



**BROADBAND LIMITATIONS DURING COVID-19
PANDEMIC AND IMPACT OF EXPANDING INTERNET SPEED
SERVICES IN EL PASO COUNTY**

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Introduction

The ripple effects of the COVID-19 public health crisis continue to impact the global economy. In El Paso County, local, state, and federal agencies have implemented strategic efforts to reduce community transmission of COVID-19. The sanitary measures taken to reduce transmission of COVID-19 have triggered an increase in internet usage for work, health, and education. The current and potential expanded demand of reliable and fast internet connection services, particularly broadband services, is crucial for the proper development and increased competitiveness of this region.

The Hunt Institute identified and assessed the gaps in broadband services throughout El Paso County in response to the recent global pandemic caused by COVID-19. This report provides a review of population demographics, education, and economic indicators, as well as an assessment of the potential regional impacts of broadband service amidst the COVID-19 pandemic in El Paso County. This study also estimates the savings resulting from the increased demand for remote education, telehealth, and telework during COVID-19.

This report is divided into five sections. First, the literature review outlines previous work done on the economic impact of broadband. Then, the following sections describe the current and projected economic and demographic indicators to understand the recent and potential increase in demand for telehealth, telework, and remote education as a result of the COVID-19 pandemic in El Paso County. The next section presents case studies by sector covering the implications of internet connection use at various speeds in El Paso County during the public health crisis. This section is followed by an estimation of saving in travel time, travel costs, and congestion by sector covered. Lastly, mapping of current broadband infrastructure is depicted.

I. Literature Review

Lobo and others (2008) estimated the economic impact of broadband infrastructure in Hamilton County, Tennessee using IMPLAN. They measured the economic impact of first-generation broadband from 2001 to 2005 by estimating total broadband expenditures in the county for both business and residential establishments. Afterwards, the authors estimated the cost of a new generation of broadband infrastructure and the economic impact using the same methodology.

The Northeastern Agricultural and Resource Economics Association (2011) estimated the economic benefits associated with telemedicine infrastructure. The authors measured the hospital savings and costs from outsourcing. The authors also measured the user savings from transportation costs due to telemedicine, this includes income savings from the hours missed at work for attending a doctor's appointment. Finally, the authors discussed that telemedicine also influences the local economy from purchasing from local pharmacies. Since doctors were sending electronic medical prescriptions, patients purchased their medication from their local pharmacies, instead of buying directly from the doctor's office, in this way more local jobs were sustained locally.

Lobo (2011) studied the economic impact and social value of the addition of fiber optic infrastructure in Hamilton County, Tennessee. The study relied on expenditure information and outlays provided by the city of Chattanooga. Lobo examined the effects that pertain to environmental and health benefits, telecommuting, and entertainments as well as efficiencies associated with electric power distribution and broadband infrastructure. Lobo used the IMPLAN methodology to derive the direct, indirect, and induced effects on employment, output, and business taxes in Hamilton County. The author also used analytical techniques to estimate the economic and social effects. Finally, Lobo conducted several case studies with anecdotal information obtained from interviewing several key informants from telework, telehealth, and remote education.

Barton (2016) with the Federal Reserve Bank of Dallas estimated the correlation between the lack of access to broadband services in major United States metropolitan statistical areas and community development and found that low and middle-income communities tend to have lower rates of access to broadband services. According to the author, broadband is an integral part of small business development, access to health care, access to financial services, education, and even access to affordable housing.

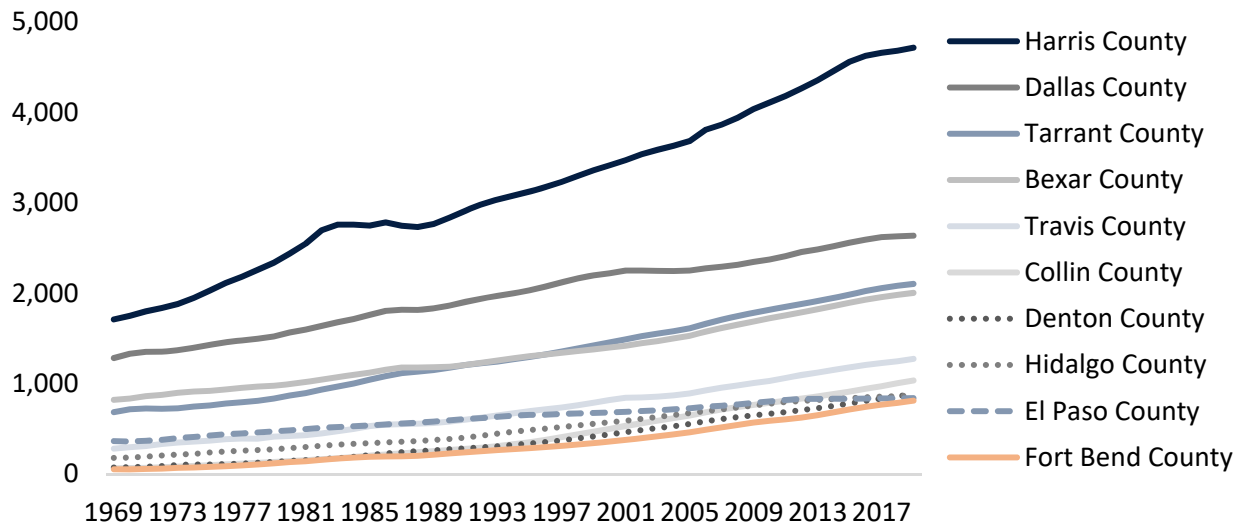
Regional Economic Models, Inc. (REMI) (2019) developed the TranSight model. This model calculates direct and indirect costs and benefits that may derive from a change in the transportation infrastructure, which include emissions, transportation costs, and safety. This model also calculates the value of time through the opportunity cost of driving. TranSight's application of time cost savings can be applied to the reduction of traffic derived from remote work. TranSight bases the value of leisure time saved by the transportation upgrade on the resulting reduction in hours per vehicle-trip multiplied by the average vehicle occupancy rate. The average time savings are then multiplied by the portion of trips under the alternative simulation conducted for leisure purposes.

II. Population, Education, and Economic Indicators

A. Population Demographics

According to the U.S. Bureau of Economic Analysis, the population in El Paso County had more than doubled from 1969 to 2019. In recent years, however, the population in El Paso County has plateaued and has remained relatively steady since 2010 (Figure 1).

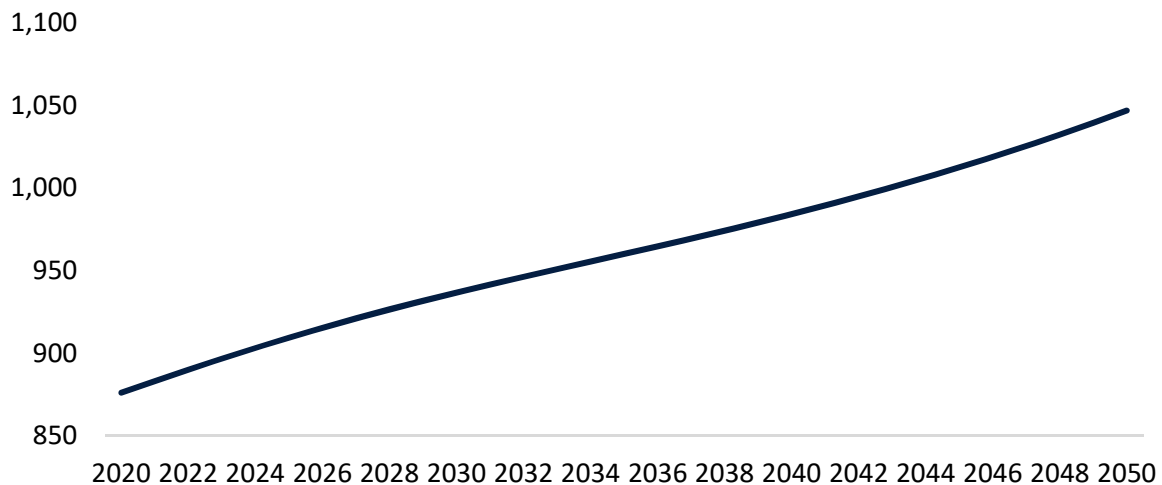
Figure 1. Top 10 Texas Counties by Total Population, Thousands



Source: U.S. Bureau of Economic Analysis.

In El Paso County, according to the Texas Demographic Center, the population is expected to continue to increase leading up to 2050. In fact, the population in El Paso County is expected to increase by 19% from 2020 to 2050.

Figure 2. Total Projected Population in El Paso County from 2020-2050, Thousands



Source: Texas Demographic Center.

In El Paso County, a significant portion of the population is very young. In 2017, 23% was under the age of 14. The table below provides the horizon city population by top age group. In 2017, 8.5% of the population was 20 to 24 while 8% of the population was 10 to 14.

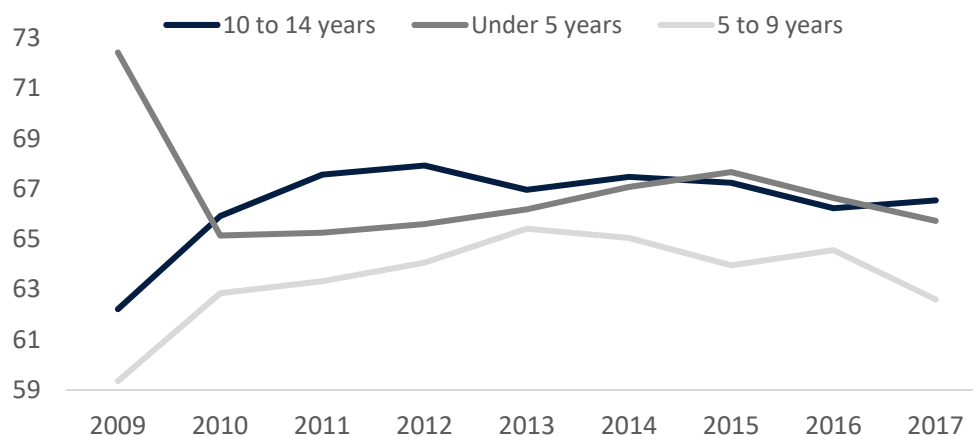
Table 1. El Paso County Population Demographics by Top Age Group

Age Group	2009	2013	2017	2017 Share (%)
20 to 24	56,380	66,543	71,271	8.5%
10 to 14	62,215	66,960	66,543	8.0%
Under 5	72,427	66,189	65,726	7.9%
15 to 19	58,946	68,190	65,084	7.8%
25 to 29	48,491	58,871	64,168	7.7%
5 to 9	59,351	65,417	62,602	7.5%
30 to 34	47,060	52,846	57,052	6.8%
40 to 44	47,735	51,261	53,904	6.5%
35 to 39	48,221	53,659	50,905	6.1%
50 to 54	42,737	50,052	49,039	5.9%
45 to 49	48,194	50,448	49,019	5.9%
55 to 59	35,794	42,339	46,501	5.6%
60 to 64	26,663	34,584	37,944	4.5%
65 to 69	21,233	24,849	28,806	3.5%
70 to 74	18,316	20,783	24,012	2.9%
75 to 79	16,506	16,739	17,697	2.1%
80 to 84	11,751	12,236	12,682	1.5%
85 years and over	8,482	10,235	11,870	1.4%
Grand Total	730,504	812,202	834,825	100%

Source: U.S. Census Bureau.

