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Bear River Health Department: COVID-19 Contact Tracing

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BEAR RIVER HEALTH DEPARTMENT: COVID-19 CONTACT TRACING

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Introduction:

As the director of the Bear River Health Department (BRHD), Jane Young started her position in the midst of the COVID-19 pandemic response as her predecessor announced that his expected retirement would commence slightly earlier than anticipated. One of the most pressing tasks that Jane faced was managing BRHD's COVID-19 contact tracing unit. Identified as an instrumental component of controlling the spread of the disease, the contact tracing unit was tasked with communicating with individuals in the community that recently tested positive for the viral infection, providing isolation instructions and support to infected individuals, asking about their close contacts that could have possibly been infected, and then following up with those contacts providing instruction about testing and self-quarantine. The work itself was taxing and required team members to be able to quickly build rapport by conveying trust and empathy over the phone during a time when community members' trust of public officials was at an all-time low.

Contact tracing was further hampered by an unpredictable work load. Epidemiology models could predict the spread of the disease in aggregate given different scenarios, but the work of the health department was often interrupted by outbreaks, hot-spots, potential super-spreading events, and a public that didn't always respond to government attempts to keep community members safe. Workload was further exacerbated by the variation in number of contacts each individual might have been in contact with during the two to three days prior to their positive test result. In some cases, newly infected individuals were highly active in the community and provided multiple names or entire groups of people that could have been potentially infected. In these cases, follow-up contacting could take hours. However, in other cases individuals were

Note: This case should be considered historical fiction, based partly on historical facts, but couched in a fictional managerial setting (Jane Young is fictional). Additionally, this case was written in October 2020 with the full understanding that future months may make much of the content of this case irrelevant or very important to the pandemic response. We invite readers to go back in time and consider the case's dilemmas without your personal knowledge of what happens in the future – the case writer did not have the privilege of knowing the future as you now do. This case does not proport to accurately capture the managerial decisions, options, or issues of BRHD during October 2020. It was written primarily to use to teach the application of managerial decision principles and tools. However, we made efforts to be truthful about statistics and data. In addition, the application and principles of contact tracing are accurately described as dictated by the CDC.

An instructor can request a full teaching note for this case by contacting Professor Mike Dixon at Mike.Dixon@usu.edu.

either already very isolated or were unwilling or unable to provide many contacts outside their immediate household.

As an experienced public health administrator, Jane knew the importance of proper and timely contact tracing, but the work seemed to keep flooding in and the team didn't seem able to keep up. She knew that the further behind the team got in being able to respond quickly to their tracing efforts, the more cases would develop in the communities she was sworn to keep healthy –improving the contact tracing efforts of the department were literally a matter of life and death to the vulnerable in her community. Taking this job in the midst of a pandemic was hard enough, but she needed to quickly gain expertise in understanding how to manage the workload of the contact tracing unit.

COVID-19 Spread

First identified in 2019 and declared a world-wide pandemic in March 2020, COVID-19[1] was a disease outbreak caused by a new strain of coronavirus SARS-CoV-19 originated in bats. By October 2020, over 44 million people had been infected worldwide resulting in a projected 1.17 million deaths[2]. The virus spread quickly throughout the world with varying degrees of success in isolating and controlling its spread. Most infected people had virus in their mouths, noses, and throats that were exhaled out on droplets when talking, sneezing, coughing, laughing, singing, and even just breathing. Virus transmission mainly occurred in two ways: (1) Droplets exhaled by infected individuals could enter into another person's mouth, eyes, nose, or throat – this type of transmission was more likely when people were in close proximity to one another. And (2) a transmission could occur if a person who had touched an infected surface (something that an infected droplet had landed on) later touched their own mouth, nose, or eyes.

While this type of viral transmission was typical of seasonal flu, the SARS-CoV-19 virus did not cause symptoms to all infected people (referred to as asymptomatic infections). However, nearly all infected individuals could still unknowingly spread the virus. For those that did have symptoms, the virus had a relatively long incubation period before symptoms appeared, 2 to 14 days with an average of 5 days. An infected person could spread the virus two days prior to the first day they experienced symptoms. Asymptomatic and pre-symptomatic spread made the virus particularly hard to control.

