

**CDC/USDA/CSTE Project Development Grant Application
Influenza Education among Youth in Agriculture**

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Maine Center for Disease Control and Prevention

Description of public/animal health problem in Maine

Maine is a large, rural state with a population of only 1.3 million. Maine's animal farming industry includes: poultry and game-birds (pheasants, chickens, turkeys, emus), camelids, cattle, swine, sheep, goats, rabbits, and farmed fish. Privately-run agricultural fairs are a huge draw in the state with fairs all summer through early fall. These fairs are exceptionally well attended and attract individuals from both in and out of state.

In the fall of 2011, Maine diagnosed our first case of influenza A/H3N2v in a child who likely acquired the illness from attending a fair. This was closely followed by a second confirmed case in a child who participated in a pig scramble at a fair and helped raise pigs. This sentinel event required a One Health approach to manage as it involved humans and animals. Maine Center for Disease Control (Maine CDC) coordinated with the Maine Department of Agriculture, Conservation, and Forestry (Maine DACF) to follow up with every farmer who showed pigs at the fair, including testing both symptomatic humans and pigs. This event triggered educational efforts and recommendations for both individuals who show animals at fairs, and fair attendees. These efforts continue annually, but with less distribution and impact than may be desired.

This sentinel event demonstrated the transmission of influenza between human and animal hosts. We are aware that this transmission can occur again and are working to reduce the risk to both humans and animals through better education, but limited funding for staff and outreach materials has hampered widespread, consistent efforts.

Maine also has high rates of enteric disease that can be linked to animal exposure. Unlike the national trend for exposure to cryptosporidiosis at water parks, Maine's cryptosporidiosis cases typically have direct contact with animals (sick and healthy). Since 2013, 79% of cryptosporidiosis cases had contact with animals; 36% with cattle, 21% with goats, and 16% with pigs. The majority (83%) of Maine's cases with Maine exposures that were speciated were *Cryptosporidium parvum* – the species linked to animal transmission. During the summers of 2006 and 2008, a summer farm camp had outbreaks of cryptosporidiosis. The children at the camp worked directly with the animals and Maine CDC identified problems with hand washing and other best practices in basic disease prevention.

In 2016, Maine had five cases of salmonellosis associated with a national cluster due to exposure to baby poultry despite an educational campaign sent to feed stores. In 2015, Maine had two cases of Hemolytic Uremic Syndrome (HUS) anecdotally associated with animal exposure at a fair.

Resources

Personnel

Maine CDC's infectious disease program consists of five sections; including field epidemiology and surveillance epidemiology. These two sections include two program managers, six surveillance epidemiologists, seven field epidemiologists, two administrative staff, and four part time health educators. Within the surveillance epidemiologists sector, Maine maintains an influenza surveillance coordinator (Sara Robinson) and an enteric disease coordinator (Stephen Combes) who can be engaged in this project. Maine CDC also has an extensive history of intern participation, and routinely has one to three interns available to assist with special projects. Maine's part time health educators are part of the Public Health Education Corps (PHC), a contract with University of Southern Maine to provide health education services to Maine CDC via graduate students. Through this program Maine CDC always has at least three individuals that are tasked to work for Maine CDC and work either collaboratively or individually on projects.

Maine DACF's Division of Animal Health consists of a state veterinarian (Michele Walsh), two assistant state veterinarians (Justin Bergeron and Rachel Fiske), a livestock specialist and poultry health/animal disease traceability technician who also act as liaisons to the State's youth agricultural groups and the Northeast Livestock Expo (NELE) (Cindy Kilgore & Donna Flint) and an administrative assistant. All of the veterinarians and the livestock specialist engage extensively with Maine's 26 agricultural fair directors and livestock superintendents.

