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Leveraging 4-H to Address Emergent Health Needs during the Covid-19 Pandemic: Epidemiology Pilot Project

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Abstract. 4-H academics responded to the Covid pandemic by rapidly adapting CDC and other resources for virtual delivery. A statewide epidemiology project was taught to 48 youth with the goal of minimizing fears and confusion, increasing prevention measures, leveraging current topics for education, and bolstering the social-emotional health of youth participants. Results indicated that youth enjoyed the project and adopted behaviors to reduce the spread of infectious diseases, such as increased mask-wearing.

INTRODUCTION

In the spring of 2020, the Covid-19 pandemic emerged worldwide. In response, the University of California 4-H Youth Development Program quickly adapted Disease Detectives (DD), an existing Centers for Disease Control and Prevention (CCDP) (2018) epidemiology program, for use in a virtual learning environment for 4-H youth. The DD project aimed to address the need for public health education on disease transmission, vaccines, handwashing, and mask wearing.

Program coordinators held project meetings virtually to adapt to shelter-in-place orders, a decision that significantly changed how in-person 4-H programs are delivered. Education professionals have used distance learning models in K-12 education to address challenges such as access, administrative efficiency, and delivery of differentiated instruction (Cavanaugh, et al., 2009; Digital learning collaborative, 2020), but rarely have 4-H professionals done the same (Fawcett, et al., 2020). The five-week California 4-H DD project combined the best practices of virtual delivery with positive youth development (PYD) theories, experiential learning, and the integrative model of behavior change (IMBC) to address relevant public health concepts (Lerner et al., 2011; Arnold, 2018; Kolb, 1984; Fishbein & Yzer, 2003).

PURPOSE AND OBJECTIVES

Misinformation, disinformation, and myths about the causes of, consequences of, and treatments for COVID-19 circulated on social media platforms and between news sources (Srivastava et al., 2020). The DD project aimed to educate youth on the science of epidemiology, the roles and careers of decision-makers, and standardized worldwide pandemic response protocols—helping to reduce their fears. Studies focused on education about preventive measures that facilitate locus-of-control, reduce anxiety, and decrease community transmission show that the education is beneficial (Evans & Bufka, 2020). The California 4-H Healthy Living Leadership Team (HLLT), a statewide group of county and state Cooperative Extension academics, sought to help meet the social and emotional needs of 4-H youth during the pandemic while California schools closed and switched to online learning formats (Hanover Research, 2020).

DEVELOPMENT AND INTERVENTION

In 2018, the CDC partnered with National 4-H to develop the Junior Disease Detectives: Operation Outbreak curriculum and lessons by Science Ambassador Fellowship science teachers (US CCDP, 2018). While the materials were meant for use in school to teach about zoonotic diseases, in 2020, the authors adapted and expanded the graphic novel and class activities to provide experiential learning opportunities about the COVID-19 pandemic in a virtual setting. The adapted currciulum focused on addressing relevant public health issues in which youth participants developed an awareness of infectious diseases, disease exposure and transmission, and pandemics; developed an understanding of the relationship between vaccines, disease prevention, and transmission; developed an understanding of an individual's role in infectious disease transmission; developed an understanding of the community's role in infectious disease transmission; and learned to recognize reputable sources of health information. Selecting an existing, vetted resource allowed for timely dissemination. Conversations and emails with the CDC and the authors of this manuscript verified that no others were adapting the materials at that time or in the months that followed, and they sanctioned and supported our work.

The expedited timeline consisted of seven weeks of adapting existing science-based lessons to include synchronous online delivery (i.e., distance learning); experiential, hands-on learning; the construction of an evaluation instrument; a statewide invitation to 4-H youth; and the development of a website (see Table 1). The project included nine 60-75-minute sequenced lessons delivered synchronously through Zoom. A free open-access website (https://ucanr.edu/sites/DiseaseDetectives/) was a useful and flexible way to organize materials and provide participants with downloadable documents such as discussion questions, lesson objectives, and health education materials. Potential project leaders nationwide could access educator lesson plans, slides, and additional resources on a separate, password-protected webpage.