[1] COVID-19 is a disease caused by a new strain of coronavirus. 'CO' stands for corona, 'VI' for virus, and 'D' for disease. Formerly, this disease was referred to as '2019 novel coronavirus' or '2019-nCoV.' https://www.who.int/

[2] Accessed October 28, 2020 https://g.co/kgs/FAKsrh

CARES Act and Public Health

The US federal response was to push financial support to individual state, local, and tribal governments by providing funding through the Coronavirus Aid, Relief, and Economic Security (CARES) Act. CARES created the largest economic stimulus ever attempted by the US federal government; as part of the overall $2 trillion stimulus, Congress allocated $139 billion to states to assist in expenditures related to public health response including covering "payroll expenses for public safety, public health, health care, human services, and similar employees whose services are substantially dedicated to mitigating or responding to the COVID-19 public health emergency[3]" including specific permission for expenses to go toward contact tracing employees. This funding allowed health departments to work with local healthcare providers to quickly set up testing centers, identify treatment locations, and understand ICU capacity to treat severely ill patients. In addition, it ushered in a wave of job posting for contact tracers and disease investigators across the country.

By 2020 there were roughly 2,800 health departments across the US[4] acting as government agencies that worked to promote and ensure community health, environmental health, public health infrastructure, and preparedness. The COVID-19 pandemic and the CARES act funding launched general awareness of public health and the role of local health departments as they spearheaded testing, education, public safety, and attempts to contain the spread of the virus across the country.

Health departments were allocated funds proportionate to their population size; the state of Utah was allocated $1.25 billion dollars and interim reports showed the state had spent $235 million dollars by June 2020[5].

Bear River Health Department

The Bear River Health Department (BRHD) is one of 13 health departments in Utah. The BRHD has jurisdiction over Cache, Rich, and Box Elder Counties, the three most northern counties in the state, largely rural with a combined population of around 185,000 covering nearly 9,000 square miles. The area included the college town of Logan, home to Utah State University (USU) with nearly 20,000 students living near or on campus in years prior to the pandemic. In 2020 BRHD had around 110 employees at 6 different locations throughout the three counties.

[3] https://home.treasury.gov/system/files/136/Coronavirus-Relief-Fund-Frequently-Asked-Questions.pdf

[4] https://en.wikipedia.org/wiki/Local_health_departments_in_the_United_States Accessed Oct 2020

[5] https://home.treasury.gov/system/files/136/Interim-Report-of-Costs-Incurred-by-State-and-Local-Recipients-through-June-30.pdf

Figure 1: Map of the United States with Utah highlighted
Source: https://www.freeworldmaps.net/united-states/utah/location.html

Figure 2: Utah Health Departments County Coverage.
Source: https://ibis.health.utah.gov/ibisph-view/about/LocalHealth.html

Controlling the Spread

The primary public health response was to promote and encourage people to change the types of behaviors that would lead to more rapid transmission of the virus. Since asymptomatic and pre-symptomatic spread was prevalent, the best way to avoid transmission was to avoid social contact - anyone could unknowingly be infected and contagious. World-wide physical distancing practices began in March of 2020; public health officials encouraged employers to allow people to work from home; delivery and remote pick up of retail grocery and pharmacy orders were ramped up; schools transitioned to online delivery modes; and non-essential businesses were asked to close. Social isolation practices were effective in limiting the spread, but they quickly introduced economic and mental health burdens that only the most autocratically controlled and socially minded citizenry could maintain.

Public health officials instead encouraged their citizens to avoid large crowds, stay socially distanced from others (at least six feet), wear face coverings, and wash their hand regularly. By Fall 2020 the school districts of BRHD had reopened as had most businesses, religious congregations, and other organizations. Face coverings were required at schools and most retail businesses; Utah State University reduced maximum classroom capacity to accommodate social distance standards. Cleaning and sanitizing surfaces such as door knobs, handles, desks and any other regularly touched surfaces became a regular practice.

Figure 3: State of Utah Safety Protocol for Public Spaces
Source: Coronovirus.utah.gov

Testing

To determine if an individual had COVID-19, a polymerase chain reaction (PCR) test was conducted, usually by taking a sample of the droplets inside a person's nose using a swab. A positive test would indicate that the virus's specific RNA was replicating and that there was an active infection – a false positive was rare. However, a false negative could occur especially if tests were to occur early in incubation stages so that the small amount of viral RNA could not be detected. Test results could take as long as three days to be returned, although by October 2020 most test results of symptomatic patients were returned within 24 hours.

By Fall 2020 testing centers were available in nearly all local communities including a dedicated testing center for USU students and staff. While testing centers were busy, long lines that had been experienced earlier in the year were no longer a problem. Still, by October 2020 cases were surging nationally and locally.