To understand population demographics by age group historically, age groups were divided into four main categories. The following graph illustrates the first category with three age groups below 14 years. The number of persons under the age of 5 decreased significantly from 2009 to 2010 and increased until 2015 when it decreased again in 2016 and 2017. After 2015, the population that was under 5 years and 5 to 9 years display a downward trend (Figure 3).

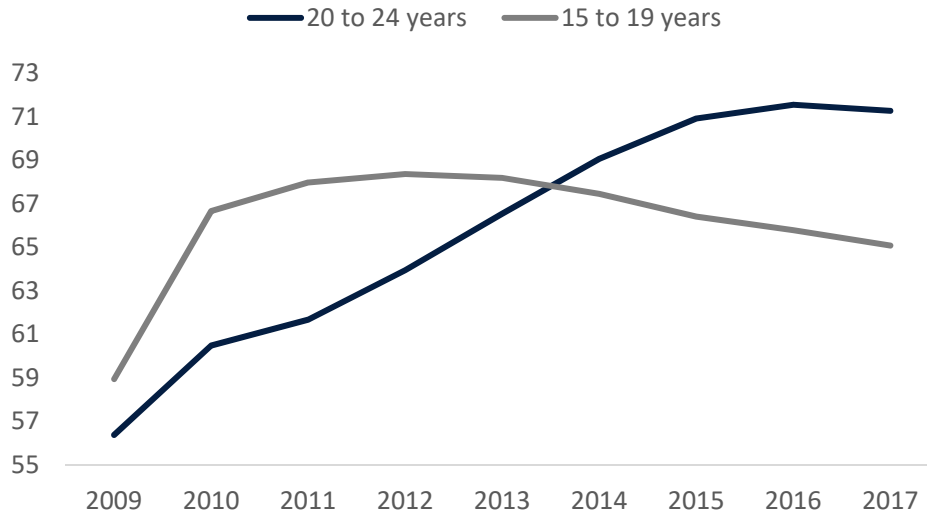
Figure 3. El Paso County Youth Population by Age Group, Thousands



Source: U.S. Bureau of Economic Analysis.

In El Paso County, in 2017, 16% of the population was among the ages of 15 to 24 years old, the second age group category. In the figure below, the population for young adults has been further divided into two sub-categories, 15 to 19 and 20 to 24 years. From 2009 to 2012, the population 15 to 19 increased significantly. Since then, however, only the population for those 20 to 24 years has continued to increase while the population for those 15 to 19 years has decreased (Figure 3).

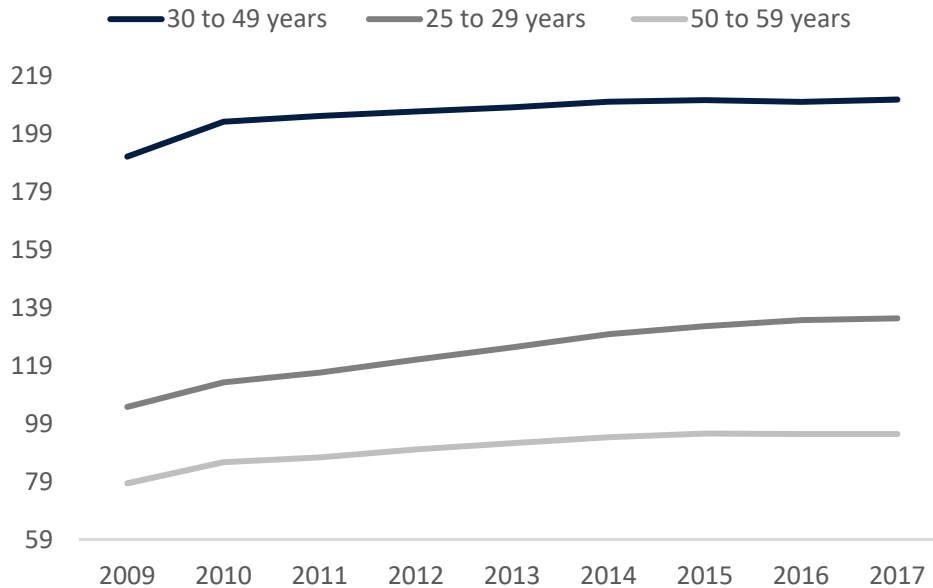
Figure 4. El Paso County Young Adult Population by Age Group, Thousands



Source: U.S. Bureau of Economic Analysis.

In El Paso County, the adult population has increased steadily since 2009 to 2017 (Figure 4). Among the adult population in El Paso County, most are 30 to 49 years.

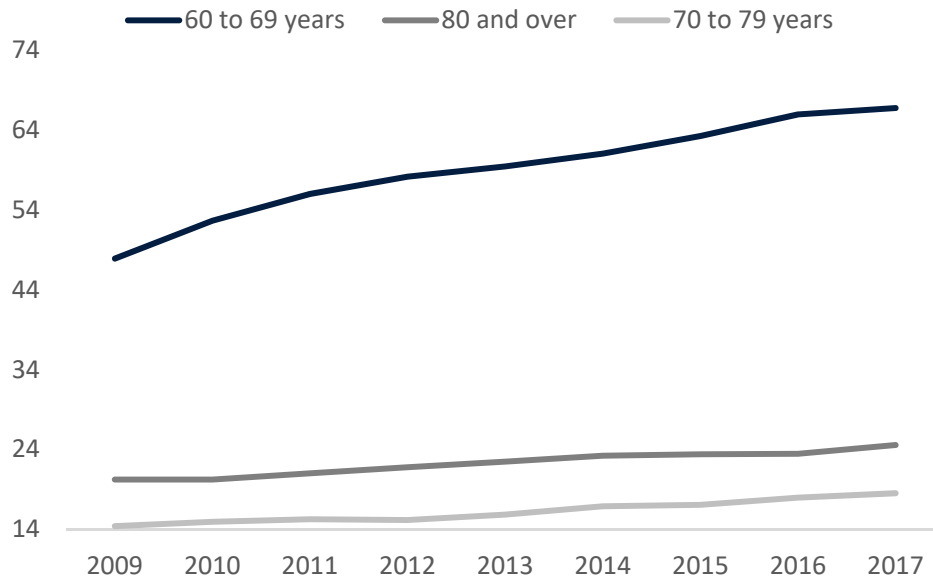
Figure 5. El Paso County Adult Population by Age Group, Thousands



Source: U.S. Bureau of Economic Analysis.

In El Paso County, the elderly population, particularly those 60 to 69 years, increased significantly from 2009 to 2017 (Figure 5). The population 70 to 79 years and 80 and over has increased steadily since 2009.

Figure 6. El Paso County Elderly Population by Age Group, Thousands



Source: U.S. Bureau of Economic Analysis.

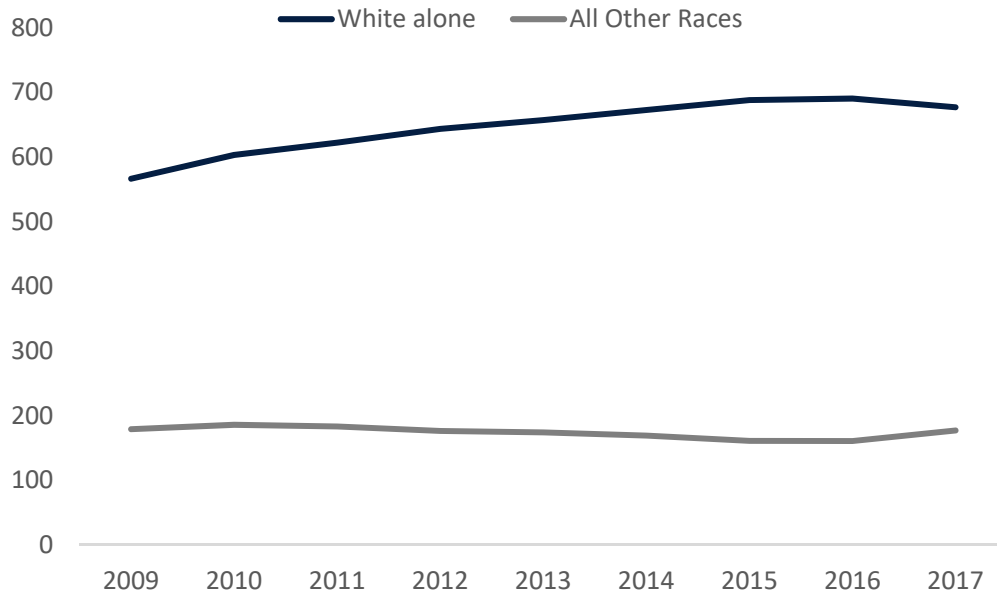
In 2017, in El Paso County, 79% of the population was White alone while 11% were some other race alone. The remaining 10% included Black or African American, Asian Alone, American Indian and Alaska Native Alone, native Hawaiian and other Pacific Islander alone, and two or more races.

Table 2. El Paso County Population by Race

Race Description	2009	2013	2017
White alone	566,462	657,330	677,126
Some other race alone	113,319	96,308	93,589
Black or African American alone	20,434	26,516	28,711
Two or more races	15,959	18,235	19,102
Two races except some other race, and three or more races	6,687	9,798	13,318
Asian alone	8,074	8,741	9,584
Two races including some other race	9,272	8,437	5,784
American Indian and Alaska Native alone	4,680	4,824	5,734
Native Hawaiian and other Pacific Islander alone	468	1,061	979
Total	745,355	831,250	853,927

Source: U.S. Bureau of Economic Analysis.

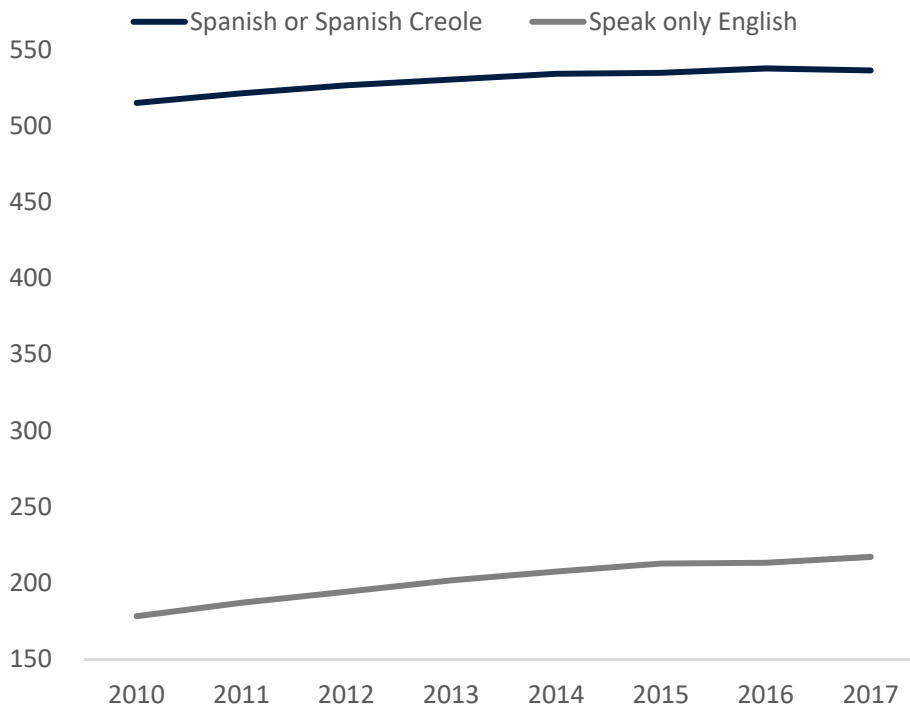
Figure 7. El Paso County Population Race, 2017, Thousands



Source: U.S. Census Bureau.

