InVeST 2015

14th – 16th September 2015
Hannover
THE POWER OF 5

SATIETY

In the management of obesity, SATIETY Canine and Feline are scientifically proven to:

1. Induce effective weight loss
2. Reduce begging
3. Maintain muscular mass
4. Improve quality of life
5. Stabilise weight

For more information on the ROYAL CANIN® Weight Management Programme please contact your Veterinary Business Manager.

Welcome to InVeST 2015

On behalf of the organizing committee, we are delighted to welcome you to Hannover to the 4th International Veterinary Simulation in Teaching (InVeST) Conference. We hope you find the conference informative and inspiring for your work and that you enjoy your stay in Hannover.

The aim of InVeST conferences is to encourage researchers, developers and educational institutions on simulation in teaching and use of simulation in veterinary education. Focus of this year’s InVeST is the development and effectiveness of simulators as well as teaching and communication skills.

This booklet contains information regarding:

- Program
- Keynote speakers
- Interactive Sessions
- Workshops
- Contact details
- List of delegates

We would like to thank our keynote speakers Sarah Baillie, Daryl Buss, Jane Shaw and Carol Gray for joining us. In addition, we would like to thank all workshop facilitators who make this conference excellent. Last but not least, we would like to thank all delegates for their contribution to this InVeST conference. Thank you to all of you for sharing your expertise and ideas to foster simulation in teaching and improving veterinary education.

Organizing Committee:
Marc Dilly, Silke Gaida & Simon Engelskirchen

A special thank you to our sponsors:
# TABLE OF CONTENTS

**USEFULL INFORMATION** .................................................................................................................. 1

**INTERNET ACCESS** .......................................................................................................................... 1

**FOOD** .............................................................................................................................................. 1

**CONTACT DETAILS** .......................................................................................................................... 1

**PROGRAM** ...................................................................................................................................... 2

**AREA MAP** ..................................................................................................................................... 6

**KEYNOTES:** ..................................................................................................................................... 7

**TOPIC: SKILLS + SIMULATION 1** ..................................................................................................... 9

- A synthetic abdominal model for teaching basic veterinary surgical techniques ............................ 9
- Comparison of teaching small intestinal anastomosis suturing techniques using simulated small intestine versus cadaveric small intestine to second year veterinary students ......................................................... 10
- Development and validation of a low-cost surgical simulator to teach canine ovariohysterectomy ...... 11
- Development and evaluation of a novel feline endotracheal intubation model ................................... 12
- Development of a dog simulator for ultrasonic based puncture of the urinary bladder ...................... 13
- Simulators in 1st year veterinary student clinical skills course .......................................................... 14
- Validation of a multipurpose reusable dog manikin for teaching basic diagnostic techniques .......... 14
- Validation of a simulator for the supplementary teaching of farriery skills to veterinary students ......... 15
- Development and validation of a multi-purpose equine neck model .............................................. 16
- Development of a low fidelity swine model to teach students restraint, blood sampling and giving injections ........................................................................................................................................ 17
- The use of a life-size simulator to teach venipuncture in the alpaca .................................................. 17

**TOPIC: TEACHING AND LEARNING** ............................................................................................ 18

- Validating the use of low-cost simulation models and online instructional modules to teach asepsis .... 18
- Did unsupervised practice of clinical pathology procedures in a Skills Laboratory Improve examination confidence and performance? ...................................................................................... 20
- vetPAL: A student led peer-assisted learning initiative ........................................................................ 20
- Using a video as a new tool to disseminate the best teaching alternatives to the harmful use of animals in veterinary education in Latin America .............................................................. 21
- Analyzing the demand for video material in veterinary education ..................................................... 22
- Evaluation of clinical skills training in veterinary education using audio-visual Instructional animations and low-fidelity models .................................................................................................... 23
Using computer simulation to enhance learning in a clinical skills laboratory environment
Best methods for surgical planning with 3D printing
The OPUSheep - Development of an Interactive 3-dimensional sheep ultrasound examination simulator
First veterinary simulator for the abdominal sonography of the cat – with focus on kidneys
The world’s first simulator for echocardiographic examinations in cats

Case-based e-learning model "CASUS" – “Health management in pig farms” as a complement tool in the practical veterinary education and advanced training
Conceptual design and realisation of the e-learning of the berliner kompaktkurse – evaluation of user satisfaction via online survey
The iVetSchool Application: a multimedia approach to supplementing veterinary medical student education through problem based learning
Development and evaluation of two anatomical po*t*casts for students learning the anatomy of the tongue
Development of 4D virtual farms
The global resource for online evidence-based veterinary medicine learning
Engagement, repetition and tracking: Using of a mobile device application to teach anesthesia dose, fluid and infusion calculations

Assessment of communication patterns of Canadian dairy practitioners during farm visits
Onsite communication skills education and outcomes assessment in a companion animal practice
Using standardised client simulation to improve clinical reasoning in veterinary undergraduates
Preparing veterinary students for clinical placements by embedding simulation and clinical scenarios into small group clinical skills teaching

Development of a low cost cow dystocia model
Construction and implementation of a bovine obstetrical model as an interactive teaching method for veterinary students
Validation of a bovine vascular access model for teaching students a technique for placing catheter in the auricular vein of cattle
A sheath scrape model attached to a multifunctional life size Breeding Soundness Examination (BSE) bull
Can virtual reality enhance academic success while learning about the canine stifle joint?
A new approach in anatomical teaching – Upgrading the conventional practical learning by immediate combination with modern digital teaching
Virtual 3D veterinary anatomy: Interactive learning modules
Student’s perception about harmful use of animals in Veterinary Education in Brazil
Meeting point of animal welfare and veterinary education or else. The difficulties of the clinician in the ocean of students and animals.
USEFULL INFORMATION

INTERNET ACCESS
You can access wireless internet on your laptop, tablets and smartphones.

For delegates from organisations participating in the Eduroam group, you can connect to Eduroam for the fastest internet. Please use your usual username and login from your institution.

If you do not have eduroam, web and email access will be available in all areas via “TiHo-Internet” W-Lan.
It will open automatically when you have the W-Lan active and open a browser.
The temporary account details (username and password) are attached to your delegate packs (pale blue paper) - if you need help, contact the registration desk.

FOOD
During breaks we provide coffee and snacks.
Lunch and the conference dinner on Monday at the Caballus are included in the registration cost.
For Lunch we prepare sandwiches and drinks in the foyer.

CONTACT DETAILS
Please do not hesitate to contact one of the organizing committee or a steward if you have any questions; we will be happy to help you.
## PROGRAM

**Monday 14th September**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00 – 12:30</td>
<td>Registration, Tea and Coffee and Snacks provided</td>
<td>Foyer, CSL</td>
</tr>
<tr>
<td>13:00 – 13:20</td>
<td>Welcome to InVeST 2015</td>
<td>Lecture hall, first floor</td>
</tr>
<tr>
<td>13:20 – 13:50</td>
<td>Keynote 1: How can we optimise the integration of simulation-based teaching into a veterinary curriculum? Sarah Baillie</td>
<td>Lecture hall, first floor</td>
</tr>
</tbody>
</table>
| 14:00 – 16:00| Workshop Session 1 90 min.  
Setting up an OSCE (Sarah Baillie & Alison Catterall)  
Teaching Surgical Skills in Large Animals (Dean Hendrickson)  
"Students in educational research projects" - how to turn students from consumers to creators (Renate Weller)  
Development and Fabrication Process for Practical Simulation Model (Russ Gray & Bryan Pfahl)  
Promoting effective student feedback (Sheena Warman) | Room Nr. 16  
Room Nr. 12  
Seminar room upstairs  
Room Nr. 7  
Room Nr. 9 |
| 16:00 – 16:20| Break                                                                     | Foyer, CSL                |
| 16:30 – 17:45| Interactive Session 1  
Skills & Simulation  
Carol Breadley: A Synthetic Abdominal Model for Teaching Basic Veterinary Surgical Techniques  
Stephanie Caston: Comparison of teaching small intestinal anastomosis suturing techniques using simulated small intestine versus cadaveric small intestine to second year veterinary students.  
Tatiana Motta: Development and Validation of a Low-Cost Surgical Simulator to Teach Canine Ovariohysterectomy  
Tatiana Motta: Development and Evaluation of a Novel Feline Endotracheal Intubation Model  
Simon Engelskirchen: Development of a dog simulator for ultrasonic based puncture of the urinary bladder | Lecture hall, first floor  
Chair: Dean Hendrickson |
<p>| 17:05 – 17:15| Break                                                                     | Chair: Robin Farrell       |
| 18:00        | Dinner Caballus                                                          |                           |</p>
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 – 9:00</td>
<td>Registration Tea and Coffee provided</td>
<td>Foyer, CSL</td>
</tr>
<tr>
<td>09:00 – 09:45</td>
<td><strong>Interactive Session 2</strong> Teaching and Learning</td>
<td>Lecture hall, first floor</td>
</tr>
<tr>
<td></td>
<td>Tatiana Motta: Validating the Use of Low-Cost Simulation Models and Online Instructional Modules to Teach Asepsis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Annett Annandale: Did unsupervised practice of clinical pathology procedures in a Skills Laboratory improve examination confidence and performance?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sarah Baillie: vetPAL: A student led peer-assisted learning initiative</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rosangela Gebara: Using a video as a new tool to disseminate the best teaching alternatives to the harmful use of animals in veterinary education in Latin America.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lina Müller: Analyzing the demand for video material in veterinary education</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dora Bernigau: Evaluation of clinical skills training in veterinary education using audio-visual instructional animations and low-fidelity models</td>
<td></td>
</tr>
<tr>
<td>09:45 – 10:00</td>
<td><strong>Break</strong></td>
<td></td>
</tr>
<tr>
<td>10:00 – 12:00</td>
<td><strong>Workshop session 2 90min</strong> Simulated clients: Enhance communication teaching and learning through in the moment coaching and feedback (Elpedia Artemiou &amp; Beth Dronson)</td>
<td>Room 5</td>
</tr>
<tr>
<td></td>
<td>The ethics of educational research (Carol Gray)</td>
<td>Room 16</td>
</tr>
<tr>
<td></td>
<td>Skills education in the veterinary curriculum; how to assess we get value for money? (Claudia Wolschrijn)</td>
<td>seminar room upstairs</td>
</tr>
<tr>
<td></td>
<td>Developing and maintaining clinical skills learning environments and student resources (Robin Farrell &amp; Linda Shell)</td>
<td>Room 7</td>
</tr>
<tr>
<td></td>
<td>&quot;How to create your own virtual patient&quot; Part 1 (Christin Kleinsorgen)</td>
<td>Room 9</td>
</tr>
<tr>
<td></td>
<td>&quot;Strategies and Tools for flipping Content and Encouraging Critical Thinking&quot; (Duncan Ferguson)</td>
<td>Lecture hall, first floor</td>
</tr>
<tr>
<td>12:00 – 13:00</td>
<td><strong>Lunch</strong></td>
<td>Foyer, CSL</td>
</tr>
<tr>
<td>Time</td>
<td>Session Block</td>
<td>Activity</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>13:00 – 13:30</td>
<td>Interactive Session 3</td>
<td>Skills &amp; Simulation</td>
</tr>
<tr>
<td></td>
<td>Márton Balogh</td>
<td>Using computer simulation to enhance learning in a clinical skills laboratory environment</td>
</tr>
<tr>
<td></td>
<td>Robert Malinkowski</td>
<td>Best Methods for Surgical Planning with 3D Printing</td>
</tr>
<tr>
<td></td>
<td>Annett Annandale</td>
<td>The OPUSheep - Development of an interactive 3-dimensional sheep ultrasound examination simulator</td>
</tr>
<tr>
<td></td>
<td>Stefanie Weber</td>
<td>First veterinary simulator for the abdominal sonography of the cat – with focus on kidneys</td>
</tr>
<tr>
<td></td>
<td>Elisabeth Zandt</td>
<td>The world's first simulator for echocardiographic examinations in cats</td>
</tr>
<tr>
<td>13:45 – 15:45</td>
<td>Workshop Session 3</td>
<td>Clinical Skills Model Buffett and Tours to the Clinical Skills Lab</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Rikke Langenbæk &amp; Marc Dilly)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Introduction to Games Based Learning</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The Layered Learning Model and Game Development</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Eric Bauman &amp; Dave Pederson)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Optimising Small Group Teaching</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Catriona Bell)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Creating a simulation case under aspects of realism and cost</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Katja Anne Dannenberg &amp; Fabian Stroben)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;How to create your own virtual patient&quot; Part 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Christin Kleinsorgen)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;Cultivating a Growth Mindset: Enhancing Receptivity to Feedback&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Jane Shaw)</td>
</tr>
<tr>
<td>16:00 – 16:30</td>
<td>Keynote 2: Internationalization of veterinary education</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Daryl Buss</td>
<td>Lecture hall, first floor</td>
</tr>
<tr>
<td>16:30 – 17:15</td>
<td>Interactive Session 4</td>
<td>E-learning</td>
</tr>
<tr>
<td></td>
<td>Florian Spiegel</td>
<td>Case-based e-learning model &quot;CASUS&quot; &quot;Health management in pig farms&quot; as a complement tool in the practical veterinary education and advanced training</td>
</tr>
<tr>
<td></td>
<td>Nicole Marquardt</td>
<td>Conceptual design and realisation of the e-learning of the berliner kompaktkurse – evaluation of user satisfaction via online survey</td>
</tr>
<tr>
<td></td>
<td>Jennifer Roberts</td>
<td>The VetSchool Application: A Multimedia Approach to Supplementing Veterinary Medical Student Education Through Problem Based Learning</td>
</tr>
<tr>
<td></td>
<td>Dora Bernigau</td>
<td>Development and evaluation of two anatomical po“t”casts for students learning the anatomy of the tongue</td>
</tr>
<tr>
<td></td>
<td>Stuart Barber</td>
<td>Development of 4D virtual farms</td>
</tr>
<tr>
<td></td>
<td>Sarah Baillie</td>
<td>The Global Resource for Online Evidence-Based Veterinary Medicine Learning</td>
</tr>
<tr>
<td>17:15 – 18:00</td>
<td>Showroom for Model and Simulator presentation</td>
<td></td>
</tr>
<tr>
<td>19:00</td>
<td>Dinner Meyers Lebenslust</td>
<td></td>
</tr>
</tbody>
</table>
**Wednesday 16th September**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 – 9:00</td>
<td><strong>Registration</strong></td>
<td>Foyer, CSL</td>
</tr>
<tr>
<td></td>
<td><strong>Tea and Coffee provided</strong></td>
<td></td>
</tr>
<tr>
<td>09:15 – 09:45</td>
<td><strong>Interactive Session 5</strong>  <strong>Communication</strong></td>
<td>Lecture hall, first floor</td>
</tr>
<tr>
<td></td>
<td>Caroline Ritter: Assessment of communication patterns of Canadian dairy practitioners during farm visits</td>
<td>Chair: Elpida Artemiou</td>
</tr>
<tr>
<td></td>
<td>Jane Shaw: Onsite Communication Skills Education and Outcomes Assessment in a Companion Animal Practice</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Claire Vinten: Using standardised client simulation to improve clinical reasoning in veterinary undergraduates</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Catriona Bell: Preparing veterinary students for clinical placements by embedding simulation and clinical scenarios into small group clinical skills teaching</td>
<td></td>
</tr>
<tr>
<td>09:45 – 10:15</td>
<td><strong>Keynote 3:</strong> Building a Communication Curriculum: One block at a time</td>
<td>Lecture hall, first floor</td>
</tr>
<tr>
<td></td>
<td>Jane Shaw</td>
<td></td>
</tr>
<tr>
<td>10:15 – 10:30</td>
<td><strong>Break</strong></td>
<td></td>
</tr>
<tr>
<td>10:30 – 11:00</td>
<td><strong>Interactive Session 6</strong>  <strong>Skills and Simulation</strong></td>
<td>Lecture hall, first floor</td>
</tr>
<tr>
<td></td>
<td>Annett Annandale: Development of a low cost cow dystocia model</td>
<td>Chair: Duncan Ferguson</td>
</tr>
<tr>
<td></td>
<td>Laura Schüller: Construction and implementation of a bovine obstetrical model as an interactive teaching method for veterinary students</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hannah Giese: Validation of a Bovine Vascular Access Model for Teaching Students a Technique for Placing Catheter in the Auricular Vein of Cattle</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Annett Annandale: A sheath scrape model attached to a multifunctional life size Breeding Soundness Examination (BSE) bull</td>
<td></td>
</tr>
<tr>
<td>11:30 – 11:45</td>
<td><strong>Break</strong></td>
<td></td>
</tr>
<tr>
<td>11:45 – 12:15</td>
<td><strong>Interactive Session 7</strong>  <strong>Skills and Simulation</strong></td>
<td>Lecture hall, first floor</td>
</tr>
<tr>
<td></td>
<td>Tatiana Motta: Can Virtual Reality Enhance Academic Success while Learning About the Canine Stifle Joint?</td>
<td>Chair: Carol Gray</td>
</tr>
<tr>
<td></td>
<td>Inga Wölfel: A new approach in anatomical teaching - Upgrading the conventional practical learning by immediate combination with modern digital teaching</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Patricia Schrock: Virtual 3D Veterinary Anatomy: Interactive Learning Modules</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Julia Matera: Student’s perception about harmful use of animals in Veterinary Education in Brazil</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Julianna Thuróczy: Meeting point of animal welfare and veterinary education or else. The difficulties of the clinician in the ocean of students and animals.</td>
<td></td>
</tr>
<tr>
<td>12:15 – 12:30</td>
<td><strong>Closing remarks – Marc Dilly</strong></td>
<td></td>
</tr>
<tr>
<td>12:30 – 13:30</td>
<td><strong>Lunch</strong></td>
<td></td>
</tr>
<tr>
<td>14:00</td>
<td><strong>Guided tours to the– Clinic for Cattle, Clinic for Swine, Small Ruminants and Forensic Medicine, Clinic for Horses, Clinic for Small Animals</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Excursion to the state stad farm Celle</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Guided city tour Hannover</strong></td>
<td></td>
</tr>
</tbody>
</table>
You'll find the registration desk in the foyer.

You'll find the lecture hall upstairs on the first floor. Please use the stairs near the toilets.

The seminar room upstairs is on the second floor. Please use the same stairs.
KEYNOTES:

1. How can we optimise the integration of simulation-based teaching into a veterinary curriculum?

(Sarah Baillie)
Simulations and models designed to aid learning and teaching in veterinary medical education are not new concepts. However, simulation, teaching models, and other innovations have blossomed in recent years, in part due to an increased emphasis on promoting Day 1 skills of the graduating veterinarian. That emphasis has been a response to feedback from the profession of veterinary medicine around the world, but it has also become a requirement of many accreditors of veterinary medical educational programs, including the Council on Education (CoE) of the American Veterinary Medical Education. The number of schools and colleges of veterinary medicine accredited by the CoE has increased, paralleled by an increasingly international composition of membership in the Association of American Veterinary Medical Colleges (AAVMC). That internationalization, combined with many other factors, has resulted in greater communication among veterinary medical educators. This meeting is an excellent example of that international collaboration and the sharing of information. The AAVMC’s Journal of Veterinary Medical Education (JVME) is proud of its role in sharing and promoting innovation and discovery in veterinary medical education. Simulation systems, along with teaching & learning aids in general, have grown in sophistication and effectiveness over the years. Consequently, the role of the JVME and meetings such as InVeSt have become ever more important as they move beyond the level of describing new innovations in simulation and modelling to an increasing focus on critical testing of their effectiveness, compared to one another as well as compared to traditional learning and teaching systems. This is an exciting time in veterinary medical education as we continue to see ever more creative and novel teaching and learning aids, accompanied by critical outcomes analyses. However, there is much more to be done. For example, student learning includes many areas, beyond clinical instruction and clinical skills, that would greatly benefit by high quality simulation and modelling. Due to the intense focus on the manipulative skills that tend to be the primary focus of Day 1 skills, however, the creation and refinement of simulations and models that facilitate conceptual understanding of important basic science principles has been relatively underserved. We are charged with educating veterinarians as health care professionals in an age of One Health. If we are to meet that obligation, we must balance the need of our graduates for manipulative and diagnostic skills with the sound bases in science and biology that are expected of a modern health care professional. Novel, effective simulation and models have an important role to play in that educational process, and I look forward to a continuum of such learning aids that will span the entire veterinary medicine educational program.s designed to aid learning and teaching in veterinary medical education are not new concepts. However, simulation, teaching models, and other innovations have blossomed in recent years, in part due to an increased emphasis on promoting Day 1 skills of the graduating veterinarian. That emphasis has been a response to feedback from the profession of veterinary medicine around the world, but it has also become a requirement of many accreditors of veterinary medical educational programs, including the Council on Education (CoE) of the American Veterinary Medical Education. The number of schools and colleges of veterinary medicine accredited by the CoE has increased, paralleled by an increasingly international composition of membership in the Association of American Veterinary Medical Colleges (AAVMC). That internationalization, combined with many other factors, has resulted in greater communication among veterinary medical educators. This meeting is an excellent example of that international collaboration and the sharing of information. The AAVMC’s Journal of Veterinary Medical Education (JVME) is proud of its role in sharing and promoting innovation and discovery in veterinary medical education. Simulation systems, along with teaching & learning aids in general, have grown in sophistication and effectiveness over the years. Consequently, the role of the JVME and meetings such as InVeSt have become ever more important as they move beyond the level of describing new innovations in simulation and modelling to an increasing focus on critical testing of their effectiveness, compared to one another as well as compared to traditional learning and teaching systems. This is an exciting time in veterinary medical education as we continue to see ever more creative and novel teaching and learning aids, accompanied by critical outcomes analyses. However, there is much more to be done. For example, student learning includes many areas, beyond clinical instruction and clinical skills, that would greatly benefit by high quality simulation and modelling. Due to the intense focus on the manipulative skills that tend to be the primary focus of Day 1 skills, however, the creation and refinement of simulations and models that facilitate conceptual understanding of important basic science principles has been relatively underserved. We are charged with educating veterinarians as health care professionals in an age of One Health. If we are to meet that obligation, we must balance the need of our graduates for manipulative and diagnostic skills with the sound bases in science and biology that are expected of a modern health care professional. Novel, effective simulation and models have an important role to play in that educational process, and I look forward to a continuum of such learning aids that will span the entire veterinary medicine educational program.