Figure 4: Drawing of COVID-19 Testing
Source: https://coronavirus-download.utah.gov/business/COVID-19_Business_Packet_FIN.pdf

Contact Tracing Background

Well before the onset of COVID-19, contact tracing had been used as an effective public health management response to control and stop the spread of infectious disease. Most notably, an outbreak of the Ebola virus in West Africa was contained in 2014[6]. The basic principles of contact tracing are to (1) isolate known cases of a disease and (2) to identify and quarantine potentially exposed people, that is, people who are known to have been in contact with infected, contagious people.

The level of contagion of infectious diseases vary and is measured by the average number of people an infected case will, in turn, infect. This is known as an R0 value (pronounced R naught). An R0 of 2 means each infected person will, on average, infect 2 others. Measles is often cited as having an R0 between 12 to 18 making it one of the most contagious diseases [7]. An R0 less than 1 means the disease is in decline and will eventually die out; an R0 that equals 1 means the disease will stay alive but won't cause an outbreak or epidemic. COVID-19 has a reported R0 value as low as 2 to 3 and as high as 5.7 [8]; regardless, at these R0 levels the number of cases would double every 3 to 6 days if left unchecked.

Testing and contact tracing responses aim to reduce spread of the disease by removing contagious individuals from the community to reduce the number of subsequent infections they can cause. Contact tracing efforts have been proven successful but are only achievable if responses are timely and citizens are understanding and accommodating.

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[6] Saurabh, S., & Prateek, S. (2017). Role of contact tracing in containing the 2014 Ebola outbreak: a review. African health sciences, 17(1), 225–236. https://doi.org/10.4314/ahs.v17i1.28

[7] Guerra FM, Bolotin S, Lim G, et al. The basic reproduction number (R0) of measles: a systematic review. The Lancet. Infectious Diseases. 2017 Dec;17(12):e420-e428. DOI: 10.1016/s1473-3099(17)30307-9.

[8] Sanche, S., Lin, Y., Xu, C., Romero-Severson, E., Hengartner, N., & Ke, R. (2020). High Contagiousness and Rapid Spread of Severe Acute Respiratory Syndrome Coronavirus 2. Emerging Infectious Diseases, 26(7), 1470-1477. https://dx.doi.org/10.3201/eid2607.200282.

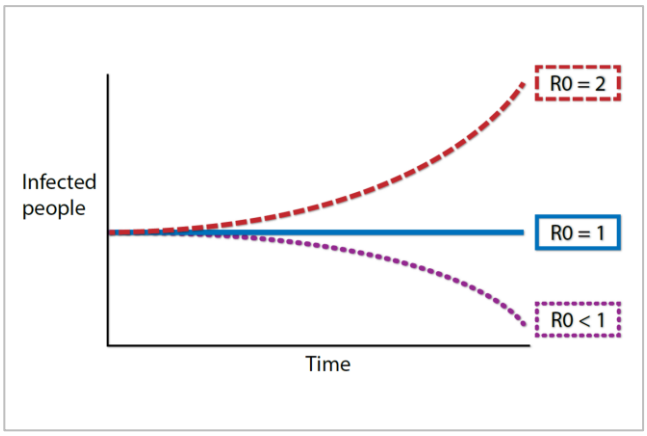

Figure 5:Graph of Reproductive Number (R0 or R-Naught)