In El Paso County, in 2017, most of the population speaks Spanish or Spanish Creole with approximately 536,000 persons speaking that language while only around 217,000 speak only English.

Figure 8. El Paso County Population by Language Spoken, Thousands

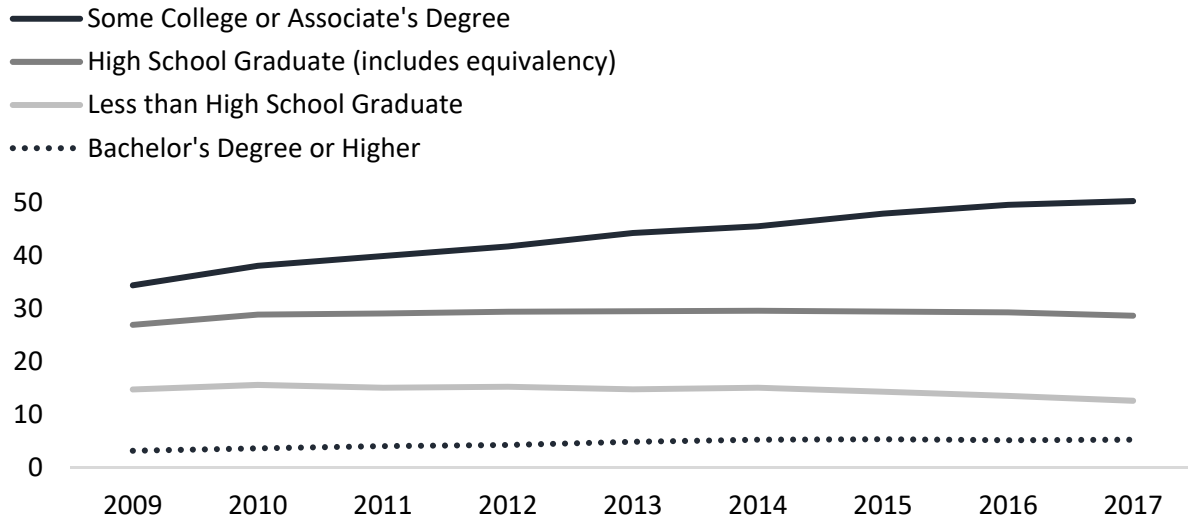


Source: U.S. Census Bureau.

B. Education Indicators

In El Paso County, for the population 18-24 age group, the most common level of education attained was some college or associate’s degree. This level of educational attainment has increased steadily since 2009. The number of the population 18-24 age group that completed high school (including equivalency) has decreased slightly since 2009 and the same is true for those with less than high school. The number of those that have completed a bachelor’s degree has increased slightly since 2009 (Figure 9).

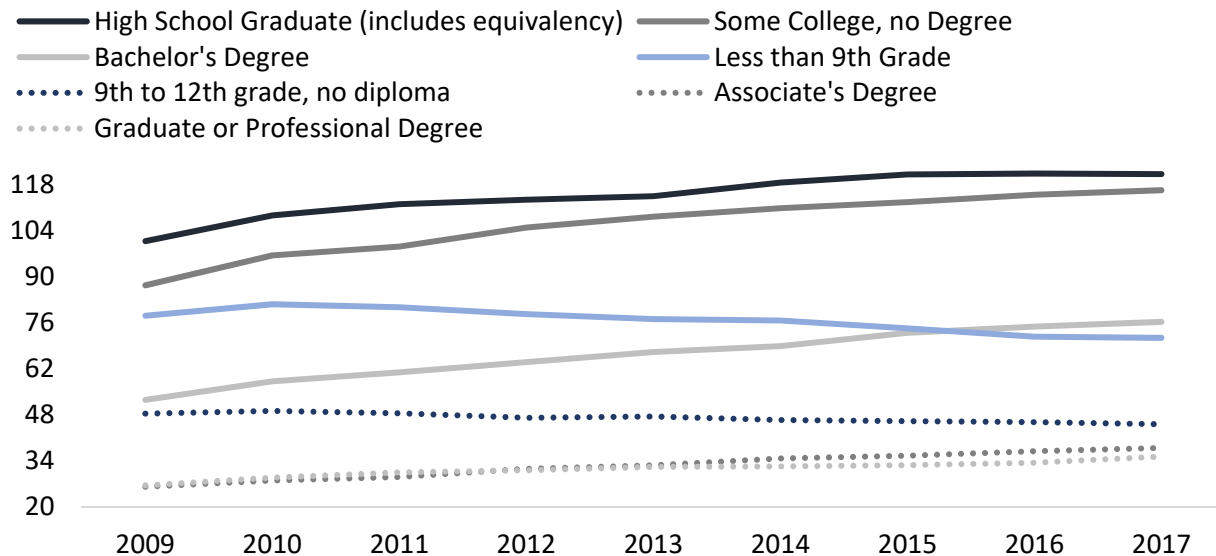
Figure 9. El Paso County Population 18-24 Age Group Educational Attainment, Thousands



Source: U.S. Census Bureau.

In El Paso County, for the population 25 and over, the most common level of education attained was high school and some college, but with no degree.

Figure 10. El Paso County Population 25 and over Educational Attainment, Thousands

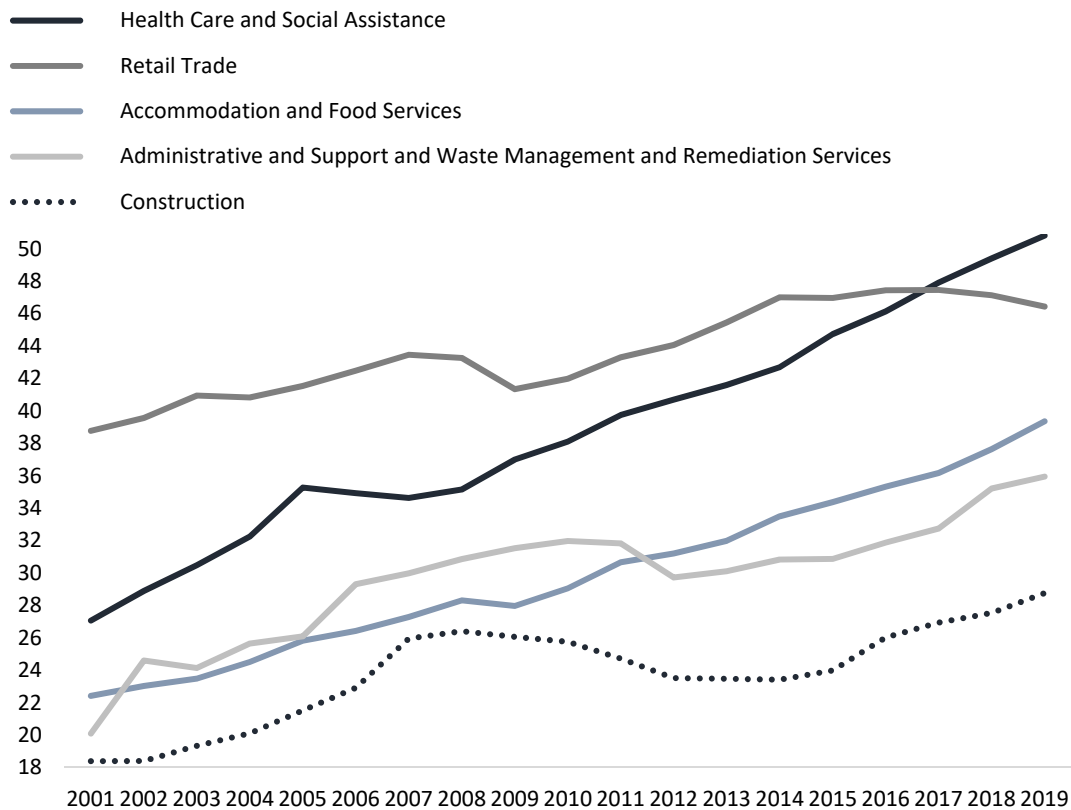


Source: U.S. Census Bureau.

C. Economic Indicators

In El Paso County, from 2001 to 2019, approximately 78% of all non-farm employment is private while 22% is public. In El Paso County, the top five industries accounted for 56% of total full time and part time employment. The Healthcare and Social Assistance sector accounts for the largest share of total employment in 2019 with approximately 50,800 jobs, 14% of total employment. The Retail Trade sector, which used to be the top industry in terms of employment before 2017, is another important industry in terms of employment with approximately 46,400 jobs or 13% in 2019. The Accommodation and Food Services employment sector accounted for approximately 39,300 jobs while Administrative Support and Waste Management and Remediation Services employment sector accounted for approximately 35,900 jobs. Lastly, Construction accounted for approximately 28,800 jobs in 2019. The figure below illustrates these trends.

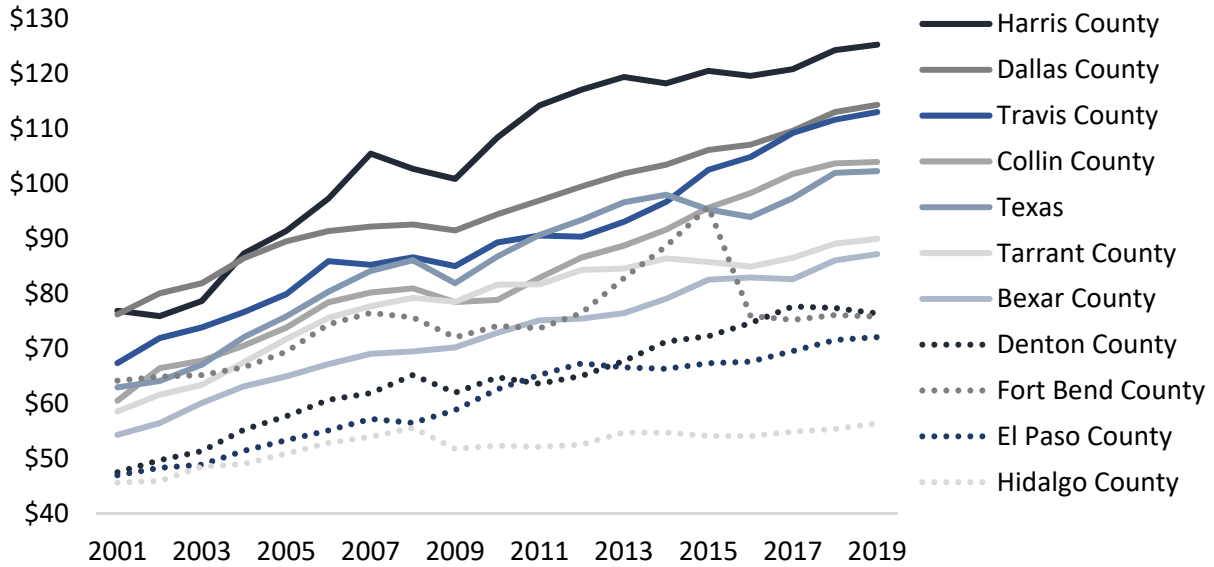
Figure 11. El Paso County Top 5 Employment Industries, Thousands



Source: U.S. Bureau of Economic Analysis.

