

APPENDIX B: Potential Value of Transit in Yavapai County, AZ

Prepared by TransitPlus and Wight & Company, October, 2016

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Executive Summary

In this Appendix, we summarize how improved mobility and access to transportation could enhance educational, employment, and health outcomes for different groups. It is organized in the following sections:

1. We introduce the basic concepts and a framework for thinking about the value of transit.
2. The second section provides a background of economic frameworks and findings of other studies.
3. The third section discusses the pathways by which mobility could improve the employment, educational, health and other outcomes of this particular community, drawing on local, regional and national datasets to determine local estimates.
4. Fourth, we suggest metrics that can be systematically tracked to understand how the availability of transit may affect individuals over time. These metrics measure a broad range of benefits to quality of life that result from transit access and would be specific to the Yavapai County as opposed to relying on national averages.

While the Appendix provides general information that can be widely applied, the example used is the value of roughly \$950,000 in transit services for the Town of Prescott Valley, a portion of the region for which there is a concrete transit plan.

The indicators can also be applied to other services that are in existence, such as transit services in Cottonwood. Examples of specific values for the region, such as for services provided by Verde Valley Caregivers Coalition or People Who Care, are also provided. While the numbers are challenging to estimate, and thus subject to error, all literature identified in this document found evidence that public spending on public transportation has wide reaching impacts that improve quality of life in communities.

Much of the variation and uncertainty in estimates is due to differences among the communities where impacts are captured. Communities vary in size, demographic make-up, traffic patterns, transportation network (density of streets vs highways, grid network etc.). Even on the lowest end of estimates in literature, the return on investment in public transportation is typically valued at least two to one: every dollar of investment in transit services yields at least two dollars in economic return that can be measured. The estimates in this Appendix suggest the return in Yavapai County could be three to one or greater. Over time, as systems grow and change, they can serve residents even more efficiently, and the return on investment of systems is likely greater as systems mature.

Framework

This appendix examines the economic returns that would specifically impact Yavapai County to help community members understand the potential impacts of making an investment in transit.

Economic benefits can be studied in terms of how they affect communities as well as how well they achieve goals set by local and regional governments. The benefits in this report are separated by who they benefit. There are individual and community direct and indirect impacts for transportation. Benefits affecting individuals and families include things like cost of living, total percent of income spent on transportation, and improved access to various activities. Benefits affecting the entire community include things such as total government spending on infrastructure and community health.

A goal of this framework is to identify accurate measures for value that do not overstate the overall value to the community, yet consider the unique needs of various groups and the value (to both individuals and the community) that may come from a work trip versus a shopping trip.

There are diverse groups in Yavapai County that could benefit from transit. Seniors, veterans, other individuals with disabilities, working adults, the unemployed and children could all benefit for different reasons and different trips. For each key population group, this report looks at primary types of trips individuals might take.

Seniors may find value in transportation that provides:

- Access to healthy food options
- Medical trips
- Independence/freedom to be out and about
 - Related opportunities to maintain social cohesion, such as by maintain existing ties to family and friends

There is also the value of time for those who provide transportation services, whether those are paid services, family time that requires time off work, or simply family or caregiver time that could be used for other activities.

For people who are unemployed, there are many impacts of unemployment and the need for public services. Yavapai County could examine:

- The value of each work trip: when people work, their wages recirculate in the economy in the form of rent, food, and services.
- The value of avoided public assistance payments. Over the long-term, the average payment value and percent of households needing public assistance could fall.
- The value of "chauffeur" time, to the extent that employed persons are relying on friends or family members to be dropped off at work, the time and mileage incurred by the driver could be factored into a cost-benefit framework.

In addition, businesses may receive value from reduced turnover and training costs.

Veterans include individuals with a wide range of needs. Their needs are reflected in populations that are seeking employment or retraining, in populations that are homeless, and in populations seeking medical treatment or substance abuse treatment. Many of the values enumerated above for seniors and for people who are unemployed can be considered for Veterans.

Individuals with disabilities represent a large population group that overlaps with the population of seniors (over 30% of seniors have one or more disability) and Veterans. There are a broad range of disabilities, including developmental and other mental disabilities, physical disabilities, and sensory disabilities. Individuals with disabilities are far less likely to have employment and to have access to an automobile – either because they are unable to drive or cannot afford the expense of an automobile.

Children under 15 represent an important, and often ignored, segment of the population when it comes to travel. Recent research has suggested that habits formed in childhood can persist into adulthood, affecting long-term behavior and health outcomes. For instance, children who walk, bike or take transit to school are more comfortable walking and biking as adults. Children who walk or bike tend to have lower BMI and better school performance than their less active peers.

Economic Benefits

This appendix provides a case study identifying the economic impacts of establishing transit services in Prescott Valley from the current service plan, as well as the larger urbanized area, using assumptions from the 2007 Transit Implementation Plan. The general assumptions take into consideration the unique characteristics of the area, the proposed levels of service identified in service plans, and the research reported in Section 2 that identifies expectations based on national surveys of transit use.

Using the values and potential effects of investment gleaned from studies across the US, and particularly looking at the cost-benefit ratios for small urban and rural areas, tables in subsequent sections breakdown value for each category: economic, low-cost mobility, social savings, and healthcare savings. These categories are defined in this manner to prevent double counting.

- Economic benefits are those which general accrue to the community in terms of economic activity. Low-cost mobility benefits can be measured at the household level, i.e., how much can a household save on automobile maintenance and operating costs when transit is an option.
- Social savings represent savings on public assistance payments that can be avoided when individuals have improved access to jobs, healthcare and other needs.
- Finally, healthcare savings is its own category due to the aging population in Yavapai County, which is expected to see more benefits in this category than average since the population of adults over age 65 is higher than the US average.

The documented benefits for Prescott Valley are well within the range shown by other research. For an annual operating expenditure of \$950,000 in transit services, the economic benefit is estimated at \$3.02 million annually. This equates to \$3.18 in economic benefits for every \$1.00 invested. The multiplier effect of the investment is not routinely counted in the estimates presented here so this remains a conservative number. A rule of thumb for rural areas is about \$3 in benefits for each \$1 invested, suggesting local numbers converge with other research findings.

Performance Measures

A variety of items that reflect the value of transit and ways to measure that value have been identified in the report and are summarized in this section. In addition, there are common data sources for transportation services such as ridership and service levels, productivity, and cost measures. These reflect data that is regularly collected by transportation providers. Such data is an important part of the equation in understanding the value of the investment in each specific transportation service, and in the comparative value of each service.

In identifying metrics that can be used to measure progress towards a goal, there are some key items to keep in mind.

- Identify information that is already tracked somewhere else and can be re-purposed. This might be national information or it might be state or local information.
- Use measures that serve dual purposes. The dual purpose might be for transportation purposes and for the purposes of the human service or other agency that would be responsible for gathering it.
- Build a solid understanding of the goals and develop a consensus that they are worthwhile.
- Allow time to work through the individual agency processes to gain approval to gather the data or make changes.
- Keep it simple and start small. Even one very specific question can be useful for building metrics.
- Report back to stakeholders on the metrics so they can see the benefits and the trends.

A key challenge to implementation is working across multiple organizations to gather data for decision-making. This requires consistency in data collection, using the same definitions so that data can be compared.

Metrics need to be developed and tracked to illustrate the key areas in which value can be found from transit services. Note that these metrics cross program boundaries. They could include:

- The value of avoiding visits to the ER due to mobility options
- The value of avoided nursing home care due to mobility options
- The value of obtaining and maintaining a job due to mobility services

For example, this report uses an estimate of 1% of People Who Care and Verde Valley trips resulting in a one-month delay in nursing home care, but measuring the actual amount will help to build an understanding of the value of these services. Similarly, measuring the actual number of people who are able to gain and maintain jobs due to transit will build an understanding of the value of these services.

