

OIE educational twinning RVC-JUST

Draft Activity report Year 4 (January 2018 – January 2019)

1 ACCOMPLISHMENTS/NEW FINDINGS

During the fourth and final year of the project, the activities planned for each of the three components (undergraduate, postgraduate, professional education) were completed and project findings and outputs disseminated across the region. The undergraduate component of the project concluded with the development and integration in teaching sessions at JUST of innovative resources:

- A collection of interactive applications to benefit the students' learning experience of probability theory, quantitative probabilistic modelling and risk analysis: https://mcrvc.shinyapps.io/stochastic_processes_rvc-just/
- A blended delivery approach to teaching pig production and health, integrating didactic lectures, student led small group sessions and a virtual reality tour of a farrowing to finish pig production unit.

The experience gained with the first of the interventions was presented as an oral presentation at the 15th International Symposium of Veterinary Epidemiology and Economics (ISVEE) in Thailand in November 2018: *R Shiny Apps as tools for technology-assisted teaching of quantitative probabilistic modelling*. The resource is publicly available and the lessons learnt are currently being written as a publication.

Similarly, the blended teaching of pig production and health using a virtual reality tour of a pig production unit was evaluated and the experience gained will be summarized in a publication to be submitted to an educational journal. Participating students reported increased interest, knowledge and understanding of pig production, husbandry and medicine following the session. The virtual reality tour and small group exercises were perceived to be more useful than the lectures in terms of learning. The pilot intervention suggests that if JUST introduced pig teaching into their curriculum, the focus should be away from traditional didactic lectures and more towards student lead exercises, group work and use of technology such as VR to enhance student learning.

As reported last year, academics from JUST and RVC worked closely together on the development of the JUST logbook, a task that was completed at the end of the second year of the project. A pilot study and survey was conducted using fifty, 5th year students to get feedback from the first draft of the logbook and based on their feedback the logbook was further refined. The survey was also useful for JUST faculty to identify gaps and strengths in the curriculum of day 1 competency teaching and assessment. The refined logbook was then given to 4th year students to complete with all the necessary tutor signatures. Forty, 4th year students completed the logbook during their 4th and 5th year of study. The data from this self-assessment of the logbook is currently under analysis. Based on the results from this study further recommendations will be made for on-going curriculum review, teaching and assessment at JUST.