2. Internationalization of veterinary education

(Daryl Buss)
Simulations and model Simulations and models designed to aid learning and teaching in veterinary medical education are not new concepts. However, simulation, teaching models, and other innovations have blossomed in recent years, in part due to an increased emphasis on promoting Day 1 skills of the graduating veterinarian. That emphasis has been a response to feedback from the profession of veterinary medicine around the world, but it has also become a requirement of many accreditors of veterinary medical educational programs, including the Council on Education (CoE) of the American Veterinary Medical Education. The number of schools and colleges of veterinary medicine accredited by the CoE has increased, paralleled by an increasingly international composition of membership in the Association of American Veterinary Medical Colleges (AAVMC). That internationalization, combined with many other factors, has resulted in greater communication among veterinary medical educators. This meeting is an excellent example of that international collaboration and the sharing of information. The AAVMC’s Journal of Veterinary Medical Education (JVME) is proud of its role in sharing and promoting innovation and discovery in veterinary medical education. Simulation systems, along with teaching & learning aids in general, have grown in sophistication and effectiveness over the years. Consequently, the role of the JVME and meetings such as InVeSt have become ever more important as they move beyond the level of describing new innovations in simulation and modelling to an increasing focus on critical testing of their effectiveness, compared to one another as well as compared to traditional learning and teaching systems. This is an exciting time in veterinary medical education as we continue to see ever more creative and novel teaching and learning aids, accompanied by critical outcomes analyses. However, there is much more to be done. For example, student learning includes many areas, beyond clinical instruction and clinical skills, that would greatly benefit by high quality simulation and modelling. Due to the intense focus on the manipulative skills that tend to be the primary focus of Day 1 skills, however, the creation and refinement of simulations and models that facilitate conceptual understanding of important basic science principles has been relatively underserved. We are charged with educating veterinarians as health care professionals in an age of One Health. If we are to meet that obligation, we must balance the need of our graduates for manipulative and diagnostic skills with the sound bases in science and biology that are expected of a modern health care professional. Novel, effective simulation and models have an important role to play in that educational process, and I look forward to a continuum of such learning aids that will span the entire veterinary medicine educational program.
3. Building a Communication Curriculum: One block at a time

(Jane Shaw)
The driving goal of the Colorado State University Communication Curriculum is to graduate career-ready veterinarians with “day-one skills” to serve and work with diverse clients, animals and team members. In order to meet this goal, the curriculum design is based on:

Adult Learning Principles
Applying adult learning theory has been instrumental to teaching professional students, who are already accomplished when they enter the program. Problem-based learning creates an active and relevant learning environment for generation Y students. We strive to engage students, create an active learner-centered environment, elicit students’ perspectives, and capitalize on students’ pre-existing knowledge and experiences as a foundation on which to build new skills.

Active Learning
The in-classroom communication modules are consciously designed with 1/3 focus on presentation of content and 2/3 time spent conducting exercises using video demonstration, small group discussion, clinician case presentations and/or role-playing. In junior practicum we flip the classroom, requiring students to complete pre-reading and take a quiz on the skills, so that they come into class with a base knowledge level. We then optimize the classroom time by practicing and applying the skills to prepare for the simulated client laboratory.

Experiential Learning
We utilize experiential learning techniques in the communication laboratory, which creates an opportunity for students to interact with simulated clients, practice their clinical interviewing skills, receive feedback from their peers, client and coach, and reflect on their communication through watching a videotape of their performance. Although challenging, stretching students beyond their comfort zone by interacting with simulated clients in a safe and supportive environment reveals powerful lessons often from the client’s viewpoint.

Theoretical and Evidence-Based
The communication courses are skills-based and theoretically pinned to the educational framework of the Calgary-Cambridge Guide. The focus is on both what skills can be used each phase of the clinical interview and how to apply these skills in the clinical setting with clients. This approach creates a strong communication toolbox that can be carried to each consultation, implemented in diverse situations and adapted to individual style.

Integration throughout the Curriculum
An effective communication curriculum incorporates opportunities to practice skills throughout all 4 years of the program. In addition to building skills over time and increasing the level of difficulty, integration of communication skills training throughout the curriculum enables reiteration of concepts and enhances learning, long-term memory and overall retention.

4. NUVACS – the communication skills collective 2002-2015

(Carol Gray)
The National Unit for the Advancement of Veterinary Communication Skills was set up in the United Kingdom in 2002. Its aim: to ensure that communication skills were included in every veterinary school’s curriculum, with a shared approach to teaching and assessment. At the time of its inception, there were 7 veterinary schools in the United Kingdom and Ireland. All sent representatives to NUVACS meetings and provided training for staff in facilitation techniques. Since the beginning, two new schools have joined the venture. A measure of the collective’s success is the fact that in the present day, nobody asks whether we should include communication skills in our veterinary teaching; instead, they ask: “How should we teach this subject?”

A core communications curriculum has been developed, and shared resources such as communication scenarios and OSCE stations, together with DVDs for teaching and training examiners and students, are available to all.

This talk will look at the history of what was considered to be one of the first successful collaborations involving all of the UK and Irish veterinary schools, taking it up to the present day and perhaps looking ahead to where it can go in the future. It will also share the pitfalls and successes of such a collaborative venture.
**TOPIC: SKILLS + SIMULATION 1**

**01**

A synthetic abdominal model for teaching basic veterinary surgical techniques

Carol Bradley1, Glenn Edwards2, A. Carlson1

1University of Melbourne, Faculty of Veterinary & Agricultural Sciences, Melbourne, Australia
2Charles Sturt University, Wagga Wagga, Australia

As with most veterinary schools within Australia, the authors were questioning the ethical validity and cadaver sustainability, together with the increasing financial burden to veterinary faculties on the continued use of fresh cadaveric tissue in the introduction of basic surgical techniques (Day 1 skills) to our DVM3 cohort.

This project looked at the specific outcomes required for basic day one surgical competency. The outcomes identified included aseptic technique, preparation of oneself and the patient, surgical draping, instrument handling, completion of a surgical incision through to the abdominal cavity and surgical closure of the abdominal incision, using a three layer technique.

Once outcomes were identified, the authors looked at traditional teaching methods on fresh cadaveric tissue or cadaver's and considered whether a synthetic model could replace some of the practical classes that traditionally used fresh cadavers and if so, could it give an equal or reasonable learning experience to the novice surgeon.

Therefore the aim of the project was to develop a cost effective synthetic model, replicating the visual and tactility of a midline abdominal incision and closure, representative of a canine patient with the potential for placement of cadaveric material within its boundaries.

A suture training model (Figure 1) constructed of a commercially available polyurethane foam wound dressing (Allevyn) was identified as being an ideal dermis and epidermis layer with the added value of having an outer water-proof layer which would allow students to practice patient preparation technique.

![Figure 1](image1)

A variety of synthetic materials were tested for visual representation, texture and robustness for each subsequent layer required.

A loosely woven material resembling fat and interspersed with red silicone was selected for the subcutaneous tissue; then using varying amounts of the material we enabled changes to its thickness and number of linea blood vessels.

The body wall is composed of two pieces of dense foam “rectus muscles” enclosed in rip-proof nylon material to replicate the internal and external rectus sheaths with a small gap in between the foam pieces to imitate the linea alba. This entire piece was loosely glued to the “skin” layer.

The addition of a Chinese food container beneath the model created an abdominal cavity that could hold cadaveric tissue and then integrated into a soft toy mannequin.

The model consists of a variety of synthetic materials selected on the basis of physical characteristics and suture pull-out strength, to replicate the handling and mechanical properties of the skin, subcutaneous tissues, and body wall, including the linea alba, internal and external rectus sheaths and rectus abdominus muscles.

The use of the model has been evaluated by students during practical classes in parallel with traditional cadaveric materials, and has been widely accepted as a model which can provide an opportunity to practice basic surgical techniques both within and outside the surgical teaching environment in a cost-effective manner.
This model has been shown to provide an acceptable alternative to cadaveric animal tissues in an integrated teaching program enabling the students to develop basic surgical techniques, thus reducing the number of animal required in the surgical teaching laboratory. The use of this model allows for early exposure to skills training ensuring that basic skills are mastered prior to exposure to valuable animal tissues and then live animals in neutering clinics and clinical practice. The model is of additional value within the Clinical Skills Centre where students are self-directed and peer reviewed in their learning prior to the clinical skills hurdle exam in DVM3.

Corresponding author:
Carol Bradley, University Of Melbourne, Faculty of Veterinary & Agricultural Sciences, 250 Princes, Hwy, 3030 Werribee, Australia, cbrad@unimelb.edu.au

DOI: 10.3205/15invest01, URN: urn:nbn:de:0183-15invest014

02
Comparison of teaching small intestinal anastomosis suturing techniques using simulated small intestine versus cadaveric small intestine to second year veterinary students

Stephanie S. Caston1, Jennifer A. Schleining1, Jared A. Danielson1, Eric L. Reinertson1, Kevin D. Kersh1
1Departments of Veterinary Clinical Sciences, Iowa State University, Ames, Iowa, United States
2Veterinary Pathology, Iowa State University, Ames, Iowa, United States
3Veterinary Diagnostic and Production Animal Medicine, Iowa State University, Ames, Iowa, United States

Yearly surveys of practices employing Iowa State University College of Veterinary Medicine graduates consistently rate proficiency in clinical skills as “very important” when practices are considering hiring a new associate; second only to communication skills. However, the cost of providing certain clinical skills training on live animals or tissues from live animals in the professional curriculum is becoming prohibitive. Teaching appropriate suture patterns on simulated tissue could allow students to be better prepared for the live animal experience, have more confidence when first presented with live animal surgery, and possibly reduce the number of live animals needed for the student to gain proficiency in intestinal suture placement [1]. This could directly reduce the cost of teaching surgical skills in the veterinary program as well as reduce the number of terminal animals that are currently utilized to provide learning specimens for surgical skills laboratories.

It is hypothesized that students who are trained on simulated small intestine to correctly place a Gambee suture pattern will perform as well as students who are trained in the traditional method of Gambee suture placement using cadaveric small intestine.

A random subset of veterinary students in the second year of the professional curriculum at Iowa State University College of Veterinary Medicine who are enrolled in the second year course Principles of Surgery Laboratory will be identified to participate in this study. Students may opt out of the study at any time. As part of a regularly scheduled laboratory introducing the surgical procedure of small intestinal anastomosis students will be divided into two groups: 1. Anastamosis utilizing simulated small intestine and 2. Anastamosis utilizing the current protocol of cadaveric small intestinal tissue harvested from euthanized horses. An instructor (ELR) will demonstrate how to perform intestinal anastomosis utilizing visual training aids and verbal communication. Each student will then be released to surgery tables supplied with the appropriate small intestinal segment where they will practice the Gambee pattern to complete intestinal anastomosis while the same instructor (ELR) provides supervision of technique. Gambee pattern placement will then be assessed by blinded investigators (JAS, KDK, and SSC) in the subsequent surgery laboratory one week later utilizing a rubric developed and validated for surgical skills assessment.

Three blinded investigators, who are board-certified in surgery, will provide assessment of each student using the following criteria (Modified Global Rating Index for Technical Skills (GRITS) from [2]):

- Respect for Tissue – Measures appropriate use of tissue handling
- Time and Motion – Measures efficiency of suture placement and appropriate motion of instrumentation
- Instrument Handling/Knowledge – Measures appropriate use of surgical instruments
- Flow of Operation – Measures progression of the anastomosis procedure
- Knowledge of Specific Procedure – Measures procedural components of small intestinal anastomosis

Inter rater reliability will be calculated using an intra-class correlation. Descriptive statistics (mean, median, standard deviation, minimum, and maximum) will be calculated for each group. Scores between groups will be compared using a Mann–Whitney U test, with p < .05 used for significance testing. Analyses will be performed using IBM SPSS Version 21.

[This study will be completed by April 8, 2015 and data analysis will be completed by mid-May 2015.]

References
Development and validation of a low-cost surgical simulator to teach canine ovariohysterectomy

Tatiana Motta, Benjamin Carter, Catrina Silveira, Lawrence Hill, Mary McLoughlin
Ohio State University, Columbus, United States

Basic surgical skill has been shown to be considered the most important area of knowledge in new graduates by over half of veterinarians. At The Ohio State University College of Veterinary Medicine, the curriculum of the first two years is based predominantly in lecture and supplemental material with minimal hands-on experience. As a result, third year students often lack surgical skill and experience high levels of anxiety when entering operative procedure labs. In this study, we aim to test the hypothesis that the utilization of low cost surgical simulation models can help to improve the performance and confidence of students, while decreasing students’ perception of stress and anxiety.

To investigate this, a low-cost surgical simulator for canine ovariohysterectomy was created. This model allows students to practice surgical skills including approach and incision, identification of relevant anatomic structures, three clamp technique, disruption of the suspensory ligament, pedicle and uterine body ligation, and closure. The model base is reusable and contains representations for the body cavity, kidneys, descending colon, bladder, and ureters. The replaceable reproductive tract for the model includes representations for the vagina, cervix, uterine body, uterine horn, patent uterine artery, ovary, ovarian pedicle, suspensory ligament and mesometrium. Twenty-four students volunteered to participate, all of whom attended a lecture and had unlimited access to supplemental materials and videos online. Half of the students were chosen at random to also receive a low cost simulator, surgical instruments, and sufficient suture material to practice the procedure up to 5 times. The study culminated for the student volunteers by performing the surgical procedure on a cadaver.

Surgical performance of each student was graded by faculty members using recorded videos and a rubric created specifically for this study. A quiz and questionnaire was also completed by the participants to evaluate the students’ knowledge, performance, comfort level, and perceived model efficacy.

No significant difference was found for the quiz scores of students trained with the simulator compared to the control group. Students in the control group spent the most time watching the videos. Students with the simulator spent 52% of their total studying time using the model. Instructional video and use of the surgical simulator were considered to be the most helpful teaching aid by 100% and 89% of the students, respectively (Figure 1). All students agreed that using the simulator increased their confidence, and most students agreed that their performance was improved and their stress level was decreased (Figure 2). Data analysis is ongoing. We expect to find that students who utilized the surgical simulator will display higher levels of surgical skill compared to students in the control group.
Development and evaluation of a novel feline endotracheal intubation model

Tatiana Motta, Erin Meola, Catrina Silveira, Mary McLoughlin, Lawrence Hill
Ohio State University, Columbus, United States

Intubation of the veterinary patient is a critical step in airway management during anesthesia as well as in emergency care. It requires ability to manipulate multiple tools at once in a limited spatial area with limited time. Feline patients have the added complication of a narrow, easily damaged glottis and overly sensitive larynx. Excessive manipulation of the larynx can induce laryngospasm making intubation more difficult. It is important for veterinary students in training to be comfortable and proficient when intubating felines to avoid damage to the respiratory tract and potentially save lives in emergency situations.

The objectives of this study were to: (1) create an intubation model specific to felines; (2) validate the model’s efficacy in training 4th year veterinary students; (3) evaluate student’s perception regarding the use of this model as a training aid.

Thirty senior students undergoing shelter surgery rotation were randomly assigned to the control or model group. Students in the control group performed routine feline intubation during their rotation. Students in the model group had access to an instructional video and the feline intubation model. These students were allowed to use the model to practice as many times as wanted prior to a routine live feline intubation.

Student’s success rate and time to complete task were recorded during live intubation throughout the 2-week rotation. Students in both groups answered a questionnaire to assess individual’s prior experience and confidence level with feline intubation. Students in the model group also answered questions rating the perceived efficacy of the feline intubation simulation model. Data collection and interpretation is ongoing. We expect to find a significant difference in student’s success rate, time of task and confidence levels for individuals the model group compared to the control group.
References


Corresponding author:
Assistant Professor Tatiana Motta, Ohio State University, 601 Vernon Tharp St., 43210 Columbus, USA, motta.13@osu.edu

DOI: 10.3205/15invest04, URN: urn:nbn:de:0183-15invest04

05
Development of a dog simulator for ultrasonic based puncture of the urinary bladder

Simon Engelskirchen1, John Rosenthal1, Stephan Hungerbuehler2, Marc Dilly1
1University of Veterinary Medicine Hannover, Foundation, Clinical Skills Lab, Hannover, Germany
2University of Veterinary Medicine Hannover, Foundation, Clinic for Small Animals, Hannover, Germany

For significant urine analysis the sample has to be devoid of contamination. Ultrasonic based puncture of the urinary bladder (cystocentesis) is a standardised procedure to collect such a sample [1]. Relocation of bacteria from the lower urinary tract into the bladder as found after catheter placement can be avoided [2]. The opportunities to practice cystocentesis are limited during study. To improve training of this skill a simple urinary bladder simulator for “cystocentesis” was created at the Clinical Skills Lab of the University of Veterinary Medicine Hannover. The intention was to create a cost effective simulator to train and assess students sample collection of urine under ultrasonic control.

A stuffed toy dog (IKEA) was used as the external cover of the simulator (Figure 1). The abdomen is represented by a compact multilayer silicon package. Inside the silicon package a fluid filled cavity simulates the “urinary bladder”. Using an attached drip infusion set (e.g. NaCl-solution) the cavity can be refilled. In contrast to a real abdomen the simulator shows no other abdominal structures than the “bladder”. During the last year of study, students participating in ultrasound examinations at a traineeship in the clinic for small animals. At the end of the traineeship students have to perform ultrasonic based “cystocentesis” in an objective structured clinical examination (OSCE) on the simulator. At the OSCE station binary checklists (yes/no) and an ultrasound device (M5Vet, Mindray) with ultrasound probe (5-8 MHz) were used.

Results of the OSCE station “cystocentesis” showed 80% (n=68) of the students passed this OSCE station. 82% could display the needle during puncture and about 74% of students successfully punctured the bladder and collected a sample. 25% were not able to demonstrate the “urinary bladder”. Almost no one modified the frequency (to 8 MHz) on the ultrasonic device to adjust the depiction. The simulators production takes about four hours, including the sewing of the stuffed dog and manufacturing the silicon package. The costs of material are approximately 50 .

Students get immediate feedback for the performance of a “cystocentesis” under ultrasound control. The simulator can be easily produced on low-cost level. Due to the use of a stuffed toy dog, one limitation of the simulator is the correct
Simulators in 1st year veterinary student clinical skills course

Tamy Frank-Cannon
Texas A&M University, College Station, TX, United States

Clinical Correlates in the 1st year of the DVM program at Texas A&M University introduces the veterinary student to clinical problem solving and aims to teach basic clinical skills such as history taking, physical exam and basic technical skills such as handling and administering medications, venipuncture & intravenous catheter placement, and instrument handling. In recent years simulators have been added to the course to give the students a hands on opportunity to learn practice these skills. Silicone based subcutaneous injection models that allow for tenting of skin have been developed as well as models that provide a resistance to injection similar to muscle tissue for intramuscular injections. These models are used to teach syringe and needle handling as well as introducing the student to giving subcutaneous and intramuscular injections. Intravenous models for the canine cephalic vein and equine jugular vein are used to teach venipuncture and IV catheter placement. In spring 2015 a canine saphenous vein model was also developed and introduced to the course. A variety of suture models, both silicone based and fabric based are made in house and used to teach students basic instrument handling with a particular focus on forceps and ringed instruments as the students learn and practice simple interrupted and continuous suture patterns. The most recent simulator addition to the course has been a feline neuter model to teach and allow repeated practice of hand and instrument based hemostatic knot techniques.

