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Welcome New Directors!



Dr. Will Sander, Representative for Education, Research and Extension sector

Dr. Sander is assistant professor for preventive medicine and public health and director of the DVM/MPH joint degree program at University of Illinois - College of Veterinary Medicine. Prior to Illinois, he spent 6 years in Washington D.C. During that time, he spent 2 years at the U.S. EPA Office of Water as an AAAS Science and Technology Fellow and 3 years supporting the Defense Threat Reduction Agency's Cooperative Biological Engagement Program. Additionally, he was a staff veterinarian for 5 years at City Wildlife, Washington D.C.'s only wildlife rehabilitation center, and practice for 4 years at VCA small animal practices. He is a diplomate of the American College of Veterinary Preventive Medicine and serves on their Executive Board. Additionally, he is the alternate Delegate for Illinois to the AVMA House of Delegates. He is a 2009 graduate of University of Wisconsin College of Veterinary Medicine and received a MPH from Yale University in 2011.



Dr. Leslie Brooks, Representative for Federal (Civilian) sector

Leslie Brooks is a AAAS Science & Technology Policy Fellow at USAID's Bureau for Humanitarian Assistance, based in the Washington, DC area. Prior to starting her Fellowship, she lived and

worked in Indianapolis, operating a mobile small animal practice. She also volunteered much of her time

helping to grow a non-profit serving people experiencing homelessness or crisis situations who also had pets. She graduated from the University of Tennessee's College of Veterinary Medicine in 2012 with a dual DVM / MPH degree.

FROM THE EVP

AAFSPHV members,

Renewal notices have been sent out to members. Please renew we need your support and participation. Members who do not renew by March 31, 2023 will be removed from the member roster.

Honorary (Complementary) membership may be awarded in recognition of distinguished service in food safety, public health, or related field. The Membership and Admissions Committee, Governing Board or the Executive Vice President shall recommend individuals to be considered for honorary membership to the Executive Council of the association. A unanimous vote of the Executive Council is required for election to honorary membership. Honorary members are not required to pay dues.

Each year we put out a call for Honorary members. If you know a veterinarian that you would like to nominate a veterinarian for honorary membership please submit using the form on our website. Under Membership: Submit recommendation for Honorary Member

Listserv/Message Board: Please share your announcements, news, events, or CE in topics relevant to our members, or job listings. Log into your member account>click Listserv/Message Board>select General Message Board>Post New Message

Survey: I will be sending a survey out to membership in February. We are creating a contact list for members willing to:

- 1. Be a mentor to students
- 2. Do informational interviews with those interesting in public health careers
- 3. Present a topic at our partner ACVPM monthly CE webinars
- 4. Speak via webinar with student groups in One Health or Public Health
- 5. Volunteer for one of our committees: Education, Communication and Finance Dr.

Katherine Waters AAFSPHV Exec VP aafsv.execvp@gmail.com



Editor's Note

CELEBRATING OUR MEMBERSHIP

First of all, a huge THANK YOU to everyone who submitted to this newsletter. We have some great links and updates in our member section so please check out what our colleagues have been up to! Please keep up the submissions! We would love to feature your work and any up and coming news.

The Quarter 1 edition for 2023 of the newsletter will be released in the first week of April. All submissions for the April edition should be submitted to me by March 22nd by 5pm CST. Any and all submissions can be submitted to editor@aafsphv.org

As always, you are welcome to send me any news and updates that should be included in the newsletter to showcase the accomplishments of our membership. Whether it is awards, new job alerts, changes in offices, or volunteer work, we would love to hear from you! If you have any questions or suggestions, please don't hesitate to reach out!

Best, Tori Novak, DVM, MPH AAFSPHV Editor

Please Subscribe!

The AAFSPHV is now publishing media content. Be sure to subscribe to our <u>YouTube channel</u> and subscribe and listen wherever you get your podcast.



We want at least 1000 subscribers by this summer!

Meet Dr. Joseph Annelli

Executive VP for the National Association of Federal Veterinarians



YouTube

Podcast

We need volunteers to be interviewed to showcase the breadth of veterinary careers in food safety and public health. If you would like to be interviewed, please contact Donna Debonis at drdebonis@gmail.com

Committee Updates

Update from the House of Delegates

Greetings AAFSPHV Members!

The 2023 AVMA House of Delegates (HOD) Winter Session was held January 6-7 in Chicago, IL, in conjunction with the AVMA's Veterinary Leadership Conference. It was another productive and successful meeting!

Background: The HOD is the principal body within the AVMA responsible for establishing policy and providing direction for matters relating to veterinary medicine. It is comprised of one delegate and one alternate delegate from each of the Principal Veterinary Organizations (including each state, the District of Columbia, and territories belonging to the U.S.) as well as select Constituent Allied Veterinary Organizations (including AAFSPHV), the Uniformed Services, and the Student AVMA. The HOD meets twice per year–once in January in conjunction with the AVMA Veterinary Leadership Conference and once during the summer in conjunction with the AVMA Convention.

First and foremost, we want to thank all of you as AAFSPHV members for your valuable feedback in preparation of the HOD meeting - your expertise and knowledge make a difference! In order to maintain this vital representation in the AVMA HOD, a certain percentage of our AAFSPHV membership must also be AVMA members. Therefore, we encourage all of you to be AVMA members so that we can continue to bring this important voice to our profession.

Highlights from our 2023 HOD Winter Session include:

Several updates were provided to the House regarding veterinary economics and workplace workforce issues. During the economic update, information was provided regarding the suspected upcoming recession. The recession is predicted to be uneven, and without a general downturn. All types of pet ownership are being affected by the impending recession. The number of household pets increased during covid spring 2020 and 2021, but by spring 2022 there was a decrease in number of households owning pets and that number is trending down.

Inflation has taken a toll on everyone. Historical salary trends have been positive, especially in the last 5 years, but the reality is that even with all the growth experienced, inflation continues to take a bite out of the earnings and has decreased disposable income. Inflation will drop during the recession, but not significantly.

Retention and attrition continue to be a priority for the veterinary profession. We have seen a slight decline in the number of veterinarians considering leaving the profession, but we still have a problem with retention in practice as well as within the sector and attrition to the profession itself.

DEI Journey for Teams is an AVMA program that provides a learning pathway for vet professionals to deepen knowledge of diversity and improve DEI in workspaces. The platform is designed for busy professionals to enhance and nurture their work experience and build meaningful relationships with clients and community. The goal is to expose, encourage, engage, inspire, and motivate your team. The program can be accessed at journeyforteams.org.

Drs. Sandra Faeh Butler, Arnie Goldman, and Bob Murtaugh all announced their candidacy for AVMA president-elect. An election will take place in July 2023 at AVMA convention in Denver, CO. The HOD also elected Dr. James Kober, West Olive, Michigan, to fill a vacant position on the AVMA Council on Biologic and Therapeutic Agents representing private clinical practice, predominantly food animal.

VETERINARY INFORMATION FORUM

<u>The Veterinary Healthcare Team - Is There a Need for a Mid-level Position?</u> The reference committee reviewing this topic **encouraged that the Board of Directors consider** including in the charge of the Committee on Advancing Veterinary Technology the following:

- Title protection
- Standardization of nomenclature
- Retention within veterinary technology field
- Financial security

- Support for the acquisition of veterinary technician specialists; and
- Consider incorporating the recommendations from the task force on veterinary technician utilization

<u>The Impact of Workplace Culture on Wellbeing and Retention:</u> **no action** was taken on this VIF topic; however, much discussion took place.