El Paso County is among the top 10 counties in terms of total population in Texas. The Hunt Institute team selected the top 10 counties in terms of total population in Texas and calculated the Gross Domestic Product (GDP) per worker for each of those counties. In 2019, El Paso County ranked 9th among these counties with a GDP per worker of approximately \$72,000.

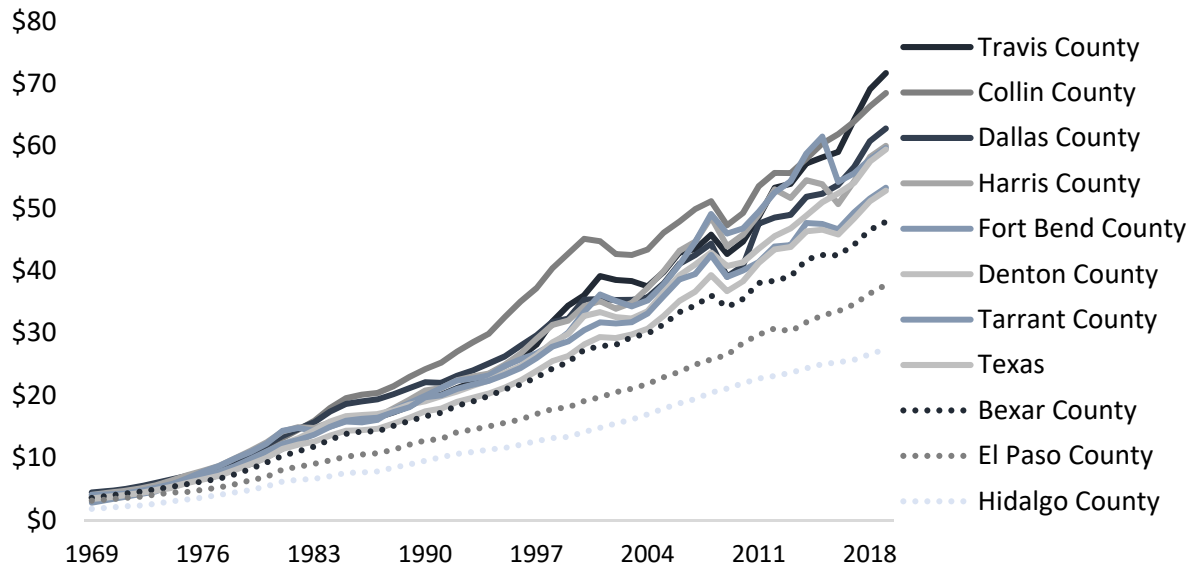
Figure 12. Selected Texas Counties Gross Domestic Product per Worker, Thousands



Source: U.S. Bureau of Economic Analysis.

El Paso County falls behind other counties in Texas with large populations in terms of per capita income. In 2018, per capita income in El Paso County was approximately \$37,700.

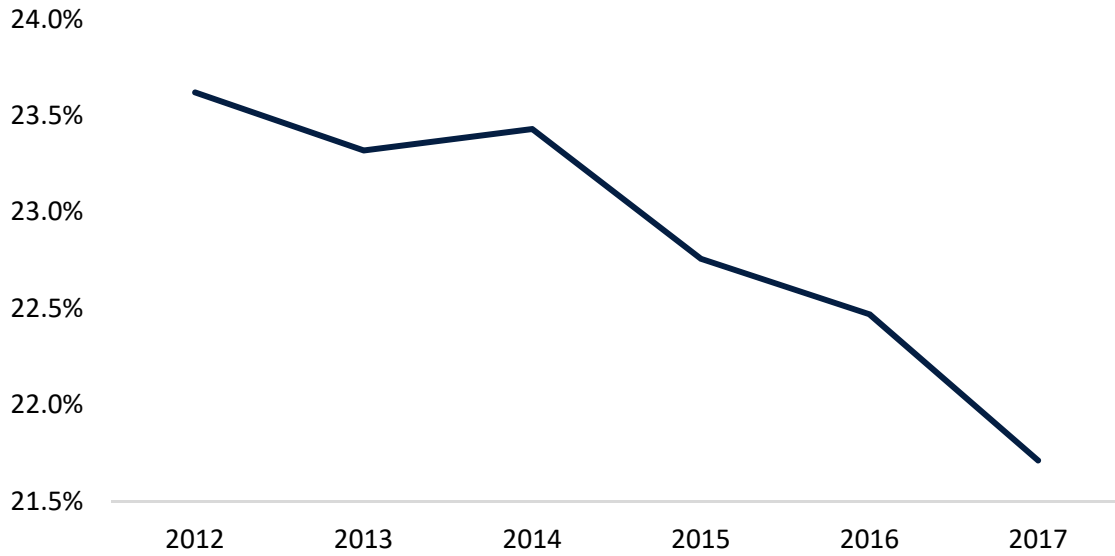
Figure 13. Selected Texas Cities Per Capita Income, Thousands



Source: U.S. Bureau of Economic Analysis.

However, in El Paso County, the percentage of people below the poverty level has decreased from 2012 to 2017.

Figure 14. Population below Poverty Level in El Paso County (%)



Source: U.S. Census Bureau.

III. Case Studies

In order to assess the implications of remote working during a pandemic, the research team identified key participants in the sectors of telework, telemedicine, and remote education for case studies through interviews. Their testimonies serve as a community outreach to complement the quantitative results of broadband usage and highlights the importance of high-speed internet connectivity.

A. Telework

The key informant for the telework sector is the CEO of a binational company that covers several different industries. He is responsible to make the final decision and oversee the projects that the company is currently developing. “We need to have a lot of communication with the technical employees and with the administration department. We must be able to use the tools of communications like Microsoft Teams. Also, we use SolidWorks, and AutoCAD for certain projects that need three-dimensional drawings. We send back and forth, lots of information about products that we design and make, which usually come in big files. We also use SAP, which is an administration program. I don't use it in my house because I don't have enough broadband speed, but we use it in the offices to keep inventories, invoicing, account receivables, payables, accounting systems.”

Given the COVID-19 pandemic, a significant amount of their operations shifted to telework in March, which requires a reliable, high-speed connection to internet for both the key informant and the employees of the company. “I will say about 80% of the administrative and technical staff is working from home. About 20% may be still working in the office on and off. The shift to telework changed everything. Before we started working from home, we had a really good system of communications and we wanted to make sure that we keep the same speed in the design process, meetings, and decision process. We are also having some video conferences to improve quality control.”

Working from home has several advantages, such as savings in gas from commuting, savings from the opportunity cost of time commuting to a workplace, and in several instances, processes become more efficient. “They (administrative employees) tell me they are traveling less. They spend much less time commuting in the city. I was prepared to really lose efficiency, but to tell you the truth it has done some benefit to the company, to some extent. Communication has improved, meetings are quicker and more people participate in meetings. Also, we are now able to record meetings. If an employee misses a meeting because they are working on something urgent, they can always access the recording.”

The key informant also mentioned a few obstacles that have arisen which is mainly that there is not that much supervision in the production lines. “The negative effect was in the beginning, especially because we were kind of blind to see what was happening right in the production lines because we were not there. But by using video conferences and people recording processes that were becoming problems, we actually analyze those videos and come up with solutions.”

For a person working from home, it is extremely important to have access to a reliable connection. Especially when it comes to video conferences, and downloading and uploading large files. The key informant had several issues given that his home connection is very slow and not many internet providers have service in the area where he lives. “For home, I cannot get fiber optic. It’s a bad connection, but I learned a trick, I use hotspot on my phone, the Apple Computer allows you put the two systems in parallel.” The same problem occurs with connectivity to their warehouse which is also located in a remote area. “In our warehouse we use broadband, we tried to get something better but we couldn’t at least not in the place where we are located in.”

The company where the key informant works at has their offices in a more centric location and has some operations in Juarez. “In Juarez communication goes fast. Between our office and the Juarez location communication is perfect, but communications from my home to my office and Juarez, it can be troublesome sometimes.”

The company has a reimbursement program that helped their employees have access to better broadband speed. “We ran a program to make sure that everybody had the best available system where they live. We had a program to look at their speeds connections so the IT team was actually looking into that. And we asked employees to upgrade or change, to move to another provider that was better in their area. We noticed differences in areas of Juarez.”

“I think the major benefit is that we discovered something that I never thought would be possible: to be able to run a company from home. Not only me, but everybody. Most of the people from administration and technical department were sent home, and the benefit that I see is just that it works. And probably we are going to implement a hybrid model once we can return to the office.”

The telework case study shows the efficiencies that can be gained in processes through a good internet connection. Internet connectivity has become essential to the sector of telework, it has maintained effective communication, and according to the key informant, it has made meetings more efficient. The key informant has had different experiences with different internet speeds and concluded that it is important to have the best connectivity possible for both him and all employees.

B. Telemedicine

The key informant of the telehealth sector works in a local hospital and has been working there for almost five years. Her job duties include answering medical related calls through different hotlines and answering questions. As part of her duties, she handles large amounts of databases for each different hotline. Due to this, she requires a reliable high-speed internet that will allow her to enter and save highly sensitive patient information in her database. Additionally, she requires high-speed internet in order to access and answer the patients’ needs or questions. Moreover, as part of her job, it is important to have access to high-speed internet given that she is part of an emergency hotline, therefore, accessing information and answering the callers’ questions almost immediately is crucial.

According to the informant, it is important that the hospital has access to high-speed internet in order to perform her job duties properly. For example, the informant has to create charts for every patient she receives on a phone call. This chart is then uploaded to a national database, which gets uploaded every one or two minutes. Uploading this information is critical in transferring the statistics of the patients to a professional who can then treat the patient. One example of the largest benefit the hospital obtains from having faster internet service during COVID-19 is that at the hospital, workers need the ability to access a patient's chart on the same day.

At her hospital, the internet connection frequently experiences connectivity issues that causes patient charts to freeze and service to the patient or doctor is delayed due to connectivity issues and slow internet. While having a proper internet connection, uploading files to the system is not an issue for the informant. More recently, her employer switched to another internet provider due to complains of slow internet connectivity that were causing calls to drop. Currently, the hospital is trying to implement a work from home program and is testing the internet platform. According to the informant, however, the change from telephone to internet service has been proving to be unreliable due to the slower internet connection from home.

High speed internet services are crucial to the sector of telemedicine. Medical staff handle very sensitive and timely information. If there is a delay in the process caused by a connectivity issue, patients cannot be treated properly.

C. Remote Education

The remote education key informant is an elementary teacher from a local school in El Paso County, Texas who has cable connection in her home. Her current job duties are creating and delivering lessons and assignments, sending files to parents and students, monitoring the progress of her pupils, and communicating with their parents to discuss said progress. She uses virtual video tools, such as Zoom and WebEx, to deliver her classes and uses telephone to communicate with the parents.

When asked about the importance of high-speed internet she said, "it's extremely important. I need to be able to upload files easily and mostly during lessons where I need to, let's say, share a document to the students or a video. It is very important to have high-speed internet because all of this is happening live. If the students are not receiving the information, or if my computer freezes for any reason, then I'm not able to deliver a lesson."

The key informant had to upgrade her internet plan from 100 megabytes to 500 megabytes given that it was not enough for her connectivity needs once the shift to remote education happened. "It's been a challenge not only for me, but for many of my colleagues. My coworkers, most of them had to upgrade their internet service, because it was not working for them. Especially those teachers who have a large household, because being connected to different devices would affect the speed of the internet and the quality of the internet connection." Before changing providers, the key informant's main connectivity issues

were the saturation of devices that led to a slow connection or to the internet to stop functioning altogether.

