Customized online and onsite training for rabies-control officers

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Problem
It is difficult to deliver adequate training for people working in rabies control in low and middle-income countries. Popular e-learning systems for low-income settings are not well suited to developing and testing practical skills, including laboratory methods.

Approach
We customized training in rabies control methods for African professionals and students from different disciplines. Trainees participated in preparatory online sessions, evaluations and exercises before and after a 12-day workshop. Trainees and mentors continued to interact through an online forum up to one year after the workshop.

Local setting
In Africa, 15 000 deaths from rabies occur each year due to a lack of awareness, inaccessibility of post-exposure prophylaxis, inadequate or absent canine rabies-control programmes and lack of governmental financial support.

Relevant changes
Thirty-two trainees – working in health departments, hospitals, veterinary stations and research institutes – were selected to participate; 28 completed the course and passed the final evaluation. Pilot rabies investigation programmes were developed, and two manuscripts submitted for publication. An online forum facilitated further progress for a year after the workshop.

Lessons learnt
A combination of customized online and onsite training is suitable for teaching disease-control personnel in low-income countries. Participation in this course enabled trainees to advocate for the development of national disease-control strategies. Mentoring is needed to develop a strong network of experts in similar settings.

Abstracts in Arabic, Chinese, French, Russian and Spanish at the end of each article.

Problem
In low- and middle-income countries, it can be difficult to deliver adequate training for people working in disease control. Many e-training programmes are based on participatory learning models in which participants share their understanding and monitor their theoretical knowledge through discussion, questioning and interaction with mentors via the internet. The current most popular e-learning systems for resource-poor settings are massive open online courses (MOOCs) which have been used by tens of thousands of students around the globe. However, this format is not well suited for specific practical training needs.

Scientists and public-health professionals working in neighbouring countries often miss opportunities to exchange information because collaborations have been traditionally formed between distant, high-income countries. Public health managers and scientists are often trained separately, making it difficult to link human and animal health at national and international levels.

Our aim was to provide practical training on rabies prevention in Africa for students and professionals in animal and human public health sectors. We also wanted to address critical gaps in rabies control as have been described elsewhere.

Approach
We used an approach called customized online training, (COLT) which focuses on small sets of trainees and is designed for situations where acquisition of skills and direct training by experts are needed. With this approach, it is feasible to tailor training to each individual trainee in a way that would be impractical in a system designed for mass audiences. The COLT approach has been used successfully for several workshops and courses in Africa, Asia and South America (http://octave.bio-med.ch). We describe here the use of the COLT approach in a course on the control and surveillance of rabies organized in Dakar, Senegal, in December 2013. The workshop was organized by the Pasteur Institutes in Dakar and Paris, the Health Sciences eTraining Foundation and the World Health Organization (WHO). It was held in the Ecole Inter-Etats des Sciences et Médecine Vétérinaire in Dakar over a period of nine days. Practical training activities were given at the Institut Pasteur of Dakar, at the Fann Hospital in Dakar and during three days in the municipality of M’bour, south of Dakar. Training in M’bour included knowledge, attitude and practice surveys, dog-population surveys and dog-vaccination campaigns.

Local setting
Rabies is a lethal encephalitis due to a lyssavirus mainly transmitted to humans by the bite or scratches of infected animals. Approximately 15 000 deaths from rabies occur in Africa each year due to a lack of awareness about the disease and the consequences of dog bites, lack of access to post-exposure prophylaxis, and inadequate or absent canine rabies-control programmes.

Relevant changes
We designed a workshop for physicians, veterinarians, public health officers and specialists in infectious diseases, virol-
ogy and/or epidemiology. Participants needed to be fluent in French and have at least a bachelor degree and preferably a master’s degree. The course was advertised through a website and by participating international organizations and regional networks. Most of the 106 applicants were from Francophone African countries. Trainees were selected on the basis of a curriculum vitae, letter of motivation and three letters of recommendation. Thirty-two participants working in national and regional veterinary stations, hospitals or research institutes in 13 countries (Algeria, Burkina Faso, Cameroon, Chad, Congo, Côte d’Ivoire, Democratic Republic of the Congo, Madagascar, Mali, Niger, Senegal, South Africa, Togo) were selected and encouraged to start pre-workshop activities.

**Online pre-workshop activities**

An online pre-training assessment tool was sent to participants, who completed this before starting a set of three activities. First, trainees were provided with annotated articles on rabies and asked to respond to questions on epidemiology, pathogenesis, laboratory methods of diagnosis, statistics and clinical features of infection. Modules could be downloaded to allow the trainees to study despite irregular internet access. Second, as a virtual team exercise, trainees were asked to write a national plan for the control and surveillance of rabies in Senegal. The trainees had to interact with each other using an online forum and address specific questions that were provided by the experts. Third, trainees had to write a manuscript on their research related to rabies, guided by an application developed by Jonathan Fuchs (Department of Public Health, San Francisco, United States of America). These activities required about 70 hours of individual work, followed by a second online evaluation.

