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Welcome to the American Association of Food Safety and Public Health Veterinarians

The AAFSPHV represents veterinarians working in:

- Public health agencies
- Departments of agriculture
- Wildlife health agencies
- Environmental agencies
- Animal welfare agencies
- Military service
- Private practice
- Shelter medicine
- Industry
- Academia
- Food safety agencies

PRESIDENT'S CORNER



Angela Demaree, DVM, MPH
President
American Association of Food
Safety & Public Health
Veterinarians (AAFSPHV)
<http://www.aaphv.org/>

Greetings Colleagues,

Many thanks to all who were able to attend our Annual Meeting in October. Below are my remarks on the State of the Association for those of you who missed the meeting. As always, if you'd like to participate as a volunteer leader or speaker, please reach out, we welcome your expertise and participation.

"I can report that our association is strong.

Not because of the usual statistics such as our membership numbers or dollars in reserve, but because our membership is currently serving in some of the most important roles around the world.

Right now, we have at least one member in Israel working to ensure a safe and continuous food supply in an unstable environment.

We have members who were deployed by the US government during the COVID crisis as part of their civilian employment.

Our members are on the front lines of food safety and public health, not just figuratively but also literally, doing the work that often goes unnoticed when a public health emergency has been averted or a safe and wholesome food supply is plentiful.

I wanted to take this time to thank and support those who are tirelessly working around the world and around the clock - sometimes putting themselves in danger, so we can seamlessly go about our lives.

Thank you, yes YOU, each and every one of you for the work you do and for taking the time out of your day to participate in your association. We appreciate and value the contribution you are making each and every day - it is important, it is necessary, and you ARE making a difference."

Angela Demaree, DVM, MPH
President American Association of Food Safety & Public Health

FROM THE EVP

2023 MEMBER SURVEY RESULTS

40 members responded to the survey.

Social media preferences: 22 use Linked In, 12 Facebook and 4 Twitter.

Several members volunteered to serve on one of our standing committees: Finance, Education, Communication and Student Outreach. The committee chairs were given contact information for those who expressed an interest in joining a committee.

Other members indicated they would be willing join our Speaker's Bureau.

AAFSPHV members are encouraged to share their expertise by joining our Speaker's Bureau.

We provide speakers for several events:

1. The AVMA and USAHA Food Safety Track/Symposia at their annual conventions
2. The American College of Veterinary Preventive Medicine in conjunction with the American Association of Food Safety and Public Health Veterinarians and the National Association of Federal Veterinarians webinar series. Webinars will cover a broad range of preventive medicine and public health topics.
3. AAFSPHV speakers for student groups interested in public health careers and related topics.

To volunteer for the speaker's bureau please go to your member webpage scroll down to Events then select the form: for speaker bureau

https://host9.viethwebhosting.com/~aafs/speakers_bureau.php

Mentoring and informational interviews: 20 members volunteered to participate as a resource for a new mentoring and informational interview group. The student outreach committee is working on a protocol for this. We are also consulting with SAVMA.

If you are interested in volunteering in any of these ways, please contact your EVP Katherine Waters, executivevp@aafsphv.org



Katherine Waters
AAFSPHV Exec VP
executivevp@aafsphv.org

Affiliation of AAFSPHV Members

- Public health agencies
- Departments of agriculture
- Wildlife health agencies
- Environmental agencies
- Animal welfare agencies
- Military service
- Private practice
- Shelter medicine
- Industry
- Academia
- Food safety agencies

Become a member
today!



Promoting the science and art of public health, food safety, epidemiology, and preventive medicine to the veterinary profession

Members,

We want to keep our organization strong and relevant.

In order to represent the public health and food safety sectors of our profession, we **need** to boost our membership numbers. To continue our free RACE CE webinars and scholarship programs we need to increase our income.

If you know of veterinarians who would be interested in joining our organization please copy and paste the Member Recruitment information below into a text or email and send it to them now.

Thank you for your support.

Become a Member for \$50/Year!

When you become a member of AAFSPHV, you join the ranks of veterinarians and veterinary students from all over the country who maintain an active interest in public health, food safety and veterinary preventive medicine and strive to promote the science and art of public health.

Benefits of Membership:

- **Free monthly online CE** in public health via our partnership with the American College of Veterinary Preventive Medicine (ACVPM)
- Access to our The Quarterly, our **newsletter** with association and member news and a compendium of abstracts relating to veterinary public health and food safety
- Supporting an organization with representation on the AVMA **House of Delegates**, Food Safety Advisory and Legislative Advisory committees
- Access to our new website with a CE calendar, forums, and a **jobs board**
- Access to our YouTube and Podcast channels featuring interviews with veterinarians working in public practice, academia, and industry
- Access to our LinkedIn for job postings and discussions
- **Networking** with veterinarians across all sectors of public health and food safety
- **Access to veterinarians** for informational interviews and job or career advice
- **Complimentary 1st year membership to recent DVM, MS in Food Safety, and MPH graduates**
- **Scholarships** to help cover **travel and expenses** for student members to attend the AVMA **Annual Meeting** and other meetings
- **NEW in 2023:** scholarship fund for **MPH or public health/food safety MS tuition** for DVM students and graduate veterinarians

To join, visit our website: <http://aafsphv.org/membership.html>

Sincerely, Katherine Waters, AAFSPHV Exec VP

Editor's Note

SEEKING NEW AAFSPHV EDITOR FOR 2024

It has been a joy serving AAFSPHV as Editor this past year but with three exciting moves and a career change time has seemed to get slimmer and slimmer. This newsletter is a fantastic tool for learning and contributing to this fantastic profession. If you have an interest in assisting as Editor, please don't hesitate to reach out with any questions!

The Quarter 4 edition for 2023 of the newsletter will be released in January. All submissions for the January edition should be submitted to me by January 3rd by 5pm CST. Any and all submissions can be submitted to editor@aafsphv.org

As always, you are welcome to send news and updates at any time to be included in the upcoming newsletter. We would love to feature member accomplishments whether it is awards, new job alerts, changes in offices, or volunteer work. We love to hear from you! If you have any questions or suggestions, please don't hesitate to reach out!

Best,
Tori Novak, DVM, MPH



SEEKING NEW AAFSPHV EDITOR

What: The AAFSPHV is seeking a new editor for the Quarterly, the online publication sent to members once every quarter.

Description: At the beginning of every quarter (Jan, April, July, October), the editor collects reports from board members, scans the table of contents of 15-20 relevant journals for papers related to 5 categories (Epidemiology, Public Health, Infectious/Parasitic Disease, Food Safety, Environmental Health/Toxicology), and compiles them into an organized format to be sent out to membership.

Skills required: basic editing abilities in Microsoft Word or Adobe. Ability to use citation programs such as EasyBib or Google Scholar. Dr. Tori Novak, current editor, will provide assistance and training to the new editor.

Time commitment: 5-7 hours every quarter

Compensation: \$200 stipend per publication

Interested parties should email Dr. Tori Novak, Current Editor by **January 1st** : editor@aafsphv.org.