“Before I upgraded my plan, uploading and downloading data was just awful. The other people in my household were at class or working at the same time. I even knew since when I started, if I wanted to upload something or share files for my students, when I was delivering a lesson I knew I was going to freeze. I had to restart my computer and it was a waste of time. With the upgrade, I noticed the difference, when I would do it during the day, and when I would do it at night or after class it was just easier and faster. I do see a big difference when we upgraded. I'm satisfied I have not had any problems since we upgraded. It worked better.”

Additionally, it is highly important that students also have access to a reliable internet connection. “It's extremely important as well. I have had students who have to leave the class, and not be present, because they could not be connected and didn't have good internet. I've had some students who cannot watch a video that I'm sharing.” This connectivity problems have negatively impacted some students, who have not been able to receive important information for issues outside of their control.

Having a reliable connection is extremely important for both students and teachers during the pandemic. It has become an integral part of the learning process. Professors need a reliable connection to deliver their course content and students need a good connection to learn the information.

IV. Estimation of Savings in Travel Time, Travel Costs, and Congestion by Sector

A. Telework

The following section presents the estimated results for savings in travel time, savings in travel costs, and reduction in congestion costs due to the pandemic. Telework refers to working from home and making use of available internet infrastructure. Therefore, the contribution to time and cost savings due to the reduction in commuting to a physical place of work are estimated for El Paso County.

Based on Census data, El Paso County had about 92.7% of the labor force commute to work by driving or taking public transportation in 2018, as shown in Table 1. The average one-way commute takes 23.6 minutes with an average distance of 23.6 miles per day at a speed of 60 miles per hour. On March 24, 2020, the El Paso County Judge issued a local emergency Order known as the “Work Safe, Stay Home” Order. Thus, this analysis only considers the approximate number of remote working days beginning on that day until the end of 2020. Assuming a remote job percentage of 35.2% in Texas due to COVID-19, the number of telecommuters in El Paso due to COVID-19 can be estimated to be about 113,696. Based on Crandall and Jackson (2001), the savings in travel time, savings in travel costs, and reduction in congestion costs can be calculated using the following formulas:

- Savings in Travel Time = Number of Telecommuters x Hours/Day x Days/Year x Half Average Hourly Wage Rate
- Savings in Travel Cost = Number of Telecommuters x Average Roundtrip Commute Miles Per Year x Average Cost Per Mile
- Reduction in Congestion Costs = Proportion of Commuting Labor Force that Telecommutes x % Reduction in Commuting x Peak Multiple x Half of Total Congestion Costs per Year

Table 3 shows data on transportation, commute mode, and commute time to work for El Paso County and the United States in 2018. The average travel time to work in El Paso is approximately 24 minutes, which is less than the national average, approximately 27 minutes. The mode of transportation is mainly by car, truck, or van with approximately 82% of working individuals that choose this type of commute. This average compares to the national average of 76% which is slightly lower.

Table 3. Transportation Indicators in El Paso County, Texas in 2018

Transportation	El Paso, TX	United States
Commute Time (mean travel to work in minutes)	23.6	27.1
Commute Mode		
Car, truck, or van - drove alone	81.7%	76.3%
Car, truck, or van - carpooled	9.8%	9.0%
Public transportation (excluding taxicab)	1.2%	4.9%
Walk	1.5%	2.6%
Bicycle	0.1%	0.5%
Worked at Home	3.8%	5.3%
Commute Time to Work		
Less than 10 minutes	10.4%	12.0%
10 to 14 minutes	13.3%	13.1%
15 to 19 minutes	18.4%	15.2%
20 to 24 minutes	19.2%	14.3%
25 to 29 minutes	9.3%	6.5%
30 to 34 minutes	16.2%	13.9%
35 to 44 minutes	4.3%	7.2%
45 to 59 minutes	5.2%	8.4%
60 or more minutes	3.6%	9.5%

Source: U.S. Census Bureau.

Table 4 presents the estimated results on the savings from teleworking due to COVID-19 in El Paso County. The estimated savings in travel time is about \$122.10 million, savings in travel costs is about \$11,965.73 million, and the reduction in congestion costs is about \$79.56 million. The total savings due to teleworking in El Paso County is approximately \$12,167.39 million.

Table 4. Savings from Telecommuting Due to COVID-19 in El Paso County, Texas

Savings from Telecommuting	2020
Number of Teleworkers	113,696
Average Commute Miles / Year	9,604
Average Commute Minutes / Trip	23.6
Average Cost Per Mile	\$5.48
Average Hourly Earnings	\$13.93
Savings in Travel Time (Million USD)	\$122.10
Savings in Travel Costs (Million USD)	\$11,965.73
Reduction in Congestion Costs (Million USD)	\$79.56
Total (Million USD)	\$12,167.39

Source: Hunt Institute using U.S. Census Bureau, Texas A&M Transportation Institute, and JobsEQ data.

B. Telemedicine

Telemedicine is the practice of caring for patients remotely using video-conference tools. It is a practice that many physicians have adopted and has been crucial during the pandemic. Telehealth specialties require different internet velocities, and some clinical applications, such as tele-radiology, require higher broadband velocities compared to tele-monitoring. Additionally, chronic patients save costs by engaging in tele-monitoring, reducing the risk of getting infected with COVID-19. The majority of chronic patients' health needs can be met with single consultations and audio-video consultations, resulting in short-term savings, according to Nord (2018). Also, telemedicine creates an opportunity of receiving healthcare to patients that do not receive medical out of fear of the pandemic and reduce the risk of COVID-19 patients infecting others.

Table 5 estimates the results of the savings when chronic patients engage in telemedicine. The Center for Disease Control (CDC) estimated that in 2017 the yearly per capita healthcare expenditures in the U.S. were \$10,739 or \$11,404.49 in 2020 dollars and that 90% of all health care expenses came from chronic patients. Additionally, the U.S. Census Bureau estimated that in 2017, 92% of the population had healthcare expenditures. Given this information, healthcare expenditures attributable to chronic patients can be estimated as follows:

$$\begin{aligned} & \% \text{ of total population with healthcare expenditures} \times \text{average health care expenditure per capita} \\ & \quad \times \% \text{ of expenses from chronic patients} \end{aligned}$$

Table 5. Savings from Telehealth during COVID-19 in El Paso County, Texas

Savings from Telehealth	2020
El Paso County Population	883,160
% Population with Healthcare Expenses	92%
Average Healthcare Expenditures Per Capita	\$11,404.49
% of Expenses from Chronic Patients	90%
Chronic Patients Total Healthcare Expenses (Billion USD)	\$8.35
Percentage of Estimated Savings from Telehealth	35%
Reduction in Telehealth Costs	\$2.92
Total Cost with Telehealth Savings (Billion USD)	\$5.43

Source: The Hunt Institute using data from Center for Disease Control and U.S. Census Bureau, and Texas Demographic Center.

It is estimated that telemedicine reduces costs by 50% for chronic patients nationally according to Dorsey and Topol (2020). The Hunt Institute chose 35% in savings when practicing remote healthcare, to obtain a more conservative estimate. The Hunt Institute estimates that in El Paso County, chronic patients would spend \$8.35 billion in 2020. Also, a 35% of reduction in costs as a result of telemedicine would equal \$2.92 billion. Therefore, El Paso’s total healthcare expenses for chronic patients would be \$5.43 billion in 2020 when adjusting for telemedicine.

C. Remote Education

The following section, similar to telework, presents the estimated results for savings in travel time due to the pandemic derived from remote education. Remote education is when students engage in education without being physically in a classroom, it is usually through online courses. To estimate savings for El Paso County, data from a school in the county and the Bureau of Labor Statistics (BLS) was used.

Based on this school’s information, 95% of its students are taking remote courses. Prior to the pandemic, 16% of students took online courses, hence, 9% of students shifted from in-person courses to remote education. According to a self-reported student survey 17% of these students work full-time and 30% of students work part-time. According to BLS the average hourly wage of a worker with a high-school diploma is \$11.94.

The methodology for calculating the savings in travel time is the same as in the telework section. The average one-way commute in El Paso is about 23.6 minutes, or 39% of commuting time in an hour. Given the number of students taking online courses before and after the pandemic, we can assume that 79% of students use remote education due to COVID-19. Again, the savings in travel time were estimated by using the following formula:

- Savings in Travel Time = Number of New Telecommuters x Hours/Day x Days/Year
x Half Average Hourly Wage Rate

The estimated savings in travel time for these students using remote education is about \$20.59 million, as shown in Table 6.

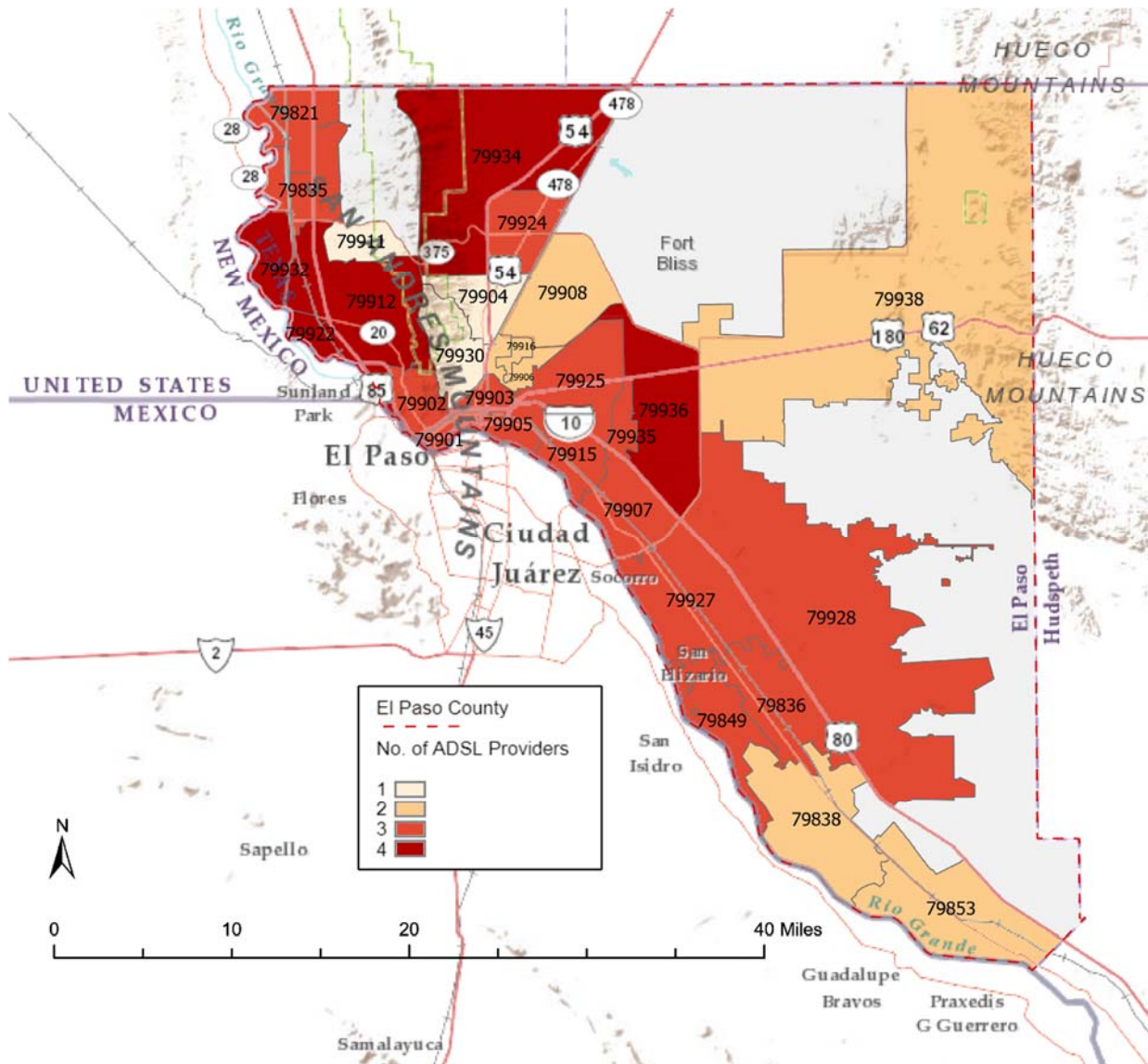
Table 6. Savings in Travel Time for Students Due to COVID-19 in El Paso County, Texas

Savings in Travel Time for Students	2020
Average Commute time in Minutes	23.6
Percent of Commute Time in an Hour	39%
Average Hourly Earnings	\$11.94
Savings in Travel Time (Million USD)	\$ 20.59

Source: Hunt Institute using data from a school in El Paso County, Census Bureau, and BLS.