**Workshop activities**

The onsite workshop, over 12 days, focused on practical sessions including: testing rabid dog-brain samples by immunofluorescence or by reverse transcriptase polymerase chain reaction (RT–PCR); anti-rabies antibody detection; analysing ribonucleic acid (RNA) sequences; and, estimating the growth rate of epidemics. The 24 teachers came from seven countries: Cambodia (1), France (4), Italy (1), Senegal (12), South Africa (1), Switzerland (3) and the United Kingdom of Great Britain and Northern Ireland (2).

The organization of the workshop activities favoured debates, discussions and analysis of local contingencies to find practical, economical and reliable solutions to the current rabies situation in Senegal. Work done during the pre-workshop period was finished during the workshop and presented to the panel of experts. The experts made recommendations and forwarded the proposed national plan, including a budget, to the ministries in charge of rabies control and surveillance in Senegal.

To assess the effectiveness of the workshop process, we held a final examination. Twenty-eight trainees succeeded with scores above 74% (range: 74–88%). The trainees attending the whole course received five credits from the European credit transfer and accumulation system, delivered by Lausanne University, Switzerland. The completion rate of the course (86%; 28/32) was higher than for many massive open online courses, which often have completion rates below 20%. All trainees completed a final evaluation in which they provided feedback on the course and indicated how they planned to transfer the knowledge and skills they had acquired to their daily practice.

**Post-workshop activities**

During the year following the course, discussions on the online forum continued between the participants and the teachers. Pilot rabies investigation programmes were developed by the participants and sent to the experts for review and then submitted to national or international funding agencies. The participants organized other courses on rabies control and prevention. These were held at the local or provincial level and in Côte d’Ivoire, Madagascar and South Africa, at the national level. Eight manuscripts on rabies-related topics were written and two have been accepted for publication in international peer-reviewed journals.

These outcomes illustrate the intensity of the post-workshop activities, the need for an ongoing training component and the value of mentoring provided before, during and after the workshop. Mentoring is a core component of medical education and career success and should be promoted in low- and middle-income countries. Box 1 summarizes the main lessons learnt during this workshop.

**Costs and human resources**

The budget for this course was 3000 Euros per trainee. This covered creating and maintaining the website, managing the online forum, travel to Senegal and local expenses for trainees and experts. The participants paid no registration fees. Of the 24 teachers present during the workshop, 14 were experts working in Senegal and research institutions in Senegal. This mix of foreign and local teachers helped to ensure the support of the host country and meant that debates between participants were informed by a very good understanding of the local situation in the field.

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Lessons from the field

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Lessons from the field

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ملخص

تخصيص التدريب المباشر على شبكة الإنترنت والتدريب الميداني في الموقع للمختصين بمكافحة داء الكلب

المشكلة

هناك صعوبة في تقديم التدريب الكافي للعاملين في مكافحة داء الكلب في البلدان منخفضة الدخل، مع وجود التحديات المتعلقة بال الدراسي ومتنقلة من حيث الأسباب المختلفة. لا تُعد نظم التعليم الإلكتروني الشعبية للمواقع منخفضة الدخل مناسبة تمامًا لتطوير واختبار المهارات العملية، بما في ذلك الأساليب المختبرية.

المؤ caffeine

استنادًا إلى تخصصات وخبرة مختلفين، قمنا بتخصيص تدريبات في أساليب مكافحة داء الكلب للمختصين الأفارقة والطلبة من مختلف الاختصاصات. وشارك المتدربون في الجلسات والتقييمات والتمارين التحضيرية المباشرة على شبكة الإنترنت، قبل وبعد إجراء حلقة العمل. واستمر المتدربون والموجهون في التفاعل من خلال منتدى مباشر على شبكة الإنترنت لمدة تصل إلى عام واحد.

الإجابة على الأسئلة

في أفريقيا، تحدث حالة وفاة جراء الإصابة بداء الكلب كل عام بسبب نقص الوعي، وصعوبة الحصول على العلاج الوقائي بعد التعرض للمرض، وعدم كفاية أو غياب برامج مكافحة داء الكلب، ونقص الدعم المالي الحكومي.