Infrastructure

Maine CDC's infectious disease epidemiology program has a strong infrastructure that will lend itself well to this project. We have trained epidemiologists and administrative staff who routinely conduct educational events and are very capable of managing the logistics of both mass mailings and in-person educational events. Maine CDC's PHC is a unique system that allows Maine CDC to continually have health education staff while providing on-the-job experience for MPH students. These students are trained in health education and literacy and bring a fresh, youthful perspective to our program. Maine used a format developed by the PHC as a model for the project during the first year of this project. We designed an approximately 20 minute PowerPoint presentation reviewing the different types of disease and the animals they could be associated with while providing fun facts. Then we utilized hands on activities to engage the youth and help reinforce the information presented previously. Activities included a card game similar to Uno (GERM-O), a handwashing station, and a build-a-pathogen station. Maine CDC has worked hard to establish a standard recognized appearance or branding for all of our materials to make sure they are

consistent and easily recognizable as a Maine product. We have relationships with graphic designers and have extensive experience adapting or developing materials to make them specific to the needs of our state.

Maine DACF also has an established infrastructure for networking within the agricultural community that will enhance Maine's success in this project. Maine is a predominantly rural state and Maine state veterinarians and livestock specialist have cultivated supportive relationships with the state's producers to facilitate information exchange regarding animal health and related matters for years. As a result, Maine DACF staff are well known and respected within this community. Every January, Animal Health staff meets with Maine's Agricultural Fair Directors and Livestock Superintendents to discuss issues of concern, including transmissible diseases, and how to avoid them. Educational materials addressing hand-washing and other biosecurity protocols/best management practices are disseminated at this time for distribution on fairgrounds in the upcoming fair season. Animal Health staff verifies the appropriate use of the materials during fair visits, and perform visual inspection to ensure that all animals on the grounds are apparently healthy.

Maine DACF also has an existing relationship with youth agricultural and 4H groups in the state and NELE that will facilitate collaboration. The state's livestock specialist (Cindy Kilgore) currently acts as the Pork Quality Assurance and Beef Quality Assurance education director for these groups, and is frequently asked to give presentations on animal husbandry practices to individual youth agricultural and 4H clubs throughout the state at various times of the year. Along with the Poultry Health and Animal Disease Traceability Technician, Donna Flint, she provides animal ID application and animal handling instruction to 4Hers upon request. State veterinarians are also well known to 4H administrators, as they consult with them and 4H club members and parents regularly regarding state animal health protocols that affect 4Hers activities (e.g. importation procedures and animal health testing requirements for show livestock). Along with this, Cindy is a key member in the coordination of NELE Kids Day.

NELE is a non-profit 501c organization that hosts an annual three day livestock exhibition. Every year the Friday of the event is designated as NELE Kids Day. On Kids Day, the students, chaperones and teachers participate in self-guided tours among multiple agricultural stations on the Windsor fairgrounds. The event gives children the opportunity to see and learn about a variety of livestock and agricultural commodities, often with hands-on interaction. In 2016, over 1600 school children in grades K-6 participated and the advanced registration numbers for 2017 are currently over 2300 students.

Collaborations

Maine demonstrates a strong ability to collaborate both within the state and with our federal partners. Within the state, Maine has several workgroups that bring together partners from all facets of the state. Relevant workgroups include: Epi-Lab, Food Safety, Infectious Disease, Influenza, Rabies, and Vectorborne Disease. Each of these workgroups has a diverse and active membership and fosters collaboration between state and non-state entities.

Sara Robinson chairs the influenza workgroup which has representatives from Maine CDC, Maine DACF, Public Health Emergency Preparedness, Maine Immunization Program, Maine's Health and Environmental Testing Laboratory (HETL), Department of Education (DOE), Poison Control, and Emergency Management. The influenza workgroup meets quarterly and is available to assist with this project through coordination, development of materials, and education opportunities.

Stephen Combes chairs the Food Safety workgroup which focuses on food, water and animal exposures leading to enteric diseases. Representatives from Maine CDC (including HETL), Maine DACF, University of Maine Cooperative Extension, Maine Department of Marine Resources, Maine DOE, and FDA regularly attend and participate in meetings and activities. The food safety workgroup is aware of this opportunity and available to assist through coordination, development of materials, and education opportunities.

Maine's vectorborne disease workgroup (VBWG), chaired by Sara Robinson, provides an excellent example of collaboration between state (Maine CDC (including HETL), Maine DACF, Maine Department of Conservation, Maine DOE, University of Maine Cooperative Extension, federal (USDA), and local partners (research facilities, pesticide companies, organic farmers associations, physicians). Maine is continuously working on improving education about Lyme disease and other tickborne diseases and as a group the VBWG created a tick Identification poster and card, developed a narrative PowerPoint presentation for fifth graders, and creates standardized tick presentations. The VBWG is involved in the development and distribution of these materials, and most group members do active education both back at their respective employer and for the general public.

