AAFSPHV QUARTERLY

APRIL 2024 VOL 4 ISSUE 1

In this issue:

President's Corner

Heading into summer, we often don't have enough time to do it all. We might be past a global pandemic with COVID-19, but in public health, there's almost ALWAYS an emergent situation that needs our attention. Whether that be a patient, a farm, a food safety crisis averted, and the list goes on as we work behind the scenes to keep food safe and the public healthy.

So, how do we reclaim those small moments of fun, joy, and happiness between the long hours? Studies have shown that simply looking at a picture or finding wonder and awe in your backyard can be game-changing for our mental health. I invite you to read an article in Pet Vet Magazine with helpful tips to feel healthier and happier and experience more joy each day.

FROM THE EXECUTIVE VP

We recently were verified by AVMA as a Constituent Allied Organization. This is a process we go through each year. To be verified as an Allied Organization we must show that we have more than 350 members and that 75% of the members are also AVMA members. As an Allied Organization we have a seat in the House of Delegates and on the Food Safety and Legislative Advisory Committees and the Committee on Antimicrobials. Your AVMA membership is crucial to our continued voice at AVMA.

Our RACE approved CE webinar series will continue monthly in 2024. We welcome the National Association of State Public Health Veterinarians (NASPHV) into our partnership with ACVPM, NAFV and USAHA. If you are interested in presenting a continuing education webinar or have topics you would like to see discussed please contact our President-Elect Dr. Pam Abney Pres-elect@aafsphv.org

At the April Governing Board meeting we discussed several changes that need to be made to the bylaws to bring them up to date. These primarily relate to how members vote, previous bylaw versions listed mail in ballots. We now conduct all member communications and polls via email, and the bylaws need to be changed to reflect this.

The Board also voted to recommend to membership that we add another AT LARGE member to broaden the experience and expertise on our Board. The general membership must approve this addition, and I will be including this request with the updated bylaw poll.

LOOKING AHEAD:

Board and Director positions open in Fall 2025:

- President Elect
- Recording Secretary
- Treasurer
- Director, State/Local Government
- Director, Private/Corporate Practice

If you are interested in nominating a member for any of these positions or if you would like to nominate yourself, please go to this link for a fillable nomination form:

https://www.viethconsulting.com/members/form.php?orgcode=AAFS&fid=4939003

If you have questions about the open positions please contact Katherine, your EVP at executivevp@aafsphv.org

Veterinary Students Please Renew Your Membership for 2024. 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:

• Scholarships to help cover travel and expenses for student members to attend the AVMA Annual Meeting and other meetings.
• Lafontaine Memorial Scholarship fund for MPH or public health/food safety MS tuition for DVM students and graduate veterinarians.
• Access to our 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.
• Complimentary 1 st year membership to recent DVM, MS in Food Safety, and MPH graduates
• Free 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.
• Supporting an organization with representation on the AVMA House of Delegates, Food Safety Advisory, Antimicrobial and Legislative Advisory committees. To join, visit our website: https://aafsphv.org/

Please share this information with other students.

Education Committee Report

AVMA 2024 has an abundance of Food Safety and Public Health content this year! Our Education Committee did a great job sourcing experts and content. We have a record number of Food Safety talks starting on Friday afternoon with a focus on Careers, then on to topics including food defense, biosecurity, and One Health to name a few. Find the full schedule of the AVMA Convention Sessions here: https://s1.goeshow.com/avma/annual/2024/AVMA2024.cfm.

We look forward to seeing you in Austin!

LET'S KEEP IN TOUCH!

Do you have job announcements, meetings that may be of interest to our members or topics you'd like to discuss with your colleagues? Please send them to Dr. Waters at executivevp@aafsphv.org

Interim Editors's Note

TWO FOR THE PRICE OF ONE!

A special thanks to our last editor, Tori Novak, for all her efforts. We hope she knows that she will be missed.

This issue is the result of the combined efforts of myself and Mike Gilsdorf. We hope you enjoy it!

Donna DeBonis & Mike Gilsdorf

SUBSCRIBE NOW!

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

We want at least 1000 subscribers by this summer!

Please Update Your Member Profile

Here's how you can update your profile:

1. Visit our AAFSPHV website at aafsphv.org
2. Log in using your credentials.
3. Navigate to the Member Information section and click on the "Change Contact/Profile Info"
4. Update your contact information, current position, and a brief bio.
5. Feel free to upload a recent photo to put a face to your name.

By updating your profile, you not only help us connect the dots within our community but also enable us to provide you with relevant updates, networking events, and opportunities tailored to your interests and expertise.

We also have exciting plans for the future, including webinars featuring distinguished speakers (Think Free CE!), and advocacy at the AVMA. Our organization has designated seats in the House of Delegates, Food Safety Advisory Committee, The Committee on Antimicrobials and the Legislative Advisory Committee where our representatives work to support a safe food supply, strong public health initiatives and legislation that benefits veterinary public health.

Let's rekindle the spirit of our AAFSPHV community and make 2024 a year of reconnection, inspiration, and growth. Your involvement is highly valued, and we are excited to witness the positive impact we can create together. Thank you for being a part of our vibrant alumni network. We look forward to seeing your updated profiles and reconnecting with you soon.

Your 2024 Officers and Board of Directors

Looking for
DIRECTOR AT LARGE

The AAFSPHV is seeking candidates for Director At Large, to replace Dr. Pam Abney who has agreed to become President Elect. The new director will complete her term of office (until Oct 2025) and is eligible to reapply for another 3 year term if desired. Information about this position is listed below. AVMA membership is required for our Governing Board members.
Members who would like to nominate themselves or another member should fill out the nomination form or send the following information in an email to executivevp@aafsphv.org
1. Position applying for:
2. Name of person being nominated_____
3. Nominator _____
4. One paragraph statement to help explain interest and background related to the Position.
5. Please attach a Resume or CV (brief or full CV)

Director At Large
Term: Spring 2024 – Oct 2025
Meetings: The Directors are members of the governing board. Meetings are held via Zoom for 1 hour once a month. Directors are encouraged to participate in one of our standing committees: Finance, Communication, Education and Student Outreach. The terms of office for the current Directors shall be three years and their terms shall be staggered. Directors are not term limited. The Directors will serve as members of the Governing Board and will provide specialized employment sector advice, support, and assistance in determining the policies and pursuing the objectives of the association.