Within three months of California shelter-in-place orders, program coordinators held an orientation meeting to provide participants with the needed technology skills to fully engage in meetings. Not all youth had equal internet access, so we provided alternatives as needed to ensure inclusive programming. We also used additional platforms, such as Google Maps to illustrate disease spread and the John Hopkins Covid-19 database to explain pandemic severity. The experiential activities included a tissue blowing activity to illustrate the importance of physical distancing in disease prevention; participants blew a tissue from varying distances with and without wearing masks. Additionally, youth teams created public service announcements based on disease prevention topics such as handwashing.

Positive youth development (PYD) generally refers to the development of characteristics in youth that lead to positive outcomes and behaviors (Lerner et al., 2011). PYD within the context of 4-H typically occurs through projects and activities that utilize experiential and inquiry-based learning methods. The pedagogical approach and delivery of the 4-H DD project was based in PYD—ensuring that each lesson provided youth with an opportunity to actively engage and experience content, reflect on that content with their peers and mentors, and apply the content to a real-life situation. The Integrative Model of Behavioral Prediction (IMBP) theorizes that people act on their intentions when they have the skills and means to do so (Fishbein & Yzer, 2003). According to IMBP, behaviors are more likely to occur when an individual has: (a) a strong intention to perform the behavior, (b) the skills and abilities to perform the behavior, and (c) no environmental limitations preventing the behavior (Fishbein & Yzer, 2003). Thus, DD program content focused on positive youth outcomes by targeting knowledge, skills, and behavior.

Forty-eight 4-H youth ages 12 to 18, hailing from 15 counties across California, enrolled in and completed the virtual California 4-H DD project. Coordinators divided youth participants into three groups with different meeting times. This formed smaller group, which increased the opportunity for youth to engage with each other and participate in conversations. The program coordinators held the one-hour virtual meetings twice a week for five weeks with all three groups.

PROJECT EVALUATION

The study employed pre- and post-survey project evaluations (17 and 25 questions, respectively) designed to measure the projects' contribution to participants' knowledge of, attitudes towards, and intentions to adopt practices that reduce the spread of disease, improve self-efficacy, and promote positive health behavior (see Appendix). The evaluation included an assessment of content knowledge (terminology, role definitions, vectors and fomites,

Table 1. Disease Detectives Learning Objectives

Lesson	Objectives
Orientation	1. Build relationships among participants. 2. Establish group agreements. 3. Learn to properly utilize Zoom.
Public Health Process	1. Identify steps during an infectious disease outbreak investigation. 2. Identify roles of public health professionals in an infectious disease outbreak investigation. 3. Identify responsibilities of public health professionals in an infectious disease outbreak investigation.
Disease Outbreak	1. Understand the signs and symptoms of infectious diseases. 2. Understand how symptoms of infectious diseases are tracked. 3. Increase willingness to implement practices that reduce the spread of disease.
Virus Transmission	1. Understand zoonotic disease transmission. 2. Differentiate between direct and indirect transmission.
Epidemiology	1. Understand disease transmission patterns with and without vaccination. 2. Understand how diseases are spread throughout populations. 3. Understand epidemiological terms (vaccination, pathogens, immunity, herd immunity, epidemic, and pandemic). 4. Increase willingness to practice behaviors that slow the spread of diseases.
Immunity	1. Understand how mathematical models are used to determine disease spread and intervention effectiveness. 2. Understand the effects of physical countermeasures (e.g., social distancing or non-pharmaceutical interventions) for disease outbreak scenarios. 3. Understand the effects of medical countermeasures (e.g., vaccines) for disease outbreak scenarios. 4. Identify public health countermeasures that restrict the spread of a disease outbreak. 5. Explain the importance of vaccinations to infectious diseases. 6. Explain the importance of monitoring cases of infectious diseases.
Vaccines	1. Understand how mathematical modeling (pandemic severity assessment framework) can be used to explain the cause and effect relationships that influence influenza and other pandemics. 2. Learn epidemiological terms (disease transmission, data managers, public health surveillance system). 3. Increase knowledge of vaccine processes.
Prevention	1. Identify an action step to mitigate the spread of an infectious disease. 2. Identify a health education/social marketing strategy. 3. Create a public service announcement or other health education/social marketing material.
Public Service & Policies	1. Increase skills in developing social marketing/health education materials. 2. Participate in policy reviews of infectious diseases. 3. Increase self-efficacy to make personal changes. 4. Gain the skills and confidence to advocate for public health measures.