Validation of a multipurpose reusable dog manikin for teaching basic diagnostic techniques

Lane Anderson, Jacqueline Whittemore
University of Tennessee, College of Veterinary Medicine, Knoxville, United States

Many veterinary schools teach basic diagnostic skills using live dogs. The purpose of this study was to validate a multipurpose manikin for teaching lymph node aspiration (FNA), venipuncture, cephalic venous catheterization, and cystocentesis.

Manikins with replaceable lymph nodes, venous systems and urinary bladders were developed. Undergraduate students were prospectively enrolled and stratified by veterinary experience prior to randomization to two groups (live animal or manikin). Groups were trained in FNA, cephalic and jugular venipuncture, intravenous catheterization, and cystocentesis over 5 weeks. Training included a written description of the technique, a training video, and a hands-on laboratory. The next week, participants were scored on performance of the previous week’s skill on a live animal using a standardized rubric by reviewers blinded to group. Six weeks later, assessment was repeated for all skills. Scores were compared between groups and timepoints by repeated-measures ANOVA. P<0.05 was significant. Table 1

Twenty-six subjects were enrolled. There were no significant differences in scores for any of the skills between the groups immediately following or 6 weeks after training (see table for median scores).
Initial proficiency and short-term retention of clinical skills do not differ for students trained using a manikin versus a live dog. Therefore manikins are a viable training method to decrease animal use.

<table>
<thead>
<tr>
<th></th>
<th>FNA</th>
<th>Cephalic venipuncture</th>
<th>Jugular venipuncture</th>
<th>Intravenous catheterization</th>
<th>Cystocentesis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initial</td>
<td>Repeat</td>
<td>Initial</td>
<td>Repeat</td>
<td>Initial</td>
</tr>
<tr>
<td>Manikin</td>
<td>9/9</td>
<td>8/9</td>
<td>8/9</td>
<td>9/9</td>
<td>8/9</td>
</tr>
</tbody>
</table>

Table 1

DOI: 10.3205/15invest07, URN: urn:nbn:de:0183-15invest071

08 Validation of a simulator for the supplementary teaching of farriery skills to veterinary students

Johanna Sharples, Renate Weller, Peter Day
Royal Veterinary College, London, United Kingdom

Veterinary graduates in the United Kingdom are required to be competent in a number of day one skills, according to the Royal College of Veterinary Surgeons (RCVS). Students must develop these skills during intra or extra mural rotations or in university clinical skills centres. However, due to multiple reasons these opportunities can prove limited.

The aim of this project was to develop and validate a multi-purpose equine foot simulator. The simulator will provide a safe and realistic environment for undergraduate veterinary students to practice day one skills involving the equine foot. It was developed by modifying a commercially available hinged-leg model named the “Blacksmith Buddy” (Champagne Horseshoe Company, Arcadia, United States of America). Students could thereby use the simulator for practicing: the use of hoof testers, shoe removal, paring and rasping the hoof and hoof bandaging. Instructional sheets were designed to accompany the simulator, and the availability of the simulator in the Clinical Skills Centre (CSC), was advertised to clinical students via mass e-mail.

To validate the simulator as an effective teaching aid, its effect on student’s competency to use hoof testers and student’s opinion of the simulator was determined. 246 fourth year Royal Veterinary College (RVC) students were examined on using hoof testers, during their formative Objective Structured Practical Veterinary Examinations (OSPVE). Results were compared between students who had used the simulator and those who had not. An online questionnaire was then sent out, asking students about their previous experience, their experience of the OSPVE and their opinions of the simulator, if they had previously used it.

Overall, 58.9% of students passed this OSPVE station. 15% had used the simulator prior to the examination, 85% had not used the simulator. There was not a statistically significant difference in OSPVE results between the two groups (p=0.53). There was a significant relationship between the hoof tester OSPVE results and students wanting to go into equine practice (p=0.02), being confident performing the OSPVE (p=0.02), and wanting more opportunities to practice (p=0.04). Additionally, students who had used the simulator were more likely to assess their skills for using hoof testers as adequate (p=0.03).

The study concludes that use of the simulator improved students’ self-assessment of their skills for using hoof testers and that students who were confident in their skills were more likely to pass the hoof tester OSPVE.

Acknowledgements: The authors would like to thank the Royal Veterinary College’s Animal Care Trust for generously funding this project.

DOI: 10.3205/15invest08, URN: urn:nbn:de:0183-15invest088
Development and validation of a multi-purpose equine neck model

Julie Williamson, John Dascania, Undine Christmann, Jason Johnson, Bradley Rohleder, Lydia Titus
Lincoln Memorial University College of Veterinary Medicine, Harrogate, TN, United States

Simulation allows a low-stakes, humane alternative to practicing clinical skills on live animals. Models facilitate deliberate practice and mastery learning which require students to reach a pre-determined level of competence. Veterinary educators are challenged because only a few commercially models are available for teaching medical and surgical skills in the horse. Models created in-house are an alternative to commercial models and may offer the advantage to be smaller, cheaper, and allow training of a larger number of skills. This poster follows the development of a novel equine neck model that allows students to practice medical tasks such as phlebotomy and intravenous, intramuscular, and subcutaneous injections as well as surgical tasks such as making and suturing skin incisions. Validation testing for phlebotomy and intramuscular (IM) injection was performed by randomly assigning students to one of two educational intervention groups. Both groups viewed a 30-minute multimedia presentation on large animal phlebotomy and injections. Immediately following this presentation, group A participated in a structured, 90-minute laboratory session utilizing the equine neck model (Figure 1) to perform phlebotomy and IM injections while group B simultaneously participated in an identical laboratory session that used equine cadaver necks on which the jugular vein had been filled with artificial blood (Figure 2). One week later students were videotaped performing phlebotomy and IM injection on live horses. Videotapes were reviewed by an expert who was blinded to student identity and group participation. The students’ performance was scored based on the completion of different steps required for each procedure and on their overall ability to complete the procedure. Student performance was compared between the 2 groups and also by taking into account previous experience. In addition, the model was assessed by a group of veterinarians for features including realism, presence of landmarks, and tactile features of the model. The equine neck model shows promise for training veterinary students, and small modifications to the model are planned according to study results.

Figure 1: Equine neck model 1

Figure 2: Equine neck model 2

Corresponding author:
Julie Williamson, Lincoln Memorial University College of Veterinary Medicine, 210 Washington St, 37752 Harrogate, United States, julie.williamson@lmunet.edu
DOI: 10.3205/15invest09, URN: urn:nbn:de:0183-15invest091
Development of a low fidelity swine model to teach students restraint, blood sampling and giving injections

Christopher Sommer, Lucas Weber, Lisa Beffort, Christine Weiß, Christina Beitz-Radzio, Sabine Ramspott, Nicole Übel
Faculty of Veterinary Medicine, Ludwig-Maximilians-Universität München, Munich, Germany

The model was developed within a student research project to provide an opportunity for students to practice restraining pigs with a snare, taking blood samples out of the jugular vein and giving injections into the neck muscle. For this purpose we obtained a two-piece plaster imprint of the head, neck and parts of the forelegs of pig’s cadaver and subsequently casted it with silicone. A plastic hose was used to simulate the jugular vein. To imitate the blood flow colored water was filled into an infusion bottle that was connected to the “jugular vein”. A closed system was created by attaching an elastic balloon to the other end of the tube, which also served to pump the “blood” back into the infusion bottle. The injection site was padded with a piece of foam rubber on the inner surface of the swine model. Different types of foam rubber were tested to find the one that imitated the resistance of the tissue during injection best. The use of the foam rubber also provided an easy possibility to renew the material of the injection site when damaged.

Disadvantages of our first models were a rough surface, the rigidity of the plastic hose and the fact that the plastic shape could only be used once.

In our second model we took a two-piece plaster imprint again and then used a pan to get a plaster mould and covered it with acrylic lacquer to obtain a mould that could be used several times. A silicone hose was used for the jugular vein.

To simulate a real-life situation, we are planning to implement two more features: The model will be installed on a mobile board, so that it can be moved by an assistant and has to be caught by the student first. As a next step we are planning to integrate a sound system into the model so that different volume levels of a pig that is restrained can be reproduced. Hereby we can create four levels of difficulty: neither sound nor moving, one of them or both.

Corresponding author:
Dr. med. vet. Sabine Ramspott, LMU Tierärztliche Fakultät Studiendekanat, Veterinärstr. 13, 80539 Munich, Germany, s.ramspott@lmu.de


The use of a life-size simulator to teach venipuncture in the alpaca

Jennifer A. Schleining, Jared A. Danielson
Iowa State University, Ames, United States

Anatomic differences in camels increase the likelihood of accidental carotid artery puncture, which can lead to complications producing seizures or even death. Because of this, practitioners not properly trained in venipuncture techniques in camels are often apprehensive with this clinical skill. The purpose of this study was to assess the use of a life-size alpaca simulator (Alpaca Venipuncture Model, Alternativae, LLC, Columbus, Ohio) on the ability to perform venipuncture in the live animal. We hypothesized that students who were trained on an alpaca simulator to correctly identify appropriate landmarks and perform venipuncture would perform better than students who were trained with a PowerPoint presentation showing the same information. Veterinary students enrolled in small ruminant lab courses at Iowa State University were randomly assigned to either a simulator laboratory for venipuncture in alpacas or a PowerPoint module. Prior to instruction students completed a questionnaire relating to attitudes about venipuncture in camels.

Following instruction, students performed venipuncture on live animals, objective venipuncture data was obtained, and a follow up questionnaire was completed. Seventy one (n=71) students have completed the study to date. Students trained on the alpaca simulator considered their instructional method to be both more helpful (p 0.001) and more realistic (p<0.0005). Students trained via PowerPoint obtained blood with fewer attempts (1.4 versus 2.1; p=0.026). Other objective measures were not significantly different between the groups. In summary, training on an alpaca venipuncture simulation model prior to performing venipuncture in the live animal provided professional veterinary students with an increased level of confidence, but did not improve performance with a live animal. Based on this data, this ongoing study was modified to include a third group with instruction utilizing both the simulator and PowerPoint module. Data utilizing the third group is not collated at the time of abstract submission, but will be presented at the symposium.

Corresponding author:
Dr. Jennifer Schleining, Iowa State University, 2418 Lloyd; VDPAM, 50011 Ames, United State of America, jschlein@iastate.edu

Validating the use of low-cost simulation models and online instructional modules to teach asepsis

Tatiana Motta, Catrina Silveira, Benjamin Carter, Mary McLoughlin
Ohio State University, Columbus, United States

Surgery site infections (SSIs) account for up to 18% of all small animal surgery complications. In order to minimize microbial contamination, several aseptic techniques have been developed. Although asepsis is essential in preventing SSIs, most students still struggle with mastering aseptic technique. The goals of this study were: (1) to develop a low-cost asepsis simulation model; (2) to develop detailed asepsis instructional modules; (3) to validate the newly developed teaching tool through student performance. We hypothesized that the use of low-cost simulators associated with instructional modules will improve students’ proficiency in asepsis.

An asepsis simulation model was created. Each model included: sterile gloves, surgery gown, scrub brush, skin simulator, draping materials, and surgical site preparation solutions. Instructional video modules demonstrating each of the aseptic techniques were created. The modules included: open gloving, sterile patient preparation, aseptic hand scrubbing, gowning, closed gloving, and patient draping. Thirty volunteers were randomly assigned into 2 groups: simulation or control group. All volunteers were first or second year veterinary students with limited or no experience on asepsis. Each volunteer attended a lecture and an in-person demonstration of each technique. Students in the control group had no additional instruction or materials. Students in the simulation group received a simulation model and were given access to the instructional videos. All students demonstrated their proficiency by aseptically preparing themselves and a canine cadaver for surgery. Each student’s aseptic and patient preparation were video recorded and are being evaluated by three faculty members.

Results from the quiz were not significantly different between the simulator (94.4%) and the control (91.7%) groups. Questionnaire data revealed that students in the simulator group invested an average of 5.4h preparing for the procedure. Furthermore, 1.9 hours were invested practicing with the simulators. This contrasts with the total of 2.5 hours invested by students in the control group (Figure 1). Direct demonstration from the instructor was considered the most useful teaching aid by 86% of the students (Figure 2). Amongst all teaching aids used, 100% of the students listed the videos as helpful. Podcast and handouts were considered not helpful by 36% and 29% of the students, respectively (Figure 3). Grading of student’s proficiency is ongoing. We expect to confirm our hypothesis, that the use of instructional video modules, in addition to low-cost simulation models will increase student proficiency and confidence in asepsis.

References
Figure 2: Usefulness

Figure 3: Helpfulness

Corresponding author:
Assistant Professor Tatiana Motta, Ohio State University, 601 Vernon Tharp St., 43210 Columbus, USA, motta.13@osu.edu

DOI: 10.3205/15invest12, URN: urn:nbn:de:0183-15invest121
Did unsupervised practice of clinical pathology procedures in a Skills Laboratory improve examination confidence and performance?

Annett Annandale, Amelia Goddard, Elrien Scheepers
Faculty of Veterinary Science, University of Pretoria South Africa, Pretoria, South Africa

Third year veterinary undergraduate students (n=180) were exposed to two supervised practical sessions of 2.5 hours duration within the clinical pathology module. The class was divided into 7 groups and each group consisted of 25–26 students. Three staff members (lecturer, resident and technologist) were present to teach and assist students during the practicals. Each student group was exposed to haematology related laboratory procedures (making and staining a blood smear, microscopic blood smear evaluation, performing a packed cell volume, total protein measurement using a refractometer and performing an in-saline agglutination preparation with microscopic evaluation) during the first practical session. The second practical session consisted of a full urinalysis that included an organoleptic, physical and chemical evaluation and a microscopic sediment evaluation. After the practical exposure, 45 of the 180 students were randomly selected to do the clinical pathology examination, while the remaining students were randomly allocated to one of the three other examination panels (Small Animals, Production Animals, Equines). Students were assigned to the different stations on the day of the examination.

For the first time this year students had the opportunity to utilise the clinical pathology laboratory working stations in the newly opened Skills Laboratory to practise all the above mentioned procedures before the examination. This additional practice was not compulsory and was unsupervised. The Skills Laboratory registered a total of 219 visits for clinical pathology procedures in the four days before the examination. These visits were of 0–30 minutes (n=29), 30–60 minutes (n=38), 2–3 hours (n=18) and 3–4 hours (n=2) duration, with the majority of visits taking 1–2 hours (n=132). Ten students visited the Skills Laboratory three times to practice procedures, 41 students twice and 107 students visited once. Out of the 180 students, 158 (88%) visited the Skills Laboratory.

Thirty-one of the 45 students doing the clinical pathology exam filled in a questionnaire about the usefulness of the unsupervised Skills Laboratory practice before the examination. Thirty of the 31 students did visit the Skills Laboratory to practise, of which 20 students visited once, 9 students twice and one student three times. Eighty-four % of questioned students (26/31) said that the additional practice opportunity helped them to become confident in the procedures, that they were less stressed about the examination and that their performance in the examination would not have been the same without it. Additionally, all students that had used the Skills Laboratory and filled in questionnaires enjoyed practising clinical pathology procedures in the Skills Laboratory.

Feedback from internal as well as external examiners indicated that students were more confident, better prepared and performed better than in the previous year. Direct comparison of marks of this year’s examination to last years’ was not possible as some other factors were also changed (differently structured examination, marking in rubrics etc.).

In conclusion, subjective feedback evaluation showed that the additional practice opportunity had a positive effect on the students’ confidence, competence, stress levels and overall examination performance. It also showed that the majority of students made full use of this learning opportunity even without any prior experience in a Skills Laboratory.

Corresponding author:
Dr Annett Annandale, University of Pretoria, Old Soutpan Road, 0110 Onderstepoort, South Africa, annett.annandale@up.ac.za

DOI: 10.3205/15invest13, URN: urn:nbn:de:0183-15invest139

vetPAL: A student led peer-assisted learning initiative

Lucy Bates1, Zoe Pither2, Sheena Warman1, Sarah Baillie3
1Bristol Vet School, Bristol, United Kingdom
2University of Bristol, Bristol, United Kingdom

A student-led peer-assisted learning (PAL) programme has been introduced at Bristol Vet School by final (fifth) year students who acted as tutors to fourth year students. The tutors taught skills in the Clinical Skills Lab and led revision sessions for small animal, equine and farm animal clinical science. The vetPAL programme was advertised to fifth and fourth year students via email, and tutors and tutees were selected on a first come, first served basis.

All tutors received training and attended workshops with activities including how to structure a teaching session and set objectives, George and Doto’s five-step method for teaching clinical skills, and leading interactive student-centred revision sessions. The tutors worked in pairs or threes and produced a session plan including aims and a timeline and listed supporting resources. The plan was checked and signed off by a member of staff. Tutors were also supplied with a ‘what-if’ flow chart, a decision-making tree for any eventualities from misconceptions in knowledge (to be reported to lecturers) to accidents or student issues that required referral to tutors or other staff.
Each session lasted approximately one hour and took place in the evening. As vetPAL was being delivered for the first time a member of staff was present but was not involved. The clinical skills sessions involved three stations lasting twenty minutes each, which fourth year tutees rotated around. The stations were:

1. Clinical examination of dogs – using models and live dogs
2. Small animal suturing – on silicon pads and checked T-towels

The revision-based sessions involved tutees choosing to attend one of a number of topics for an hour. Topics included subjects fifth years deemed important but commonly misunderstood and covered a broad range of subjects including bovine fertility, common problems of the equine hindlimb, ocular lesions, the atopic dog, feline lower urinary tract disease, and cat flu.

Questionnaires were distributed at the end of each session to tutors and tutees. 80% of tutees at the clinical skills sessions and 95% at the revision sessions marked the sessions as extremely beneficial. Common themes in success include informal atmosphere, not being afraid to ask questions, small group sizes and the tutors being able to easily relate to the position of the tutees. Tutors described development of communication and teaching skills, increased ability to summarise a subject and greater self-confidence as personal benefits.

Following the success of the initiative, final year students are in the process of handing vetPAL on to the fourth years who will become next year’s tutors.

Corresponding author:
Professor Sarah Baillie, Bristol Vet School, Langford, BS40 5DU Bristol, United Kingdom, sarah.baillie@bristol.ac.uk

DOI: 10.3205/15invest14, URN: urn:nbn:de:0183-15invest142

15

Using a video as a new tool to disseminate the best teaching alternatives to the harmful use of animals in veterinary education in Latin America

Rosangela Gebara1, Victoria Bengoa2, Nancy Clarke3, Ruth De Vere1, Joe Anzuino3, Roy Kareem3, Helen Proctor3, Gemma Gardner1

1World Animal Protection - Brazil, São Paulo, Brazil
2World Animal Protection - Latin America, Bogota, Colombia

Over 126 million vertebrates and invertebrates are estimated to be used annually in biomedical research, toxicological tests and in education and training worldwide. Furthermore, 2 to 3% of these animals are used for teaching and training in medical courses as veterinary [1]. However, 33 scientific papers no less suggest that for biomedical students who learned using alternative methods, 39.4% have achieved higher or equivalent results compared to those that have undergone traditional learning [2].

However, the teaching replacement of live animals when compared to the replacement of animals in scientific research appears more developed, and may be considered as applicable in almost current tertiary teaching protocols [3]. Some studies suggest Replacement of harmful use of animals in medical colleges is hampered by lack of information and discussion on alternatives, official data, as well as concern about financial investment and effectiveness of “alternative” methods [4].

Using video to demonstrate examples of Veterinary Colleges that are already using humane methods in teaching, with the same pedagogical rigor and with the same pedagogical results to other coordinators and teachers becomes an important tool in the dissemination of this concept. With this objective, in March 2015, World Animal Protection undertook a project to document use of the main alternative methods in 4 Veterinary schools in Latin America, University Mayor de Chile, Universidad CES Colombia, Universidad Anhembi-Morumbi - Brazil, and Universidad del Valle del Mexico (Figures 1 - 3).