Key Take-Aways

Findings from this review suggest a few areas of focus for future research and local community participation, observation, and tracking.

- **Veterans** Transportation Programs are a great help, but the great distances between their homes, VA hospitals and clinics means Veterans often travel across several counties to access care. Having multiple options to access care and services could alleviate some of the demands on service providers and provide a better quality of service to Veterans.
- Yavapai County has a high **elderly population**, and as residents age their needs change. Any planned services should take into account the needs of this group over five, ten and likely fifteen-year planning horizons. Trends should be monitored to assess their needs. Another key area in which to monitor trends is mobility for residents with disabilities, particularly those living independently or with family members.
- Transit has a **return on investment** in terms of economic return on public dollars expended, and research demonstrates it is a healthy and cost-effective way to travel. Since transit operations and costs tend to be optimized at a point of critical mass, the CYMPO region is likely still a few years away from realizing some of these larger benefits. In the meantime, agencies can partner together to provide transport service and realize these networked benefits. This will create a framework for providing coordinated services and measuring their value, whether or not general public transit service is expanded.
- Finally, **performance metrics** need to be collected continuously to illustrate the value of partnerships and investment in transit. While there are many reasons to track these measures to show return on investment, the ROI for the CYMPO region may be quite different than values revealed in other regions. The only way to know what public and private donor dollars are buying in Yavapai County is to measure outcomes. Getting this information is a matter of asking questions of clients and patients and mapping their responses to the costs of services accessed or missed.

1 Introduction

Much of the population of Yavapai County in Arizona does not have access to publicly funded transit service, even though CYMPO is allocated approximately \$1.2 million annually in Federal funds to support transit services. In addition, Federal funds are available for rural transit or transportation for people who are elderly or have disabilities, with another \$1.2 million allocated for specialized and general public transportation services. According to a number of studies, between \$3 and \$7 in economic returns are generated for every dollar invested in transit, and the value varies depending on the type of trips being considered (Godavarthy et al., 2014; Cronin et al. 2008; Porter et al. 2015). These facts together suggest the region is losing out on economic benefits by not taking advantage of available funds. This appendix examines the economic returns that would specifically impact Yavapai County to help community members understand the potential impacts of making an investment in transit. It also delineates how quality of life and other hard to measure aspects can be influenced by the availability of transit service. Finally, we provide some possible measures to track the impact of investment in transit services over time.

Initial investigations showed that specific data on the economic impacts of transit services is not readily available. The impacts of transit services are spread among many areas, and generally each area (employment, education, access to medical services, etc.) focuses on key indicators under the control of programs in each area. The impacts of ancillary services such as transit in the delivery of, access to, or availability of a resource or service are rarely considered. Furthermore, many guidebooks and analysis methods focus on the traffic congestion and air quality impacts of public transportation, and these measures are monetized down to the vehicle or passenger mile of travel. These efforts to monetize congestion, safety, and environment are valuable for traditional engineering benefit-cost analysis and are appropriate for areas, such as the entryways into Sedona, where transit can provide a significant benefit to congestion. However, these efforts tell us little about the longer-term impacts and possibilities that transit access can have on a community. For instance, one type of health and safety measure one might find would be to evaluate the relative risk of traffic crashes by car or transit and predict expected reductions in crash costs if some percent of the population shifts to using transit; it is less common for an agency to quantify how access to transit could provide independence and mobility which support longer-term (and harder to measure) health outcomes.

Additionally, many existing research studies focus on the value of existing services, not the potential value of new or more coordinated service. Existing studies look at trip making behavior and ask survey respondents what they would do if they did not have a transit alternative. Given that this study is focused on what the benefits might be of further investment in mobility management alternatives, we must look at existing mobility and healthcare options and costs, and make assumptions about how residents might behave if services were expanded. This type of estimation is inherently problematic in that stated preferences regarding hypothetical behaviors are less accurate than revealed preferences, that is, what people actually do and is therefore *revealed* in surveys. In transit planning it is often found that people state they would ride a bus frequently if

service was established, but the reality of actual ridership falls far short of their stated preferences (or what they say they would do if a service or product existed).

To assist the community in understanding the role transit serves in the economic and quality of life of a community, this appendix:

- Reviews current literature to identify a useful framework for measuring the impacts of transit services.
- Identifies possible groups affected by transit service or lack of service and the types of benefits each group might experience.
- Considers the impacts in Yavapai, identifying specific impacts and the potential magnitude of the impacts
- Explores how the community services and programs can track the value of an investment in transit services and track the impact over time.

2 Background and Literature Review

Economic benefits can be studied in terms of how they affect communities as well as how well they achieve goals set by local and regional governments; a number of studies across the US have quantified the benefits of transit in this way. In this section, we describe effects from both of these directions, presenting a framework for considering the value of services and gathering a comprehensive set of potential performance measures that might be of interest to the region. The value to various groups/stakeholders in Yavapai County can be calculated by examining performance measures specific to each population. One could also compare the desired outcomes of a service and map benefits that way.

There are several studies of rural and small urban areas (Godavarthy et al., 2014; Mattson, 2010; Peterson, 2014; Salisbury 2013) and a number of meta-analyses (Porter et al., 2015; Litman, 2015) that informed the framework in Figure 1. For this study, we drew from existing literature on cost benefit analyses and chose to present the value in terms of various demographic groups affected and trip purposes. This is because (1) different groups have different needs and experience the transportation landscape differently and (2) the value to these groups in terms of quality of life is vastly different.

To date, few authors have parsed the costs and potential benefits to groups in such a meta-analysis. A goal is to identify accurate measures for value that do not overstate the overall value to the community, yet consider the unique needs of various groups and the value (to both individuals and the community) that may come from a work trip versus a shopping trip. The diagram in Figure 1 illustrates connections among activities/income generated by transit. For instance, if transit makes it possible for someone who was previously unemployed to find and maintain a job, that individual not only has income to spend, but their spending has economic benefits for local businesses (who can then hire more employees, stock products, etc.)

The benefits in this report are separated by who they benefit. Micro-level benefits affecting individuals and families include things like cost of living, total percent of income spent on transportation, and improved access to various activities. Macro-level benefits include things that affect the entire community, such as total government spending on infrastructure and community health. There are some benefits which bridge these two levels; for example, communities that have infrastructure which promotes active travel (biking, walking) can have an impact on family medical bills as well as the entire community's need for emergency services like ambulances, which are typically paid for via some form of taxation. This means there are individual and community direct and indirect impacts for transportation. One objective of this report is to delineate these costs and benefits specifically for Yavapai County.