vaccine facts, and preventative procedures), attitudes (career aspirations, advocacy beliefs), self-efficacy (media literacy, role in disease transmission), and behaviors (hand washing, mask wearing, disinfecting/cleaning, and physical distancing). The type of survey questions included matching, multiple response, true/false, Likert-scale, and open-ended. Coordinators added a set of retrospective behavior questions (Table 2) to the post-survey for the participants to reflect and report their current practices compared to practices employed prior to their participation in the program. Available disease prevention guidelines from the CDC, experts' opinions, and a review of literature on youth-focused epidemiology knowledge all guided the development of the survey questions. The knowledge questions aimed to measure participants' ability to match epidemiology terms with the correct term description and gauge participants' knowledge of vaccination and disease transmission. The University of California, Davis Institutional Review Board approved evaluation of the project.

We administered the pre- and post-survey evaluations using an email link to the online Qualtrics surveys. The surveys were open for one-week each; the pre-survey was available in June 2020, and the post-survey was available in July 2020. The response rate was 94% (n=45) for the pre-survey and 69% (n=33) for the post-survey.

We applied a thematic analysis to the open-ended questions (Braun et al., 2006). The youth responses were coded independently by each team member and then discussed amongst the team. The team analyzed code applications through a consensus-based and systematic process, a form of accountability to reach inter-coder agreement (Cornish, Gillespie, & Zittoun, 2013). We had a final list of seven parent codes: careers in epidemiology, learning new knowledge, project activities, social activities, teamwork activities, health resources, and prevention of disease transmission.

PROJECT OUTCOMES

We grouped post-survey and qualitative results into three categories based on the IMBC (Fishbein & Yzer, 2003): knowledge, behavior change, and advocacy/intention to perform behavior.

KNOWLEDGE

Participants showed increased knowledge of epidemiology roles and terms such as health communication specialists, epidemiologist, zoonotic, and vaccine. They also reported an increase in their knowledge about practices that slow the spread of diseases, such as hand washing, circulating fresh air, and keeping sick animals separate from others. Youth indicated that they learned about herd immunity, vaccines, and masks with their responses to questions related to "what herd immunity means," "how vaccines work," and "I learned why masks work."

BEHAVIOR CHANGE

After completing the project, all participants reported that they were more likely to wash their hands or use hand sanitizer after working with animals and after using a public or school bathroom; over 90% of youth indicated that they were more likely to do so before food preparation and eating at home, after sneezing or coughing, after using the bathroom, and after shopping in a public space (see Table 2). All youth reported that they were more likely to wear a face mask when out in public, and over 96% indicated that they were more likely to do so when visiting friends. Additionally, over 90% of youth indicated that they were more likely to clean and disinfect tools used to administer medication to animals, their cell phone, and computer devices. When asked what they learned from the project, one stated: "I learned why masks work, I learned how hand sanitizer works, and I learned how I can help my community."

INTENTION TO PERFORM BEHAVIOR

Qualitative analysis of the open-ended questions revealed that youth also reported increased confidence, abilities, and desire to become leaders in the health of their communities. Many reported that they felt they could help control the spread of disease (97%), could envision themselves getting involved in their local community to help slow the spread of disease (88%), could envision themselves being an advocate for health in their community (82%), and could discuss disease transmission with others (97%). In addition, most youth stated they would definitely quarantine themselves (82%) or their animals (79%) if disease symptoms were present. Following project participation, over half of all participants could picture themselves choosing a career in medicine, public health, veterinary sciences or epidemiology. When asked what the best part of the project was, one participant stated, "The best part of the project was learning about how to protect myself and keep my family safe in these troubled times."