CALL TO ACTION

Members,

We want to keep our organization strong and relevant. 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. To keep our Allied Organization status in AVMA we need to increase our member numbers.

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. Please support AAFSPHV and recruit your colleagues, so they can enjoy these **benefits**.

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 include access to:

- Free monthly online CE in public health via our partnership with the American College of Veterinary Preventive Medicine (ACVPM)
- The Quarterly, our newsletter with association and member news and a compendium of abstracts relating to veterinary public health and food safety
- Representation on the AVMA House of Delegates, Food Safety Advisory and Legislative Advisory committees
- Our new website with a CE calendar, forums, and a jobs board
- Our YouTube and Podcast channels featuring interviews with veterinarians working in public practice, academia, and industry
- Our LinkedIn Group for job postings and discussions
- Networking with veterinarians across all sectors of public health and food safety
- Mentor veterinarians for informational interviews and job or career advice
- Complimentary first year membership to recent DVM, MS in Food Safety, and MPH graduates and new ACVPM diplomats
- Scholarships to help cover travel and expenses for student members to attend the AVMA Annual Meeting and other meetings and Veterinary Leadership Conference
- NEW in 2023: the Dan Lafontaine Memorial 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

FROM THE AVMA FOOD SAFETY COMMITTEE DELEGATE

Call for Members for the new Pet Food Safety Issues Working Group

Are you concerned about pet food safety? Do you have expertise or education in this topic? If so, please join us here to work on Pet Food Safety issues. AAFSPHV is creating a working group to discuss pet food safety and develop guidance for professionals in the area and the public. All AAFSPHV members are invited to participate as we discuss pet food safety issues as well as items brought up before the AVMA Food Safety Committee. Paulo Mohyla is our delegate and Donna DeBonis is the alternate to the AVMA Committee and will be bringing items from there up for discussion, as well as emerging issues related to this theme.

In addition to Pet Food Safety, we will also be taking a look at Animal Feed issues. So, those of you in Food Animal Production are also encouraged to join in on this discussion. (If you are interested in being considered for the working group, please send an email to Paulo at paulomohyla@gmail.com with your name, title, location, and professional experience related to this area. All meetings are expected to be remote with no more than 4 hours of commitment per month).
Please bring your topics to this discussion board as well as any applicable free CE, so we can post it on our AAFSPHV Event Calendar.

AAFSPHV Lafontaine Memorial Scholarship Application Period Open

Applications due by June 30 2024

Background

Daniel E. Lafontaine Sr. grew up in Alvada, Ohio and earned his Doctor of Veterinary Medicine degree at The Ohio State University (1967). Following graduation, he served in the Army Veterinary Corps for 26 years, retiring as a Colonel in 1993. During his service, he earned a Master of Public Health from the University of Minnesota. Dr. Lafontaine subsequently served as Director of the South Carolina Meat Poultry Inspection Department and was the Assistant State Veterinarian of South Carolina. He finished his career as a Vice President and associate of the HACCP Consulting Group, LLC. Dr. Lafontaine was a member of many professional organizations to include a diplomate of The American College of Veterinary Preventive Medicine; past president of the former American Association of Food Hygiene Veterinarians (now American Association of Food Safety and Public Health Veterinarians); past chair of the AVMA House Advisory Committee, past member of the AVMA Legislative Advisory Committee, and chaired the AVMA Antimicrobial Use Task Force. In 1996, Dr. Lafontaine was named AAFHV Food Hygiene Veterinarian of the Year. He received the AVMA Public Service Award in 2008. He traveled worldwide to teach food safety practices to colleagues and soldiers. Dr. Lafontaine took great pride in the Army Veterinary Corps, his second career with the State of South Carolina, and consulting on food safety and hygiene. Dr. Lafontaine, 78, Bel Air, Maryland, died Feb. 24, 2021.

Purpose

To honor Dr. Lafontaine's legacy and efforts in food safety and public health practices.

Qualifications

1. Be a veterinarian working on an advanced degree or be a student working on a veterinary degree with an emphasis on food safety and public health.
2. Enrolled in an advanced university program (DVM, master's, PhD, DrPH, etc.) focused on food safety and public health.
3. Demonstrate intent to continue in a career focused on food safety and/or public health.

TO APPLY:

1. Go To aafsphv.org
2. Log in to your member account
3. Select scholarship button
4. Select Lafontaine Memorial and fill out online application
5. Attach a CV or resume

Applications will be reviewed during July 2024 and the $1000 scholarship award granted to the chosen candidate by the Aug 15, 2024. Questions? Contact executivevp@aafsphv.org

FROM THE AVMA HOD DELEGATE

Greetings AAFSPHV Members!

The 2024 AVMA House of Delegates (HOD) Winter Session was held January 5-6 in conjunction with the AVMA Veterinary Leadership Conference in Chicago. It was another productive and successful meeting!

As a reminder, 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.

As always, 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 2024 HOD Winter Session include:

Resolutions

Resolution 1 – New policy on mitigating hazards in the veterinary workplace
Resolution 2 – Revised policy on safe non-commercial transport of pets in motor vehicles
Resolution 3 – Revised policy on dog and cat population management
Resolution 4 – Revised policy on safety testing
Resolution 5 – Revised policy on raw or undercooked animal-source protein in cat and dog diets
Resolution 6 – Revised policy on animal loss support services

- The House referred Resolution 1—New Policy on Mitigating Hazards in the Veterinary Workplace to the Board of Directors for further clarification by the Council on Veterinary Service.
- The House amended and approved the adoption of Resolution 2—Revised Policy on Safe Non-Commercial Transport of Pets in Motor Vehicles.
- The House amended and approved the adoption of Resolution 3—Revised Policy on Dog and Cat Population Management.
- The House approved the adoption of Resolution 4—Revised Policy on Safety Testing.
- The House approved Resolution 5—Revised Policy on Raw or Undercooked Animal Source Protein in Cat and Dog Diets.
- The House amended and approved the adoption of Resolution 6—Revised Policy on Animal Loss Support Services.

Veterinary Information Forum (VIF)

During the Veterinary Information Forum, the House of Delegates (HOD) and Reference Committees discussed the following topics: Future Veterinary Workforce Needs, Telehealth and the Veterinarian-Client-Patient Relationship (VCPR), and the Veterinary Midlevel Position. While no action was taken, the HOD and Reference Committees engaged in robust discussion and provided valuable input to AVMA Leadership. Detailed information was distributed to the HOD members and Executive Directors of member and allied organizations at the conclusion of

the meetings.