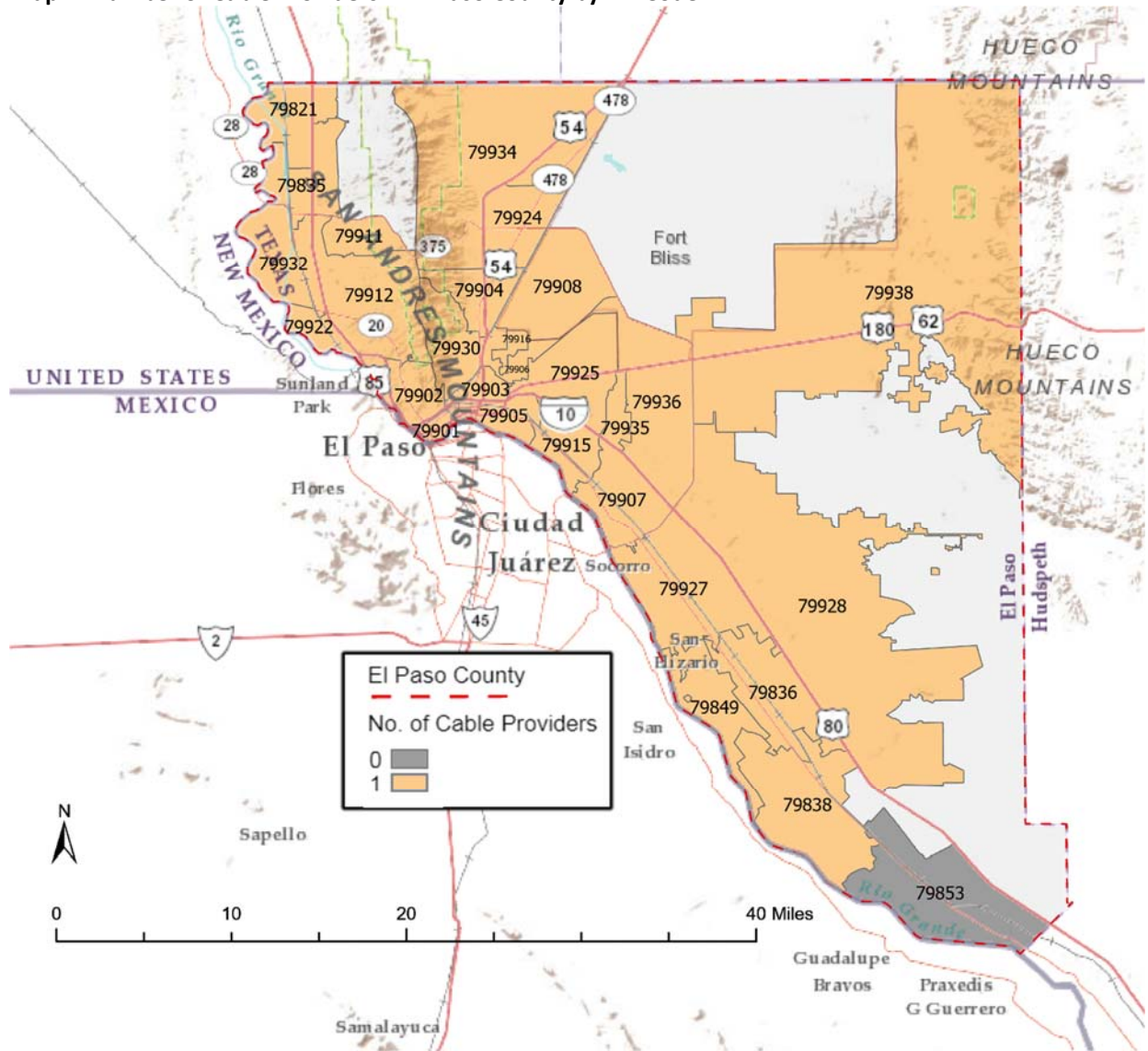
V. Mapping of Current Internet Infrastructure

Map 1. Number of ADSL Providers in El Paso County by ZIP Code



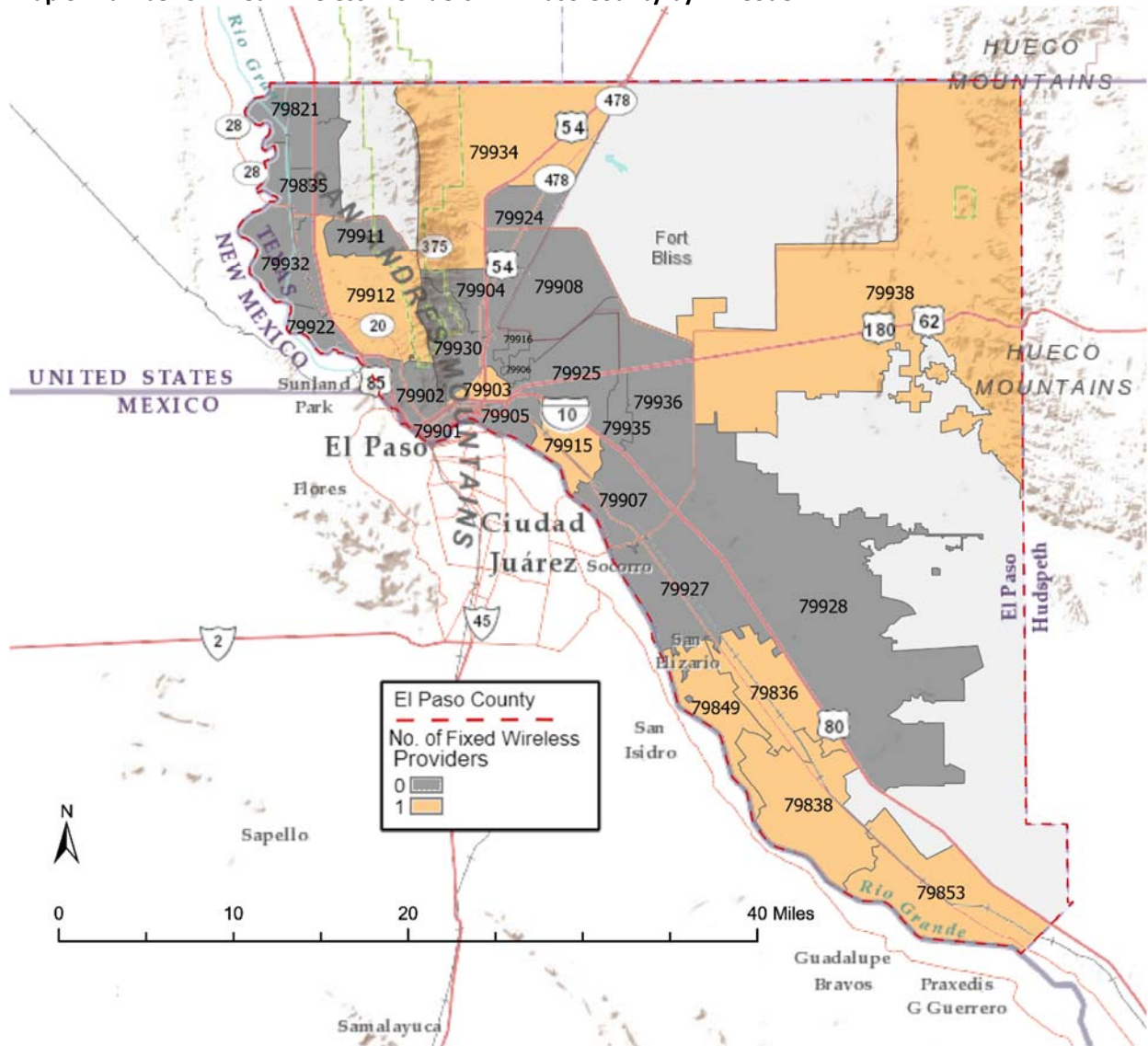
Source: Hunt Institute using Federal Communication Commission data.

Map 2. Number of Cable Providers in El Paso County by ZIP Code



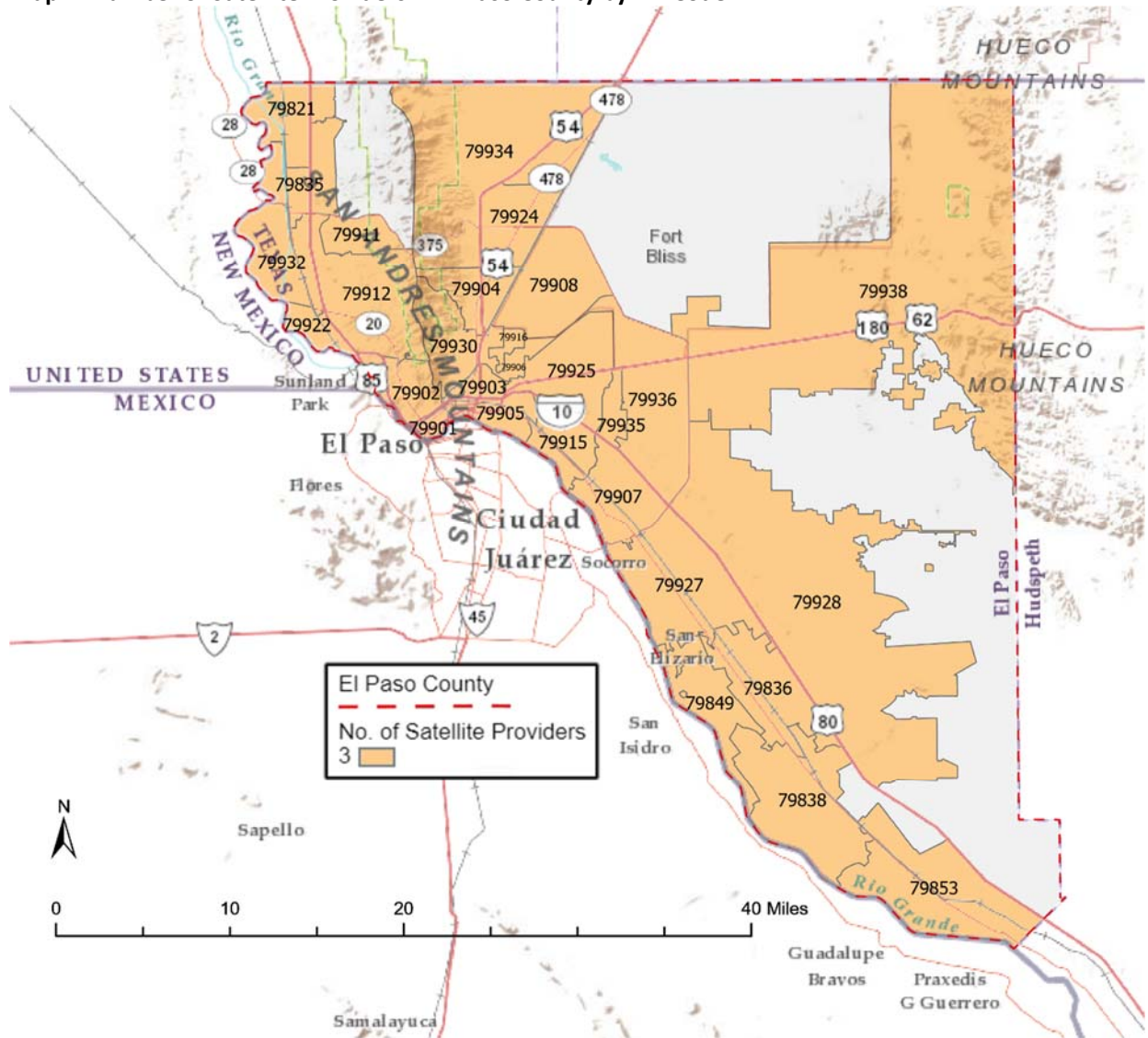
Source: Hunt Institute using Federal Communication Commission data.

