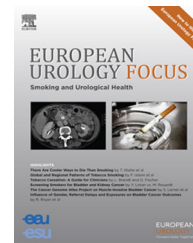


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Education

The European Urology Residents Education Programme Hands-on Training Format: 4 Years of Hands-on Training Improvements from the European School of Urology

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Abstract

Background: The European School of Urology (ESU) started the European Urology Residents Education Programme (EUREP) in 2003 for final year urology residents, with hands-on training (HOT) added later in 2007.

Objective: To assess the geographical reach of EUREP, trainee demographics, and individual quality feedback in relation to annual methodology improvements in HOT.

Design, setting, and participants: From September 2014 to October 2017 (four EUREP courses) several new features have been applied to the HOT format of the EUREP course: 1:1 training sessions (2015), fixed 60-min time slots (2016), and standardised teaching methodology (2017). The resulting EUREP HOT format was verified by collecting and prospectively analysing the following data: total number of participants attending different HOT courses; participants' age; country of origin; and feedback obtained annually.

Results and limitations: A total of 796 participants from 54 countries participated in 1450 HOT sessions over the last 4 yr. This included 294 (20%) ureteroscopy (URS) sessions, 237 (16.5%) transurethral resection (TUR) sessions, 840 (58%) basic laparoscopic sessions, and 79 (5.5%) intermediate laparoscopic sessions. While 712 residents

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European Association of Urology;
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(89%) were from Europe, 84 (11%) were from non-European nations. Of the European residents, most came from Italy (16%), Germany (15%), Spain (15%), and Romania (8%). Feedback for the basic laparoscopic session showed a constant improvement in scores over the last 4 yr, with the highest scores achieved last year. This included feedback on improvements in tutor rating ($p = 0.017$), organisation ($p < 0.001$), and personal experience with EUREP ($p < 0.001$). Limitations lie in the difficulties associated with the use of an advanced training curriculum with wet laboratory or cadaveric courses in this format, although these could be performed in other training centres in conjunction with EUREP.

Conclusions: The EUREP trainee demographics show that the purpose of the course is being achieved, with excellent feedback reported. While European trainees dominate the demographics, participation from a number of non-European countries suggests continued ESU collaboration with other national societies and wider dissemination of simulation training worldwide.

Patient summary: In this paper we look at methodological improvements and feedback for the European Urology Residents Education Programme hands-on-training over the last 4 yr.

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1. Introduction

Minimally invasive surgery (MIS) started its true journey in the late 1980s and has seen an exponential rise in the last two decades [1,2]. With the evolution of minimisation and technological advances, there has been great variation in surgical training standards, leading to a need for training, simulation, and a structured curriculum. Endourology hands-on training (HOT) in a simulated environment started in the late 1990s but lacked a comprehensive training curriculum [3,4]. This led to the establishment of training protocols to structure and streamline training requirements and delivery [4-6].

Simulation training has gained momentum and there has been a huge rise in the number of simulators available, with trends suggesting an increase in the number of papers in this area published over the last two decades [7]. The European School of Urology (ESU) started the European Urology Residents Education Programme (EUREP) in 2003 for final year urology residents, with HOT added later in 2007. The motto in 2007 was "Sharpen your skills at the Dry-Lab courses which offer hands-on-interaction with state-of-the-art- equipment" and the trainee/tutor ratio was 3:1. Over the next few years, online course material was made available before the course for trainee preparation. This included history of endourology, instruments, physiology, aspects of anaesthesiology, safety, and training.

The first standardisation of the training methodology came in 2011 with a pilot European Training in Basic Laparoscopic Urological Skills (E-BLUS) examination [5]. At the time, the course provided 15 training stations for laparoscopy, with a trainee/tutor ratio of 2:1. Teaching sessions varied from 80 to 120 min. In 2014 quality feedback questionnaires were introduced, together with an additional basic laparoscopy task and a camera handling trainer, which was made available on each laparoscopy station. In the following years more effort was put in to standardise and create a training model that could be easily reproduced outside the course in Europe and internationally.

