

STEC CAP News

CONTROLLING SHIGA TOXIN-PRODUCING *E. coli* TO IMPROVE BEEF SAFETY

Director's Update

Greetings from the EMT. There are several upcoming events we all need to be aware of. The 2015 Annual STEC conference is June 3-5 in Manhattan Kansas. All STEC collaborators are expected to attend. The registration site is open on our website at <http://www.stecbeefsafety.org>. Feel free to contact Jill Hochstein (jhochstein2@unl.edu; 402-472-8564), our Project Manager, with questions or for more details. Poster abstracts are due Thursday May 7, 2015 by 5:00PM CT, so if you haven't submitted your abstract please do so as soon as possible.

The proceedings from last year's 2014 Governor's Conference and STEC Annual Conference is available on-line at http://www.stecbeefsafety.org/documents/STEC_CAP2014%20booklet_HR.compressed.pdf. Video web links to each of the presentations are also included in the document.

The Annual Meeting of the International Association for Food Protection (IAFP) will be held in Portland, Oregon on July 25-28 (<https://www.foodprotection.org/annualmeeting/>). As we have done in past years, we will have a STEC CAP breakfast there. Stand by for details.

The Verocytotoxin-producing *Escherichia*



Daniel Gallagher

coli conference VTEC 2015 (vtec2015.org) is September 13-16 in Boston, Massachusetts. The triennial conference was last held in Amsterdam in 2009. This conference

is relevant to many of the STEC CAP collaborators, and hopefully you will consider submitting abstracts. The submission deadline is May 15, 2015. Our own Rod Moxley will help head one of three pre-congress symposia on Sunday September 13th: "Food Safety from Farm to Field to Plate".

Congratulations are in order to several of our students and colleagues. Amanda Wilder, a master's student in Food Science at Kansas State was awarded a 2015 United Dairymen of Idaho Scholarship. She is a native of Meridan, Idaho and is evaluating antimicrobial interventions during processing under the direction of Dr. Phebus. Samson Zhilyeav, a master's student in Civil and Environmental Engineering at Virginia Tech was awarded a Charles E. Via Fellowship. Samson is developing the risk assessment for

...continued page 3

Transmission dynamics of STEC in cattle populations: modeling update

Our goal is to use the data collected under Objective 2 to estimate some basic transmissibility metrics that would help us to better understand how the different non-O157 STEC behave in feedlots. Most of our understanding of STEC ecology in cattle is limited to one STEC, O157. It is unclear whether the other STEC have similar dynamics in the cattle reservoir. Although STEC may share common transmission pathways and habitats, even small differences in the ability to thrive and survive in different cattle and environment habitats may result in differences in their transmissibility and persistence in feedlots. One important transmission metric is the so-called basic reproduction number. The basic reproduction number is defined as the expected number of secondary infections produced by a single typical infectious individual in a completely

...continued page 4



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Inside this issue

Director's Update 1
Transmission of Dynamics..... 1
Little Apple, Big Welcome!..... 2
STEC CAP Points on the Board Reporting.. 4
REGISTRATION IS OPEN! 6



Little Apple, Big Welcome!

While visiting Manhattan, KS for the STEC CAP Annual Conference, we wanted to highlight a few of the places and amenities that you will enjoy while in town for the conference. The first is the Hilton Garden Inn & Manhattan Conference Center where the conference will be held June 3-5th. Lodging rooms contain complimentary Internet access with remote printing to the business center, large work desks, refrigerators, microwaves and coffee-makers. The hotel has a full service Grille & Bar serving breakfast and dinner daily. It also includes an indoor pool and whirlpool.

Our Objective Team meetings on Wednesday afternoon will be held at the Biosecurity Research Institute (BRI). BRI is located on the Kansas State University campus. It was designed and constructed to meet or exceed biosafety level 3 (BSL-3) and biosafety level 3 Agriculture (BSL-3Ag) standards. This facility provides K-State scientists and their collaborators with a safe and secure location to study high-consequence pathogens affecting plants, animals, and food products.