Update from the Communications Committee

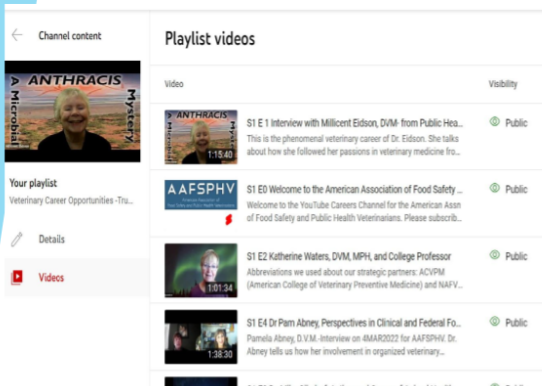
Communications involves not only our email Listserv, but also our social media accounts, and our website. Our Social Media is YouTube, Podcast, Twitter, LinkedIn, and FaceBook. Our website is our interactive Membership Hub. It features:

- ❖ Job Board - this is completely free and we encourage you to post
- ❖ Calendar: Continuing Education and meetings -all continuing ed that pertains to food safety and public health are invited (contact Dr. Waters for help in posting)
- ❖ Online applications for Scholarships for Students
- ❖ AAFSPHV Social Media Links on website and our ListServ
- ❖ Online membership renewal
- ❖ Newsletter archives
- ❖ Member Directory

AAFSPHV Channels on Youtube and Spotify (season 3 Interviews)

Career Opportunities of American Association of Food Safety and Public Health Veterinarians

AAFSPHV [YouTube Channel](#)



AAFSPHV [Podcast Channel](#)



The communication committee is on the cusp of great changes. We invite you to join us. Member duties are as simple as reposting our social media posts in all of your social media. Create content (simply provide links for pertinent food safety and public health articles). Share your story with an interview so we can show fellow veterinarians what the options are for career paths. And finally, to help us on this committee with any aspect of new ideas. Please contact me at drdebonis@gmail.com

Donna DeBonis, DVM
Communications Committee Chair
Past AAFSPHV President

Update from the Food Safety Advisory Committee

The AVMA Food Safety Advisory Committee (FSAC) had a busy and productive 2023. From 1 October 2022 through 30 September 2023, FSAC met 9 times (2 Semiannual In-person; 7 Monthly Virtual; and associated Virtual Agenda Planning) In this time, FSAC accomplished policy reviews, provided input to AVMA's comment on a federal docket, and provided 2 presentations at AVMA's 2023 Convention.

The FSAC reviewed and submitted recommendations to the Board on the following policies.

- ❖ Revised Policy on Processes for Microbial Reduction in Food renamed Technologies for pathogen mitigation in food processing.
- ❖ Safe Handling of Commercially Prepared Pet Food and Pet Treats (to be submitted)
- ❖ Raw or Undercooked Animal Source Protein in Cat and Dog Diets (to be submitted)

Responses to External Stakeholders

- ❖ Docket AMS - NOP - 21 - 0073 National Organic Program: Organic Livestock and Poultry Standards, 11 October 2022

Presentations/Advocacy

- ❖ AVMA Annual Convention 2023
- ❖ The veterinarian's role in beef quality assurance. Carla Huston, DVM, PhD, DACVPM (Epidemiology) Location: 502, Session Code: 1418. 1 CE credit
- ❖ Developing an interactive biosecurity plan for livestock operations. Carla Huston, DVM, PhD, DACVPM (Epidemiology) Location: 502, Session Code: 1417. 1 CE credit

Pet Food Working Group in 2024

If you have experience in the pet food industry and would like to join a working group to discuss pet food safety, pet food certification, regulatory, product testing and integrity and new process intervention, please contact Paulo Mohyla, DVM MS, at paulomohyla@gmail.com for more information.

The Dan E. Lafontaine Veterinary Memorial Scholarship First Recipient

The first recipient of the Dan E. Lafontaine Veterinary Memorial Scholarship is Dan Cook who is presently studying at the University of Missouri-Columbia in his 2nd year of veterinary school.



He states, “My love of animals and passion to provide quality food products to people is what has driven me to become a public health veterinarian. I have a Master of Animal Science, emphasis in Meat Science, from the University of Arkansas and a Bachelor of Science in Agriculture from Truman State University. After graduating from the University of Arkansas, I worked for Simmons Pet Food in Kansas and then Cargill, Inc. as a FSQR Supervisor in Missouri.”

Dan and his wife have been married for 10 years and they have three children. With his family, Dan loves the outdoors including hiking, camping, and hunting. Dan plans on working with USDA-FSIS as a public health veterinarian, ensuring quality in our food supply for the public.

The Dan E. Lafontaine Veterinary Memorial Scholarship was established in 2021 to provide financial support to veterinary students and veterinarians who are enrolled in graduate programs in food safety and public health.

Daniel E. Lafontaine Sr. DVM, MPH, Dip. ACVPM served in the Army Veterinary Corps for 26 years, retiring as a Colonel in 1993. Dr. Lafontaine subsequently served as Director of the South Carolina Meat Poultry Inspection Department and was the Assistant State Veterinarian of South Carolina. In 1996, Dr. Lafontaine was named AAFHV Food Hygiene Veterinarian of the Year. He received the AVMA Public Service Award in 2008. He finished his career as a Vice President and associate of the HACCP Consulting Group, LLC.

This scholarship is managed by the non-profit organization, American Association of Food Safety and Public Health Veterinarians (AAFSPHV) where Dr. Lafontaine was intimately involved as a leader and supporter. In honor and memory of Dr. Lafontaine, in gratitude for his work in food safety, and to support those following a similar path, please consider donating to the Dan E Lafontaine Veterinary Memorial Scholarship via check payable to “AAFSPHV” and sent to AAFSPHV c/o Dr. Katherine Waters, Executive Vice President, 2519 California Street, Denver, Colorado 80205. Communication with Dr. Waters may be made through email: aafsv.execvp@gmail.com.

Food Safety and Public Health Veterinarian of the Year



Dr Sharon Thompson

Each year, the American Association of Food Safety and Public Health Veterinarians (AAFSPHV) recognizes veterinarians who have gone above and beyond in their contributions to the field of public health, including the field of food safety.

The recipient of the 2023 AAFSPHV Public Health Veterinarian of the Year award is Dr. Sharon Thompson. Dr. Thompson is a Professor and Director of the Center for Agriculture and Food Security and Preparedness (CAFSP) at the University of Tennessee College of Veterinary Medicine. Dr. Thompson is also Co-Director of the Tennessee Integrated Food Safety Center of Excellence, one of 5 National Food Safety Centers supported by the Centers for Disease Control and Prevention (CDC).

Her career, spanning the federal and academic sectors, has focused on food safety and public health issues, and she has worked on these issues internationally with multiple countries, including Pakistan, Bangladesh, Jordan, Egypt, Cambodia, Iraq, Ukraine, Columbia, UAE, Malaysia and Vietnam. Dr. Thompson has successfully administered over \$41 million in competitive grants and contracts. Dr. Thompson founded CAFSP in 2005. Since then, CAFSP has developed 49 instructor-led training courses and 33 online courses for FDA, CDC, DHS FEMA, USDA, the U.S. State Department, and several national associations such as AFDO, NEHA and NASDA. CAFSP has conducted 314 instructor-led course deliveries (~9307 participants) and hosted ~31,587 online course participants from 33 countries.

Before joining the University of Tennessee, Dr. Thompson was the Associate Director for Veterinary Medical and International Affairs with FDA's Center for Veterinary Medicine, where she managed the Center's international programs, including work with Codex Alimentarius, OIE, WHO and FAO. She received her BA in Biology from Harvard University, her DVM from Virginia Tech, and her MPH from the University of Tennessee.

Congratulations, Dr. Thompson!

AAFSPHV Annual Meeting Report

THE 2023 AAFSPHV ANNUAL MEMBERSHIP MEETING WAS HELD ON OCTOBER 19, 2023 VIA ZOOM.

President Angela Demaree gave opening comments on the state of the association, then closed the meeting with a look at future. Reports were given by our standing committee chairs in communication, education, student outreach and finance.

❖ AVMA reports:

- HOD Update: Katherine Waters for Kristen Clark
- Food Safety Advisory Committee: Paulo Mohyla
- Legislative Advisory Committee: Pam Abney
- Committee on Antimicrobials: Gabriel Innes

- ❖ Dr. Susan Thompson was announced as the 2023 Food Safety and Public Health veterinarian of the Year.

The meeting agenda, powerpoint slides and minutes, as well as a recording of the meeting will be posted to our website under the organization button.

