Course Change Request

New Course Proposal

Date Submitted: 05/07/18 12:55 pm

Viewing: BIOL 427 : Disease Ecology and Conservation

Last edit: 05/07/18 12:55 pm

Changes proposed by: jbazaz

Are you completing this form on someone else's behalf?

Yes

Requestor:

Name	Extension	Email
A. Alonso Aguirre	7590	aaguirr3@gmu.edu

Effective Term: Summer 2018

Subject Code: BIOL - Biology **Course Number:** 427

Bundled Courses:

Equivalent Courses:

Catalog Title: Disease Ecology and Conservation

Banner Title: Disease Ecology & Conservation

Will section titles vary by semester? No

Credits: 3

Schedule Type: Lecture

Hours of Lecture or Seminar per week: 3

Repeatable: May only be taken once for credit (NR)
GRADUATE ONLY

Default Grade Mode: Undergraduate Regular

Recommended Prerequisite(s): 60 credits and BIOL 213 or BIOL/EVPP 305/306 and BIOL 308 OR EVPP 301, or permission of instructor.

Recommended Corequisite(s):

Required Prerequisite(s) / Corequisite(s) (Updates only):

Registrar's Office Use Only - Required Prerequisite(s)/Corequisite(s):

And/Or	(	Course/Test Code	Min Grade/Score	Academic Level	)	Concurrency?

Registration Restrictions (Updates only):

Registrar's Office Use Only - Registration Restrictions:

Field(s) of Study:

Class(es):

Level(s):

Degree(s):

School(s):

Catalog Description: Presents the trans-disciplinary discipline of conservation medicine, the study of relationships between organism and ecosystem health and environmental conditions. Topics include infectious and noninfectious

In Workflow

1. **BIOL Undergraduate Representative**
2. **SC Curriculum Committee**
3. SC Associate Dean
4. ESP Chair
5. Assoc Provost-Undergraduate
6. Registrar-Courses
7. Banner

Approval Path

1. 10/16/18 11:32 am Larry Rockwood (lrockwoo): Approved for BIOL Undergraduate Representative

diseases, pathogens, processes, and impacts on human, biotic, and ecosystem health, and how to address the consequences of diseases to populations and ecological communities. Notes: This course will co-meet with EVPP 527. Undergraduate students in this course will have separate (shorter) reading and writing assignments and will be graded according to a different rubric than the graduate students.

Justification: Creating this course under a BIOL course code rather than continuing to offer it as a BIOL special topics course.

Does this course cover material which crosses into another department? Yes

Impacted Departments:

Department
ESP - Environmental Science & Policy

Learning Outcomes:

Attach Syllabus BIOL427syllabus.pdf

Additional Attachments

Staffing: A. Alonso Aguirre

Relationship to Existing Programs: This course can be applied to the Environmental Science BS or the Biology BS or BA. Welcomed to be used by other programs as deemed appropriate by departments.

Relationship to Existing Courses: Also regularly offered as an EVPP prefix; these courses will be crosslisted.

Additional Comments:

Reviewer Comments

Key: 15919

DISEASE ECOLOGY AND CONSERVATION

EVPP 427-001/BIOL 435-003
EVPP 527-001/BIOL 507-001

3 Credit Hours
Fall Semester 2015
Lecture: 4:30–7:10 p.m. Tuesdays
Aquia 219

Instructor:	Prof. A. Alonso Aguirre
Office:	David J. King Hall 3005 MSN: MSN: 5F2, Fairfax
Office Hours:	Tuesdays 2:00-4:00 pm or BY APPOINTMENT (send email request)
Phone:	703.993.7590
Cell:	304.200.0145
Email:	aaguirr3@gmu.edu

Prerequisite(s):	*Undergraduate students*: EVPP 301 OR BIOL308 and 60 credit hours; or Instructor's permission. *Graduate Students*: Courses on Evolution, Ecology, Zoology and Conservation Biology or Instructor's permission.