Be sure to attend the opening Welcome Reception at the Flint Hills Discovery Center which is within walking distance of the hotel. The Flint Hills Discovery Center is a tribute to the last 4% of tallgrass prairie in North America. The 35,000 square foot facility includes interactive exhibits highlighting the science, history, and culture of the ecoregion from pre-history to present day. In addition to the Discovery Center, other attractions to visit may include the Kansas State Insect Zoo, Sunset Zoo, and the Kansas State Gardens. Manhattan is home to Kansas State University. The Univer-

sity has a reputation for stellar bioscience and food safety research. It is home to the National Bio and Agro-defense Facility. Kansas State University is on track to be one of the top 50 public research Universities in the nation by 2025.

And don't forget the shopping and the great restaurants of Manhattan! Aggieville, the oldest shopping district in Kansas, is located next to K-State, at the intersection of Manhattan and Bluemont Avenues. If hunger strikes, there are a multitude of restaurants including Harry's Downtown, della Voce, and The Chef, which boasts the best breakfast in Manhattan.



Some fun facts about the Little Apple:

- The state's second largest body of water, Tuttle Creek Lake is located five miles north of Manhattan with the dam and reservoir situated on the northern edge of the Flint Hills. The lake area offers 12,000 acres of water with 100 miles of irregular, wooded shoreline.
- Guns & Gear magazine named Tuttle Creek and Milford Lake one of the top five hot spots in the nation to hunt whitetail deer.
- Men's Journal magazine, Manhattan was named one of "The 50 Best Places to Live."
- The last full weekend in June, Manhattan hosts the Kicker Country Stampede. Country music's hottest stars arrive in Manhattan to entertain fans from across the United States for this four-day weekend of country music and camping. Attendance exceeds 150,000 over the four-day event. The American Bus Association named Country Stampede one of the Top 100 Events in North America.

- The Konza Prairie Biological Station is an 8,600-acre tallgrass prairie preserve owned by The Nature Conservancy and Kansas State University. This research park offers three different hiking trails for you to enjoy the Flint Hills.
- Eight miles west of Manhattan on K-18 is the Home of the Big Red One, Fort Riley. Founded in 1852, Fort Riley Army Post was originally established to protect settlers on

the Oregon and Santa Fe Trails. Fort Riley is home to brigades of the 1st Infantry Division (Mechanized), the 1st Armored Division and the 937th Engineer Groups (Combat). The reservation covers more than 101,000 acres, spanning both Riley and Geary counties.

For more information, check out the Manhattan Visitors Guide. And don't forget to register at the STEC CAP Website!



...Directors Update ...continued from page 1

to the risk assessment. This is one of the main deliverables of the project. Bring your data to the June meeting in Manhattan, KS where we will discuss our collaborators' accomplishments to date and how to plan for completing the research goals for the project.

The EMT is actively working on a no-cost time extension for a sixth year of the project. Following USDA guidelines, we'll submit the request in mid-2016. We're well aware of the uncertainty the extension poses for planning, both in student recruitment and research expenditures. This will be one of the topics that we can discuss at the annual meeting.

As always, the successful completion of the project depends on everyone's efforts. While you are enjoying the spring weather, please remember that we are in the final stages of data collection, data integration, and educational outreach for this collaborative effort. As we move toward completion, be thinking what we have learned and can transfer to USDA, industry, and consumer, about assessing and mitigating STEC in beef that will serve as major accomplishments for the \$25 million project.

- Daniel Gallagher

STEC CAP Points on the Board (POB) Reporting

The Executive Management Team and OEIE, in collaboration with Piestar, are excited to announce the launching of the STEC CAP POB Reporting Hub! This is a new web-based data collection reporting system for the documentation of your Points on the Board (POBs). For the remainder of the STEC CAP project, all collaborators are asked to use this system to report achievements related to progress, successes, and impacts of the project. As a collaborator, you will need to create an account with the STEC CAP Reporting Hub. We ask that you do this immediately by clicking (or copying and pasting) the link below:

<https://steccap.piestar.com/login/rmoxley1@unl.edu>

When you follow the link above for your first visit, you will be prompted to set your password. You may then login to <https://steccap.piestar.com> at any time using your email address and the password you created.