Member News

❖ CE Webinars Continue Monthly:

ACVPM and NAFV we sponsor this CE webinar series

These 1 hour webinars are RACE approved

There is no cost for our members to attend. In order to get CE credit, you must attend the live online session for at least 45 minutes (RACE certification requirement). The seminars are recorded and are available on the ACVPM YouTube channel.

<https://www.youtube.com/channel/UC7AzlytZCFfn39mBfJTb6XQ>

We send out webinar announcements via our broadcast email.

❖ Call for Honorary Member Nominations:

The AAFSPHV is a national organization that recognizes and fosters excellence in veterinary public health and food safety. We ask members to nominate veterinarians who have contributed to our profession by nominating them for Honorary Membership. Honorary members receive all communications from our organization, can contribute to our publications, attend CE webinars and member meetings.

To nominate an individual for Honorary Membership, please fill out the form on the website.

Login and go to your member page>Membership>Submit recommendation for Honorary Member

<https://www.viethconsulting.com/members/form.php?orgcode=AAFS&fid=5074645>

After the nomination is received, it will be presented to our Governing Board for approval and the nominee will be notified.

Thank you, by nominating an honorary member, you help us honor their contribution to our profession as well as increase the visibility and understanding of our organization and who we are.

❖ Colleague and author Dr. Millicent Eidson releases newest medical thriller:

Aligned with her public health teaching, Dr. Millicent Eidson writes medical thrillers to communicate zoonotic risks. She released her third novel "Corona: A Microbial Mystery" in Aug., 2023, available at <https://books2read.com/coronamicrobialmystery>.

"After investigating the first human COVID case in Arizona, Maya Maguire's focus shifts to coronavirus in animals. As a Chinese American adoptee, her origin story comes full circle like an ouroboros—a dragon eating its tail."

Check out more at <https://drmayamaguire.com>

Members On The Move

❖ Dr. Kristen Clark moves to Minnesota Department of Health

In Mid-August, Dr. Kristen Clark joined the Minnesota Department of Health as the Director of the MN One Health Antibiotic Stewardship Collaborative (MOHASC). MOHASC provides a collaborative environment to promote judicious antibiotic use and stewardship and to reduce the impact of antibiotic-resistant pathogens of human, animal, and environmental health importance. Through MOHASC, Minnesota leaders in human, animal, and environmental health work together to raise awareness and change behaviors to preserve antibiotics and treat infections effectively with the goal of promoting and improving antibiotic stewardship efforts across the One Health spectrum. Dr. Clark was also inducted as the President of the Iowa Veterinary Medical Association in September and currently serves as the AAFSPHV Delegate to the AVMA. Congratulations Dr. Clark!



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ENVIRONMENTAL HEALTH AND TOXICOLOGY

Disparities in Toxic Chemical Exposures and Associated Neurodevelopmental Outcomes: A Scoping Review and Systematic Evidence Map of the Epidemiological Literature

Children are routinely exposed to chemicals known or suspected of harming brain development. Targeting Environmental Neuro-Development Risks (Project TENDR), an alliance of more than 50 leading scientists, health professionals, and advocates, is working to protect children from these toxic chemicals and pollutants, especially the disproportionate exposures experienced by children from families with low incomes and families of color. This scoping review was initiated to map existing literature on disparities in neurodevelopmental outcomes for U.S. children from population groups who have been historically economically/socially marginalized and exposed to seven exemplar neurotoxicants: combustion-related air pollution (AP), lead (Pb), mercury (Hg), organophosphate pesticides (OPs), phthalates (Phth), polybrominated diphenyl ethers (PBDEs), and polychlorinated biphenyls (PCBs).

Systematic literature searches for the seven exemplar chemicals, informed by the Population, Exposure, Comparator, Outcome (PECO) framework, were conducted through 18 November 2022, using PubMed, CINAHL Plus (EBSCO), GreenFILE (EBSCO), and Web of Science sources. We examined these studies regarding authors' conceptualization and operationalization of race, ethnicity, and other indicators of sociodemographic and socioeconomic disadvantage; whether studies presented data on exposure and outcome disparities and the patterns of those disparities; and the evidence of effect modification by or interaction with race and ethnicity.

Two hundred twelve individual studies met the search criteria and were reviewed, resulting in 218 studies or investigations being included in this review. AP and Pb were the most commonly studied exposures. The most frequently identified neurodevelopmental outcomes were cognitive and behavioral/psychological. Approximately a third (74 studies) reported investigations of interactions or effect modification with 69% (51 of 74 studies) reporting the presence of interactions or effect modification. However, less than half of the studies presented data on disparities in the outcome or the exposure, and fewer conducted formal tests of heterogeneity. Ninety-two percent of the 165 articles that examined race and ethnicity did not provide an explanation of their constructs for these variables, creating an incomplete picture.

As a whole, the studies we reviewed indicated a complex story about how racial and ethnic minority and low-income children may be disproportionately

harmed by exposures to neurotoxicants, and this has implications for targeting interventions, policy change, and other necessary investments to eliminate these health disparities. We provide recommendations on improving environmental epidemiological studies on environmental health disparities. To achieve environmental justice and health equity, we recommend concomitant strategies to eradicate both neurotoxic chemical exposures and systems that perpetuate social inequities.

Authors: Devon C. Payne-Sturges, Tanya Khemet Taiwo, Kristie Ellickson, Haley Mullen, Nedelina Tchangalova, Laura Anderko, Aimin Chen, and Maureen Swanson

Source: (2023). Environmental Health Perspectives 131:9 CID: 096001
<https://doi.org/10.1289/EHP11750>

Associations between Urinary Concentrations of Disinfection Byproducts and in Vitro Fertilization Outcomes: A Prospective Cohort Study in China

Experimental studies show that disinfection byproducts (DBPs) can inhibit oocyte maturation, decrease fertilization capacity, and impair embryo development, but human evidence is lacking. We aimed to evaluate the associations between exposure to drinking water DBPs and in vitro fertilization (IVF) outcomes.

The study included 1,048 women undergoing assisted reproductive technology (ART) treatment between December 2018 and January 2020 from a prospective cohort study, the Tongji Reproductive and Environmental study in Wuhan, China. Exposure to DBPs was assessed by dichloroacetic acid (DCAA) and trichloroacetic acid (TCAA) in up to four urine samples, which were collected on the day of both enrollment and oocyte retrieval. Multivariable generalized linear mixed models, accounting for multiple IVF cycles per woman, were applied to evaluate the associations between urinary biomarkers of DBP exposures and IVF outcomes. Stratified analyses were used to explore the potential effect modifiers.

The included 1,048 women underwent 1,136 IVF cycles, with 960 (91.6%), 84 (8.0%), and 4 (0.4%) women contributing one cycle, two cycles, and three cycles, respectively. We found that elevated quartiles of urinary DCAA and TCAA concentrations were associated with reduced numbers of total oocytes and metaphase II oocytes and that urinary DCAA concentrations with a lower proportion of best-quality embryos (all p for trends less than 0.05). Moreover, elevated quartiles of urinary DCAA concentrations were associated with decreased proportions of successful implantation, clinical pregnancy, and live birth (14%, 15%, and

15% decreases in adjusted means comparing the extreme quartiles, respectively; all p for trends less than 0.05 (trends < 0.05). Stratification analyses showed that the inverse associations of urinary TCAA concentrations with multiple IVF outcomes were stronger among women greater than or equal to 30 ≥ 30

y of age (p for interactions less than 0.05 interactions < 0.05).

Exposure to drinking water DBPs was inversely associated with some IVF outcomes among women undergoing ART treatment. Further study is necessary to confirm our findings.