A DVD (“The Best Alternative methods to the harmful use of animals in Veterinary education in Latin America”) is currently being developed which will be used to demonstrate humane methods that are already being widely used by schools in the Latin America region. This will also encourage increased engagement by vet schools and educators with effective and ethical “alternatives” through testimonies and interviews with renowned lecturers, deans and students.

References
1. De Boo J, Knight A.Increasing the implementation of alternatives to laboratory animal use. AATEX. 2008;13(3):109-17.
2. Humane education resources [Internet]. Available from: http://www.humanelearning.info/index.html
Analyzing the demand for video material in veterinary education

Lina Müller1, Andrea Tipold2, Christin Kleinsorgen1, Elisabeth Schaper1

1University of Veterinary Medicine Hannover, Foundation, Competence Centre for E-Learning, Didactics and Educational Research in Veterinary Medicine, Hannover, Germany
2University of Veterinary Medicine Hannover, Foundation, Clinic for Small Animal Medicine and Surgery, Hannover, Germany

The University of Veterinary Medicine Hannover Foundation (TiHo) is producing video material for veterinary students. On the one hand the TiHo is providing worldwide accessible videos on YouTube, on the other hand some lecture recordings are already available at the university homepage (http://www.tiho-hannover.de).

Educational videos are uploaded to the TiHo YouTube channel “TiHoVideos” as a studying aid. YouTube users can subscribe to the channel and videos are being watched frequently. Video instructions showing the correct approach to the different learning stations in the Clinical Skills Lab (CSL) were produced and uploaded.

Lecture recordings with lecturnity® by imc and web seminars (“webinar”) recorded with Adobe®Connect™ by Adobe Systems (Deutsches Forschungsnetz, DFN) are available either openly or password protected. To improve teaching methods, lecture recordings with the software Opencast Matterhorn® by the Opencast Community are planned and in production. Opencast Matterhorn® is free open-source software to manage educational audio and video content, e.g. produce lecture recordings, manage the contents and distribute the material to the students.

In order to evaluate the users’ attitude towards video material in veterinary education, this study concentrates on the perception of the veterinary students and lecturers.

To evaluate the actual utilization of the TiHo YouTube videos, veterinary students will be asked to complete questionnaires with regard to their study sessions in the CSL.

Their experience with those YouTube videos in addition to whether and in what way their experience in the CSL was influenced from watching them will be rated and evaluated.

The expected data will help to outline the correlation between the usage of YouTube videos and students’ visits to the CSL.
The demand for veterinary lecture recordings amongst students and lecturers is to be determined by using questionnaires in combination with focus group interviews. A prepared guideline for the focus group interviews will lead the qualitative collection of data.

The guideline for the focus group interviews and the questionnaires are being developed. First results in this ongoing study will be presented at the InVeST conference.

The production of video material is complex, so the demand for and the utilization of these videos needs to be assessed. With the expected data, the videos can be further adapted to the needs of the students to ideally support their learning experience.

Corresponding author:
Lina Müller, University of Veterinary Medicine Hannover, Foundation; Competence Centre for E-Learning, Didactics and Educational Research in Veterinary Medicine, Bünteweg 11, 30559 Hannover, Germany, lina.mueller@tiho-hannover.de

DOI: 10.3205/15invest16, URN: urn:nbn:de:0183-15invest163

Evaluation of clinical skills training in veterinary education using audio-visual instructional animations and low-fidelity models

Dora Bernigau, Maria Aulmann, Sebastian Schmalz, Christoph Mülling
Institute of Veterinary Anatomy, Histology and Embryology, Faculty of Veterinary Medicine, Leipzig University, Leipzig, Germany

Veterinary medical education in Germany conveys large quantities of theoretical knowledge in a densely packed curriculum. The acquisition of Day-One-Skills is recognized as an essential part of education but training opportunities for developing these essential clinical skills are rare in the Curriculum. Alternative teaching methods in form of clinical skills simulators provide good training opportunities for the students developing their practical skills.

Multimedia-based teaching materials have repeatedly been shown to serve as valuable learning tools. They are used with increasing frequency and intensity and their popularity among students is high. Among these especially audio-visual material can enhance veterinary students’ learning success in comparison to traditional linear ways of learning. Potcasts are audiovisual flash-animations originally composed for teaching anatomical topics (from formalin pot to potcast”). In this study potcasts were developed to provide students a step by step information and instruction on a clinical skill.

The purpose of this study was to evaluate the training of specific clinical skills using potcasts and low-fidelity simulation training.

Two instructional potcasts and two low-fidelity models of canine intubation and canine female urinary catheterization were used. In a crossover study design both, acquired psychomotor and cognitive skills of two intervention groups after a different theoretical preparation were compared. A survey captured the participants’ feedback. Sixty first year veterinary students were randomly allocated to two groups (potcast group and text group). For the same duration of time for preparation the potcast group watched a potcast while the text group read an instructional text which served as the screenplay of the potcast. Then both groups had separate self-directed training sessions on low-fidelity models. Outcomes were assessed in practical examinations on a cadaver using an objective structured clinical examination (OSCE) checklist and written memory tests.

The potcast group performed significantly better in both OSCE and memory tests than the text group in study “intubation” (OSCE: p < 0.001; memory tests: p = 0.001) but no significant differences were observed in study “catheterization” (OSCE: p = 0.762; short-term memory test: p = 0.335; long-term memory test: p = 0.662). Overall, participants enjoyed clinical skills training but experienced self-directed learning as challenging.

Clinical skills training using potcasts and self-directed low-fidelity simulation training are a good combination for students. However, they should be complemented by supervisor or peer instruction rather than used as exclusive tool for teaching first year veterinary students.

Corresponding author:
Dr. Dora Bernigau, Veterinär-Anatomisches Institut, Universität Leipzig, An den Tierkliniken 43, 04103 Leipzig, Germany, heller@vetmed.uni-leipzig.de

DOI: 10.3205/15invest17, URN: urn:nbn:de:0183-15invest176


**Topic: Skills + Simulation 2**

18

Using computer simulation to enhance learning in a clinical skills laboratory environment

Márton Balogh1, Linda Müller2, Sándor Cseh2, Tony Johnson3, Paul Pion4

1Veterinary Information Network, Budapest, Hungary
2Szent István University, Faculty of Veterinary Science, Budapest, Hungary
3Veterinary Information Network, West Lafayette, IN, United States
4Veterinary Information Network, Davis, CA, United States

Utilizing high fidelity mannequins, many day one skills can be transferred to students. These instructional exercises are effective at helping students master how to perform these skills, but do not provide context for management of the patient as a whole. Computer-based clinical simulations can provide this context.

We believe that the combination of mannequin-based skills training and computer based simulations of clinical problems will provide a more complete learning experience. The mannequins used will be both handmade and commercially available phantoms. The computer simulation will be the Virtual Clinic of the Veterinary Information Network (VIN).

The first combined training, to be launched in September 2015 is the management of acute, hypovolemic shock. The three step exercise will require students to first stop bleeding using custom made bleeding limb models. The next step will be to provide an intravenous route for fluid administration, using custom built IV catheterization models. The final step will be to manage the fluid resuscitation and stabilization of their patient presented to them in the Acute Hemorrhage Simulator of the VIN Virtual Clinic.

Students will be scored on their performance by summing the results of an objective scoring chart of their performance with the mannequins, and the built-in performance review of the VIN Virtual Clinic.

Corresponding author:
DVM Márton Balogh, Veterinary Information Network, 1 Hárs Köz, 8230 Balatonfüred, Hungary, marton@vin.com

DOI: 10.3205/15invest18, URN: urn:nbn:de:0183-15invest183

19

Best methods for surgical planning with 3D printing

Robert Malinowski

Michigan State University College of Veterinary Medicine, East Lansing, United States

This poster session will highlight the methods used by Michigan State University’s College of Veterinary Medicine for surgical planning using 3D printing technology. This resource is becoming increasingly vital for the small animal orthopedic service and is now being carried out on a regular basis. The process utilizes off the shelf, commercial software including Materialise Mimics and Autodesk 3DS MAX, and produces a model that is available the next business day using a consumer grade 3D printer. Rapid turnaround is essential and oftentimes multiple models are required in order to serve as teaching tools for residents, interns and students. As 3D printing technologies continue to evolve, the model creation time has been rapidly decreasing while the accuracy and level of detail continues to improve.

Corresponding author:
Assistant Professor Robert Malinowski, Michigan State University College of Veterinary Medicine, 736 Wilson Rd Room A227, 48824 East Lansing, USA, malino11@cvm.msu.edu

DOI: 10.3205/15invest19, URN: urn:nbn:de:0183-15invest194
The OPUSSheep - Development of an interactive 3-dimensional sheep ultrasound examination simulator

Peter Charles Irons1, Alex Spyridis2, B.T.J. (Sunil) Maharaj2, Annett Annandale1

1Faculty of Veterinary Science, University of Pretoria South Africa, Pretoria, South Africa
2Faculty of Engineering, Built Environment and Information Technology University of Pretoria South Africa, Pretoria, South Africa

Transabdominal ultrasound (US) examination is an accurate method of pregnancy diagnosis in sheep from about 35 days of pregnancy. The early determination of pregnancy and detection of multiple fetuses have a major influence on economic and managemental decisions in the sheep farming industry, which is the predominant livestock industry in large parts of central and western South Africa. Pregnancy diagnosis by US is therefore an important day 1 skill for South African veterinary graduates. Hands-on training opportunities for undergraduate veterinary students are limited and not every final year student has sufficient opportunity to perform the procedure. There is therefore a clear need for a simulator which could assist students in attaining these skills. The objective of the project was to develop a life-like model combining manual and electronic components which could be used in teaching for correct probe placement and interpretation of images.

A collaboration between the Faculty of Veterinary Science and the Faculty of Engineering, Built Environment and Information Technology of the University of Pretoria, South Africa, resulted in the development of a simulated scanning environment that combines an Automated Diagnostic System (ADS) with iButton technology and a Graphic User Interface (GUI). A life-size sheep model with a mobile right hindleg giving access to the right groin for scanning purposes was preserved by a taxidermist and iButton tags were fitted into the model. A simulated US probe with iButton sensors interacts with the iButton tags in the sheep model and is connected to a computer or laptop with the device software for the ADS. The GUI represents the US device. During the scanning procedure, correct placement of the probe results in real-time display of a randomly selected grey scale ultrasound image on the computer. Images are randomly chosen from the image library within the ADS. The operator can evaluate the image and make their own diagnosis of pregnancy, gestational age, and fetal number (singleton vs multiples) before allowing the system to make the diagnosis. The ADS has been found to be 76%-84% accurate. The system also evaluates probe contact strength and probe placement as indicators of good operator technique. If the probe is not placed in the correct anatomical region an error message is displayed on the screen.

In conclusion, the system has been found to be easy to use and educational, and to successfully replicate a sheep scanning environment. Further development and validation of the system is underway.

References

21
First veterinary simulator for the abdominal sonography of the cat – with focus on kidneys

Stefanie Weber, Elisabeth Zandt, Jasmin Radtke, Cordula Poulsen Nautrup, Sven Reese

Anatomy, Histology und Embryology, Department of Veterinary Science, Ludwig-Maximilians-University Munich, Munich, Germany

Abdominal sonography is one of the most important diagnostic imaging methods in the field of veterinary medicine. However, a high level of theoretical knowledge as well as numerous hours of practical training are necessary to produce valuable images and to correctly interpret them. Until now the practical education of sonography occurs entirely with living and mostly healthy animals. In contrast to veterinary medicine, human medical education has successfully used simulators for ultrasound training for more than 20 years.

Objective of this work was the development of a simulator for the abdominal sonography of the cat. Another important aspect in developing this simulator was to create the possibility of examining “sick animals” with simulation as well as making sufficient practical training available for all students and veterinarians without affecting animal welfare acts or laws.

Three-dimensional ultrasound datasets of abdominal organs of 43 death cats were created with the ultrasound system “MyLab Twice” (Esaote, Cologne, Germany). These datasets included physiologic and pathologic kidneys. Furthermore, abdominal anatomic serial sections, three-dimensional computer tomographies (CTs) and magnetic resonance images (MRIs) of the abdomen of adult cats were created. The feline abdominal sonography simulator works on the basis of the SonoSimIl1 by Sonofit GmbH, Darmstadt, Germany.
Ultrasound examinations can be carried out on cat models in dorsal or lateral recumbency as well as on standing “cats”. The kidneys are explored with a linear transducer and are then screened in transversal, sagittal and horizontal views. This corresponds to real sonographic examinations of kidneys. Size is determined with help of range and area measurements. The special feature directly compares the ultrasound images with corresponding anatomical sections, as CTs and MRIs improve the anatomical and topographical imagination of the examiner. A further advantage of the simulator is the integration of diseases. By solving exercises (with solutions), the user can also check his newly developed skills.

Using the new simulator, feline abdominal sonography can be practiced under guidance or independently and the acquired skills can be subsequently checked.

The educational value of this first veterinary simulator for abdominal sonography as part of the students’ clinical education and training for veterinarians will be evaluated objectively in the winter semester 2015/16. In addition, future attempts to create suitable three-dimensional ultrasound datasets of living cats will be carried out soon.

Corresponding author:
Univ.-Prof. Dr. med. vet. Cordula Poulsen Nautrup, Anatomy, Histology und Embryology, Department of Veterinary Science, Ludwig-Maximilians-University Munich, Munich, Germany, cordula.poulsennautrup@lmu.de


22

The world’s first simulator for echocardiographic examinations in cats
Elisabeth Zandt, Julia Decker, Stefanie Weber, Inga Wölfel, Cordula Poulsen Nautrup
Ludwig-Maximilians-University, Department of Veterinary Science, Institute for Anatomy, Histology and Embryology, Munich, Germany

Performing echocardiography properly requires many hours of training. Echocardiographic examinations are especially stressful for cats. Therefore, finding animals for training purposes is difficult. Furthermore, laws concerning animal welfare restrict the use of living animals for educational purposes.

For this reason, an echocardiographic simulator for cats has been developed.

This ultrasound simulator consists of three-dimensional echocardiographic datasets, two cat models on a model echocardiographic examination table and a model transducer in a computer unit combined with an electromagnetic tracking system: the SonoSim III developed by Sonofit GmbH, Darmstadt, Germany.

Three-dimensional echocardiographic datasets of two healthy and three diseased cats (suffering from hypertrophic cardiomyopathy or a ventricular septal defect) were further processed. In order to improve quality, each image contained in the dataset was processed with the same color scheme, in which the inner parts of the heart were blackened, the left heart was colored in red, and the right heart was colored in blue. These datasets were included in the SonoSim III.

Additionally, two cat models have been developed. They are equipped with special features, such as elbow skinfolds and palpable ribs for improving orientation and consist of a foam core covered with fake fur. One model is designed in left lateral, the other one in right lateral recumbency. The cat models are lying on an examination table, which allows the examination to be conducted with the model transducer from below.

With the feline echocardiography simulator, the learner is able to practice examining a healthy cat in long- and short axis views from the right side and left apical three, four and five chamber views, in colored and in black and white version. The learner can practice echocardiography autodidactically with the help of the Follow-Up feature. In this mode, a special task is given and the simulator gives feedback whether the task is completed or not.

For advanced learners, it is possible to use the feline echocardiographic simulator for diagnosing heart diseases, as the datasets of three diseased cats are also available during simulation.

In a survey carried out among senior students at the Ludwig-Maximilians-University of Munich who evaluated the feline echocardiographic simulator, the respective standard views produced in the simulator were evaluated with ‘very close to reality’ by 50–38% and with ‘close to reality’ by 57–53% of the students. Additionally, the use of examining “diseased cats” was evaluated with 97% as ‘very useful’ and the simulator as a supplement for living animals in practical education was evaluated by 89% with ‘very good’.

As it becomes more difficult to use live animals in veterinary medical education, the importance of simulation is constantly increasing. This feline echocardiographic simulator provides students with the chance to practice echocardiography on cat models under near-realistic conditions, without the use of living animals. This improves education significantly and allows animal welfare laws to be respected.

Corresponding author:
Prof. Dr. Cordula Poulsen Nautrup, Ludwig-Maximilians-University, Department of Veterinary Science, Institute for Anatomy, Histology and Embryology, Munich, Germany, cordula.poulsennautrup@lmu.de


26
Case-based e-learning model “CASUS” – “Health management in pig farms” as a complement tool in the practical veterinary education and advanced training

Sebastian Spiegel1, Florian Spiegel1, Svenja Lösken2, Andrea Düngelhoef3, Christin Kleinsorgen1, Elisabeth grosse Beilage2, Jan P. Ehlers4, Michael Wendt1

1 Clinic for Swine and Small Ruminants, Forensic Medicine and Ambulatory Service, University of Veterinary Medicine Hannover, Foundation, Germany, Hannover, Germany
2 Field Station for Epidemiology, Bakum, University of Veterinary Medicine Hannover, Foundation, Germany, Bakum, Germany
3 E-Learning Department, University of Veterinary Medicine Hannover, Foundation, Germany, Hannover, Germany
4 Didactics and Educational Research in Health Science, Faculty of Health, Witten/Herdecke University, Witten/Herdecke, Germany

Using an interactive, case- and web-based tutorial “CASUS - Learning with virtual patients” veterinary students are enabled testing their individual learning success as well as preparing themselves for practical procedures and exams. At the University of Veterinary Medicine Hannover, Foundation Germany currently various “virtual patients” created with CASUS are offered for the preclinical and clinical veterinary education. This project is supported by the Competence Centre for E-Learning, Didactics and Educational Research in Veterinary Medicine (KELDAT).

The project is focused on pig herd visits and subsequent diagnostic procedures. On farm data from herds with typical pig diseases were collected and transferred to e-learning-based cases (virtual herd visits). Six CASUS cases were created on the subject areas of respiratory, intestinal and skin diseases, diseases of the nervous system as well as locomotive disorders and reproductive failure. More virtual cases are in preparation.

Following up these virtual herd visits students can learn about the principles of herd health management and test their knowledge with regard to clinical symptoms of typical diseases, diagnostic procedures, interpretation of diagnostic results and recommending necessary treatments and prevention programs to the farmer.

CASUS offers some benefits compared to other learning methods. It uses a user-friendly interface with minimal system requirements. Furthermore it provides optional multimedia integration like videos, pictures and audios as well as discussion forums. The expert modus allows users in addition to read up on more detailed and extensive information about diseases, diagnostic procedures, treatments, etc. These communicative and interactive possibilities facilitate understanding and provide self-control and individual learning success. Students directly receive their learning feedback at every stage of the case work.

Seeing, listening, recognizing, showing, trying and communicating enable a realistic learning. CASUS can serve as a bridge function between theory and praxis.

Animal welfare principles can be supported by using virtual patients. Thus, subsequent practical procedures can be performed faster, safer and more experienced, leading to less stress in animals (refinement). Moreover, fewer animals are needed for the practical exercises because of better theoretical knowledge and suitable preparation of the students (reduction).

Since 2013 a yearly doubling increasing number of students has taken this option of learning and found thereby an improved preparation for tests and practical exercises. On average each student has successfully processed two cases and has invested 40 minutes per case in time.

By independent evaluation of their learning success, students were given security and were provided with a complementary way of individual learning.

In the future “virtual patients” created with CASUS shall be offered in English language for expanding CASUS on EU-level.

Corresponding author:
Florian Spiegel, Clinic for Swine and Small Ruminants, Forensic Medicine and Ambulatory Service, University of Veterinary Medicine Hannover, Foundation, Germany, Bischofsholer Damm 15, 30173 Hannover, Germany. Spiegel.F@gmx.de

DOI: 10.3205/15invest23, URN: urn:nbn:de:0183-15invest230
Since 2012 the continuing education course “Gepfchte/r Tierpflegemeister/in” (certified master course for animal caretakers) and since 2014 the FELASA B and C courses are designed as blended learning courses. The respective theoretical contents (certified master course for animal caretakers: 180h, FELASA B course: 20h, FELASA C course: 40h) are provided via a customized learning management system. This learning environment is based on Drupal, the programming was performed by the company Computer Manufaktur GmbH, Berlin.

Designing this learning platform it was important for us to include following aspects:

- Intuitive usability, also for users with minor web 2.0 experience (user account, navigation, course slide)
- Clear arrangement and consistent appearance
- Multiform interactive components (diverse quiz functions, mouse over function, discussion forum, e-note pad, poll function)
- Multimedia-based and multimodal learning (audio tracks, videos, images, downloads, script incl. notes)
- Possibility to check the participants’ activity (quiz, first run only page by page, time tracking)
- Administrative work (registration, mail communication)
- Integration in existing web page and corporate design

Using a characteristic orientated online survey we will compare these requirements with the evaluation by all participants of 2014 (n=261). The aim of the survey is to detect sources of user dissatisfaction, to identify critical aspects of course administration and attendance and reveal points of improvement. We will create a questionnaire which covers all topics from above and consists of items with even numbers of answers plus the possibility to abstain, as well as a field for free comments. Further, we will ask for demographic data.