IMPLICATIONS

This project sought to improve participants' understanding of the prevention and transmission of infectious diseases. The intervention, which was based on PYD theories and the IMBC, engaged youth in experiential and inquiry-based learning (Kolb, 1984; Fishbein & Yzer, 2003). The post-survey had a 69% response rate. There was evident behavior change in the practices of hand washing, mask wearing, physical distancing, and cleaning practices. Attitudes around pursuing related careers and advocacy beliefs improved.

Participants were able to contribute to disease awareness and messaging by creating health education materials (PSAs) for 4-H programming. This feeling of contribution is an important aspect of positive youth devel-

Table 2. Youth Post-Survey Results from Behavior Change Questions

How has your current hand washing (or use of hand sanitizer) behavior changed, compared to before this 4-H Disease Detective project?			
I wash them….	n	Much more often, More often, Somewhat more often (%)	Somewhat less often, Less often, Much less often (%)
before preparing food	32	96.9	3.1
at home before eating	31	93.6	6.4
after sneezing or coughing	32	93.8	6.2
after using the bathroom at home	31	96.8	3.2
after shopping in a public space, such as a grocery or retail store	32	96.9	3.1
after working with animals	32	100	0
after using a public or school bathroom	29	100	0
How has your current use of face masks (or coverings) changed, compared to before this 4-H Disease Detective project?			
I use them…	*n*	Much more often, More often, Somewhat more often (%)	Somewhat less often, Less often, Much less often (%)
When out in public	30	100	0
While visiting with friends	28	96.4	3.6
How have your current cleaning and disinfecting practices changed, compared to before this 4-H Disease Detective project?			
I clean them…	*n*	Much more often, More often, Somewhat more often (%)	Somewhat less often, Less often, Much less often (%)
Tools used to administer medication to animal	26	96.2	3.8
Cell phone	31	93.6	6.4
Computer keyboard and mouse	32	93.7	6.3

opment (Lerner, 2011) and helps build an adolescent's level of competence, compassion, connection to others, confidence, and character.

Experiential learning strategies can help educate youth and disseminate research-based information to their communities and families (Carver & Enfield, 2006). 4-H is a trusted organization present in many communities, making it a crucial partner in global continuing education efforts. The California 4-H DD project demonstrated the potential to incorporate public health concepts into Cooperative Extension more broadly, such as in distance learning classrooms and other out-of-school programs. Educating youth—and thus their families and communities—on infectious disease transmission and prevention has the potential to benefit public health on a broad scale.

CONCLUSIONS

Traditional 4-H youth development programs rely on in-person experiential education that utilize evidence-based curriculum in small local groups. During the Covid-19 stay-at-home orders in California, this model was not possible. Furthermore, the acute need for public health information was unparalleled by any of the authors' previous experiences. By adapting existing materials—developed by trustworthy sources—to a new project topic using technology-based meeting formats, social support, application of information to current topics, and development of self-agency, 4-H helped youth learn how to adjust to life during a global pandemic. While reliance on established projects is important, Cooperative Extension must be proactive, fluid, and responsive with subject matter and approach in times of great need (Arnold & Rennekamp, 2020).

This article provides evidence that youth gain knowledge and change behaviors in disease transmission after an educational intervention focused on epidemiology. Youth education materials are currently available at https://ucanr.edu/sites/DiseaseDetectives/. 4-H is positioned to provide behavioral, theory-driven educational materials for youth to address broad public health issues.