Authors: Yan-Ling Deng, Chong Liu, Xiao-Qiong Yuan, Qiong Luo, Yu Miao, Pan-Pan Chen, Fei-Peng Cui, Min Zhang, Jia-Yue Zeng, Tian Shi, Ting-Ting Lu, Yu-Feng Li, Wen-Qing Lu, and Qiang Zeng

Source: (2023). Environmental Health Perspectives 131:9 CID: 097003
<https://doi.org/10.1289/EHP12447>

Glyphosate and environmental toxicity with “One Health” approach, a review

The herbicide Glyphosate (GLY), or N-(phosphonomethyl) glycine was synthesized in 1950 and applied to control weeds in agricultural production. For a long time, it was believed that it was an inert compound, but many studies have instead demonstrated over the years the dangers of GLY to the ecosystem and human health. Among the best-known effects, it is known that GLY interferes with the metabolic pathways of plants and the main groups of microorganisms, negatively influencing their growth. GLY interferes with the metabolic pathways of plants and major groups of microorganisms negatively affecting their growth. The extensive GLY application on fields results in a “slow death” of plants through the minor resistance to root pathogens and in increasing pollution of freshwaters and soils. Unfortunately, however, unlike the old beliefs, GLY can reach non-target destinations, in this regard, ecological studies and environmental epidemiology are of significant interest. In this review, we focus on the effects of acute and chronic exposure to GLY on the health of plants, animals, and humans from a One Health perspective.

GLY has been linked to neurological and endocrine issues in both humans and animals, and behavioral modification on specific bioindicators, but the knowledge about the ratio cause-and-effect still needs to be better understood and elucidated. Environmental GLY residues analysis and policy acts will both require new criteria to protect environmental and human health.

Authors: Margherita Ferrante, Paola Rapisarda, Alfina Grasso, Claudia Favara, Gea Oliveri Conti

Source: (2023). Environmental Research, Volume 235, 2023, 116678, ISSN 0013-9351,
<https://doi.org/10.1016/j.envres.2023.116678>

Toxicity assessment of poultry-waste biosynthesized nanosilver in *Anabas testudineus* (Bloch, 1792) for responsible and sustainable aquaculture development-A multi-biomarker approach

The current study investigates the potential utilization of poultry intestines for the synthesis of stable silver nanoparticles (AgNPs) and their impact on fish physiology. The AgNPs were synthesized and characterized using various analytical techniques. The toxicity of AgNPs on *Anabas testudineus* was evaluated, determining a 96-h LC50 value of 25.46 mg l⁻¹. Subsequently, fish were exposed to concentrations corresponding to 1/10th, 1/25th, 1/50th, and 1/100th of the estimated LC50 for a duration of 60 days in a sub-acute study. A comprehensive range of biomarkers, including haematological, serum, oxidative stress, and metabolizing markers, were analyzed to assess the physiological responses of the fish. Additionally, histopathological examinations were conducted, and the accumulation of silver in biomarker organs was measured. The results indicate that silver tends to bioaccumulate in all biomarker organs in a dose- and time-dependent manner, except for the muscle tissue, where accumulation initially increased and subsequently decreased, demonstrating the fish's inherent ability for natural attenuation. Analysis of physiological data and integrated biomarker responses reveal that concentrations of 1/10th, 1/25th, and 1/50th of the LC50 can induce stress in the fish, while exposure to 1/100th of the LC50 shows minimal to no stress response. Overall, this study provides valuable insights into the toxicity and physiological responses of fish exposed to poultry waste biosynthesized AgNPs, offering potential applications in aquaculture while harnessing their unique features.

Authors: Puja Chakraborty, Kishore Kumar Krishnani, Ashok Mulchandani, Dhruva Jyoti Sarkar, Basanta Kumar Das, Kurcheti Paniprasad, Paramita Banerjee Sawant, Neeraj Kumar, Biplab Sarkar, Nalini Poojary, Abhijit Mallik, Prasenjit Pal

Source: (2023). Environmental Research, Volume 235, 2023, 116648, ISSN 0013-9351,
<https://doi.org/10.1016/j.envres.2023.116648>

Groundwater antibiotics contamination in an alluvial-pluvial fan, North China Plain: Occurrence, sources, and risk assessment

Antibiotics in groundwater have received widespread concern because high levels of them

harm aquatic ecosystems and human health. This study aims to investigate the concentration, distribution, ecological and human health risks as well as potential sources of antibiotics in groundwater in the Hutuo River alluvial-pluvial fan, North China Plain. A total of 84 groundwater samples and nine surface water samples were collected, and 35 antibiotics were analyzed using ultra-performance liquid chromatography-tandem mass spectrometry. The results indicated that 12 antibiotics were detected in surface water with the total concentrations ranging from 5.33 ng/L to 64.73 ng/L. Macrolides were the primary category of antibiotics with a detection frequency of 77.8% (mean concentration: 9.14 ng/L). By contrast, in shallow granular aquifers (<150 m), 23 antibiotics were detected and the total concentrations of them ranged from below the method detection limit to 465.26 ng/L (detection frequency: 39.7%). Quinolones were the largest contributor of antibiotics with detection frequency and mean concentration of 32.1% and 12.66 ng/L, respectively. And ciprofloxacin and ofloxacin were the two preponderant individual antibiotics. The mean concentration of groundwater antibiotics in peri-urban areas was approximately 1.7-4.9 times that in other land use types. Livestock manure was the predominant source of antibiotics in groundwater. Erythromycin, sulfametoxydiazine, ofloxacin, and cinoxacin exhibited medium ecological risks to aquatic organisms. All antibiotics posed no risks to human health. The findings of this study provide valuable insights into the occurrence and management of antibiotic contamination in the groundwater in the Hutuo River alluvial-pluvial fan.

Authors: Dongya Han, Qinxuan Hou, Jiangmin Song, Ruinan Liu, Yong Qian, Guanxing Huang

Source: (2023). *Environmental Research*, Volume 235, 2023, 116653, ISSN 0013-9351, <https://doi.org/10.1016/j.envres.2023.116653>

EPIDEMIOLOGY AND BIostatISTICS

Ancestral Origin and Dissemination Dynamics of Reemerging Toxigenic *Vibrio cholerae*, Haiti

The 2010 cholera epidemic in Haiti was thought to have ended in 2019, and the Prime Minister of Haiti declared the country cholera-free in February 2022. On September 25, 2022, cholera cases were again identified in Port-au-Prince. We compared genomic data from 42 clinical *Vibrio cholerae* strains from 2022 with data from 327 other strains from Haiti and 1,824 strains collected worldwide. The 2022 isolates were homogeneous and closely related to clinical and environmental strains circulating in Haiti during 2012-2019. Bayesian hypothesis testing indicated that the

2022 clinical isolates shared their most recent common ancestor with an environmental lineage circulating in Haiti in July 2018. Our findings strongly suggest that toxigenic *V. cholerae* O1 can persist for years in aquatic environmental reservoirs and ignite new outbreaks. These results highlight the urgent need for improved public health infrastructure and possible periodic vaccination campaigns to maintain population immunity against *V. cholerae*.

Authors: Carla N. Mavian, Massimiliano S. Tagliamonte, Meer T. Alam, S. Nazmus Sakib, Melanie N. Cash, Monika Moir, Juan Perez Jimenez, Alberto Riva, Eric J. Nelson, Emilie T. Cato, Jayakrishnan Ajayakumar, Rigan Louis, Andrew Curtis, V. Madsen Beau De Rochars, Vanessa Rouzier, Jean William Pape, Tulio de Oliveira, J. Glenn Morris, Marco Salemi¹, and Afsar Ali

Source: (2023). *Emerging Infectious Diseases*, 29(10), 2072-2082. <https://doi.org/10.3201/eid2910.230554>

Spatial Epidemiologic Analysis and Risk Factors for Nontuberculous Mycobacteria Infections, Missouri, USA, 2008-2019

Nontuberculous mycobacteria (NTM) infections are caused by environmental exposure. We describe spatial distribution of NTM infections and associations with sociodemographic factors and flooding in Missouri, USA. Our retrospective analysis of mycobacterial cultures reported to the Missouri Department of Health and Social Services surveillance system during January 1, 2008-December 31, 2019, detected geographic clusters of infection. Multilevel Poisson regression quantified small-area geographic variations and identified characteristics associated with risk for infection. Median county-level NTM infection rate was 66.33 (interquartile range 51-91)/100,000 persons. Risk of clustering was significantly higher in rural areas (rate ratio 2.82, 95% CI 1.90-4.19) and in counties with >5 floodings per year versus no flooding (rate ratio 1.38, 95% CI 1.26-1.52). Higher risk for NTM infection was associated with older age, rurality, and more flooding. Clinicians and public health professionals should be aware of increased risk for NTM infections, especially in similar environments.