We wanted to understand whether modifying the structure of HOT sessions regarding the duration of these sessions, the number of participants, the trainee/trainer ratio, and the teaching methodology resulted in a change in quality perception by the trainees. In this study we analysed data collected

from EUREP to provide individual quality feedback, trainee demographics, and the geographical reach of EUREP in relation to the methodological improvements adopted over the last 4 yr.

2. Materials and methods

Data for EUREP were prospectively analysed over the 4 yr from September 2014 to October 2017. Several novelties have been applied to the HOT format of the EUREP course, including 1:1 training sessions (from 2015), fixed 60-min time slots (from 2016), and a standardised teaching methodology (from 2017). In addition, from 2017 a teaching guide was introduced to provide tips on optimisation of the training sessions and to ensure a more precise real-time assessment.

The resulting EUREP HOT format was verified yearly by collecting and prospectively analysing the following data: total number of participants attending the different HOT courses, participants' age, country of origin, and annual feedback obtained. Feedback was collected using Likert-scale questionnaires on tutor rating, course organisation, and personal experience, with scores ranging from 1 (poor) to 5 (excellent). The scores were compared over time.

3. Results

A total of 796 participants from 54 countries participated in 1450 HOT sessions (response rate 89%) over the last 4 yr (Table 1). This included 294 (20%) ureteroscopy (URS) sessions, 237 (16.5%) transurethral resection (TUR) sessions, 840 (58%) basic laparoscopic (E-BLUS) sessions and 79 (5.5%) intermediate laparoscopic sessions. Participants'

Table 1 – Age range of participants for the total of 1450 sessions performed during 2014–2017.

| Age range | Sessions, n (%) | TUR (n) | URS (n) | Laparoscopy (n) | |
|-----------|-----------------|------------|------------|-----------------|--------------|
| | | | | Basic | Intermediate |
| 20–24 yr | 6 (0.5) | 0 | 1 | 5 | 0 |
| 25–29 yr | 297 (22) | 37 | 76 | 172 | 12 |
| 30–34 yr | 887 (65.5) | 149 | 179 | 516 | 43 |
| 35–39 yr | 147 (11) | 26 | 25 | 81 | 15 |
| 40–45 yr | 16 (1) | 2 | 2 | 12 | 0 |
| 46–51 yr | 1 | 1 | 0 | 0 | 0 |
| Unknown | 96 | 22 | 11 | 54 | 9 |

TUR = transurethral resection; URS = ureteroscopy.

Table 2 – Participants from European and non-European countries during 2014–2017.

| Participants (n) | | Europe | | Asia | | Africa | |
|------------------|-----|----------------|----|----------------------|----|--------------|-----|
| Italy | 112 | Sweden | 10 | India | 23 | South Africa | 3 |
| Germany | 110 | Czech Republic | 8 | Taiwan | 12 | Egypt | 3 |
| Spain | 106 | Georgia | 6 | Lebanon | 4 | Algeria | 2 |
| Romania | 56 | Slovakia | 6 | Pakistan | 2 | Unknown | 13 |
| Poland | 37 | Belarus | 5 | Syria | 1 | | |
| Turkey | 32 | Ukraine | 5 | Israel | 1 | | |
| Portugal | 26 | Croatia | 4 | Hong Kong | 1 | | |
| Belgium | 23 | Slovenia | 4 | China | 1 | | |
| Greece | 20 | Serbia | 4 | North America | | | |
| Russia | 17 | Denmark | 3 | Canada | 3 | | |
| France | 18 | Latvia | 3 | USA | 1 | | |
| Switzerland | 16 | Macedonia | 3 | South America | | | |
| UK | 14 | Cyprus | 2 | Mexico | 3 | | |
| Netherlands | 13 | Ireland | 2 | Brazil | 2 | | |
| Hungary | 12 | Armenia | 1 | Colombia | 1 | | |
| Lithuania | 11 | Azerbaijan | 1 | Paraguay | 1 | | |
| Austria | 10 | Bulgaria | 1 | Peru | 1 | | |
| Finland | 10 | Luxembourg | 1 | Australia | 5 | Total | 591 |

age ranged from 21 to 51 yr; the age demographics are shown in Table 1. Two-thirds of all participants (65.5%) were aged 30–34 yr, while 22% were aged 25–29 yr.