Sign up for Mason Alert (e.g., weather closings, emergencies) at **https://alert.gmu.edu**

Syllabus

Course Description

Conservation of biological diversity faces multiple challenges. The relationship of humans to impacts on terrestrial and aquatic organisms has been recognized, but conservation strategies traditionally have not included investigations of the symbioses and linkages among all organisms, and the continuum of environment and health, to frame protection policies and educate the public. In the 1990s, conservation medicine emerged as a transdisciplinary field that studies the relationships between human, animal, and ecosystem health and environmental conditions. Biomedical sciences are combined with conservation biology and other disciplines to trace the environmental sources of pathogens and pollutants, develop an understanding of the ecological causes of changes in human, biotic, and ecosystem health, and address the consequences of diseases to populations and ecological communities. This advanced course will provide a framework in which to examine the connections between condition of the planet and health of all species. It will also challenge students in the ecological sciences, health sciences and the natural sciences to think about new, collaborative ways to address ecological health. Understanding infectious and noninfectious diseases, pathogens, processes, impacts, and how to maintain healthy populations of species—and the ecosystem services the species provide—is the key to conservation.

Prerequisites
Undergraduate: 60 credits and BIOL 213 or BIOL/EVPP 305/306 and BIOL 308 or permission of the instructor

Graduate: Courses in microbiology, ecology, or conservation, or permission of instructor

Course Objectives and Student Learning Outcomes

The course will examine health issues from various standpoints, including the emergence and resurgence of infectious disease agents and how they are investigated; the effects of global climate change on health; the increasing impacts of toxic chemicals and hazardous substances; and the health implications of habitat fragmentation, degradation, and loss of biodiversity.

Students will participate in individual and team assignments to be able to:

Explain the difference between health and disease;

Discuss biotic and abiotic agents causing diseases, the paradigm of disease, factors controlling diseases, and how they are investigated;

Define terms pertaining to health, disease, epidemiology, ecology, and medicine;

Analyze diverse readings on conservation medicine and its role in conserving species and ecosystems;

Collect examples of diseases occurring in terrestrial and aquatic organisms;

Evaluate recent reports on emerging diseases in wildlife, domestic animals, and humans and their effects on ecosystems; and

Explain how disease investigations can improve conservation projects.

Course Expectations

Each session will combine lectures, class exercises, on occasion guest speakers, and student discussion. As with any cross-listed course (undergrad/grad) offering, ***this will not be an easy course***. The successful student **must read assignments, study supporting materials, and prepare assignments outside of class**. Self-directed study skills are important. Students need to organize material logically and communicate well orally and in writing.

Class Preparation

"He who hesitates is lost...." Reading, research, and assignments are detailed on the following class outlines. Any concerns about keeping up with assignments should be discussed with Prof. Aguirre. More students are juggling work, research, internships, shadowing, and families. Please note "Although many students must work to meet living expenses, employment must not take priority over academic responsibilities. Students employed more than 20 hours a week are

strongly urged not to attempt a full-time academic load. Students employed more than 40 hours a week should attempt no more than 6 credits per semester. Students who fail to observe these guidelines may expect no special consideration for academic problems arising from the pressures of employment.." (University catalog, section AP.1.2. Academic Load, see: http://catalog.gmu.edu/content.php?catoid=27&navoid=5365#attendance). Please consider your responsibilities and interests and plan accordingly to protect your health and GPA!

Class Participation

Students should come to class ready to participate in all activities (assignments completed prior to class). They should behave in a mature and professional manner and abide by the GMU honor code. **Please turn off cell phones or pagers before class begins.**

Absenteeism should be limited to illness or emergencies, or discuss concerns with the instructor.

Students should notify the instructor before class if they must miss a class. **Multiple missed classes will affect student grades** as class exercises are given in almost every lecture. PowerPoint TEXTS will be posted so you have the highlights of each lecture. However, you need to make every effort to attend. Students should contact classmates to obtain lecture notes and assignments, if necessary as quizzes and exams will be based also from readings from the books and other materials.

Students may record the lectures (sound), but may not take photographs or videos. Instead, they should take notes, which will help them study for the quizzes. If using electronic devices (such as laptops, notebooks, tablets), please be respectful of your peers and your instructor and do not engage in activities that are unrelated to class. Such disruptions show a lack of professionalism and can affect your grade.

If you are a student with a disability and you need academic accommodations, please notify the instructor and contact the Office of Disability Services (ODS) at 993-2474. All academic accommodations must be arranged through the ODS.

E-mail Communications

Prof. Aguirre will send e-mail messages only to your GMU e-mail account. Students must use their Mason email accounts— "MASONLIVE" account—to receive important University information, including messages related to this class. See http://masonlive.gmu.edu for more information. Please be sure you check it often and keep your mailbox from getting "over quota" (filled up so you won't get any)! If you are not getting messages (e.g., masonlive issues), please give an alternate e-mail address.

