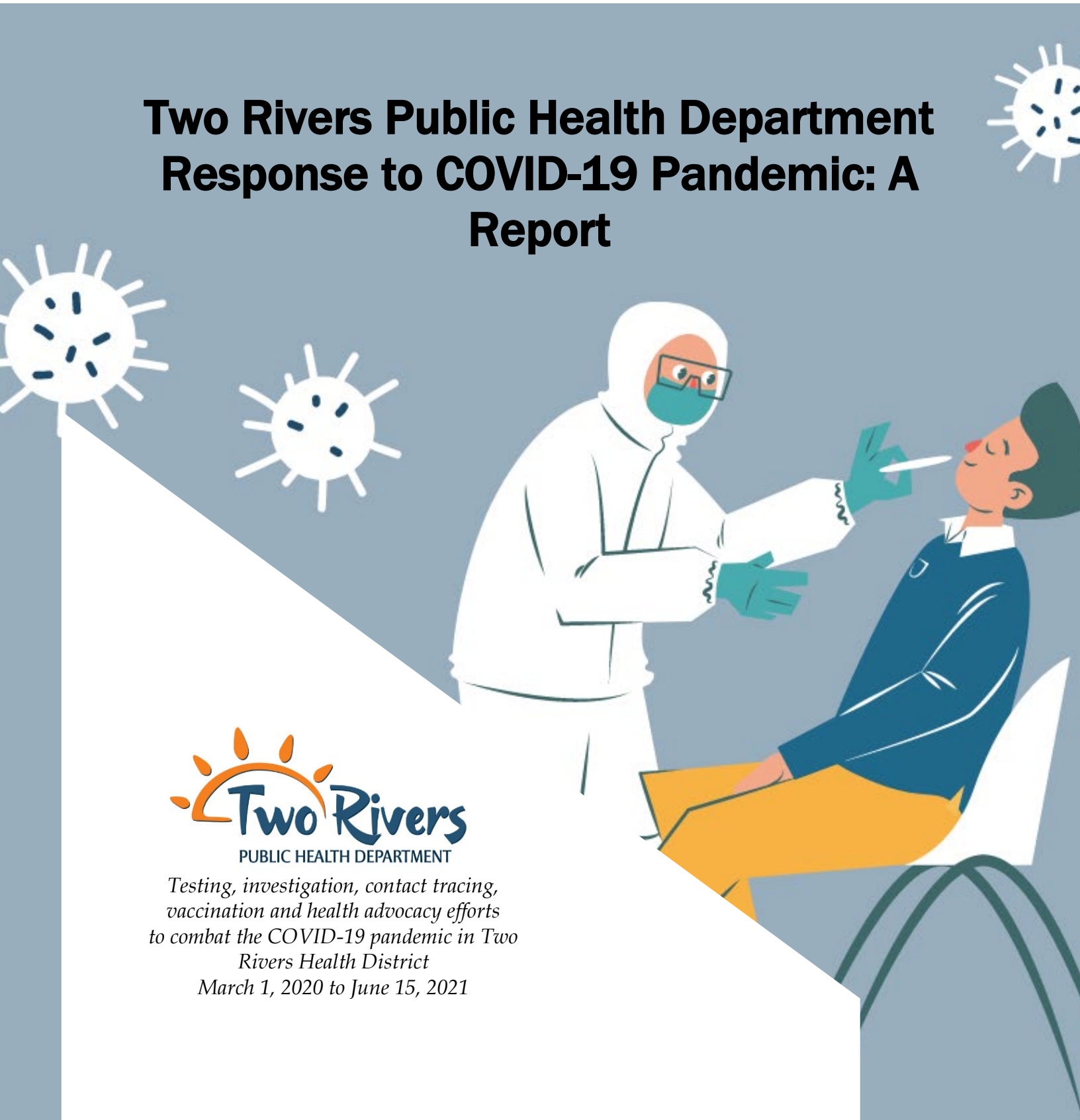
Two Rivers Public Health Department Response to COVID-19 Pandemic: A Report



Two Rivers
PUBLIC HEALTH DEPARTMENT

Testing, investigation, contact tracing, vaccination and health advocacy efforts to combat the COVID-19 pandemic in Two Rivers Health District
March 1, 2020 to June 15, 2021

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Executive Summary

The COVID-19 response by Two Rivers Public Health Department (TRPHD) represents an astonishing endeavor by the local health department to address a global public health risk. Through the course of the Coronavirus Disease Pandemic, TRPHD was closely involved in all aspects of the pandemic response, working with partners for testing, investigation and contact tracing, focused communication, vaccination and advocacy. Between March 1st 2020 and June 15th 2021, over 135,000 tests were conducted by different entities in the district, testing over 45,000 residents of the district at least once. Since March 2020, there were two separate outbreaks of COVID-19 in the district, one mostly confined to Dawson County around April 2020 – May 2020, and the other more widely disseminated across the district in October – December. Buffalo and Dawson County residents accounted for over 80% of all cases. Over 10,500 persons have tested positive for COVID-19 during this period, and 120 persons have died due to the disease. TRPHD's case mortality rate on June 15th, 2021 (1.13%) was slightly lower than the state of Nebraska, and substantially lower than the nationwide average on the same date. TRPHD was one of the first health districts in Nebraska to have successfully vaccinated over a third of its elderly population (aged 65 years or more). TRPHD is the single largest provider of vaccine doses in the district, providing little less than a fifth of all doses till June 15th. Currently, more than 45% of Two Rivers Health District has received at least one dose of the COVID vaccine, although weekly vaccination rates dropped from May-July, after vaccination was opened to residents aged 12 years and over. As of October 2021, TRPHD continues to monitor and track selected cases, assess risk and provide vaccines across the region in addition to its regular work of surveillance and public health program implementation in the health district.

History and Background

On December 31st, 2019, health officials in China reported the existence of a cluster of cases of highly contagious viral pneumonia among people associated with the Huanan Seafood Wholesale Market in Wuhan, Hubei Province, later confirmed to be associated with a hitherto unknown, or novel coronavirus. This virus was initially named the 2019 novel Coronavirus (2019 n-CoV), and subsequently renamed the Severe Acute Respiratory Syndrome Coronavirus-2, or SARS-CoV-2. The disease caused by it was named the Coronavirus disease 2019 or COVID-19, or simply referred to as COVID. [1] Today, multiple variants of the coronavirus have developed in countries outside China, and have subsequently spread to the United States. These include the highly contagious Delta Variant (B.1.617.2) and the Gamma Variant (P1/P2), which together accounted for almost a third of cases in Nebraska in mid-July 2021. [2]

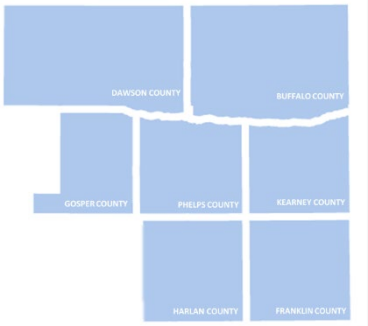
Within the first month following the initial COVID announcement by Chinese officials, cases had risen to almost 10,000 across 21 countries. Worldwide cases swelled to over 8 times that number by the end of February, prompting the World Health Organization (WHO) to declare a global pandemic on the 11th of March, 2020. The first case of COVID-19 in the United States was detected in Snohomish County, Washington on January 21st, and the first case in Nebraska was recorded on March 7th, 2020 in Douglas County. The US Government declared a state of National Emergency on March 13th, 2020, followed by Governor Pete Ricketts' "21 Days to stay home and stay healthy" initiative on April 10th. [3-6] The first case of COVID-19 was detected in Two Rivers Public Health District (TRPHD) on March 20th, and the first death due to COVID-19 was on March 31, 2020. By mid-June, over 10,500 persons had tested COVID positive across TRPHD and 120 persons had died due to the disease. The United States recorded 33.8 million cases and over 605,000 deaths as of early July, 2021. [7] In the same time, Nebraska recorded over 225,000 cases and 2523 deaths. Experts across the US predict the COVID-19 pandemic is expected to cause average life expectancy at birth to drop by about 1.13 years in 2021, equaling the lowest estimate since 2003. [8]

The introduction of vaccines has greatly aided the fight against COVID-19 in the US and across the world. The mRNA (tradename Pfizer, Moderna in the US) and adenovirus vaccines (tradename Janssen in the US) are well-tolerated, safe and effective against most existing variants of the disease, including the delta variant. More importantly, vaccination dramatically reduces the risk of hospitalization in case of infection with COVID-19. [9] As of mid- July 2021, 47.7% of the total population in the US and about 48% of Nebraskans were fully vaccinated. [10] However, analysis of county-level Centers for Disease Control (CDC) data in June 2021 revealed that there was a rural-urban vaccination gap across the United States, and that the gap was highest in Nebraska. [11] As of early September, about 43% of the total population in Two Rivers Health District was fully vaccinated, and 50% had received at least one dose. (For a pictorial history of the COVID-19 pandemic response in TRPHD, please see Appendix 1)


“At the best of times, the partnership with our community and healthcare systems is excellent, at the worst of times it is essential. We are stronger together.”
-Jeremy Eschliman
Health Director

COVID-19 in TRPHD

Two Rivers Public Health Department (TRPHD) covers 7 counties in central Nebraska, reaching 96,986 people who reside in the health district spread across roughly 4663 square miles. It is the largest rural health district in the state by population. Over three quarters of residents live in Buffalo and Dawson Counties, a tenth live in Phelps County, and the remaining 15% is spread somewhat comparably among the four counties of Kearney, Harlan, Franklin and Gosper in decreasing order of population. The largest cities are Holdrege (pop. 5408), Lexington (pop. 10115) and Kearney (pop. 33867) meaning that well over half the residents of TRPHD live in three cities, over a third in Kearney city alone. About 17% of the district is over 65 years of age and about 24% under 18, but there is wide variation between counties, with over 24% of Dawson County aged less than 18 and 28% of Franklin County aged over 65. 9 (For details, see appendix 2)



With over 26,134 workers in 23 plants processing beef, pork and poultry, Nebraska is home to the largest number of workers employed by the meatpacking industry in the country, [12] and the large meatpacking facility in Lexington, Dawson County was thrust into the spotlight during the initial days of the pandemic. The progress of the COVID-19 pandemic in TRPHD can be divided into two phases, an initial outbreak of cases in April-May of 2020 followed by a larger wave in October-November of that year. [13] It is now fairly evident that many cases during the first outbreak were connected to a meatpacking facility in Dawson County [14] while the outbreak in November was more disseminated and spread across the district. For a detailed look at the progress of the COVID-19 pandemic in TRPHD over the first three months, please see the report published in August, 2020 [14] (https://www.trphd.org/file_download/inline/fc84d43d-8e36-4a50-b720-0478adac3d0a).

Beginning with the first COVID-19 case detected in the health district on March 19, 2020, TRPHD has managed almost all of the contact tracing, investigation and quarantine follow-up services across the health district. In addition, Two Rivers coordinated all of the public COVID testing services through TestNebraska.com, working with local partners to co-ordinate regular testing across nine sites in the district. Since January, TRPHD has offered COVID-19 vaccines through the Vaccine For Children (VFC) clinics, building on existing relationships that were strengthened through co-operation with partners for the Test Nebraska program. After private hospitals and clinics in the seven counties of TRPHD, Two Rivers Health District accounts for the most number of vaccine doses provided. Considering each individual

provider separately, TRPHD is the single largest entity that provided vaccine doses to residents across the district. In March, Two Rivers Health Department was the first health district in Nebraska to fully vaccinate over a third of its senior population (65 years and over).

IN THE FIRST SIX MONTHS OF 2021, TRPHD HAS CONDUCTED JUST UNDER 150 VACCINE CLINICS ACROSS ABOUT 45 SITES, ALMOST A THIRD OF WHICH WERE MOBILE VACCINE TRAILER SITES.

In addition, TRPHD coordinated and led a Districtwide health education, advocacy and communications effort, in close partnership with multiple National, State and Local agencies. TRPHD was the sole point of contact for City and County Officials, working closely with city governments and Hospital and Emergency Management Staff across the district, in addition to school superintendents in almost 25 school districts spread across TRPHD. The department has released weekly districtwide risk dials and COVID reports since August 2020, in addition to focused citywide reports and more recently, weekly vaccination updates. TRPHD also engaged widely with members of the public through the website, social media and traditional outlets like print, radio and television. There was regular outreach with business owners, faith-based organizations, chambers of commerce as well as private citizens seeking to make plans for upcoming gatherings and events.

COVID-19 Response by TRPHD – an overview

Analysis Frame

The COVID-19 response by Two Rivers Health Department may be broadly classified in the following categories:

1. COVID-19 Testing Services: include efforts by the National Guard early in the pandemic, coordinating testing through TestNebraska and distribution of rapid test kits to long term care and other residential facilities in the district.
2. COVID-19 Contact Tracing and Investigation Services: includes efforts to contact persons testing positive and inform them of their test results. In addition, contact tracers elicited detailed case histories, identified close contacts and provided isolation/quarantine information
3. COVID-19 Medical Materials Management and Logistics: includes inventory, storage, management, distribution and tracking of medical materials. This covers all items like Personal Protective Equipment (PPE), medical equipment and devices for testing and vaccination services.
4. COVID-19 Vaccination Services: includes co-ordination with local clinical partners to ensure vaccine supply as well as planning, conduct and follow up of vaccination clinics
5. COVID-19 Community Engagement and Policy Advocacy: includes engagement with city, county and state officials, clinicians and hospitals, school officials and members of the general public.