We will use the obtained data to determine actions to be taken to improve user satisfaction and usability of our e-learning platform. To evaluate the effectiveness of the measures we plan to conduct a follow up survey one year later.

Corresponding author:
PhD Nicole Marquardt, berliner fortbildungen, Heerstr. 18-20, 14052 Berlin, Germany, marquardt@berliner-fortbildungen.de


25

The iVetSchool Application: a multimedia approach to supplementing veterinary medical student education through problem based learning

Jennifer Roberts1, Ann Rashmir1, Robert Malinowski1, Jon Patterson1, Kent Ames1, Frank Welker1, Lowell Midla2, Ben Nabors3, Robert Linford4, Matt Raven1

1Michigan State University, East Lansing, MI, United States
2Ohio State University, Marysville, OH, United States
3Mississippi State University, Mississippi State, MS, United States

Students’ assessment of clinical cases in teaching hospitals is a principle tenet to veterinary education worldwide. Training large animal veterinarians has become increasingly more challenging due to the decreasing numbers of food animal and equine cases at many veterinary colleges. With increased urbanization, the decline in large animal cases admitted to veterinary teaching hospitals has continued. Preservation of cases in a digitally based, interactive fashion is a logical step in the evolution of veterinary education and could contribute significantly to teaching in the veterinary curriculum. The iVetSchool App, developed by the investigators, uses media rich, clinically based case studies to train students in a problem based learning format. The app allows instructors to replace traditional, text-based cases in Problem Based Learning courses with an interactive format that is more engaging for today’s technologically inclined veterinary student population.

The purpose of this innovative idea was to address deficiencies in clinical case exposure by identifying exemplar large animal cases and developing them into multimedia-based case studies. Large animal veterinary educators developed a list of technical procedures with an emphasis on both techniques and skills required to diagnose, manage, and treat large animal diseases by an entry level veterinary practitioner. Actual clinical cases were used to develop the media-based case studies. The case studies walk students through a media-based clinical case from history and diagnosis to treatment and outcome. In addition to teaching clinical problem solving and reasoning skills, each case study was designed to teach specific large animal diseases or food safety techniques. In conjunction with the writing the text based portion of the case studies, appropriate aspects of the clinical case were digitized to produce the final media-based case study. Examples of integrated multimedia include videos of techniques, photographs of patients, audio files, diagrams, radiographs, laboratory results, and text-based content.

A key point to the efficacy of an instructional program incorporating the use of an App is that students must enjoy the format of the training and want to continue its use. Therefore, students were asked to evaluate the App at the end of the semester with a survey. The survey contained two scales each comprised of four Likert scale items and seven open-ended questions designed to illicit deeper insight into the students’ perspective regarding the iVetSchool App. Students had an overall positive response (3.6/5) indicating that they enjoyed using the App and that it helped them learn relevant material. Positive comments about the App included that students were able to work at their own pace anywhere and anytime with
nearly 25% of the students volunteering that they enjoyed the variety of cases available. The most common criticism of the App was that students did not always like the way their answers were scored. The overall student evaluation of the App was positive and warrants further integration into veterinary curricula.

Although the iVetSchol app is designed for veterinary students, the App is a reference library of archived clinical cases that may be useful to practicing veterinarians, animal scientists, and secondary/postsecondary agricultural educators anywhere in the world.

References

Corresponding author:
Assistant Professor Jennifer Roberts, Michigan State University, 736 Wilson Rd, Rm D202, 48824 East Lansing, Michigan, USA, wileyje1@cvm.msu.edu


Development and evaluation of two anatomical potcasts for students learning the anatomy of the tongue

Dora Bernigau, Sebastian Schmalz, Christoph Mülling
Institute of Veterinary Anatomy, Histology and Embryology, Faculty of Veterinary Medicine, Leipzig University, Leipzig, Germany

“VetAnaTube”, a working group at our Institute deals with the production of multimedia learning material. Especially “potcasts” are used frequently by students. Potcasts are audiovisual flash-animations featuring specimens of the anatomical museum.

The aim of the present study was to evaluate whether and to which extent potcasts enhance the learning effect in veterinary anatomy in comparison to traditional linear ways of learning.

Two potcasts featuring the anatomy of the tongue were developed. Images of specimens and a descriptive text were combined to an audiovisual animation using the software Adobe Flash Professional. 1st and 2nd year students (n=101) were randomly allocated to a “potcast-group” and a “text-group”. After ten minutes of preparation (watching the potcast vs. reading the text) students took a written mini-exam (10 questions). In addition the potcast-group was asked to complete a feedback sheet (6 step scale).

Evaluation of the test revealed that the potcast-groups of both years achieved better results compared to the text-groups. Total results for right answers of the 1st year students show that the potcast group (47.8%) was up to 6.4% better than the text group (41.4%). In comparison 2nd year students in both groups achieved higher rates of right answers (84.8% vs. 78.9%) again in favour of the potcast group. These differences varied within the individual questions.

Potcasts clearly improved learning success and knowledge retention in comparison to simple text forms. Thus they are suitable for acquiring and refreshing knowledge in veterinary anatomy.

Corresponding author:
Dr. Dora Bernigau, Veterinär-Anatomisches Institut, Universität Leipzig, An den Tierkliniken 43, 04103 Leipzig, Germany, heller@vetmed.uni-leipzig.de

Development of 4D virtual farms

Stuart Barber1, Evan Hallein1, David Shallcross1, Elizabeth Bramley2, Caroline Jacobson2, Pietro Celi3, Michael McGowan4, Jenny Weston5, Jane Owens1

1University of Melbourne, Melbourne, Australia
2Murdoch University, Perth, Australia
3University of Sydney, Sydney, Australia
4University of Queensland, Gatton, Australia
5Massey University, Palmerston North, New Zealand

Compared to veterinary graduates of the 20th century, veterinary students in Australasia are now more likely to come from a non-rural background and to work a considerable distance from where they have studied for at least some of their career. While students are required to spend time working on different livestock farms during their degree, it is not possible to spend time on all enterprise types and environmental conditions. These factors increase the need for best-practice education to improve student understanding of the wide variety of agricultural enterprises.

We have developed high-resolution, panoramic, four-dimensional (360 degree through time) virtual farms across Australasia, using funding from the Office of Learning and Teaching (OLT) to allow students to view many different farm enterprises (Figure 1). At each collaborating veterinary school, staff members identified appropriate properties for selection, and images were collected over multiple sites on the farm. The location of each image is recorded using GPS, allowing images to be taken from the same location over multiple visits, giving the fourth dimension (time).

Various files including video, photos, pop-up windows, documents and links to web sites can be embedded within the framework of the property view, allowing the integration of learning and assessment resources within the tool. Development of the virtual farms gives students the next best experience to visiting each property. It allows them to view what occurs on a property over the year, with real examples of what happens in the convenience of the classroom or at home at a speed that suits them.

Corresponding author:
Dr Stuart Barber, University of Melbourne, Corner Flemington Road and Park Drive, 3010 University of Melbourne, Australia, srbarber@unimelb.edu.au
The global resource for online evidence-based veterinary medicine learning

Kristen Reyher1, Emma Crowther1, Rachel Dean2, Sarah Baillie1, Sebastian Arlt3, Marnie Brennan1, David Brodbelt1, Fiona Brown1, Douglas Grindlay1, Ian Handel1, Mark Holmes1, Catherine McGowan1, Timothy Parkin1, Emma Place1, Gwen Rees9, Darren Shaw6, Javier Sanchez10, Laura Urdes11, Kristien Verheyen4, Sheena Warman9

1University of Bristol, School of Veterinary Sciences, Langford, United Kingdom
2University of Nottingham, Loughborough, United Kingdom
3University of Berlin, Berlin, Germany
4Royal Veterinary College, Potters Bar, United Kingdom
5University of Edinburgh, Edinburgh, United Kingdom
6Cambridge University, Cambridge, United Kingdom
7University of Liverpool, Liverpool, United Kingdom
8University of Glasgow, Glasgow, United Kingdom
9University of Bristol, Langford, United Kingdom
10University of Prince Edward Island, Charlottetown, United Kingdom
11University of Bucharest, Bucharest, Romania

Evidence-based veterinary medicine (EBVM) can be defined as the use of the best and most relevant available scientific evidence in conjunction with clinical expertise to make the best possible decision about a veterinary patient, while considering the circumstances of each patient and its owners/carers.

To help direct the uptake of EBVM in the veterinary consciousness, we have assembled an extensive international team with a collective passion for delivering high-quality teaching of EBVM. The team is currently working together to develop an open access series of online, re-usable learning objects presented as a coherent web tutorial designed to introduce learners to the key concepts of EBVM.

The resource will be organised into modules addressing the five key areas of EBVM:

- Ask – how to formulate answerable questions
- Acquire – how to obtain relevant information
- Appraise – how to evaluate the available evidence
- Apply – how to apply the evidence to clinical practise
- Assess – how to measure the effect of implemented changes

The purpose of this online resource is to introduce EBVM to learners, hence it will be appropriate for students and practitioners for self-study; it is also envisaged that the resource will be used in whole or in part as standalone teaching modules to support other EBVM teaching. The resource will utilise best pedagogical approaches, and will include formative multiple choice questions, short tasks and recommendations for further study. Development of the resource will follow an iterative cycle of development which includes review by both the core team as well as other identified stakeholders (e.g. students, practitioners, industry representatives).

It is hoped that the development of this resource will increase awareness of EBVM in the veterinary profession, and allow practitioners the opportunity to develop the skills needed to utilise EBVM in everyday clinical practice. Future aims of the project team include designing methods of cataloguing and disseminating evidence syntheses to support clinical decision making and evidence-based veterinary practice as well as building a community of practice in this area.

The project team would like to acknowledge RCVS Knowledge for funding the development of the online EBVM resource.

Corresponding author:
Senior Lecturer Kristen Reyher, University of Bristol, School of Veterinary Science, Langford House, BS40 5DU Langford, United Kingdom, kristen.reyher@bristol.ac.uk

DOI: 10.3205/15invest28, URN: urn:nbn:de:0183-15invest288
Engagement, repetition and tracking: Using of a mobile device application to teach anesthesia dose, fluid and infusion calculations

Robert Keegan, Scott Bullers, Gary Brown, John Gay
WSU, Pullman, United States

The ability to accurately and quickly perform anesthetic drug and infusion rate calculations is an essential skill that must be mastered by veterinary students, yet many students view these calculations as being difficult, tedious and unengaging. In response to student requests for practice problems we have created a mobile device-based anesthetic problem generator with the goal of improving student engagement while providing practice problems on demand. The VCalc application combines a dose, fluid rate, and infusion problem generator with a cloud-based database to record student attempts as well as the number of problems of each type that were answered correctly.

One hundred twenty eight veterinary students enrolled in an anesthesia course were studied to evaluate the acceptance and learning efficacy of the application. Students were assigned to install the application onto their personal phone, tablet or PC and complete three problems of each type (9 total). Subsequent to attempting the 9 problems on the app, students completed an examination which included 4 calculation questions (1 Drug, 1 Fluid, 2 Infusion calculations). After completing the examination, students submitted a survey of attitudes and opinions concerning the applicability and usefulness of the app.

All students installed or accessed the app and attempted at least one of the problems. The 128 students enrolled in the class attempted 2337 total problems, averaging 7.4, 7.4 and 6.5 Drug, Fluid and Infusion problems per student respectively. Students correctly answered a total of 1400 problems, averaging 5.0, 4.5, and 3.3 Drug, Fluid and Infusion problems per student answered correctly. The 4 exam calculation questions were all answered correctly by greater than 92% of the students. The survey indicated that a majority of students found that the app was useful or very useful for practicing anesthetic drug calculations and would like to see more apps developed and used within the curriculum. Finally, 77% of students reported that they had used the app to study for the exam.

The VCalc practice app was perceived as a useful and engaging instructional tool and was used by a majority of students to study for the exam. Students wished to see more apps developed and used within the veterinary curriculum. The VCalc application is available for Android, iOS and Windows platforms.

Corresponding author:
Associate Professor Robert Keegan, Washington State, 1100 Grimes Way, 99164 Pullman, US, rdk@vetmed.wsu.edu

DOI: 10.3205/15invest29, URN: urn:nbn:de:0183-15invest297
Assessment of communication patterns of Canadian dairy practitioners during farm visits

Caroline Ritter1, Cindy L. Adams1, Jeroen De Buck1, Steve Mason1, David F. Kelton1, Jolanda Jansen3, Herman W. Barkema1
1University of Calgary, Calgary, Canada
2University of Guelph, Guelph, Canada
3St. Anna Advies, Nijmegen, Netherlands

Veterinarians have important roles in dairy farmers’ decision-making regarding farm management; they are often regarded as the most trustworthy and reliable sources of advice on disease and disease risk management. Consequently, competent communication is a core clinical skill for practitioners. There is clear evidence in human medicine and companion animal settings that communication skills can influence satisfaction, adherence and health outcomes. However, there is a paucity of evidence-based findings regarding communication skills used by food-animal veterinarians. Therefore, we are planning to conduct a study to evaluate interactions between dairy producers and practitioners.

Veterinary communication with dairy producers will be recorded during regular Herd Health visits. Ten dairy practitioners (each visiting seven farms) will be equipped with a GoPro® (compact, rugged camcorder). Conversations will be recorded and categorized using the Roter Interaction Analysis System (RIAS), a leading technique to analyze interpersonal communication. In RIAS, codes are assigned to communication units (e.g. phrases, parts of phrases, or single words). These codes can be divided in two broad categories: 1) codes related to gathering or verification of clinical and therapeutic information (=instrumental codes); and 2) codes related to expression of concerns, agreement, criticism, empathy, etc. (=affective or social codes). Codes will be used to describe and quantify communication patterns used by the dairy practitioners. We will assess the following: proportion of talk, information gathering, client education and counselling, relationship building, activating, partnership, and orientation.

Recording dairy practitioners will enable description of distinct communication patterns. Identified gaps can be targeted in teaching veterinary students and practitioners. Improvement of communication skills is expected to increase farmer satisfaction and adherence with veterinary advice. Results of this study will help veterinarians to become more effective proactive coaches and advisors for dairy farmers.

Onsite communication skills education and outcomes assessment in a companion animal practice

Jane Shaw1, Gwyn Barley2, Kirsti Broadfoot1, Ashley Hill4, Debra Roter5
1Colorado State University, Fort Collins, United States
2Colorado Trust, Denver, United States
3University of Colorado, Denver, United States
4University of California, Davis, Davis, United States
5Johns Hopkins University, Baltimore, United States

The objectives of the study were twofold: to provide communication skills education to veterinary professionals in the practice setting and to evaluate the efficacy of 6-month training by measuring veterinarian-client communication and client and veterinarian satisfaction pre and post-intervention.

This is a case-based pre-test/post-test intervention study of a veterinary practice in Denver, Colorado. A purposive sample of three veterinarians and seven support staff were recruited to the study from a single practice. The entire veterinary practice participated in the 6-month educational program that included interactive communication modules, individual coaching and a communication laboratory. Thirty-six clients participated in the study by having a wellness or problem visit video-recorded (18 pre and 18 post skill training). In addition, 180 clients completed satisfaction surveys (90 pre and 90 post skills training). The Roter interaction analysis system (RIAS) was used to analyze the visit videotapes, and physician visit satisfaction scale and client visit satisfaction questionnaire (CSQ) were used.

Compared to pre-training visits, appointments were 5.40 minutes longer (p = 0.04), veterinarians asked 60% fewer closed lifestyle-social questions (p = 0.05), provided more 1.40 more biomedically-related client education (p < 0.01), and used 1.3 times more facilitative (p < 0.01) and 1.25 times more emotional rapport (p = 0.04) communication. Clients provided 1.3 times more biomedically-related information (p = 0.05), tended to ask more questions (p = 0.06) and engaged in twice more social conversation (p < 0.01) in post-training visits. After the training, aspects of visit satisfaction improved for both
veterinarians and clients. Veterinarians perceived their clients as complaining less (p < 0.01), and more personable (p < 0.01) and trusting (p < 0.01), and clients felt more involved in the appointment (p = 0.04) and reported greater veterinarian interest in their opinion (p < 0.01).

The training fostered a more client-centered approach with greater client education, rapport and facilitation of client input in an unhurried environment, resulting in enhanced overall veterinarian and parts of client visit satisfaction.

Corresponding author:
Associate Professor Jane Shaw, Colorado State University, 300 West Drake Road, 80523 Fort Collins, USA, jane.shaw@colostate.edu

DOI: 10.3205/15invest31, URN: urn:nbn:de:0183-15invest318

Using standardised client simulation to improve clinical reasoning in veterinary undergraduates
Claire Vinten, Kate Cobb, Sarah Freeman, Liz Mossop
University of Nottingham, Nottingham, United Kingdom

Standardised patients are widely used in undergraduate medical education for a multitude of purposes, including clinical reasoning skill development. In veterinary education, standardised clients (SCs) are used extensively in communication skill training, but are not commonly used to achieve other learning outcomes.

A simulated client program focussing on clinical reasoning skill development has been designed and implemented into The University of Nottingham School of Veterinary Medicine and Science (UNSVMS) curriculum. During a clinical placement in a first opinion small animal practice, all final year students undertake three consecutive consultations with an SC. They are required to diagnose and treat the accompanying canine patient, and are debriefed on their decision making strategies afterwards. Each consultation is filmed for later analysis. The session is designed to mirror typical consultations faced by new graduates in a fully immersive setting.

The effect of SC simulation on clinical reasoning development is being evaluated in four ways:
1. Comparison of skill levels demonstrated in each consultation (using the Lasater Clinical Judgment Rubric (LCJR))
2. Student self-assessment of clinical reasoning (using the LCJR) pre- and post-simulation
3. Quantitative student survey feedback
4. Qualitative student focus group discussions

The study is ongoing but preliminary self-assessment, survey and focus group data suggest students’ clinical reasoning skills improve as a result of the sessions.

Corresponding author:
Claire Vinten, University of Nottingham, Sutton Bonington, LE12 5RD Loughborough, England, svxcev@nottingham.ac.uk

DOI: 10.3205/15invest32, URN: urn:nbn:de:0183-15invest320

Preparing veterinary students for clinical placements by embedding simulation and clinical scenarios into small group clinical skills teaching
Robert Ward, Caroline Mosley, Carolyn Morton, Stacy Spielman, Catriona Bell
Royal (Dick) School of Veterinary Studies, Edinburgh, United Kingdom

A series of small group clinical skills practical classes were specifically designed and delivered in the 2014-15 academic year to help to prepare 3rd year veterinary students for their forthcoming clinical or ‘Extra-mural studies (EMS)’ placements in private veterinary practices. The content of these classes was informed both by results from a wider curriculum mapping exercise at the Royal (Dick) School of Veterinary Studies (R(D)SVS) plus feedback from students, faculty members and EMS providers.

Classes were badged under the umbrella term of ‘Preparing for EMS’, and key clinical skills were grouped together to produce the series of themed classes shown below:
1. Small Animal Skills
2. Large Animal Skills
3. Emergency and Critical Care Skills
4. Diagnostic Skills
5. Diagnostic Skills 2

Learning objectives were then formulated for each class, and these then informed the design of a series of ‘scenario-based stations’ that the students rotated around during each class. Most stations were based around typical clinical scenarios that a student may encounter during their EMS placements, and required them to learn a specific clinical skill e.g. urinary catheterisation of a male dog; or dose calculation, equipment selection and administration of an intravenous injection to a horse.

In order to provide additional relevant clinical context for each skill, the majority of scenarios involved a short clinical vignette which included the name of the patient plus a detailed signalment and brief clinical presentation. In addition, the Emergency and Critical Care (ECC) class was based around just one emergency patient, ‘Bruce’ a Labrador who had initially presented for surgery to remove an intestinal foreign body and then proceeded to ‘crash’ under anaesthesia, thus requiring a number of related ECC procedures to be carried out by the students.

Business skills were also embedded into the student learning experience in some classes, with the focus being for students to develop an appreciation of the cost of consumable items and common clinical procedures. Students were thus required to keep a log of the equipment and procedures that they had used on the various stations (e.g. intravenous cannula, pair of sterile gloves etc), and to then add up their total cost at the end of the practical class using a ‘price list’ generated using current ‘real’ prices from the Hospital for Small Animals at the R(D)SVS.