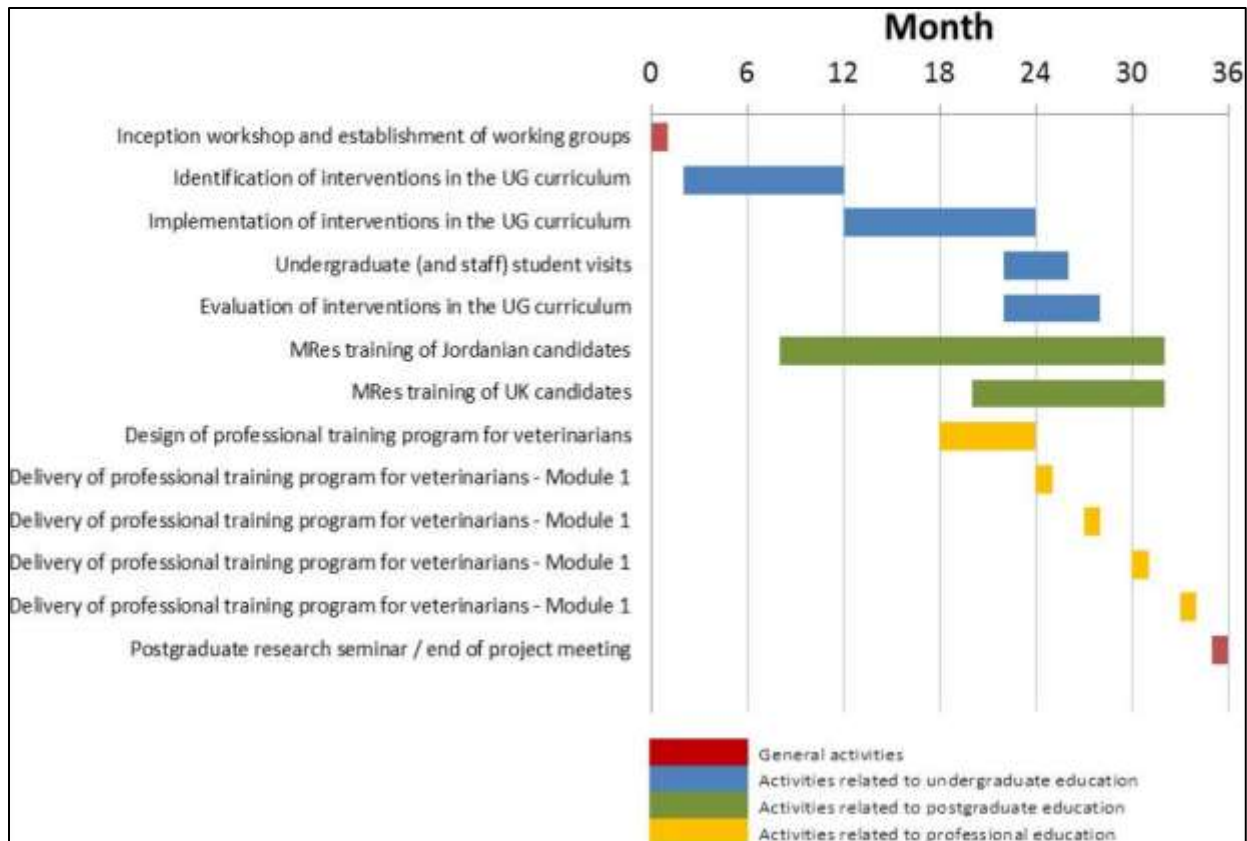
The postgraduate component of the project had been almost completed at the end of the previous year. During the last year of the project, the only student who did not graduate in the previous year due to late start of her project successfully graduated resulting in a total of 5 RVC MRes students, 5 'twinned' JUST MSc students and one Jordanian RVC MSc student graduating as a result of the twinning project. Current destinations of the graduates include initial part-time academic positions at JUST (Zain Shaheen and Esmaeel Malkawi), PhD studies at RVC (Maria Inês Neves, Winnie Ntow-Boahene), international work with Médecins Sans Frontières (Emi Takahashi), government work in the Jordanian Ministry of Agriculture (Lina Masoud), private practice (Dima Momani) and work in academic publishing with Springer Nature (Tillie Cryer). The twinned MRes – MSc component represents one of the main achievements of the project and is potentially of interest for other OIE educational twinning initiatives. The experience was summarized in a poster presented by one of the graduates at ISVEE 15th. We expect that the work done by the students will result in a number of scientific outputs. To date, one paper has been accepted for publication by *Epidemiology and Infection* (Neves et al.) and a second paper is under review by *BMC Microbiology* (Ibrahim et al.).

Work on the professional education components of the project has taken place during this final year. A training workshop delivered in Amman, with participation of 40 of the 130 veterinarians employed by the Jordan Veterinary Services, including the Jordan Chief Veterinary Officer. Following the workshop, a mobile application to be used as interface for Jordanian veterinarians to access relevant resources for field veterinary epidemiology has been developed and is about to be launched.

In the final year of the project, we have also put emphasis on the dissemination of project findings and lessons learnt, not only within in Jordan, but also across the region. To that end, we organized two workshops, one with a mostly national focus in Amman and a second one in Cairo. The event in Amman was attended by dignitaries from JUST, RVC, OIE, his Excellency the British Ambassador, Edward Oakden, and the Jordan Minister of Higher Education and Scientific Research, His Excellency Professor Adel Tweisi. The event was at the same time a celebration of the successes of the project (e.g. graduation of students) and a forum to discuss opportunities for further engagement in the future both in Jordan and across the region. The event in Cairo had the overall objective of sharing Jordan's experience and disseminating findings, aspirations and lessons learnt concerning veterinary curriculum design and revision. The workshop was attended by representatives of RVC, JUST, OIE and Deans of Veterinary Schools from Egypt, Sudan, Iraq, Tunisia, Morocco, Turkey and Lebanon.