- Workplace wellbeing requires attention to both individual and systemic factors
- Support individual efforts by making it possible for employees to take regular breaks and time away from work
- Across the practice/organization
- Model healthy and effective communication at all levels of

leadership, including dealing civilly and constructively with conflict

- Acknowledge the good work of those on our teams
- Build psychological safety on teams
- Lead by example
 - Establish baseline measurements and reassess at regular intervals
 - Take a proactive approach using evidence-based tools

- Make self-care feasible through addressing policies and procedures
- Create a dedicated wellbeing strategy that supports a sense of

belonging, facilitates candid and open communication, and promotes trust among all team members

HOUSE OF DELEGATES FORMAL BUSINESS Nine resolutions were brought before the house

Resolution 1–Supersede Policy on Responsible Breeding of Companion Animals. This resolution passed as written. *AAFSPHV voted FOR this resolution.*

Resolution 2–Supersede Policy on Therapeutic Medications in Non-racing Performance Horses. This resolution passed as written. *AAFSPHV voted FOR this resolution.*

Resolution 3–New Policy on Unregulated Horse Racing. This resolution passed as written. *AAFSPHV voted FOR this resolution.*

Resolution 4–Supersede Policy on Castration and Dehorning of Cattle. This resolution passed as written. *AAFSPHV voted FOR this resolution.*

Resolution 5– Consolidated policy on Harmonized Approach to Voluntary and Regulated Aquatic Animal Health Programs. This resolution was amended and passed as amended. *AAFSPHV voted FOR this resolution as amended*.

Resolution 6–Consolidated Policy on Veterinary Compounding. This resolution was amended and passed as amended. *AAFSPHV voted FOR this resolution as amended.*

Resolution 7–Revised Policy on The Importance of Veterinarians in Food Safety. This resolution was amended and passed as amended. *AAFSPHV voted FOR this resolution as amended.*

Resolution 8–Revised Policy on The Veterinarian's Role in Supporting Appropriate Selection and Use of Service, Assistance, Emotional Support, and Therapy Animals. This resolution was referred back to the BOD for more consideration by the animal welfare committee.

Resolution 9–Revised Policy on Dog Bite Prevention. This resolution was amended and passed as amended. *AAFSPHV voted FOR this resolution as amended.*

Sincere thanks to Dr. Lindy O'Neal, HOD Delegate from Arkansas and House Advisory Committee member, for her work in putting together a summary of the HOD meeting as summarized here.

As your AAFSPHV Delegate and Alternate Delegate to the HOD, we are here to serve you and to bring your valuable input on current and emerging topics in veterinary medicine to the forefront. We want to hear from you and truly value your input. You can find our contact information listed below.

There is also a variety of <u>AVMA volunteer opportunities</u> available on the AVMA website. Please notify us if you're interested in having AAFSPHV support your interest in a position with a nomination. We look forward to talking with you!

Respectfully submitted,

Kristen Clark, DVM, MPH, DACVPM

AAFSPHV Delegate

clarkk@iastate.edu

Katherine Waters, DVM, MPH, DACVPM, CPH AAFSPHV Executive Vice President & Alternate Delegate

aafsv.execvp@gmail.com

Update from the Communications Committee

Our Communication committee is seeking new members. We will not be meeting in a Zoom, but just work on projects via our dedicated forum on the new website. So, if you are interested in helping out, please contact me at <u>drdebonis@gmail.com</u>.

Also, I am doing more interviews for our AAFSPHV Career Alternatives in Veterinary Medicine: <u>https://www.youtube.com/@AAFSPHV</u>. Please Subscribe and Share!

Looking forward to hearing from you.

Donna DeBonis, DVM, MS

Past President AAFSPHV

drdebonis@gmail.com

Update from the Committee on Student Outreach

The applications for Student Membership and the Student Scholarship Funds have been updated for 2023. They will be available soon on the member website, and I will be working on creating a Student Outreach Committee section as well.

I also wanted to thank our membership for the opportunity to serve as the lead for Student Outreach for the past year. However, my work duties have detracted from my ability to serve well. I truly believed the Committee would be better served by someone who either works in academia or has closer ties to the graduate and professional programs in Public Health and/or Food Safety. If you are interested in serving as the lead for Student Outreach, please contact me.

Jane Lewis, DVM, MSFS, DACVPM

Update from the Finance Committee

The Budget/Finance Committee met on 30 January 2023 to discuss the 2022 financial activities and to review the anticipated budget for 2023. Key items and issues discussed included the AAFSPHV Dues paying membership; considering transitioning our savings account to an interest-bearing account that draws higher interest rates; and offering a \$1,000 Dan E. Lafontaine Veterinary Memorial Scholarship for the first time during 2023.

Table 1: 2023 -- Anticipated Budget -

 Beginning Balance: \$22,773

 Dues Income 2023: \$7,700

 Expenses:
 \$10,185

 P/L:
 <\$2,485>

Ending Balance: \$20,288

<u>Dues Pay Membership</u>: As part of the budget discussion, the anticipated expenses will exceed the income anticipated from the dues. The dues amount increased this year to \$50/year for each active member and the online invoicing system began for the Fall of 2022. With the anticipated dues at \$7,700 at \$50/member, this only represents only 154 dues paying members. Our break-even for our anticipated expenses of \$10,185 plus transaction fees is 211 dues paying members. The difference is 57 additional dues paying members will be needed to meet our 2023 budget obligations. Further, evaluation of our membership is ongoing.

<u>Interest bearing Savings:</u> Presently we have a Savings balance of \$10,818, and we are drawing an interest rate of 0.25% on our savings account. There are other interest-bearing options available that we are considering including CDs, Business Time Accounts and Money Market Accounts. Once the options have been evaluated, the Finance Committee with make a recommendation to the Board of Directors for approval.

<u>Dan E. Lafontaine Veterinary Memorial Scholarship</u>: We will offer our first \$1,000 scholarship for the Fall of 2023. In order for this to occur, we will need to reactivate the scholarship committee, the online application will be activated and accessible on the AAFSPHV website, and the scholarship will review and grade the applications and make a recommendation to the Board of Directors.

Update from the Legislative Advisory Committee

The LAC met on 1/31 to discuss the urgent matter of regulating xylazine.

As a review, xylazine is a veterinary drug commonly used in large animals for sedation, anesthesia, and pain relief. It is classified as an alpha-2 adrenergic agonist, meaning it works by stimulating certain receptors in the nervous system to produce sedative and analgesic effects. Xylazine is widely used in the field with horses, cattle, and pigs, for various procedures such as castration, dehorning, and minor in field surgical operations. Xylazine has several beneficial effects, including reducing anxiety, inducing a calm and relaxed state, and providing pain relief. Additionally, it can lower the heart rate, reduce blood pressure, and cause a decrease in respiratory rate.

The USDA allows xylazine for veterinary applications within organic livestock production (see 7 CFR 205.603) restricting it for use "by or on the lawful written or oral order of a licensed veterinarian," and must be followed by "a meat withdrawal period of at least 8 days after administering to livestock intended for slaughter; and a milk discard period of at least 4 days after administering to dairy animals." The FDA has approved the use of xylazine as an animal drug administered through implantation or injection "to produce sedation, as an analgesic, and as a preanesthetic to local or general anesthesia," the application of which is restricted "to use by or on the order of a licensed veterinarian," (21 CFR 522.2662).

