

Rosabel Roig-Vila (Ed.)

# Investigación e innovación en la Enseñanza Superior

Nuevos contextos,  
nuevas ideas

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Rosabel Roig-Vila

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## 83. Learning global public health through international practice: Role of #DMUglobal mass trips

Peña-Fernández, Antonio<sup>1</sup>; Escalera, Begoña<sup>2</sup>; Peña, María de los Ángeles<sup>2</sup>

<sup>1</sup> *Leicester School of Allied Health Sciences, De Montfort University. The Gateway, Leicester LE19BH, UK; Antonio.pena-fernandez@dmu.ac.uk*

<sup>2</sup> *Departamento de Ciencias Biomédicas, Universidad de Alcalá, Crta. Madrid-Barcelona Km, 33.6, 28871 Alcalá de Henares, Madrid, Spain; angeles.pena@uah.es*

### ABSTRACT

Global public health knowledge is critical to provide healthcare professionals with the necessary skills to respond to outbreaks of infection. To facilitate the acquisition of global public health skills in healthcare students at De Montfort University (DMU, UK), we designed a practical strategy to monitor emerging zoonotic human parasites in New York (NYC, USA) and tailoring interventions to protect the public using the novel programme to promote internationalisation named #DMUglobal. Thus, fifty final year students from three different programmes at DMU travelled to NYC early in 2019 to monitor *in situ* the presence of *Cryptosporidium parvum* and *Giardia intestinalis* in animal faecal samples found in Central Park using portable immunoassay cards. On return to DMU, students completed, in groups, a scientific poster with applicable public health interventions (protection and decontamination options) selected using the innovative methodology available at the UK Recovery Handbook for Biological Incidents (Public Health England, 2015). Students presented and discussed their posters in an open voluntary session celebrated at DMU, showing high levels of understanding. Participants completed a questionnaire: 87% enjoyed the practical performed, and 78% producing and defending the poster. All considered that the skills gained will help with their studies and future careers. In conclusion, despite the need for more comprehensive studies to ascertain the degree of knowledge acquisition, the results collected suggest that internationalisation facilitates the learning of global health. Participants were able to acquire soft and transversal competences during this innovative experience, including mobility, critical thinking and research skills.

**KEYWORDS:** #DMUGLOBAL, global health awareness, internationalisation, public health.

### 1. INTRODUCTION

Recent pandemics such as the 2013-16 Ebola outbreaks in West Africa (Coltart et al., 2017) and the increasing threat of bioterrorism (Green et al., 2019) have highlighted the relevance of teaching global public health in human health degree/training programmes, so future healthcare professionals are provided with the relevant skills to respond to outbreaks of infection. Moreover, teaching global public health is critical as the world has become an interdependent global community, sharing similar health issues and public health functions (Jackson and Cole, 2013). Thus, the public health sector is increasingly demanding healthcare professionals and related workforces with knowledge and training to respond to biological events that put populations at risk (Hogan and Haines, 2011; Cáceres et al., 2019), as well as evidence-based and analytical skills to advocate for public health interventions that, in turn, will help patients, communities and the environment. Moreover, by teaching global public

health and health interventions, healthcare students not only will achieve better educational outcome to prevent disease but promote healthy living (Li and Dong, 2019).

Global public health has different definitions that highlight the multinational and multidisciplinary nature of this field. One of the goals of this field is to improve health by reducing avoidable diseases, which involves taking into consideration the environment due to the increasing world interconnectedness that could facilitate cross-border transmission of pathogens and globalisation of diseases (Arthur et al., 2011; Williams and Des Marais, 2016).

Despite latest studies on the teaching status of global public health that have reported an increase in the teaching of an interest in this field (Rowson et al., 2012; Aulakh et al., 2017), different authors demand that the teaching of global public health should be encouraged and introduced into healthcare curricula, as a core component, as recent reports have indicated that healthcare workers are unprepared to face cross-border movement of pathogens and other challenges produced by increasing globalisation (Mdege, 2019). To facilitate the teaching of this topic, Mdege (2019) has also indicated that internationalisation of the curriculum would be necessary as a key component to appropriately prepare healthcare professionals to be able to respond to global health issues.