Required Textbook

Aguirre, A. A., R. S. Ostfeld and P. Daszak. 2012. *New Directions in Conservation Medicine: Applied Cases of Ecological Health*, Oxford University Press, New York, 646 pp.

Course Assignments

Definitions of Terms
Each student is expected to identify 100 common terms in disease ecology and submit them **written by hand**. This is a way to expose you to common terminology in health and disease ecology hoping that you may remember some of these definitions while writing them.

Written Assignments
In addition to reading and studying the textbook, other books, and journal papers, **undergraduates will prepare one written assignment and graduate students will prepare two written assignments** of 400 words not including references drafted as commentaries, comparing, contrasting, or critiquing a technical or popular article recently published (2016 or later) on a disease ecology issue (i.e. anthrax outbreak in bison; dolphins stranding in the Virginia coast; Chikungunya virus spreading in the Caribbean; Zika virus spreading in the Americas), in the style of *Letters to Science*
http://www.sciencemag.org/site/collections/online/eletters/guidelines.xhtml

Identify ***specific*** issues/critiques you have with **an article of your choice from a refereed journal or popular magazine**. This can be something that you found problematic, interesting, ridiculous, missing, etc. and then compare and support your arguments with other sources in the literature. You are **encouraged** to search articles from all sources. Use Web of Science or other journal databases to do additional literature searches.

Make your critiques **explicit and clear**, e.g.: "I find three main critiques in the way this argument was presented." … paragraph 1, 2, 3. Preferable to critique is a piece of **primary** literature, popular magazine or even TV news report, and not a review paper or chapter.

Do not spend too many words describing the intro, methods, conclusions, etc. of the article or report that you are critiquing. Try to give a very **brief** overview of the important points or methods and spend the rest of your paper giving **your own** "two-cents"! A good idea is to end with what you think needs to be done in the future based on your critique. **Don't be repetitive** with your points, you only have up to 400 words, therefore be concise and clear. Make every word count (this may be one of the big challenges of the assignments and will train you for real manuscript writing with editor-imposed word limits).

Proofread: Review your spelling and grammar before handing your work in! Avoid run-on or ambiguous sentences.

Each paper should be neatly prepared and proofread, especially checking for consistency, completeness, and correctness (Help: The Writing Center, OWL/On-line Writing Lab). Many online grammar resources are available now. This book might help when writing:

Ross-Larson, B. 1996. *Edit Yourself: A Manual for Everyone Who Works With Words.* W.W. Norton & Co., New York, NY.

All statements of fact in your paper need to be referenced to some authority. You can of course get access to that material electronically, BUT the use of web sites as a primary source of

information is discouraged. You should be using primary literature (e.g. peer reviewed journal articles) and reports for your authority. Limit web citation to no more than about 25% of the total. Full references (all authors names) should be provided in the Literature Cited section of your paper. As for citation style – use *Letters to Science*, but include all authors in the Literature Cited portion of the paper. Footnotes are reserved for limited explanatory material only. In the body of the text use numbers with an alphabetized Literature Cited section.

Use **proper reference structure**, author-year e.g., "AbuBakar *et al* (2011) isolated Nipah virus from pigs" or numbered reference (if you want to save words), e.g. "Nipah virus was isolated from pigs [1]".

References:

1. AbuBakar, S., L.-Y. Chang, A.R.M. Ali, S.H. Sharifah, K. Yusoff, and Z. Zamrod, *Isolation and molecular identification of Nipah virus from pigs.* Emerging Infectious Diseases, 2004. **10**(12): p. 2228-2230.

Please use Word (either .doc or .docx files only) and email your paper to me at the due date.

Research Paper

Not for Undergrads! Each graduate student will be expected to write a research paper on an infectious disease of wildlife agreed upon by the instructor and student. The paper shall be 4,000-6,000 words containing the history, science, human dimensions, and conservation medicine implications of the topic at the human health, wildlife health and ecosystem health interface. Grading of the paper will be judged on content, form, and relevancy to the course subject. Further details of the paper will be covered at the time of assignment. Use the **EcoHealth** Journal guidelines for length and style of the research papers (PDF in Blackboard).