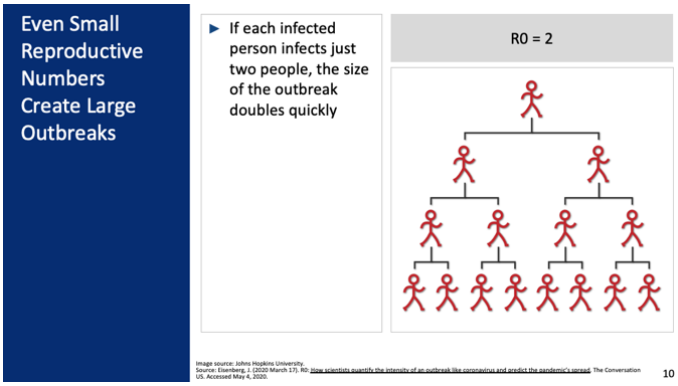

Figure 6: Small Reproductive Numbers Create Large Outbreaks

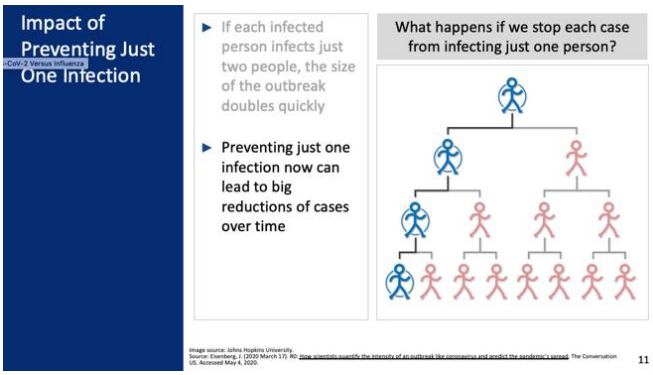

Figure 7: Impact of Preventing Just One Infection

Source: Johns Hopkins Bloomberg School of Public Health Coursera Course on Contact Tracing: https://www.coursera.org/learn/covid-19-contact-tracing
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Contact Tracing Process

Upon receiving a positive test result in their community, a member of the tracing team begins to investigate a **case**[9] by calling the infected individual. Usually the person has already been contacted by testing staff or their doctor who has told them the results of the test and asked them to expect to be contacted by a member of the health department contact tracing unit. Cases are often very emotional upon hearing about their positive test results; they can be anxious about their health or of the health of their close family or friends that may be at higher risk; they may be frustrated with the inconvenience the infection will bring; or, they may have feelings of embarrassment about having been infected or the possibility of having infected others. For this reason, contact tracers are trained in empathetic responses and active listening techniques in order to build rapport with their cases. Contact tracers don't provide medical advice since they are usually not trained in doing so.

Figure 8:Six Steps to Investigate Cases and Trace Their Contacts
Source: Johns Hopkins Bloomberg School of Public Health Coursera Course on Contact Tracing: https://www.coursera.org/learn/covid-19-contact-tracing
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After introducing themselves and the purpose of their call, the contact tracer asks the case about the nature of the symptoms they are currently feeling in order to assess if they need immediate medical attention – chest pain, trouble breathing, and blue lips are signs that the virus is causing severe lung damage, in which case the tracer helps the case to seek immediate emergency care. In most cases emergency care is not warranted, so the contact tracer next calculates the period of time that the case would likely have been infectious by asking when the case first felt symptoms. The infectious period usually starts two days prior to the first sign of symptoms (or 2 days prior to the first positive test for asymptomatic cases) and will last through

[9] People who have been confirmed as infected are referred to as cases. People who have been in close contact with cases are called contacts.

the duration of their illness, usually 10 days from when symptoms appear. The timing of when a person is tested and how long it takes for test results to return can vary, so contact tracers often have to do some investigation and calculation to determine the likely infectious period.

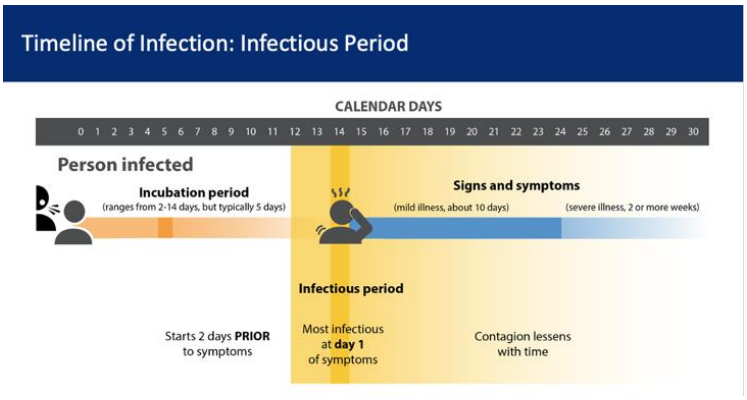

Figure 9: Timeline of Infection: Infections Period

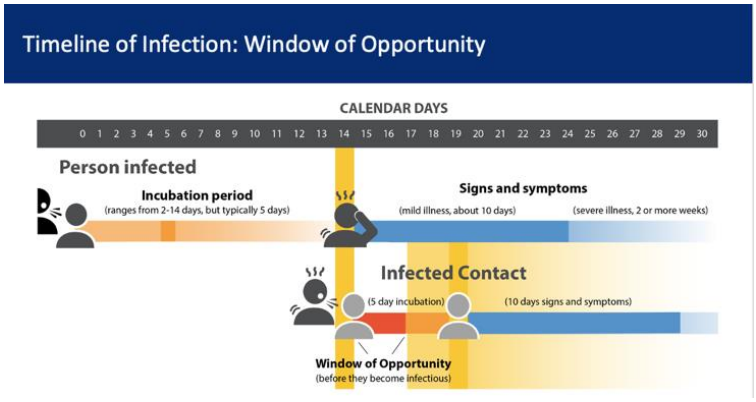

Figure 10: Timeline of Infection: Window of Opportunity

Source: Johns Hopkins Bloomberg School of Public Health Coursera Course on Contact Tracing: https://www.coursera.org/learn/covid-19-contact-tracing
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Next, the case is asked to list individuals with whom they may have been in close contact during their infectious period. Close contact is defined as having been within 6 feet of an individual for more than 15 minutes. Tracers talk to cases about their days, asking them where they went