The deadly 2014-16 West Africa Ebola outbreak highlighted different key capacity-building needs to tackle future infectious diseases with a zoonotic role, including the development of appropriate evidence-based risk management policies and skilled first responders and healthcare workforce (Gebreyes et al., 2014; Williams and Des Marais, 2016). Zoonotic pathogens could contaminate and spread in the environment, creating different sources of infection that are an increasing threat to human health and the environment. Environmental health is a prominent field of global public health, as it is intrinsically related to human health, which aims to prevent humans and the environment from being exposed to any hazard, including chemical and biological agents (Frumkin, 2016). Thus, Walpole et al. (2017) have suggested the necessity of incorporating environmental health into medicine, which would be also recommendable for related degrees and professions.

### **1.1. Promoting global public health at DMU**

Our international innovation teaching group at De Montfort University (DMU, United Kingdom, UK) is performing different strategies to promote global public health actions to strengthen infectious disease prevention, detection and response awareness, in healthcare programmes (Peña-Fernández et al., 2017a, 2018a, 2018b). We report here a novel strategy to promote different skills related to global public health action to detect and prevent potential outbreaks of infection that can affect different countries through internationalisation, as it has been suggested as an appropriate strategy to teach and learn necessary skills to respond to these events. To do this, we have designed a novel strategy to enhance our current teaching related to global health, medical response and awareness, which involves the performance of practical exercise in a non-UK country, to promote participants to gain critical information to any response, such as identifying appropriate and rapid detection methods, or gaining information about the capabilities of the health sector of the affected country to respond to these events. This practical exercise consisted in the determination of the potential presence and distribution of emerging zoonotic human parasites in animal faecal material found in Central Park in New York City (NYC, United States), to identify potential interventions and decontamination techniques to protect the population using a novel methodology developed by Public Health England to aid tailoring of responses to biological incidents and outbreaks of infection. Students were able to put into practice what they studied in different modules across their programmes about prevention,

detection and response to emerging human pathogens, such as in Medical Microbiology. To facilitate the delivery of this international exercise, our department was funded with a #DMUglobal mass trip scheme, which involves a short-term visit outside the UK to promote and facilitate the acquisition of different transversal competences and international mobility, which are funded by the #DMUglobal department, which also includes the Erasmus+ programme (Peña-Fernández et al., 2018c, 2019).

The objectives of this paper were to: a) determine if the novel training created met its immediate goals to promote acquisition of global public health skills to prevent and respond to outbreaks of infection; b) assess its effectiveness to acquire mobility and international skills, which are required to future healthcare personnel that would like to work in global public health; and c) to identify the strengths and weaknesses of the training to enhance it for future years.

## 2. METHODS

A complete description of the full #DMUglobal trip organised, named “Biological Hazards in New York”, has been provided in Peña-Fernández et al. (2019). Briefly, students travelled to NYC from the 3rd to 8th January 2019 with three academic staff and were requested to determine the potential presence and distribution of two emerging human parasites with a potential zoonotic role (*Cryptosporidium parvum* and *Giardia intestinalis*) in animal faecal samples found in Central Park. Students, divided in groups, monitored the presence of these parasites using immunoassay cards (Thermo Scientific™ Xpect™ *Giardia/Cryptosporidium* Test) according to manufacturer’s instructions and previous methodologies to reduce environmental contamination (Dado et al., 2012). A veterinarian reported on animal species using photographs of the stool samples monitored, as potential interventions would be related with the animal species.