Maine CDC collaborated with Maine DACF in 2011 and 2015 to develop a biosecurity/fair hygiene outreach campaign featuring posters which target agricultural fair attendees. The series of posters feature a llama, sheep, cow and horse along with the message "wash your hands" and a hand-washing symbol. These and similar posters are available for order on Maine CDC's website and are currently disseminated to fairs annually. The posters are distributed to agricultural fair staff every year along with information regarding the diseases and practices of concern (e.g. influenza and excessive pig-to-people contact in fair enclosures)

which may affect health of fair attendees for the upcoming season. Many attendees of these organizational meetings are also 4H leaders and educators, so Maine DACF staff has a historical educational role and relationship with this group. New funding would allow this collaboration to continue and tailor new outreach materials to specifics of zoonotic disease, such as influenza.

Maine has also collaborated extensively with federal CDC on influenza related projects. Maine CDC and federal CDC conducted a joint vaccine effectiveness study on H1N1 and school located vaccine clinics in 2009 and 2010. Maine collaborated with federal CDC on an outbreak of influenza in a prison and helped coordinate vaccine clinics and provide education. Maine completed a special project with federal CDC and the Association of Public Health Laboratories to look at alternative influenza data and how that might be incorporated into routine influenza surveillance. Maine also collaborated on the Influenza Education among Youth in Agriculture project with federal CDC and CSTE during 2015.

Perhaps the most relevant collaboration was in the fall of 2011 when Maine CDC, Maine DACF, federal CDC, and the USDA collaborated on Maine's two confirmed H3N2v cases. Both of these cases were fair associated, so Maine DACF worked closely with the fair itself to identify individuals who showed swine at the fair, participated in pig scrambles, or who may have worked in the swine barn. USDA veterinarians then visited each farm associated with the fair and sampled any ill swine. Maine CDC in collaboration with federal CDC worked hard to inform the public of the risk, provide education at fairs, and to test symptomatic contacts (both human and animal) that were identified through site visits.

This work has continued each fair season with Maine DACF providing recommendations for exclusion of febrile swine from fairs, and signage on the fair grounds to remind ill individuals to stay away from the animal barns to reduce cross species infections.

Maine CDC collaborates with federal CDC on enhanced cryptosporidiosis surveillance by participating in CryptoNet. All positive *Cryptosporidium* specimens tested at HETL are sent to federal CDC for speciation and molecular characterization. Based on previous few years testing, the only *Cryptosporidium hominis* cases in Maine residents are those with recreational water exposure in other states or countries. *Cryptosporidium parvum*, which is usually associated with animals, is seen among persons with Maine exposures, often related to animals. The information from this testing, allows Maine CDC to develop targeted education to promote hand- washing and safe practices when around animals.

Methods

Maine has a history of successful educational material campaigns as well as direct interventions with youth. We intend to build upon our existing experience and enhance our influenza and enteric disease messaging and educational campaigns. In order to do this, we propose a two-pronged approach. The first prong is to enhance our ongoing efforts raise the level of awareness of zoonotic diseases. To achieve this, our first objective is to distribute educational materials geared towards animal and human health at fairs. This includes posters that could be placed at animal barns, as well as smaller cards that could either be mailed or distributed to participants. These cards would remind people about good hygiene and etiquette and what symptoms to watch for.

Objective 1: Distribute educational materials

- Timeline: Summer 2017
- Primary Responsibility: All
 - Institute use of influenza postcards, and One Health fair posters during the 2017 fair season

Our second prong is to improve relationships with youth agricultural groups, provide One Health training to leaders, and measure the success of our efforts through the objectives 2-5. This will be accomplished through a one day workshop, held in conjunction with an existing agricultural fair conference. The majority of youth leaders will already be attending the conference, and we propose to sponsor their attendance for one additional day in order to train them on our materials and provide opportunity for collaborations and questions. We know other states already have a similar approach and ideally we would like to send two representatives to a similar event in another state in order to take advantage of the work the other state has already done and improve collaboration between states.