Map 3. Number of Fixed Wireless Providers in El Paso County by ZIP Code



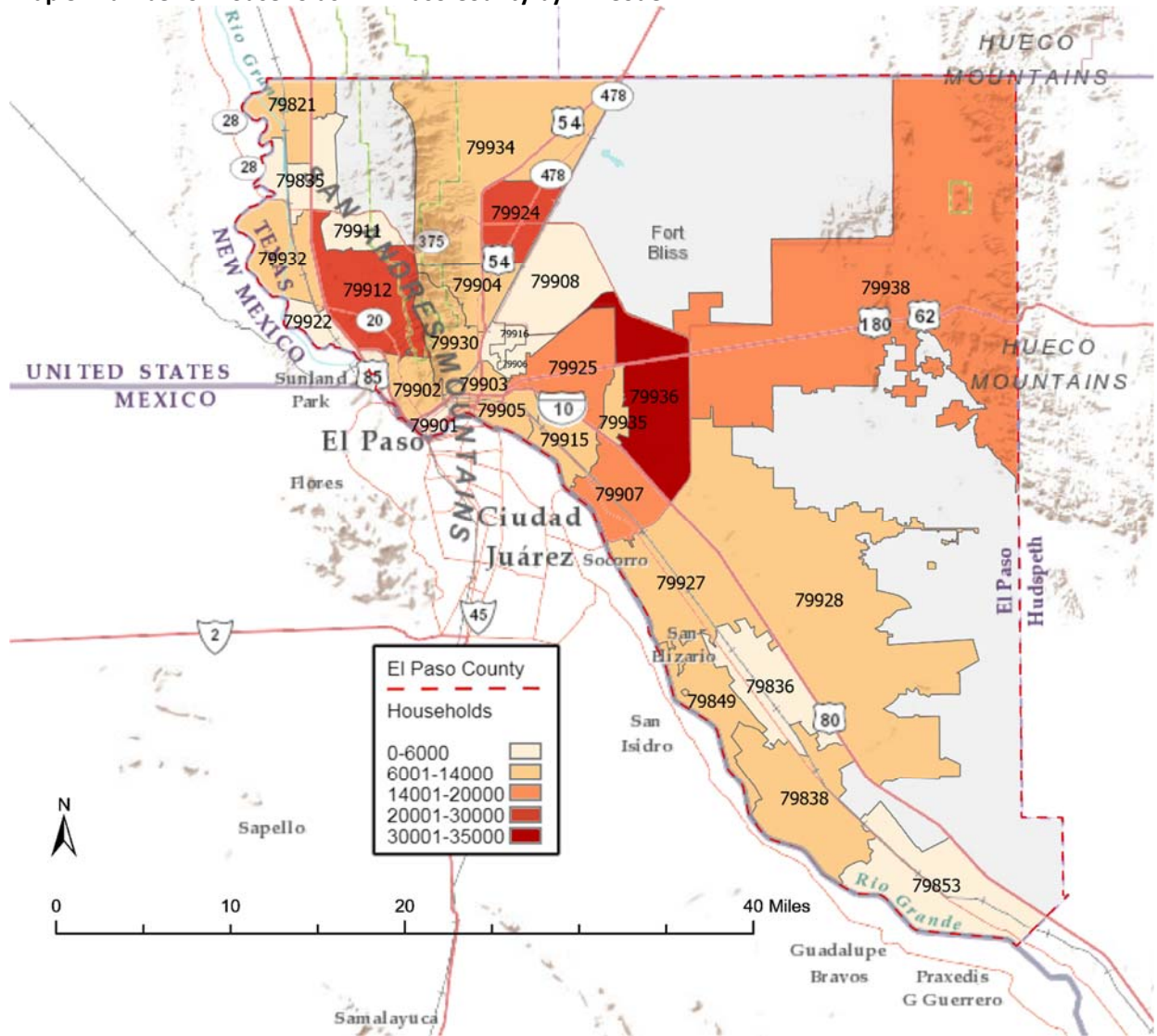
Source: Hunt Institute using Federal Communication Commission data.

Map 4. Number of Satellite Providers in El Paso County by ZIP Code



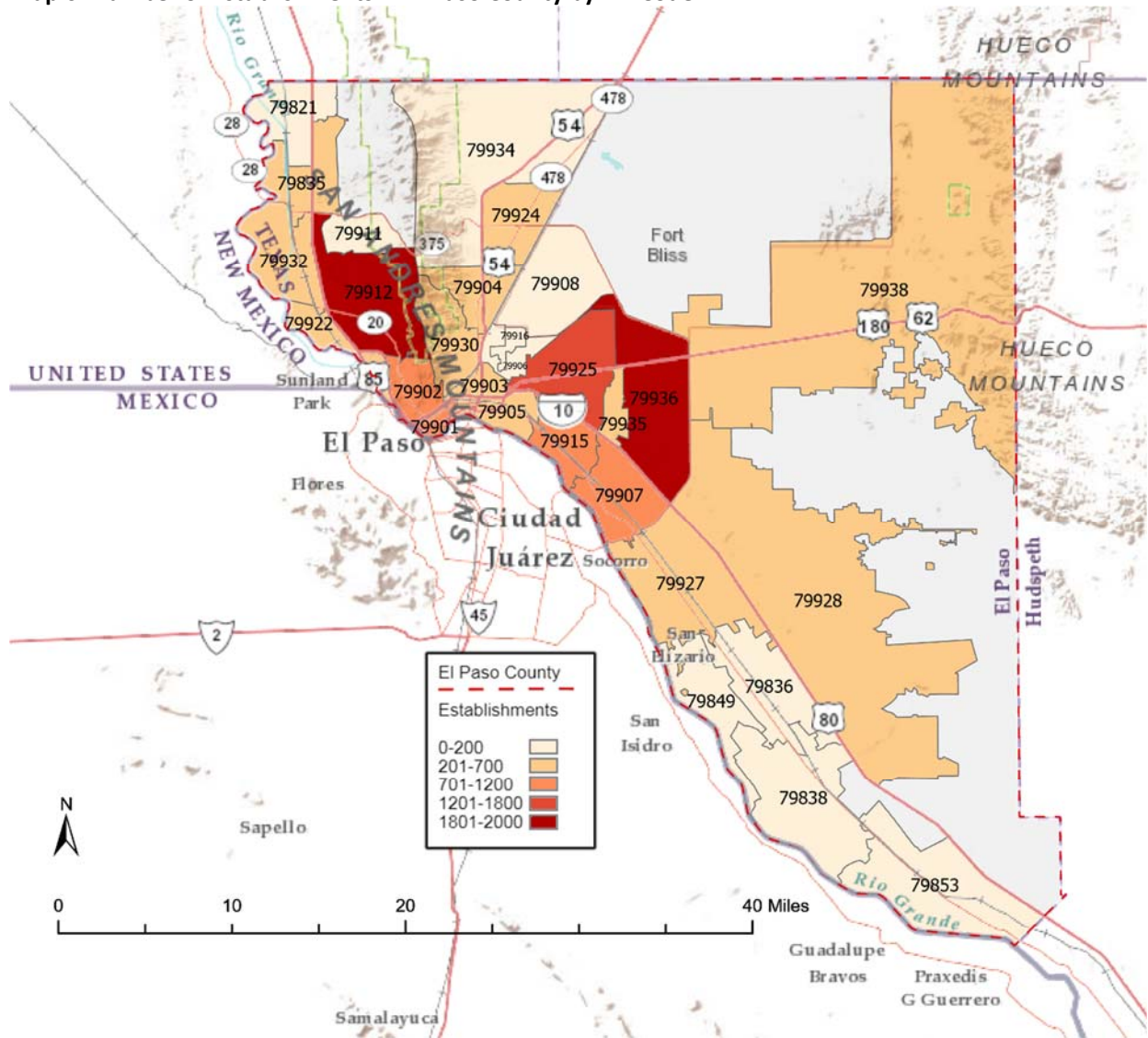
Source: Hunt Institute using Federal Communication Commission data.