On their return to DMU, students in groups estimated the potential risks for public health and identified applicable interventions and decontamination techniques to protect the public in order to create scientific posters that were presented during an interactive session on 18th January 2019. Appropriate references and guidance was provided beforehand to facilitate students in the identification of applicable interventions to tackle the environmental presence and distribution of these human pathogens, including decontamination and protection techniques or strategies. More specifically, students were requested to use the UK Recovery Handbook for Biological Incidents (UKRHBI) developed by Public Health England (PHE; Pottage et al., 2015), which helps the user to select applicable recovery options or techniques to protect the public and to decontaminate and recover different environments affected by biological hazards following an interactive and multistage methodology from a pool of options for different environments (Pottage et al., 2014, 2015). Thus, groups were able to select the most applicable and effective recovery option(s) according to their results from the environmental monitoring study performed in NYC and with consideration of the physiological characteristics of these zoonotic pathogens.

### 2.1. Context and participants

A qualitative and quantitative study was performed to determine the success of this novel training to enhance awareness about the relevance of environmental monitoring for developing appropriate public health interventions to minimise future infections and/or outbreaks. Fifty final year human health science students [BSc Biomedical Science, BMedSci Medical Science, BSc Healthcare Science (Audiology)] from the Leicester School of Allied Health Sciences applied to attend the #DMUglobal mass trip to NYC. Students voluntarily apply to this #DMUglobal opportunity, which is offered to a

maximum of 50 students, and were selected according to different criteria including their grades in the previous academic course and whether they have attended another mass trip before. Selected 50 applicants were deployed to NYC from the 3rd to 8th January 2019 with three academic staff. Appropriate training was provided to all participants in a specific hands-on session which also included e-learning tutorials from the Internet about the use of the immunocards. Additionally, all students received a full kit with all the necessary materials and consumables to undertake the monitoring (including personal protective equipment such as gloves and swabs); the immunocards and aliquots of the reagents were provided to each group of students, so they could complete the environmental monitoring in groups.

## 2.2. Instruments

We used different approaches, quantitative and qualitative, to determine the degree of effectiveness of our novel strategy to facilitate the acquisition of global public health skills to respond to outbreaks of infection. As qualitative methods, we analysed the students' performance during the practical work in NYC (monitoring of emerging parasites) as well as their performance and level of interaction and engagement during the defence of their respective scientific posters, which was an interactive session open session to all final year students from these three programmes. Groups displayed their posters using Power Point. To encourage critical thinking and research analysis, academics encouraged the audience (peers that did not attend the trip and other groups) to formulate questions, which were used to determine the level of understanding of this activity as indicated in Peña-Fernández et al. (2019). As a quantitative approach, a validated feedback-questionnaire was distributed by the end of the poster session to evaluate the level of student satisfaction and interest in this novel training initiative as well as to explore the success of the experience. The questionnaire had a series of Likert scale questions related to the training and trip experience, with a few open-questions (free-response), so participants could comment on their overall experience and suggest future improvements. Students were informed about the project and that the anonymous data provided could be used in a study, so approval from participants was obtained. Ethical approval was provided by the Research Ethics Committee at De Montfort University (Ref. 3038).

## 3. RESULTS

Most students were actively involved in the production, defence and peer-evaluation of the created posters. Students were shown to have acquired most of the mobility competencies defined by Erasmus (named memo<sup>©</sup> factors; European Commission, 2016), specifically curiosity, confidence and vigour. These results are in agreement with those found during a similar previous experience, in which healthcare students monitored carbon monoxide in NYC during a pilot #DMUglobal mass trip performed in 2018 (Peña-Fernández et al., 2018c). Our students indicated that they felt more confident and with more decision power.

Fifteen students voluntarily completed a validated feedback-questionnaire on the overall experience, reporting high levels of engagement and satisfaction in all the different activities organised (Table 1). Specifically, 87% enjoyed monitoring the presence of these emerging human parasites in animal faecal samples, 93.4% considered that selection and use of appropriate device for *in situ* detection of parasites was easy and 78% enjoyed producing and defending the poster (Table 1), which involved selection of applicable protection and decontamination techniques to prevent potential outbreaks due to the presence of the emerging human parasites monitored in Central Park. All participants consid-

ered that the information and skills gained will help with their studies (47% agreed, 53% strongly agreed) and future careers (60% agreed, 40% strongly agreed), and provided them with mobility and international experience (Table 1).