and who they talked to in order to compile a list of **contacts**[10]. At times, cases are hesitant to share information for fear of breach of privacy or because they are embarrassed about the situation. Tracers let cases know that personal and medical information will be kept private and that tracers are bound by HIPPA laws[11] to keep information private; contacts will only be told that they have been in close contact with someone who was infected and tracers will not divulge the case's name. Similarly, they describe that the purpose of tracing is not for data gathering but for disease control; the information that cases provide is only used in stopping the spread of the disease.

Next, tracers ask the case to isolate until after their infectious period is over (10 days from the start of symptoms and 24 hours without fever and without medication). This means they are to limit all close contact with another person for that time period. In many cases, living arrangements make this infeasible, for example a case may share living space with others and has no feasible alternative living situations. Some communities have established isolation living arrangements e.g., Utah State University has designated some dorms as isolation and quarantine living quarters. Tracers ask cases if they will have access to food, medicine, and other necessities during their period of isolation. If cases are hesitant to isolate due to economic hardship, family, work, or school responsibilities the tracer tries to identify the needs and the concerns of the case and refer them to community and social support services.

After the call with the case, the tracer begins calling the contacts and explains to them that they have been identified as having had close contact with an infectious and contagious individual. They are asked to self-quarantine for 14 days from the day of the contact and given similar instructions and resources given to cases (note: infected cases *isolate*, contacts *quarantine*). If they are feeling symptoms, they are asked to get tested to confirm if they have become infected; if their results come back positive, they become a case and their contacts are collected and asked to quarantine. If they are not feeling symptoms but there has a been sufficient number of days since contact with the case, they may seek out testing as well. However, a negative test of a contact may mean that the virus has not had time to fully incubate in order to be detected by a test – incubation period is up to 14 days, but on average is 5 days, so a negative test result is not a substitute for a full quarantine period.

[10] People who have been in close contact with cases are called contacts. People who have been confirmed as infected are referred to as cases.

[11] The Health Insurance Portability and Accountability (HIPPA) Act of 1996 ensures that protected health information (PHI) cannot be disclosed without permission.

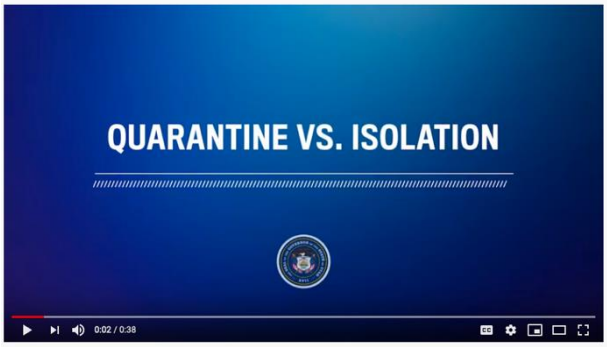

Figure 11: Video Comparing Quarantine and Isolation produced by the State of Utah https://youtu.be/c8vtnFawmbA

Case Load

During the summer months of 2020 the 7-day average number of positive cases was close to 20 a day in BRHD with a regular peak of around 30 cases a day early in the week to account for a lull in testing over the weekend. Looking through the historical data, Jane noticed that cases spiked 5 to 14 days after holidays or celebrations due to isolated super-spreader events in which one infected individual had infected many others at a family picnic or other gathering. In June, a meat packing plant in Cache County also had a major outbreak resulting in over 440 cases and the death of an employee[12]. During this outbreak, lines for testing centers in BRHD were often hours long as the public saw its first local outbreak coincide with the seasonal bloom of local flora that introduced pollen into the air, causing allergy sufferers to question their symptoms that were similar to those of COVID-19. On June 5th, BRHD saw its highest positive case count to date with 218 positive cases reported in one day.

By the end of August, the number of cases had dropped to an average of around 10 a day in BRHD, but the reopening of public schools and the return of university students to the area led to a steady increase of cases throughout the fall months. By October, Utah Governor Herbert changed the alert status of health districts and nearly all counties, including those in BRHD, putting them on high alert[13]. By the end of October hospitals throughout the state were reporting that they had reached ICU bed capacity[14] and the new 7-day average of BRHD was close to 85 new cases per day with spikes above 120.