OIE Educational twinning RVC-JUST: highlights from the 4th year of the project

- The entire cohort of 5 RVC MRes students and 5 “twinned” JUST MSc students successfully completed their studies taking positions in academia, government and the private sector.
- Two teaching interventions delivered in JUST making use innovative teaching technologies:
 - Interactive R Shiny applications for probability theory and risk analysis
 - Blended delivery of teaching in pig production and health, integrating didactic lectures, student led small group sessions and a virtual reality tour of a farrowing to finish pig production unit.
- Dr Zain Shaheen, who graduated from the MSc Wild Animal Health as part of the twinning project, has become the Chief Veterinarian and Director of the Petra project at the Princess Alia Foundation (PAF) and part time lecturer at JUST.
- At the Jordan University of Science and Technology, I work as a part time lecturer at the Faculty of Veterinary Medicine and Surgery.
- Workshop for Jordanian Veterinary Services attended by 40 of the 130 veterinarians employed by the Jordan Veterinary Services.
- Dissemination event Workshop Amman attended by Dignitaries from JUST, RVC, OIE, his Excellency the British Ambassador Edward Oakden, and the Jordan Minister of Higher Education and Scientific Research, His Excellency Professor Adel Tweisi.
- Dissemination event in Cairo attended by representatives of JUST, RVC, OIE and Deans of Veterinary Schools from Egypt, Sudan, Iraq, Tunisia, Morocco, Turkey and Lebanon.
- A mobile App for Jordanian veterinarians to access resources for field veterinary epidemiology developed.
- First papers written by MSc/MRes students submitted and published in peer-reviewed scientific journals.
- Final visit by 9 JUST academics to RVC clinical skills lab and hospitals.



Gantt chart showing activities planned along the originally planned 3 years duration of the project.

1.1. UNDERGRADUATE EDUCATION

1.1.1. *Design and implementation of curriculum interventions*

This activity was originally expected to involve the delivery of three interventions in the JUST curriculum but a total of four interventions have finally been delivered:

1. Problem based session linking herd health, livestock welfare and public health.
2. Problem based session linking livestock health and production, public health and food safety
3. Interactive teaching of probability concepts and risk analysis using online applications
4. Pig production and health teaching integrating lectures, small group work and a virtual reality tour

The third intervention was delivered in Irbid in October 2018 by Dr. Matteo Crotta and Prof. Javier Guitian from RVC working together with Profs. Obaidat and Alaboudi.



Figure 1. Dr. Matteo Crotta delivering a session on risk analysis in animal health to undergraduate students at JUST.

The interactive applications developed and used in this intervention are available in:
https://mcrvc.shinyapps.io/stochastic_processes_rvc-just/

INTERACTIVE SESSION 1/2 “LAW OF LARGE NUMBERS”

- > Students were given a questionnaire: 9 questions with 4 possible answers (The questionnaire was written in Chinese)
- > Turning points were used to count how many correct answers each student got
- > Results were used to explain the difference between the frequency distribution and the theoretical distribution and demonstrate, using the app how increasing the number of tests the former approaches the latter.



Figure2. Example of how turning point questions and the app were used to explain probability concepts