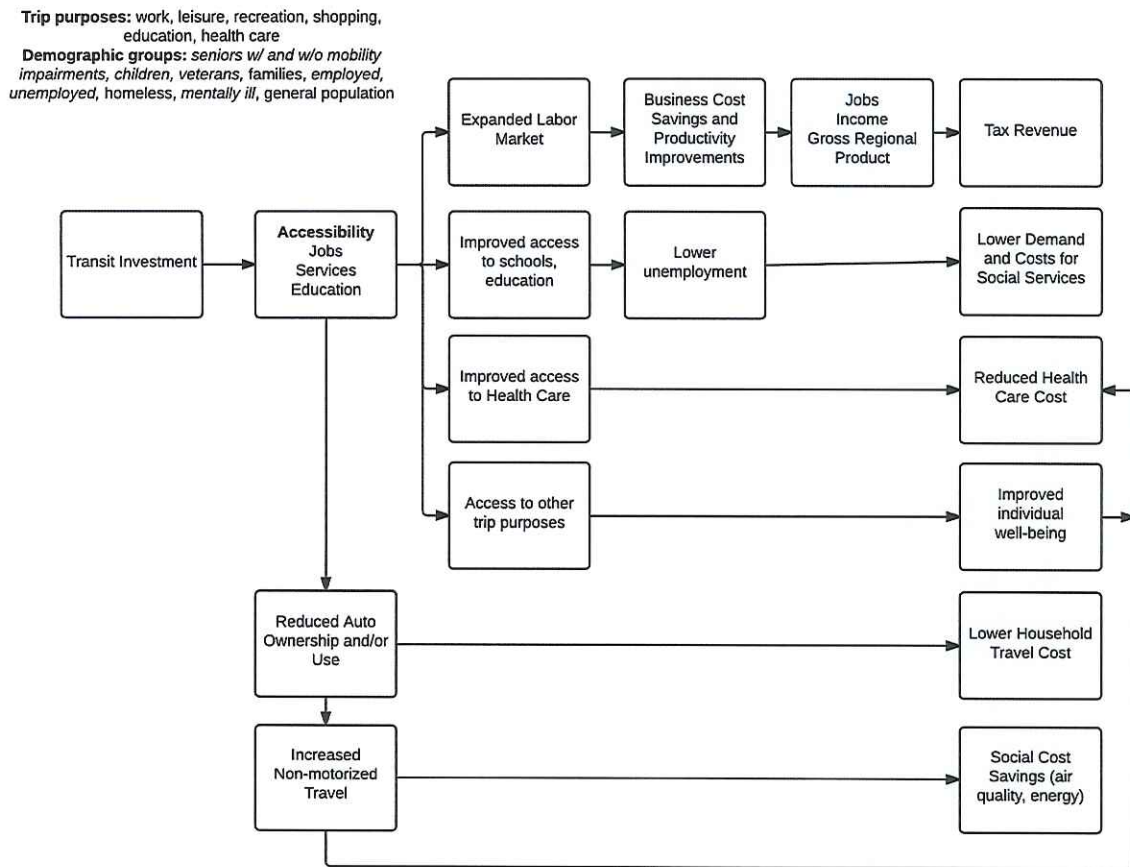


Figure 1 Value Analysis Framework with Trip Purposes and Groups Noted (Adapted from Porter et al., 2015)

While peer cities can be compared, it is challenging to make predictions about how residents might behave were enhanced transit services available, and the behavior of residents drives the return on investment. In our review and estimates, we remain cognizant of this fact and try to be conservative in estimating the total number of trips that would be taken and their overall value to the community by assuming low numbers of residents would change their current behavior when relevant.

2.1 Benefits by Population Group and Trip Purpose

There are diverse groups in Yavapai County that could benefit from transit. Seniors, veterans, other individuals with disabilities, working adults, the unemployed and children could all benefit for different reasons and different trips. Many existing estimates assume a single, point value for a trip – but this detracts from the variety and diversity of populations' needs. For instance, a trip to the doctor to treat a child with asthma is very different than a trip to treat a veteran with PTSD or a senior with a heart condition. The long-term costs of care for these conditions vary, and the quality of life expectations are different for all. It is difficult to take into account all these variations when estimating value, so for this report we look to existing research which has quantified benefits by trip

purposes. We describe how these various trip types could benefit different groups to account for the various interest groups in Central Yavapai County.

The sections below describe some possible values for key population groups and their trip purposes. It provides a range of estimates for the possible value, based on local or national values as available.

2.2 Seniors With and Without Mobility Challenges

Seniors represent one of the largest and fastest growing demographic groups in Prescott Valley and Yavapai County as a whole. The needs and abilities of this group also vary widely. As one ages and overall health deteriorates, medical trips become more important for quality of life and long-term care options. Many community and volunteer-based services already exist in Yavapai County, but their resources are stretched thin. Capturing the value of the diverse trips seniors make, whether or not they are living with serious health conditions, is a subject of much research (see e.g. Dannenberg et al., 2011). A common finding is that individuals with access to a personal vehicle are more likely to visit routine health check-ups, which is important for older adults, particularly those with chronic conditions. Given the links between diet, health, exercise, and doctor visits, there are also networked benefits explored via research. Even harder to measure, there are psychological and social benefits that have been studied: the ability to get “out and about” and be independent of constraints of family, friends or volunteer programs is important. Some of the cited value to seniors includes the following:

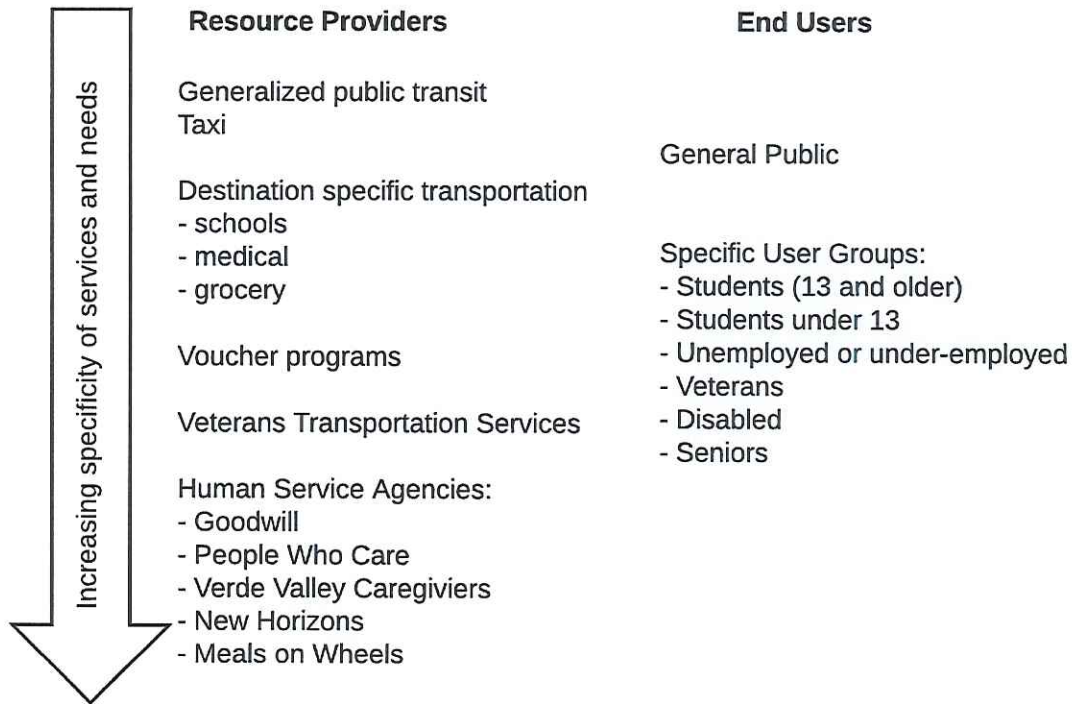
- Value of access to healthy food options
- Value of medical trips (can be broken down by condition and required frequency of interaction with health professional)
- Value of independence/freedom to be out and about
 - Similarly, value of social cohesion, to maintain existing ties to family and friends unhindered by transportation
- Value of time for those who provide transportation services, whether those are paid services, family time that requires time off work, or simply family or caregiver time that could be used for other activities.
- Studies utilizing the Health Outcomes Survey (CMS 2016) could provide baseline measures to compare Yavapai County with.

In Yavapai County, groups like People Who Care and Verde Valley Caregivers provide door-through-door, specialized transportation services. Verde Valley Caregivers also provides other support services such as home repairs to allow seniors to live in their homes independently for as long as possible and both services assist with grocery shopping, support and a second set of ears at medical appointments, and bill-paying. Existing services such as these, and the specialized needs of certain groups, mean that national averages for the general benefit of transit services may not be appropriate for this community. The high number of volunteer hours that the residents of Yavapai County contribute suggests the trade-offs need to be examined more carefully. In Figure 2, these needs are separated in order to draw these distinctions. Figure 2 suggests a hierarchy of

needs; general service providers could accommodate lower order needs, and specialized services could provide more specialized trips.