Objective 2: Improved Interstate collaboration – site visit to another state to participate in a similar workshop/conference

- Timeline: Summer 2017
- Primary Responsibility: Influenza Surveillance Coordinator, Intern (Sara, TBD)
 - Reach out to state with a similar project
 - Determine feasibility of attending event
 - Schedule time with sponsoring state to learn best practices
 - Participate in event
 - Utilize lessons learned to plan Maine's event

Maine proposes to have a One Health session at the Kid's Day in which we will have the kids complete a questionnaire to help determine their knowledge of Zoonotic Diseases, Biosecurity, and careers in animal and human health. This event is attended by students from throughout Maine, many of whom participate in 4H and will allow us to evaluate the knowledge of the group as a whole. This baseline would then be compared to a similar exercise conducted during the 2018 NELE Kids Day. Many of the same individuals participate year after year and this allows us to evaluate the entire state at once rather than evaluating individual groups. This should allow Maine to evaluate the effectiveness of educational efforts targeted at 4H leaders during the Fall and winter of 2017.

Objective 3: Gauge baseline knowledge – NELE

- Timeline: May 2017
- Primary Responsibility: DACF (Justin)
 - o Hold a session on Kids Day and have the youth complete a questionnaire
 - o Summarize NELE questionnaire and tailor train the trainer materials to areas that need the greatest improvement

Objective 4: Train the Trainer workshop

- Timeline: January 2018
- Primary Responsibility: All
 - o Update materials developed in 2015
 - o Develop educational presentations on related topics
 - o Have hands on experiences that leaders can do with their groups
 - o Provide take home packages so leaders can train their own groups

Objective 5: Evaluate improvement in knowledge – NELE

- Timeline: May 2018
- Primary Responsibility: DACF (Justin)
 - o Hold a session on Kids Day and have youth complete a questionnaire
 - o Summarize differences between NELE 2017 and NELE 2018 questionnaires

Objective 6: Participate in Grantee Meeting

- Timeline: 2017 (Date and time TBD)
- Primary Responsibility: Influenza Surveillance Coordinator, DACF

Through these activities, Maine hopes to demonstrate a significant increase in knowledge about the human and animal health interface, as well increase awareness and knowledge of public and animal health and the role we all play in disease prevention.

Support provided by this grant will enhance, improve and increase current state efforts to prevent zoonotic disease agents with possible links to Maine agriculture and to identify and monitor possible reservoirs and vectors for emerging disease. Once the program is established Maine hopes to be able to continue the outreach through routine work of both Maine CDC and DACF, even if funding is no longer available. The intent of training youth agricultural group leaders is to make the program sustainable over time with very little maintenance required.

This project will allow Maine partners to:

- Improve participant awareness and knowledge of zoonotic diseases in general, influenza in particular
- Emphasize prevention methods for potential zoonotic diseases
- Motivate fair/show participants to adopt animal health monitoring and biosecurity practices to prevent zoonotic disease transmission
- Increase participant awareness and knowledge of One Health principles and the roles of human and animal public health agencies in healthy fair practices
- Increase participant understanding of the connections between animal and human public health, particularly in public venues
- Solidify relationships among stakeholders to facilitate more effective/efficient response to zoonotic disease outbreaks or epidemics.

Estimated number of participants engaged by proposal:

- Over 800,000 people attend Maine's agricultural fairs and would be exposed to the educational materials
- An estimated 2,500 youth participate in youth agricultural activities
- An estimate 30 youth agricultural group leaders would be trained during the workshop

IRB – not applicable

A close-up photograph of two brown calves in a wooden stall. The calves are looking towards the camera, with their heads resting on the wooden bars. The lighting is warm and natural, highlighting the texture of their fur and the wood of the stall.

Share your love, not your germs.
If you are ill, please
visit another time.



Share your love, not your germs.
If you are ill, please
visit another time.