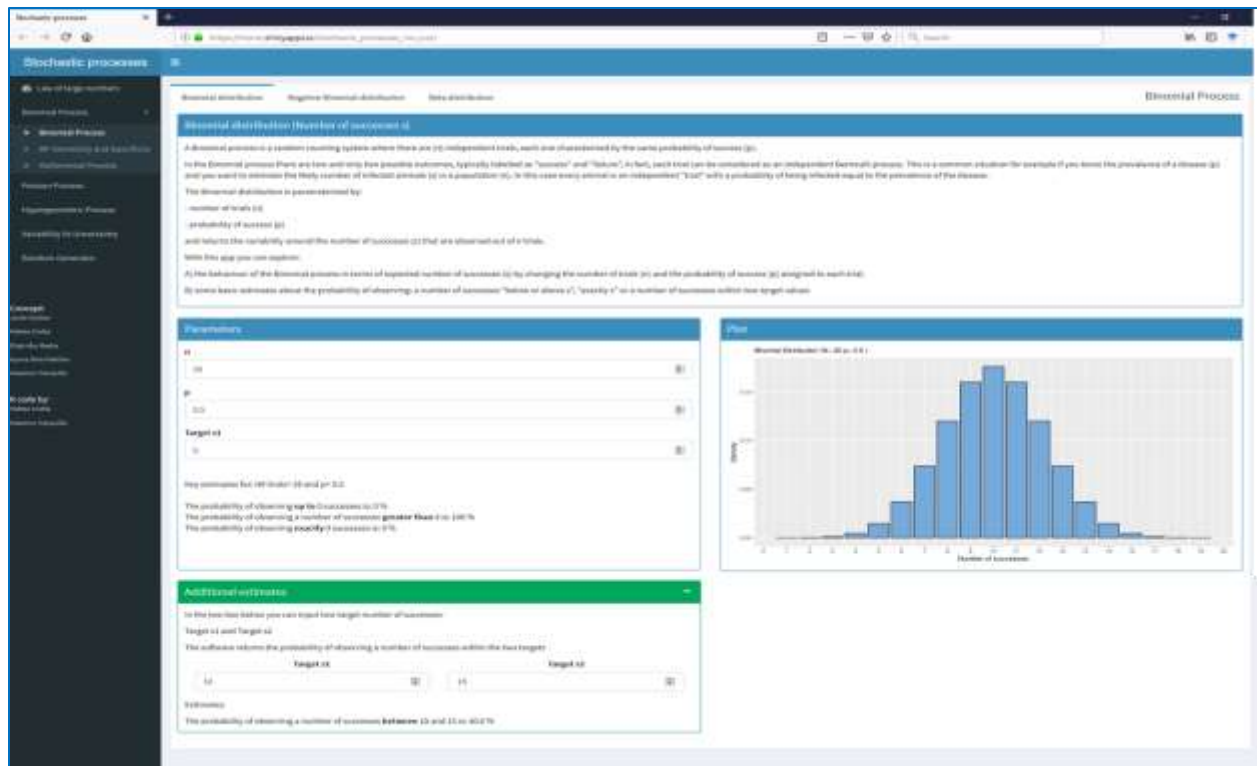


Figure3. Screen capture showing the interface that students use to explore different probability distributions

The need to address the topic of pig production and health in the JUST curriculum was identified at early stages of the project. Currently pig production is not covered in the JUST veterinary curriculum. Previously there was little perceived need due to Jordan being predominately a Muslim country with few veterinary graduates practicing outside of the Middle East. However, as the curriculum has expanded there is now a recognized need for the introduction of pig production, management and health to meet part of the requirements for EAEVE accreditation. The aim of the intervention was to assess the pilot introduction of swine related blended teaching into the JUST veterinary curriculum. A blended delivery approach was trialled with traditional didactic lectures, student lead small group sessions and a virtual reality (VR) tour of a farrowing to finishing pig production unit. This intervention was led by Dr. Troy Gibson supported by Dr. Nicola Blackie, Mr. Darryl Slack, Prof. Ehab Abu-Basha and Prof. Zuhair Bani Ismail. To evaluate the effectiveness of the teaching, twenty-two students (mixture of 4th, 5th and MSc year) were given a pre and post intervention survey to gauge: (1) their current level of experience and understanding of pig production, management and health; (2) their perceptions of different teaching styles and their role in veterinary education; and (3) changes in perception and understanding of the topic. Many of the questions were matched between the pre and post questionnaires to allow assessment of changes in perception and understanding of the topic.



Dr. Troy Gibson, Dr. Nicola Blackie and Mr. Darryl Slack delivering swine-related blended teaching to a group of 22 JUST students (Irbid, January 2019).

1.1.2. Evaluation of interventions and reporting

Evaluation of the third intervention was carried out by gathering students opinions on their learning during the sessions (Figure 4) and using the App and by means of sets of questions asked to different groups of students before and after using the app as outlined in Figure 5. The initial analysis of the results suggest that students enjoyed the interactive approach to teaching. They asked questions, used the App to test different hypothesis and explored the shape of the distributions when changing the parameters. On the other hand the overall performance measured as proportion of correct responses was low, which may relate to the short time given to students to become familiar with the App.