Transportation services for seniors, both with and without mobility challenges, have benefits beyond the conveyance to a destination. The trip itself has a cost in terms of mileage, fuel costs, and volunteer time. The destination – e.g. a medical appointment, social visit or grocery trip, is where the value for the customer is derived. There are additional intangibles such as social cohesion and well-being which are more difficult to quantify. These intangibles are typically achieved by highly personalized, individual and familiar services (characteristics that most general public transport services lack). With these distinctions in mind, Figure 2 illustrates a “Hierarchy of Mobility Needs” for both users and specialized care providers, whereby clients who need more specialized services and services in addition to transportation can be directed to more specialized providers. Figure 2 shows that while specialized services can be provided to meet different needs within a community, the increasing specialization means some groups may be left un-served or underserved. Pooling resources and recognizing where users and needs overlap is one way to make effective use of resources for the greatest good. As the county ages, it may become more necessary to direct as many customers as possible to a generalized service in order to use limited transportation and volunteer resources wisely.

Figure 2 Hierarchy of Mobility Needs for Communities



Since they are not typically commuting to full-time jobs, retired persons have different activity patterns than other segments of the population. They may work part-time jobs and have their own transportation or rely on others to get where they need to be. As they age, seniors may experience loss of hearing or vision which makes it more difficult for them to drive, meaning they must rely on friends, family members and community services to get where they need to go. If community transportation services do not exist, those with vision or hearing impairments sometimes feel they have no alternative than to drive themselves.

Measuring the Value of Access for Seniors

Some ways to measure the potential value of the trip categories relevant to seniors and retired persons include:

- Medical trips that should be made vs. medical trips that are made (e.g. I should visit doctor biweekly, but go monthly due to transportation constraints)
- Frequency of grocery shopping trips (which affects fresh food purchases)
- Individual assessed psychological and social outcomes
- Hospital re-admission rates
- Nursing home costs avoided (researchers typically make an assumption, e.g. 1% of trips result in avoided nursing home stay).

In addition to avoiding the cost of nursing home stays, it is common for more able-bodied seniors who can no longer drive to move to a location where basic support services such as transportation are available, or moving in with adult children who can provide such supports. When a senior moves away, the community loses their retirement income and the property taxes they pay.

Additional detail on some key trip types for seniors is provided below.

Medical Trips

The value of medical trips varies depending on an individual's conditions. Medical conditions such as asthma, diabetes and heart disease are often tracked in transportation studies because they are affected by air quality and physical activity. Left untreated, these conditions can escalate, so it is important that patients follow prescribed medical treatment to maintain optimum health. If a patient lacks transportation to get to their appointments, however, they may miss appointments or visit the doctor less frequently. One oft-cited example is patients missing or cutting-short dialysis appointments in order to meet the time window constraints of their transportation mode (Source: SURTC, New Horizons mentioned in October 2015 meeting).

To estimate the value of medical trips, one can gather data about the prevalence of various medical conditions among the population and the recommended number of doctors' visits each year. Godavarthy et al. (2014) performed this analysis for rural and small urban areas in western states and determined the benefit for a medical trip ranges from \$333 to \$2,743 in cost savings for patients, and up to more than \$34,000 for quality-adjusted life-year (QALY). These values come from the long-term costs of care for escalating conditions and the cost savings patients might expect when they visit the doctor for screenings and are able to catch conditions early on. Another way to estimate the value is to compare what a patient would be required to pay to take a taxi in the absence of transit; depending on fare and distance, for a similar western U.S. city, a patient would save \$39-\$107 for round-trip taxi fare to a doctor's appointment (SWEEP, 2013).

Similarly, Cronin et al. (2008) estimated a value of \$11.08 per dollar invested in a medical trip. They estimate this value by assuming if 1% of medical trips to dialysis appointments results in a customer avoiding a 1-day hospital stay (\$7,900 in Florida in 2008), then \$1.4 billion in state benefits would be realized. In reality, it is inaccurate to assume all these benefits would accrue at the state level, and these public dollars could (and likely would) be redirected to other uses, but Cronin's (2008) analysis provides a benchmark by which to evaluate benefits.

Applying this logic to the County, Verde Valley Caregivers averages 1,833 trips per month (VCG, 2015). In 2011, the average cost of an ER visit in Arizona was \$2,627 (Rabel, 2012). If 1% of Verde Valley Caregiver trips result in a client avoiding an ER visit, then the monthly benefit of those trips is \$48,153 and the annual benefit of those trips is \$578,000. For a sense of scale, in 2011, the state of Arizona paid \$49.1 million for ER visits through Medicaid/AHCCCS, and tax-payer support for Medicaid was \$202.3 million (Rabel, 2012).

Flaherty et al. (2003) noted an ambulance trip costs \$400-525 and non-emergency medical transport (NEMT) trips cost \$10-\$20, and a significant number of ambulance rides for Medicare patients are not for true emergencies. Shifting some of these trips to other modes, or providing more in-home and preventive care mechanisms, could represent a significant cost savings to the Medicare program. In September 2015, 415 emergency medical service (EMS) calls were made to the Central Yavapai Fire Department; these calls were logged because some medical assistance was given. If more data were available on the nature of the calls and medical assistance, one could estimate the value that improved access to regular preventive health appointments might have on the demand for emergency medical services.

Grocery Trips

A critical component of healthy living, particularly for those experiencing or recovering from illness or medical treatment, is access to healthy food. Central Yavapai County has a deep network of community care services like People Who Care and Meals on Wheels who can provide this critical access. Between September 2014 and August 2015, People Who Care provided over 5,500 grocery trips. Table 2.1 illustrates the value these trips might represent to all those involved assuming the results would be seen from 55 of the trips, that is, 1% of the total trips. This table is meant to illustrate that every trip, no matter its purpose, has direct and indirect benefits to the individual and the community in which the trip is taking place.

As Table 2.1 shows, there might be considered at least three stakeholders: the person who needs the trip, their alternate driver (e.g. a friend or family member) or the volunteer who provides the trip, and the program administrator who also may have time which can be used in other ways depending on the needs of their clientele. Each individual has associated costs and benefits with making or avoiding the trip. Note this table could be applied not only for grocery trips, but for any type of trip where a volunteer driver or program administrator are involved.

The *trip-maker* has a preferred arrival and departure time for their grocery trip. The more travel options that exist (a transit schedule, a volunteer's schedule, or a friend or family member's schedule) then the more flexibility they have to make the trip to suit their own needs. This is important because it means they can schedule other activities, such as medical appointments or social outings, when most suitable or when they have the most energy. This flexibility provides a network of beneficial impacts that is difficult to quantify – having flexibility means more beneficial activities can be scheduled if one desires.

Table 2.1 Value of Grocery Trips to Various Stakeholders

Trip Stakeholder	Benefit of trip alternatives	Rate	Annual Value of 1% of Total Trips at 1 hour (55 trips)
Trip-maker	Improved care and option value	n/a	n/a
Alternate driver	Schedule flexibility	\$22.83/hour ¹	\$1,250
Volunteer	Social cohesion and activity	\$22.83/hour	\$1,250
Meals on Wheels or other Program Administrator	Time/resources to serve other clients in need	Varies	Value transferred to other clients

¹Independent Sector 2015 value of volunteer time in Arizona

The second stakeholder is the *alternate or volunteer driver*. In the same way that flexibility benefits the trip-maker, the available alternatives mean the alternate driver could serve as the “back-up” option in case other modes fail. Similarly, the volunteer becomes available to perform other trips, or even other activities if the need for volunteers is low. Since volunteers may also be using their own vehicle, there may be additional savings in terms of fuel and vehicle maintenance for reducing miles traveled if mileage reimbursement is not available through some programs.

The *program administrators*, such as those scheduling trips for Meals on Wheels or People Who Care, may see an increase in capacity to use volunteers and vehicles for other trips. The volunteers can be directed to serve trips where there is no convenient transit alternative, focusing their resources on areas of highest need.