Maine Center for Disease
Control and Prevention

An Office of the
Department of Health and Human Services

Paul R. LePage, Governor

Mary C. Mayhew, Commissioner

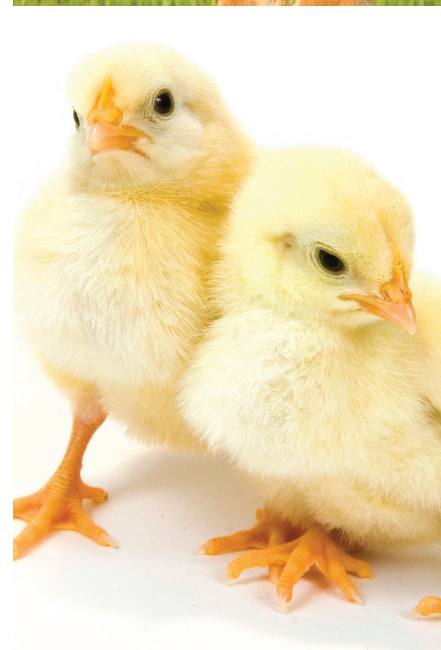


www.maine.gov/idepi

Keep us healthy.

If you're sick, please stay out of the barn.

- ☑ People and animals can share germs
- ☑ Wash your hands before and after touching animals
- ☑ Wash your hands before eating



THANKS FOR VISITING
DON'T FORGET TO
WASH your HANDS





STAY HEALTHY AND HELP STOP
THE SPREAD OF GERMS. PLEASE...

WASH
YOUR
HANDS

Influenza can be shared between people and pigs.

Symptoms of influenza in pigs include:

Fever

Coughing

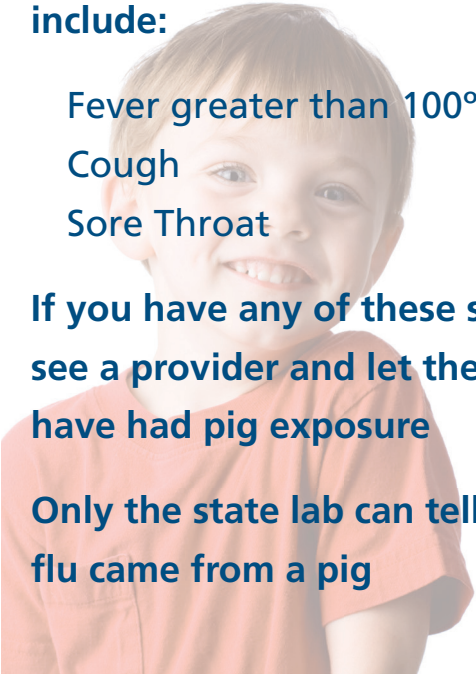
Low energy

If your pig has these symptoms, see a vet



www.maine.gov/idepi

www.maine.gov/dacf/ahw/animal_health/index.shtml



Symptoms of influenza in humans include:

Fever greater than 100° F

Cough

Sore Throat

**If you have any of these symptoms,
see a provider and let them know you
have had pig exposure**

**Only the state lab can tell if human
flu came from a pig**



GERM-O

www.maine.gov/idepi

GERM-O

AGES 7+
2-10 PLAYERS

Object of the game:

Be the first player to get rid of all your cards.

How to Play:

The dealer shuffles the deck and deals each player seven (7) cards.

The remainder of the cards are placed face down in the center of the players to form a DRAW pile.

The first card in the DRAW pile is turned face up to begin a DISCARD pile.

The player to the left of the dealer starts.

On your turn, you must match a card from your hand to the card on top of the DISCARD pile by color or type of bacteria.

EXAMPLE: If the card is a RED ASCARIS, the player must play a RED card or an ASCARIS card.

If you don't have a card that matches, you must take one from the DRAW pile. You may play that card on the same turn, otherwise the play continues to the next person.

Action Cards:



Draw 2: The next player must draw 2 cards and miss a turn.



Draw 4: You choose the color that continues play plus, the next player must draw 4 cards and miss their turn.



Reverse: The direction of the game changes from left to right or visa versa.



Skip: The next player is skipped.



Wild: You choose the color that continues play. You may play this card anytime.

Going out:

When you play your second to last card, you must yell "Germ-O" signaling that you only have one card left in your hand. If you don't yell "Germ-O" before the next player begins their turn, you must draw 2 cards as a penalty.

If no player is out of cards by the time the DRAW pile is depleted, the DISCARD pile is shuffled and play continues until there is a winner.