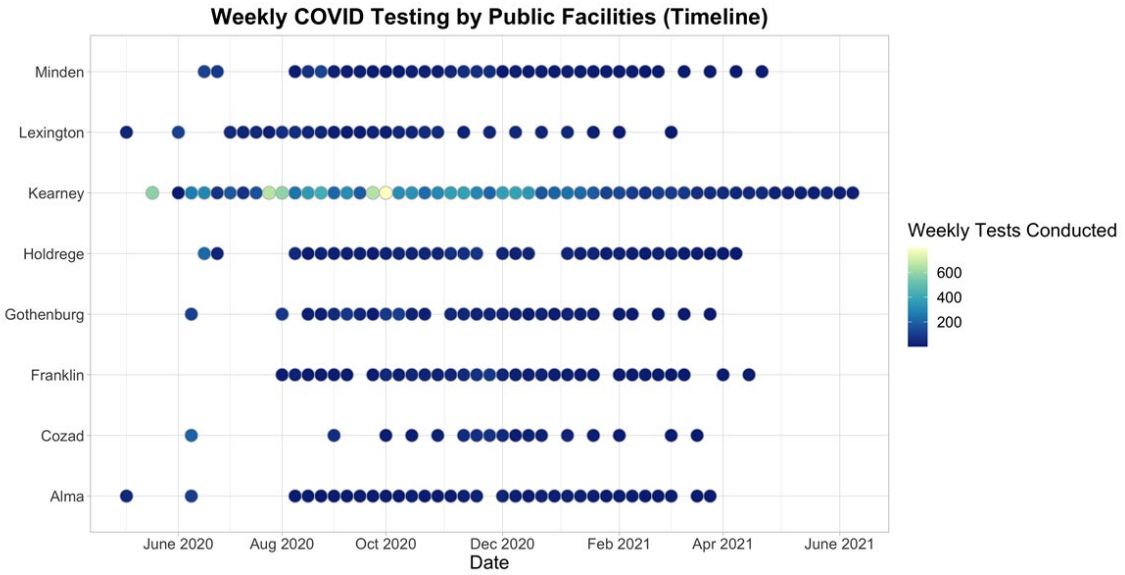
We describe TRPHD response through the planning, operation, communication and data analysis functions undertaken in each of the five categories described above.

Testing

In April 2020, TRPHD worked closely with the National Guard to set up mass drive-through testing sites in Buffalo & Dawson counties while partnering with the Nebraska Public Health Laboratory (NPHL) for more routine testing services. The intervention with the National Guard lasted for around a month, following which the state of Nebraska announced free public COVID testing through the TestNebraska program. Through this program, TRPHD coordinated with local health systems to create and staff testing sites throughout the district. TRPHD ensured PPE and testing supplies through the Nebraska DHHS supply chain.

TRPHD staff reached out to partners, established memoranda of understanding with them and facilitated staff training; including but not limited to, in clinic flow, IT/ Computer entry, ordering of test kits and Personal Protective Equipment (PPE), and transport of samples to the designated laboratory in Lincoln city. The first

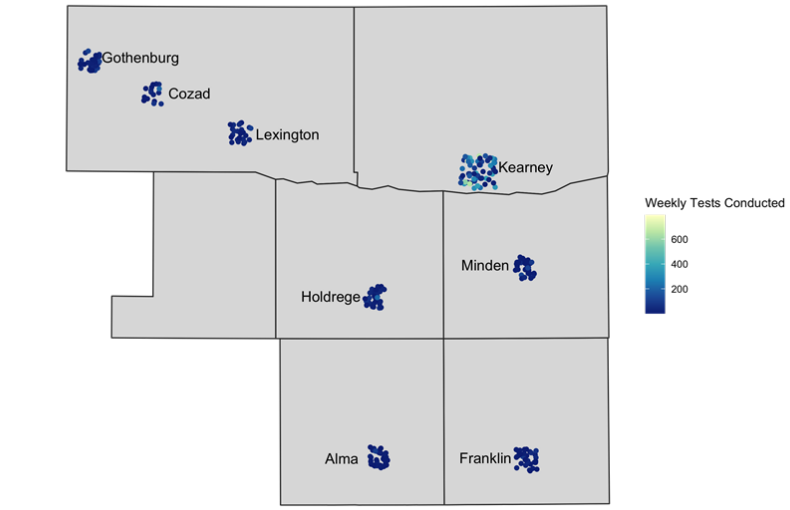
TestNebraska site was opened at the Buffalo County Fairgrounds in Kearney city on June 24, 2020 and the second was in Lexington. Beginning Aug 5, six more sites opened in Gothenburg, Franklin, Holdrege, Minden, Alma and Cozad, offering testing either weekly or bi-monthly. An additional site was added in Kearney city at the University of Nebraska at Kearney (UNK) campus. (for details on testing sites and schedules, please see Appendix 3). Test sites were designed to be drive-through. Logistics and clinic flow planning played a huge role in ensuring an efficient patient experience. By mid-June 2021, about 17435 appointments had been scheduled through TestNebraska and 16694 test results obtained. The last TestNebraska site was conducted in Buffalo County Fairgrounds on July 16, 2021. The graph below shows weekly testing at sites facilitated by TRPHD (including TestNebraska & National Guard testing) across eight cities from March 2020 – June 2021. The plot represents both weekly frequency and the volume of tests conducted at each site.



In addition, TRPHD distributed over 20,000 test kits of BinaxNOW Rapid test kits to partners across the district. Between March 1, 2020 – June 15, 2021, a total of 137,167 COVID tests were conducted by all facilities in TRPHD, about 45% of which were laboratory-based Polymerase Chain Reaction (PCR tests). Public testing (primarily TestNebraska & National Guard) accounted for about 18% of those, all PCR tests. Long term care and residential facilities (like retirement homes, veterans' homes) accounted for almost 50% of testing, although these were almost all antigen-based 'rapid' tests. Over 1/3rd of all tests were conducted in the three months between September and December 2020. Women accounted for over 2/3rds of all tests conducted in the district.

The map b displays public testing sites through TestNebraska by location in TRPHD. Each test site was functional weekly or bi-monthly. The map grades sites by city location and color coded them based on the proportional number of tests conducted. Kearney city, with its two sites, accounted for a large proportion of tests conducted. Every county with the exception of Gosper had a test site, and there were three sites to serve Dawson County. (Please see appendix 4 for table describing total tests conducted in TRPHD from March 1, 2020- Jun 16, 2021.)

Weekly COVID Testing by TRPHD-Facilitated Locations (Map)



Contact Tracing and Case Investigation

On March 20th 2020, a 42-year-old female who had moved to Buffalo County from New York city for employment was confirmed as the first case of COVID-19 in Two Rivers Public Health District. She was mildly symptomatic and advised isolation and quarantine. Within a week TRPHD identified a COVID-positive elderly couple, the department worked closely with the Rapid Response Team (RRT) comprised of epidemiologists and other experts from multiple agencies including the CDC, United States Public Health Service Corps (USPHSC) and Department of Health and Human Services (DHHS). Over two weeks in late March, RRT helped the overwhelmed disease surveillance team in TRPHD set up internal systems to monitor outbreak investigations and conduct contact tracing.

The contact tracing and investigation team led by the Community Health Nurse and Emergency Response Coordinator was quickly expanded, and a core team of four began detailed contact tracing and follow up in late March, reaching out to identified patients with telephone calls and further check-in. At the same time, the Health Department Office was completing a long-planned move from the city of Holdrege in Phelps to Kearney in Buffalo County. Work proceeded at a temporary address in Kearney through the initial COVID outbreak in April-May as final changes were made to the new office building. The exigencies of shifting workplace dynamics had to be balanced almost daily with the demands of a rapidly spreading pandemic, resulting in innovative solutions to unanticipated logistic problems. TRPHD moved into the current office headquarters in Kearney in June, 2020.

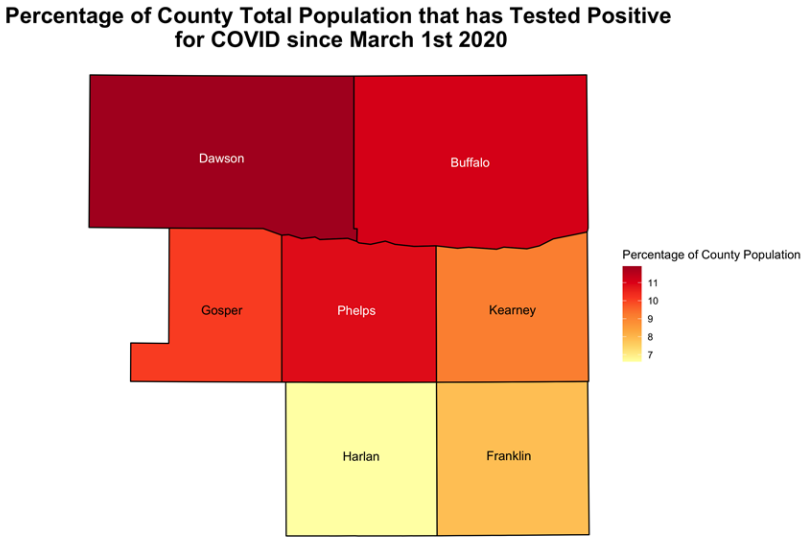
Regardless of the location a TRPHD resident was tested, their COVID lab reports were automatically sent to a centralized database. When Two Rivers received a positive lab report for COVID-19, the individual would have a case opened in the database. In this case report, the department was able to track demographic information of all patients, such as city of residence, age, gender, as well as document the specifics of their illness,

such as symptoms developed, preexisting conditions and history of potential exposures and contacts.

Before a case was opened, department employees would reference a patient's name and date of birth to ensure that it had not previously been opened. This allowed the department to ensure that people tested multiple times were not being labeled as new COVID-19 cases. After a case was opened, the patient contact information was sent to a Two Rivers case investigator and contact tracer. After the case investigator collected information from the individual, they would instruct the patient on how to isolate until they are no longer contagious and would assist the patient with any questions or concerns regarding the virus and their isolation. Case investigation would also assist the patient with any strains that isolation caused, such as assistance with sourcing food or childcare. Finally, the case investigator would ask the patient if they had been in close contact within the days leading up to their symptom onset or positive test.

Following this, the same investigator would contact the patient's close contacts, inform them of the proper guidance of quarantining, and would proceed to answer any questions. Contacts were never informed of the name or any identifying information of the COVID-positive person that exposed them.

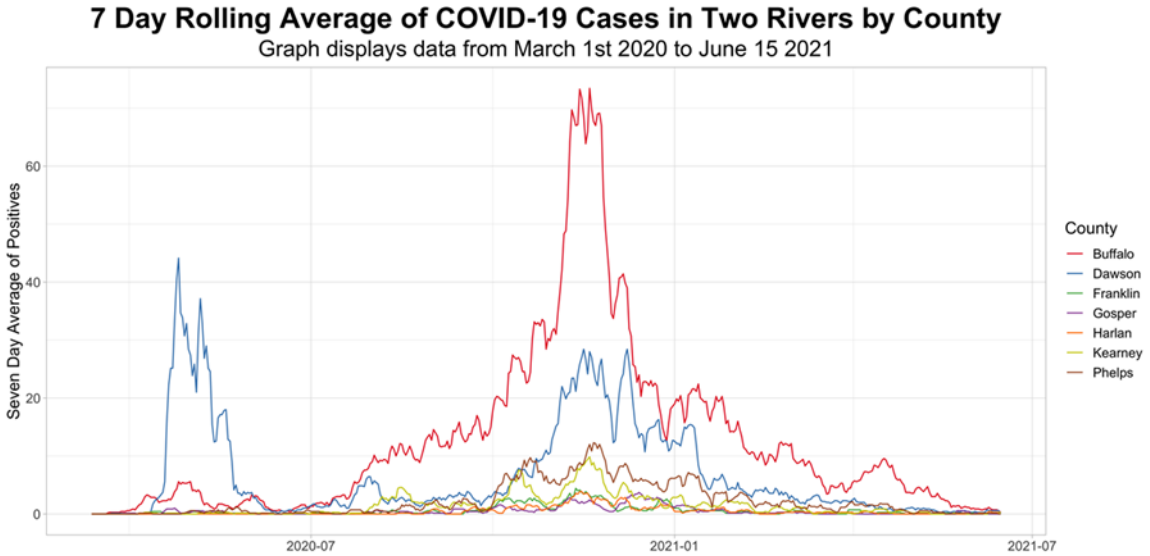
After this process was complete, the case investigator would follow up with the COVID-positive patient several days after the initial call to examine whether their condition had improved, document any new symptoms, and answer any new questions the patient had. This process was repeated until the patient no longer experienced symptoms. Finally, the patient's information was entered into the digital case file. Through the pandemic, Two Rivers employed 16 part-time and 4 full-time case investigators. From the beginning of 2020 to the end of June, over 22,000 calls were made; the department reached over 9500 COVID-positive patients. The map describes the 7 counties in TRPHD by the relative proportion of their population that tested positive for COVID-19 (over 11% in Dawson, less than 7% in Harlan).