Finally, for programs that receive taxpayer dollars, taxpayers have the comfort of knowing their dollars are being spent more effectively because the program dollars are spent on the direct need, not only on transportation.

Trips for Education or Training

The Northern Arizona Council of Governments (NACOG) offers training programs including Chronic Disease Self-Management, Diabetes Self-Management, Chronic Pain Self-Management, and A Matter of Balance (fall prevention training) (NACOG 2015 Annual Report). These are programs developed by medical and public health professionals and shown to have a cost to savings ratio of 1:4 (Chronic Disease Self-Management Program, 2013). In fiscal year 2015, the NACOG Area Administration on Aging (AAA) certified trainers who facilitated 18 workshops reaching 264 participants. In order for participants to travel to these workshops, they could get a ride from a friend, family member or one of the human service agencies in the area. The ability for seniors with chronic conditions to get appropriate self-care information contributes to their overall health and reduces their need for more costly care. This benefits individuals, the community, and society and may be reflected in direct medical expenses through a hospital or EMS provider.

Community events and evening courses offered by the colleges in the region also offer opportunities for enrichment (classes on history, computer skills, knitting, etc.) that provide opportunities for individuals to enhance their quality of life and improve their skills. No dollar benefit has been identified for access to such classes.

Other Health and Well-being Impacts

Other benefits that have been identified, but are difficult to find precise estimates for, are related to general well-being. The opportunity to socialize, recreate and access healthy food all contribute to quality of life, but values among individuals would vary. It has been noted that Yavapai County has one of the highest suicide rates in the nation, with many occurring in isolated rural areas where there is little or no access to transportation services for all types of trips. While the suicide rate is the result of many factors, isolation is an important one.

2.3 Unemployed Persons

Many transportation disadvantaged programs around the country were developed for the express purpose of transporting people to work. The Job Access Reverse Commute (JARC) funding program (now a part of the regular Federal Transit Administration funding programs), DARTS (Delta in Mississippi) and JOBLINKS programs were all responses to the Welfare Reform Act (1996) to enable individuals to get to work in order to cut down on social services spending.

Job fairs in Prescott and Prescott Valley in the spring and fall of 2015 had over 400 attendees and as many or more jobs represented. Five percent of attendees at the spring 2015 fair noted they had been denied a job before due to lack of transportation. Even if someone is not denied a job initially, the difficulty in keeping a job when one relies on others for transportation is a challenge. A Department of Employment Services representative estimated that 60% of job seekers who seek out help with finding a job are searching for jobs within a 5 mile radius of their home, with 5 miles being the distance they deem appropriate to walk to and from work each day. Clearly, enhanced mobility would allow these individuals to expand their search radius, or at least reduce time spent commuting (if employees can avoid walking long distances) and increasing time available for other activities, wage-earning or otherwise. As major job sites in Yavapai County are at least 15 miles apart, this effectively means residents without vehicles are restricted to working and living in the same community. According to Census data, 10.6% of all Prescott Valley residents work in the City of Prescott, and 50% of all Prescott Valley residents travel more than 10 miles to work. Among residents living in Prescott Valley, 81% work outside Prescott Valley. The distance between residences and jobs is a critical factor in being able to keep and maintain employment.

There are many impacts of unemployment and the need for public services, making it difficult to pinpoint precise costs, but existing research has measured a number of variables. Possible values Yavapai County could examine include:

- Value of each work trip
 - This could be computed as the number of people who use transit to get to work times the 8 hour workday times the prevailing wage (typically minimum wage)

- Another way to measure is the cost savings of transit fares compared to taxi for work trips. To use this measure, the number of people using a taxi or transit to commute to work and the distance they travel would need to be known.
- Value of avoided public assistance payments, typically the expected drop in public assistance payments multiplied by the current average payment. Over the long-term, average payment value and households needing public assistance could fall
- Value of “chauffeur” time, if applicable. If employed persons are relying on friends or family members to be dropped off at work, the time and mileage incurred by the driver could be factored into a cost-benefit framework.

MEASURING THE VALUE OF EMPLOYMENT ACCESS

The appropriate measures to capture these values could include:

- Job retention/turnover rates
- Average public assistance payment per household
- Number of households receiving public assistance
- Number of individuals who rely on a friend or family member for work commute
- Unemployed persons in zero-car households.
- Mode share of employed persons and average time to work

2.4 Veterans

Veterans include individuals with a wide range of needs. Their needs are reflected in populations that are seeking employment or retraining, in populations that are homeless, and in populations seeking medical treatment or substance abuse treatment. The number, age, and disabilities of Veterans in a community can provide an indication of the degree of needs in such programs. Similarly, the successful integration of Veterans into mainstream society provides a measure of the health and resiliency of the economy. Veterans are a significant portion of the population of Yavapai County at 13%. This is higher than the national average, and as rural veterans they typically have more difficulty accessing medical care or employment than veterans who return to urbanized areas (Peterson, 2014).

MEDICAL TRIPS

Existing research has quantified the typical distance and cost to transport veterans in western states. Veterans Transportation Services (VTS) and Disabled American Veterans (DAV) have nationwide volunteer programs that provide millions of trips; the value of these volunteer hours should not be overlooked. Indeed, because volunteers are eligible for mileage reimbursement (41.5 cents per mile) and when their labor hours are factored in, volunteer provided veteran transportation represents a value of hundreds of millions of dollars (Peterson, 2014). The need for

travel for medical or substance abuse treatment specific to Veterans is covered here; information on medical trips provided under Section 2.2 (Seniors) also is applicable to many Veterans.

With the VA hospital in Prescott, both VTS and DAV services are active in the area. Solid information on the number of hours and miles of volunteer time is not readily available, although there are over 65 volunteers involved¹. Both services cover an area larger than Yavapai County, so it is necessary to allocate mileage and hours to Yavapai County for only those Veterans traveling from points within the County.

The value and benefit of having access to transportation includes the reduction in missed appointments if veterans can access care. Riley (2016) noted that there are predictors for patients with a high number of missed appointments, and transportation options could be targeted to them. Currently, many veterans may miss medical appointments or fail to schedule important appointments due to transportation barriers. Other barriers include the need for specialized care referrals and the inability to bring children along for trips. There are long-term cost implications associated with these missed medical appointments; that is, if one's condition escalates, treatment may be costlier if treatment is delayed.

EMPLOYMENT TRIPS

In Yavapai County, many veterans reach the end of their allowable stay in VA housing before they have been able to secure full-time employment, and the difficulty in securing full-time employment is partially a result of difficulty in securing transportation to employment. The Northern Arizona Veteran's Administration reported that between October 2014 and October 2015, 113 of 283 veterans who sought employment placement assistance did not have transportation to work. While section 2.3 discussed employment travel generally, looking at the value and benefits related to Veteran employment transportation might also include:

- The value of employment to veterans specifically, where a work trip is typically measured as the value of a day's wages – 8 hours at minimum wage per day.
- The potential value of time-savings for veterans, if they were able to get more direct, reliable access to their destinations.

2.5 Individuals with Disabilities

Individuals with disabilities represent a large population group that overlaps with the population of seniors (over 30% of seniors have one or more disability) and Veterans. There are a broad range of disabilities, including developmental and other mental disabilities, physical disabilities, and sensory disabilities. Individuals with disabilities are far less likely to have employment and to have access to

¹ The 65 volunteers completed over 14,000 medical transports for veterans living throughout Yavapai County; 6,000 trips served the VA Medical Center in Prescott. The remaining 8,000 trips were among Phoenix, Cottonwood, Lake Havasu and Prescott.

an automobile – either because they are unable to drive or cannot afford the expense of an automobile.

The type and severity of an individual's disability affects the type of transportation services needed and trip purposes for which transportation is required. Individuals who are of working age are likely to need transportation to employment. Individuals who are unable to work, have travel patterns and trip needs that are more similar to the senior population.