Contents: 109 cards

21 - Blue cards

20 - Green cards

18 - Yellow cards

18 - Red cards

8 - Draw 2 cards in 4 colors

8 - Reverse cards in 4 colors

8 - Skip cards in 4 colors

4 - Draw 4 wild cards

4 - Wild cards

Brought to you by the Maine Center for Disease Control and Prevention and the Maine Department of Agriculture Conservation & Forestry.



Paul R. LePage, Governor

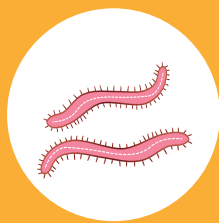
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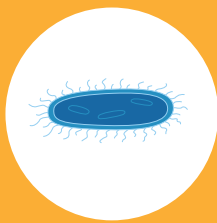
Campylobacter



Campylobacter



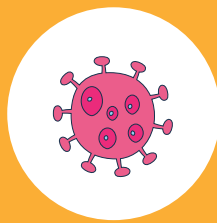
Salmonella



Salmonella



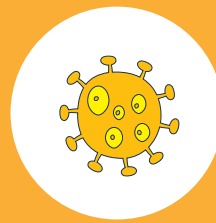
Swine influenza



Swine influenza



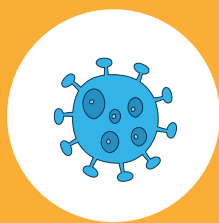
Avian influenza



Avian influenza



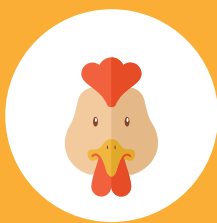
Seasonal influenza



Seasonal influenza



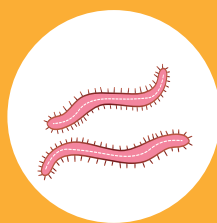
Chicken



Chicken



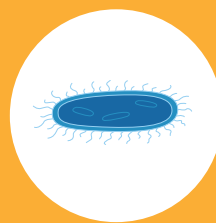
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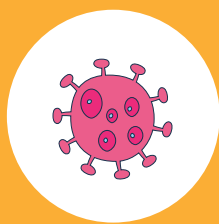
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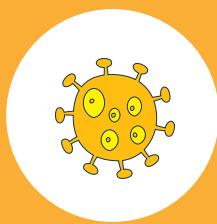
Swine influenza



Swine influenza



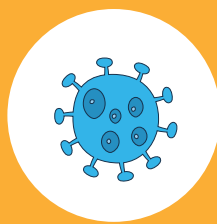
Avian influenza



Avian influenza



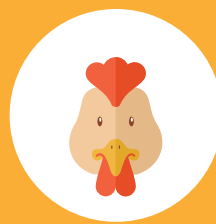
Seasonal influenza



Seasonal influenza



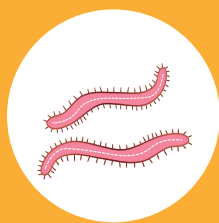
Chicken



Chicken



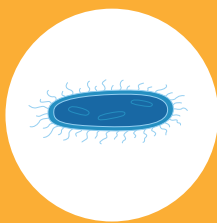
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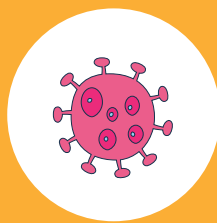
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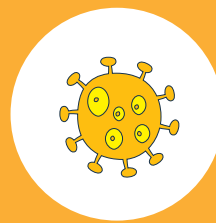
Swine influenza