Regarding their country of origin, 712 participants (89%) were from Europe and 84 (11%) were from non-European nations. Of the European residents, most came from Italy (16%), Germany (15%), Spain (15%), and Romania (8%) (Table 2). Of the non-European nations, the majority came from India (4%) and Taiwan (2%).

The feedback for the E-BLUS session showed a constant improvement in score over the last 4 yr, with the highest scores achieved in 2017 (Table 3). This included feedback on improvements in tutor rating ($p = 0.017$), organisation ($p < 0.001$), and personal experience with EUREP ($p < 0.001$). While the overall rating for most aspects was between 4 (good) and 5 (excellent), overall the course duration had a slightly lower rating as most participants would like to have longer training sessions. However, this improved over the last 2 yr when the sessions were streamlined to 60-min sessions with a 1:1 trainee/tutor ratio. When comparing the scores from 2014 and 2017, there was a significant improvement in tutor rating ($p = 0.011$), organisation ($p = 0.005$), and personal experience with EUREP ($p < 0.001$).

4. Discussion

ESU started EUREP to harmonise and standardise training across Europe and to facilitate national societies in offering curriculum-based training to residents. EUREP provided a resident platform for simulation-based training and assessment in TUR, laparoscopy, and URS. HOT supplemented the theoretical knowledge gathered during this 5-d residential programme. The results and feedback demonstrate how valued it is for the residents involved. The individualised tutor ratio, organisation, and personal experience all add to evolution of the ideal course that other courses may strive to achieve. It is also a testament to the hard work of the ESU and the tutors involved, and their dedication, time, and effort in making the programme successful.

Table 3 – Feedback for EUREP basic laparoscopy HOT 2014–2017.

| | 2014 | 2015 | 2016 | 2017 | p value | |
|---|--------|------|------|------|----------------|-----------|
| | | | | | Trend analysis | 2014–2017 |
| Modifications to the EUREP training format | | | | | | |
| Working hours per tutor (h) | 22.1 | 22.7 | 24 | 22 | | |
| Trainee/tutor ratio | 2:1 | 1:1 | 1:1 | 1:1 | | |
| Session duration (min) | Random | 45 | 60 | 60 | | |
| Teaching guide available for tutors | No | No | No | Yes | | |
| Residents undergoing basic laparoscopy HOT | 183 | 236 | 225 | 196 | | |
| Evaluation by participants^a | | | | | | |
| How do you rate your tutor's teaching | | | | | | |
| Focus on your individual training needs | 4.7 | 4.7 | 4.6 | 4.8 | | |
| Providing helpful training advice | 4.7 | 4.7 | 4.7 | 4.9 | | |
| Assessing your improvement | 4.6 | 4.7 | 4.7 | 4.8 | | |
| Providing a structured training session | 4.6 | 4.7 | 4.7 | 4.8 | | |
| Total | 4.7 | 4.7 | 4.7 | 4.8 | 0.017 | 0.011 |
| How do you rate the organisation | | | | | | |
| Set-up of the equipment | 4.7 | 4.7 | 4.7 | 4.7 | | |
| Duration of the course | 3.9 | 3.7 | 4 | 4.1 | | |
| Number of tutors per trainee | 4.7 | 4.8 | 4.8 | 4.9 | | |
| Time dedicated to the exercise | 4.2 | 4 | 4.3 | 4.5 | | |
| Total | 4.4 | 4.3 | 4.5 | 4.6 | < 0.001 | 0.005 |
| Personal experience | | | | | | |
| Did it meet your expectations | 4.3 | 4.4 | 4.4 | 4.6 | | |
| Did your basic laparoscopy skills improve | 4.2 | 4.3 | 4.3 | 4.5 | | |
| Overall impression of the course | 4.5 | 4.6 | 4.6 | 4.7 | | |
| Total | 4.3 | 4.4 | 4.4 | 4.6 | < 0.001 | < 0.001 |

EUREP = European Urology Residents Education Programme; HOT = hands-on training.