The current efforts of the AVMA on the topic can be read <u>here</u>. The LAC had a robust discussion on how do we maintain availability of xylazine if it becomes a scheduled drug by the DEA. THe xylazine hitting the street currently is in powdered form and veterinary diversion is not considered to be a significant contributor to the street xylazine problem. The AVAM Board, GRD and other interested parties have secured meetings with officials to move forward in a manner to mitigate the impact to large animal and wildlife veterinarians.

Best Regards,

Michele Pfannenstiel, DVM, PCQI, CFSQA

Member News

USDA Veterinary Services offers professional development through Training and Exercise Program

Veterinary Services (VS) hosts training webinars on a variety of animal health topics. Videos are <u>recorded</u> and available at your convenience.



Cornell Wildlife Health Center features blogs by veterinary toxicologist Karyn Bischoff

Learn more about toxicology in these fun, relevant blogs that will appeal to all audiences. Check out the latest ones here!

One Word: Nurdles

The Buzz on Bee Toxicology

Hawaii Highlights One Health by making January "One Health Month"

Governor Josh Green, in support of a collection of local veterinarians, made January 2023 the first ever One Health Month for the islands state. "The purpose of this Proclamation is to support, strengthen and expand One Health-related efforts in Hawaii, and to increase awareness of One Health principles to improve human health, animal health, environmental stewardship, and prospects for agriculture and fisheries."

AAFSPHV at the AVMA House of Delegates Meeting





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ENVIRONMENTAL HEALTH AND TOXICOLOGY

Pollinator Deficits, Food Consumption, and Consequences for Human Health: A Modeling Study

Animal pollination supports agricultural production for many healthy foods, such as fruits, vegetables, nuts, and legumes, that provide key nutrients and protect against noncommunicable disease. Today, most crops receive suboptimal pollination because of limited abundance and diversity of pollinating insects. Animal pollinators are currently suffering owing to a host of direct and indirect anthropogenic pressures: land-use change, intensive farming techniques, harmful pesticides, nutritional stress, and climate change, among others.

We aimed to model the impacts on current global human health from insufficient pollination via diet.

We used a climate zonation approach to estimate current yield gaps for animal-pollinated foods and estimated the proportion of the gap attributable to insufficient pollinators based on existing research. We then simulated closing the "pollinator yield gaps" by eliminating the portion of total yield gaps attributable to insufficient pollination. Next, we used an agricultureeconomic model to estimate the impacts of closing the pollinator yield gap on food production, interregional trade, and consumption. Finally, we used a comparative risk assessment to estimate the related changes in dietary risks and mortality by country and globally. In addition, we estimated the lost economic value of crop production for three diverse case-study countries: Honduras, Nepal, and Nigeria.

Globally, we calculated that 3%-5% of fruit, vegetable, and nut production is lost due to inadequate pollination, leading to an estimated 427,000 (95% uncertainty interval: 86,000, 691,000) excess deaths annually from lost healthy food consumption and associated diseases. Modeled impacts were unevenly distributed: Lost food production was concentrated in lower-income countries. whereas impacts on food consumption and mortality attributable to insufficient pollination were greater in middle- and high-income countries with higher rates of noncommunicable disease. Furthermore, in our three case-study countries, we calculated the economic value of crop production to be 12%-31% lower than if pollinators were abundant (due to crop production losses of 3%-19%), mainly due to lost fruit and vegetable production. According to our analysis, insufficient populations of pollinators were responsible for

large present-day burdens of disease through lost healthy food consumption. In addition, we calculated that low-income countries lost significant income and crop yields from pollinator deficits. These results underscore the urgent need to promote pollinator-friendly practices for both human health and agricultural livelihoods.

Authors: Matthew R. Smith, Nathaniel D. Mueller, Marco Springmann, Timothy B. Sulser, Lucas A. Garibaldi, James Gerber, Keith Wiebe, and Samuel S. Myers

Source: (2022). Environmental Health Perspectives 130:12 CID: 127003 https://doi.org/10.1289/EHP10947

Predicting the Effects of Climate Change on Dengue Vector Densities in Southeast Asia through Process-Based Modeling

Aedes aegypti and Ae. albopictus mosquitoes are major vectors for several human diseases of global importance, such as dengue and yellow fever. Their life cycles and hosted arboviruses are climate sensitive and thus expected to be impacted by climate change. Most studies investigating climate change impacts on Aedes at global or continental scales focused on their future global distribution changes, whereas a single study focused on its effects on Ae. aegypti densities regionally.

A process-based approach was used to model densities of Ae. aegypti and Ae. albopictus and their potential evolution with climate change using a panel of nine CMIP6 climate models and climate scenarios ranging from strong to low mitigation measures at the Southeast Asian scale and for the next 80 y.

The process-based model described, through a system of ordinary differential equations, the variations of mosquito densities in 10 compartments, corresponding to 10 different stages of mosquito life cycle, in response to temperature and precipitation variations. Local field data were used to validate model outputs. We show that both species densities will globally increase due to future temperature increases. In Southeast Asia by the end of the century, Ae. aegypti densities are expected to increase from 25% with climate mitigation measures to 46% without; Ae. albopictus densities are expected to increase from 13%-21%, respectively. However, we find spatially contrasted responses at the seasonal scales with a significant decrease in Ae. albopictus densities in lowlands during summer in the future.

These results contrast with previous results, which brings new insight on the future impacts of climate change on Aedes densities. Major sources of uncertainties, such as mosquito model parametrization and climate model uncertainties, were addressed to explore the limits of such modeling.

Authors: Lucas Bonnin, Annelise Tran, Vincent Herbreteau, Sébastien Marcombe, Sébastien Boyer, Morgan Mangeas, and Christophe Menkes

Source: (2022). Environmental Health Perspectives 130:12 CID: 127002 https://doi.org/10.1289/EHP11068

Bring Your Own Location Data: Use of Google Smartphone Location History Data for Environmental Health Research

Environmental exposures are commonly estimated using spatial methods, with most epidemiological studies relying on home addresses. Passively collected smartphone location data, like Google Location History (GLH) data, may present an opportunity to integrate existing long-term time-activity data. We aimed to evaluate the potential use of GLH data for capturing long-term retrospective timeactivity data for environmental health research. We included 378 individuals who participated in previous Global Positioning System (GPS) studies within the Washington State Twin Registry. GLH data consists of location information that has been routinely collected since 2010 when location sharing was enabled within android operating systems or Google apps. We created instructions for participants to download their GLH data and provide it through secure data transfer. We summarized the GLH data provided, compared it to available GPS data, and conducted an exposure assessment for nitrogen dioxide (NO2) air pollution. Of 378 individuals contacted, we received GLH data from 61 individuals (16.1%) and 53 (14.0%) indicated interest but did not have historical GLH data available. The provided GLH data spanned 2010-2021 and included 34 million locations, capturing 66,677 participant days. The median number of days with GLH data per participant was 752, capturing 442 unique locations. When we compared GLH data to 2-wk GPS data (~1.8 million points), 95% of GPS time-activity points were within 100m of GLH locations. We observed important differences between NO2

exposures assigned at home locations compared with GLH locations, highlighting the importance of GLH data to environmental exposure assessment.