Some private non-profit organizations provide services to individuals with disabilities, and others live independently or are cared for by their families. Arizona has a dispersed system for serving individuals with disabilities, so higher functioning individuals are more likely to live at their family's home or in an independent living situation than in many other states as it is relatively easy for families to obtain financial support for their children with disabilities. For the higher functioning individuals, the ability to have transportation is a key to being able to maintain employment and contribute to society.

2.6 Children and their Caregivers

Examining children's travel is important for measuring children's health, safety and educational outcomes.

Children under 15 represent an important, and often ignored, segment of the population when it comes to travel. Recent research has suggested that habits formed in childhood can persist into adulthood, affecting long-term behavior and health outcomes. For instance, children who walk, bike or take transit to school are more comfortable walking and biking as adults. We also know that people who take transit walk an additional 15 minutes per day compared to people who do not use transit (Saelens, 2014). Thus for children, benefits of interest include immediate health impacts and school performance (because children who use active modes to school have a lower BMI and better grades). In auto-oriented communities that lack general public transit, children would either bike, walk, be driven or take a school bus to school. However, since the 1960s, the number of children walking and biking to school has declined sharply, as has the number of children who get the recommended 60 minutes per day of exercise. At the same time, childhood obesity has become a problem attracting national attention and efforts to encourage not only more activity but also healthier school lunches (CDC 2015).

More indirectly, but still relevant to Yavapai County residents and decision makers, is the long-term impact that active travel could have on the population's health and well-being. Thus, important benefits to children that could be quantified include:

- Value of educational trips, measured by changes in truancy or tardiness rates
- Value of after-school enrichment activities (if flexible services permit staying after school)
- Value of medical trips for childhood medical conditions. These are particularly important because, if untreated, these could escalate long-term care costs into adolescence and adulthood.

PHYSICAL ACTIVITY, SAFETY, AND TIME USE

Public health, education and transportation experts all recognize that children's school and social travel is a means to promote healthy lifestyles while reducing traffic on the roads due to adults chauffeuring children to school and activities. Children's active travel, such as walking and biking to school, improves "strength and endurance, helps control weight, reduces anxiety and stress, and increases self-esteem" (APHA 2015). Compared to 50 years ago, the number of children in the United States walking or biking to school is extremely low, and there is a growing concern over the short- and long-term impacts of childhood obesity and the role transportation can play in combatting this trend (CDC 2015). Children who are able to travel independently accumulate more physical activity than children who travel and play with adult supervision (Schoeppe et al., 2013). While it is difficult to quantify, it is important to be aware of since children's independence can affect other aspects of public and school district spending.

Chauffeuring costs are another cost that impacts the drivers as well as the transportation network. Reduced chauffeuring promotes independence and allows parents or caregivers to use their time in other ways (Whitehead-Frei and Kockelman, 2015). For some, chauffeuring children can be a good opportunity to talk as a family, but it can also conflict with other income generating activities (Litman, 2015). Nationwide, the average benefit to a driver who is able to avoid chauffeuring if the passenger's trip could be shifted to transit is \$1.05 per mile, or \$5.25 for a 5-mile trip, assuming a driver value-of-time (VOT) of \$12/hour and vehicle operating costs (Litman, 2015, p. 31). Using the Arizona value of volunteer time \$22.83² per hour, a 20-minute chauffeuring trip represents \$7.61 in driver savings, and could also represent additional *earnings* if the driver were able to continue working during that time.

School buses and pick-ups from a caregiver also require a particular schedule. If students need to arrive in a limited time frame, it may limit their ability to stay later at school to participate in available enrichment activities such as music, tutoring, sports, or other clubs. Frequent and reliable public transportation can provide students, particularly adolescents, with some flexibility to participate in these activities. There is also evidence that children who participate in afterschool activities have positive academic, behavioral and psychological outcomes (Fredricks and Eccles, 2006).

COST OF K-12 TRANSPORTATION

Lacking appropriate facilities to bike and walk to school, school districts and communities might choose to invest in school buses to allow children to access school safely. For example, according to the Humboldt Unified School District 2012 Auditor general report, the Humboldt USD spent \$709 on transportation per rider (\$380 per pupil) in fiscal year 2010; comparing these numbers suggest slightly more than half of Humboldt USD students are using the bus to get to school. If

² Independent Sector 2015 estimate of value of volunteer time in Arizona, based on Bureau of Labor Statistics data.

transit services were to be developed in the Town of Prescott Valley, the school district and parents who now chauffeur children might be beneficiaries.

Schools have the option to shift their transportation services to private operators in order to save money, but in some cases the costs are similar whether operated by school districts or private operators (as was the case in a study of school transportation spending in Pennsylvania, [Price et al., 2012]). Other cities partner with general transit providers to get students to school. Comparing eight case studies nationwide, the cost of these partner services to the student varies from \$0 per ride to \$30 per month for an unlimited transit pass (Vincent et al., 2014). For some cases, the costs to the school district were available. Polk County, Florida pays \$46,000 per month to provide passes to 25,000 students; so the cost to the school district is less than \$2 per student per month. The portion of Portland Public Schools' payment to Tri-Met that goes to reimbursement for student transportation is \$560,000, and roughly 12,500 students made an average of 60 trips per month, for an average cost of 75 cents per trip; however, many of these trips were for non-school purposes. In the cases Vincent et al. (2014) studied, services for students with special needs are still operated by the schools, but other students can shift to a more general service.

When a community chooses to invest in public transit services for those students for whom it is appropriate, costs shift from the school district to the public transit agency. It is important to note that with fixed route transit, there is often little additional cost associated with carrying students. If there are empty seats available, the students can fill them. If additional fixed route services are needed for capacity, then all riders benefit as there is usually an extra trip or two added, providing more frequent services. The public transit provider incurs the cost of this additional service but the administrative overhead does not change, and in fact administrative tasks for the school district could decrease if some transportation management is shifted to a transit agency.

The federal and state funding formulas for school transportation would not necessarily allow a school district to simply shift funding from transportation to other services. However, the option to provide bus services only for students who need it and shift remaining students (including those who are chauffeured) to a general service, biking, or walking could reduce the total traffic and wear-and-tear on Arizona roads. Arizona ranks 47th in per pupil spending on K-12 education and has cut funding in recent years, suggesting the ability to gradually shift toward a generalized public transportation system for student transportation could redirect some of the transportation operating budget to other expenses in Yavapai County.

MEASURING ACTIVE TRAVEL

The benefits of active travel are challenging to assess since they depend on an individual's overall health and physical condition. Nancy McGuckin (2015) offers some common indicators for measuring the level of active travel, which can be calculated from most regional and national household travel surveys:

- Daily minutes and miles of activity per capita;

- The portion of the population—by meaningful groups, if possible—that achieves various levels of activity—such as 10, 20, or 30 minutes or more of active travel per day;
- The percent of children within 2 miles of school who walk or bike; and
- The percent of adults who report no active travel at all—that is, who are sedentary

2.7 Conclusion

Section 2 has described a varied set of population groups, the trips they take, and the benefits they may receive from having access to public or specialized transportation. Much of the research that has been carried out has focused on a population group or a trip type. It is important to note that although, for example, employment transportation is common to many population groups, the travel characteristics and benefits gained by each group are somewhat different. Similarly, for medical trips, the travel characteristics and benefits of trips for a child will be quite different than a senior, even though both may have chronic conditions. Breaking out the individual components is useful for both identifying where the benefits can be realized and applying benefits to a specific location. This examination has also shown where data that includes the value of transportation is available and where it is missing to recommend performance measures for tracking in Section 4.