Low fidelity (e.g. UC Davis vascular access mannikins) and homemade simulators (e.g. modified Melissa and Doug® stuffed toys) were used in each scenario, thus making the classes affordable and deliverable to a year of 180 students. Each class lasted between 60–80 minutes and was delivered by two academic plus one technical staff member to 1/8 class sizes (approximately 20 students) in order to optimise the learning opportunities for each student.

Classes were extremely well received by students, and the ‘rotating station’ format with accompanying handout proved to be an efficient model for delivering clinical skills teaching. Future plans will focus on developing pragmatic methods for formative assessment of these clinical skills, followed by summative assessment using objective structured clinical examinations (OSCEs).

Corresponding author:
Senior Lecturer Catriona Bell, University of Edinburgh, Easter Bush Campus, EH25 9RG Roslin, UK, Catriona.Bell@ed.ac.uk


Development of a low cost cow dystocia model

Annett Annandale, Liezl Kok, Elrien Scheepers
Faculty of Veterinary Science, University of Pretoria South Africa, Pretoria, South Africa

Handling of bovine dystocia cases is a day one competency for veterinary graduates. For training purposes, obstetrical manipulations can be performed on abattoir or model calves. These procedures are usually done on tables were students can see which malpresentation, -position or -posture is present. It is however desirable to have students perform obstetrical manipulations blindly. An obstetrical examination leading to a diagnosis and management plan of the existing dystocia, as well as placing of ropes and other equipment while one can not see the calf in the birth canal can be challenging. Hands-on training opportunities for undergraduate veterinary students are limited and not every final year student has sufficient opportunity to perform the procedures. There are cow dystocia models commercially available but these are costly. Therefore an attempt was made to produce a low cost cow dystocia model that can be used with a dystocia calf model (Veterinary Simulator Industries, Canada). An existing steel frame was modified into a Holstein Friesian cow dystocia model. A removable dragon skin perineum was designed and a canvas uterus was made to certain specifications by a tent manufacturer. The canvas uterus has a full length zip lock on the dorsal surface for easy access and cleaning and can be removed from the steel frame. The birth canal was simulated by a narrowing with a 50 cm diameter within the steel frame. A large plastic garden refuse bin was cut into half, spray painted and attached to the sides of the steel frame using hinges for mobility. A black and white rope tail was attached to finish off the “Holstein Friesian look”. This model has proven to be usable and real enough, and to fulfill the main objective of handling a bovine dystocia blindly.

Corresponding author:
Dr Annett Annandale, University of Pretoria, Old Soutpan Road, 0110 Onderstepoort, South Africa, annett.annandale@up.ac.za

DOI: 10.3205/15invest34, URN: urn:nbn:de:0183-15invest349

Construction and implementation of a bovine obstetrical model as an interactive teaching method for veterinary students

Laura Schüller, Wolfgang Heuwieser, Carola Fischer-Tenhagen
Clinic for Animal Reproduction, Berlin, Germany

The acquisition of obstetrical skills in veterinary medicine is a complex learning process for veterinary students. It is important that the teaching process concentrates not only on theoretical knowledge, but also on practical skills in manual exploration and corrections of fetal dislocations. Therefore the use of obstetrical models is required and commonly used in veterinary education. Nevertheless, available commercial models (vet simulator industry, Calgary Canada) are very costly and only available overseas. It is well documented that learning is expected to be most effective when given topics are not only reproduced but also the intensive reflection on a related problem is enabled or the information is transferred from one format (e.g. printed information) into another format (e.g. manual implementation).

Therefore, the objective of this project was, to develop and construct a model for the interactive teaching of bovine dystocia in context of an elective workshop for veterinary students. The students were supposed to define the most important requirements for a bovine obstetrical model and to realize those requirements in the construction of an obstetrical model. The project was conducted in context of 2 consecutive elective workshop modules for veterinary students in the 3rd and 5th year of veterinary education at the Freie Universität Berlin. Eighteen students were allowed to choose this elective workshop as opportunity out of a selection of clinical courses from all veterinary fields. The workshop was conducted by 2 instructors in 2 consecutive modules.

The first module was performed at seven 2 hr appointments on a weekly basis. Students were assigned to one of 5 different working groups depending on their personal interest. Working groups were defined by their anatomic structure and importance for the obstetrical process as (1) uterus, cervix and vagina, (2) the pelvis, (3) the external genital organs, (4) the outer framework, and (5) the calf. The first exercise for each group was to discuss the physiology of the functional structure during parturition and to define specific characteristics of the functional structures in the context of obstetrical procedures. Results of each group were presented and discussed among all students. The second exercise for each group was to determine and define specific physiological characteristics of each functional structure that needed to be implemented in the obstetrical model and to make a list of required materials that could simulate those functional structures in the obstetrical model. General requirements to the obstetrical model were availability and longevity of all materials as well as easy cleaning and disinfection of all parts. Furthermore, the budget for all required materials was...
The objective of this project was to develop and construct a model for the interactive teaching of bovine dystocia during an elective course on bovine obstetrics for veterinary students. Within the scope of this project an obstetrical model was constructed by a group of veterinary students that provided an authentic feel of the bovine birth canal and the opportunity for the full extraction of the fetus. Furthermore, the application of lubricants and a wide range of obstetrical instruments was enabled. All students described their learning experience as highly valuable and intense. Further projects should provide construction plans of teaching models to enable reconstruction and later refinements for all interested students.

Corresponding author:
Dr. Laura Schüller, Clinic for Animal Reproduction, Freie Universität Berlin, Königsweg 65, 14163 Berlin, Germany, laura.schueller@fu-berlin.de


36

Validation of a bovine vascular access model for teaching students a technique for placing catheter in the auricular vein of cattle

H. Giese1, J. Hilke1, Y. Gundelach2, M. Dilly1

1Clinical Skills Lab, University of Veterinary Medicine Hannover, Foundation, Germany
2Clinic for Cattle, University of Veterinary Medicine Hannover, Foundation, Germany

Day-one-skills and competences have been introduced by the European Association of Establishments for Veterinary Education (EAEVE) in 2008. These include how to perform first aid as well as administrating appropriate treatment [1]. For
parenteral administration of drugs and fluids e.g. in case of dehydration, intravenous (IV) drip infusion through catheter placement is a well-established procedure. In cattle catheterization of the auricular vein guarantees a safe fit and can be used over several days even to infuse larger amounts of fluids [2]. A bovine model for catheter placement into the auricular vein has been constructed at the University of Veterinary Medicine Hannover (Figure 1). After evaluation by experts and students the model has been rated as useful for teaching [3].

Figure 1: Bovine vascular access model for placing catheter in the auricular vein of calves

Aim of this study was to test whether students with a training-session on the model perform catheter placement into the auricular vein of cattle successfully and correct. Furthermore student’s opinion on the model in comparison to live animal was collected.

During the last year of study, 13 students with no hands on experience in catheter placement in cattle were taught catheterization on the model. Afterwards all students underwent a checklist-based assessment (nine binary items) on live animals using an objective structured clinical examination (OSCE). Every student was allowed to perform two attempts, if needed. After the assessment students were asked to rate the model with a questionnaire. Questions focused on overall looks, haptic features and use of the model for teaching purposes. Rating was given on a Likert-Scale from one to four, “1 = fully agree”, “2 = agree”, “3 = mostly agree” and “4 = don’t agree”.

A total of nine students (69 %) succeeded in placing the catheter, seven students performed all checklist items correct and two students scored 89 % of all items. Four students did not manage to place the catheter. Only two students succeeded on their first attempt.

Students rated the overall look of the simulator 2.27, the haptic features 2.73 and the use for teaching 1.83 Overall the model seems to be able to demonstrate essential characteristics of catheter placement into the auricular vein in cattle. Furthermore, simulator-based training helped students to perform catheter placement successfully. In the future, the use of the model under different conditions as well as different delivery approaches on the effect of student’s performance will be of interest.

References


A sheath scrape model attached to a multifunctional life size Breeding Soundness Examination (BSE) bull

Annett Annandale, Liezl Kok, Elrien Scheepers
Faculty of Veterinary Science, University of Pretoria South Africa, Pretoria, South Africa

The diagnosis of bovine venereal diseases is an important skill required of any rural or large animal veterinary practitioner in Southern Africa. All newly graduated veterinarians as well as veterinary nurses must be able to perform a sheath scrape. The procedure is slightly invasive but fairly simple and can be taught well on a veterinary model. Once the idea for the sheath scrape model was developed, it was decided to attach it to a life size BSE bull. An existing taxidermy mould was used to manufacture a "Brahman" bull made of fiberglass with a gel coating. The skin from a bovine carcass was preserved. The scrotal contents (testes and epididymides), penis and accessory sex glands were used to make moulds of
these organs. The moulds were then used to cast silicone models of the organs. Further parts used to construct the bull model included a dragon skin perineum, a pilates ball ("rumen"), rubber tubing ("oesophagus"), pool pipes ("trachea") and silicone injection pads. Cleaned anatomical specimens of the pelvis, sacrum and tail vertebrae were also added to the model. Skills that can be taught on the bull include most of the procedures done during a BSE, i.e. rectal palpation to assess the accessory sex glands, palpation of the sheath and its contents, palpation of scrotal contents (interchangeable normal and abnormal testes, epididymides and spermatic cords), measurement of scrotal circumference, palpation of the penile sigmoid flexure, evaluation of sheath confirmation as well as the sheath wash and scrape procedure. Additional features are the passing of a stomach tube into the "rumen", with the possibility of rumen auscultation to ensure correct placement of the stomach tube, intravenous and intramuscular injection sites and an epidural anaesthesia function, where correct needle placement is confirmed by a light coming on.

Corresponding author:
Dr Annett Annandale, University of Pretoria, Old Soutpan Road, 0110 Onderstepoort, South Africa, annett.annandale@up.ac.za


38

Can virtual reality enhance academic success while learning about the canine stifle joint?
Tatiana Motta, Joanna Pogue, Kristy Margulieux, Jonathan Dyce
Ohio State University, Columbus, United States

Visual-spatial ability in veterinary students has been shown to be a key skill necessary for educational success and long-term knowledge. Research has shown that students who employed a multitude of study methods over a single study method had greater academic success and a deeper processing of material. Yet, most veterinary curricula provide only lectures including two-dimensional images along with a limited number of hands-on laboratories. Advancements in technology have presented veterinary educators with the opportunity to create additional and improved tools for the study of the animal body. The ability for a student to mentally manipulate an image as if it were three-dimensional (3D) is essential for good clinical and surgical practice of medicine. The purpose of this study was to create a 3D model of the stifle joint and create an interactive clinical case web tool. In addition, we aimed to evaluate students’ anatomical proficiency once the 3D virtual model was used in association with the interactive clinical case.

Methods – A 3D virtual model of the canine stifle joint was created. Thirty senior students undergoing an elective orthopedic surgery rotation were recruited. Students were randomly assigned to one of these two groups: control group (students had access to the routine educational tools, including text books and lecture notes) simulation group (in addition to the routine educational tools mentioned, students had full access to the simulation model and the clinical case). All students were given a questionnaire to evaluate their previous orthopedic experience and 2 quizzes, one at the beginning of their two-week rotation and another one at the end of their rotation. Data from the questionnaire and quizzes is still being collected and evaluated.

We expect to find a significant difference in academic success and knowledge retention between the students who were provided with the supplemental 3D stifle model and clinical case web tool compared to those students who did not have access to the model.

References

Corresponding author:
Assistant Professor Tatiana Motta, Ohio State University, 601 Vernon Tharp St., 43210 Columbus, USA, motta.13@osu.edu

A new approach in anatomical teaching – Upgrading the conventional practical learning by immediate combination with modern digital teaching

Inga Wölfel1, Elisabeth Zandt1, Andreas Brühschwein2, Andrea Meyer-Lindenberg2, Cordula Poulsen Nautrup1
1Anatomy, Histology and Embryology, Department of Veterinary Science, Ludwig-Maximilians-University, Munich, Germany
2Clinic of Small Animal Surgery and Reproduction, Centre of Clinical Veterinary Medicine, Ludwig-Maximilians-University, Munich, Germany

The gross anatomy has always been one of the significant cornerstones of veterinary education. A detailed anatomical knowledge is fundamental for the correct interpretation of clinical imaging and the proper implementation of medical interventions. This also applies to the skeletal system of domestic mammals. The precise knowledge of numerous osseous structures, their topography and definition with technical terms, and their functional and clinical relevance are the basis for understanding the entire musculoskeletal system.

Education is becoming exacerbated due to the constantly rising number of students and the expanding curriculum. The simultaneous decrease in both the number of lessons and teaching staff interferes with comprehensive teaching. Thus, the theoretical training based on books, atlases, lectures and digital learning media predominates. Practical training shifts unfavorably to the background. The majority of the students has particular difficulty in transferring the theory to the real anatomical specimen. Moreover, the correct pronunciation of the technical terminology is especially difficult for beginners.

A reasonable approach to improve the practical education and develop practical combines real anatomical specimens with theoretical digital context. This pathway has been chosen in this project.

In order to implement the new teaching concept, the tracking system from the simulator SonoSim III of Sonofit GmbH (Darmstadt, Germany) was used. The bones of canine and equine thoracic limbs were chosen as an example of an anatomical system. Additionally, audio-, text-, image- and video-files of anatomical specimens, conventional radiographs and CT-scans were integrated into the simulator.

In the case presented, the thoracic limb skeleton of dog and horse was developed with the use of SonoSim III, a novel instrument for autodidactic acquisition of the gross anatomy. When touching the bony structures of a real anatomical specimen with a special pen, suitable explanatory audio and text files will be played or displayed on a monitor. This allows the students to learn the topography independently and autodidactically and to label the osseous structures with the technical terms. Moreover, this system provides the more interested user with additional anatomical and clinical information by showing radiographs of the respective bony structures. This innovative system will support and improve the gross anatomical education as well as encourage the understanding of clinical imaging. The new recently developed learning tool will be used and evaluated in the upcoming semester 2015/16 by the veterinary medicine students of the first semester at the Ludwig-Maximilians-University, Munich.

Corresponding author:
Univ.-Prof. Dr. med. vet. Cordula Poulsen Nautrup, Anatomy, Histology and Embryology, Department of Veterinary Science, Ludwig-Maximilians-University, Munich, Germany, cordula.poulsen@lmu.de


DOI: 10.3205/15invest39, URN: urn:nbn:de:0183-15invest39

Virtual 3D veterinary anatomy: Interactive learning modules

Patricia Schrock, Carsten Staszyk
Institute of Veterinary Anatomy, -Histology and -Embryology, Faculty of Veterinary Medicine, Jus7tus-Liebig-University Giessen, Germany

Especially first year students of the veterinary medicine are faced with learning enormous amounts of anatomical information in a very short period of time. The available time spent in anatomical labs is limited, therefore it is inevitable to recapitulate anatomical issues at home. However, exceedingly few students have any anatomical specimen to practice on. Up to now, home study mainly is based on learning anatomical issues from 2D drawings or photographs found in textbooks. The idea is to provide realistic 3D-dimensional models of different regions of the animal body based on CT Scans for the use at home. Additionally, by embedding these models into learning modules with predefined questions and answer possibilities in form of single choice, multiple choice and matching tests, students are guided through the enormous amount of anatomical information given in the textbooks.

High resolution CT scans of skulls and bones are generated. Based on the different gray scales, every picture point is assigned to a material and subsequently 3D models are created. Close attention is paid to generate most realistic and detailed anatomical 3D-models. Important anatomical structures are highlighted. To enable easy access for everyone, the models are transformed into PDFs. By integrating these 3D-PDFs into learning modules, students are challenged to acquire distinct anatomical knowledge by careful inspection of the 3D-models.

Detailed and realistic 3D-models of different anatomical issues are generated and embedded into learning modules, which are based on self directed questions and answer. The multiple choice test based self-assessment in combination with 3D-
models with highlighted anatomical structures enable the students to learn the anatomical issues more focused and promotes the three-dimensional imagination abilities.

By creating learning modules with embedded 3D-models and by evaluating the knowledge students have acquired using single choice, multiple choice and matching tests, the gap between learning sessions within the anatomical labs and the self-directed learning at home can be bridged.

However, a very elaborate procedure is needed to create realistic and detailed anatomical 3D-models.

Corresponding author:
Carsten Staszyk, Institute of Veterinary Anatomy, Histology and Embryology, Faculty of Veterinary Medicine, Justus-Liebig-University Giessen, Germany, carsten.staszyk@vetmed.uni-giessen.de

DOI: 10.3205/15invest40, URN: urn:nbn:de:0183-15invest406

41

Student’s perception about harmful use of animals in Veterinary Education in Brazil

Rosangela Gebara, Julia Matera
Department of Surgery, School of Veterinary Medicine and Animal Science, University of São Paulo, São Paulo, Brazil

Brazil currently ranks first in the world in number of veterinary schools, currently has 183 cursos. There is no official data on how animals are used in veterinary medicine education, how many are killed for this purpose, how many go through harmful procedures that affected their physiological and psychological welfare and what colleges are already using humane methods in veterinary and life science courses.

Similarly, there is not any wide-ranging study that demonstrates the opinion of the veterinary students about this important issue that permeates the daily lives of tens of academic courses.

In an on-going study, an online questionnaire (with 26 semi opened questions) was applied to 1383 students of veterinary medicine from 27 states of Brazil, and it can be demonstrated up to the present time, most of these respondents understand some important and relevant concepts regarding use of animals in Veterinary Education.

Most (45.3%) of respondents, that was asked if they know about the concept of the 3Rs (replace, reduce and refine) regarding the use of animals in teaching and research", said “Yes” and 12.6% answered, “They know in part”.

In another question, 84.7% answered they mean by “harmful use” of animals in teaching, - “Euthanasia of healthy animals for a demonstration classes” and in the second place (82.8%) - “An invasive procedure (surgery, suture, endotracheal intubation, etc.) in a healthy animal, which does not need such a procedure”.

When they were asked about - Which would be the main ADVANTAGES of the use of “substitutive methods” when compared to the harmful use of animals in the Vet school? Most respondents (88.6%), answered that the main advantage is “To be a method ethically acceptable, where there is no cruelty to animals.”

In another question, about the IMPORTANCE of adopting humane & substitutive methods and no longer use live animals in a harmful way in the undergraduate education, 73% of respondents said “Yes, they should adopt substitutive methods because as veterinarians have the ethical and professional obligation to ensure welfare and respect animals”, showing that for these students there is a moral obligation of vet professional regarding animals.

Although the study is not yet complete, with these preliminary data we can say that this sample of students show us to be familiar with concepts of harmful use of animals, substitutive methods and 3Rs, and they believe that Veterinary colleges should adopt such humane methods as an ethical obligation.

As in most of the times, the driving force for changes in traditional teaching methods are the students, know about these issues is a very important tool for students around the world, demonstrating the importance of discussing this issue with this population.
Meeting point of animal welfare and veterinary education or else. The difficulties of the clinician in the ocean of students and animals.

Julianna Thuróczy, Linda Müller, Eszter Kollár, Sára Kecskeméthy, Nóra Császár, Sándor Cseh

SzIU, Faculty of Veterinary Science, Budapest, Hungary

The Faculty of Veterinary Science, Budapest is the only veterinary school in Hungary. Current enrolment is about 100 and 120 students for the Hungarian and English programs, respectively. This means that we have a total of 800 students at the veterinary school from which, each year 400-450 students step into clinical practice, obligatory at the small animal clinic.

Obligatory clinical shifts cross over the consecutive last four semesters, which are destined for the increase manual skills of students.

On the other hand, although the number of inhabitants of Hungary is narrowly more than 9.8 million, the percentage of dog and/or cat-keeping households is more than 40% in contrast with the 20–30 % European average. The estimated number of stray dogs is more than 200 thousands from the total of 2.5 million dogs and only 1.5 million are registered in the official database despite of rules. In spite of a high number of successful placement to new owners and euthanasia (unfortunately), the stray dog number does not decrease from year to year. The only explanation is their reproduction.

The faculty was looking for possibilities to provide practice for students, the shelters were looking for possibility of spaying stray dogs. The university offers spaying, and the shelters provide the dogs. And the government covers the half of the expenses.

Three to five students form a group and the shift lasts from Monday until Friday. Although until this time students had passed the collective practices in groups and they have become familiar with the theory of placing intravenous catheters, disinfection for operation, rules of sterility, and anatomy of reproductive organs, but this is the first direct contact with anaesthesia, opening of abdominal cavity of a breathing animal. From the start, there were 914 dogs operated by the students on 159 operation days. The four supervisors work in daily relay with each other and discuss the students’ progress daily with each other, controlling their development individually. This means statistically, that the activity of one supervisor increases the practical skills of 100–112 students, and results in 229 spayed animals.