House Advisory Panel Presentations

To further enhance discussions, two House Advisory Panel members were invited to speak at this HOD Session to share their expertise and knowledge. Presenting this year were: Dr. Tristan Colonius, FDA Center for Veterinary Medicine, who presented on the FDA Innovation Agenda; and Dr. Kis Robertson Hale, USDA Food Safety and Inspection Service, who presented on the District Veterinary Medical Officer position.

Elections

The House elected Dr. Kristin Haas (Animal Health) and Dr. Brigid Elchos (Human Health) to the Council on Public Health; Dr. Lloyd Reitz to the Private Clinical Practice position on the Council on Research; and Dr. Jessica Fox to the Private Mixed Practice position on the Council on Veterinary Service.

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 AVMA volunteer opportunities 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
Kristen.Clark@state.mn.us

Katherine Waters, DVM, MPH, DACVPM, CPH
AAFSPHV Executive Vice President &
Alternate Delegate
executivevp@aafsphv.org

Members in the News

Catch **Dr. Murphy** in his interview with Dr. DeBonis on our new AAFSPHV YouTube channel. It already has over 200 views!

AVMA'S VETERINARY VERTEX PODCAST EPISODE:
Veterinarians: Guardians Against Zoonotic Diseases and Champions of One Health

*Featuring **Dr. Will Sander***

ABSTRACTS TABLE OF CONTENTS

ENVIRONMENTAL HEALTH AND TOXICOLOGY

Inequities in Drinking Water Quality Among Domestic Well Communities and Community Water Systems, California, 2011–2019

Objectives. To evaluate universal access to clean drinking water by characterizing relationships between community sociodemographics and water contaminants in California domestic well areas (DWAs) and community water systems (CWSs).

Methods. We integrated domestic well locations, CWS service boundaries, residential parcels, building footprints, and 2013–2017 American Community Survey data to estimate sociodemographic characteristics for DWAs and CWSs statewide. We derived mean drinking and groundwater contaminant concentrations of arsenic, nitrate, and hexavalent chromium (Cr[VI]) between 2011 and 2019 and used multivariate models to estimate relationships between sociodemographic variables and contaminant concentrations.

Results. We estimated that more than 1.3 million Californians (3.4%) use domestic wells and more than 370 000 Californians rely on drinking water with average contaminant concentrations at or above regulatory standards for 1 or more of the contaminants considered. Higher proportions of people of color were associated with greater drinking water contamination.

Conclusions. Poor water quality disproportionately impacts communities of color in California, with the highest estimated arsenic, nitrate, and Cr(VI) concentrations in areas of domestic well use. Domestic well communities must be included in efforts to achieve California's Human Right to Water.

Authors: Clare Pace, Carolina Balazs, Komal Bangia, Nicholas Depsky, Adriana Renteria, Rachel Morello-Frosch, and Lara J. Cushing

Source: (2022). *American Journal of Public Health,* 112(1), 88-97, https://doi.org/10.2105/AJPH.2021.306561

Effects of Dicyclohexyl Phthalate Exposure on PXR Activation and Lipid Homeostasis in Mice

Background:
Exposure to plastic-associated endocrine disrupting chemicals (EDCs) has been associated with an increased risk of cardiovascular disease (CVD) in humans. However, the underlying mechanisms for this association are unclear. Many EDCs have been shown to function as ligands of the nuclear receptor pregnane X receptor (PXR), which functions as xenobiotic sensor but also has pro-atherogenic effects in vivo.
Objective:
We sought to investigate the contribution of PXR to the adverse effects dicyclohexyl phthalate (DCHP), a widely used phthalate plasticizer, on lipid homeostasis and CVD risk factors.
Methods:
Cell-based assays, primary organoid cultures, and PXR conditional knockout and PXR-humanized mouse models were used to investigate the impact of DCHP exposure on PXR activation and lipid homeostasis in vitro and in vivo. Targeted lipidomics were performed to measure circulating ceramides, novel predictors for CVD.

Results:
DCHP was identified as a potent PXR-selective agonist that led to higher plasma cholesterol levels in wild-type mice. DCHP was then demonstrated to activate intestinal PXR to elicit hyperlipidemia by using tissue-specific PXR-deficient mice. Interestingly, DCHP exposure also led to higher circulating ceramides in a PXR-dependent manner. DCHP-mediated PXR activation stimulated the expression of intestinal genes mediating lipogenesis and ceramide synthesis. Given that PXR exhibits considerable species-specific differences in receptor pharmacology, PXR-humanized mice were also used to replicate these findings.

Discussion:
Although the adverse health effects of several well-known phthalates have attracted considerable attention, little is known about the potential impact of DCHP on human health. Our studies demonstrate that DCHP activated PXR to induce hypercholesterolemia and ceramide production in mice. These results indicate a potentially important role of PXR in contributing to the deleterious effects of plastic-associated EDCs on cardiovascular health in humans. Testing PXR activation should be considered for risk assessment of phthalates and other EDCs.
https://doi.org/10.1289/EHP9262

Authors: Sui, Y., Meng, Z., Chen, J., Liu, J., Hernandez, R., Gonzales, M. B., ... & Zhou, C.

Source: (2021). *Environmental health perspectives*, 129(12), 127001.

SARS-CoV-2 detection in wastewater as an early warning indicator for COVID-19 pandemic. Madrid region case study

COVID-19 pandemic is ongoing for more than a year and has changed priorities and boosted some WBE studies. The aim of this work is to contributed to our knowledge sharing the methodology developed for SARS-CoV-2 detection in wastewater of Madrid region of over six million and a half inhabitants, where the sewer system is a combined system.

At first, a pilot test in a small metropolitan area was carried out in order to define the criteria for the selection of the sampling points to be applied to the entire region. Methodologys for laboratory analysis and statistical analysis and interpretation of data are also presented. This work relies highly on fieldwork, so sewer network safe accessibility is paramount. A total of 289 sampling points were weekly characterised. Each sampling point represents a sewershed, some of them in a cascade distribution. Samples are tested for SARS-CoV-2 concentration (gc/L, genome copies per litre) and physicochemical parameters are also analysed to validate or discard what at first could be an unusual virus presence. Field results are correlated with health indicators such as incidence rates and hospitalisation data.