Authors: Carlos Mejia-Chew, Miguel A. Chavez, Min Lian, Angela McKee, Leighton Garrett, Thomas C. Bailey, Andrej Spec, Mansi Agarwal, and George Turabelidze

Source: (2023). *Emerging Infectious Diseases*, 29(8), 1540-1546. <https://doi.org/10.3201/eid2908.230378>

Waterborne Infectious Diseases Associated with Exposure to Tropical Cyclonic Storms, United States, 1996-2018

In the United States, tropical cyclones cause destructive flooding that can lead to adverse health outcomes. Storm-driven flooding contaminates environmental, recreational, and drinking water sources, but few studies have examined effects on specific infections over time. We used 23 years of exposure and case data to assess the effects of tropical cyclones on 6 waterborne diseases in a conditional quasi-Poisson model. We separately defined storm exposure for windspeed, rainfall, and proximity to the storm track. Exposure to storm-related rainfall was associated with a 48% (95% CI 27%-69%) increase in Shiga toxin-producing *Escherichia coli* infections 1 week after storms and a 42% (95% CI 22%-62%) increase in Legionnaires' disease 2 weeks after storms. Cryptosporidiosis cases increased 52% (95% CI 42%-62%) during storm weeks but declined over ensuing weeks. Cyclones are a risk to public health that will likely become more serious with climate change and aging water infrastructure systems.

Authors: Victoria D. Lynch and Jeffrey Shaman

Source: (2023). *Emerging Infectious Diseases*, 29(8), 1548-1558.
<https://doi.org/10.3201/eid2908.221906>

Assessing the epidemiological risk at the human-wild boar interface through a one health approach using an agent-based model in Barcelona, Spain

Wild boar (WB, *Sus scrofa*) populations are increasing in urban areas, posing an epidemiological risk for zoonotic pathogens such as hepatitis E virus (HEV) and antimicrobial-resistant *Campylobacter* (AMR-CAMP), as well as non-zoonotic pathogens such as African swine fever virus (ASFV). An epidemiological extension of a validated Agent-Based Model (ABM) was developed to assess the one-year epidemiological scenarios of HEV, AMR-CAMP, and ASFV in the synurbic WB-human interface in Barcelona, Spain. The predicted citizen exposure was similar for HEV and AMR-CAMP, at 0.79% and 0.80% of the human population in Barcelona, respectively, despite AMR-CAMP being more prevalent in the WB population than HEV. This suggests a major role of faeces in pathogen transmission to humans in urban areas, resulting in a non-negligible public health risk. The ASFV model predicted that the entire WB population would be exposed to the virus through carcasses (87.6%) or direct contact (12.6%) in 51-71 days after the first case, with an

outbreak lasting 71-124 days and reducing the initial WB population by 95%. The ABM predictions are useful for animal and public health risk assessments and to support risk-based decision-making. The study underscores the need for interdisciplinary cooperation among animal, public, and environmental health managers, and the implementation of the One Health approach to address the epidemiological and public health risks posed by the synurbization of WB in urban areas. The spatially explicit epidemiological predictions of the ABM can be adapted to other diseases and scenarios at the wildlife-livestock-human interface.

Authors: González-Crespo Carlos, Martínez-López Beatriz, Conejero Carles, Castillo-Contreras Raquel, Serrano Emmanuel, López-Martín Josep Maria, Serra-Cobo Jordi, Lavín Santiago, López-Olvera Jorge Ramón

Source: (2022). *One Health*, Volume 17, 2023, 100598, ISSN 2352-7714,
<https://doi.org/10.1016/j.onehlt.2023.100598>

FOOD SAFETY

De-novo exposure assessment of heavy metals in commercially important fresh and dried seafood: Safe for human consumption

The heavy metals (HMs) in seafood are alarming due to their biomagnification in the food chain. The concentrations of As, Cd, Hg, Pb, Cr, and Ni in both fresh and dried fish were quantified, and the potential exposure and safe intake levels for human consumption were assessed by the European Commission (EC) and the Food Safety Standard Authority of India (FSSAI). HMs concentrations ranged from 0.003 mg/kg (Cr) to 2.08 mg/kg for (As) and 0.007 mg/kg (Hg) to 2.76 mg/kg (As). Cd, Hg, and Pb levels in fresh and dried fish were below the maximum residue limits (MRLs) set by the EC and FSSAI, which were 0.1 mg/kg, 0.5 mg/kg, and 0.3 mg/kg, respectively. Cr and As concentrations were also below the MRLs of 12 mg/kg and 76 mg/kg for aquatic products specified by FSSAI. The concentration of HMs in fresh and dried fish was found in the order of As > Cr > Ni > Pb > Cd > Hg and As > Cd > Cr > Ni > Pb > Hg, while the fresh and dried fishes contained HMs in the following order: *E. areolatus* > *S. longiceps* > *L. lentjen* > *S. barracuda* > *E. affinis* > *S. javus* and DA > DS > DR > DB > DSF. The metal pollution index (MPI) validates seafood is HMs free, while the single (Pi) and Nemerow integrated pollution index (Pnw) indicate that concentrations of Cd and As in fresh and dried fish have exceeded the threshold value. The target hazard quotient (THQ<1), hazard index

(HI < 1), and target cancer risk (TCR<10–4) indicate that there are no non-carcinogenic and carcinogenic risks through the consumption of seafood and seafood products collected from the Tuticorin coast and marketed at the domestic and international levels. The preliminary findings emphasize the importance of formulating domestic legislation/government initiatives to promote seafood and its consumption. The attainment of this objective shall be facilitated by examining the levels of persistent organic pollutants (POPs) in seafood and evaluating its potential risk to consumers.

Authors: Ulaganathan Arisekar, Rajendran Shalini, Shanmugam Sundhar, Shannon R. Sangma, Rajesh Bharathi Rathinam, Mohammed F. Albeshr, Abdulwahed Fahad Alrefaei, Bejawada Chanikya Naidu, Anantharaja Kanagaraja, Sahana M.D, Saranya Packialakshmi J

Source: (2023). Environmental Research, Volume 235, 2023, 116672, ISSN 0013-9351, <https://doi.org/10.1016/j.envres.2023.116672>

One health transmission of fluoroquinolone-resistant *Escherichia coli* and risk factors for their excretion by dogs living in urban and nearby rural settings

Rates of fluoroquinolone resistance in *Escherichia coli*, a key opportunistic human pathogen, are problematic. Taking a One Health approach, we investigated the excretion of fluoroquinolone-resistant (FQ-R) *E. coli* by 600 dogs (303 from rural and 297 from urban environments) recruited from a 50 × 50 km region where we have also surveyed FQ-R *E. coli* from cattle and from human urine. FQ-R *E. coli* were detected in faeces from 7.3% (rural) and 11.8% (urban) of dogs. FQ-R *E. coli* from rural dogs tended to be of sequence types (STs) commonly excreted by cattle, whilst those from urban dogs tended to carry plasmid-mediated quinolone resistance genes, common in human *E. coli* in our study region. Phylogenetic evidence was obtained for sharing FQ-R *E. coli* - particularly for STs 10, 162 and 744 - between cattle, dogs and humans. Epidemiological analysis showed a strong association between feeding dogs uncooked meat and the excretion of FQ-R *E. coli*, particularly for STs 10, 162 and 744. This practice, therefore, could serve as a transmission link for FQ-R *E. coli* from farmed animals entering the home so we suggest that dogs fed uncooked meat should be handled and housed using enhanced hygiene practices.