Final PowerPoint Presentation

Not for Undergrads! Graduate students are required to give a 15-min presentation (+5 min Q&A) via PowerPoint slides on a *contemporary* issue/topic relevant to *Disease Ecology and Conservation*. **This assignment is optional for undergraduate students to improve their grades.** These presentations are worth *20% of your grade*. The issues/topics (*but not the contents*) for the presentations are not limited to those covered in the textbook. *Choose your favorite infectious disease, in a terrestrial or marine species or ecosystem from a newspaper, magazine article, or scientific journal article*. In your presentation, provide a brief background of the problem; describe the impacts of this disease to wildlife, domestic animals, humans and ecosystems and concerns from an economic, cultural, environmental, and conservation medicine perspective. Impacts can be considered from species to ecosystems and from molecular to global. Management implications may include discussion of mechanisms of control, prevention measures and proactive intervention to control impacts of the pathogen.

Presentations will be **20 minutes total**

The slide presentation "rule of thumb" is 1 slide per minute so plan accordingly.
Your 1st slide should be a title slide with your name and title of the talk. Next should be an introduction & overview to the topic followed by more specifics. Next you should discuss the implications of your infectious disease and management issues related to conservation medicine. Finally, you should provide conclusions in which the main points are highlighted.

Presentations will be graded on the clarity of the presentation, the professionalism of the slides, the content of the material presented, and your ability to answer questions posed by classmates and instructor.

Each topic below will get a score ranging from **1** (poor), **2** (good), **3** (very good) **4** (excellent)

Literature Review- Scope of information gathering

Scientific knowledge- How accurate is the information presented

Management Implications- all presentations should address *at least* 3 of the following areas:

a) Effects of an infectious disease in species and ecosystems from the molecular to the global, including human health
b) Economic perspectives
c) Cultural perspectives
d) Socioeconomic perspectives
e) Environmental policy angle
f) Perspectives from both the development, agriculture and conservation
g) Public health angles
h) Solutions to the problems outlined

Conclusions-Conclusions are sound and supported by data

Slides-Slides are well organized, logical, and easy to read and to interpret

Style-Delivery is clear, audible, with proper elocution and eye contact with audience

Time-Speaker adheres strictly to time limit.

Grading Criteria

The total grade received for this course will be based on the following assignments and assessments:

Activity	EVPP427/BIOL435 %Contribution to Total Grade	EVPP527/BIOL507 %Contribution to Total Grade
Definitions of Terms	10%	5%
Class participation	5%	5%
Extra readings	-	5%
Two written commentaries	10% (one only)	10% (5% each)
Research paper	-	20%
Four surprise quizzes (5 given)	40% (10% each)	20% (5% each)
Mid-term Exam	35%	25%
PowerPoint presentation	-	10%
TOTAL	**100%**	**100%**

The final grade for undergraduate students will be based on this scale: A = 100–93%, A- = 92-90%, B+ = 89-86%, B=85-83, B- = 82-80%, C = 79–70%, D = 69–60%, F < 59%. **A CURVE WILL NOT BE APPLIED.**

The final grade for graduate students will be based on this scale: A= 100–90%, B= 89-80, C = 79–70%, D= 69–60%, F < 59%. **A CURVE WILL NOT BE APPLIED.**

Academic Integrity

GMU is an Honor Code university; please see the University Catalog for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. When in doubt (of any kind) please ask for guidance and clarification. Students are expected to complete the work on their own or as a team, depending on the assignment.

All exams will be completed by individuals in the classroom or as a team outside the classroom (those registered for the course).

Unless otherwise noted, these assessments will be taken without the use of study aids, memoranda, textbooks, other books, data, or other information available.

It is important to note that materials produced for this course, particularly for the research paper, require creativity in organization and presentation, but that the information presented within the paper or other product must be properly acknowledged as to its source. Statements of a general nature or that synthesize information from several sources need not be attributed to a specific source; however, statements of specific details or direct quotations ("between quotation marks") from books, journals, newspaper or other media articles, Internet web pages, or other authorities must be identified with the name of the author and year in the text and the full citation provided in a literature cited section at the end of the paper. The instructor will provide the format for citations.

Other Useful Campus Resources

WRITING CENTER: A114 Robinson Hall; 703-993-1200; http://writingcenter.gmu.edu

UNIVERSITY LIBRARIES: "Ask a Librarian" http://library.gmu.edu/mudge/IM/IMRef.html

COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS): 703-993-2380;
http://caps.gmu.edu

LEARNING SERVICES: 703-993-2999; http://caps.gmu.edu/learningservices/; offer many good study skills workshops!