In the instance that a patient who had recently tested positive for COVID-19 would die, TRPHD contacted the coroner's office and medical staff (if the patient was hospitalized) to determine whether COVID was listed as a cause of death on the patient's death certificate ("Underlying Cause of Death"). All deaths relating to COVID-19 must be confirmed by the state of Nebraska before they are reported. Each case is investigated over telephone - the next of kin is contacted, and exit interviews conducted by staff before releasing a public notification. For details on procedure for COVID death certification, see https://www.cdc.gov/nchs/data/nvss/vsrg/vsrg03-508.pdf

Finally, given the recent rise in COVID-19 variants, PCR tests are now randomly screened to detect for which (if any) variant is present. While the detection of variants allows for Two Rivers Public Health Department to track the spread of the virus more comprehensively, variant positive cases are still processed, contacted, and investigated in the same manner as all other cases. Due to the time it takes for laboratories to sequence a PCR test, the results of a variant test are usually discovered after the patient has already been contacted by the health department.

TRPHD publishes periodically updated dashboards that describe the progress of COVID-19 in the district, as well as the current status of medical/ surgical beds and ICU beds in the district. The website (www.trphd.org) also publishes comprehensive weekly reports at the district level and depending on need, at the city level. These have been accompanied by a weekly risk dial that describes the degree of COVID transmission in the region. Details of the dashboards, weekly reports and risk dial are described in the 'public engagement & policy advocacy' section. The graphs below describe the weekly average of cases by county and by age group in Two Rivers Health District from March 1, 2020 – June 15, 2021.

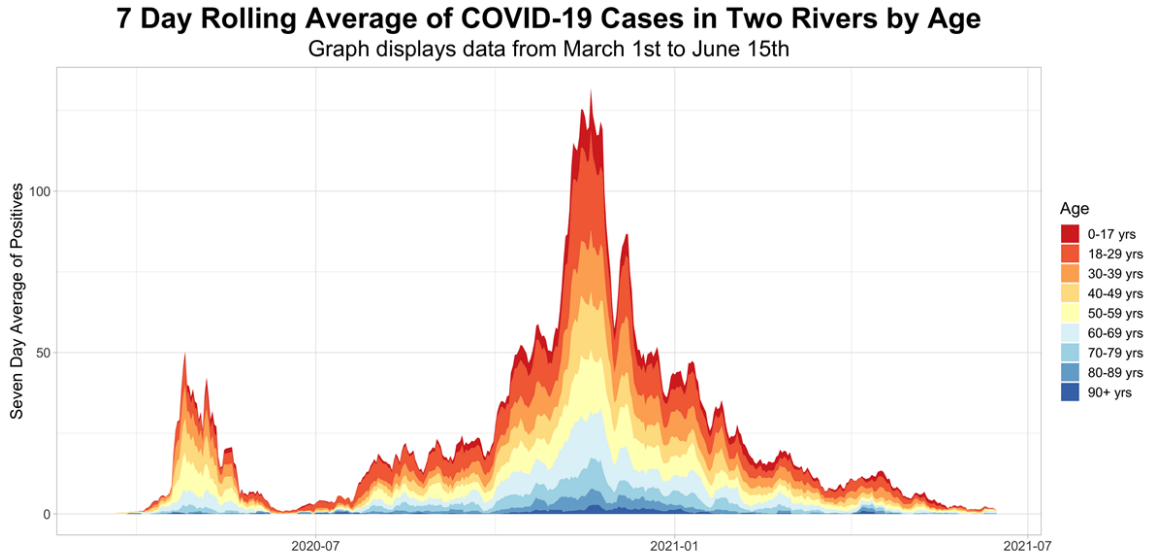


Some broad trends stand out in the incidence of COVID-19 in TRPHD. It is clear that there were two separate outbreaks of COVID-19 in the district, one mostly confined to Dawson County around April – May, and the other which was more widely disseminated across the district, underway in October – December. Buffalo and Dawson counties

accounted for over 80% of all cases. The outbreak in April-May primarily affected persons between the age of 18-49, indicating spread among working age populations. The outbreak in October however, was more gradual to begin, first affecting 18–39-year-olds, then 50–64-year-olds, and finally rising across all age groups, especially those aged 70 years or more.

Throughout the course of the pandemic, women were significantly more likely to be tested than men, and they accounted for a slightly higher proportion of positive cases. Over 60% of positive cases in TRPHD were detected in persons less than 50 years, residents aged 60 years or more accounted for about 22% of overall cases. The proportion of positive cases by county roughly corresponded to their relative population share in the district. Thus, Buffalo accounted for about 50% of all cases, Dawson and Phelps accounted for 27% and 9% respectively. Among persons who tested COVID positive before June 15, 2021, over 18% identify as Hispanic or Latino, although that proportion ranges from almost 40% in Dawson to about 4% in Harlan County. After retired, unemployed and disabled persons, healthcare workers and students (including minors) made up the largest category of positive cases. Professionals, educational services and food production (meat & poultry) formed the other common occupations among positive persons.

The clear evidence of clustering among persons of the same occupation or educational group and the temporal trends in transmission provide clues that may help us to surmise about the nature of spread of COVID in the community – likely first through the workplace, and then through family contacts. (For detailed look at positive cases in TRPHD, please see appendix 5)



Medical Material Management & Distribution

Medical materiel management and distribution for public health departments is the ability to acquire, manage, transport, and track medical materiel during a public health

incident. A global shortage of Personal Protective Equipment (PPE) was experienced throughout 2020. This shortage directly affected healthcare facilities, long term care facilities, and government operations such as schools, law enforcement, and courthouses. Indirectly, it impacted access to COVID-related medical equipment and devices for local business and personal use across the country.

On a local level, TRPHD began to coordinate release of PPE and COVID-relevant medical materials, working with the State of Nebraska to access State and Federal stockpiled equipment and devices. At a federal level, the national stockpile was inventoried and released by population to States to be distributed at the local level. However, response structures for distribution were reformatted in light of the COVID pandemic. Public health departments were largely entrusted with this task, rather than Emergency Management Agencies. Historically, disaster and emergency management plans identified local Emergency Managers as responsible for obtaining and distributing PPE and other equipment. Due to the duration of the pandemic, distribution was not coordinated by the emergency management chain consisting of Nebraska Emergency Management Agency (NEMA) and the Federal Emergency Management Agency (FEMA) but was facilitated through Nebraska DHHS.

It was immediately apparent that there were issues with long term storage and access to medical equipment and PPE under existing agreements. However, none of TRPHD's own emergency plans had dealt with the prospect of long-term distribution processes, and certainly not on this scale. Working rapidly even as the incidence of COVID cases in the district were rising, TRPHD collaborated with Tri-Basin Natural Resource District to store and release PPE on a long-term basis through a warehouse site in Holdrege, in Phelps County. This partnership not only included storage, but also assistance with distribution, receiving and logging of PPE shipments, and other expertise as needed. Shortly after this, Phelps County Emergency Management began to assist with the paperwork and tracking of PPE disbursement. Emergency Managers from Buffalo, Dawson, Harlan, Gosper, and Kearney counties assisted in transporting medical materials to central locations in each county. Throughout the pandemic this collaboration with partners, and their local familiarity with resources and locations, helped to distribute PPE more efficiently.

The sheer scale of distribution of materials bears some reflection. In a little over 18 months since March 2020, TRPHD has coordinated the receipt, storage and distribution of almost two and a half million sets of gloves, 425,000 surgical gowns, over 128,000

N95 masks, 330,000 surgical masks and a little under 100,000 KN95 masks. Through the Federal-State-Local distribution pipeline, TRPHD coordinated the movement of almost 10,000 infrared thermometers, over 42,000 face shields and goggles and almost 550 gallons of hand sanitizer. This effort continued as vaccination services were rolled out across the health district; TRPHD distributed over 21,000 bandages and over 15,000 syringes in connection with vaccination clinics across the 7 counties.

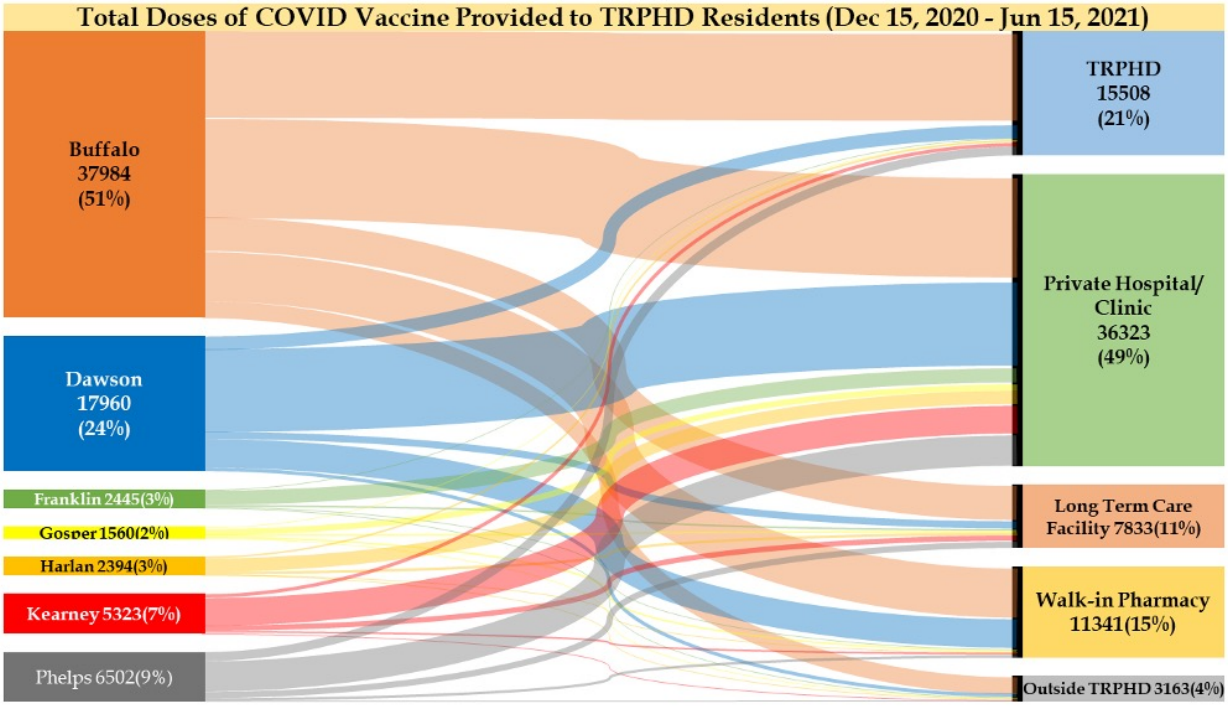
Vaccination

Since December 15, 2020, TRPHD has coordinated the distribution and administration of COVID-19 vaccines through the department's Vaccines For Children (VFC) clinic and through local hospitals and clinics. Initial scarcity of Emergency Use Authorized COVID-19 vaccines caused the need for close coordination of vaccine administration through a phased system created by Nebraska DHHS through recommendations from the CDC Advisory Committee on Immunization Practices. Shortages of COVID-19 vaccines lasting through April 2021 facilitated the coordination of TRPHD vaccine allotment and disbursement in partnership with Kearney Regional Medical Center. Kearney Regional Medical Center Pharmacy utilized an ultra-cold freezer to maintain Pfizer COVID-19 vaccine and coordinated with other district hospitals and clinics for pick-up of vaccine allotments and ancillary kits.

As vaccines were first rolled out in December 2020, pharmacy chains had contracted with the federal government to provide vaccines to Long Term Care Facilities. Subsequently, TRPHD and its partners have assumed responsibility for the task of vaccinating residents in long term care and assisted living facilities. conducted mass vaccination clinics in March and April. Vaccines became available to residents of care facilities and healthcare workers in December, persons over 65 years in early February, educators and first responders in mid-February, and to persons aged 16 years and over in early April. TRPHD has offered vaccines to an ever-widening group of residents since January, including to all residents aged 12 years and over in May, 2021. For a description of different phases of vaccine rollout, see appendix 7.

TRPHD began providing vaccine doses to residents through the on-site vaccine clinic as early as December 2020. Regular clinics continue to be scheduled at the office, in addition to public (open to everyone), closed (restricted to a specific group, such as employees of a business or factory), mobile (trailer-based) and fixed (at a fixed location or address). The first public mass vaccination clinic was conducted by Two Rivers Health District on February 27, 2021. During this time, registration was still managed at a local level, necessitating manual entry and registration by staff attending calls at TRPHD. Planning for vaccine clinics included creating standard operating protocols for checking in patients, screening, vaccine administration, allergy management, monitoring and evaluation.

TRPHD has held 65 mass clinics at 9 locations, 38 closed clinics (restricted to a specific group) at nearly 20 locations, and 39 Mobile clinics at over 15 locations in the past 6 months, providing mostly Moderna & Pfizer vaccines (two doses), with some clinics also providing the single-dose Janssen vaccines. In addition, TRPHD has helped conduct more than 20 clinics in collaboration with partners across 7 counties. Over a fifth of the vaccine doses were provided by TRPHD through its multiple clinics and mobile outreach. The graph below describes the COVID vaccine doses provided to TRPHD residents by county of residence. All doses of Pfizer/ Moderna (2-dose) and Janssen (single-dose) vaccines have been included in the graph.