This information is daily shared with regional health authorities, disaggregated by municipalities, or aggregated for the entire Madrid region. Results have proved to anticipate health indicators. The tool is used as an early warning indicator for COVID-19 pandemic. Further work is planned to apply the current scheme for a permanent epidemiological surveillance system of 87 sampling points to pinpoint infection hotspots and activate the linked sewersheds in the event of an outbreak.

Authors: Lastra, A., Botello, J., Pinilla, A., Urrutia, J. I., Canora, J., Sánchez, J., ... & Flores, J.

Source: (2022). *Environmental research,* 203, 111852.

The effects of exercise training on the lungs and cardiovascular function of animals exposed to diesel exhaust particles and gases

Air pollution has been identified as one of the main environmental risks to health. Since exercise training seems to act as an anti-inflammatory modulator, our hypothesis is that exercise training prevents damage to respiratory and cardiovascular function caused by diesel exhaust particle (DEP) exposure. This study aimed to evaluate whether aerobic exercise training prior to DEP exposure prevents inflammatory processes in the pulmonary and cardiovascular systems. Therefore, BALB/C male mice were or were not submitted to a 10-week exercise training protocol (5×/week, 1 h/d), and after four weeks, they were exposed to DEP in a chamber with 24 μg/m^3 PM2.5 or filtered air. Heart rate variability, lung mechanics and bronchoalveolar lavage fluid, cytokines and polymorphonuclear cells in the lung parenchyma were evaluated. Exposure to DEPs reduced heart rate variability and the elastance of the respiratory system and increased the number of cells in bronchoalveolar lavage fluid, as well as macrophages, neutrophils and lymphocytes, the density of polymorphonuclear cells and the proportion of collagen fibres in the lung parenchyma. Additionally, DEP-exposed animals showed increased expression of IL-23 and IL-12p40 (proinflammatory cytokines) and inducible nitric oxide synthase. Exercise training avoided the increases in all these inflammatory parameters, except the elastance of the respiratory system, the amount of collagen fibres and the expression of inducible nitric oxide synthase. Additionally, trained animals showed increased expression of the anti-inflammatory cytokine IL-1ra. Although our data showed a reduction in proinflammatory markers and an increase in markers of the anti-inflammatory pathway, these changes were not sufficient to prevent damage to the lung and cardiovascular function induced by DEPs. Based on these data, we propose that aerobic exercise training prevents the lung inflammatory process induced by DEPs, although it was not sufficient to avoid chronic damage, such as a loss of lung function or cardiovascular events.

Authors: Olivo, C. R., Castro, T. B. P., Riane, A., Regonha, T., Rivero, D. H. R. F., Vieira, R. P., ... & Prado, C. M.

Source: (2022). *Environmental Research*, 203, 111768.

Lead in Archeological Human Bones Reflecting Historical Changes in Lead Production

Forty years ago, in a seminal paper published in *Science*, Settle and Patterson used archeological and historical data to estimate the rates of worldwide lead production since the discovery of cupellation, approximately 5000 years ago. Here, we record actual lead exposure of a human population by direct measurements of the concentrations of lead in petrous bones of individuals representing approximately 12 000 years of inhabitation in Italy. This documentation of lead pollution throughout human history indicates that, remarkably, much of the estimated dynamics in lead production is replicated in human exposure. Thus, lead pollution in humans has closely followed anthropogenic lead production. This observation raises concerns that the forecasted increase in the production of lead and other metals might affect human health in the near future.

Authors: Erel, Y., Pinhasi, R., Coppa, A., Ticher, A., Tirosh, O., & Carmel, L.

Source: ((2021). *Environmental Science & Technology*, *55*(21), 14407-14413.

EPIDEMIOLOGY AND BIOSTATISTICS

Seroepidemiological survey on pigs and cattle for novel K88 (F4)-like colonisation factor detected in human enterotoxigenic *Escherichia coli*

Enterotoxigenic *Escherichia coli* (ETEC) strains that express various fimbrial or nonfimbrial colonisation factors (CFs) and enterotoxins are critical causes of diarrhoeal diseases. Human ETEC serotype O169:H41 (O169) has been a representative of epidemic ETEC worldwide; the organism shows massive adherence to HEp-2 cells similar to enteroaggregative *E. coli*. Previously, we determined the complete sequence of the unstable virulence plasmid, pEntYN10. The plasmid included a unique set of genes encoding a novel CF resembling K88 (F4) of porcine ETEC, in addition to CS6, a well-known representative CF of human ETEC, and another novel CF similar to CS8 (CFA/III) of human ETEC. In the present study, we focused on K88-like CF (hereafter, $K88_{O169}$) that may allow the organisms to infect domestic livestock like original K88-harbouring strains that can cause diarrhoea in piglets. Samples were tested for antibodies against recombinant proteins of possible paralogous adhesins, FaeG1 and FaeG2, from $K88_{O169}$ and the FaeG of typical K88 (F4). The seroepidemiological study using recombinant antigens (two paralogs FaeG1 and FaeG2 from $K88_{O169}$) showed reactivity of porcine (18.0%) and bovine (17.1%) sera to $K88_{O169}$ FaeG1 and/or FaeG2 antigens on indirect ELISA tests. These results suggest that *E. coli* with $K88_{O169}$ adhesin can infect various hosts, including pigs and cattle. This is the first report of domestic livestock having antibodies to $K88_{O169}$ of human ETEC. Although human ETEC had been thought to be distinguished from those of domestic animals based on CFs, zoonotic strains may conceal themselves among human ETEC organisms. The concept of One Health should be adopted to intervene in ETEC infections among animals and humans.

Authors: Tanimoto, Y., Inoue, M., Komatsu, K., Odani, A., Wada, T., Kage-Nakadai, E., & Nishikawa, Y.

Source: (2022). *Epidemiology and Infection, 150*, E6. doi:10.1017/S0950268821002697

A climate-dependent spatial epidemiological model for the transmission risk of West Nile virus at local scale

In this study, initial elements of a modelling framework aimed to become a spatial forecasting model for the transmission risk of West Nile virus (WNV) are presented. The model describes the dynamics of a WNV epidemic in population health states of mosquitoes, birds and humans and was applied to the case of Greece for the period 2010–2019. Calibration was performed with the available epidemiological data from the Hellenic Centre for Disease Control and Prevention and the environmental data from the European Union's earth observation program, Copernicus. Numerical results of the model for each municipality were evaluated against observations. Specifically, the occurrence of WNV, the number of infected humans and the week of incidence predicted from the model were compared to the corresponding numbers from observations. The results suggest that dynamic downscaling of a climate-dependent epidemiological model is feasible down-to roughly $80km^2$. This below nomenclature of territorial units for statistics (NUTS) 3 level represents the municipalities being the lowest level of administrative units, able to cope with WNV and take actions. The average detection probability in hindcast mode was 72%, improving strongly as the number of infected humans increased. Using the developed model, we were also able to show the fundamental importance of the May temperatures in shaping the WNV dynamics. The modeling framework couples epidemiological and environmental dynamical variables with surveillance data producing risk maps downscaled at a local level. The approach can be expanded to provide targeted early warning probabilistic forecasts that can be used to inform public health policy decision making.