Related changes

تم اختيار اثنان وثلاثين متدربًا (من ضواحي الصحة، وأعمال ومستشفيات، ومحطات البيطرية، ومعاهد الأبحاث العالمة) للترشيح، وقد قام 28 متدربًا منهم بإتمام الدورة والتدريبات المتصلة. وقد تم إعداد برامج مبتكرة لتحسين ورشة داء الكلب، وتتيح للمبتدئين للنشر. وقام متدربون مباشر على شبكة الإنترنت باستخدام المبادئ في أساليب مكافحة داء الكلب للمختصين الذين يمكنهم تقديم التدريب الكافي للعاملين في مكافحة داء الكلب في البلدان منخفضة الدخل، ولا تُعد نظم التعليم الإلكتروني الشعبية للمواقع منخفضة الدخل مناسبة تمامًا لتطوير واختبار المهارات العملية، بما في ذلك الأساليب المختبرية. لذا، قمنا بتخصيص تدريبات في أساليب مكافحة داء الكلب للمختصين الأفارقة والطلبة من مختلف الاختصاصات. وشارك المتدربون في الجلسات والتقييمات والتمارين التحضيرية المباشرة على شبكة الإنترنت، قبل وبعد إجراء حلقة العمل. واستمر المتدربون والموجهون في التفاعل من خلال منتدى مباشر على شبكة الإنترنت لمدة تصل إلى عام واحد بعد إجراء حلقة العمل.

ملاحظات

في أفريقيا، تحدث حالة وفاة جراء الإصابة بداء الكلب كل عام بسبب نقص الوعي، وصعوبة الحصول على العلاج الوقائي بعد التعرض للمرض، وعدم كفاية أو غياب برامج مكافحة داء الكلب، ونقص الدعم المالي الحكومي.

Résumé

Une formation personnalisée, en ligne et sur place, pour les agents de lutte contre la rage

Problème Il est difficile de dispenser une formation appropriée aux personnes intervenant dans la lutte contre la rage dans les pays à revenu faible et intermédiaire. Les systèmes populaires d'apprentissage en ligne conçus pour les pays à faible revenu ne sont pas adaptés au développement et au test des compétences pratiques, notamment en ce qui concerne les méthodes analytiques.

Approche Nous avons adapté la formation sur les méthodes de lutte contre la rage à l'intention de professionnels et d'étudiants africains issus de différentes disciplines. Les bénéficiaires de la formation ont participé à des séances de préparation en ligne, à des évaluations et à des exercices, avant et après un atelier de 12 jours. Puis, les bénéficiaires de la formation et les tuteurs ont continué à interagir jusqu'à un an après l'atelier via un forum accessible en ligne.

Environnement local En Afrique, 15.000 décès dus à la rage surviennent chaque année. Cette situation vient d'un manque de sensibilisation, de l'inaccessibilité des traitements de prophylaxie post-exposition, de programmes de lutte contre la rage canicole inappropriés voire inexistant et d'un manque de soutien financier gouvernemental.

Changements significatifs Trente-deux bénéficiaires de la formation (qui travaillent dans des services de santé, des hôpitaux, des centres vétérinaires ou des instituts de recherche) ont été sélectionnés pour la formation ; vingt-quatre ont été évalués et ont passé avec succès l'évaluation finale. Des programmes pilotes d'enquête sur la rage ont été élaborés et deux manuscrits ont été soumis pour publication. Un forum en ligne a facilité la poursuite des progrès pendant l'année qui a suivi l'atelier.