According to experiences, it can be concluded that high level of theoretical education does not substitute practice. The adjustment of the operation mask, avoiding to touch non-sterile objects with sterile operation gloves, need some automatism of reflexes. The first contact with the feeling of responsibility for a living being effects students in different ways. Observed reactions vary from inspiration through depression to confusion. One of the most important role of the supervisor is to help to focus student’s attention on important points and teach how to make decisions and considerations.

The management of the student operations needs new skills from the supervisors, too. Reflect to the actions in pre- and post-operative rooms, and management of the operation, all these postulate the ability of shared attention from supervisor and well-trained technicians.

Although the risk of hidden diseases and sensitivities is high due to unknown anamneses, there were only two lost from the 914 patients.

Corresponding author:
Ph.D. Julianna Thuróczy, SzIU, Faculty of Veterinary Science, Budapest, Hungary, thuroczy.julianna@aotk.szie.hu


Freely available from: http://www.egms.de/en/meetings/invest2015/15invest42.shtml
Workshop Session 1

Setting up an OSCE
(Sarah Baillie, Alison Catterall)

In the workshop we will share our experiences running OSCEs for animal handling, clinical skills and communication skills. The workshop will cover the whole process from the initial planning, to preparing and running an OSCE, through to analysis of the results. We will provide practical tips for resourcing the examinations, managing a circuit and training staff.

Teaching Surgical Skills in Large Animals
(Dean Hendrickson)

This workshop will provide the attendee to hear about some of the various methods that are being used to teach surgical skill in large animals. The attendees will also be asked to participate in a forum to discuss the best way to teach surgical skills in large animal patients. A couple of examples will be provided for the attendees to participate in large animal surgical skills.

“Students in educational research projects” – how to turn students from consumers to creators
(Renate Weller)

Active involvement in research promotes the development of a whole range of generic as well as research specific skills. In this inter-active workshop we will explore how we can engage students in the research process by getting them involved in pedagogical research. We will discuss “tips and tricks” on how to get the most out of these project in terms of student and supervisor satisfaction, publications and teaching material (e.g. simulators) and of course student (and supervisor) continuing development.

Development and Fabrication Process for Practical Simulation Model
(Russ Gray, Bryan Pfahl)

Description of entire fabrication process of a specific practical simulation model, including research, initial sculpture, molding, casting, prototypes and testing.

Promoting effective student feedback
(Sheena Warman)

This interactive workshop will give participants an opportunity to consider the importance of effective feedback for student learning. There will be discussion of the potential challenges of feedback, particularly within the clinical environment, and participants will be encouraged to try out some simple frameworks for facilitating feedback dialogue with students. Approaches to enhancing the feedback culture within institutions will be considered.
Workshop Session 2

Simulated clients: Enhance communication teaching and learning through in the moment coaching and feedback
(Elpida Artemiou, Beth Dronson)

Clinical communication is a Day One competency, and training in communication skills using simulated clients in small-group experiential sessions facilitated with attention to effective skills in coaching and delivery of constructive feedback is essential. Using the premises of the Calgary-Cambridge Guide, participants will practice effective approaches in providing feedback as well as explore challenges and opportunities in the delivery of communication skills training. In small groups, participants will practice communication teaching and coaching skills through vignettes and live simulations as well as engage in discussions on how best to support student, faculty and clinician learning experiences in educational and practice settings.

The ethics of educational research
(Carol Gray)

We will look at the main ethical concerns involved in educational research. We will apply these to several (anonymised) real-life applications for research ethics approval and review these as a group.

Skills education in the veterinary curriculum; how to assess we get value for money?
(Claudia Wolschrijn)

Recently, new skills labs have been designed and opened at a number of vet schools. Most of them are centralized labs, to which the students come and register before practicing the skills. In the NL, we chose to have a decentralized skills lab; every clinical department is responsible for its own skills education and has space allocated for practice. As such, skills like animal handling, tying knots, basic laboratory exercises, but also cadaver surgery are all located in a designated area. For logistic reasons, the basic skills (obliged for every Bachelor student) are available at the farm animal department. All the species-specific skills are taught at the respective department. The advantage of such an approach is that the skills lab is always nearby, making it possible to have reinforcement of the skills during the clinical rotations.

How do we know this works? Are student evaluations enough? What value have the marks the students score during training and in their clinical rotations? In our experience, validation of skills lab teaching is difficult and hard to publish. Individual devices need a gold standard and the testing of five validities, but is it possible or even better to validate the lab as a whole?

In this workshop we want to exchange best practices among the members on how to run a skills lab and how to validate the use of it.

Developing and maintaining clinical skills learning environments and student resources
(Robin Farrell Linda Shell)

This workshop is intended for those interested in developing skills and sharing ideas on how best to set up a clinical skills teaching and learning environment. The workshop will focus on the more intricate details of planning an individual laboratory from how the room should be set up to what types of resources (e-learning materials, videos, models and consumable items) should be available to the students based on their level of competency in any one particular skill or procedure.

Challenges and tips for success will be highlighted in hopes of easing the implementation process of building or growing a clinical skills program. The information provided will be drawn from the literature and our colleague’s experiences.

Clinical skills laboratories vary considerably when it comes to size and funding. This workshop aims to provide information that can be applied to any budget from the small inexpensive learning space to the grandiose program design. The facilitators will introduce each step of the laboratory and budget planning process followed by small group work. Participants will have an opportunity to create a laboratory plan and work together to find solutions to common problems encountered.
“How to create your own virtual patient” Part 1  
(Christin Kleinsorgen)

Previous studies confirm the use of e-learning and virtual patients as efficient and auspiciously demonstrate better retention of knowledge.  
In our first session we will start with a short introduction to virtual patients and their use and implementation at the TiHo.  
Then the case-based learning system CASUS® will be presented in the second half. You will get familiar with the player’s and authoring mode.  
Aim of this Workshop is to create your own virtual patient in a small group, and present it at the end of the Workshop.  
Therefore be prepared with data of one of your favourite example cases (we will provide substitutes if necessary).

“Strategies and Tools for flipping Content and Encouraging Critical Thinking”  
(Duncan Ferguson)

Critical thinking and problem-solving, individually and in teams, are key activity of a veterinarian’s job.  
However, the educational process in the pre-clinical training years is focused largely on the virtually impossible task to “deliver,” largely through lectures, complex medical content, with little practice at these crucial processes. The challenge for the instructor is to spend more time with the student while they consolidate their understanding through the application of the content. Today’s digital technologies offer potential solutions in what has become known as “flipping” or “inverting” the content into digital formats which students are asked to review before face-to-face instructional time is spent on application of the information. Self-paced customized learning approaches also become more feasible. Such blended instruction has been shown to result in enhanced longterm learning. This workshop will focus on several strategies and available low-cost instructional tools for reconfiguring instruction that would enhance classroom time for a focus on interactivity and critical thinking. Techniques for developing low-cost short instructional videos, portable and customizable module platforms such as the one available on TED Ed (http://www.ed.ted.com) and problem/case platforms which enhance higher level critical thinking will be emphasized in the workshop. The goal will be for each participant to gain practice developing elements of such a learning module.
Workshop Session 3

Clinical Skills Model Buffett and Tours to the Clinical Skills Lab
(Marc Dilly, Rikke Langenbæk)

This workshop is suitable for conference attendees who would like to try multiple clinical skills teaching models developed at the University of Copenhagen and University of Veterinary Medicine Hannover. Participants will be encouraged to test and construct some models/simulators. Feel free to bring your ideas, construction plans or even models with you. Furthermore, participants will experience a wide range of teaching models and have the opportunity to pick up plans for construction.

Introduction to Games Based Learning, The Layered Learning Model and Game Development
(Eric Bauman, Dave Pederson)

Educational games are becoming ubiquitous within medical education and other types of clinical training programs. Students enjoy games and to some extent expect them to be a part of their learning experience. Games themselves by there very nature provide both an evaluative and summative experience for teachers and students. They provide immediate and justintime feedback through a series of rules and consequences (Bauman 2012). Games evaluate player, learner success through performance (SQUIRE, 2006). Performance evaluation is a familiar and contextually relevant premise found through out medical education (Bauman and RalstonBerg, 2014; Bauman and Games, 2011; Games and Bauman, 2011). This workshop will provide participants with an overview of gamebased learning situated from the perspective of medical education using the layered learning model. this workshop will conclude with a faculty facilitated interactive game development exercise using a narrative storyboarding technique.

Optimising Small Group Teaching
(Catriona Bell)

Learning Objectives:
By the end of this workshops you should be able to:
1. Explain the purpose of using an icebreaker at the start of small group teaching sessions (SGTS)
2. List techniques that may help to encourage individual contributions from students during SGTS
3. Select the most appropriate room layout for SGTS
4. Adapt questioning techniques during SGTS
5. Identify appropriate strategies for dealing with difficult students during SGTS
6. Share ‘top tips’ for optimising student learning during SGTS

Creating a simulation case under aspects of realism and cost
(Katja Anne Dannenberg, Fabian Stroben)

Simulation is an essential part of training for clinical practice and an opportunity to apply clinical skills in realistic settings both in human and veterinary medicine. Simulation is well known to increase the feeling of preparedness, can effect behavioural changes and is linked to a higher level of performance in medical students.

In this workshop design features of a “good” simulation case will be developed using an example case and small group work. Discussions will focus on aspects of realism and cost-effectiveness: How much realism is needed to achieve learning-benefits and how can I develop full-scale simulation with limited means? Throughout the workshop examples of the emergency room simulation “Nachtdienst: Bist du bereit?!?” (Nightshift: Are you ready?!) will be introduced, which is organized by student tutors of the Lernzentrum, skills lab of the Charité-Universitätsmedizin Berlin.

This workshop addresses junior-educators with little experience in facilitating simulation for both human and veterinary medicine. Learning goals of this workshop are not specific for any discipline.
“How to create your own virtual patient” Part 2  
(Christin Kleinsorgen)

“How to create your own virtual patient” Part 2  
(Christin Kleinsorgen)

“Cultivating a Growth Mindset: Enhancing Receptivity to Feedback”  
(Jane Shaw)

As educators, we often teach colleagues or students approaches to “giving feedback”. This workshop focuses on techniques for “receiving feedback”. Providing and receiving feedback is one of the key competencies for personal and professional development. Barriers to receiving feedback include: temperament (50%), interpretation (40%) and circumstances (10%). There is a 3000 percent variability in emotional responses between individuals who respond to feedback with catastrophic thinking to those who are unable to hear the feedback at all. There is potential in the 40% window of interpretation to turn upsetting feedback into learning. This workshop will present concrete strategies for enhancing receptivity to feedback in colleagues and students.
Author index

(Referring to abstract numbers)