Authors: Angelou, A., Kioutsioukis, I., & Stilianakis, N. I.

Source: (2021). *One Health*, *13*, 100330.

Domestic pig prioritized in one health action against fascioliasis in human endemic areas: Experimental assessment of transmission capacity and epidemiological evaluation of reservoir role

The Northern Bolivian Altiplano is the human fascioliasis hyperendemic area where the highest prevalences and intensities in humans have been reported. Preventive chemotherapy was implemented in the last ten years. Surveillance showed high human infection and re-infection rates in between the annual triclabendazole monodose treatments. A complementary One Health control action was launched to decrease the infection risk. Among the multidisciplinary axes, there is the need to establish animal reservoir species priorities for a more efficient control. Laboratory and field studies were performed for the first time to assess the *Fasciola hepatica* transmission capacity of the pig and its potential reservoir role. The experimental follow-up of altiplanic pig isolates through altiplanic *Galba truncatula* snail vector isolates were performed at different miracidial doses and different day/night temperatures. Experiments included egg embryonation, miracidial infectivity, lymnaeid snail infection, intramolluscan larval development, cercarial production, chronobiology of the cercarial shedding, vector survival to infection, metacercarial infectivity of mammal host, and adult stage development. Surveys included the assessment of prevalence, intensity, egg measurements and egg shedding rates in nature. Pig contribution was evaluated by comparing with the main altiplanic reservoirs sheep and cattle. Results demonstrated that the pig assures the whole *F. hepatica* life cycle and participates in its transmission in this area. The fast egg embryonation, high cercarial production, long multi-wave shedding chronobiological pattern in monomiracidial infections at permanent 20 °C temperature, and the high daily egg outputs per pig are worth mentioning. The high infection risk suggests early infection of freely running piglets and evolutionary long-term adaptation of the liver fluke to this omnivorous mammal, despite its previously evoked resistance or non-suitability. Genetic, physiological and immune similarities with humans may also underlie the parasite adaptation to humans in this area. The pig should be accordingly included for appropriate control measures within a One Health action against human fascioliasis. The pig should henceforth be considered in epidemiological studies and control initiatives not only in fascioliasis endemic areas with human infection risk on other Andean countries, but also in rural areas of Latin America, Africa and Asia where domestic pigs are allowed to run freely.

Authors: Mas-Coma, S., Funatsu, I. R., Angles, R., Buchon, P., Mas-Bargues, C., Artigas, P., ... & Bargues, M. D.

Source: (2021). *One Health*, *13*, 100249..

Modelling the introduction and transmission of *Campylobacter* in a North American chicken flock

Campylobacter is the second leading cause of foodborne illness in the United States. Although many food production animals carry *Campylobacter* as commensal bacteria, consumption of poultry is the main source of human infection. Previous research suggests that the biology of *Campylobacter* results in complete flock colonization within days. However, a recent systematic review found that the on-farm prevalence of *Campylobacter* varies widely, with some flocks reporting low prevalence. We hypothesized that the low prevalence of *Campylobacter* in some flocks may be driven by a delayed introduction of the pathogen. The objectives of this study were to (a) develop a deterministic compartmental model that represents the biology of *Campylobacter*, (b) identify the parameter values that best represent the natural history of the pathogen in poultry flocks and (c) examine the possibility that a delayed introduction of the pathogen is sufficient to replicate the observed low prevalence examples documented in the literature. A deterministic compartmental model was developed to examine the dynamics of *Campylobacter* in chicken flocks over a 56-day time period prior to movement to the abattoir. The model outcome of interest was the final population prevalence of *Campylobacter* at day 56. The resulting model that incorporated a high transmission rate ($\beta = 1.04$) was able to reproduce the wide range of prevalence estimates observed in the literature when pathogen introduction time is varied. Overall, we established that the on-farm transmission rate of *Campylobacter* in chickens is likely high and can result in complete colonization of a flock when introduced early. However, delaying the time at which the pathogen enters the flock can reduce the prevalence observed at 56 days. These results highlight the importance of enforcing strict biosecurity measures to prevent or delay the introduction of the bacteria to a flock.

Authors: Plishka, M., Sargeant, J. M., Winder, C., & Greer, A. L.

Source: (2022). *Zoonoses and public health*.

FOOD SAFETY

The Lytic Siphophage vB_StyS-LmqsSP1 Reduces the Number of Salmonella enterica Serovar Typhimurium Isolates on Chicken Skin

Phage-based biocontrol of bacteria is considered a natural approach to combat foodborne pathogens. Salmonella spp. are notifiable and highly prevalent pathogens that cause foodborne diseases worldwide. In this study, six bacteriophages were isolated and further characterized that infect food-derived Salmonella isolates from different meat sources. The siphovirus VB_StyS-LmqsSP1, which was isolated from a cow's nasal swab, was further subjected to in-depth characterization. Phage-host interaction investigations in liquid medium showed that vB_StyS-LmqsSP1 can suppress the growth of Salmonella species isolates at 37°C for 10 h and significantly reduce the bacterial titer at 4°C. A reduction of 1.4 to 3 log units was observed in investigations with two food-derived Salmonella isolates and one reference strain under cooling conditions using multiplicities of infection (MOIs) of 104 and 105. Phage application on chicken skin resulted in a reduction of about 2 log units in the tested Salmonella isolates from the first 3 h throughout a 1-week experiment at cooling temperature and with an MOI of 105. The one-step growth curve analysis using vB_StyS-LmqsSP1 demonstrated a 60-min latent period and a burst size of 50 to 61 PFU/infected cell for all tested hosts. Furthermore, the genome of the phage was determined to be free from genes causing undesired effects. Based on the phenotypic and genotypic properties, LmqsSP1 was assigned as a promising candidate for biocontrol of Salmonella enterica serovar Typhimurium in food.