[12] https://www.hjnews.com/news/local/hyrum-meatpacking-plant-outbreak-worse-than-reported-441-had-virus-1-died/article_18ee0ebf-fe08-5801-86af-3994772cd586.html
[13] https://www.sltrib.com/news/2020/10/13/utah-coronavirus-cases-up/

[14] https://www.sltrib.com/news/2020/10/16/utah-has-more/

Keeping Up

By June of 2020, BRHD had hired and trained 7 contact tracers that could be deployed to work up to 40 hours a week. On average, a case and all subsequent follow-up contacts took 30 minutes to complete, but the time varied dramatically depending on the individual circumstances of the case. Tracers were paid by the hour not by the case and were instructed to not go faster than necessary – making sure tracing efforts were done correctly was deemed more important than completing two cases an hour. On the other hand, the department had a goal to complete tracing for all cases on the day they received the positive test result.

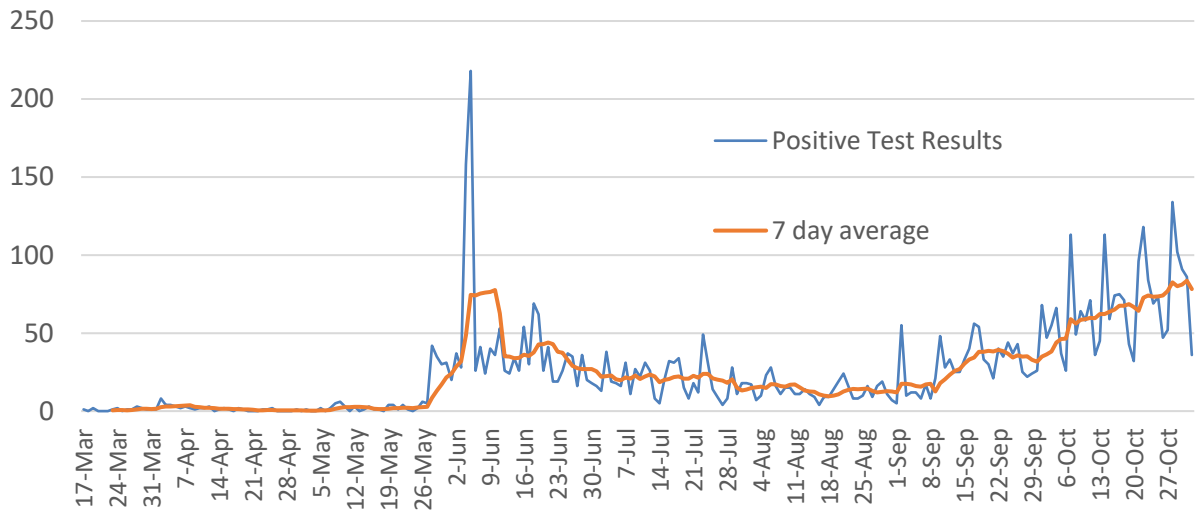

Figure 12: Bear River Health Department - Daily Positive Test Count, March 2020 to Oct 2020
Source: Utah Department of Health, https://coronavirus.utah.gov/case-counts/ retrieved Nov 1st, 2020

Except for the week of the meat plant outbreak, the team was able to meet this goal throughout the summer months. However, by October many case and contact interviews were happening the day after the positive test; even with the entire team working full time, they rarely cleared out the incoming list of work to complete. The same-day goal was not just a good idea established by management; the faster contact tracing could be completed, the more likely a quarantine of a potentially infected individual would stop further transmission. If a person had contact with a contagious individual more than 5 days before contact tracing started, it was likely that they were now actively contagious and spreading the disease themselves. Contact tracing had potential to reduce the spread of the disease, but only if it was timely.

Jane's Options

Having started this position during a growing wave of infections, Jane saw the inability of the contact tracing team to meet the same-day goal as a serious problem. Setting up a meeting with her leadership team, she asked each member of her team to come prepared with options and details or data that would help them make the right decisions. After a grueling half-day Zoom meeting, she summarized to the team their options:

1. Hire and train more contact tracers.

The tracing team lead emphasized that the team was unable to keep up with the work on most days, and it seemed like they needed more tracers. However, all trained and experienced contact tracers, for that matter anyone with a public health background, were already working given the worldwide pandemic. So, this option meant recruiting and training new tracers. Other health departments around the country had found success in asking applicants to take an online six-hour training developed by Johns Hopkins Bloomberg School of Public Health and offered free on Coursera[15] before applying for the position. The training was well-designed and introduced potential hires to the work they would do but was far from complete. New tracers would complete their training with the help of existing tracers thus temporarily reducing the team's capacity. The human resources director estimated that it would take two months to fully train a contact tracer to take on a load as heavy as that of current team members.