3 Case Study: Economic Impacts

This section identifies the economic impacts of developing transit services within the central portion of Yavapai County, an area that includes an urbanized area covering the Town of Prescott Valley and City of Prescott and a somewhat larger planning area that includes the towns of Chino Valley and Dewey-Humboldt as well as some surrounding unincorporated area. The northern portion of Yavapai County has solid transit services, with local services in the Town of Cottonwood and regional services between Cottonwood and Sedona. A range of mountains separates the northern portion of Yavapai County from the central portion.

There has been both support and opposition to transit in Central Yavapai County. A group of citizens has long advocated for the establishment of regular fixed route bus services in the urbanized area and services between the communities in the region, but there is significant political resistance to funding such services. While urbanized area Federal Transit Administration funds are available for a portion of the operating costs, local residents would need to raise a tax to provide local match.

The recent transit implementation plan for the Town of Prescott Valley identifies the level of service, costs, and ridership that could be provided for a system that uses the available FTA funding (TransitPlus, 2016). An operating cost assumption of \$950,000 allows us to use national estimates for what each dollar invested in operating cost could produce.

This case study identifies the economic impacts of establishing transit services in Prescott Valley, as well as the larger urbanized area, using assumptions from the 2007 Transit Implementation Plan for the latter. The general assumptions take into consideration the unique characteristics of the area, the proposed levels of service identified in service plans, and the research reported in Section 2 that identifies expectations based on national surveys of transit use.

General assumptions include the following:

- Approximately a \$950,000 annual operating cost budget would require a \$425,000³ local investment in transit. Federal match and fare revenues would provide the balance.
- CYMPO also contracted for a Transit Needs Study in 2007 that identified what a regional system would be, providing services in both Prescott and Prescott Valley as well as connecting the two cities. Those assumptions are documented Table 3.1 and factored into the assumptions about value.

It is important to note that the impacts on various groups will change as demographics of the community change. Table 3.2 reports the 2010 demographics of the CYMPO region. Relatively slow growth is projected for the region but the trend in Arizona, as across the nation, shows

³ Based on the average of 2 options presented to the public in Prescott Valley. A system with a similar level of costs and services was designed for the Prescott and Prescott Valley region in 2007, but the Prescott Valley estimates reflect the most current costs.

communities skewing toward more seniors. Additionally the percent of the population with disabilities has been increasing nationwide and in Arizona.

Table 3.1 Underlying Assumptions for Benefit Calculations

Measure	Value	Source
Number of potential regular customers in Prescott Valley	900-1,800	Nelson/Nygaard 2007
Number of potential regular regional customers	3,250-4,000	
Percent of customers who see weekday commute as #1 priority	57%	
Percent of customers who see weekday midday as #1 priority	28%	
Population of the urbanized area	80,000	US Census, 2010
Portion of residents who might be expected to use service at least once a month (3% of population)	2,400 (urban area) 1,200 (Prescott Valley only)	Litman, 2015
Annual cost of proposed service (Based on budget for 2- full year of operations)	\$950,000 (only in Prescott Valley)	TransitPlus, 2016
Local share of proposed service (Based on budget for 2- full year of operations)	\$425,000	

Note: CYMPO partnered with Northern AZ University Sustainability Center on a study titled "Exploring Shared Community Values and Public Transportation" which identifies stated preferences for use that are higher than Litman, but also a preference for service that operates more frequently than planned for Prescott Valley (e.g., service every 15 minutes rather than every hour). The two services proposed in October 2015 were expected to have a local share of \$393,000 and \$463,000, with an equal federal match for either scenario.

Table 3.2 Demographic Characteristics of Town of Prescott Valley

Characteristic	Number	Percent
Total Population	40,145	100%
Total Households	15,256	100%
Population aged 65+	7,134	17.8%
Population age 18-64 with disabilities	3,987	9.9%
Households below Poverty	1,816	11.9%
Veterans	4,761	11.9%
Zero Vehicle Households	233	1.5%
Jobs in Prescott Valley	9,265	100%
Jobs filled by local residents within 10 miles of Prescott Valley	4,600	49.6%
Prescott Valley jobs held by residents	3,001	32.4%
Workforce age 16-64 Source: ACS 2014; Margin of error = +/- 733	18,176	100%
Unemployed persons Source: DES Career Trends, 4.9% of labor force	890	4.9%

Using the values and potential effects of investment gleaned from studies across the US, and particularly looking at the cost-benefit ratios for small urban and rural areas, tables in subsequent sections breakdown value for each category: economic, low-cost mobility, social savings, and healthcare savings. These categories are defined in this manner to prevent double counting.

- **Economic benefits** are those which general accrue to the community in terms of economic activity.
- **Low-cost mobility benefits** can be measured at the household level, i.e., how much can a household save on automobile maintenance and operating costs when transit is an option.
- **Social savings** represent savings on public assistance payments that can be avoided when individuals have improved access to jobs, healthcare and other needs.
- Finally, **healthcare savings** is its own category due to the aging population in Yavapai County, which is expected to see more benefits in this category than average since the population of adults over age 65 is higher than the US average.

Note that since some healthcare numbers are not available, the benefits listed in this section are likely incomplete. We also do not estimate the potential value to the school district of shifting some students to a generalized service and away from district funded buses, since such an estimate would require more data on household and student travel in Yavapai County. Both of these items could be measured for future analyses of value.

3.1 Economic Impacts

Access to jobs, increased gross regional product, a larger tax base, and the ability to look for jobs outside a 5-mile radius are all economic benefits of transit service. The numbers in Table 3.3 reflect the expected benefits based on assumptions from the literature and the local investment and ridership for Yavapai County. The potential economic benefits are quite large, totaling \$1,793,000. It is also assumed that the taxi voucher program would be replaced by the proposed call-and-ride and ADA Complementary Paratransit services, so the increase in local investment for services would be reduced by \$50,000.

Because the benefits of mobility and access are connected, the costs incurred by individuals and the public for lack of access are connected. For instance, providing convenient transportation to work that enables an individual to remain employed may cost less in the long-run than public assistance payments.

Table 3.3 Economic Benefits of Transit Investment

BENEFIT	Annual Benefit (from literature or local)	Community Level Benefit	Sum of Annual Community Benefits	Sources
Job access	Unemployment .2 or .3 percentage points lower. A .2% decline = 36 jobs. Based on 4,600 jobs filled by local residents within 10 miles, assume 1% (46) of workers use transit for work trip. Trips for employment have associated cost savings and value of \$4-\$5	36+46 jobs = 82 jobs * \$4.5 per one-way trip * 480 trips per year	\$ 177,000	Faulk & Hicks, 2010; Porter et al. 2015; Godavarthy et al. 2014
Education access	Value of educational trip is \$4-\$5.85	50 students * \$4.50 per trip * 400 trips per year	\$90,000	Cronin et al., 2013, Porter et al. 2015, Godavarthy et al. 2014
Business productivity	Turnover rate is lower in counties with transit vs without resulting in lower training costs	100 jobs * \$1,000 training expenses per job	\$100,000	Faulk & Hicks 2010
Tax revenue	\$490,000 per million spent on transit operations and capital ^(a)	\$490,000	\$490,000	Weisbrod & Reno 2009
Volunteer Time	PWC serves 375 trips annually and operates 1,125 hours annually in Prescott Valley ^(b) .	1,125 hours * \$22.83/hour, Assume 5% of existing trip-hours could shift to paratransit	\$1,280	PWC trips; Independent Sector 2015
Income from new direct jobs created by transit and jobs supported by transit spending	Direct employment: 12.5 jobs ^(c) Supported jobs: 14.2 per million spent on operations	26.7 jobs at \$35,000 per job	\$934,500	Godavarthy et al. 2014

Notes:

(a) This number is based on national investment figures (not small urban areas). The actual number for operations only is higher (\$530,000 per million spent) but we chose to use the average for capital and operations. The tax revenue economic impacts are associated with the job impacts and includes both indirect and induced benefits.