Swine influenza



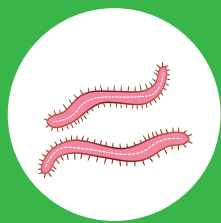
Avian influenza



Avian influenza



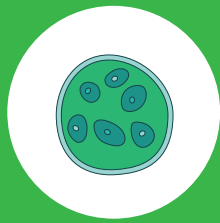
Campylobacter



Campylobacter



Crypto



Crypto



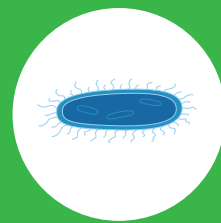
E. coli



E. coli



Salmonella



Salmonella



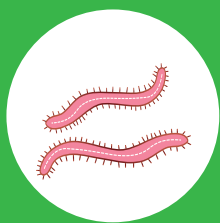
Cow



Cow



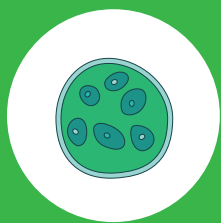
Campylobacter



Campylobacter



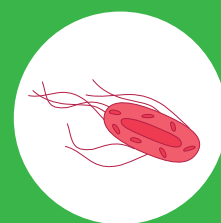
Crypto



Crypto



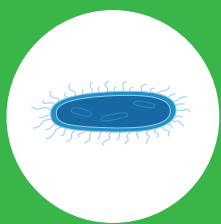
E. coli



E. coli



Salmonella



Salmonella



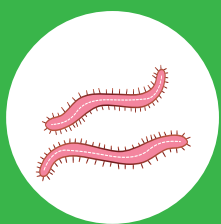
Cow



Cow



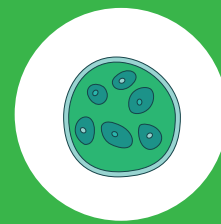
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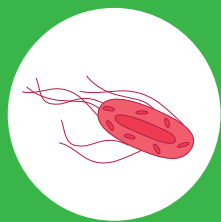
Crypto