**Table 1.** Responses (%) to the feedback-questionnaire to evaluate the novel training implemented to strengthen infectious disease prevention, detection and response awareness.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Content of the tour (#DMUglobal trip) was relevant	0	0	0	53.3	46.7
Duration of the tour was appropriate	0	13.3	0	33.3	33.3
Received appropriate information to undertake environmental monitoring	0	0	6.7	53.3	40
Enjoyed monitoring the presence of parasites	6.7	0	6.7	53.3	33.3
Immunocards were easy to use	0	0	6.7	46.7	46.7
Enjoyed producing and presenting poster	0	0	21.4	28.6	50
Producing the poster has helped me to understand the topic	0	0	20	33.3	46.7
Gained some presentation skills	0	0	0	60	40
Training awakened my interest for medical parasitology	0	0	13.3	53.3	33.3
Will use knowledge gained in my studies	0	0	0	46.7	53.3
Tour provided skills such as international experience	0	0	0	20	80

Participants also documented the part of the trip that they found most interesting, for example: “testing for *Giardia* and *Cryptosporidium*, and that waiting period to see if the swab contained anything on the immunocard”; “learning a new technique for environmental monitoring and understanding how quick and easy it is to do”; or “the best part was the poster presentation as it brought everything together”. Things to improve, participants highlighted and suggested an increase in time available to complete the environmental monitoring in NYC, the provision of more reagents to use with the immunocards, and the potential of collecting samples to be analysed in a local laboratory/university in NYC using specific molecular tests.

#### 4. DISCUSSION

The supervision of the students’ practical work in NYC and the evaluation of the scientific posters would indicate that the #DMUglobal mass trip was successful in providing students with some knowledge of how to design and perform environmental monitoring of zoonotic emerging pathogens



and identify applicable public health interventions and decontamination techniques/strategies to lessen their infections. The production and defence of the poster demonstrated that most students were able to perform a literature review and confirmed a good level of understanding of detection and prevention of outbreaks due to the presence of these emerging human parasites.

Despite time dedicated to the study of environmental health being very limited in these healthcare programmes at DMU, participants were able to identify applicable decontamination and recovery techniques using the novel guidance of UKRHBI, which is in line with previous observations from our research group that have seen that Pharmacy students were able to tailor a decontamination programme using the UKRHBI (Peña-Fernández et al., 2017b). Moreover, groups were able to provide a rationale for the selected decontamination and recovery techniques during the defence of their posters, which would indicate some acquisition of awareness on how to detect specific biological hazards in the environment and how to respond to their presence. Additionally, the monitoring study carried out was appropriate as immunocards reflected correct use, which in conjunction with the overall training, would suggest that this training, although limited in time, was effective in facilitating the learning and understanding of this topic. Thus, 80% of participants indicated that producing the posters helped them to understand the topic (Table 1). Our results agree with other authors that have demonstrated that even very short courses (3 hours) can improve knowledge, attitude and skills regarding responding to biological outbreaks (Parrish et al., 2005).

## 5. CONCLUSIONS

In conclusion, despite the need for more comprehensive studies to ascertain the degree of knowledge acquisition, the results collected suggest that internationalisation facilitates the learning of emerging diseases and global health (specifically related to the relevance that environmental monitoring of emerging human pathogens has to tailor public interventions), which are in agreement with those studies that have pointed out the necessity of internationalising the curriculum to appropriately prepare healthcare professionals to face global health challenges. To finish, our results indicate that #DMUglobal mass trips could be an appropriate, novel, strategy for promoting internationalisation and mobility. Participants in this excursion were able to acquire soft and transversal competences during this innovative experience such as mobility, critical thinking, research skills, communication and teamwork.

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