Authors: Jordan E. Sealey, Ashley Hammond, Kristen K. Reyher, Matthew B. Avison

Source: (2023). One Health, Volume 17, 2023, 100640, ISSN 2352-7714, <https://doi.org/10.1016/j.onehlt.2023.100640>

Deep ultraviolet fluorescence sensing with multispectral imaging to detect and monitor food-borne pathogens on the leafy green phyllosphere

Demand for sustainable and safe raw agricultural commodities is growing rapidly worldwide. Reducing the risk of foodborne illnesses associated with fresh produce is a task which the industry and academic researchers have been struggling with for many years. There is an immediate need to devise a non-invasive optical detection system to monitor the food-borne pathogens on the leaf surface. The detection of foodborne pathogens on leafy produce is performed often too late because of the invasive techniques used to evaluate the pathogen colonization. Use of deep ultraviolet fluorescence (DUVF) sensing and visible-near infrared multispectral imaging (MSI) has previously been used to monitor plant interactions against both biotic and abiotic stress regimes. Using the patho-system that we developed to monitor *Salmonella* sp. and *Listeria* sp. ingress in leafy greens such as lettuce/spinach, we show that plant response in terms of fluctuation of chlorophyll pigments post-*Salmonella/Listeria* treatment is rapid. We also show that the mode of application of *Salmonella/Listeria* via foliar or root supplementation changes the ChIA response. Our data also reveals that the plant sentinel response in terms of early photosynthetic response may be critical to detect food-borne pathogens on leafy greens. MSI demonstrated that plant stress was detectable and proportional to the bacterial inoculation rate on plants. Our research may lead to implementation of better strategies and technology to increase yield and reduce risks associated with contamination of foodborne bacterial pathogens.

Authors: Nick Johnson, Kalmia Kniel, Harsh Bais, Anthony Ragone

Source: (2023). Journal of Food Safety, 43(5), e13056. <https://doi.org/10.1111/jfs.13056>

Climate change and food safety: Temperature impact on the attachment of *Escherichia coli* pathogens on cress leaf

Climate change and its worldwide effects are undeniable. Temperature increase due to climate change may affect foodborne pathogen survival on fresh produce. This study aimed to

present an evaluation of climate change impact regarding temperature rise situations, on attachment of different pathogenic *Escherichia coli* strains on cress grown under controlled conditions. EHEC O157:H7, EAEC O104:H4 and EPEC O26 were inoculated with initial inoculum concentration of 8 log MPN/mL at different stages during growth to observe how inoculation time (7, 14, 21 and 28 days post sowing; dps) and route (seed and leaves) affect pathogen load on fresh produce. This study revealed that temperature increase designed according to mitigation scenarios for climate change (+2, +4 and +6 °C) did not cause any considerable change in pathogen persistence on leaf at 30 dps (~4.5 to 7 log MPN/g). In plants contaminated at later stage (21 and 28 dps), higher bacterial populations were obtained for all temperatures studied. Our results show that *E. coli* translocated towards leaf portions from seed and established significant amount of pathogen load on leaf (~4 to 5.3 log MPN/g). Also, inoculated bacteria have tightly bound to leaf (~3.5 to 7 log MPN/g) and cannot be eliminated by washing. Although persistence of *E. coli* O157:H7, O104:H4 and O26 did not differ significantly according to temperature, the bacterial load on the leaves was above infectious dose for humans.

Authors: Hilal Samut, Şahin Namli, Fatma Neslihan Ozdemir, Nuray Çömlekçioğlu, Yeşim Soyer

Source: (2023). *Journal of Food Safety*, 43(5), e13059. <https://doi.org/10.1111/jfs.13059>

Recent insights into green antimicrobial packaging towards food safety reinforcement: A review

Food packaging is widely used method of food preservation around the world. It is an element that enhances the quality and food product safety. The primary function of packaging is to protect food from contamination, undesirable chemical reactions and to provide physical protection. Food spoilage caused by food-borne pathogens and microbes is increasing tremendously posing an enormous threat. In the field of food packaging, new biodegradable and natural antimicrobial agents from plants and animals are gaining popularity. Recent foodborne outbreaks have prompted more creative and safe ways to initiate efficient packaging systems in food industries. However, as consumer demand for natural food ingredients has grown as a result of increasing safety and availability, natural substances are thought to be safer. Antimicrobial packaging that incorporates natural antimicrobials is thus a viable active packaging innovation. One

possibility for increasing the safety and quality of foods while prolonging their shelf life is to employ natural antibacterial packaging. This article focuses on environmentally friendly bio-based polymers that can be utilized in food packaging to enhance mechanical strength, gas permeability, and water resistance, among other features. It also includes useful information about natural antimicrobial agents found in fruits and vegetables, as well as animal by-products, their properties, safety laws, and uses aimed at improving and increasing food quality and safety.

Authors: Arshied Manzoor, Sadeeya Khan, Aamir Hussain Dar, Vinay Kumar Pandey, Rafeeya Shams, Saghir Ahmad, G. Jeevarathinam, Manoj Kumar, Punit Singh, R. Pandiselvam

Source: (2023). *Journal of Food Safety*, 43(4), e13046. <https://doi.org/10.1111/jfs.13046>

INFECTIOUS AND PARASITIC DISEASES

Wildlife nidoviruses: biology, epidemiology, and disease associations of selected nidoviruses of mammals and reptiles

Wildlife is the source of many emerging infectious diseases. Several viruses from the order Nidovirales have recently emerged in wildlife, sometimes with severe consequences for endangered species. The order Nidovirales is currently classified into eight suborders, three of which contain viruses of vertebrates. Vertebrate coronaviruses (suborder Cornidovirineae) have been extensively studied, yet the other major suborders have received less attention. The aim of this minireview was to summarize the key findings from the published literature on nidoviruses of vertebrate wildlife from two suborders: Arnidovirineae and Tornidovirineae. These viruses were identified either during investigations of disease outbreaks or through molecular surveys of wildlife viromes, and include pathogens of reptiles and mammals. The available data on key biological features, disease associations, and pathology are presented, in addition to data on the frequency of infections among various host populations, and putative routes of transmission. While nidoviruses discussed here appear to have a restricted in vivo host range, little is known about their natural life cycle. Observational field-based studies outside of the mortality events are needed to facilitate an understanding of the virus-host-environment interactions that lead to the outbreaks. Laboratory-based studies are needed to understand the pathogenesis of diseases caused

by novel nidoviruses and their evolutionary histories. Barriers preventing research progress include limited funding and the unavailability of virus- and host-specific reagents. To reduce mortalities in wildlife and further population declines, proactive development of expertise, technologies, and networks should be developed. These steps would enable effective management of future outbreaks and support wildlife conservation.