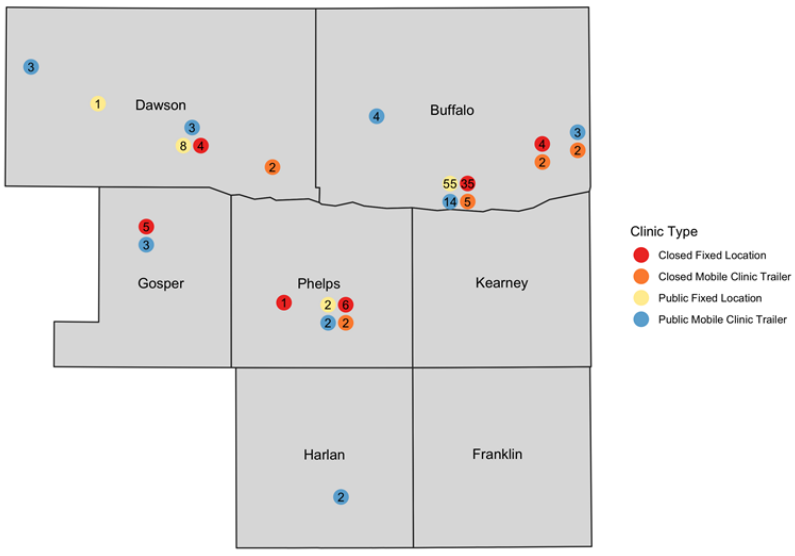
All private hospitals and accredited clinics in the seven counties (Buffalo, Dawson, Franklin, Gosper, Harlan, Kearney, Phelps) together accounted for about half of vaccine doses provided. Long term care facilities are spread across the district, but a vast majority of the residents are clustered in Buffalo county, accounting for a little over a tenth of all doses given till June 15th. About 15% of TRPHD residents received their COVID vaccine from walk-in pharmacies, which began to offer vaccination to customers around April-May. Walk-in Pharmacies now account for an increasing share of new vaccinations, especially through the Summer and into Fall. A small proportion of TRPHD residents were vaccinated outside of the district (including out of State). If one were to consider each organization providing vaccines (like hospitals & pharmacies) separately, TRPHD is the single largest entity that provided vaccine doses to residents across the district.

"THE OPPORTUNITY TO USE A MOBILE VACCINE CLINIC TRAILER HAS GREATLY INCREASED ACCESS TO VACCINATIONS IN OUR DISTRICT. "
- VON LUTZ, CLINICAL SERVICES SUPERVISOR

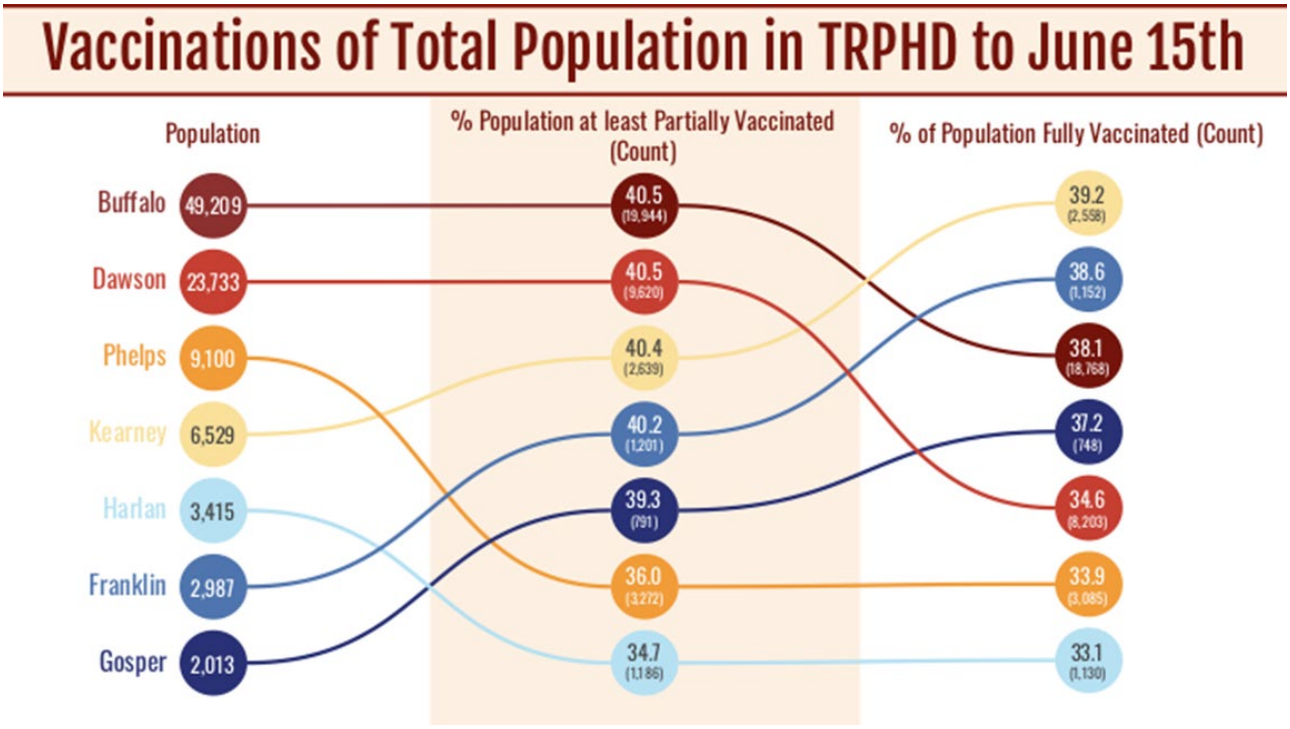
For the purpose of expanding vaccine access to underserved and geographically remote parts of the health district, TRPHD acquired a truck and enclosed trailer through Federal Emergency Management Agency (FEMA) funding in March of 2021. The enclosed trailer was retrofitted with hard wood laminate floors, electricity, FRP sidewalls, LED lighting, storage cabinets, countertop and drop-down work counters to serve as a mobile vaccine clinic. Over 30 mobile clinics have been conducted so far. The mobile clinic is set up on a three-week rotational schedule that visits almost 15 locations across 5 counties. Within this rotation, clinic times are set up to allow individuals to obtain vaccine during their lunch hour or in the evening, after work hours. Please see appendix 6 for a detailed table describing fully vaccinated people by county in TRPHD.

The map below describes vaccine clinics conducted by TRPHD across seven counties in the district. Clinics are coded by color – they may be either public (open to all) or closed (restricted to a group). In addition, clinics may be either fixed location (within a physical structure) or mobile vaccine clinic trailers. Also indicated is the number of actual clinics conducted in each site.

Number of Public Vaccination Clinic in TRPHD by Clinic Type



TRPHD publishes a vaccine dashboard on its website that tracks vaccination rates across the district. In addition to this, TRPHD releases a weekly report that describes long-term progress in vaccination across the district and identifies broad trends and provides data insights. Over 17 reports have been released thus far by the department describing multiple aspects of the vaccination rollout across the district in real time [15,16]



The figure above describes the relative share of vaccination by county in TRPHD as of Jun 15, 2021. Each county is depicted by a colored circle, and the relative position of each corresponds to the proportion vaccinated. Actual numbers (count) are included in parenthesis. Although only persons aged 12 years and over are currently eligible for the vaccine, the state of Nebraska has moved to the convention of describing vaccination rates for the entire population. For a description of population aged 12 years and over in the 7 counties of TRPHD, please see appendix 9.

Community Engagement & Policy Advocacy

Advocacy and health communication on topics surrounding COVID-19 were a key part of the unique functions provided by TRPHD during the Coronavirus Disease pandemic. Since local health departments were the first point of contact regarding Directed Health Measures (DHMs) in each county, staff at TRPHD worked closely with county officials to ensure that the DHMs were locally applicable and enforceable by county health officials. [17]

TRPHD attended regular (sometimes daily) online meetings with Department of Health and Human Services (DHHS), closed bi-monthly meeting with Nebraska State Senators and weekly briefings with University of Nebraska Medical Center (UNMC) through the Infection Control Assessment Promotion Program (ICAP), and with the State-level 'Fusion Cell' established by DHHS. TRPHD convened the Buffalo County Joint Information Center (BCJIC) to address COVID protocols and guidelines in Buffalo County.

TRPHD was the point of contact for City and County Officials for up-to-date local information on the pandemic. The department worked closely with local governments, Hospital and Emergency Management Staff, Veterinarians, businesses and media outlets across the district. TRPHD worked with local government in the cities of Kearney, Lexington, Holdrege, Gothenburg and Minden to devise masking resolutions that were locally appropriate and evidence-based, as well as with county board superintendents in each of the seven counties to create isolation & quarantine protocols. Please see appendix 10 for an example of a report shared at a city council meeting in Gothenburg. These reports were current as of the day of reporting, and provided comparative analysis of disease incidence in different cities.

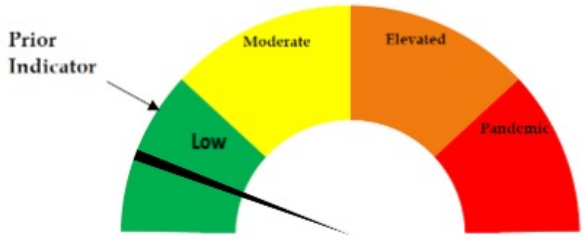
TRPHD worked with school officials in almost 25 school districts spread across TRPHD (Educational Service Unit 10 & 11 in Nebraska). In the Summer of 2020, TRPHD was involved with school officials across the district to devise reopening plans so as to enable schools to open with restrictions in the Fall. The plans included guidelines for masking and social distancing within schools. Through close co-operation with school nurses, TRPHD was able to co-ordinate quarantine and isolation recommendations for students and staff, and co-ordinate vaccine distribution in the schools. Concurrently,

There was regular outreach with business owners, faith-based organizations, chambers of commerce as well as private citizens to implement safety measures for workplace safety, and gathering safety. Directed health measures (DHMs) required businesses and groups to submit plans to local health departments in order to assure the safety of guests. Individuals making plans for upcoming gatherings and events contacted TRPHD for review of the measures in place. The plans were submitted through survey

software and were given approval by health department staff. Because of this process created by DHMs, TRPHD staff maintain ongoing conversations with local leaders to implement non-pharmaceutical interventions for local events.

TRPHD conducted weekly clinical calls with clinicians and other healthcare providers in the district that began in January 2020 and discussed key new information, synthesized CDC bulletins and shared real-time epidemiological insights with clinicians. The calls were a key touchstone for physicians and care providers in the district as they navigated the evolving public health guidelines. The call also addressed other local disease activity including BeachWatch reports, information on influenza and other seasonal and emergent infections, insight on disease investigations and vaccine administration. The calls are currently bi-monthly, changing schedules in May-June 2021. Two Rivers also worked closely with members of the general public as they finalized plans for outdoor events or when there were queries regarding guidelines laid out in the DHMs.

TRPHD engaged with hospital leaders and local emergency management through weekly meetings to guarantee a unified approach to responding to the pandemic. TRPHD participated with TRIMRS to engage regional hospitals, local health departments, and emergency management to synchronize response efforts. Regular meetings and data sharing allowed partners to keep track of surging COVID numbers and to anticipate hospital services being overwhelmed. The Healthcare Coalition Coordinator publishes a TRIMRS hospital dashboard that displays key indicators for all major hospitals in the region in addition to local hospital dashboards for the four participating health departments.



Risk Dial for COVID-19
Two Rivers Public Health
Published Jun 17, 2021

Beginning August 5, 2020 TRPHD released a weekly COVID-19 progress report for the district that included the weekly risk dial and a detailed analysis of disease and testing trends. In time, these were joined by weekly reports describing the three biggest cities (Kearney, Lexington and Holdrege). Absolute counts and test positivity rates for the previous week and four weeks were described by age, gender and county of residence. An epidemiological assessment of the progress of the pandemic accompanied every report along with supporting graphs and tables. The weekly report provided the epidemiological justification for the Risk Dial published every week that assesses risk of COVID transmission in the district. Over 40 districtwide weekly reports were published

between August 2020 and July 2021, and over 20 reports were published discussing COVID progress across Kearney, Lexington and Holdrege urban areas (see https://www.trphd.org/covid-19/weekly-reports.html for districtwide and citywide weekly reports – archived from August 2020 onwards). The reports continue to be published, over a year of weekly reports publicly accessible on the website archives describe the progress of the pandemic in the district.