We believe collecting GLH data is a feasible and cost-effective method for capturing retrospective time-activity patterns for large populations that presents new opportunities for environmental epidemiology. Cohort studies should consider adding GLH data collection to capture historical time-activity patterns of participants, employing a "bring-your-own-location-data" citizen science approach. Privacy remains a concern that needs to be carefully managed when using GLH data.

Authors: Perry Hystad, Ofer Amram, Funso Oje, Andrew Larkin, Kwadwo Boakye, Ally Avery, Assefaw Gebremedhin, and Glen Duncan

Source: (2022). Environmental Health Perspectives 130:11 CID: 117005 https://doi.org/10.1289/EHP10829

Impact of Hurricanes and Associated Extreme Weather Events on Cardiovascular Health: A Scoping Review

The frequency and destructiveness of hurricanes and related extreme weather events (e.g., cyclones, severe storms) have been increasing due to climate change. A growing body of evidence suggests that victims of hurricanes have increased incidence of cardiovascular disease (CVD), likely due to increased stressors around time of the hurricane and in their aftermath.

The objective was to systematically examine the evidence of the association between hurricanes (and related extreme weather events) and adverse CVD outcomes with the goal of understanding the gaps in the literature. A comprehensive literature search of populationlevel and cohort studies focused on CVD outcomes (i.e., myocardial infarction, stroke, and heart failure) related to hurricanes, cyclones, and severe storms was performed in the following databases from inception to December 2021: Ovid MEDLINE, Ovid EMBASE, Web of Science, and The Cochrane Library. Studies retrieved were then screened for eligibility against predefined inclusion/exclusion criteria. Studies were then qualitatively synthesized based on the time frame of the CVD outcomes studied and special populations that were studied. Gaps in the literature were identified based on this synthesis.

Of the 1,103 citations identified, 48 met our overall inclusion criteria. We identified articles describing the relationship between CVD and extreme weather, primarily hurricanes, based on data from the United States (42), Taiwan (3), Japan (2), and France (1). Outcomes included CVD and myocardial infarction-related hospitalizations (30 studies) and CVVD-related mortality (7 studies). Most studies used a retrospective study design, including one casecontrol study, 39 cohort studies, and 4 timeseries studies.

Although we identified a number of papers that reported evaluations of extreme weather events

and short-term adverse CVD outcomes, there were important gaps in the literature. These gaps included a) a lack of rigorous long-term evaluation of hurricane exposure, b) lack of investigation of hurricane exposure on vulnerable populations regarding issues related to environmental justice, c) absence of research on the exposure of multiple hurricanes on populations, and d) absence of an exploration of mechanisms leading to worsened CVD outcomes. Future research should attempt to fill these gaps, thus providing an important evidence base for future disaster-related policy.

Authors: Arnab K. Ghosh, Michelle R. Demetres, Benjamin P. Geisler, Shakirah N. Ssebyala, Tianyi Yang, Martin F. Shapiro, Soko Setoguchi, and David Abramson

Source: (2022). Environmental Health Perspectives 130:11 CID: 116003 https://doi.org/10.1289/EHP11252

Environmental contamination with highly resistant microorganisms after relocating to a new hospital building with 100% singleoccupancy rooms: A prospective observational before-and-after study with a three-year follow-up

Inanimate surfaces within hospitals can be a source of transmission for highly resistant microorganisms (HRMO). While many hospitals are transitioning to single-occupancy rooms, the effect of single-occupancy rooms on environmental contamination is still unknown. We aimed to determine differences in environmental contamination with HRMO between an old hospital building with mainly multiple-occupancy rooms and a new hospital building with 100% single-occupancy rooms, and the environmental contamination in the new hospital building during three years after relocating.

Environmental samples were taken twice in the old hospital, and fifteen times over a three-year period in the new hospital. Replicate Organism Direct Agar Contact-plates (RODACs) were used to determine colony forming units (CFU). Cotton swabs premoistened with PBS were used to determine presence of methicillin-resistant Staphylococcus aureus, carbapenemaseproducing Pseudomonas aeruginosa, highly resistant Enterobacterales, carbapenemresistant Acinetobacter baumannii, and vancomycin-resistant Enterococcus faecium. All identified isolates were subjected to whole genome sequencing (WGS) using Illumina technology.

In total, 4993 hospital sites were sampled, 724 in the old and 4269 in the new hospital. CFU

counts fluctuated during the follow-up period in the new hospital building, with lower CFU counts observed two- and three years after relocating, which was during the COVID-19 pandemic. The CFU counts in the new building were equal to or surpassed the CFU counts in the old hospital building. In the old hospital building, 24 (3.3%) sample sites were positive for 49 HRMO isolates, compared to five (0.1%) sample sites for seven HRMO isolates in the new building (P < 0.001). In the old hospital, 89.8% of HRMO were identified from the sink plug. In the new hospital, 71.4% of HRMO were identified from the shower drain, and no HRMO were found in sinks.

Our results indicate that relocating to a new hospital building with 100% single-occupancy rooms significantly decreases HRMO in the environment. Given that environmental contamination is an important source for healthcare associated infections, this finding should be taken into account when considering hospital designs for renovations or the construction of hospitals.

Authors: Adriënne S. van der Schoor, Juliëtte A. Severin, Corné H.W. Klaassen, Diederik Gommers, Marco J. Bruno, Johanna M. Hendriks, Anne F. Voor in 't holt, Margreet C. Vos

Source: (2023). International Journal of Hygiene and Environmental Health, Volume 248, 2023, 114106, ISSN 1438-4639, https://doi.org/10.1016/j.ijheh.2022.114106

EPIDEMIOLOGY AND BIOSTATISTICS

The Sequential Multiple Assignment Randomized Trial for Controlling Infectious Diseases: A Review of Recent Developments

Infectious diseases have posed severe threats to public health across the world. Effective prevention and control of infectious diseases in the long term requires adapting interventions based on epidemiological evidence. The sequential multiple assignment randomized trial (SMART) is a multistage randomized trial that can provide valid evidence of when and how to adapt interventions for controlling infectious diseases based on evolving epidemiological evidence.

We review recent developments in SMARTs to bring wider attention to the potential benefits of employing SMARTs in constructing effective adaptive interventions for controlling infectious diseases and other threats to public health. We discuss 2 example SMARTs for infectious diseases and summarize recent developments in SMARTs from the varied aspects of design, analysis, cost, and ethics.

Public health investigators are encouraged to familiarize themselves with the related materials we discuss and collaborate with experts in SMARTs to translate the methodological developments into preeminent public health research.