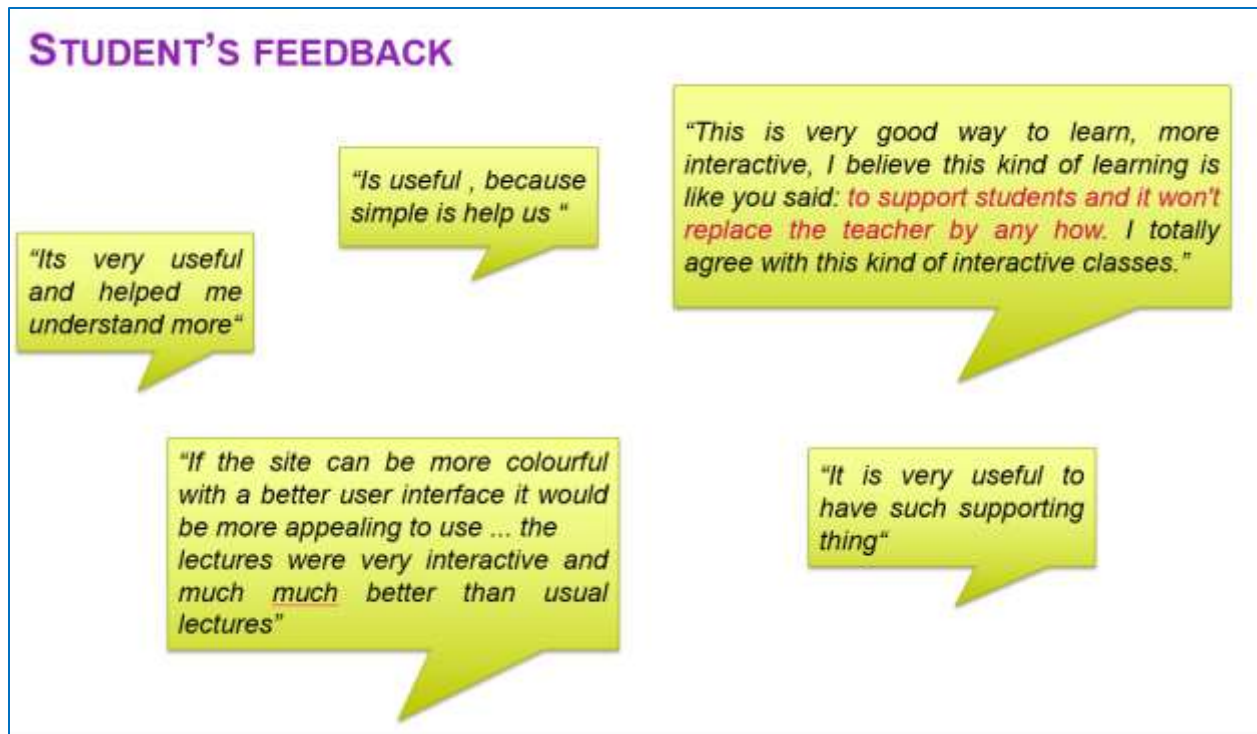


Figure4. Student feedback on the third intervention focused on the teaching of probability concepts and risk analysis with the help of interactive Apps.