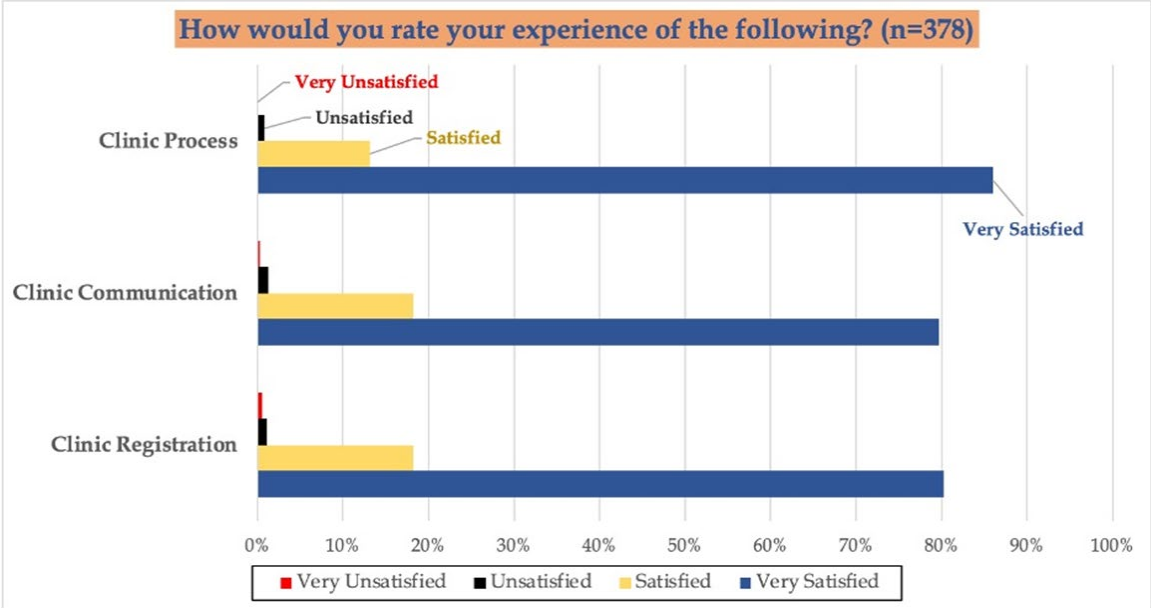
The weekly risk dial is an objective assessment of the anticipated risk due to COVID-19 in the community, measured using three sets of indicators:

- Epidemiological (incl. disease incidence, test positivity rate),
- Testing coverage and contact tracing (incl. tests per capita, close contacts of positive cases alerted)
- Healthcare service indicators (incl. ICU bed occupancy, ventilator usage)

Disease incidence and contact tracing data is extracted from the state-maintained National Electronic Disease Surveillance System (NEDSS), weekly hospital data is sourced from the Knowledge Center system and presented through the TRPHD hospital data and dashboard. Beginning from March 2021, additional variables describing vaccine coverage were added (including first and second dose coverage) to make the predictive model more robust. The dial's final position is based on both a composite assessment of the risk score in each category as well as a subjective assessment by key staff members who oversee either testing, contact tracing or hospital monitoring. The weekly risk dial published on June 17, 2021 is displayed above for reference. Please see appendix 12 for a copy of the weekly press release accompanying the graphic above. The weekly Risk Dial used in TRPHD was adapted from the Risk Dial used by Lincoln-Lancaster County Health Department (LLCHD) and modified to meet local needs. For more details on the Risk Dial metrics, please visit https://app.lincoln.ne.gov/city/covid19/pdf/COVID19RiskDialMetricsDescription.pdf

Until early 2021, two public dashboards described new cases across the district (updated daily) as well as by county (updated weekly). The daily dashboard described overall progress and daily increase, while the county-level dashboard described details of COVID-positive patients for the preceding four weeks. These dashboards provided granular data regarding the background characteristics of patients testing positive and described case trends in real time. Currently, the districtwide dashboards for hospital status, newly detected cases and vaccinations continues to be updated regularly on the website.

TRPHD conducted an exit survey to gauge attitudes among vaccine recipients, these anonymous surveys were answered by people who had just received their dose of COVID-19 vaccine. After surveying almost 400 individuals, the response was overwhelmingly positive. Over 80% of those surveyed reported being "very satisfied" by registration and communication process, and over 86% by clinic workflow and conduct. Fig 7 describes responses by vaccine recipients on clinic performance (results up to April 16, 2021). Please see appendix 8 for details on survey recipients.



TRPHD also engages widely with members of the public through the website (www.trphd.org), social media outlets like Facebook (https://www.facebook.com/2RPHD), Instagram (https://instagram.com/2rivers_public_health?utm_medium=copy_link), Twitter (https://twitter.com/trpublichealth?s=11) and traditional outlets like print, radio and television. Social media outreach and virtual public engagement was focused on delivering clear, consistent messages that were in keeping with CDC guidelines and locally relevant. Social media engagement also included providing real-time feedback and responses to public queries and clarifications. In the fraught political climate of 2020, exacerbated by natural anxieties surrounding the pandemic and social isolation, many of these interactions were tense, even combative.

Over the past year, Two Rivers has engaged directly with print outlets through press releases. The department releases daily (now weekly) press releases in English, Spanish, Somali and Arabic on the website. Notable print partners are: the New York Times, Omaha World-Herald, Kearney Hub, Holdrege Daily Citizen, Harlan County Journal, Franklin County Chronicle, Lexington Clipper-Herald, Minden Courier and the Gothenburg Times. In addition, TRPHD worked with radio outlets such as NRG in Kearney, KUVR in Holdrege, and KRVN in Lexington. Two Rivers' staff made a minimum of weekly appearances on NTV news, and frequent appearances on KSNB 4Local as well as through streamed online events on Facebook Live. Staff also made appearances on both Omaha TV news stations. The topics discussed included all relevant information regarding COVID-19, public education about the importance of personal health information and confidentiality, business continuity preparedness (virtual work), interpretation and applicability of Directed Health Measures, weekly Risk Dial, testing and vaccinations in long term care facilities, mask wearing, hand sanitizing and social distancing, safe holiday celebrations, advice for schoolchildren going back to school, safety and efficacy of COVID-19 vaccines (especially Janssen

COVID-19 vaccine), vaccine breakthrough cases and the presence of variant types in wild circulation.

TRPHD has created multiple flyers and health educational materials that present simple, easy-to-remember messages dealing with topics like masking and quarantine isolation protocols. Please see appendix 11 for examples of bi-lingual health education material produced in TRPHD. The Department has attempted, where possible, to provide health information and outreach in all of the relevant languages in its district. In addition, weekly Risk Dial reports are color coded and provide a pictorial assessment of COVID-19 spread in the community. Following the first outbreak of cases in April-May, a detailed report of the early outbreak of COVID cases in Dawson County has been available for public comment and perusal on the TRPHD website since August. [14]

Key Insights & Policy Implications

The past year represents the most challenging yet rewarding period of activity in TRPHD's history, and is a testimony to the resilience and indomitable spirit of the staff and community. The entire staff at TRPHD have worked tirelessly to safeguard the health and safety of the community, collaborating with government, business, healthcare, long term care and civil society institutions across multiple areas of common endeavor. Throughout it all, we were united by a common sense of purpose and the overarching goal of keeping our residents safe and healthy. At the same time, we were mindful of the need for navigating and interpreting official recommendations as people planned for social gatherings with close family and friends.

Through the pandemic, TRPHD has focused on providing correct & consistent information regarding Federal and State guidelines backed by key insights germane to the Two Rivers Health District area, while expanding service provision, logistics and co-ordination at the same time. While not exhaustive, the following list covers some broad insights about public health department response in the face of emergencies.

- A key insight was the role of the local health department as a bridge between government, private sector and civil society stakeholders, collaborating with institutions across multiple levels. The thoughtful and considered approach adopted by educational, healthcare, business and service sector industries was supported by TRPHD through relationships fostered over the course of the pandemic. The responsibility for coordinating key service delivery and materials management functions at this scale during a time of emergency was unprecedented for TRPHD. The work done by TRPHD in movement of Personal Protective Equipment and vaccine distribution are just two examples of the extraordinary response mounted by the health department over the past 18 months.
- The COVID pandemic revealed the power of population-level data for driving policy decisions and influencing policymakers. At the same time, it also exposed the limits of data-driven counsel, especially in face of competing political and social compulsions. Two Rivers Health Department focused on providing current and consistent data to policymakers, media outlets and the general public. As statewide datasets were updated every two hours, case numbers would also shift slightly from day to day, creating confusion, especially in March-April 2020.

However, beginning June, the department began to provide daily updates on key aspects of the pandemic like newly cases, hospital occupancy and vaccination rates. Archived reports with more in-depth analyses describing positivity rates and cohort-level variations allowed for retrospective review of disease trends. Through official communication (oral and published - like the clinical calls, the risk dial), media outreach (print, visual, web) combined with personal interaction with stakeholders, Two Rivers was able to inform the narrative, assist in formulating responses and provide a consistent source of information and counsel that was evidence-based and locally relevant. TRPHD was able to provide policymakers with county and city-specific data analyses at different times during the pandemic. The department was also quick to recognize the limits of its capabilities, especially in creating evidence or testing hypothesis. The limits of local data in driving public policy decisions were also revealed during the course of the pandemic, for example in the different responses to mask resolutions across the seven counties. The role of misinformation in shaping public discourse exposed the limitations of evidence-based health communication, especially when called to counter malicious allegations unfounded in reality.

- The Public Health Emergency Preparedness and Response program, created in response to terrorist attacks in New York city in 2001, was designed to prepare for disasters of all kinds including planning for, responding to and preventing an influenza pandemic. Emergency response plans addressed most conceivable contingencies and attempted to communicate a range of risk and the most conservative approach, with specific insight provided by local emergency managers. However, existing plans did not anticipate active politicization of efforts to respond to a pandemic. The politics that played into the response of COVID-19 were far exceeding the scale of any previous response, and these complicated actions taken by every public health agency in the nation. Not only did we have to promote the science base of a novel infectious disease, often in the face of insufficient or early evidence, we also had to counter active misinformation about the disease. The misleading and false information circulating about the COVID vaccine and the rise in public vaccine skepticism is another vivid example of this phenomenon. As a department, the experience taught us to be nimble yet patient, to adjust to prevalent trends while staying steadfast to evidence-based approaches and to best work with our stellar partners during a deeply unsettling time to protect our district and community.
- Two Rivers Health Department is home to the second highest number of long-term care facilities among all health districts in Nebraska, thus emergency preparedness capacity of healthcare and assisted living facilities in the district is of particular importance in the face of a pandemic that predominantly targeted older people. The past 18 months has resulted in unprecedented strain to long term and other residential facilities and revealed gaps in critical health infrastructure that hold these institutions together. Supply chain bottlenecks have long threatened system efficiency in times of crisis, and it was no different during the COVID crisis. However, the impact on long term care facilities was

magnified, considering personal health risks to residents and care providers, and the indispensable nature of medical and supportive care provision in the time of a pandemic that disproportionately targeted the elderly. Staffing shortages, logistics disruption and difficulty adapting to new regulatory structures in face of shifting policies were some of the key issues faced by long term care institutions.

- The relationship between the health department and healthcare institutions in the district has undergone a historic transformation during the 18 months of the pandemic. The department expanded its role as a dispenser of credible, scientifically valid and locally germane information and guidance for clinicians and hospital administrators, while working closely with the institutions for distributing stockpiled PPE and other materials. The nationwide shortage in key chemical and material components (like testing reagents, N95 masks) also highlighted the delicate nature of these supply chains and the cost of disruption to essential medical supplies in face of an emergency.

Conclusion

Taken in total, the COVID-19 response by Two Rivers Public Health Department represents an astonishing endeavor by the local health department to address a global public health risk. TRPHD closely coordinated almost all aspects of the pandemic response including testing, investigation and contact tracing, vaccination and advocacy. Between March 1st 2020 and June 15th 2021, over 135,000 tests were conducted by different entities in the district, testing over 45,000 residents of the district at least once. Over 10,500 persons have tested positive for COVID-19 during this period, and 120 persons have died due to the disease. TRPHD's case mortality rate on June 15th was slightly lower than Nebraska, and substantially lower than the nationwide average. Women in TRPHD were significantly more likely to be tested, but only marginally more likely to be COVID-positive (53% v/s 47%). Women were also significantly more likely to avail of vaccination services, even after controlling for age and county of residence. Over 18% of COVID-positive persons self-identified as Hispanic or Latino. As of June 15th, little over 40% of Two Rivers Health District has received at least one dose of the COVID vaccine, although weekly vaccination rates have dropped since May, when vaccines were open to all residents aged 12 years and over.

In 18 months since March 2020, TRPHD has coordinated the movement of over two and a half million sets of gloves, 426,000 surgical gowns, 42,000 face shields and goggles and over 550,000 N95/KN95 and surgical masks in collaboration with local and State partners. As of June 15th 2021, TRPHD had assisted in the conduct of almost 25,000 RT-PCR COVID tests and directly vaccinated over 7800 residents through its public vaccination clinics.

TRPHD continues to monitor and track cases, assess risk and provide vaccines across the region in addition to its regular work of surveillance and public health program implementation in the health district. Around May 2021, the B.1.617.2 variant of SARS-COV2 virus (delta variant) was first detected in TRPHD, and soon was linked to a

majority of new cases in the health district. The delta variant is more infectious than the earlier version of the SARS-COV2 virus, and possibly results in more serious illness in those affected. The variant was linked to high mortality rates in countries like India and Indonesia that had low rates of vaccination at the time of the outbreak. Over 1600 COVID positive cases have been recorded in TRPHD in the three months after June 15th, 2021, over 40% of these aged 29 years or less (compared to about 30% before June 15th, 2021). This age group is also most likely to be unvaccinated, either due to age restrictions or generally low uptake. Although vaccination rates have picked up considerably across the district, hospital bed and ICU occupancy rates have also shown an increase in recent weeks leading to early September and seem poised to trend higher in coming weeks. Over 45% of the total population of TRPHD is fully vaccinated as of early October, however the higher incidence of seriously ill COVID patients aged 50 years or less compared to last year is a source of concern. In its latest iteration, the novel coronavirus has once again revealed its remarkable capacity to evolve and mutate to adapt to society's defenses. United action and community-level responses remain our most potent weapon against the virus' continuing dangers. Over the past 18 months, the role of public health departments has assumed crucial significance as they seek to inform the public of local data while situating it within the regional, national and global conversation. In addition, by providing germane healthcare services (testing, vaccination) and coordinating federal supply of materials, health departments fulfil a vital role in the healthcare puzzle, and further the principles of equity and universal access.