ACADEMIC COUNSELING PROGRAM: 703-993-2380:
http://caps.gmu.edu/learningservices/academiccounseling.php

UNIVERSITY POLICIES
The University Catalog, http://catalog.gmu.edu, is the central resource for university policies affecting student, faculty, and staff conduct in university academic affairs. Other policies are available at http://universitypolicy.gmu.edu/. All members of the university community are responsible for knowing and following established policies.

Course Schedule*

Week	***Date***	***Book Chapters***	***Topic***
1	08/29	Foreword, Preface	Introduction to the course. General concepts & definitions
		Chapter 1	Conservation Medicine: Ecological Health in Practice
2	09/5	Chapters 37 & 38	Eco-epidemiological approaches to infectious disease
3	09/12	Chapters 8 & 9	Global environmental change and disease ecology
4	09/19	Chapters 6 & 7	Disease, biodiversity and species extinction
5	09/26	Chapters 5 & 10	Habitat fragmentation/loss and disease ecology
			Lyme disease and the dilution effect
6	10/3	Chapters 14 & 15	Principles of emerging infectious diseases
			Emerging infectious diseases: terrestrial ecosystems
7	10/10	***No class***	**Columbus Day Recess: No class**
8	10/17	Chapters 18 & 22	EIDs: marine ecosystems. *E. Peters*
			Definitions of Terms Due
9	10/24	Chapters 20 & 21	Disease ecology of plants invertebrates. *E. Peters*
10	10/31	Chapter 16 & 29	Disease ecology and migratory species. *E. Peters*
			Written Commentary 1
11	11/7		***Midterm Exam***
12	11/14	Chapter 29** Chapter 6***	Disease ecology, bioterrorism and environmental security. *E. Peters*
13	11/21	Chapters 11 & 12	The wildlife trade, bushmeat and the spread of disease
			Midterm Exam Due
14	11/28	Chapters 41 & 42	Prediction and prevention of the next epidemic
			Written Commentary 2 due
15	12/5		**Final PPT Presentations**
			Research Paper due

* In additon to the chapters for each session, ALL graduate students will require to read **two preselected, refereed papers/chapters** listed below that need to be discussed in class.

** Chapter 29 from Aguirre et al. 2002 will be provided as a PDF

*** Chapter 6 from Friend 2006 will be provided in PDF

Required Readings for Graduate Students:

Week 1:

Textbook: Chapters 2 & 3

Week 2:

Anderson, R. M., and R.M. May. 1979. Population biology of infectious diseases: part I. Nature 280: 361-367.

May, R.M., and R.M. Anderson. 1979. Population biology of infectious diseases: part II. Nature 280: 455-461.

Week 3:

Harvell, C.D., C.E. Mitchell, J.R. Ward, S. Altizer, A.P. Dobson, R.S. Ostfeld and M.D. Samuel. 2002. Climate warming and disease risks for terrestrial and marine biota. Science 296:2158-2162.

Ostfeld, R. 2009. Climate change and the distribution and intensity of infectious diseases. Ecology 90(4):903-905.

Week 4:

Keesing, F., L.K. Belden, P. Daszak, A. Dobson, C.D. Harvell, R.D. Holt, P. Hudson, A. Jolles, K.E. Jones, C.E. Mitchell, S.S. Myers, T. Bogich, and R.S. Ostfeld. 2010. Impacts of biodiversity on the emergence and transmission of infectious diseases. Nature 468:647-652.

MacPhee, R.D.E., and A.D. Greenwood. 2013. Infectious disease, endangerment, and extinction. Int. J. Evol. Biol. doi.org/10.1155/2013/571939

Week 5:

Patz, J.A., P. Daszak, G.M. Tabor, A.A. Aguirre, M. Pearl, J. Epstein, N.D. Wolfe, A.M. Kilpatrick, J. Foufopoulos, D. Molyneux, D.J. Bradley, and Members of the Working Group on Land Use Change and Disease Emergence. 2004. Unhealthy landscapes: policy recommendations on land use change and infectious disease emergence. Environmental Health Perspectives 112(10):1092-1098.

Schmidt, K. A. and R. S. Ostfeld. 2001. Biodiversity and the dilution effect in disease ecology. Ecology 82:609-619.