Authors: Shakeri, G., Hammerl, J. A., Jamshidi, A., Ghazvini, K., Rohde, M., Szabo, I., ... & Kittler, S.

Source: (2021). *Applied and environmental microbiology*, 87(24), e01424-21.

Florfenicol Enhances Colonization of a Salmonella enterica Serovar Enteritidis floR Mutant with Major Alterations to the Intestinal Microbiota and Metabolome in Neonatal Chickens

Florfenicol is an important antibiotic commonly used in poultry production to prevent and treat *Salmonella* infection. However, oral administration of florfenicol may alter the animals' natural microbiota and metabolome, thereby reducing intestinal colonization resistance and increasing susceptibility to *Salmonella* infection. In this study, we determined the effect of florfenicol (30 mg/kg of body weight) on gut colonization of neonatal chickens challenged with *Salmonella* enterica subsp. enterica serovar *Enteritidis*. We then analyzed the microbial community structure and metabolic profiles of cecal contents using microbial 16S amplicon sequencing and liquid chromatography-mass spectrometry (LC-MS) untargeted metabolomics, respectively. We also screened the marker metabolites using a multi-omics technique and assessed the effect of these markers on intestinal colonization by S. Enteritidis. Florfenicol administration significantly increased the loads of S. Enteritidis in cecal contents, spleen, and liver and prolonged the residence of S. Enteritidis. Moreover, florfenicol significantly affected cecal colony structures, with reduced abundances of Lactobacillus and Bacteroidetes and increased levels of Clostridia, Clostridium, and Dorea. The metabolome was greatly influenced by florfenicol administration, and perturbation in metabolic pathways related to linoleic acid metabolism (linoleic acid, conjugated linoleic acid [CLA], 12,13-EpOME, and 12,13-diHOME) was most prominently detected. We screened CLA and 12,13-diHOME as marker metabolites, which were highly associated with Lactobacillus, Clostridium, and Dorea. Supplementation with CLA maintained intestinal integrity, reduced intestinal inflammation, and accelerated Salmonella clearance from the gut and remission of enteropathy, whereas treatment with 12,13-diHOME promoted intestinal inflammation and disrupted intestinal barrier function to sustain Salmonella infection. Thus, these results highlight that florfenicol alters the intestinal microbiota and metabolism of neonatal chickens and promotes Salmonella infection mainly by affecting linoleic acid metabolism.

Authors: Mei, X., Ma, B., Zhai, X., Zhang, A., Lei, C., Zuo, L., ... & Wang, H.

Source: (2021). *Applied and Environmental Microbiology*, 87(24), e01681-21

A review of antimicrobial resistance in imported foods

Antimicrobial resistance is one of the most serious threats to medical science. Food supply is recognized as a potential source of resistant bacteria, leading to the development of surveillance programs targeting primarily poultry, pork, and beef. These programs are limited in scope, not only in the commodities tested, but also in the organisms targeted (*Escherichia coli*, *Salmonella*, and *Campylobacter*); consequently, neither the breadth of food products available nor the organisms that may harbour clinically relevant and (or) mobile resistance genes are identified. Furthermore, there is an inadequate understanding of how international trade in food products

contributes to the global dissemination of resistance. This is despite the recognized role of international travel in disseminating antimicrobial-resistant organisms, notably New Delhi metallo-beta-lactamase. An increasing number of studies describing antimicrobial-resistant organisms in a variety of imported foods are summarized in this review.

Authors: Jung, D., Morrison, B. J., & Rubin, J. E.

Source: (2021). *Canadian Journal of Microbiology*, 99(999), 1-15.

What makes a foodborne virus: comparing coronaviruses with human noroviruses

In order to answer the question whether coronaviruses (CoVs) can be transmitted via foods, this review made a comparison between CoVs with the most recognized foodborne virus, human noroviruses (NoVs). As a result, although CoVs indeed have shown the possibilities to remain infectious on foods and/or food packaging materials long enough (from several days to several weeks) to potentially cause transmission, they seem to be less persistent than NoVs towards common disinfection practices with alcohols, chlorine and ultraviolet (UV). More importantly, the chance of foodborne transmission of CoVs is considered low as CoVs mainly spread through the respiratory tract and there is no clear evidence showing CoVs can follow fecal-oral routes like human NoVs and other foodborne viruses.

Authors: Li, D., Zhao, M. Y., & Tan, T. H. M.

Source: (2021). *Current Opinion in Food Science,* 42, 1-7.

Salmonella illness outbreaks linked to backyard poultry purchasing during the COVID-19 pandemic: United States, 2020

Poultry contact is a risk factor for zoonotic transmission of non-typhoidal *Salmonella* spp. *Salmonella* illness outbreaks in the United States are identified by PulseNet, the national laboratory network for enteric disease surveillance. During 2020, PulseNet observed a 25% decline in the number of *Salmonella* clinical isolates uploaded by state and local health departments. However, 1722 outbreak-associated *Salmonella* illnesses resulting from 12 *Salmonella* serotypes were linked to contact with privately owned poultry, an increase from all previous years. This report highlights the need for continued efforts to prevent backyard poultry-associated outbreaks of *Salmonella* as ownership increases in the United States.

Authors: Nichols, M., Gollarza, L., Palacios, A., Stapleton, G. S., Basler, C., Hoff, C., ... & Tolar, B.
Source: (2021). *Epidemiology & Infection,* 149. E234. doi:10.1017/S0950268821002132

INFECTIOUS AND PARASITIC DISEASES

Potential Use for Serosurveillance of Feral Swine to Map Risk for Anthrax Exposure, Texas, USA

Anthrax is a disease of concern in many mammals, including humans. Management primarily consists of prevention through vaccination and tracking clinical-level observations because environmental isolation is laborious and bacterial distribution across large geographic areas difficult to confirm. Feral swine (*Sus scrofa*) are an invasive species with an extensive range in the southern United States that rarely succumbs to anthrax. We present evidence that feral swine might serve as biosentinels based on comparative seroprevalence in swine from historically defined anthrax-endemic and non-anthrax-endemic regions of Texas. Overall seropositivity was 43.7% (n = 478), and logistic regression revealed county endemicity status, age-class, sex, latitude, and longitude were informative for predicting antibody status. However, of these covariates, only latitude was statistically significant ($\beta = -0.153$, $p = 0.047$). These results suggests anthrax exposure in swine, when paired with continuous location data, could serve as a proxy for bacterial presence in specific areas.