Authors: Xinru Wang, Bibhas Chakraborty

Source: (2023). Am J Public Health. 2023;113(1):49-59. https://doi.org/10.2105/AJPH.2022.307135

Development and assessment of an epidemiologic dashboard for surveillance of Varroa destructor in Ontario apiaries

Varroosis (caused by the Varroa destructor mite) is a key health issue for honey bees in North America. Because these mites can exist in reservoirs of feral honey bee colonies, eradication is impossible, and instead efforts are made to maintain mites below a critical threshold. Monitoring for Varroa mites within a population is key for allocating resources and targeting interventions but surveillance can be difficult and/or expensive. This project aims to reflect on the success of data dashboards developed throughout the 2019-coronavirus pandemic and showcase how these methods can improve surveillance of Varroa mite infestations in Ontario, Canada. Dashboards provide a consistent source of information and epidemiologic metrics through data visualizations, and mobilize data otherwise bound to tables and intermittent reports. In the present work, an interactive dashboard for the surveillance of Varroa mite infestations across the province is proposed. This dashboard was developed using routine ministry inspection data to depict the spatio-temporal distribution of mites across a five-year data collection period. Through interactive figures and plots, able to be disaggregated to a specific region and time frame, this dashboard will allow for members of the beekeeping community to monitor provincial mite levels throughout the season. Seven criteria found to be common across highly actionable COVID-19 dashboards were used in a beta testing stage of development to assess the quality of the dashboard, and critically reflect on its strengths and weaknesses. Furthermore, future directions for surveillance dashboards are explored, including integration with citizen science data collection to develop a comprehensive province-wide surveillance system. The outcome of this project is a

functional dashboard proof-of-concept for population-level monitoring of Varroa mites and a model for future tools designed for other species and diseases. Authors: K.E. Sobkowich, O. Berke, T.M. Bernardo, D.L. Pearl, P. Kozak

Source: (2023). Preventive Veterinary Medicine, Volume 212, 105853, ISSN 0167-5877, https://doi.org/10.1016/j.prevetmed.2023.105853

Seroprevalence of Toxoplasma gondii infection in sheep and goats from different geographical regions of the world: Systematic review and meta-analysis

The Toxoplasma gondii is an obligate intracellular protozoan parasite which significantly impact small ruminant productivity, international animal trade and transboundary movement of animal across the globe. The seroprevalence of T. gondii infection (toxoplasmosis) in sheep and goats is widely studied in many parts of the world and there is a lack of comprehensive information on prevalence estimates considering the global and regional perspectives. The aim of the study was to use systematic review and meta-analysis methods to estimate the global and regional pooled seroprevalence of T. gondii infection in sheep and goats, as well as factors that influence prevalence estimations. Relevant articles reporting the seroprevalence of toxoplasmosis in sheep and/goats were searched in five electronic databases, including PubMed, Web of Science, Scopus, Embase and ProQuest. After the publications were checked to verify they fit the inclusion criteria, a total of 225 articles were included in the systematic review and meta-analysis, reflecting data from 70 countries/regions. The pooled prevalence was estimated using a random effect metaanalysis model. Overall, the seroprevalence of T. gondii infection was 33.86% (95% CI: 30.47-37.25%) in sheep and 31.78% (95% CI: 28.99-34.58%) in goats, with significant variation in prevalence estimates across geographical locations (p < .001). Substantial heterogeneity (I2 > 75%) was observed in most pooled seroprevalence estimates. The T. gondii infection in global sheep and goat population showed uptrend over the period. This information would be useful for epidemiologist, health authorities and farmers in order to plan future T. gondii survey and infection management strategies both locally and internationally.

Authors: Md Ahaduzzaman, Tanjila Hasan

Source: (2022). Transboundary and Emerging Diseases, 69, 3790- 3822. https://doi.org/10.1111/tbed.14753

Advanced biosensing technologies for monitoring of agriculture pests and diseases: A review

The threat posed to crop production by pests and diseases is one of key factors that could reduce global food security. Early detection is of critical importance to optimize control strategies, make accurate predictions, and eventually prevent the loss of crop productivity. Recent technological advancements highlight the opportunity to revolutionize agriculture monitoring and identification of pests and diseases. Biosensing methodologies offer potential solutions for real-time and automated monitoring, which allow advances in early and accurate detection and thus support sustainable crop protection. Herein, advanced biosensing technologies for pests and diseases monitoring, including image-based, electronic noses, and wearable sensing methods are presented. Besides, challenges and future perspectives for agriculture applications are discussed. Moreover, we believe it is necessary to integrate technologies through interdisciplinary cooperation for further exploration, which may provide unlimited possibilities for innovations and applications of agriculture monitoring.

Authors: Jiayao He, Ke Chen, Xubin Pan, Junfeng Zhai and Xiangmei Lin

Source: (2023). J. Semicond, 44(2): 023104. doi:10.1088/1674-4926/44/2/023104

FOOD SAFETY

New insights into cross-contamination of fresh-produce

Cross-contamination is a primary cause of pathogen contamination in fresh-produce affecting any point of its production-distribution chain. This work provides a review of the latest research on cross-contamination in vegetables and fruits based on laboratory data, epidemiological information, and predictive models. Importantly, the review stresses the paramount impact of water-mediated microbial transfer on prevalence levels of pathogens in produces during industrial water-based processing. This increasing effect on prevalence and the low infective dose of some pathogens can bring to light the prime role of crosscontamination in the illness burden and the large outbreaks usually linked to produces. The use of disinfectants can reduce but not eliminate crosscontamination, being largely influenced by other factors (organic load, produce/water ratio, produce surface, time, etc.). Produce preparation areas can also play a leading role due to the formation of cross-contamination ecosystems, making microbial transfer possible in any direction, involving different sources, utensils, fomites, and handling practices, as well as affecting different food batches. Therefore, unraveling and understanding the complexity of the cross-contamination pathways in food preparation areas should be considered as a priority. A myriad of variables can reduce or enhance microbial transfer efficiency, including cells' adhesion, chemical and physical properties of the produce and abiotic surfaces, moisture content, contact pressure and time, biofilm, aggregative cell structures, handling practices, and so on. More mechanistic predictive models such as agent-based approaches are needed to overcome experimental limitations and data gaps. Models, if accessible, may be used as simulation bench to assist decision-makers in testing different control measures and interventions, identifying the most effective strategies to reduce cross-contamination.

Authors: Arícia Possas, Fernando Pérez-Rodríguez

Source: (2023). Current Opinion in Food Science, Volume 49, 2023, 100954, ISSN 2214-7993, <u>https://doi.org/10.1016/j.cofs.2022.100954</u>

Vibrio parahaemolyticus in seafood: recent progress in understanding influential factors at harvest and food-safety intervention approaches

Vibrio parahaemolyticus is a foodborne pathogen that is naturally found in estuarine and marine environments. Seafood may acquire this pathogen from its growing environment or through cross-contamination. Recent studies have shown that the occurrence and levels of this pathogen in seafood at harvest are influenced by aquaculture practices and environmental factors, particularly sea-surface temperature and salinity conditions. Various possible strategies for controlling V. parahaemolyticus and its biofilm formation in seafood and on contact surfaces have been developed in recent studies. This review provides insights into current seafood safetycontrol applications, indicating the need for future research.

Authors: Nodali Ndraha, Lihan Huang, Vivian CH Wu, Hsin-I Hsiao

Source: (2022). Current Opinion in Food Science, Volume 48, 2022, 100927, ISSN 2214-7993, <u>https://doi.org/10.1016/j.cofs.2022.100927</u>

Food safety interventions in low- and middle-income countries in Asia: A systematic review

Effective and sustainable interventions are necessary for long-term improvement of food safety. This review provides a summary of food safety interventions evaluated in selected lowand middle-income countries in Asia between 2000 and 2020. A systematic screening of published articles from PubMed and CabDirect databases was carried out with the aid of Rayyan QCRI software. A total of 25 studies were considered in the review. A 'before and after' study design was the most frequently used design (64%), while five studies (20%) used a randomized control trial (RCT) design. Interventions applied focused on training to improve knowledge, attitudes, and practices (KAP) towards safe food (60%) or on specific technologies (40%). Nine of the 25 studies were specific on the value chain considered: cattle (1), poultry (1), pigs (4) and fish value chains (3). Except for one study, all interventions reported some level of success; 17 were rated as having a high level of success, defined differently across studies. However, there is a clear evidence gap for the efficacy and costeffectiveness of food safety interventions in market settings, both consumer- and vendorfacing. A rigorous and standardized assessment of intervention effectiveness and sustainability is recommended, to not only identify areas of improvement, but also to ensure scaling of interventions with demonstrated evidence of success and sustainability.