Authors: Andrew S. Flies, Emily J. Flies, Nicholas M. Fountain-Jones, Ruth E. Musgrove, Rodrigo K. Hamede, Annie Philips, Matthew R. F. Perrott, and Magdalena Dunowska

Source: (2023). *mBio*, 14(4), e0071523.
<https://doi.org/10.1128/mbio.00715-23>

Anaplasma bovis-Like Infections in Humans, United States, 2015-2017

The genus *Anaplasma* includes several species of tickborne, zoonotic pathogens of global importance. Three recognized species (*Anaplasma phagocytophilum*, *Anaplasma ovis*, and *Anaplasma bovis*) and one provisionally named species (*Anaplasma capra*) are associated with moderately severe to severe disease in humans (1). Human infections with *A. bovis*, a pathogen first identified in monocytes of cattle in Algeria in 1936 and subsequently detected in other countries in Africa, Asia, and the Americas, were reported from China in 2017 (1-3). In 2015, a targeted metagenomic approach designed to amplify the V1-V2 region of the bacterial 16S rRNA (*rrs*) gene identified DNA of an *A. bovis*-like agent in blood specimens from 2 US patients with suspected tickborne illnesses (4). The agent demonstrated 100% identity across a 357-bp region of *rrs* to *A. bovis*-like sequences amplified from several human-biting *Dermacentor* tick species in North America (4). An additional 2 US patients positive for this same *Anaplasma* species were identified in 2017 (L. Kingry et al., unpub. data), although the genetic identity of this pathogen remained limited to the same 357-bp sequence of *rrs* (5-7). To further characterize the phylogenetic position of this novel agent, we evaluated additional sequences to determine the uniqueness of this strain among the expanding global complex of *A. bovis*-like bacteria.

Authors: Sandor E. Karpathy, Luke Kingry, Bobbi S. Pritt, Jonathan C. Berry, Neil B. Chilton, Shaun J. Dergousoff, Roberto Cortinas, Sarah W. Sheldon, Stephanie Oatman, Melissa Anacker, Jeannine Petersen, and Christopher D. Paddock

Source: (2023). *Emerging Infectious Diseases*, 29(9), 1904-1907.
<https://doi.org/10.3201/eid2909.230559>

Novel Echarate Virus Variant Isolated from Patient with Febrile Illness, Chanchamayo, Peru

The genus *Phlebovirus* (order *Bunyvirales*, family *Phenuiviridae*) consists of 66 species according to the International Committee on Taxonomy of Viruses (1). *Phleboviruses* are globally distributed and can be transmitted by phlebotomine sandflies, mosquitoes, or ticks (2,3). Sandfly *phlebovirus* can cause unspecific symptoms in humans and often is misdiagnosed as dengue fever, malaria, or influenza (4,5); however, its clinical symptoms can range from high fever, severe headache, muscle pain, and aseptic meningitis to mild or severe meningoencephalitis (6). In Peru, 3 of 9 *phleboviruses* that cause febrile illness in Central and South America (3-5,7) have been identified: *Echarate virus* (ECHV), *Maldonado virus* (7), and *Candiru virus* (7).

During the last decade, isolates characterized by whole-genome sequencing have contributed to increased detection of novel and recombinant pathogenic and nonpathogenic *phleboviruses* worldwide (2,5,7), demonstrating a high viral diversity within this genus. Therefore, continuous public health surveillance, including genome characterization as a complementary tool, is critical to identifying novel and emerging viruses of clinical relevance in the Americas. We report the identification and characterization of a novel ECHV virus variant isolated from a patient with acute febrile illness (AFI) in Peru.

Authors: Gilda Troncos, Dina Popuche, Bishwo N. Adhikari, Kyle A. Long, Jane Ríos, Michel Valerio, Carolina Guevara, Regina Z. Cer, Kimberly A. Bishop-Lilly, Julia S. Ampuero, Maria Silva, and Cristhopher D. Cruz

Source: (2023). *Emerging Infectious Diseases*, 29(9), 1908-1912.
<https://doi.org/10.3201/eid2909.230374>

Prospecting for Zoonotic Pathogens by Using Targeted DNA Enrichment

More than 60 zoonoses are linked to small mammals, including some of the most devastating pathogens in human history. Millions of museum-archived tissues are available to understand natural history of those pathogens. Our goal was to maximize the value of museum collections for pathogen-based research by using targeted sequence capture. We generated a

probe panel that includes 39,916 80-bp RNA probes targeting 32 pathogen groups, including bacteria, helminths, fungi, and protozoans. Laboratory-generated, mock-control samples showed that we are capable of enriching targeted loci from pathogen DNA 2,882–6,746-fold. We identified bacterial species in museum-archived samples, including *Bartonella*, a known human zoonosis. These results showed that probe-based enrichment of pathogens is a highly customizable and efficient method for identifying pathogens from museum-archived tissues.

Authors: Egie E. Enabulele, Winka Le Clec'h, Emma K. Roberts, Cody W. Thompson, Molly M. McDonough, Adam W. Ferguson, Robert D. Bradley, Timothy J. C. Anderson, and Roy N. Platt

Source: (2023). *Emerging Infectious Diseases*, 29(8), 1566-1579.
<https://doi.org/10.3201/eid2908.221818>

Virome characterization and identification of a putative parvovirus and poxvirus in bat ectoparasites of Yunnan Province, China

Ectoparasites found on bats are known to contain important microbes. However, the viruses hosted by these obligate parasites are understudied. This has led to the near oversight of the potential role of these ectoparasites in virus maintenance and transmission from bats to other interacting species and the environment. Here, we sampled bat ectoparasites parasitizing a diverse selection of bat species in the families Rhinolophidae, Vespertilionidae, Megadermatidae, Hipposideridae and Pteropodidae in Yunnan Province, China. We show that the ectoparasite prevalence was generally higher in male compared to female bats. Most ectoparasites were found to fall within the Nycteribiidae, Spinturnicidae and Streblidae bat ectoparasite families. We subsequently applied a non-biased sequencing of libraries prepared from the pooled ectoparasites, followed by an in-silico virus-centric analysis of the resultant reads. We show that ectoparasites hosted by the sampled families of bats are found to carry, in addition to a diverse set of phages, vertebrate and insect viruses in the families Aliusviridae, Ascoviridae, Chuviridae, Circoviridae, Flaviviridae, Hepadnaviridae, Hepeviridae, Herpesviridae, Iridoviridae, Marshellviridae, Nairoviridae, Orthomyxoviridae, Parvoviridae, Poxviridae, Reoviridae, Retroviridae, and Rhabdoviridae. We further report a partial Parvovirus VP1/VP2 gene and partial Poxvirus ubiquitin-like gene predicted by two independent next generation sequencing data analysis pipelines. This study describes the natural virome of bat ectoparasites, providing a platform for understanding the role these

ectoparasites play in the maintenance and spread of viruses to other animals.

Authors: Alexander Tendu, Yakhoub Kane, Ruiya Li, Victor Omondi, Xing Chen, Yanhua Chen, Emilio Mastriani, Jiaming Lan, Alice Catherine Hughes, Nicolas Berthet, Gary Wong

Source: (2023). *One Health*, Volume 17, 2023, 100641, ISSN 2352-7714,
<https://doi.org/10.1016/j.onehlt.2023.100641>

PUBLIC HEALTH TOPICS

Early evaluation of the Food and Drug Administration (FDA) guidance on antimicrobial use in food animals on antimicrobial resistance trends reported by the National Antimicrobial Resistance Monitoring System (2012-2019)

Antimicrobial resistance (AMR) is one of the biggest challenges to global public health. To address this issue in the US, governmental agencies have implemented system-wide guidance frameworks and recommendations aimed at reducing antimicrobial use. In particular, the Food and Drug Administration (FDA) prohibited the extra-label use of cephalosporins in food animals in 2012 and issued the guidance for industry (GFI) #213 about establishing a framework to phase out the use of all medically relevant drugs for growth promotion in 2012. Also in 2015, the FDA implemented veterinary feed directive (VFD) drug regulations (GFI# 120) to control the use of certain antimicrobials. To assess the potential early effects of these FDA actions and other concurrent antimicrobial stewardship actions on AMR in the food chain, we compared the patterns of the phenotypic (minimum inhibitory concentration (MIC) and percentage of resistance) and genotypic resistances for selected antimicrobials before and after 2016 across different enteric pathogen species, as reported by the National Antimicrobial Resistance Monitoring System (NARMS). Most of the antimicrobials analyzed at the phenotypic level followed a downward trend in MIC after implementing the guidance. Although, most of those changes were less than one 1-fold dilution. On the other hand, compared to MIC results, the results based on phenotypic resistance prevalence evidenced higher differences in both directions between the pre- and post-guidance implementation period. Also, we did not find relevant differences in the presence of AMR genes between pre- and post-VFD drug regulations. We concluded that the FDA guidance on antimicrobial use has not led to substantial reductions in antimicrobial drug resistance.