One of the study's limitations is that the questions in the survey are grouped based on literature-supported assumptions that the items help measure corresponding constructs. No additional statistical analysis was performed except inter-item correlations to further support the question grouping. Although we observed an increase for most of the knowledge questions, not all were statistically significant. We believe the survey ceiling effect (Cramer & Howitt, 2004) could be one of the potential reasons for non-significant pre-post knowledge change.

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APPENDIX. 4-H STATEWIDE EPIDEMIOLOGY PROJECT

POST-SURVEY

Q1 Name: _____

Q2 County: _____

Q3 Age: _____

Q4 **Match the job description with the job title by dragging the title to the corresponding job description.**

collects and analyzes information about who is sick, when they became sick, and exposures they may have had before becoming sick to determine where, when, and how each person may have become infected.	a professional who uses statistics to develop reports that can be used to improve health.	creates databases to store collected information in a manner that it can be efficiently analyzed and shared.	test and analyze samples from human cases, animal cases, and potential cases.	professionals who develop communication strategies, messages and products, and communicate public health risks, concerns, trends, and recommendations to the public, as well as media, policy makers and other health professionals.
_____ epidemiologist (1)	_____ epidemiologist (1)	_____ epidemiologist (1)	_____ epidemiologist (1)	_____ epidemiologist (1)
_____ data managers (2)	_____ data managers (2)	_____ data managers (2)	_____ data managers (2)	_____ data managers (2)
_____ biostatisticians (3)	_____ biostatisticians (3)	_____ biostatisticians (3)	_____ biostatisticians (3)	_____ biostatisticians (3)
_____ health communication specialists (4)	_____ health communication specialists (4)	_____ health communication specialists (4)	_____ health communication specialists (4)	_____ health communication specialists (4)
_____ laboratory scientists (5)	_____ laboratory scientists (5)	_____ laboratory scientists (5)	_____ laboratory scientists (5)	_____ laboratory scientists (5)

Q5 Define the following terms by dragging the corresponding term to the definition.

Infections spread between animals and humans.	A product that is given to produce or artificially increase immunity to a particular disease.	Keeping people or animals that have been exposed to a disease separate from others.	Techniques to influence the way people and communities act.	Global disease outbreak occurring over a wide geographic area and affecting a really high number of people.	The chance of a new infection occurring when a person who is susceptible to becoming infected interacts with a person who is infected.	A way to determine how easily the disease is spreading and how "bad" the disease infection may be.	The presence and intensity of a disease in the body.	Provides a system for health professionals to sort disease outbreaks into categories (suspected, probable, confirmed).	A highly contagious infection of the nose, throat and lungs (respiratory system) that causes a fever and severe aching.	The tracking of diseases, which improves the response and allows systems to adapt to current and future issues.
____ quarantine (1)	____ quarantine (1)	____ quarantine (1)	____ quarantine (1)	____ quarantine (1)	____ quarantine (1)	____ quarantine (1)	____ quarantine (1)	____ quarantine (1)	____ quarantine (1)	____ quarantine (1)
____ zoonotic (2)	____ zoonotic (2)	____ zoonotic (2)	____ zoonotic (2)	____ zoonotic (2)	____ zoonotic (2)	____ zoonotic (2)	____ zoonotic (2)	____ zoonotic (2)	____ zoonotic (2)	____ zoonotic (2)
____ vaccine (3)	____ vaccine (3)	____ vaccine (3)	____ vaccine (3)	____ vaccine (3)	____ vaccine (3)	____ vaccine (3)	____ vaccine (3)	____ vaccine (3)	____ vaccine (3)	____ vaccine (3)
____ social marketing (4)	____ social marketing (4)	____ social marketing (4)	____ social marketing (4)	____ social marketing (4)	____ social marketing (4)	____ social marketing (4)	____ social marketing (4)	____ social marketing (4)	____ social marketing (4)	____ social marketing (4)
____ pandemic (5)	____ pandemic (5)	____ pandemic (5)	____ pandemic (5)	____ pandemic (5)	____ pandemic (5)	____ pandemic (5)	____ pandemic (5)	____ pandemic (5)	____ pandemic (5)	____ pandemic (5)
____ disease transmissibility (6)	____ disease transmissibility (6)	____ disease transmissibility (6)	____ disease transmissibility (6)	____ disease transmissibility (6)	____ disease transmissibility (6)	____ disease transmissibility (6)	____ disease transmissibility (6)	____ disease transmissibility (6)	____ disease transmissibility (6)	____ disease transmissibility (6)
____ disease severity (7)	____ disease severity (7)	____ disease severity (7)	____ disease severity (7)	____ disease severity (7)	____ disease severity (7)	____ disease severity (7)	____ disease severity (7)	____ disease severity (7)	____ disease severity (7)	____ disease severity (7)
____ pandemic severity assessment framework (PSAF) (8)	____ pandemic severity assessment framework (PSAF) (8)	____ pandemic severity assessment framework (PSAF) (8)	____ pandemic severity assessment framework (PSAF) (8)	____ pandemic severity assessment framework (PSAF) (8)	____ pandemic severity assessment framework (PSAF) (8)	____ pandemic severity assessment framework (PSAF) (8)	____ pandemic severity assessment framework (PSAF) (8)	____ pandemic severity assessment framework (PSAF) (8)	____ pandemic severity assessment framework (PSAF) (8)	____ pandemic severity assessment framework (PSAF) (8)