2. Train their existing contact tracing staff to work faster.

A quick calculation showed that the current capacity of the team should be 112 cases a day, so the team lead was challenged as to why the team was getting behind in the first place. Even with the recent surge, the BRHD 7-day average daily count was around this number. The team lead didn't have an answer but insisted that the team was working as hard as it could – there were no slackers on the team and everyone was carrying a full load. Someone suggested that the average time spent on each case must be more than 30 minutes. Someone else was able to quickly pull some data and showed that the average number of cases completed per tracer per 8 hour shift was 14.5 for the past 30 days but was perhaps much higher in the past 7 days. The standard deviation was high – also roughly 14.5 cases per day per tracer per shift. What would happen if the mean time was reduced to 30 minutes or lower? Also, what would happen if the variance was somehow reduced? What could be done to reduce the mean and variance of the time to complete calls?

[15] https://www.coursera.org/learn/covid-19-contact-tracing

3. Crosstrain other BRHD staff to be used during short term, predictable spikes in infections.

BRHD consisted of 110 health professionals working in varying areas. Since most had a public health background, training them to be contact tracers might be faster and easier. However, contact tracers did a lot of their work during irregular hours – they usually did not work a normal 9-to-5 business day, but worked as cases came and did a lot of following-up during evenings and weekends. Most BRHD employees did not work these types of hours. Additionally, most employees didn't have many extra hours in their workday to start contact tracing – it had been all-hands-on-deck since the outbreak, and everyone had work in their own domain that was already related to the pandemic. Should contact tracing have priority over some of the other work done at BRHD? Some of the staff were working on public relations efforts to try to get citizens to be aware of what they could do to be safer. Others were working closely with hospitals and testing centers to monitor access to PPE and tracking the capacity of ICUs. Hospitals were beginning to ask for medically qualified personnel to take shifts in the hospitals to relieve their own burdened staff. The environmental staff was working closely with the local sewer and wastewater treatment plants to get another picture of the spread of the disease in the communities. Still others were pushing hard to promote flu shot clinics at schools throughout the region in order to offset the coming flu season. The demand for other social services offered by the BRHD had also only increased due to economic hardships caused by the pandemic.

4. Ask school districts and Utah State University to do the contact tracing for cases from students from their schools.

Utah State University had already placed a job posting to hire contact tracers for cases originating from their students. As a part of their response to the pandemic and their dedication to staying open, USU had become certified to conduct their own testing and had dedicated dorms for isolation and quarantine. In October 2020, USU was recognized as a leader among universities for their preparation, response, policies and relative success in the face of the challenging times[16]. By the end of October, USU was seeing about a 7-day average of between 13 and 17 new cases a day with spikes around 25. However, all in-person classes and activities were moving fully online after Thanksgiving and most students would not return to campus until after the middle of January.

[16] https://ususatesman.com/usu-named-among-top-institutions-for-covid-response/

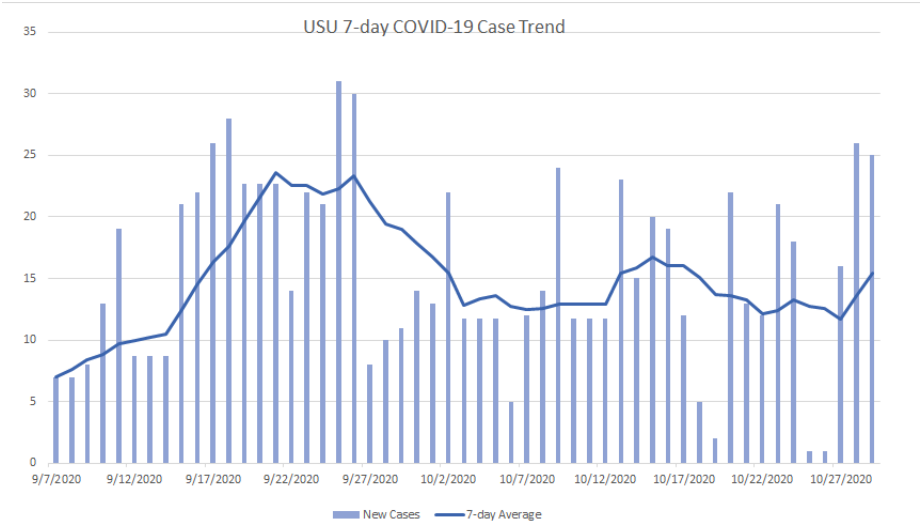

Figure 13: Utah State University's 7-day COVID-19 Case Trends
Source: https://www.usu.edu/covid-19/ Retrieve November 1, 2020