Authors: Liton Chandra Deb, Manuel Jara, Cristina Lanzas

Source: (2023). *One Health*, Volume 17, 2023, 100580, ISSN 2352-7714, <https://doi.org/10.1016/j.onehlt.2023.100580>

Host characteristics and their influence on zoonosis, disease emergence and multi-host pathogenicity

The interplay between agent-host-environment characteristics is responsible for the emergence and zoonotic potential of infectious disease pathogens. Many studies have investigated key agent characteristics and environmental factors responsible for these phenomena. However, little is known about the role played by host characteristics in zoonoses, disease emergence and the ability of pathogens to infect multiple hosts. We compiled a dataset of 8114 vertebrate host-agent interactions from published literature. Multiple host characteristics and the pathogen's zoonotic, emergence and multi-host potential were then linked to the dataset. The associations between zoonotic, emerging human pathogen and multi-host pathogenicity and several host characteristics were explored using logistic regression models. The numbers of publications and sequences from the agent-host combinations were used to control for the research effort. Hosts in the class Aves (odds ratio [OR] 20.87, 95% CI 2.66-163.97) and Mammalia (OR 26.09, 95% CI 3.34-203.87) were more likely to host a zoonotic pathogen compared to the class Amphibia. Similarly, hosts having *Bursa fabricii* (i.e., birds) (OR 1.8, 95% CI 1.4-2.3) were more likely to host an emerging human pathogen. The odds of being a zoonotic pathogen were highest when the host female required a greater number of days for maturity, and the pathogen was able to affect a greater number of host species. In contrast, the hosts from which a higher number of pathogens were reported were less likely (OR 0.39, 95% CI 0.31-0.49) to be associated with an emerging human pathogen. The odds of an emerging human pathogen were highest when the host had a higher adult body mass, and the specific pathogen could affect more host species. The odds of a pathogen infecting multiple hosts were highest when a host had shorter female maturity days (>670-2830 days) and lower birth/hatching weight (>42.2-995 g) compared to longer female maturity days (>2830-6940 days) and greater birth/hatching weight (>3.31-1160 kg). We conclude that several host characteristics - such as mass, maturity, immune system and pathogen permissiveness - are linked with zoonoses, disease emergence or multi-host pathogenicity. These findings can contribute to preparedness for emerging infections and zoonotic diseases.

Authors: Balbir B. Singh, Michael P. Ward, Navneet K. Dhand

Source: (2023). *One Health*, Volume 17, 2023, 100596, ISSN 2352-7714, <https://doi.org/10.1016/j.onehlt.2023.100596>

Examining the international bushmeat traffic in Belgium: A threat to conservation and public health

The carriage of bushmeat into the European Union is an infringement of EU Animal Health and Wildlife Trade legislation and poses a threat to biodiversity and public health. To explore the nature and scale of the international bushmeat trade, seized leaking luggage and passengers arriving at Brussels Zaventem airport from sub-Saharan Africa between 2017 and 2018 were searched for "meat" (bushmeat and livestock) by border control authorities. Visual identification, radiography and genetic analysis were applied to derive information from seized specimens, including at least ten CITES-listed species. We estimate that an average of 3.9 t of bushmeat is smuggled monthly through Brussels. The average consignment of meat seized per passenger was 2.8 kg and 4 kg of bushmeat or domestic livestock meat, respectively. The international trafficking of bushmeat is evidently active, yet penalties are rarely enforced; hence we provide suggestions to simplify law enforcement procedures.

Authors: Anne-Lise Chaber, Georgia Kate Moloney, Veronique Renault, Sandrella Morrison-Lanjouw, Mutien Garigliany, Lucette Flandroy, Daniel Pires, Valeria Busoni, Claude Saegerman, Philippe Gaubert

Source: (2023). *One Health*, Volume 17, 2023, 100605, ISSN 2352-7714, <https://doi.org/10.1016/j.onehlt.2023.100605>

Dogs and Cats Are Less Susceptible to the Omicron Variant of Concern of SARS-CoV-2: A Field Study in Germany, 2021/2022

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) caused a pandemic of unprecedented extent. Besides humans, a number of animal species can be infected; however, in some species, differing susceptibilities were observed depending on the virus variant. Here, we serologically investigated cats and dogs living in households with human COVID-19 patients. The study was conducted during the transition period from delta as the dominating variant of concern (VOC) to omicron (BA.1/BA.2) to investigate the frequency of virus transmission of both VOCs from infected owners to their pets. The animal sera

were tested by surrogate virus neutralization tests (sVNT) using either the original receptor-binding domain (RBD), enabling the detection of antibodies against the delta variant, or an omicron-specific RBD. Of the 290 canine samples, 20 tested positive by sVNT, but there were marked differences between the sampling time and, related thereto, the virus variants the dogs had contact to. While in November 2021, infected owners led to 50% seropositive dogs (18/36), only 0.8% (2/254) of animals with household contacts to SARS-CoV-2 between December 2021 and April 2022 tested positive. In all cases, the positive reaction was recorded against the original RBD. For cats, a similar pattern was seen, as in November 2021, 38.1% (16/42) tested positive, and between December 2021 and March 2022, only 5.0% (10/199). The markedly reduced ratio of seropositive animals during the period of omicron circulation suggests a considerably lower susceptibility of dogs and cats to this VOC. To examine the effect of further omicron subvariants, sera taken in the second and third quarter of 2022 from randomly selected cats were investigated. 2.3% (11/372) tested seropositive, and all of them showed a stronger reaction against the original RBD, further supporting the assumption of a lower susceptibility of companion animals to the omicron VOC.

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The Effect of Temperature on the Distribution of Zoonotic Pathogens in Livestock and Wildlife Populations: A Systematic Review

Background. Evidence for the impact of climate change on the distribution of zoonoses has largely focussed on the burden in humans and is lacking information on the effect of temperature on nonvectorborne zoonoses that are transmitted indirectly through contaminated environments. We present a systematic literature review on the impact of temperature on the distribution of zoonotic pathogens in mammalian livestock and wildlife populations, with a focus on nonvectorborne zoonoses that can be spread through air, water, food, and soil. **Methods.** We systematically searched PubMed, Scopus, and Web of Science, as well as grey literature, and screened titles, abstracts, and full text. English, peer-reviewed, and full text studies were included if they: focused on temperature; considered incursion, distributional burden or risk; and focused on a zoonotic pathogen in livestock and/or wildlife populations of mammalian vertebrates that

can be transmitted through indirect pathways without a nonmammalian and nonvertebrate intermediate host. **Results.** Temperature was an important determinant of zoonoses distribution across all 17 studies included in the final review, with 11 studies finding a positive association. The majority of studies focused on parasites (7) and bacteria (9) and were conducted in the northern hemisphere. Two studies provided future climate projections that identified areas of increasing prevalence and expanded risk for pathogens that were already established. However, no studies specifically investigated the risk of zoonotic incursion with increasing temperature. Few studies explored how local variations in temperature and urbanisation interact with distal changes like Arctic warming to affect the distribution and spread of nonvectorborne pathogens through food, water, and soil. **Conclusions.** The review's findings point to the value of a One Health approach to biosecurity that builds on the interconnected relationship between human, animal, plant, and environmental health. Such research is urgently needed to inform the prioritisation and risk assessment of zoonoses more comprehensively in a rapidly changing climate.

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