Authors: Emmah Kwoba, David Obiero Oduori, Elisabetta Lambertini, Lian Francesca Thomas, Delia Grace, Florence Mutua

Source: (2023). Zoonoses and Public Health, 00, 1-14. <u>https://doi.org/10.1111/zph.13028</u>

Assessing evidence of a potential Salmonella transmission across the poultry food chain

Enhanced Salmonella surveillance programmes in poultry were implemented in all European Member States, with minimum prevalence targets for a list of targeted serotypes to safeguard food and public health. Based on the Belgian Salmonella surveillance programme and focusing on poultry, the overarching aim of this study was to highlight possible Salmonella transmissions across the food chain (FC). For this purpose, firstly, the prevalence patterns of Salmonella (targeted and the most prevalent non-targeted) serotypes along the FC were described over time. Secondly, the effectiveness of the control measures against vertical transmission (breeders to 1-day-old broiler and layer chicks) was indirectly assessed by looking into the odds of targeted serotypes detection. Thirdly, it was appraised if Salmonella prevalence can significantly increase during broilers and layers production. In addition, it was tested if being tested negative at the end of production in broilers when tested positive at the entrance is serotype dependent (targeted vs. non-targeted serotypes). Results showed that, firstly, the prevalence patterns of the listed serotypes were inconstant over time and across the FC. Secondly, the odds of Salmonella targeted serotype detection in 1-day-old broiler and in 1-day-old layer flocks were lower than in breeder flocks while, thirdly, infection during broiler and layer production can lead to significant increase in positivity in subsequent samples. Finally, being infected by a targeted or by non-targeted serotype at the entrance of the flock poorly reflects the Salmonella status at the end of production. Note that this study did not make a distinction between the different sources of contamination and the effects of sampling methods and isolation methods should be subject to further investigation.

Authors Mickaël Cargnel, Maria-Eleni Filippitzi, Dieter Van Cauteren, Wesley Mattheus, Nadine Botteldoorn, Ludivine Cambier, Sarah Welby

Source: (2023). Zoonoses and Public Health, 70, 22-45. <u>https://doi.org/10.1111/zph.12998</u>

Effect of pesticide application on Salmonella survival on inoculated tomato leaves

Outbreaks of Salmonellosis have been traced to contaminated tomato. The produce production environment poses a risk for Salmonella contamination: however. little is known about the effects of pest management practices on Salmonella during production. The study objective was to evaluate pesticide application on the inactivation of Salmonella on tomato leaves. Thirty greenhouse-grown tomato plants were inoculated with S. enterica serovars Newport or Typhimurium. Inoculation was performed by dipping tomato leaves in an 8-log CFU/mL Salmonella suspension with 0.025% (vol/vol) Silwet L-77 surfactant for 30 s, for a starting concentration of 6-7 log CFU/mL. Plants were treated with one of four pesticides, each with a different mode of action [acibenzolar-Smethyl, copper-hydroxide, peroxyacetic acid (PAA), and streptomycin]. Pesticides were applied at manufacturers' labeled rate for plant

disease management with water as a control treatment. Salmonella was enumerated at 0.125 (3 h), 2, 6, and 9 days post-inoculation (dpi), and counts log-transformed. Growth of Salmonella was not observed. At 2 dpi, PAA and streptomycin significantly reduced surface Salmonella concentrations of inoculated tomato leaves (0.7 and 0.6-log CFU/g, respectively; $p \le 0.05$), while significant Salmonella log reduction occurred in the ground tomato leaves after copper hydroxide treatment (0.8-log CFU/g; $p \le 0.05$), compared to the control. No significant differences in Salmonella populations on tomato leaf surface and in ground leaves were observed from 2 to 9 dpi, regardless of pesticide application. These findings suggest single infield pesticide applications may not be an effective mitigation strategy in limiting potential Salmonella contamination. Future research, including multiple in-field pesticide applications, or pesticide use in combination with other mitigation strategies, may offer intriguing management practices to limit possible preharvest contamination.

Authors: Ganyu Gu, Claire M. Murphy, Alexis M. Hamilton, Jie Zheng, Xiangwu Nou, Steven L. Rideout, Laura K. Strawn

Source: (2023). Journal of Food Safety, e13043. https://doi.org/10.1111/jfs.13043

INFECTIOUS AND PARASITIC DISEASES

Role of Seaports and Imported Rats in Seoul Hantavirus Circulation, Africa

Seoul orthohantavirus (SEOV) is not considered a major public health threat on the continent of Africa. However, Africa is exposed to rodentborne SEOV introduction events through maritime traffic after exponential growth of trade with the rest of the world. Serologic studies have already detected hantavirus antibodies in human populations, and recent investigations have confirmed circulation of hantavirus, including SEOV, in rat populations. Thus, SEOV is a possible emerging zoonotic risk in Africa. Moreover, the range of SEOV could rapidly expand, and transmission to humans could increase because of host switching from the usual brown rat (Rattus norvegicus) species, which is currently invading Africa, to the more widely installed black rat (R. rattus) species. Because of rapid economic development, environmental and climatic changes, and increased international trade, strengthened surveillance is urgently needed to prevent SEOV dissemination among humans in Africa.

Authors: Guillaume Castel, Claudia Filippone, Caroline Tatard, Jacques Vigan, and Gauthier Dobigny

Source: (2023). Emerging Infectious Diseases, 29(1), 20-25. https://doi.org/10.3201/eid2901.221092.

High pathogenicity avian influenza: targeted active surveillance of wild birds to enable early detection of emerging disease threats

Avian influenza (AI) is an important disease that has significant implications for animal and human health. High pathogenicity AI (HPAI) has emerged in consecutive seasons within the UK to cause the largest outbreaks recorded. Statutory measures to control outbreaks of AI virus (AIV) at poultry farms involve disposal of all birds on infected premises. Understanding of the timing of incursions into the UK could facilitate decisions on improved responses. During the autumnal migration and wintering period (autumn 2019- spring 2020), three active sampling approaches were trialed for wild bird species considered likely to be involved in captive AI outbreaks with retrospective laboratory testing undertaken to define the presence of AIV.

Faecal sampling of birds (n = 594) caught during routine and responsive mist net sampling failed to detect AIV. Cloacal sampling of hunterharvested waterfowl (n = 146) detected seven positive samples from three species with the earliest detection on the 17 October 2020. Statutory sampling first detected AIV in wild and captive birds on 3 November 2020. We conclude that hunter sourced sampling of waterfowl presents an opportunity to detect AI within the UK in advance of outbreaks on poultry farms and allow for early intervention measures to protect the national poultry flock.