Appendix 1: COVID-19 Response in TRPHD – a Timeline

Appendix 2: Population of 7 Counties in TRPHD

The population of all 7 counties in TRPHD are shown below. Data used is from the 2019 mid- year census estimate (American Community Survey, ACS)

County	Population
Buffalo	49,659
Dawson	23,595
Franklin	2,979
Gosper	1,990
Harlan	3,380
Kearney	6,495
Phelps	9,034
TRPHD total	**97,132**
Nebraska state	1,934,408
United States	328,239,523

Appendix 3: Details of TestNebraska COVID Testing Sites in TRPHD

City	Date started	Periodicity	Location(s)
Kearney	June 24, 2020	Weekly (Wed), then twice weekly (Wed/Fri), then weekly again, followed by three times a week (Mon/Wed/Fri) in March, 2021	Buffalo Co Fairgrounds, CHI Health annex
Lexington	July 15, 2020	Weekly (Wed), then every alternate week (from March 2021)	Lexington Regional Health Center, St. Ann's Parish Church Grounds
Gothenburg	August 5, 2020	Weekly (Tue), ended early 2021	YMCA, Gothenburg
Franklin	August 5, 2020	Weekly (Wed), followed by bi-weekly (Mon/Wed), before back to weekly before stopping in Feb 2021	Franklin Memorial Hospital
Holdrege	Aug 13, 2020	Every alternate week (Thu) (alternating with Minden)	Phelps County Fairgrounds, Holdrege Recycling Center
Minden	Aug 11, 2020	Every alternate week (Tue) (alternating with Holdrege)	Kearney County Fairgrounds

Alma	Aug 20, 2020	Weekly (Thu), then bi-weekly (Mon/Thu) during Oct-Dec, then weekly again	Harlan County Health System
Kearney (UNK)	Aug 24, 2020	Bi-weekly (Mon & Tue)	UNK
Cozad	Sep 30, 2020	Weekly, then ended in February-March	Cozad Fire Station

Appendix 4: COVID tests - Age, Gender, Test location & Test type: Mar 1, 2020 – June 16, 2021

	Buffalo	Dawson	Franklin	Gosper	Harlan	Kearney	Phelps	Total
Total Tests by County of Patient Residence – N	68,951 *100%*	28,321 *100%*	4,108 *100%*	2,951 *100%*	4,177 *100%*	11,064 *100%*	17,595 *100%*	137,167 *100%*
Gender – n (% of Column Total)								
Female	43,746 *63%*	17,370 *61%*	3,079 *75%*	1,955 *66%*	2,967 *71%*	7,437 *67%*	13,139 *75%*	89,693 *65%*
Male	21,549 *31%*	9,816 *35%*	872 *21%*	904 *31%*	1,062 *25%*	2,939 *27%*	3,926 *22%*	41,068 *30%*
Missing or did not disclose	3,656 *5%*	1,135 *4%*	157 *4%*	92 *3%*	148 *4%*	688 *6%*	530 *3%*	6,406 *5%*
Age – n (% of Column Total)								
0-17 yrs	5,566 *8%*	2,515 *9%*	215 *5%*	300 *10%*	225 *5%*	527 *5%*	1,440 *8%*	10,788 *8%*
18-29 yrs	17,282 *25%*	6,358 *22%*	778 *19%*	231 *8%*	511 *12%*	1,680 *15%*	3,350 *19%*	30,190 *22%*
30-39 yrs	10,577 *15%*	4,268 *15%*	551 *13%*	283 *10%*	430 *10%*	1,322 *12%*	2,243 *13%*	19,674 *14%*
40-49 yrs	9,104 *13%*	3,933 *14%*	727 *18%*	420 *14%*	612 *15%*	1,350 *12%*	2,130 *12%*	18,276 *13%*
50-59 yrs	9,241 *13%*	4,093 *14%*	631 *15%*	428 *15%*	710 *17%*	1,903 *17%*	2,470 *14%*	19,476 *14%*
60-69 yrs	7,073 *10%*	3,266 *12%*	716 *17%*	455 *15%*	612 *15%*	1,334 *12%*	2,291 *13%*	15,747 *11%*
70-79 yrs	4,227 *6%*	1,739 *6%*	236 *6%*	310 *11%*	232 *6%*	861 *8%*	966 *5%*	8,571 *6%*
80-89 yrs	3,599 *5%*	1,353 *5%*	178 *4%*	322 *11%*	447 *11%*	963 *9%*	1,635 *9%*	8,497 *6%*
90+ yrs	2,266 *3%*	790 *3%*	75 *2%*	202 *7%*	397 *10%*	1,121 *10%*	1,070 *6%*	5,921 *4%*
Missing or did not disclose	16 *0%*	6 *0%*	1 *0%*	0 *0%*	1 *0%*	3 *0%*	0 *0%*	27 *0%*
Test Type – n (% of Column Total)								
Antigen	33,980 *49%*	13,121 *46%*	2,550 *62%*	2,035 *69%*	3,137 *75%*	7,107 *64%*	13,007 *74%*	74,937 *55%*
PCR	34,944 *51%*	15,179 *54%*	1,558 *38%*	914 *31%*	1,038 *25%*	3,953 *36%*	4,580 *26%*	62,166 *45%*

Test Type Unknown	27 *0%*	21 *0%*	0 *0%*	2 *0%*	2 *0%*	4 *0%*	8 *0%*	64 *0%*
Dates – n (% of Column Total)								
Mar 1 (2020) - June 15	3,777 *5%*	3,385 *12%*	174 *4%*	146 *5%*	111 *3%*	309 *3%*	475 *3%*	8,377 *6%*
Jun 16 - Sept 15	8,997 *13%*	3,819 *13%*	498 *12%*	290 *10%*	319 *8%*	1,451 *13%*	1,402 *8%*	16,776 *12%*
Sept 16 - Dec 15	23,388 *34%*	9,126 *32%*	1,848 *45%*	1,146 *39%*	1,822 *44%*	4,133 *37%*	6,982 *40%*	48,445 *35%*
Dec 16 - Mar 15 (2021)	19,483 *28%*	7,863 *28%*	1,117 *27%*	1,087 *37%*	1,314 *31%*	3,098 *28%*	5,760 *33%*	39,722 *29%*
Mar 16 (2021) - June 15	13,306 *19%*	4,128 *15%*	471 *11%*	282 *10%*	611 *15%*	2,073 *19%*	2,976 *17%*	23,847 *17%*
Testing Location – n (% of Column Total)								
Private Hospital or Clinic in Buffalo County	17,418 *25%*	1,364 *5%*	302 *7%*	144 *5%*	125 *3%*	913 *8%*	455 *3%*	20,721 *15%*
Private Hospital or Clinic in Dawson County	102 *0%*	5,084 *18%*	0 *0%*	152 *5%*	0 *0%*	2 *0%*	57 *0%*	5,397 *4%*
Private Hospital or Clinic in Franklin, Gosper, Harlan, Kearney, or Phelps County	95 *0%*	29 *0%*	356 *9%*	45 *2%*	155 *4%*	982 *9%*	1,242 *7%*	2,904 *2%*
Private Lab, Pharmacy, or Employer Test	3,052 *4%*	5,388 *19%*	48 *1%*	161 *5%*	161 *4%*	225 *2%*	1,365 *8%*	10,400 *8%*
Long Term Residential Facility in Buffalo County	26,671 *39%*	892 *3%*	265 *6%*	52 *2%*	0 *0%*	1,330 *12%*	374 *2%*	29,584 *22%*
Long Term Residential Facility in Dawson County	56 *0%*	7,603 *27%*	0 *0%*	150 *5%*	3 *0%*	0 *0%*	59 *0%*	7,871 *6%*
Long Term Residential Facility in Gosper County	43 *0%*	479 *2%*	0 *0%*	1,585 *54%*	3 *0%*	0 *0%*	127 *1%*	2,237 *2%*
Long Term Residential Facility in Harlan County	135 *0%*	4 *0%*	125 *3%*	0 *0%*	2,193 *53%*	0 *0%*	70 *0%*	2,527 *2%*
Long Term Residential Facility in Kearney County	720 *1%*	6 *0%*	218 *5%*	8 *0%*	34 *1%*	5,114 *46%*	266 *2%*	6,366 *5%*
Long Term Residential Facility in Phelps County	372 *1%*	206 *1%*	167 *4%*	75 *3%*	599 *14%*	503 *5%*	10,745 *61%*	12,667 *9%*
Long Term Residential Facility Outside Two Rivers	931 *1%*	443 *2%*	1,635 *40%*	78 *3%*	165 *4%*	121 *1%*	149 *1%*	3,522 *3%*
Public Testing (TestNE, National	14,383 *21%*	4,998 *18%*	800 *19%*	383 *13%*	613 *15%*	1,533 *14%*	1,923 *11%*	24,633 *18%*

Guard, Local Health Depts.)								
Outside TRPHD	2,874 *4%*	1,334 *5%*	157 *4%*	90 *3%*	77 *2%*	233 *2%*	261 *1%*	5,026 *4%*
Other Testing Location	2,099 *3%*	491 *2%*	35 *1%*	28 *1%*	49 *1%*	108 *1%*	502 *3%*	3,312 *2%*

Appendix 5: COVID positive cases - Age, Gender, Race/Ethnicity & Occupation : Mar 1, 2020 – June 16, 2021

	Buffalo	**Dawson**	**Franklin**	**Gosper**	**Harlan**	**Kearney**	**Phelps**	**Total**	
Total Positive Cases by County– N	5,467 *100%*	2,831 *100%*	236 *100%*	203 *100%*	226 *100%*	599 *100%*	991 *100%*	10,553 *100%*	
Gender– n (% of Column Total)									
Female	2,873 *53%*	1,481 *52%*	128 *54%*	106 *52%*	131 *58%*	316 *53%*	548 *55%*	5,583	*53%*
Male	2,594 *47%*	1,350 *48%*	108 *46%*	97 *48%*	95 *42%*	283 *47%*	443 *45%*	4,970	*47%*
Age– n (% of Column Total)									
0-17 yrs	512 *9%*	227 *8%*	15 *6%*	13 *6%*	15 *7%*	70 *12%*	95 *10%*	947 *9%*	
18-29 yrs	1,398 *26%*	518 *18%*	35 *15%*	21 *10%*	36 *16%*	132 *22%*	146 *15%*	2,286	*22%*
30-39 yrs	896 *16%*	494 *17%*	27 *11%*	15 *7%*	33 *15%*	87 *15%*	150 *15%*	1,702	*16%*
40-49 yrs	749 *14%*	413 *15%*	29 *12%*	22 *11%*	32 *14%*	78 *13%*	145 *15%*	1,468	*14%*
50-59 yrs	762 *14%*	476 *17%*	42 *18%*	39 *19%*	24 *11%*	90 *15%*	169 *17%*	1,602	*15%*
60-69 yrs	564 *10%*	386 *14%*	43 *18%*	44 *22%*	54 *24%*	86 *14%*	122 *12%*	1,299	*12%*
70-79 yrs	333 *6%*	216 *8%*	32 *14%*	20 *10%*	21 *9%*	33 *6%*	91 *9%*	746 *7%*	
80-89 yrs	177 *3%*	76 *3%*	11 *5%*	21 *10%*	8 *4%*	17 *3%*	51 *5%*	361 *3%*	
90+ yrs	75 *1%*	25 *1%*	2 *1%*	8 *4%*	3 *1%*	6 *1%*	21 *2%*	140 *1%*	
Missing or did not disclose	1 *0%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	1 *0%*	2 *0%*	
Race– n (% of Column Total)									
American Indian or Alaska Native	12 *0%*	10 *0%*	0 *0%*	0 *0%*	0 *0%*	1 *0%*	2 *0%*	25 *0%*	
Asian	35 *1%*	24 *1%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	59 *1%*	

Black or African American	57 *1%*	93 *3%*	2 *1%*	0 *0%*	0 *0%*	2 *0%*	8 *1%*	162 *2%*	
Native Hawaiian or Other Pacific Islander	9 *0%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	9 *0%*	
White	4,367 *80%*	2,038 *72%*	186 *79%*	172 *85%*	174 *77%*	462 *77%*	790 *80%*	8,189	*78%*
Two or More Races	15 *0%*	4 *0%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	19 *0%*	
Other Race	52 *1%*	113 *4%*	0 *0%*	0 *0%*	1 *0%*	5 *1%*	4 *0%*	175 *2%*	
Missing or did not disclose	920 *17%*	549 *19%*	48 *20%*	31 *15%*	51 *23%*	129 *22%*	187 *19%*	1,915	*18%*
Ethnicity– n (% of Column Total)									
Hispanic or Latino	644 *12%*	1,102 *39%*	12 *5%*	14 *7%*	8 *4%*	37 *6%*	63 *6%*	1,880	*18%*
Not Hispanic or Latino	3,890 *71%*	1,349 *48%*	180 *76%*	156 *77%*	177 *78%*	456 *76%*	769 *78%*	6,977	*66%*
Missing or did not disclose	933 *17%*	380 *13%*	44 *19%*	33 *16%*	41 *18%*	106 *18%*	159 *16%*	1,696	*16%*
Occupational Category– n (% of Column Total)									
Agriculture or Animal Husbandry	133 *2%*	100 *4%*	29 *12%*	9 *4%*	17 *8%*	47 *8%*	76 *8%*	411 *4%*	
Construction and Real Estate	108 *2%*	39 *1%*	5 *2%*	3 *1%*	1 *0%*	12 *2%*	18 *2%*	186 *2%*	
Disabled, Retired, or Unemployed	655 *12%*	361 *13%*	35 *15%*	55 *27%*	38 *17%*	60 *10%*	180 *18%*	1,384	*13%*
Educational Services	310 *6%*	116 *4%*	13 *6%*	4 *2%*	5 *2%*	43 *7%*	58 *6%*	549 *5%*	
Food or Lodging Services	165 *3%*	31 *1%*	0 *0%*	3 *1%*	1 *0%*	10 *2%*	20 *2%*	230 *2%*	
Food Production (Meat/Poultry)	57 *1%*	507 *18%*	0 *0%*	6 *3%*	0 *0%*	1 *0%*	3 *0%*	574 *5%*	
Healthcare Services	678 *12%*	224 *8%*	28 *12%*	20 *10%*	38 *17%*	73 *12%*	111 *11%*	1,172	*11%*
Manufacturing or Heavy Industry	194 *4%*	56 *2%*	4 *2%*	2 *1%*	1 *0%*	28 *5%*	39 *4%*	324 *3%*	
Minor or Student	687 *13%*	261 *9%*	22 *9%*	15 *7%*	17 *8%*	75 *13%*	112 *11%*	1,189	*11%*
Professional Services	349 *6%*	138 *5%*	11 *5%*	10 *5%*	11 *5%*	34 *6%*	51 *5%*	604 *6%*	
Public Sector	152	63	7	3	14	12	23	274	