Other local health departments were asking for help from their K-12 school districts to perform tracing for student cases[17]. This effort largely fell on the shoulders of districts' nursing staff. This approach had varying success; some nurses were unable to find time to conduct the tracing. In other areas, school districts were happy to take on tracing since they felt they could do a better job knowing where students had been inside a school, who they had close contact with, and what activities they had been a part of. School district administrators were committed to staying open and could be convinced of the value of contact tracing as a part of their overall strategy. It was also another way to show parents the commitment of the district and the seriousness placed on children's safety during the pandemic.

A member of the leadership team pointed out that the BRHD community update given on October 28, 2020 reported the following statistics:

> "It is also important to know that 57% of our transmission is due to household exposure, and 16% is from social gatherings. Workplace transmission represents about 9% and there is very little transmission occurring in our K-12 classrooms. Students, teachers, and administrators have been vigilant in classroom settings.[18]"

[17] e.g., Weber School District: http://wsd.net/covid-19/adjusted-quarantine-guidelines/new-quarantine-guidelines

[18] Executive Director's update accessed Nov 1, 2020: https://brhd.org/coronavirus/

Looking closer at the data, only about 4% of the cases could be attributed to school classroom transmission. Was it fair to push the tracing efforts to the schools if they were already doing such a good job trying to enforce behavior change among their students?

Additionally, some members of Jane's team pointed out that BRHD would not have as much control over tracing efforts conducted by other parties. They pointed to early days in the pandemic when the Governor had authorized the Utah National Guard to act as contact tracers and a few were assigned to BRHD. The quality of the guard members' work was not at the level of the current team – they could only do half as many cases per day, and they were less able to build the rapport needed to properly get contact information from cases. Would the same happen if the school districts handled contact tracing?

5. Ask or force contact tracers to work overtime during spikes.

One member of the leadership team suggested that maybe the tracers just got behind occasionally and that some overtime would take care of the issue. The team lead thought that morale of the team was already pretty low, they were working very hard, and the fruits of their labor were not evident as case counts continued to rise. Forcing or even asking the team to work overtime might prove to be a breaking point. She had particular concern for a couple of members of the team who had experienced some rough days recently; what would happen if these two quit when they were needed the most?

Additionally, no one could predict accurately when the current wave would recede – was this just a temporary spike or should the team be considering a more long-term solution? After meeting with federal CDC officials, the Governor's office told local health departments to expect the numbers of cases to continue to rise throughout the cold winter months[19]. A "wave" is a good analogy since an ocean wave is proceeded by another and there is no on/off switch that will give the team a break – if the team works overtime there will likely be no time for rest and recovery.

6. Divide the daily workload evenly between the contact tracers, and let them work on their own list of cases rather than working off of a master list.

One team member suggested that the team was overwhelmed by the long list of cases that needed to be addressed every day. Maybe if the list was divided into 7 lists it wouldn't seem so

[19] https://www.sltrib.com/news/2020/10/25/coronavirus-utah-covid/

overwhelming and would give some sense of ownership to the tracers, motivating them to get the work completed on time. Something didn't seem quite right about this idea, but no one could put their finger on it.

Conclusion

Monday, November 2nd 2020: Jane knew she had to act now. What the future would hold was uncertain, but she believed in being prepared and in taking actions needed to protect the health of her community, and her first test as the new director of BRHD was to maintain contact tracing as a key component in that regard.

APPENDIX:

Task of Health Departments

from https://en.wikipedia.org/wiki/Local_health_departments_in_the_United_States
Accessed Oct 28, 2020

1. Monitor health status to identify and solve community health problems.
2. Diagnose and investigate health problems and health hazards in the community.
3. Inform, educate, and empower people about health issues.
4. Mobilize community partnerships and action to identify and solve health problems.
5. Develop policies and plans that support individual and community health efforts.
6. Enforce laws and regulations that protect health and ensure safety.
7. Link people to needed personal health services and assure the provision of healthcare when otherwise unavailable.
8. Assure competent public and personal healthcare workforce.
9. Evaluate effectiveness, accessibility, and quality of personal and population-based health services.
10. Research for new insights and innovative solutions to health problems.