Authors: Maison, R. M., Pierce, C. F., Ragan, I. K., Brown, V. R., Bodenchuk, M. J., Bowen, R. A., & Bosco-Lauth, A. M. (
Source: (2021). *Emerging Infectious Diseases,* 27(12), 3103.

Standing Water and Missing Data: The Murky Relationship between Flooding and Mosquito-Borne Diseases

In their analysis of previous studies, the authors found that flood events were generally associated with increased incidence of mosquito-borne diseases, such as malaria and dengue fever—sometimes after a brief dip in transmission. Yet the specifics varied considerably both by disease and by mosquito species and subspecies, which can differ across geographic locations. The authors note that flooding's effects on the built environment and social infrastructure—such as housing damage and displaced populations—also influence the spread of vector-borne diseases. A nuanced understanding of local conditions may help public health experts and disaster responders reduce disease spread after flooding through better preparedness and targeted interventions, they conclude.

Authors: Seltenrich, N.

Source: (2021). *Environmental Health Perspectives,* 129(12), 124001.

First Evidence of Powassan Virus (Flaviviridae) in *Ixodes Scapularis* in Appalachian Virginia, USA

Here we report the first detection and confirmation of Powassan virus (POWV) (family: Flaviridae) in *Ixodes scapularis* ticks collected from Appalachian Virginia. *Ixodes scapularis* ticks were collected from vegetation across field sites in eight counties of western Virginia from June 2019 to April 2021. From these collections, one nymph and one adult male *I. scapularis* were determined to be positive for POWV using real-time RT-PCR and Sanger sequencing. Both positive ticks were collected from Floyd county, VA, at residential sites; the nymph in June 2020 and the adult male in April 2021. The presence of POWV in Virginia in its natural tick vector is crucial knowledge in beginning to understand the movement and transmission of this pathogen into new geographical areas and the risk it poses to medical and veterinary health.

Authors: Cumbie, A. N., Whitlow, A. M., & Eastwood, G.

Source: (2021). *The American journal of tropical medicine and hygiene*. Ahead of print. https://doi.org/10.4269/ajtmh.21-0825.

Climatic Variability and Human Leptospirosis Cases in Cartagena, Colombia: A 10-Year Ecological Study

Leptospirosis is an acute febrile disease that mainly affects developing countries with tropical climates. The complexity and magnitude of this disease is attributed to socioeconomic, climatic, and environmental conditions. In this study, in a 10-year period from 2008 to 2017, the relationship between human leptospirosis cases and climatic factors in Cartagena de Indias, Colombia were evaluated. Monthly leptospirosis cases, climatic variables, and macroclimatic phenomena (El Niño and La Niña) were obtained from public datasets. Local climatic factors included temperature (maximum, average, and minimum), relative humidity, precipitation, and the number of precipitation days. Time series graphs were drawn and correlations between cases of leptospirosis and climatic variables considering lags from 0 to 10 months were examined. A total of 360 cases of leptospirosis were reported in Cartagena during the study period, of which 192 (53.3%) were systematically notified between October and December. Several correlations were detected between the number of cases, local climatic variables, and macroclimatic phenomena. Mainly, the increase of cases correlated with increased precipitation and humidity during the La Niña periods. Herein, seasonal patterns and correlations suggest that the climate in Cartagena could favor the incidence of leptospirosis. Our findings suggest that prevention and control of human leptospirosis in Cartagena should be promoted and strengthened, especially in the last quarter of the year.

Authors: Cano-Pérez, E., Loyola, S., Espitia-Almeida, F., Torres-Pacheco, J., Malambo-García, D., & Gómez-Camargo, D.

Source: (2021). *The American journal of tropical medicine and hygiene*. Ahead of print. https://doi.org/10.4269/ajtmh.21-0890.

Susceptibility of turkeys, chickens and chicken embryos to SARS-CoV-2

The susceptibility of turkeys, chickens and chicken embryos to SARS-CoV-2 was evaluated by experimental infection. Turkeys and chickens were inoculated using a combination of intranasal, oral and ocular routes. Both turkeys and chickens did not develop clinical disease or seroconvert following inoculation. Viral RNA was not detected in oral swabs, cloacal swabs or in tissues using quantitative real-time RT-PCR. In addition, chicken embryos were inoculated by various routes including the yolk sac, intravenous, chorioallantoic membrane and allantoic cavity. In all instances, chicken embryos failed to support replication of the virus. SARS-CoV-2 does not affect turkeys or chickens in the current genetic state and does not pose any potential risk to establish an infection in both species of domestic poultry.

Authors: Berhane, Y., Suderman, M., Babiuk, S., & Pickering, B.

Source: (2021).
Zoonoses Public Health; 68: 684 – 690. https://doi.org/10.1111/zph.12836

PUBLIC HEALTH TOPICS

Interplay between Bacterial Clones and Plasmids in the Spread of Antibiotic Resistance Genes in the Gut: Lessons from a Temporal Study in Veal Calves

Intestinal carriage of extended spectrum β-lactamase (ESBL)-producing Escherichia coli is a frequent, increasing, and worrying phenomenon, but little is known about the molecular scenario and the evolutionary forces at play. We screened 45 veal calves, known to have high prevalence of carriage, for ESBL-producing E. coli on 514 rectal swabs (one randomly selected colony per sample) collected over 6 months. We characterized the bacterial clones and plasmids carrying blaESBL genes with a combination of genotyping methods, whole genome sequencing, and conjugation assays. One hundred and seventy-three ESBL-producing E. coli isolates [blaCTX-M-1 (64.7%), blaCTX-M-14 (33.5%), or blaCTX-M-15 (1.8%)] were detected, belonging to 32 bacterial clones, mostly of phylogroup A. Calves were colonized successively by different clones with a trend in decreasing carriage. The persistence of a clone in a farm was significantly associated with the number of calves colonized. Despite a high diversity of E. coli clones and blaCTX-M-carrying plasmids, few blaCTX-M gene/plasmid/chromosomal background combinations dominated, due to (i) efficient colonization of bacterial clones and/or (ii) successful plasmid spread in various bacterial clones. The scenario “clone versus plasmid spread” depended on the farm. Thus, epistatic interactions between resistance genes, plasmids, and bacterial clones contribute to optimize fitness in specific environments.

Authors: Massot, M., Châtre, P., Condamine, B., Métayer, V., Clermont, O., Madec, J. Y., ... & Haenni, M.