Authors: Daniel Wade, Adham Ashton-Butt, Graham Scott, Scott M. Reid, Vivien Coward, Rowena D. E. Hansen, Ashley C. Banyard, and Alastair I. Ward

Source: (2022). Epidemiology & Infection, 151, E15. <u>doi:10.1017/S0950268822001856</u>

Multi-Year Comparison of Community- and Species-Level West Nile Virus Antibody Prevalence in Birds from Atlanta, Georgia and Chicago, Illinois, 2005-2016

West Nile virus (WNV) is prevalent in the United States but shows considerable variation in transmission intensity. The purpose of this study was to compare patterns of WNV seroprevalence in avian communities sampled in Atlanta, Georgia and Chicago, Illinois during a 12-year period (Atlanta 2010-2016; Chicago 2005-2012) to reveal regional patterns of zoonotic activity of WNV. WNV antibodies were measured in wild bird sera using ELISA and serum neutralization methods, and seroprevalence among species, year, and location of sampling within each city were compared using binomial-distributed generalized linear mixed-effects models. Seroprevalence was highest in year-round and summer-resident species compared with migrants regardless of region: species explained more variance in seroprevalence within each city. Northern cardinals were the species most likely to test positive for WNV in each city, whereas all other species, on average, tested positive for WNV in proportion to their sample size. Despite similar patterns of seroprevalence among species, overall seroprevalence was higher in Atlanta (13.7%) than in Chicago (5%). Location and year of sampling had minor effects, with location explaining more variation in Atlanta and year explaining more variation in Chicago. Our findings highlight the nature and magnitude of regional differences in WNV urban ecology.

Authors: Joseph R. McMillan, Gabriel L. Hamer, Rebecca S. Levine, Daniel G. Mead, Lance A. Waller, Tony L. Goldberg, Edward D. Walker, Jeffrey D. Brawn, Marilyn O. Ruiz, Uriel Kitron, and Gonzalo Vazquez-Prokopec

Source: (2022). The American Journal of Tropical Medicine and Hygiene. 108(2):366-376. doi:10.4269/ajtmh.21-1086

Spatiotemporal monitoring of myxomatosis in European wild rabbit (Oryctolagus cuniculus) in Spanish Mediterranean ecosystems

A long-term active epidemiological surveillance programme was conducted to determine seroprevalence to myxoma virus (MYXV), infection prevalence and spatiotemporal patterns and factors associated with MYXV circulation in wild rabbits (Oryctolagus cuniculus) in Spanish Mediterranean ecosystems. A total of 2376 animals were sampled over four study periods: 2009-2012 (P1), 2012-2015 (P2), 2015-2018 (P3) and 2018-2021 (P4). Antibodies against MYXV were detected by a commercial indirect ELISA in 59.9% (1424/2376; 95% CI: 58.0-61.9) of wild rabbits. At least one seropositive animal was detected on 131 (96.3%) of 136 game estates sampled. MYXV infection was confirmed by PCR in 94 of 1063 (8.8%; 95% CI: 7.3-10.7) wild rabbits. Circulation of the novel recombinant MYXV (ha-MYXV) was not found in wild rabbits analysed during P4. Five statistically significant

spatiotemporal clusters of high MYXV seroprevalence were identified using a Bernoulli model: one in P2 and four in P3. A generalized linear mixed model (GLMM) analysis identified sampling season (autumn), age (adult and juvenile), outbreaks of myxomatosis in the month prior to sampling, mean annual temperature, humidity and seropositivity to rabbit haemorrhagic disease virus as factors potentially linked with MYXV seropositivity. GLMM analysis identified outbreaks of myxomatosis in the month prior to sampling, MYXV seropositivity and presence of lesions compatible with myxomatosis as factors associated with MYXV infection. The results indicate high exposure, widespread but non-homogeneous distribution, and endemic circulation of MYXV in wild rabbit populations in southern Spain during the last decade. Prevalence of antibodies against MYXV showed fluctuations both within the year and over the study periods, revealing variations in the immunity of wild rabbit populations in Mediterranean ecosystems that could increase the risk of MYXV re-emergence in immunologically naïve populations. The present study highlights the importance of long-term surveillance to better understand the epidemiology of MYXV in wild lagomorphs.

Authors: Leonor Camacho-Sillero, Beatriz Cardoso, Adrián Beato-Benítez, Félix Gómez-Guillamón, José M. Díaz-Cao, Débora Jiménez-Martín, Javier Caballero-Gómez, Sabrina Castro-Scholten, David Cano-Terriza, Ignacio García-Bocanegra

Source: (2022). Transboundary and Emerging Diseases, 69, 3494- 3505. https://doi.org/10.1111/tbed.14709

Current situation and future direction of Newcastle disease vaccines

Newcastle disease (ND) is one of the most economically devastating infectious diseases affecting the poultry industry. Virulent Newcastle disease virus (NDV) can cause high mortality and severe tissue lesions in the respiratory, gastrointestinal, neurological, reproductive and immune systems of poultry. Tremendous progress has been made in preventing morbidity and mortality caused by ND based on strict biosecurity and wide vaccine application. In recent decades, the continual evolution of NDV has resulted in a total of twenty genotypes, and genetic variation may be associated with disease outbreaks in vaccinated chickens. In some countries, the administration of genotypematched novel vaccines in poultry successfully suppresses the circulation of virulent NDV strains in the field. However, virulent NDV is still endemic in many regions of the world, especially in low- and middle-income countries, impacting the livelihood of millions of people dependent on poultry for food. In ND-endemic countries, although vaccination is implemented for disease control, the lack of genotype-matched vaccines that can reduce virus infection and transmission as well as the inadequate administration of vaccines in the field undermines the effectiveness of vaccination. Dissection of the profiles of existing ND vaccines is fundamental for establishing proper vaccination regimes and developing next-generation vaccines. Therefore, in this article, we provide a broad review of commercial and experimental ND vaccines and promising new platforms for the development of next-generation vaccines.

Authors: Zenglei Hu, Xiaozheng He, Jing Deng, Jiao Hu & Xiufan Liu

Source: (2022). Vet Res 53, 99 (2022). https://doi.org/10.1186/s13567-022-01118-w

PUBLIC HEALTH TOPICS

Multistate reptile- and amphibian-associated salmonellosis outbreaks in humans, United States, 2009-2018

Non-typhoidal Salmonella cause an estimated 1.4 million human illnesses, 26,000 hospitalizations and 400 deaths annually in the United States. Approximately 11% of these infections are attributed to animal contact. Reptiles and amphibians are known sources of salmonellosis: voung children (aged <5 vears) are disproportionately affected by reptile- and amphibian-associated salmonellosis (RAAS) outbreaks. We describe multistate RAAS outbreaks to characterize illnesses and inform prevention efforts. RAAS outbreaks were defined as ≥2 culture-confirmed human Salmonella infections with similar pulsed-field gel electrophoresis patterns and epidemiologic, laboratory or traceback evidence linking them to a common reptile/amphibian exposure. Data sources included the Animal Contact Outbreak Surveillance System; CDC Outbreak Response and Prevention Branch's outbreak management database: PulseNet, the national molecular subtyping network for foodborne disease surveillance in the United States; and the National Antimicrobial Resistance Monitoring System. Twenty-six RAAS outbreaks were reported during 2009-2018, resulting in 1465 illnesses and 306 hospitalizations. The outbreaks were associated with turtles (19), lizards (5), snakes (1) and frogs (1). Sixteen (61.5%) outbreaks were linked to small turtles (<4 inches), resulting in 914 illnesses. Forty-nine percent of outbreak-associated patients were

aged <5 years. Of 362 patients/caregivers interviewed, 111 (30.7%) were aware that reptiles/amphibians can carry Salmonella. Among 267 patient isolates with antimicrobial susceptibility information, 20 (7.5%) were nonsusceptible to ≥1 antibiotic used to treat human salmonellosis. RAAS outbreaks result in considerable morbidity, particularly among young children. Illnesses linked to small turtles are preventable through education, targeted outreach to caregivers and paediatricians, and when appropriate, enforcement. Historically, individual states and jurisdictions have enforced existing or promulgated new authorities to address outbreaks. Preventing future RAAS outbreaks requires addressing challenges related to the illegal sale/distribution of small turtles; and for legal reptile sales, providing information on RAAS risk to consumers at point of sale to support informed pet ownership decisions.