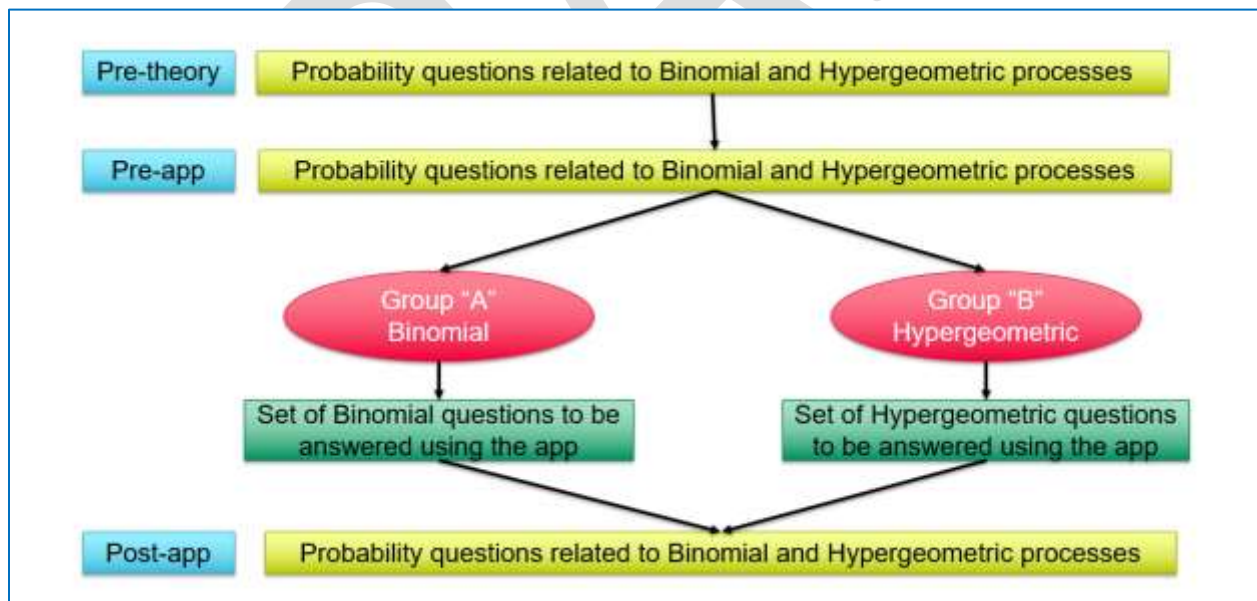


Figure5. Approach for the evaluation of the value of the interactive Apps for the teaching of probability concepts and risk analysis.

In relation to the 4th intervention, the twenty-two students who attended were given a pre and post intervention survey. Prior to the workshop, 91% of students reported that they did not have sufficient knowledge and understanding of the pig production cycle. After completion of the workshop this changed

to 89% reporting an improvement in their understanding of the pig production cycle. When asked if pig production and health should be included in the JUST veterinary curriculum, 55% responded that it should at the beginning of the workshop, increasing to 63% by the end. Eighty four percent of students reported that the combination of lectures, VR and small group sessions enhanced their learning of pig production, husbandry and welfare. However, when asked which parts of the workshop were most important to their learning of the topic, 63% reported that the VR pig farm tour was most important, followed by the small group exercises (44%). The traditional lectures were ranked the least important (56%). In conclusion, students reported increased interest, knowledge and understanding of pig production, husbandry and medicine following the workshop. The VR tour and small group exercises were ranked the most useful and lectures as least in terms of learning. Based on the overall finding of this study, if JUST introduced pig teaching into their curriculum, the focus should be away from traditional didactic lectures and more towards student lead exercises, group work and use of technology such as VR to enhance student learning.

1.1.3. Student visits

The only student visits that took place during the fourth year were of RVC MRes students to be part of the dissemination event in Amman, where they presented some of their work and met again with JUST MSc students.

1.1.4. Visit by JUST academic staff to clinical teaching facilities and clinical skills lab

In the last month of the project, a group of 9 JUST academics visited RVC for a week. For some of the academics this was the first visit to RVC. The group took part of a range of activities involving tours of the two campuses and visits to the RVC's Equine Hospital and large animal imaging, Queen Mother Hospital for Small Animals, Bolton's Park Farm and Clinical Skills Lab. The week was also used for preparation of the last and fourth intervention and discussions of the way forward regarding publications, curriculum revision at JUST and future of the partnership.



JUST and RVC academics and graduates at RVC Camden – January 2019

1.1.5. Alignment with OIE recommendations on the competencies of graduating veterinarians and OIE guidelines on Veterinary Education Core Curriculum (ongoing across entire duration of the project)

As reported in previous reports, this component of the project has exceeded our initial aspirations. The project has contributed to the development of JUST day 1 competencies and a veterinary skills logbook aligned with EAEVE and OIE competencies. . A pilot study and survey was conducted using fifty, 5th year students to get feedback from the first draft of the logbook and based on their feedback the logbook was further refined. The survey was also useful for JUST faculty to identify gaps and strengths in the curriculum of day 1 competency teaching and assessment. The refined logbook was then given to 4th year students to complete with all the necessary tutor signatures. Forty, 4th year students completed the logbook during their 4th and 5th year of study. The data from this self-assessment of the logbook is currently under analysis. Based on the results from this study further recommendations will be made for on-going curriculum review, teaching and assessment at JUST.



JUST-FVM Veterinary Clinical Skills Logbook Developed as part of the OIE JUST-RVC Twinning Project

1.2. POSTGRADUATE EDUCATION

This component of the project was almost completed in the previous year. The only update is the successful graduation of the last MSc student at JUST (Haneen Abubaker), whose project was delayed because of a late start. Due to the different timelines of projects at RVC and JUST it was not practical to have a single event where all projects could be presented. Instead, two RVC students and all JUST students attended the April event in Amman where their work was presented to national and international dignitaries.