Leçons tirées L’association de modules proposés en ligne et sur place est adaptée à la formation du personnel de lutte contre la maladie dans les pays à faible revenu. La participation à cette formation a permis à ses bénéficiaires de plaire pour l'élaboration de stratégies nationales de lutte contre la maladie. Un tutorat est nécessaire pour constituer un solide réseau d’experts dans des contextes similaires.
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References
1. Grainger B. Introduction to MOOCs: avalanche, illusion or augmentation? [Policy Brief]. Moscow: UNESCO Institute for Information Technologies in Education, 2013. Available from: http://unidoc.unesco.org/images/0022/002238/223896e.pdf [cited 2015 March 25].
2. Marques J. A short history of MOOCs and distance learning. MOOC news and views; 2013. Available from: http://moocnewsandreviews.com/a-short-history-of-moocs-and-distance-learning/ [cited 2015 March 25].
3. Daniel J. Making sense of MOOCs: musings in a maze of myth, paradox and possibility. J Interact Media Educ. 2012(3):18. doi: http://dx.doi.org/10.5334/2012-18
4. Dodet B; Partners for Rabies Prevention. The blueprint for rabies prevention and control: a novel operational toolkit for rabies elimination. PLoS Negl Trop Dis. 2012(6)(2):e1388. doi: http://dx.doi.org/10.1371/journal.pntd.0001388 PMID: 22369727
5. Dodet B; Partners for Rabies Prevention. The fight against rabies in Africa: From recognition to action. Vaccine. 2009 Aug 13;27(37):5027–32. doi: http://dx.doi.org/10.1016/j.vaccine.2009.06.030 PMID: 19560430
6. Dodet B, Adjougoua EV, Aguemom AR, Amadou OH, Aitop AL, Baba BA, et al.; Africa Rabies Expert Bureau (AfroREB). Fighting rabies in Africa: the Africa Rabies Expert Bureau (AfroREB). Vaccine. 2008 Nov 25;26(50):6295–8. doi: http://dx.doi.org/10.1016/j.vaccine.2008.04.087 PMID: 18617294
7. Knobel DL, Cleaveland S, Coleman PG, Fèvre EM, Meltzer MI, Miranda ME, et al.; Re-evaluating the burden of rabies in Africa and Asia. Bull World Health Organ. 2005 May;83(5):360–8. PMID: 15976877
8. Shiff S, Hampson K, Andeson A. Potential economic benefits of eliminating canine rabies. Antiviral Res. 2013 May;98(2):352–6. doi: http://dx.doi.org/10.1016/j.antiviral.2013.03.004 PMID: 23499650
9. MOOCs on the move: How Coursera is disrupting the traditional classroom [podcast]. Knowledge @ Wharton. 2012 Nov 7. Philadelphia: Wharton School of the University of Pennsylvania; 2012. Available from: http://knowledge.wharton.upenn.edu/article/moocs-on-the-move-how-coursera-is-disrupting-the-traditional-classroom/ [cited 2015 Apr 27].
10. Nakanjako D, Byakika-Kibwika P, Kintu K, Azrine J, Nakwagala F, Luzige S, et al. Mentorship needs at academic institutions in resource-limited settings: a survey at Makerere University College of Health Sciences. BMC Med Educ. 2011;11(1):53. doi: http://dx.doi.org/10.1186/1472-6920-11-53 PMID: 21801406

References
1. Grainger B. Introduction to MOOCs: avalanche, illusion or augmentation? [Policy Brief]. Moscow: UNESCO Institute for Information Technologies in Education, 2013. Available from: http://unidoc.unesco.org/images/0022/002238/223896e.pdf [cited 2015 March 25].
2. Marques J. A short history of MOOCs and distance learning. MOOC news and views; 2013. Available from: http://moocnewsandreviews.com/a-short-history-of-moocs-and-distance-learning/ [cited 2015 March 25].
3. Daniel J. Making sense of MOOCs: musings in a maze of myth, paradox and possibility. J Interact Media Educ. 2012(3):18. doi: http://dx.doi.org/10.5334/2012-18
4. Dodet B; Partners for Rabies Prevention. The blueprint for rabies prevention and control: a novel operational toolkit for rabies elimination. PLoS Negl Trop Dis. 2012(6)(2):e1388. doi: http://dx.doi.org/10.1371/journal.pntd.0001388 PMID: 22369727
5. Dodet B; Partners for Rabies Prevention. The fight against rabies in Africa: From recognition to action. Vaccine. 2009 Aug 13;27(37):5027–32. doi: http://dx.doi.org/10.1016/j.vaccine.2009.06.030 PMID: 19560430
6. Dodet B, Adjougoua EV, Aguemom AR, Amadou OH, Aitop AL, Baba BA, et al.; Africa Rabies Expert Bureau (AfroREB). Fighting rabies in Africa: the Africa Rabies Expert Bureau (AfroREB). Vaccine. 2008 Nov 25;26(50):6295–8. doi: http://dx.doi.org/10.1016/j.vaccine.2008.04.087 PMID: 18617294
7. Knobel DL, Cleaveland S, Coleman PG, Fèvre EM, Meltzer MI, Miranda ME, et al.; Re-evaluating the burden of rabies in Africa and Asia. Bull World Health Organ. 2005 May;83(5):360–8. PMID: 15976877
8. Shiff S, Hampson K, Andeson A. Potential economic benefits of eliminating canine rabies. Antiviral Res. 2013 May;98(2):352–6. doi: http://dx.doi.org/10.1016/j.antiviral.2013.03.004 PMID: 23499650
9. MOOCs on the move: How Coursera is disrupting the traditional classroom [podcast]. Knowledge @ Wharton. 2012 Nov 7. Philadelphia: Wharton School of the University of Pennsylvania; 2012. Available from: http://knowledge.wharton.upenn.edu/article/moocs-on-the-move-how-coursera-is-disrupting-the-traditional-classroom/ [cited 2015 Apr 27].
10. Nakanjako D, Byakika-Kibwika P, Kintu K, Azrine J, Nakwagala F, Luzige S, et al. Mentorship needs at academic institutions in resource-limited settings: a survey at Makerere University College of Health Sciences. BMC Med Educ. 2011;11(1):53. doi: http://dx.doi.org/10.1186/1472-6920-11-53 PMID: 21801406