Map 5. Number of Households in El Paso County by ZIP Code



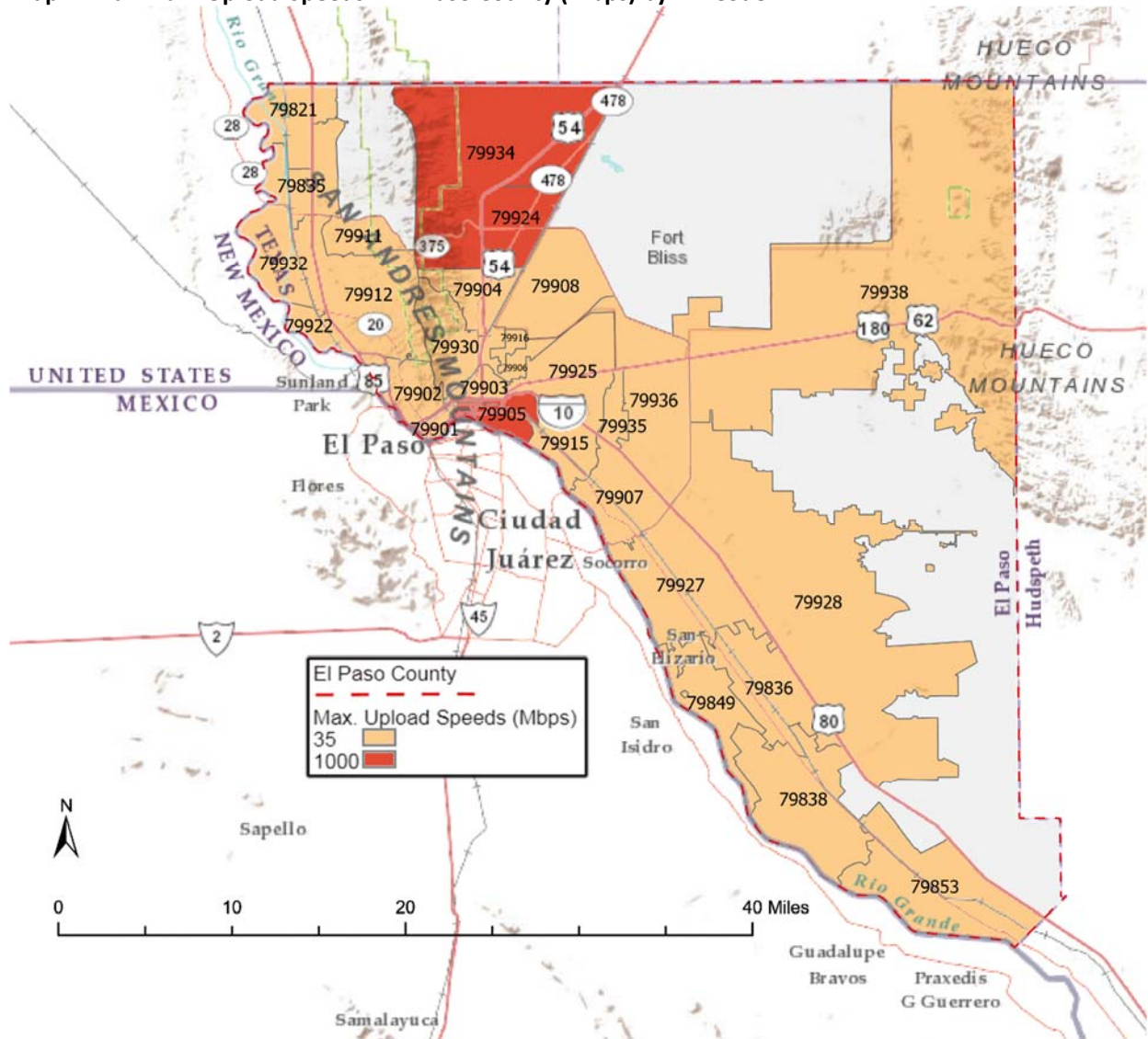
Source: Hunt Institute using Federal Communication Commission data.

Map 6. Number of Establishments in El Paso County by ZIP Code



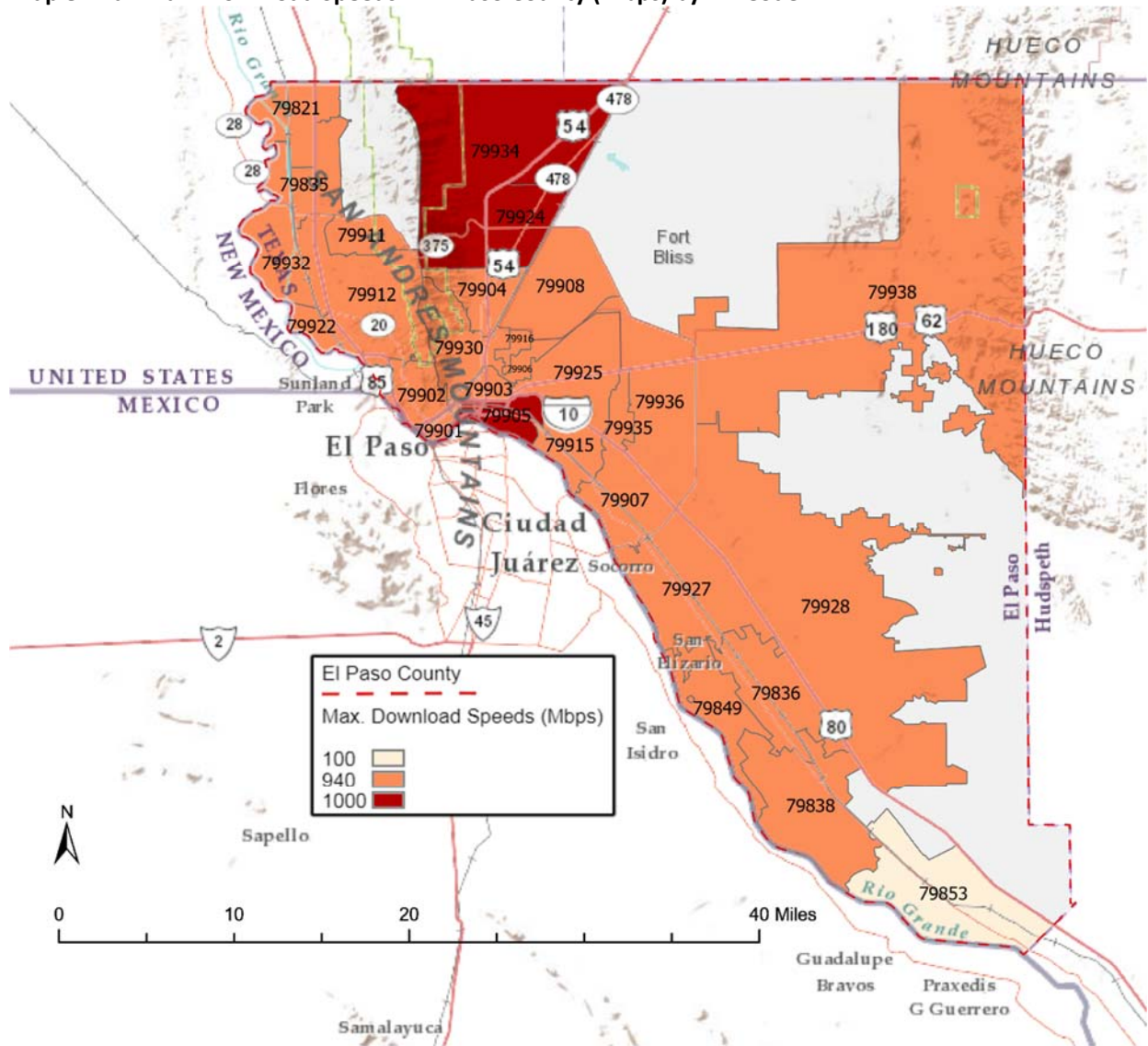
Source: Hunt Institute using Federal Communication Commission data.

Map 7. Maximum Upload Speeds in El Paso County (Mbps) by ZIP Code



Source: Hunt Institute using Federal Communication Commission data.

Map 8. Maximum Download Speeds in El Paso County (Mbps) by ZIP Code



Source: Hunt Institute using Federal Communication Commission data.

VI. Conclusion

An increase in Internet usage demand resulting from more remote education, telehealth, and telework requires a reliable broadband infrastructure to assure the competitiveness across El Paso County. The Hunt Institute created an assessment of the gaps in broadband services throughout the El Paso County in response to the recent global pandemic caused by COVID-19. This report first provides a review of population demographics and economic indicators, creating a population and industry profile for El Paso County. Then, it provides an assessment of the potential regional impacts of broadband service amidst the pandemic. In El Paso County, according to the U.S. Bureau of Economic Analysis, the population in El Paso County had more than doubled from 1969 to 2019. In recent years, however, the population in El Paso County has plateaued and has remained relatively steady since 2010. However, according to the Texas Demographic Center, the population is expected to continue to increase leading up to 2050.

In El Paso County, a significant portion of the population is very young. In 2017, for example, 23% of the total El Paso County population was under the age of 14. This means that a significant portion of the El Paso County population will continue to rely on broadband services for school, while their parents may also rely on telework given the recent COVID-19 pandemic.

In El Paso County, the top five industries accounted for 56% of total full time and part time employment, led by the Healthcare and Social Assistance sector, which accounted for approximately 50,800 jobs or 14% of total employment in 2019. Giving the relative importance of the health sector in El Paso County and the increasing demand of this sector in a remote fashion, expansion of broadband services will be crucial.

The research team also provided case studies where it identified key participants in the sectors of telework, telemedicine, and remote education that covered the implications of remote work during a pandemic. Their testimonies complemented the quantitative results of broadband usage and highlight the importance of high-speed internet connectivity. The participants in this case study outlined the importance of reliable broadband services in El Paso County.

Additionally, savings in travel time, travel costs, and congestion were estimated. Estimated savings in travel time were at \$122.10 million, in travel costs at \$11,965.73 million, and the reduction in congestion costs at \$79.56 million. Therefore, total savings due to telecommuting in El Paso County were estimated at \$12,167.39 million.

In addition, the Hunt Institute estimated that in El Paso County, chronic patients would spend \$8.35 billion in 2020. A 35% of reduction in costs because of telemedicine would be equivalent to \$2.92 billion. Therefore, El Paso's total healthcare expenses for chronic patients would be \$5.43 billion in 2020 when adjusting for telemedicine. Lastly, the estimated savings in travel time for students in a school in El Paso County using remote education is estimated to be about \$20.59 million.

Having the proper broadband services for the needs of El Paso County would enhance productivity for workers and students.

References

- Alcatel-Lucent, 2012. "Building the Benefits of Broadband: How New Zealand Can Increase the Social & Economic Impacts of High-Speed Broadband." Available at:
<https://www.tmcnet.com/tmc/whitepapers/documents/whitepapers/2013/6687-building-benefits-broadband-how-new-zealand-increase-social.pdf>
- Regional Economic Models, Inc, 2019. "Transight: Model Documentation." Available at:
<https://www.remi.com/wp-content/uploads/2019/07/TranSight-Model-documentation.pdf>
- Bick, Alexander, Adam Blandin, and Karel Mertens, June 2020. "Work from Home after the Covid-19 Outbreak." Federal Reserve Bank of Dallas. Accessed December 18, 2020.
<https://bit.ly/3r9toFU>
- County of El Paso Texas. March 30, 2020. "First Amendment to Order No 7. by the County Judge of El Paso County, Texas". Accessed December 14, 2020.
<https://bit.ly/34cgn4u>
- Crandall, R.W. and C.L. Jackson, 2001. "The \$500 Billion Opportunity: The Potential Economic Benefit of Widespread Diffusion of Broadband Internet Access," mimeo, Criterion Economics, LLC.
- Lobo, B., 2011. "The Economic and Social Value of EPB's Fiber Optic Infrastructure in Hamilton County," mimeo UTC.
- Whitacre, B.E., 2011. "Estimating the Economic Impact of Telemedicine in a Rural Community," *Agricultural and Resource Economics Review* 40/2, 182-183.
- Barton, J., 2016. "Closing the Digital Divide: A Framework for Meeting CRA Obligations" Federal Reserve Bank of Dallas: Community Development.
- Dorsey ER, Topol EJ. State of Telehealth. *N Engl J Med*. 2016 Jul 14;375(2):154-61. DOI: 10.1056/NEJMra1601705. PMID: 27410924.
- G, Nord. "Emergency Telemedicine Consultation a Cost-Effective Call." *Pharmaco Economics & Outcomes News* 810, no. 1 (2018): 10–10.
<https://doi.org/10.1007/s40274-018-5201-y>
- "FastStats - Health Expenditures." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, November 10, 2020.
<https://www.cdc.gov/nchs/fastats/health-expenditures.htm>
- Bureau, U.S. Census. "Health." The United States Census Bureau, October 8, 2020.
<https://www.census.gov/topics/health.html>