Ostfeld, R.S. 2013. A Candide response to Panglossian accusations by Randolph and Dobson: biodiversity buffers disease. Parasitology doi:10.1017/S0031182013000541

Randolph, S.E., and A.D.M. Dobson. 2012. Pangloss revisited: a critique of the dilution effect and the biodiversity-buffers-disease paradigm. Parasitology 139(7):847-863. doi: dx.doi.org/10.1017/S0031182012000200

Week 6:

Daszak, P., A.A. Cunningham, and A.D. Hyatt, 2000. Emerging infectious diseases of wildlife–threats to biodiversity and human health. Science 287: 443-449.

Jones, K.E., N.G. Patel, M.A. Levy, A. Storeygard, D. Balk, J.L. Gittleman, and P. Daszak. 2008. Global trends in emerging infectious diseases. Nature 451:990-994.

Week 7:

No Class

Week 8:

Chapters 23 & 27

Week 9:

The *Journal of Invertebrate Pathology* is an excellent resource for information on insect diseases.

Anderson, P.K., A.A. Cunningham, N.G. Patel, F.J. Morales, P.R. Epstein, and P. Daszak. 2004. Emerging infectious diseases of plants: Pathogen pollution, climate change and agrotechnology drivers. Trends in Ecology and Evolution 19(10):535-544.

Boyd, I.L., P.H. Freer-Smith, C.A. Gilligan, and H.C.J. Godfray. 2013. The consequence of tree pests and diseases for ecosystem services. Science 342: 1235773, DOI:

Bromenshenk, J.J., C.B. Henderson, C.H. Wick, M.F. Stanford, A.W. Zulich, et al. 2010. Iridovirus and microsporidian linked to honey bee colony decline. PLoS ONE 5(10): e13181. doi:10.1371/journal.pone.0013181.

Gilbert, G.S. 2002. Evolutionary ecology of plant diseases in natural ecosystems. Annu. Rev. Phytopathol. 40:13-43. 10.1126/science.1235773.

Week 10:

Altizer, S., R. Bartel, and B.A. Han. 2011. Animal migration and infectious disease risk. Science 331:296-302.

Reed, K.D., J.K. Meece, J.S. Henkel, and S.K. Shukla. 2003. Birds, migration and emerging zoonoses: West Nile virus, Lyme disease, influenza A and enteropathogens. Clinical Medicine & Research 1(1):5-12.

Week 11:

Take-Home Midterm

Week 12:

Emerging Infectious Diseases Journal- special issue on bioterrorism
www.cdc.gov/ncidod/eid/vol5no4/contents.htm

Chomel, B.B., and B. Sun. 2010. Bioterrorism and invasive species. Rev. sci. tech. Off. int. Epiz. 29(2):193-199.

Week 13:

Gomez, A. and Aguirre, A.A. 2008. Infectious diseases in the illegal wildlife trade. Animal Biodiversity and Emerging Diseases 1149:16-19.

Smith, K.F., Behrens, M.D., Schloegel, L.M., Marano, N., Burgiel, S. and Daszak, P. 2009. Reducing the risks of the wildlife trade. Science 324: 594-595.

Week 14:

Gortazar C., L.A. Reperant, T. Kuiken, J. de la Fuente, M. Boadella, B. Martínez-Lopez, F. Ruiz-Fons, A. Estrada-Peña, C. Drosten, G. Medley, R. Ostfeld, T. Peterson, K. C. VerCauteren, C. Menge, M. Artois, C. Schultsz, R. Delahay, J. Serra-Cobo, R. Poulin, F. Keck, A.A. Aguirre, H. Henttonen, A.P. Dobson, S. Kutz , J. Lubroth and A. Mysterud. 2014. Crossing the interspecies barrier: opening the door to zoonotic pathogens. PLoS Pathogens 10(6): e1004129. doi:10.1371/journal.ppat.1004129.

Suzán G., G. E. García-Peña, I. Castro-Arellano, O. Rico, A. V. Rubio, M. J. Tolsá, B. Roche, P. R. Hosseini, A. Rizzoli, K. A. Murray, C. Zambrana-Torrelio, A. A. Aguirre, P. Daszak, A.-H. Prieur-Richard, J. N. Mills, and J.-F. Guégan. 2015. Metacommunity and phylogenetic structure determine wildlife and zoonotic infectious disease patterns in time and space. Ecology and Evolution doi: 10.1002/ece3.1404