_____ public health surveillance system (9)	_____ public health surveillance system (9)	_____ public health surveillance system (9)	_____ public health surveillance system (9)	_____ public health surveillance system (9)	_____ public health surveillance system (9)	_____ public health surveillance system (9)	_____ public health surveillance system (9)	_____ public health surveillance system (9)	_____ public health surveillance system (9)	_____ public health surveillance system (9)
_____ influenza (10)	_____ influenza (10)	_____ influenza (10)	_____ influenza (10)	_____ influenza (10)	_____ influenza (10)	_____ influenza (10)	_____ influenza (10)	_____ influenza (10)	_____ influenza (10)	_____ influenza (10)
_____ case classification (11)	_____ case classification (11)	_____ case classification (11)	_____ case classification (11)	_____ case classification (11)	_____ case classification (11)	_____ case classification (11)	_____ case classification (11)	_____ case classification (11)	_____ case classification (11)	_____ case classification (11)

Q6 **Which of these things could possibly make you sick from an animal? (check all that apply)**

- Eating in the barn with your livestock
- Watching a seahorse at the aquarium
- Feeding your fish
- Collecting feathers in the wild
- Petting or cuddling an animal
- Shoveling manure
- Not washing your hands after grooming your animal
- Wearing leather or wool
- Watching a dog show

Q7 **True or False to these statements about vaccinations and disease transmission.**

True	**False**
_____ Each disease has its own specific vaccine.	_____ Each disease has its own specific vaccine.
_____ People and animals who are vaccinated are much less likely of getting sick even after being around the disease many times.	_____ People and animals who are vaccinated are much less likely of getting sick even after being around the disease many times.
_____ Different vaccines will keep you immune for different lengths of time.	_____ Different vaccines will keep you immune for different lengths of time.
_____ Vaccinations can cause autism and/or brain damage.	_____ Vaccinations can cause autism and/or brain damage.
_____ Animals who are vaccinated can never get sick.	_____ Animals who are vaccinated can never get sick.
_____ People and animals who are not vaccinated can become infected after being around a sick person or animal one time.	_____ People and animals who are not vaccinated can become infected after being around a sick person or animal one time.
_____ Herd immunity is when enough people have gotten sick or are vaccinated that it is harder for the disease to spread.	_____ Herd immunity is when enough people have gotten sick or are vaccinated that it is harder for the disease to spread.