	3%	*2%*	*3%*	*1%*	*6%*	*2%*	*2%*	*3%*
Retail	256 *5%*	73 *3%*	6 *3%*	8 *4%*	6 *3%*	13 *2%*	28 *3%*	390 *4%*
Self-employed	63 *1%*	17 *1%*	3 *1%*	3 *1%*	6 *3%*	4 *1%*	9 *1%*	105 *1%*
Social Assistance Services	109 *2%*	27 *1%*	6 *3%*	2 *1%*	5 *2%*	10 *2%*	12 *1%*	171 *2%*
Transportation and Automotive Services	114 *2%*	62 *2%*	10 *4%*	6 *3%*	4 *2%*	11 *2%*	24 *2%*	231 *2%*
Utilities	34 *1%*	18 *1%*	3 *1%*	1 *0%*	2 *1%*	7 *1%*	13 *1%*	78 *1%*
Missing or did not want to disclose	1,403 *26%*	738 *26%*	54 *23%*	53 *26%*	60 *27%*	159 *27%*	214 *22%*	2,681 *25%*

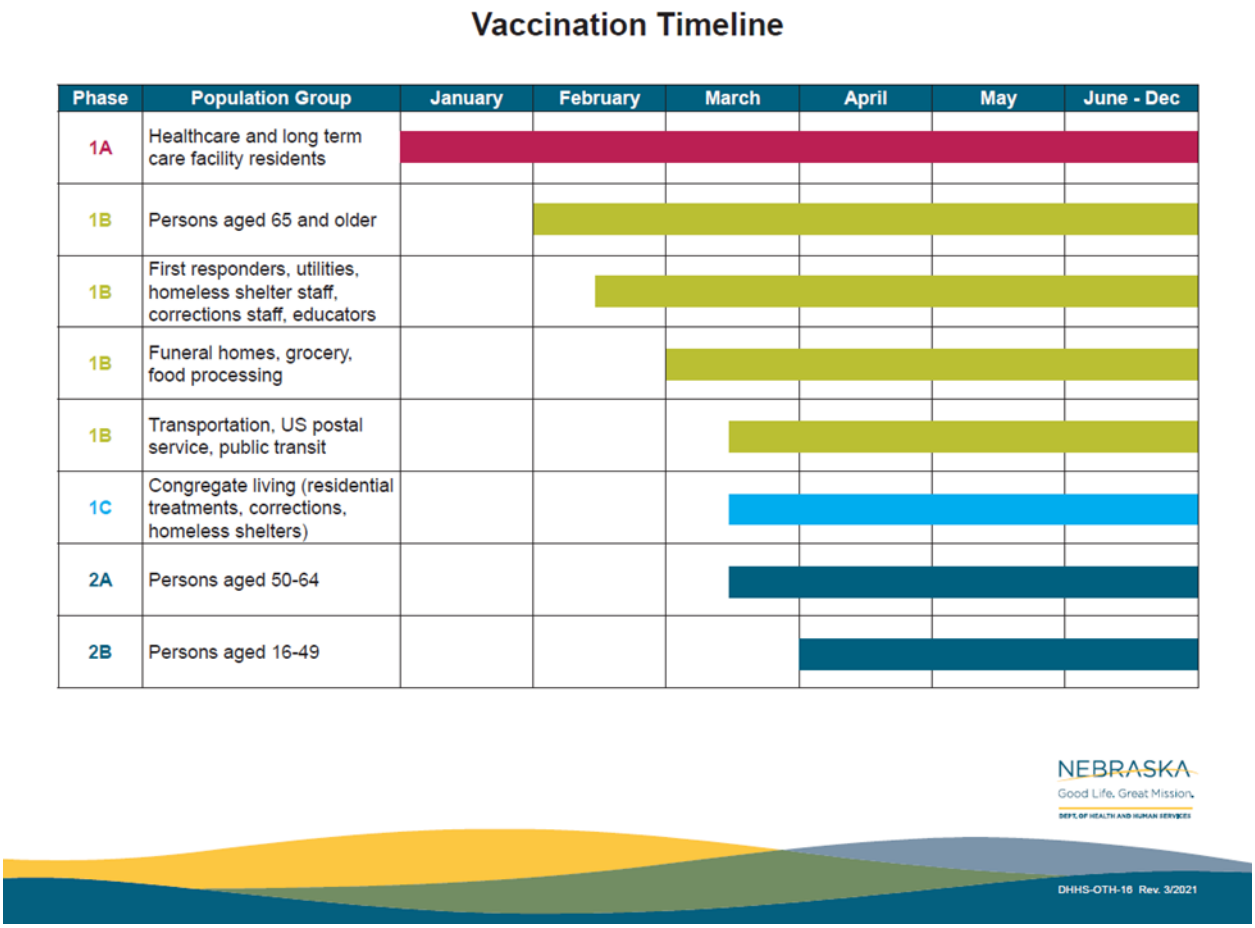
Appendix 6: COVID Vaccination - Age, Gender, Race/ Ethnicity, Vaccine location: Mar 1, 2020 – June 16, 2021

	Buffalo	**Dawson**	**Franklin**	**Gosper**	**Harlan**	**Kearney**	**Phelps**	**Outside TRPHD**	**Total**
Persons Fully Vaccinated by County of Patient Residence - N	17,639 *100%*	7977 *100%*	1,112 *100%*	709 *100%*	1,079 *100%*	2,484 *100%*	3,013 *100%*	5,006 *100%*	39,019 *100%*
Gender – n (% of Column Total)									
Female	9,930 *56%*	4,334 *54%*	632 *57%*	377 *53%*	612 *57%*	1,387 *56%*	2,755 *55%*	1,754 *58%*	21,781 *56%*
Male	7,666 *43%*	3,575 *45%*	480 *43%*	330 *47%*	465 *43%*	1,093 *44%*	2,229 *45%*	1,246 *41%*	17,084 *44%*
Missing or did not disclose	43 *0%*	68 *1%*	0 *0%*	2 *0%*	2 *0%*	4 *0%*	22 *0%*	13 *0%*	154 *0%*
Age – n (% of Column Total)									
0-17 yrs	297 *2%*	261 *3%*	7 *1%*	10 *1%*	16 *1%*	52 *2%*	77 *2%*	41 *1%*	761 *2%*
18-29 yrs	2,394 *14%*	775 *10%*	47 *4%*	36 *5%*	61 *6%*	207 *8%*	912 *18%*	190 *6%*	4,622 *12%*
30-39 yrs	2,330 *13%*	854 *11%*	94 *8%*	38 *5%*	92 *9%*	278 *11%*	648 *13%*	285 *9%*	4,619 *12%*
40-49 yrs	2,401 *14%*	1,008 *13%*	87 *8%*	72 *10%*	83 *8%*	330 *13%*	649 *13%*	307 *10%*	4,937 *13%*
50-59 yrs	2,596 *15%*	1,320 *17%*	166 *15%*	114 *16%*	147 *14%*	401 *16%*	738 *15%*	492 *16%*	5,974 *15%*
60-69 yrs	3,561 *20%*	1,716 *22%*	293 *26%*	222 *31%*	271 *25%*	565 *23%*	909 *18%*	718 *24%*	8,255 *21%*

70-79 yrs	2,544 *14%*	1,303 *16%*	214 *19%*	131 *18%*	241 *22%*	378 *15%*	575 *11%*	555 *18%*	5,941 *15%*
80-89 yrs	1,171 *7%*	599 *8%*	164 *15%*	72 *10%*	129 *12%*	196 *8%*	352 *7%*	339 *11%*	3,022 *8%*
90+ yrs	345 *2%*	141 *2%*	40 *4%*	14 *2%*	39 *4%*	77 *3%*	146 *3%*	86 *3%*	888 *2%*
Race – n (% of Column Total)									
American Indian or Alaska Native	47 *0%*	15 *0%*	0 *0%*	2 *0%*	3 *0%*	2 *0%*	9 *0%*	7 *0%*	85 *0%*
Asian	243 *1%*	55 *1%*	2 *0%*	2 *0%*	2 *0%*	4 *0%*	55 *1%*	10 *0%*	373 *1%*
Black or African American	104 *1%*	132 *2%*	0 *0%*	2 *0%*	2 *0%*	6 *0%*	68 *1%*	4 *0%*	318 *1%*
Native Hawaiian or Other Pacific Islander	11 *0%*	4 *0%*	1 *0%*	1 *0%*	1 *0%*	1 *0%*	3 *0%*	9 *0%*	31 *0%*
White	16,169 *92%*	6,707 *84%*	1,021 *92%*	677 *95%*	1,005 *93%*	2,291 *92%*	4,097 *82%*	2,828 *94%*	34,795 *89%*
Other Race	819 *5%*	679 *9%*	68 *6%*	14 *2%*	27 *3%*	145 *6%*	492 *10%*	76 *3%*	2,320 *6%*
Missing or did not disclose	246 *1%*	385 *5%*	20 *2%*	11 *2%*	39 *4%*	35 *1%*	282 *6%*	79 *3%*	1,097 *3%*
Ethnicity – n (% of Column Total)									
Hispanic or Latino	1,026 *6%*	1,917 *24%*	13 *1%*	14 *2%*	5 *0%*	73 *3%*	493 *10%*	78 *3%*	3,619 *9%*
Not Hispanic or Latino	15,822 *90%*	5,396 *68%*	1,062 *96%*	654 *92%*	950 *88%*	2,349 *95%*	4,104 *82%*	2,711 *90%*	33,048 *85%*
Missing or did not disclose	791 *4%*	664 *8%*	37 *3%*	41 *6%*	124 *11%*	62 *2%*	409 *8%*	224 *7%*	2,352 *6%*
Provider – n (% of Column Total)									
Long Term Residential Facility	2,338 *13%*	450 *6%*	87 *8%*	108 *15%*	150 *14%*	336 *14%*	1,159 *23%*	408 *14%*	5,036 *13%*
Private Hospital or Clinic in Buffalo County	5,798 *33%*	262 *3%*	69 *6%*	44 *6%*	30 *3%*	256 *10%*	533 *11%*	124 *4%*	7,116 *18%*
Private Hospital or Clinic in Dawson County	138 *1%*	4,755 *60%*	0 *0%*	315 *44%*	3 *0%*	2 *0%*	569 *11%*	97 *3%*	5,879 *15%*

Private Hospital or Clinic in Kearney County	333 *2%*	10 *0%*	171 *15%*	1 *0%*	15 *1%*	1,406 *57%*	150 *3%*	65 *2%*	2,151 *6%*
Private Hospital or Clinic in Phelps County	128 *1%*	34 *0%*	42 *4%*	63 *9%*	153 *14%*	94 *4%*	337 *7%*	1,565 *52%*	2,416 *6%*
Private Hospital or Clinic in Franklin, Gosper or Harlan County	35 *0%*	3 *0%*	612 *55%*	1 *0%*	607 *56%*	20 *1%*	171 *3%*	29 *1%*	1,478 *4%*
Two Rivers Health Department	5,755 *33%*	455 *6%*	86 *8%*	71 *10%*	86 *8%*	243 *10%*	576 *12%*	562 *19%*	7,834 *20%*
Walk-in pharmacy	3,114 *18%*	2,008 *25%*	45 *4%*	106 *15%*	35 *3%*	127 *5%*	1,511 *30%*	163 *5%*	7,109 *18%*

Appendix 7: Vaccination Rollout Timeline



Appendix 8: Background characteristics of Vaccine survey recipients

	16-49 y	50-64 y	65-74 y	75-84 y	85+ y	Total
INDUSTRY						
Agriculture/Animal Husbandry	12	7	1	0	0	20
Construction & Real Estate	4	0	0	0	0	4
Disabled/ retired/ unemployed	3	7	20	5	1	36
Educational services	76	30	3	0	0	109
Food & Hospitality services	12	4	0	0	0	16
Food production (meat/ poultry)	2	0	1	0	0	3
Healthcare services	10	7	1	0	0	18
Manufacturing/ Heavy industry	6	6	1	0	0	13
Other	19	12	9	2	0	42
Professional services	15	8	1	0	0	24
Public sector	3	1	0	0	0	4
Retail & Sales	13	14	2	0	0	29
Self-Employed	9	4	2	0	0	15
Social Assistance Services	1	2	0	0	0	3
Student	25	0	0	0	0	25
Utilities	1	0	0	0	0	1
EDUCATION						
College degree or higher	158	77	19	5	0	259
High school diploma or GED	44	24	14	1	0	83
Less than high school	5	0	0	0	0	5
Other	8	6	9	1	1	25
GENDER						
Female	129	65	22	3	1	220
Male	84	42	18	4	0	148

Appendix 9: Vaccine- eligible population by age and County - TRPHD

Vaccine-eligible population

The total COVID-19 vaccine-eligible population of Two Rivers Health District is currently about 81,216. This includes all residents over the age of 12 years living in the seven counties that make up the district. The table below describes the eligible population in each of the seven counties divided by age category.