Crypto



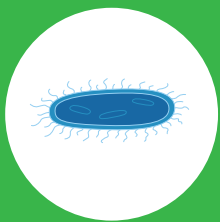
E. coli



E. coli



Salmonella



Salmonella



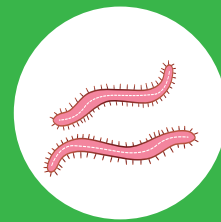
Cow



Cow



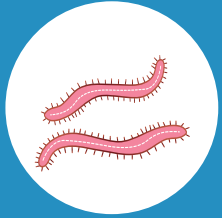
Campylobacter



Campylobacter



Campylobacter



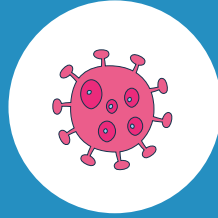
Campylobacter

Ascaris



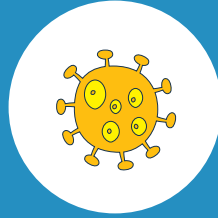
Ascaris

Swine influenza



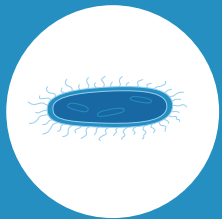
Swine influenza

Avian influenza



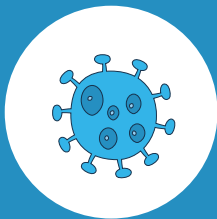
Avian influenza

Salmonella



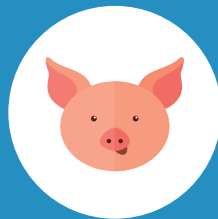
Salmonella

Seasonal influenza



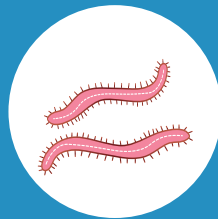
Seasonal influenza

Pig



Pig

Campylobacter



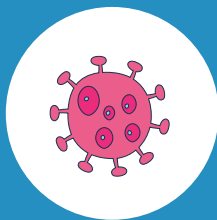
Campylobacter

Ascaris



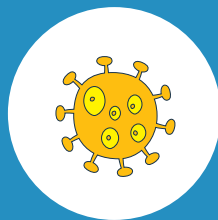
Ascaris

Swine influenza



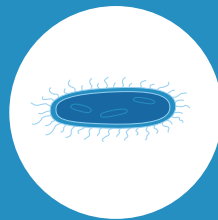
Swine influenza

Avian influenza



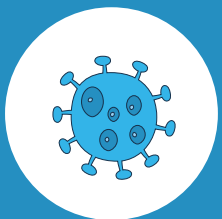
Avian influenza

Salmonella



Salmonella

Seasonal influenza



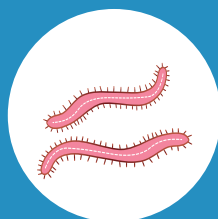
Seasonal influenza

Pig



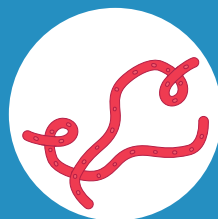
Pig

Campylobacter



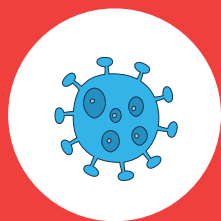
Campylobacter

Ascaris



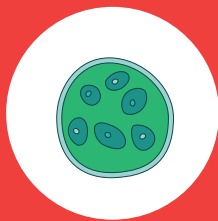
Ascaris

Seasonal influenza



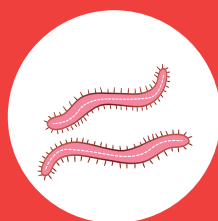
Seasonal influenza

Crypto



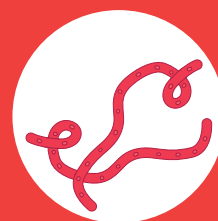
Crypto

Campylobacter



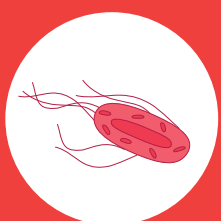
Campylobacter

Ascaris



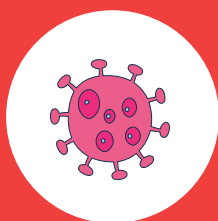
Ascaris

E. coli



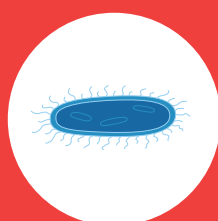
E. coli

Swine influenza



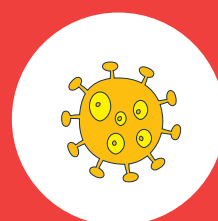
Swine influenza

Salmonella



Salmonella

Avian influenza



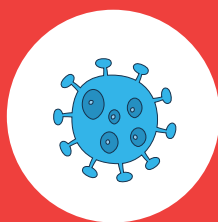
Avian influenza

Human



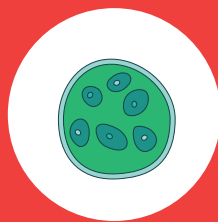
Human

Seasonal influenza



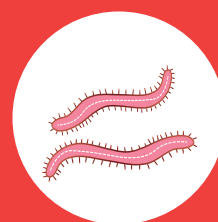
Seasonal influenza

Crypto



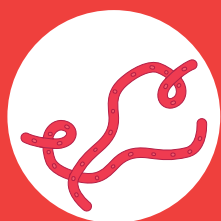
Crypto

Campylobacter



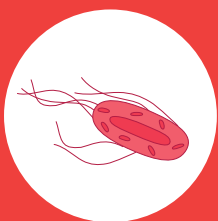
Campylobacter

Ascaris



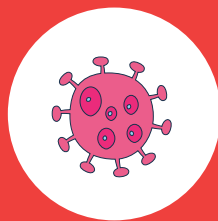
Ascaris

E. coli



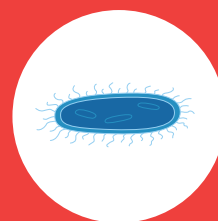
E. coli

Swine influenza



Swine influenza

Salmonella



Salmonella

Reverse ↗



↖ Bio-Security

Reverse ↗



↖ Bio-Security

Reverse ↗



↖ Bio-Security

Reverse ↗



↖ Bio-Security

Reverse ↗



↖ Bio-Security

Reverse ↗



↖ Bio-Security

Reverse ↗



↖ Bio-Security

Reverse ↗



↖ Bio-Security

Draw 2 ↗



↖ Dirty Hands

Draw 2 ↗



↖ Dirty Hands

Draw 2 ↗



↖ Dirty Hands

Draw 2 ↗



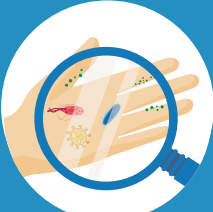
↖ Dirty Hands

Draw 2 ↗



↖ Dirty Hands

Draw 2 ↗



↖ Dirty Hands

Draw 2 ↗



↖ Dirty Hands

Draw 2 ↗



↖ Dirty Hands