By June 12, 2015, STEC CAP project collaborators will need to complete all modules. Points on the Board submitted through the system will be included in the next Supplemental Report to the STEC CAP program officer at USDA. Points on the Board that are not reported may lead to the outputs and outcomes of the project being under-represented in reports to the project's funder.

The STEC CAP POB Reporting Hub is designed to be a smoother and more efficient experience for reporting your achievements. Beneath the signature line, we've provided some basic information about the Piestar system and our transition from the old survey to the Piestar system.

If you have questions about the new STEC CAP POB Reporting Hub, please use the "Help" option located under your user name in the menu bar or in the site footer for questions about data entry or to provide feedback about the system. As always, you can also contact OEIE directly at steccap@ksu.edu with questions.

...Transmission dynamics of STEC in cattle populations: modeling update ...continued from page 1

susceptible population. It captures in a single metric the underlying factors influencing transmission and has a threshold value. If the basic reproduction number is greater than one, the number of infections will usually grow in the population because one infected individual leads to more than one secondary infection, and the pathogen may persist well in the population. The basic reproduction number is also used to determine the strength of the intervention measures necessary to control a pathogen.

To estimate the basic reproduction number and other metrics, we developed a mathematical model that captures the transmission of STEC among cattle. In order to fit the model to the type of collected data (i.e., cross-sectional data), we need to make some simplifying assumptions about how STEC is transmitted between animals. Our model assumes that the transmission

and infection processes for the different STEC strains are independent and unrelated, and that for a given STEC, animals can be in two categories. Animals are classified as susceptible if they do not shed a given STEC or infectious if they shed the STEC. Once infectious animals stop shedding, it is assumed that they return to the same susceptible class. We have analyzed and fitted the data from Objective 2 collected during the summer of 2013 to the model, and we are currently analyzing the 2014 summer data.

The model was fitted to three types of prevalence data based on the diagnostic method used to define STEC; prevalence based on 1) serogroup identification, 2) serogroup identification and the presence of at least one Shiga toxin-encoding gene, and 3) serogroup identification, the presence of at least one Shiga toxin-encoding gene, and the attaching and effacing

intimin-encoding gene (eae). Our preliminary results based on fitting the 2013 data indicate that for the subset of strains with Shiga toxin and/or eae genes, the basic reproduction number for all the non-O157 were below 1. When we use the serogroup data, three non-O157 had basic reproduction numbers greater than one, O26, O45 and O103. The basic reproduction number for O157 was closed to 2. Overall, non-O157 strains seem less transmissible than O157 in the cattle population.

In the coming months, we plan to finish analyzing all the datasets available. In addition, we continue working in identifying the best approaches to maximize the use of the available data to model transmission.

- Cristina Lanzas,
North Carolina State University

Check us out on the Web! Visit us at: www.stecheefsafety.org
 Subscribe to the listserv. Send an email to: listserv@unl.edu In the message field: [subscribe stecheefsafety](mailto:subscribe_stecheefsafety)

Registration is now open for the 2015 STEC CAP Conference to be held June 3-5, 2015 in Manhattan, KS. Hosted by Kansas State University, this year's conference is open to all STEC CAP collaborators. To register, click [here](#), and to find more information hotels, flights, and agenda, click [here](#).

This project was supported by Agriculture and Food Research Initiative Grant No. 2012-68003-30155 from the USDA National Institute of Food and Agriculture, Prevention, Detection and Control of Shiga Toxin Producing *Escherichia coli* (STEC) from Pre-Harvest Through Consumption of Beef Products Program -A4101.