	12-29 YRS	30-49 YRS	50-64 YRS	65+ YRS	TOTAL(12+ YRS)
TRPHD	**24794**	**22863**	**17760**	**15799**	**81216**
BUFFALO	14,314	11910	8184	6863	41,271
DAWSON	5,750	5723	4334	3696	19,503
FRANKLIN	515	586	717	809	2,627
GOSPER	333	418	532	526	1,809
HARLAN	625	649	735	845	2,854
KEARNEY	1,385	1508	1343	1239	5,475
PHELPS	1,872	2069	1915	1821	7,677

Appendix 10: Sample citywide report for School Board Meeting (October 2020)

GOTHENBURG July 1, 2020 – Oct 12, 2020

Key takeaways:

- Overall positivity rates are low (just under 8% for the three and a half months since July 1)
- There was a relatively large flareup of cases in July-August, following which we see a more recent increase in cases among 65 and over. (however, testing has also increased in this population) (please see table)
- Gothenburg's case load is greater than Cozad but less than Lexington (please see graph)

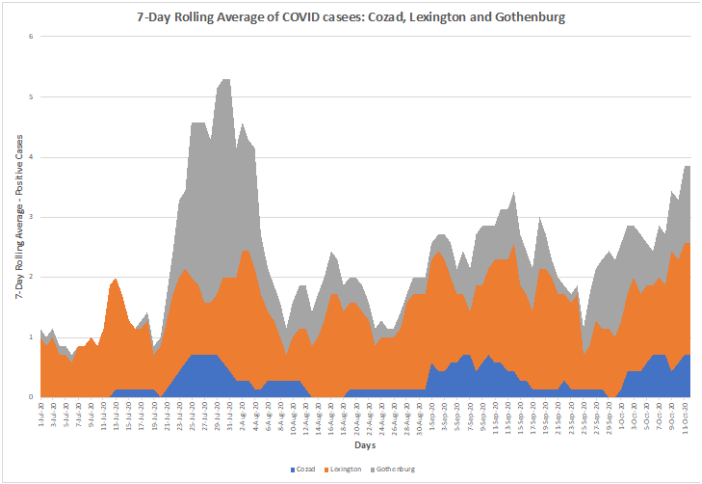
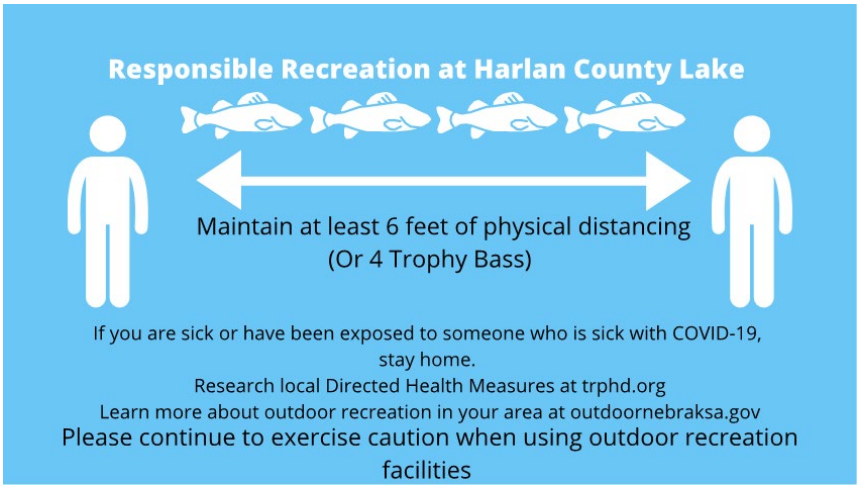


Table describes the total tests done weekly and the number of positive results for each week in Gothenburg since July 1, 2020.

	0-4yrs		5-17 yrs		18-49 yrs		50-64 yrs		65 yrs & over		TOTAL	
Weeks since July 1	Total tests/ week	Positive cases/ week	Total tests/ week	Positive cases/ week	Total tests/ week	Positive cases/ week	Total tests/ week	Positive cases/ week	Total tests/ week	Positive cases/ week	Total/ week	Positive cases/ week
1Jul- 7Jul	2		1		7		2		7		19	
8Jul- 14Jul	2		5		14		5		13		39	
15Jul- 21Jul	1		2		9		10	1	12	2	34	3
22Jul- 28Jul	3		16	1	34	8	13	2	14	8	80	19
29Jul- 4Aug	5		10	1	42	6	13		25	7	95	14
5Aug- 11Aug	1		12		25	2	14		35	3	87	5
12Aug- 18Aug			7		19		7	1	10	2	43	3
19Aug- 25Aug	1		9		20		5		13	1	48	1
26Aug- 1Sep			14		17	1	12	1	9		52	2
2Sep- 8Sep	1		8		24	5	8	1	8		49	6
9Sep- 15Sep	2		18		63	3	39	3	9		131	6
16Sep- 22Sep	1		4		16		7		7	1	35	1
23Sep- 29Sep	3		18		32	4	19	1	12	4	84	9
30Sep-6Oct			17		51	2	34	1	32	1	134	4
7Oct- 13Oct			8		30	4	24	3	39	2	101	9
1 JUL - 13 OCT	22		149	2	403	35	212	14	245	31	1031	82

Appendix 11: Sample Health Education Flyers Published by TRPHD



Appendix 12: Risk Dial Press Release June 17, 2021

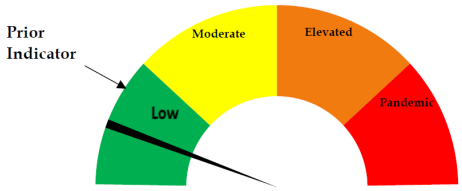
FOR IMMEDIATE RELEASE
June 17, 2021
9:52 AM
888-669-7154

CONTACT PERSON
Aravind Menon
Epidemiologist

Two Rivers Releases Updated Risk Dial and Vaccination Report

KEARNEY – Two Rivers Public Health updated the weekly risk dial on Thursday, June 17, 2021. The risk dial did decrease from the previous week, and is now lower in the green "low" level of risk. Also, as a result of decreasing cases and consistent level of low risk, the risk dial will now be updated bi-weekly unless there is an increase of risk.

COVID test positivity rate is at its lowest level since record-keeping began. The number of new cases last week was the lowest since April 2020. The last month averaged less than two cases daily across the district, about 90% of those from Buffalo & Dawson counties. Weekly tests have dropped dramatically, especially as long-term care facilities have wound down routine testing. There was no COVID-related ICU and ventilator utilization in TRPHD in the past two weeks; 36.1% of the total population of TRPHD district is now fully vaccinated. TRPHD has regularly scheduled mobile vaccination clinics at 8 sites across seven counties. Those eligible for the vaccine are advised to contact their physician or refer to the vaccination clinic schedule at www.trphd.org. In the meantime, unvaccinated residents are advised to continue to adhere to strict preventive measures (social distancing, correct and consistent masking) at all times to protect themselves and others.



Risk Dial for COVID-19
Two Rivers Public Health
Published Jun 17, 2021

Summary of key takeaways from the district vaccination rate report:

1. As of Jun 14, 2021, 36.1% of TRPHD's total population has been fully vaccinated. The number of people accessing their first dose of COVID vaccination last week was 50% less than a month previously.
2. The proportion of persons partially vaccinated in Dawson county continues to remain higher than the fully vaccinated, even after accounting for the time taken to catch up. This indicates that at least some of the residents have decided not to avail of the second dose of vaccine. TRPHD strongly urges all residents to avail of the full vaccination schedule (1 or 2 doses as indicated).
3. Uptake of new vaccinations continue to be slow in the 30-64 age group. The number of Buffalo county residents fully vaccinated daily has dropped dramatically in the previous month.
4. Two Rivers Health Department has scheduled mobile vaccination clinics at multiple sites across the seven counties to distribute vaccines and to focus on areas of potential shortfall.

ABOUT TWO RIVERS PUBLIC HEALTH DEPARTMENT

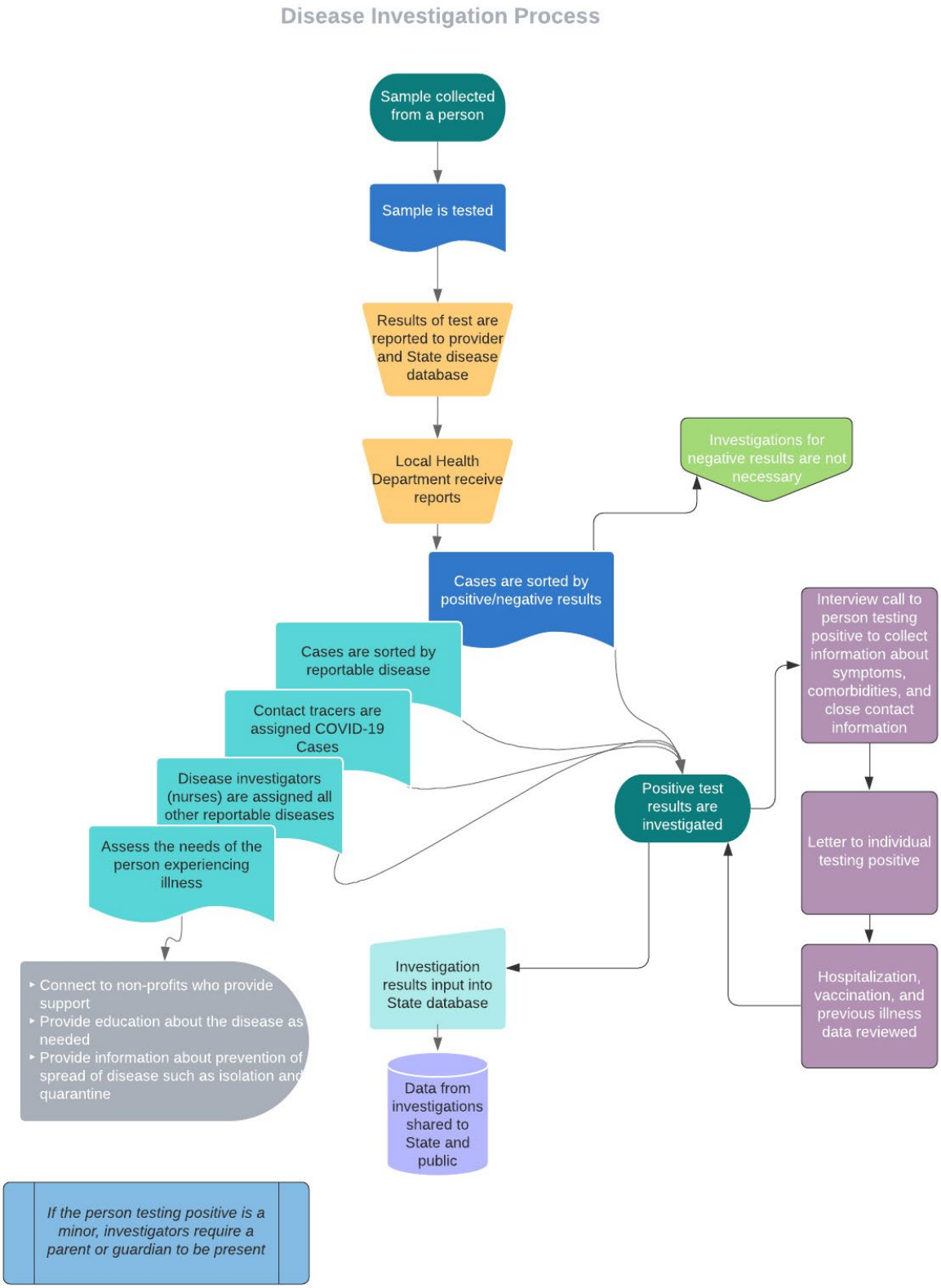
Two Rivers Public Health Department engages collaborative partners, community leaders and the public to promote healthy lifestyles, provide preventative education, assure

environmental quality, and create more healthy and safe communities for all who live within the district. Follow TRPHD on Facebook and Twitter @2RPHD.

Appendix 13: Medical Materials Distributed

Medical Materials and Equipment	Estimated volume distributed (by Aug 8, 2021)
Nitrile gloves (all sizes)	2,400,707
Surgical gowns (all sizes)	425,775
N95 masks (individual)	128,528
KN95 masks (individual)	98,395
Surgical masks (individual)	328,207
Test NE kits (incl emergency test kits)	11,601
Infrared thermometers	9,374
Face shields and goggles (individual)	42,221
Disposable syringes	15,350
Bandages	21,600
Disinfectant wipes (boxes)	18,896
Hand sanitizer (gallons)	549

Appendix 14: Disease Investigation Process



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