Authors: Michelle A. Waltenburg, Ariana Perez, Zainab Salah, Beth E. Karp, Jean Whichard, Beth Tolar, Lauren Gollarza, Lia Koski, Anna Blackstock, Colin Basler, Megin Nichols

Source: (2022). Zoonoses and Public Health, 69, 925-937. <u>https://doi.org/10.1111/zph.12990</u>

Biosecurity and antimicrobial use in broiler farms across nine European countries: toward identifying farm-specific options for reducing antimicrobial usage

Broiler chickens are among the main livestock sectors worldwide. With individual treatments being inapplicable, contrary to many other animal species, the need for antimicrobial use (AMU) is relatively high. AMU in animals is known to drive the emergence and spread of antimicrobial resistance (AMR). High farm biosecurity is a cornerstone for animal health and welfare, as well as food safety, as it protects animals from the introduction and spread of pathogens and therefore the need for AMU. The goal of this study was to identify the main biosecurity practices associated with AMU in broiler farms and to develop a statistical model that produces customised recommendations as to which biosecurity measures could be implemented on a farm to reduce its AMU, including a cost-effectiveness analysis of the recommended measures. AMU and biosecurity data were obtained cross-sectionally in 2014 from 181 broiler farms across nine European countries (Belgium, Bulgaria, Denmark, France, Germany, Italy, the Netherlands, Poland and Spain). Using mixed-effects random forest analysis (Mix-RF), recursive feature elimination was implemented to determine the biosecurity measures that best predicted AMU at the farm

level. Subsequently, an algorithm was developed to generate AMU reduction scenarios based on the implementation of these measures. In the final Mix-RF model, 21 factors were present: 10 about internal biosecurity, 8 about external biosecurity and 3 about farm size and productivity, with the latter showing the largest (Gini) importance. Other AMU predictors, in order of importance, were the number of depopulation steps, compliance with a vaccination protocol for non-officially controlled diseases, and requiring visitors to check in before entering the farm. K-means clustering on the proximity matrix of the final Mix-RF model revealed that several measures interacted with each other, indicating that high AMU levels can arise for various reasons depending on the situation. The algorithm utilised the AMU predictive power of biosecurity measures while accounting also for their interactions, representing a first step toward aiding the decision-making process of veterinarians and farmers who are in need of implementing onfarm biosecurity measures to reduce their AMU.

Authors: Panagiotis Mallioris, Gijs Teunis, Giske Lagerweij, Philip Joosten, Jeroen Dewulf, Jaap A. Wagenaar, Arjan Stegeman, and Lapo Mughini-Gras

Source: (2022). Epidemiology & Infection, 151, E13. doi:10.1017/S0950268822001960

A snapshot survey of antimicrobial resistance in food-animals in low and middle-income countries

Antimicrobial resistance remains a threat to global public health. Low-and middle-income countries carry a greater burden of resistance because of higher rates of infection as well as, potentially, location-specific risk factors. Food animals occupy a critical crossover point for the spread of antimicrobial resistance to humans and the environment. However, this domain remains poorly surveilled outside high-income settings. We used point surveillance from 191 studies reporting phenotypic AMR in food animals across 38 African, Middle Eastern, Asian and South and Central American countries to depict antimicrobial resistance trend in food animals. By computing Multiple Antibiotic Resistance indices and finding an overall mean of 0.34 ± 0.16 , which is above the 0.2 index associated with multidrug resistance and high risk, we show that multidrug resistance in bacteria from food animal sources is worryingly high. MAR indexes from food animals were overall higher than those previously computed from aquaculture but, unlike aquaculturecomputed MAR indices, did not track closely with those of human-associated bacteria in the

same countries. Food animals are an important reservoir for rising antimicrobial resistance in bacteria, and hence improved surveillance in this sector is highly recommended.

Authors: Odion O. Ikhimiukor, Iruka N. Okeke

Source: (2023). One Health, Volume 16, 100489, ISSN 2352-7714, https://doi.org/10.1016/j.onehlt.2023.100489

Impact of the switch from four to three intradermal rabies post-exposure prophylaxis sessions in patients bitten by dogs: A cost-consequence analysis from the patients' perspective

The annual incidence of rabies deaths has been estimated in Cambodia at nearly 5.8/100.000 person-years. The cost of post exposure prophylaxis (PEP) and travel is potentially a significant barrier for exposed patients and their families, although safety nets are in place to provide the prophylaxis at no cost for lowincome families. A decision-tree model was built to estimate changes in the costs from the patients' perspective and the survival outcomes of the Institut Pasteur du Cambodge (IPC) rabies PEP regimen after the switch from the Thai Red Cross (TRC) rabies PEP regimen in patients exposed to WHO category II or III bites by dogs. Derived from the IPC database, data included the trajectory of 203,497 patients, 1412 calledback patients and economic data on 201 patients. Uncertainty was addressed using oneway and probabilistic sensitivity analyses. Compared to the TRC regimen, the IPC regimen was cheaper and equally effective in patients with category II bites. In patients with category III bites, the IPC regimen was cheaper and its modeled probability of survival was 0.04% (95% CI, -0.12%; 0%) lower than the TRC regimen. However, the mortality rate was very low and the causes of death were uncertain. The data available may have lacked power to be able to statistically significantly tell apart the difference between genuine PEP failure and incorrect PEP administration, in the three versus the four-PEP sessions.

Authors: Alicia Le Bras, Kevin Zarca, Yiksing Peng, Malen Chan, Isabelle Durand-Zaleski

Source: (2022). One Health, Volume 15, 2022, 100408, ISSN 2352-7714, https://doi.org/10.1016/j.onehlt.2022.100408

Reducing zoonotic avian influenza transmission at household poultry slaughter using a behaviour change tool for limited literacy audiences Human infections in Egypt with highly pathogenic avian influenza (HPAI) likely due to airborne transmission of HPAI virus (HPAIV) during home slaughter of poultry predominately affect women and children, who are the primary caregivers of household poultry. This study developed a safe contained poultry slaughter procedure to reduce airborne HPAIV and zoonotic infections and simultaneously created an educational outreach tool for teaching the modified procedure. The tool designed for limited literacy audiences used two illustrated posters and handouts for teaching the safe contained poultry slaughter procedure. The posters were developed with advice of animal health professionals and then refined by target audience women's focus groups. These women's focus groups proved to be the critical step for assuring the understanding, acceptance, effectiveness and accuracy of the outreach tool. The safe contained poultry slaughter procedure was designed to be low or no cost, sustainable by using a universal implement found in village households and designed as a minor variation of standard poultry halal slaughter. It was crafted to be culturally appropriate and religiously acceptable.

Authors: Andrew A. Clark, Samah Eid, Mohamed K. Hassan, Kip Carter, David E. Swayne

Source: (2022). Zoonoses and Public Health, 69, 956-965. <u>https://doi.org/10.1111/zph.12993</u>