1.3. PROFESSIONAL EDUCATION (months 18-36)

This was one of the main focus of work in the final year of the project. A two-day workshop was organized in October in Amman for the Jordan Veterinary Services. The workshop was attended by 40 veterinarians from across the whole country, out of a total of 130. This represents around one third of all the veterinarians working for the Jordan Veterinary Services. The workshop was used to deliver presentations on a range of epidemiological tools and discuss their practical use in the context of some of the more pressing issues for the Jordan Veterinary Services. Epidemiologists engaged in research and policy in Jordan gave presentations on topics such as brucellosis control, MERS-CoV epidemiology and response to animal health emergencies. The event served to inform the design and contents of a mobile App that could be used by veterinarians to access relevant resources for practical field epidemiology. The App has been developed and its contents currently being loaded both in English and Arabic.



Participants of the workshop for Jordanian Veterinary Services in October 2019, Amman



Dr. Ghazi Yehia, OIE Regional Representative, addressing participants at the workshop for Jordanian Veterinary Services



Prof. Guitian presenting at the workshop for Jordanian Veterinary Services in October 2019, Amman

2 INTERACTIONS

As in previous years, there was a considerable amount of interaction between RVC and JUST during the fourth year of the project. RVC staff and postgraduate students travelled to Jordan for the April dissemination event, the workshop for veterinary services, the last two teaching interventions and the dissemination event in Cairo. JUST academics travelled to the UK to visit clinical teaching facilities and to Cairo for the dissemination event.

Two important dissemination events were organized during the last year of the project. The first event took place in Amman and was attended by dignitaries from JUST, RVC, OIE, his Excellency the British Ambassador, Edward Oakden, and the Jordan Minister of Higher Education and Scientific Research, His Excellency Professor Adel Tweisi. Undergraduate and postgraduate students involved in project activities had the opportunity to share their experiences and opportunities for continuation of the partnership in both, education and research, were discussed with different national stakeholders.



JUST President, Professor Saeb Khraisat and RVC Principal, Professor Stuart Reid at the dissemination event in Amman.

The event in Cairo was celebrated in December 2018 and had the overall objective of sharing the experience of the twinning between RVC and JUST and disseminating some of the findings of potential relevance to other veterinary schools in the region and to members of the Mediterranean Network of Establishment for Veterinary Medicine (REEV-Med). The event was attended by representatives from RVC, JUST and OIE and by Deans of Veterinary Schools from Egypt, Sudan, Iraq, Tunisia, Morocco, Turkey and Lebanon.



Along the whole duration of the project, more than 40 staff members of JUST and RVC have been directly involved in project activities that have provided training opportunities to more than 100 undergraduate students, 11 postgraduate students and 40 veterinarians. A total of 44 academics and students have travelled to the partner institution, several of them multiple times, and in the final year of the project, senior representatives from veterinary schools in 7 Middle Eastern countries attended the last dissemination event.

3 PUBLICATIONS AND REPORTS

Presentations given during the fourth year of the project include:

- Crotta et al. *R Shiny Apps as tools for technology-assisted teaching of quantitative probabilistic modelling*. Oral presentation at the 15th International Symposium of Veterinary Epidemiology and Economics (ISVEE).
- Neves et al. *The transmission dynamics of campylobacter among broilers in semi-commercial farms*. Oral presentation at the 15th International Symposium of Veterinary Epidemiology and Economics (ISVEE).
- Neves et al. *ISVEE poster OIE Veterinary Education Twinning Programme RVC-JUST: Postgraduate Education by Research*. Poster presented at the 15th International Symposium of Veterinary Epidemiology and Economics (ISVEE).
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The Cairo event has been summarized as a report and the third and fourth interventions as short abstracts in anticipation to the drafting of papers.

As for the research done by the postgraduate students, an additional paper has been submitted and a paper submitted in the previous year has been accepted for publication and is currently in press:

- Neves et al. Quantifying *Campylobacter* transmission among broilers and the day of first infection in semi-commercial conditions in Jordan. *Epidemiology and Infection*. In press.
- Ibrahim et al. Identification of *Escherichia Coli* from broiler chickens in Jordan, their antimicrobial resistant gene characterization and the associated risk factors. *BMC Microbiology*. Under review.

4 COURSES TAUGHT/TRAINING PROVIDED

Undergraduate: The third and fourth teaching interventions for JUST undergraduate students have been delivered (see above).

Professional studies: Workshop for Jordan Veterinary Services (see above).