^a Scored as: 1 = bad; 2 = poor; 3 = fair; 4 = good; 5 = excellent.

As the focus of health care education changes, simulation has to be integrated into a comprehensive curriculum. Although these 1-h sessions will not make anyone an expert, the principle is to achieve incremental gains whereby all trainees have a chance to advance their competence and skill with 1:1 mentorship that builds on their previous knowledge and proficiency. This improvement is partly reflected in the feedback provided by the trainees of all age groups who attended EUREP from many European and non-European countries.

Continuous evolution of EUREP is showcased by the adoption of new technology and bench models [8]. While providing top-quality training, EUREP tutors are also involved every year in the development of novel training protocols that, like E-BLUS and the more recent endoscopic stone treatment step 1 (EST-S1), are then translated to official European Association of Urology (EAU) assessment protocols ready for delivery even outside Europe. The tutors themselves need awareness of this to make the course more interesting and to keep it up to date [8,9]. An example is the use of K-box bench trainer for training in flexible URS [10].

While the course was structured and ran successfully for a number of years, owing to end-of-training HOT examinations such as E-BLUS and EST-S1, trainees who take these might feel nervous during the course itself [5,6]. However, the course also allows them to focus and prepare for the examination and maximise their potential for achievement. The other limitation of the EUREP format is difficulties in using more advanced training instruments such as lasers and in curricula with animal wet laboratory or cadaveric courses, although these could be done in other training centres in conjunction with EUREP. Standardised training protocols will allow more accurate and measurable training according to trainee needs. While basic models will be more useful to novices, more advanced models will allow complex and more realistic training [11,12] when needed. A combination of didactic teaching and supervised HOT not only improves surgical ability but is also helpful in real-life operating room environments [3].

The EUREP platform has allowed a successful era of E-BLUS and EST-S1 examinations [5,13] that can be a part of a trainee's portfolio and is now successfully conducted in numerous centres across the world. It seems that the EUREP journey has just begun, with new and more exciting courses and curricula on the horizon, such as the lower tract curriculum and advanced laparoscopic and stone treatment courses.

The feasibility of the EUREP HOT format, with 1:1 training, 60-min time slots, and standardised teaching methodology, is demonstrated by the enthusiasm and feedback given by the residents involved and reflects the annual improvements applied by the organisers. Moreover, this format allows easy planning of the training sessions and provides information on how many tutors are needed and the time needed to provide quality training to any target number of course participants. The gradual evolution of the course sets a format that other courses may strive to achieve, using EUREP as a benchmark for HOT courses. It is also a testament to the hard work of the ESU and the

tutors involved for their dedication, time, and effort in making the programme successful.

5. Conclusions

The EUREP trainee demographics show that the purpose of the course is being achieved, with excellent feedback from the majority of trainees in the age group when they would be in their final year of training. While European trainees dominate the demographics, participation from a number of non-European countries suggests continued ESU collaboration with other national societies and wider dissemination of simulation training worldwide. The yearly improvements applied to the format have been well appreciated by participants. The EUREP HOT format, with its 1:1 standardised sessions of 60 min, is feasible and reliable, which explains why the methodology is a solid base for EAU HOT courses around the world.

Author contributions: Bhaskar K. Somani had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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Acquisition of data: Van Cleynenbreugel, Gozen, Barmoshe, Biyani, Gaya, Hellawell, Pini, Rodriguez, Sanchez Salas, Macek, Skolarikos, Wagner, Eret, Haensel, Siena, Schmidt, Klitsch, Vesely, Ploumidis, Proietti, Kamphuis, Tokas.

Analysis and interpretation of data: Veneziano.

Drafting of the manuscript: Somani.

Critical revision of the manuscript for important intellectual content: Veneziano.

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