Source: (2021). *Applied and Environmental Microbiology*, 87(24), e01358-21.

Closing lower secondary schools had no impact on COVID-19 incidence in 13–15-year-olds in Finland

School lockdowns have been widely used to control the COVID-19 pandemic. However, these lockdowns may have a significant negative impact on the lives of young people. In this study, we have evaluated the impact of closing lower secondary schools for COVID-19 incidence in 13–15-year-olds in Finland, in a situation where restrictions and recommendation of social distancing were implemented uniformly in the entire country. COVID-19 case numbers were obtained from the National Infectious Disease Registry (NIDR) of the Finnish Institute for Health and Welfare, in which clinical microbiology laboratories report all positive SARS-CoV-2 tests with unique identifiers in a timely manner. The NIDR is linked to population data registry, enabling calculation of incidences. We estimated the differences in trends between areas with both restaurant and lower secondary school closures and areas with only restaurant closures in different age groups by using joinpoint regression. We also estimated the differences in trends between age groups. Based on our analysis, closing lower secondary schools had no impact on COVID-19 incidence among 13–15-year-olds. No significant changes on COVID-19 incidence were observed in other age groups either.

Authors: Juutinen, A., Sarvikivi, E., Laukkanen-Nevala, P., & Helve, O.

Source: (2021). *Epidemiology and Infection, 149*, E233. doi:10.1017/S0950268821002351

Streptococcus bovis-bacteremia: subspecies distribution and association with colorectal cancer: a retrospective cohort study

This study aimed to describe the incidence of *Streptococcus bovis/Streptococcus equinus* complex (SBSEC) bacteremia, distribution of the SBSEC subspecies, and their respective association with colorectal cancer (CRC). A population-based retrospective cohort study of all episodes of SBSEC-bacteremia from 2003 to 2018 in Skåne Region, Sweden. Subspecies was determined by whole-genome sequencing. Medical charts were reviewed. The association between subspecies and CRC were analysed using logistic regression. In total 266 episodes of SBSEC-bacteremia were identified and the average annual incidence was 2.0 per 100 000 inhabitants. Of the 236 isolates available for typing, the most common subspecies was *S. gallolyticus* subsp. *pasteurianus* 88/236 (37%) followed by *S. gallolyticus* subsp. *gallolyticus* 58/236 (25%). In order to determine the risk of cancer following bacteremia, an incidence cohort of 174 episodes without a prior diagnosis of CRC or metastasised cancer was followed for 560 person-years. CRC was found in 13/174 (7%), of which 9 (69%) had *S. gallolyticus* subsp. *gallolyticus*-bacteremia. In contrast to other European studies, *S. gallolyticus* subsp. *pasteurianus* was the most common cause of SBSEC-bacteremia. CRC diagnosis after bacteremia was strongly associated with *S. gallolyticus* subsp. *gallolyticus*-bacteremia. Identification of SBSEC subspecies can guide clinical decision-making regarding CRC work-up following bacteremia.

Authors: Öberg, J., Rasmussen, M., Buchwald, P., Nilson, B., & Inghammar, M.

Source: (2022). *Epidemiology and Infection, 150*, E8. doi:10.1017/S0950268821002533

Bovine leukemia viral DNA found on human breast tissue is genetically related to the cattle virus

Bovine leukemia virus (BLV) infection is widespread in cattle and associated with B cell lymphoma. In a previous study we demonstrated that bovine leukemia viral DNA was detected in human breast tissues and significantly associated with breast cancer. Our current study aimed to determine whether BLV DNA found in humans and cattle at the same geographical region were genetically related. DNA was extracted from the breast tissue of healthy (n = 32) or cancerous women patients (n = 27) and from the blood (n = 30) of cattle naturally infected with BLV, followed by PCR-amplification and partial nucleotide sequencing of the BLV *env* gene. We found that the nucleotide sequence identity between BLV *env* gene fragments obtained from human breast tissue and cattle blood ranged from 97.8 to 99.7% and grouped into genotype 1. Thus, our results further support the hypothesis that this virus might cause a zoonotic infection.

Authors: Canova, R., Weber, M. N., Budaszewski, R. F., da Silva, M. S., Schwingel, D., Canal, C. W., & Kreutz, L. C.

Source: (2021). *One Health*, *13*, 100252.

Association between pet ownership and physical activity and mental health during the COVID-19 “circuit breaker” in Singapore

Introduction
The negative impact of the coronavirus disease 2019 (COVID-19) pandemic on mental health and physical activity is well reported. While prior studies showed a positive influence of pet ownership on physical activity and mental health, the interactions between the pandemic and pet ownership are not well studied.

Objective
To determine the association between pet ownership, physical activity levels and mental health during the COVID-19 pandemic.
Materials and methods
A cross-sectional study was conducted from May 19 to July 13, 2020 among Singapore residents aged 21 to 64 years through a previously published questionnaire. Inverse probability treatment weighting was used to develop mixed-effects models for outcome comparisons. We recorded participant data on pet ownership, duration and intensity of physical activity, and RAND 36-item Health Survey mental health domains during the COVID-19 pandemic.

Results
The questionnaire was completed by 431 pet owners and 103 non-pet owners. A greater proportion of pet owners were female, non-married, employed and owned pets in the past. Pet owners reported 31.8 (95% CI 13.6 to

50; $p = .001$) more minutes per week of mild-intensity physical activity compared to non-pet owners. No statistically significant differences were found for moderate- and vigorous-intensity physical activity. Pet owners had better emotional well-being ($\beta = 9.66$, 95% CI 4.97 to 14.4; $p < .001$), energy ($\beta = 8.29$, 95% CI 3.46 to 13.1; $p = .001$) and social functioning ($\beta = 11.2$, 95% CI 5.03 to 17.4; $p < .001$) scores than non-pet owners. However, no statistically significant difference was observed for general health scores. Pet owner physical activity levels, general health, emotional well-being and energy scores correlated positively with pet attachment scores.

Conclusion
Pet ownership was associated with greater physical activity levels and better mental health, particularly in main caregivers with higher pet attachment scores. These findings suggest that pet ownership is beneficial to physical and mental well-being during periods of social isolation amidst a global pandemic.

Authors: Tan, J. S. Q., Fung, W., Tan, B. S. W., Low, J. Y., Syn, N. L., Goh, Y. X., & Pang, J.

Source: (2021). *One Health*, *13*, 100343.