Q8 **Which of these help slow the spread of disease? (check all that apply)**

- Wearing a face mask
- Keeping your bedroom organized
- Using a toilet seat cover
- Sneezing into a tissue instead of sneezing uncovered into the air
- Keeping sick animals separate from others
- Cleaning grooming items between use
- Eating an apple a day
- Sunshine
- Staying away from other people or animals when sick
- Using sunscreen
- Using hand sanitizer
- Using medications as prescribed
- Washing your hands
- Doing your homework on time
- Circulating fresh air in closed spaces as much as possible

Q9 **Current recommendations are for people to remain six feet apart in public. How do you determine what would be about six feet long?**

_____

Q10 **For the following questions, put a check mark in the box that is closest to your answer.**

	I definitely cannot	I probably cannot	I maybe cannot	I maybe can	I probably can	I definitely can	Unsure
Do you think you can help control the spread of diseases?							
Do you think you can choose good sources of health information?							
Could you picture yourself choosing a career in medicine, public health, veterinary sciences, or epidemiology?							
Can you envision yourself getting involved in your local community to help slow the spread of disease?							
Do you think you can influence the policies of 4-H?							
Can you envision yourself being an advocate for health in your community?							

Q11 **To quarantine means to stay in a closed room alone when you feel sick. Is it possible for you to do this in your home?**

- Yes
- Maybe
- No

Q12 **If maybe or no, what would make this possible for you?**

_____

Q13 **To quarantine an animal means to keep it in a separate place alone and away from other animals when it is sick, has been exposed to other animals, or is being introduced into a new herd. Is it possible for you to do this with your animal(s)?**

- Yes
- Maybe
- No

Q14 **If maybe or no, what would make this possible for you?**

_____

Q15

	I definitely would not	I probably would not	I maybe would not	I maybe would	I probably would	I definitely would	Unsure
Would you choose to quarantine yourself if you started to get sick (for example a fever, cough, runny nose, extreme tiredness, were not hungry, or felt really bad?							
Would you choose to quarantine your animal if it started to get sick (for example, a fever, a runny nose, extreme tiredness, less hunger, vomiting, diarrhea, difficulty breathing, difficulty walking, sudden weight loss, or a skin rash?							

Q16 **How has your current hand washing (or use of hand sanitizer) behavior changed, compared to before this 4-H Disease Detective project? I wash them…**

	…Much more often	…More often	...Somewhat more often	...Somewhat less often	...Less often	...Much less often	Does not apply
before preparing food?							
at school before eating?							
at home before eating?							
after sneezing or coughing?							
after using the bathroom at home?							
after shopping in a public space, such as a grocery or retail store?							
after working with animals?							
after handling a delivered package or piece of mail?							
after using a public or school bathroom?							
after coming home from school?							
after using a shared item, such as a computer, phone, pen, ATM keypad, etc?							

Q17 **How has your current use of face masks (or coverings) changed, compared to before this 4-H Disease Detective project? I use them...**

	...Much more often	...More often	...Somewhat more often	...Somewhat less often	...Less often	...Much less often	Does not apply
When out in public							
While at school							
While visiting with friends							
While playing outside							
When sick at home							
While at work							
While being physically active							

Q18 **How has your current cleaning and disinfecting practices changed, compared to before this 4-H Disease Detective project? I clean them...**

	...Much more often	...More often	...Somewhat more often	...Somewhat less often	...Less often	….Much less often	Does not apply
Tools used to administer medication to animal							
TV remote							
Cell phone							
Computer keyboard and mouse							

Q19 **As a result of the 4-H Disease Detectives project, are you discussing disease transmission and prevention with others...:**

- Much more frequently
- More frequently
- A bit more frequently
- A bit less frequently
- Less frequently
- Much less frequently

Q20 **How likely are you to recommend this class to a friend?**

- I definitely would
- I probably would
- I maybe would
- I maybe would not
- I probably would not
- I definitely would not

Q21 **List three things you learned as a result of this project?**

_____

Q22 **What part of this project was fun and engaging?**

_____

Q23 **What was the best part of the project?**

_____

Q24 **What is one thing that could be done to make the 4-H Disease Detectives Project better next time?**

_____