Adams, Cindy L. 30
Ames, Kent 25
Anderson, Lane 07
Annandale, Annett 13, 20, 34, 37
Anzino, Joe 15
Art, Sebastian 28
Aulmann, Maria 17
Baillie, Sarah 14, 28
Balogh, Márton 18
Barber, Stuart 27
Barkema, Herman W. 30
Barley, Gwyn 31
Bates, Lucy 14
Belfort, Lisa 10
Beitz-Radzio, Christina 10
Bell, Caterina 33
Bengoa, Victoria 15
Bennigau, Dora 17, 26
Bradley, Carol 01
Bramley, Elizabeth 27
Brennan, Marnie 28
Broadfoot, Kirsti 31
Brodbelt, David 28
Brown, Fiona 28
Brown, Glyn 28
Brünschwitz, Andreas 39
Bullers, Scott 29
Carlson, A. 01
Carter, Benjamin 03, 12
Caston, Stephanie S. 02
Celi, Pietro 27
Christmann, Undine 09
Clarke, Nancy 15
Cobb, Kate 32
Crowther, Emma 28
Császár, Nóra 42
Csem, Sándor 18, 42
Danielson, Jared A. 02, 11
Dascanio, John 09
Day, Peter 08
De Buck, Jeroen 30
De Vere, Ruth 15
Dean, Rachel 28
Decker, Julia 22
Dilly, Marc 05, 36
Düngelhoef, Andrea 23
Dye, Jonathan 38
Edwards, Glenn 01
Eilers, Jan P. 23
Engelskirchen, Simon 05
Fischer-Tenhagen, Carla 35
Frank-Cannon, Tamy 06
Freeman, Sarah 32
Gardner, Gemma 15
Gay, John 29
Gebara, Rosangela 15, 41
Giese, H. 36
Goddard, Amelia 13
Grindlay, Douglas 28
Grósz Beilage, Elisabeth 21
Gundelach, Y. 36
Hallein, Evan 27
Handel, Ian 28
Heuwieser, Wolfgang 35
Hilke, J. 36
Hill, Ashley 31
Hill, Lawrence 03, 04
Holmes, Mark 28
Hungerbühler, Stephan 05
Irons, Peter Charles 20
Jacobson, Caroline 27
Jansen, Jolanda 30
Johnson, Jason 09
Johnson, Tony 18
Kaeppke, Maren 24
Kareem, Roy 15
Kecksméth, Sára 42
Keegan, Robert 29
Kelton, David F. 30
Kersh, Kevin D. 02
Kleinsorgen, Christoph 16, 23
Kok, Liezl 34, 37
Kollár, Eszter 42
Linford, Robert 25
Löskén, Svenja 23
Maharaj, B.T.J. (Sunil) 20
Malinowski, Robert 19, 25
Marquardt, Nicole 24
Mason, Steve 30
Matera, Julia 41
McGowan, Catherine 28
McGowan, Michael 27
McLaughlin, Mary 03, 04, 12
Meola, Erin 04
Meyer-Lindenberg, Andrea 39
Midla, Lowell 25
Morton, Carolyn 33
Mosley, Caroline 33
Mossop, Liz 32
Motta, Tatiana 03, 04, 12, 38
Müller, Lina 16
Müller, Linda 18, 42
Mülling, Christoph 17, 26
Nabors, Ben 25
Owens, Jane 27
Parkin, Timothy 28
Patterson, Jon 25
Pion, Paul 18
Pither, Zoe 14
Place, Emma 28
Pogue, Joanna 38
Poulsen Nautrup, Cordula 21, 22, 39
Proctor, Helen 15
Radtk, Jasmin 21
Ramsbottom, Sabine 10
Rashmir, Ann 25
Raven, Matt 25
Rees, Gwen 28
Reese, Sven 21
Reinertson, Eric L. 02
Reyher, Kristen 28
Ritter, Caroline 30
Roberts, Jennifer 25
Rohleder, Bradley 09
Rosenthal, John 05
Roter, Debra 31
Sanchez, Javier 28
Schaper, Caroline 16
Schaeper, Erlien 13, 34, 37
Schleining, Jennifer A. 02, 11
Schmalz, Sebastian 17, 26
Schrock, Patricia 40
Schüller, Laura 35
Shallicross, David 27
Sharples, Johanna 08
Shaw, Darren 28
Shaw, Jane 31
Silveira, Catrina 03, 04, 12
Sommer, Christopher 10
Spiegel, Florian 23
Spiegel, Sebastian 23
Spielman, Stacy 33
Spyridis, Alex 20
Staszyk, Carsten 40
Thuróczy, Julianna 42
Tipold, Andrea 16
Titus, Lydia 09
Übel, Nicole 10
Urdes, Laura 28
Verheyen, Kristien 28
Vinten, Claire 32
Ward, Robert 33
Warman, Sheena 14, 28
Weber, Lucas 10
Weber, Stefanie 21, 22
Weiß, Christine 10
Welker, Frank 25
Weller, Renate 08
Wendt, Michael 23
Weston, Jenny 27
Whittemore, Jacqueline 07
Williamson, Julie 09
Wölfel, Inga 22, 39
Zandt, Elisabeth 21, 22, 39
<table>
<thead>
<tr>
<th>Delegate Name</th>
<th>Institution</th>
<th>Email Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taimur Alavi</td>
<td>Ivala Limited</td>
<td><a href="mailto:Taimur.alavi@gmail.com">Taimur.alavi@gmail.com</a></td>
</tr>
<tr>
<td>Lane Anderson</td>
<td>University of Tennessee, College of Veterinary Medicine</td>
<td><a href="mailto:sander66@utk.edu">sander66@utk.edu</a></td>
</tr>
<tr>
<td>Annett Annandale</td>
<td>Faculty of Veterinary Science, University of Pretoria</td>
<td><a href="mailto:annett.annandale@up.ac.za">annett.annandale@up.ac.za</a></td>
</tr>
<tr>
<td>Tatiana Art</td>
<td>University of Liege, Faculty of Veterinary Medicine</td>
<td><a href="mailto:tatiana.art@ulg.ac.be">tatiana.art@ulg.ac.be</a></td>
</tr>
<tr>
<td>Elpida Artemiou</td>
<td>Ross University School of Veterinary Medicine</td>
<td><a href="mailto:eartemiou@rossvet.edu.kn">eartemiou@rossvet.edu.kn</a></td>
</tr>
<tr>
<td>Sarah Baillie</td>
<td>University of Bristol</td>
<td><a href="mailto:sarah.baillie@bristol.ac.uk">sarah.baillie@bristol.ac.uk</a></td>
</tr>
<tr>
<td>Márton Balogh</td>
<td>Veterinary Information Network</td>
<td><a href="mailto:anyadayahalor@gmail.com">anyadayahalor@gmail.com</a></td>
</tr>
<tr>
<td>Stuart Barber</td>
<td>University of Melbourne</td>
<td><a href="mailto:sbarber@unimelb.edu.au">sbarber@unimelb.edu.au</a></td>
</tr>
<tr>
<td>Carolin Bauer</td>
<td>University of Veterinary Medicine Hannover</td>
<td><a href="mailto:chm.bauer@yahoo.de">chm.bauer@yahoo.de</a></td>
</tr>
<tr>
<td>Catriona Bell</td>
<td>Royal (Dick) School of Veterinary Studies University of Edinburgh</td>
<td><a href="mailto:Catriona.Bell@ed.ac.uk">Catriona.Bell@ed.ac.uk</a></td>
</tr>
<tr>
<td>Dora Bernigau</td>
<td>Faculty of Veterinary Medicine, Leipzig University</td>
<td><a href="mailto:heller@vetmed.uni-leipzig.de">heller@vetmed.uni-leipzig.de</a></td>
</tr>
<tr>
<td>Carol Bradley</td>
<td>University of Melbourne</td>
<td><a href="mailto:cbrad@unimelb.edu.au">cbrad@unimelb.edu.au</a></td>
</tr>
<tr>
<td>Jackie Brearley</td>
<td>University of Cambridge</td>
<td><a href="mailto:jcb78@cam.ac.uk">jcb78@cam.ac.uk</a></td>
</tr>
<tr>
<td>Laura Buckley</td>
<td>University of Liverpool</td>
<td><a href="mailto:laurab79@liv.ac.uk">laurab79@liv.ac.uk</a></td>
</tr>
<tr>
<td>Daryl Buss</td>
<td>Association of American Veterinary Medical Colleges</td>
<td><a href="mailto:dbuss@avavmc.org">dbuss@avavmc.org</a></td>
</tr>
<tr>
<td>Stephanie Caston</td>
<td>Iowa State University</td>
<td><a href="mailto:stephcaston@gmail.com">stephcaston@gmail.com</a></td>
</tr>
<tr>
<td>Alison Catterall</td>
<td>University of Bristol</td>
<td><a href="mailto:A.J.Catterall@bristol.ac.uk">A.J.Catterall@bristol.ac.uk</a></td>
</tr>
<tr>
<td>Frank Cerfogli</td>
<td>Des Moines Area Community College</td>
<td><a href="mailto:fmcerfogli@dmacc.edu">fmcerfogli@dmacc.edu</a></td>
</tr>
<tr>
<td>Christopher Sommer</td>
<td>LMU Munchen</td>
<td><a href="mailto:Sommerchrist@gmx.de">Sommerchrist@gmx.de</a></td>
</tr>
<tr>
<td>Anne Cogny</td>
<td>Oniris Nantes</td>
<td><a href="mailto:anne.gogny@oniris-nantes.fr">anne.gogny@oniris-nantes.fr</a></td>
</tr>
<tr>
<td>Katja Anne Dannenberg</td>
<td>Charité-Universitätsmedizin Berlin</td>
<td><a href="mailto:katja-anne.dannenberg@charite.de">katja-anne.dannenberg@charite.de</a></td>
</tr>
<tr>
<td>Marc Dilly</td>
<td>University of Veterinary Medicine Hannover</td>
<td><a href="mailto:Marc.Dilly@tih-anhemover.de">Marc.Dilly@tih-anhemover.de</a></td>
</tr>
<tr>
<td>Julia Dittes</td>
<td>Veterinärmedizinische Fakultät Leipzig</td>
<td><a href="mailto:julia-dittes@t-online.de">julia-dittes@t-online.de</a></td>
</tr>
<tr>
<td>Kristy Dowers</td>
<td>Colorado State University</td>
<td><a href="mailto:kdowers@colorstate.edu">kdowers@colorstate.edu</a></td>
</tr>
<tr>
<td>Niklas Wolf Dresden</td>
<td>Veterinär-Anatomisches Institut Leipzig</td>
<td><a href="mailto:niklas.dresden@gmx.de">niklas.dresden@gmx.de</a></td>
</tr>
<tr>
<td>Beth Dronson</td>
<td>Zoetis</td>
<td><a href="mailto:beth.dronson@zoetis.com">beth.dronson@zoetis.com</a></td>
</tr>
<tr>
<td>Sabrina Effmert</td>
<td>University of Veterinary Medicine Hannover</td>
<td><a href="mailto:sabrina_effmert@web.de">sabrina_effmert@web.de</a></td>
</tr>
<tr>
<td>Simon Engelskirchen</td>
<td>University of Veterinary Medicine Hannover</td>
<td><a href="mailto:simon.engelskirchen@tih-anhemover.de">simon.engelskirchen@tih-anhemover.de</a></td>
</tr>
<tr>
<td>Zita Faixova</td>
<td>University of veterinary medicine and pharmacy in Kosice</td>
<td><a href="mailto:zita.faixova@uvf.sk">zita.faixova@uvf.sk</a></td>
</tr>
<tr>
<td>Robin Farrell</td>
<td>Ross University School of Veterinary Medicine</td>
<td><a href="mailto:RFarrell@rossvet.edu.kn">RFarrell@rossvet.edu.kn</a></td>
</tr>
<tr>
<td>Duncan Ferguson</td>
<td>University of Illinois at Urbana-Champaign</td>
<td><a href="mailto:dcf@illinois.edu">dcf@illinois.edu</a></td>
</tr>
<tr>
<td>Kerstin Fey</td>
<td>Klinik für Pferde, Innere Medizin, der JLU Gießen</td>
<td><a href="mailto:kerstin.fey@vetmed.uni-giessen.de">kerstin.fey@vetmed.uni-giessen.de</a></td>
</tr>
<tr>
<td>Audrey Fraipont</td>
<td>Faculty of Veterinary Medicine of Liege</td>
<td><a href="mailto:audrey.fraipont@ulg.ac.be">audrey.fraipont@ulg.ac.be</a></td>
</tr>
<tr>
<td>Tammy Frank-Cannon</td>
<td>Texas A&amp;M University</td>
<td><a href="mailto:tfrank-cannon@cvm.tamu.edu">tfrank-cannon@cvm.tamu.edu</a></td>
</tr>
<tr>
<td>Silke Gaida</td>
<td>University of Veterinary Medicine Hannover</td>
<td><a href="mailto:Silke.gaida@tih-anemover.de">Silke.gaida@tih-anemover.de</a></td>
</tr>
<tr>
<td>Hannah Giese</td>
<td>University of Veterinary Medicine Hannover</td>
<td><a href="mailto:hannah.giese@tih-anemover.de">hannah.giese@tih-anemover.de</a></td>
</tr>
<tr>
<td>Marc Gogny</td>
<td>Ecole Nationale Vétérinaire d’Allert</td>
<td><a href="mailto:direction@vet-allert.fr">direction@vet-allert.fr</a></td>
</tr>
<tr>
<td>Russell Gray</td>
<td>Veterinary Simulator Industries Ltd.</td>
<td><a href="mailto:consult@vetsimulators.com">consult@vetsimulators.com</a></td>
</tr>
<tr>
<td>Carol Gray</td>
<td>University of Liverpool</td>
<td><a href="mailto:cgray@liverpool.ac.uk">cgray@liverpool.ac.uk</a></td>
</tr>
<tr>
<td>Stefanie Gunther</td>
<td>University of Veterinary Medicine Hannover</td>
<td><a href="mailto:stefanieguenthner@freenet.de">stefanieguenthner@freenet.de</a></td>
</tr>
<tr>
<td>Delegate Name</td>
<td>Institution</td>
<td>Email Address</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>Michel Heimes</td>
<td>University of Veterinary Medicine Hannover</td>
<td><a href="mailto:michel.heimes@tiho-hannover.de">michel.heimes@tiho-hannover.de</a></td>
</tr>
<tr>
<td>Dean Hendrickson</td>
<td>Colorado State University</td>
<td><a href="mailto:dean.hendrickson@colostate.edu">dean.hendrickson@colostate.edu</a></td>
</tr>
<tr>
<td>Maria Jahn</td>
<td>Veterinarmedizinische Fakultät Leipzig</td>
<td><a href="mailto:maria_1412@t-online.de">maria_1412@t-online.de</a></td>
</tr>
<tr>
<td>Mathias Jahng</td>
<td>University of Veterinary Medicine Hannover</td>
<td><a href="mailto:mathias.jahng@tiho-hannover.de">mathias.jahng@tiho-hannover.de</a></td>
</tr>
<tr>
<td>Breda Jakovac Strajn</td>
<td>UL Veterinary Faculty</td>
<td><a href="mailto:breda.jakovacstrajn@vf.uni-lj.si">breda.jakovacstrajn@vf.uni-lj.si</a></td>
</tr>
<tr>
<td>Andria Joy</td>
<td>Ontario Veterinary College</td>
<td><a href="mailto:ajoy@uoguelph.ca">ajoy@uoguelph.ca</a></td>
</tr>
<tr>
<td>Andrej Kirbis</td>
<td>UL Veterinary Faculty</td>
<td><a href="mailto:dekan@vf.uni-lj.si">dekan@vf.uni-lj.si</a></td>
</tr>
<tr>
<td>Camilla Kirketerp Nielsen</td>
<td>University of Copenhagen</td>
<td><a href="mailto:cape@sund.ku.dk">cape@sund.ku.dk</a></td>
</tr>
<tr>
<td>Christin Kleinsorgen</td>
<td>University of Veterinary Medicine Hannover E-Learning Department</td>
<td><a href="mailto:Christin.Kleinsorgen@tiho-hannover.de">Christin.Kleinsorgen@tiho-hannover.de</a></td>
</tr>
<tr>
<td>Diana Klingenberg</td>
<td>University of Veterinary Medicine Hannover</td>
<td><a href="mailto:diana.klingenberg@web.de">diana.klingenberg@web.de</a></td>
</tr>
<tr>
<td>Christian Knecht</td>
<td>University of Veterinary Medicine, Vienna</td>
<td><a href="mailto:christian.knecht@vetmeduni.ac.at">christian.knecht@vetmeduni.ac.at</a></td>
</tr>
<tr>
<td>Susan Kopke</td>
<td>University of Veterinary Medicine Hannover</td>
<td><a href="mailto:susan.kopke@tiho-hannover.de">susan.kopke@tiho-hannover.de</a></td>
</tr>
<tr>
<td>Meike Kuhlmann</td>
<td>Faculty of Veterinary Medicine Justus-Liebig-University Giessen</td>
<td><a href="mailto:meike.m.kuhlmann@vetmed.uni-giessen.de">meike.m.kuhlmann@vetmed.uni-giessen.de</a></td>
</tr>
<tr>
<td>Rikke Langebæk</td>
<td>Department of veterinary clinical and animal sciences, University of Copenhagen</td>
<td><a href="mailto:nl@sund.ku.dk">nl@sund.ku.dk</a></td>
</tr>
<tr>
<td>Robert Malinowski</td>
<td>Michigan State University College of Veterinary Medicine</td>
<td><a href="mailto:malin011@cvm.msu.edu">malin011@cvm.msu.edu</a></td>
</tr>
<tr>
<td>Erin Malone</td>
<td>University of Minnesota</td>
<td><a href="mailto:malon001@umn.edu">malon001@umn.edu</a></td>
</tr>
<tr>
<td>Kristy Margulieux</td>
<td>The Ohio State University</td>
<td><a href="mailto:margulieux.1@osu.edu">margulieux.1@osu.edu</a></td>
</tr>
<tr>
<td>Dawn Marick</td>
<td>University of Illinois College of Veterinary Medicine</td>
<td><a href="mailto:d-morin@illinois.edu">d-morin@illinois.edu</a></td>
</tr>
<tr>
<td>Nicole Marquardt</td>
<td>berliner fortbildungen</td>
<td><a href="mailto:marquardt@berliner-fortbildungen.de">marquardt@berliner-fortbildungen.de</a></td>
</tr>
<tr>
<td>Julia Maria Matera</td>
<td>University of São Paulo - School of Veterinary Medicine and Animal Science</td>
<td><a href="mailto:materajm@usp.br">materajm@usp.br</a></td>
</tr>
<tr>
<td>Pierre Moissonnier</td>
<td>Ecole Nationale Vétérinaire d'Alfort</td>
<td><a href="mailto:pmoissonnier@vet-alfort.fr">pmoissonnier@vet-alfort.fr</a></td>
</tr>
<tr>
<td>Caroline Mosley</td>
<td>Royal (Dick) School of Veterinary Studies</td>
<td><a href="mailto:caz@bryland.co.uk">caz@bryland.co.uk</a></td>
</tr>
<tr>
<td>Tatiana Motta</td>
<td>The Ohio State University</td>
<td><a href="mailto:motta.13@osu.edu">motta.13@osu.edu</a></td>
</tr>
<tr>
<td>Lina Müller</td>
<td>University of Veterinary Medicine Hannover</td>
<td><a href="mailto:lina.mueller@tiho-hannover.de">lina.mueller@tiho-hannover.de</a></td>
</tr>
<tr>
<td>Linda Müller</td>
<td>Szent István University, Department and Clinic of Reproduction</td>
<td><a href="mailto:muller.linda@aotk.szie.hu">muller.linda@aotk.szie.hu</a></td>
</tr>
<tr>
<td>Oskar Nagy</td>
<td>University of veterinary medicine and pharmacy in Kosice</td>
<td><a href="mailto:onagy@uvf.sk">onagy@uvf.sk</a></td>
</tr>
<tr>
<td>Maire O’ Reilly</td>
<td>School of Veterinary Medicine, University College Dublin</td>
<td><a href="mailto:maire.reilly@ucd.ie">maire.reilly@ucd.ie</a></td>
</tr>
<tr>
<td>Christiane Otzdorff</td>
<td>Ludwig-Maximilians-University Munich</td>
<td><a href="mailto:c.otzdorf@lmu.de">c.otzdorf@lmu.de</a></td>
</tr>
<tr>
<td>Bryan Pfahl</td>
<td>Veterinary Simulator Industries Ltd.</td>
<td><a href="mailto:consult@vetsimulators.com">consult@vetsimulators.com</a></td>
</tr>
<tr>
<td>Susan Phillips</td>
<td>School of Veterinary Medicine, University of Surrey</td>
<td><a href="mailto:s.m.phillips@surrey.ac.uk">s.m.phillips@surrey.ac.uk</a></td>
</tr>
<tr>
<td>Martina Piviani</td>
<td>University of Liverpool</td>
<td><a href="mailto:M.Piviani@liverpool.ac.uk">M.Piviani@liverpool.ac.uk</a></td>
</tr>
<tr>
<td>Joanna Pogue</td>
<td>The Ohio State University</td>
<td><a href="mailto:pogue.6@osu.edu">pogue.6@osu.edu</a></td>
</tr>
<tr>
<td>Cordula Poulsen Nautrup</td>
<td>University Munich</td>
<td><a href="mailto:cordula.poulsennautrup@mu.de">cordula.poulsennautrup@mu.de</a></td>
</tr>
<tr>
<td>Simone Rammelmeier</td>
<td>University of Veterinary Medicine, Vienna</td>
<td><a href="mailto:Simone.Rammelmeier@web.de">Simone.Rammelmeier@web.de</a></td>
</tr>
<tr>
<td>Klaus Riedelberger</td>
<td>University of Veterinary Medicine, Vienna</td>
<td><a href="mailto:klaus.riedelberger@vetmeduni.ac.at">klaus.riedelberger@vetmeduni.ac.at</a></td>
</tr>
<tr>
<td>Caroline Ritter</td>
<td>University of Calgary</td>
<td><a href="mailto:cmnritte@ucalgary.ca">cmnritte@ucalgary.ca</a></td>
</tr>
<tr>
<td>Bridget Roberts</td>
<td>University of Surrey</td>
<td><a href="mailto:b.roberts@surrey.ac.uk">b.roberts@surrey.ac.uk</a></td>
</tr>
<tr>
<td>Jennifer Roberts</td>
<td>Michigan State University</td>
<td><a href="mailto:wileyje1@cvm.msu.edu">wileyje1@cvm.msu.edu</a></td>
</tr>
<tr>
<td>Alessandra Scaglierani</td>
<td>Dipartimento di Scienze mediche Veterinare Università di Bologna</td>
<td><a href="mailto:alessand.scaglierani@unibo.it">alessand.scaglierani@unibo.it</a></td>
</tr>
<tr>
<td>John Rosenthal</td>
<td>University of Veterinary Medicine Hannover</td>
<td><a href="mailto:John.Rosenthal@tiho-hannover.de">John.Rosenthal@tiho-hannover.de</a></td>
</tr>
<tr>
<td>Delegate Name</td>
<td>Institution</td>
<td>Email Address</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Elisabeth Schaper</td>
<td>University of Veterinary Medicine Hannover</td>
<td><a href="mailto:elisabeth.schaper@tiho-hannover.de">elisabeth.schaper@tiho-hannover.de</a></td>
</tr>
<tr>
<td>Jennifer Schleining</td>
<td>Iowa State University</td>
<td><a href="mailto:jschlein@astate.edu">jschlein@astate.edu</a></td>
</tr>
<tr>
<td>Sebastian Schmalz</td>
<td>Faculty of Veterinary Medicine, Leipzig University</td>
<td><a href="mailto:s.schmalz@gmx.net">s.schmalz@gmx.net</a></td>
</tr>
<tr>
<td>Patricia Schrock</td>
<td>University of Veterinary Medicine Hannover</td>
<td><a href="mailto:p.schrock@gmx.de">p.schrock@gmx.de</a></td>
</tr>
<tr>
<td>Luise Schroeder</td>
<td>University of Veterinary Medicine Hannover</td>
<td><a href="mailto:luise.schroeder@tiho-hannover.de">luise.schroeder@tiho-hannover.de</a></td>
</tr>
<tr>
<td>Laura Schüller</td>
<td>Clinic for Animal Reproduction, Free University of Berlin</td>
<td><a href="mailto:laura.schueller@fu-berlin.de">laura.schueller@fu-berlin.de</a></td>
</tr>
<tr>
<td>Sabrina Seeger</td>
<td>University of Veterinary Medicine Hannover</td>
<td><a href="mailto:sabrinaseeger@web.de">sabrinaseeger@web.de</a></td>
</tr>
<tr>
<td>Johanna Sharples</td>
<td>Royal Veterinary College</td>
<td><a href="mailto:jsharples@rc.ac.uk">jsharples@rc.ac.uk</a></td>
</tr>
<tr>
<td>Jane Shaw</td>
<td>Colorado State University</td>
<td><a href="mailto:Jane.Shaw@ColoState.EDU">Jane.Shaw@ColoState.EDU</a></td>
</tr>
<tr>
<td>Linda Shell</td>
<td>Ross University School of Veterinary Medicine</td>
<td><a href="mailto:lshell@rossvet.edu.kn">lshell@rossvet.edu.kn</a></td>
</tr>
<tr>
<td>Catrina Silveira</td>
<td>The Ohio State University</td>
<td><a href="mailto:silveira.7@osu.edu">silveira.7@osu.edu</a></td>
</tr>
<tr>
<td>Sebastian Spiegel</td>
<td>University of Veterinary Medicine Hannover</td>
<td><a href="mailto:spiegel.s@gmx.de">spiegel.s@gmx.de</a></td>
</tr>
<tr>
<td>Florian Spiegel</td>
<td>University of Veterinary Medicine Hannover</td>
<td><a href="mailto:spiegel.f@gmx.de">spiegel.f@gmx.de</a></td>
</tr>
<tr>
<td>Carsten Staszyk</td>
<td>Faculty of Veterinary Medicine Justus-Liebig-University Giessen</td>
<td><a href="mailto:Carsten.Staszyk@vetmed.uni-giessen.de">Carsten.Staszyk@vetmed.uni-giessen.de</a></td>
</tr>
<tr>
<td>Fabian Stroben</td>
<td>Department for Curriculum Management, Charité-Universitätsmedizin Berlin</td>
<td><a href="mailto:fabian.stroben@charite.de">fabian.stroben@charite.de</a></td>
</tr>
<tr>
<td>Julianna Thuroczy</td>
<td>SzIU, Faculty of Veterinary Science Budapest</td>
<td><a href="mailto:thuroczy.julianna@aotk.szie.hu">thuroczy.julianna@aotk.szie.hu</a></td>
</tr>
<tr>
<td>Linda Van Ryneveld</td>
<td>University of Pretoria Faculty of Veterinary Science</td>
<td><a href="mailto:linda.vanryneveld@up.ac.za">linda.vanryneveld@up.ac.za</a></td>
</tr>
<tr>
<td>Denis Verwilghen</td>
<td>University of Copenhagen</td>
<td><a href="mailto:dv@sund.ku.dk">dv@sund.ku.dk</a></td>
</tr>
<tr>
<td>Claire Vinten</td>
<td>The University of Tennessee</td>
<td><a href="mailto:rvidela@utk.edu">rvidela@utk.edu</a></td>
</tr>
<tr>
<td>Catherine Wager</td>
<td>University of Nottingham School of Veterinary Medicine and Science</td>
<td><a href="mailto:clairevinten@outlook.com">clairevinten@outlook.com</a></td>
</tr>
<tr>
<td>Maren Warhonowicz</td>
<td>MVS Medizinverlage Stuttgart GmbH &amp; Co. KG</td>
<td><a href="mailto:maren.warhonowicz@medizinverlage.de">maren.warhonowicz@medizinverlage.de</a></td>
</tr>
<tr>
<td>Sheena Warman</td>
<td>University of Bristol</td>
<td><a href="mailto:sheena.warman@bristol.ac.uk">sheena.warman@bristol.ac.uk</a></td>
</tr>
<tr>
<td>Stefanie Weber</td>
<td>Ludwig-Maximilians-University Munich</td>
<td><a href="mailto:s.weber@anat.vetmed.uni-muenchen.de">s.weber@anat.vetmed.uni-muenchen.de</a></td>
</tr>
<tr>
<td>Renate Weller</td>
<td>Royal Veterinary College</td>
<td><a href="mailto:rweller@rvc.ac.uk">rweller@rvc.ac.uk</a></td>
</tr>
<tr>
<td>Julie Williamson</td>
<td>Lincoln Memorial University</td>
<td><a href="mailto:hunterj1@gmail.com">hunterj1@gmail.com</a></td>
</tr>
<tr>
<td>Anne Wöhle</td>
<td>University of Veterinary Medicine Hannover</td>
<td><a href="mailto:anne.woehle@tiho-hannover.de">anne.woehle@tiho-hannover.de</a></td>
</tr>
<tr>
<td>Inga Wolfel</td>
<td>Ludwig-Maximilians-University, Munich</td>
<td><a href="mailto:i.woelfel@anat.vetmed.uni-muenchen.de">i.woelfel@anat.vetmed.uni-muenchen.de</a></td>
</tr>
<tr>
<td>Claudia Wolschrijn</td>
<td>Utrecht University</td>
<td><a href="mailto:c.f.wolschrijn@uu.nl">c.f.wolschrijn@uu.nl</a></td>
</tr>
<tr>
<td>Elisabeth Zandt</td>
<td>Ludwig-Maximilians-University, Munich</td>
<td><a href="mailto:e.zandt@anat.vetmed.uni-muenchen.de">e.zandt@anat.vetmed.uni-muenchen.de</a></td>
</tr>
</tbody>
</table>

Noch einfacher? Semesterbescheinigung zu den Öffnungszeiten in der Infothek auf dem Campus abgeben.

NATOM – Bildungssoftware
Eine einzigartige Software, um Erkrankungen und anatomische Strukturen von Hunden und Katzen anschaulich und auf den individuellen Patienten maßgeschneidert darzustellen. Im Studium kann das Programm unterstützend und zur Prüfungsvorbereitung genutzt werden.
Mit freundlicher Unterstützung von

ROYAL CANIN