(b) People Who Care operates in Prescott and Prescott Valley. Only trips in Prescott Valley are used to estimate the potential impact of the potential transit services.

(c) This figure is from a study of rural and small urban area impacts. The national study (Weisbrod and Reno, 2009) estimates 41 direct and supported jobs. The service plan for Prescott Valley is close to the 12.5 direct jobs in the 2014 Godavarthy, et al study. The average wage was also reduced from \$40,000 to \$35,000.

3.2 Low-Cost Mobility

A major cost savings for travelers is the reduced cost of automobile ownership and maintenance if they can replace some trips with transit. Savings will occur if some of the 1,200 projected individuals expected to use the service at least once a month are able to replace a portion of their car trips with transit. To estimate savings it is important to equate individual riders to trips. Generally a portion of riders use transit service 3-5 days a week, with some making multiple trips in a day. Another portion of riders use transit service 1-2 days a week, and a portion use transit service less than one day a week. However, on average, if 1,200 individuals make 90,500 trips annually (the midpoint between the high and low ridership estimates), on average each of the riders will make 6.25 trips per month or 75 trips annually. It is likely that a limited number of individuals will make most the trips, including workers. It is estimated that:

- 80% of the riders do not have access to an auto (960 individuals and 72,400 annual trips)
 - Of these, 20% (190 individuals and 14,500 annual trips) have someone else drive them. These auto trips will no longer be made, saving the fuel and maintenance expenses as well as the value of the driver's time.
- 20% of the riders (240 individuals and 18,100 trips) have access to a car and use it to make trips. Some of the cars may be shared with another family member or in poor condition. Some of these trips might be ones where the rider now uses a car; others might be ones where a friend or family member with a car is a chauffeur.
 - If 10% of these individuals (24 individuals) are able to either get rid of their car or reduce from two cars in their household to one car, the savings would be substantial.
 - All of these trips result in reduced vehicular travel.

Households could choose to save that money or spend it on other activities, and it is this spending on other items that results in the levels of economic returns reported in Table 3.3. Table 3.4 lists the community savings that could be attributed to having transit as a low-cost mobility alternative.

Table 3.4 Low-Cost Mobility Savings

BENEFIT	Annual Benefit (from literature or local)	Sum of Annual Community		Sources
		Benefits	Benefits	
Gasoline and maintenance savings for trips not made by auto	Average annual cost in AZ was \$2,756 in 2012; Assume 12,000 average miles per vehicle for \$0.23 ⁴ per mile. Assume 32,600 annual trips.	14,500 annual chauffeured trips plus 18,100 reduced auto trips* 10 mile average trip * \$0.23 per mile	\$75,000	Kuby & Golub 2015; Salisbury 2013; TransitPlus 2016
Savings in time for driver no longer chauffeuring trips	Assume 30 minutes per trip for 14,500 trips at \$21 per hour	= 30 minutes * 14,500 annual trips	\$152,300	IRS, 2015
Reduction in vehicles among riders	Average depreciation + other costs of car ownership in AZ were \$5,700 in 2012; Transit slows growth of congestion, level of service would not result in measurable changes in congestion	24 fewer vehicles * \$5,700 per vehicle.	\$137,000	Kuby & Golub 2015; Salisbury 2013
Reduced congestion		Not available	-0-	Litman 2015
Reduced cost of medical trips	Values in literature range from \$8-\$11 in cost savings per trip	Assume 10% (9,000) medical trips annually are taken * \$8 trip savings per trip	\$72,000	Metlife 2012, Cronin et al. 2008, Salisbury 2013

Note: many of these benefits would be realized at the household level. They are summed over the Prescott Valley community to get community level benefits.

3.3 Social Services Impacts

Faulk and Hicks (2010) found that counties with transit services have lower public assistance payments than counties without transit. The estimated this savings to be 18 to 61 cents per dollar invested in transit. For Central Yavapai County, the benefit would be roughly \$369,000 (Table 3.5).

The value of independent living for seniors and individuals with disabilities is harder to capture. The average cost of assisted living in Arizona is \$3,196 per month. If 111 individuals (one percent of the population of seniors (7,134) and individuals with disabilities (3,987) in Prescott Valley) could use paratransit services to meet daily needs and continue to live independently on average for one month longer than if transportation was not available, those clients would save a total of \$355,000 for each month of avoided payments.

We do not at present have good information on the number of months longer individuals are able to remain in their homes when transportation services are available. It is widely acknowledged that transportation is one of the key factors to being able to remain in one's home, especially when there are no family members nearby. In the Prescott Valley area, the Aging Services program does do in-home assessments, but at present it is not possible to track the amount of time individuals might be able to continue living independently if transportation were available. This would be a relatively easy change to make to the current forms.

Table 3.5 Benefits of Transit for Social Services Spending and Outcomes

BENEFIT	Annual Benefit (from Literature or Local)	Benefit Converted for Prescott Valley	Summary of Annual Community Benefit	Source
Avoided public assistance payments	Save 18-61 cents per dollar of transit operating expenses	\$945,000 operating expenses * 39 cent savings (median)	\$369,000	Faulk & Hicks, 2010
Value of independent living / aging in place for seniors	Avoided cost of 1-month in assisted living is \$3,196	Assume annually 111 clients would gain on average 1 month of independent living. 111 clients * \$3,196/month	\$355,000	MetLife, 2012

3.4 Healthcare Impacts

Reduced readmission, increased preventive care access, reduced cancellation (and hence insurance expense) and more efficient scheduling for care providers are all potential benefits to the health care sector. Individuals may also experience improved health due to enhanced access to care. Table 3.6 summarizes some of the values available in literature. With more tracking at the local level, a table of benefits could ultimately include many cost savings for patients and care providers. Unfortunately, it is difficult to assign a dollar value to some of these metrics. Suggested performance measures in Section 4 could improve the understanding of the relationship between transportation and health access.

Table 3.6 Benefits of Transit for Healthcare Spending and Outcomes

BENEFIT	Annual Benefit (from literature or local)	Community Level Benefit	Sum of Annual Community Benefits	Sources
Health visits	Transit users visit doctor additional 4 times per year	Assume 20 people (1% of users) would take additional 4 trips and avoid median charge for ER visit of \$2,627	\$52,500	Arcury et al. 2005, see also Nemet and Bailey 2000 ¹
Health benefits of increased walking for users	Additional 15 minutes physical activity per day (Saelens 2014)	Assume 2,000 weekly riders would walk additional 15 minutes per week	--	Litman 2015; Salisbury 2013
Reduced EMS visits due to health access	Assume 10% reduction in EMS calls if easier to access medical care	40 EMS ² calls per month (Sept 2015 Avg.) * \$400 (out-of-pocket cost estimate for EMS services)	\$16,000	Local/ US Avg. Central Yavapai Fire Dept. Sept. 2015 data

¹ Arcury et al. 2005 is a widely cited study, but it has some contradictions with another large survey with regard to acute care versus preventive care visits. A more precise value for health could be calculated if additional data were available for Human Services health trips and Yavapai Regional Medical Center.

² The vehicles and paramedics might be sent elsewhere, so the resources would be directed to other uses. Insurers may save their share of the cost.

While costs for care will vary across the use, Peterson and Scott (2010) found that the cost of assisted living almost always is higher than living at home (with or without a mortgage) and having an at home care provider. It is possible that a low-cost assisted living center would be more affordable, but their findings suggest that the average or high-cost assisted living care carries significantly higher out-of-pocket costs than living at home.

3.5 County, State and Federal Funding

How do the economic benefits of having transit services fall to the local, state, and federal levels? How does this impact the willingness of these organizations to fund transit services? Some economic benefits are part of the general economy while government programs may affect other benefits. For example, one person might work in a job in the private sector and have medical insurance through private sector options while another might either not have medical insurance provided through work or be dependent on a government program for insurance. The benefits of being able to access regular medical service might fall to the private sector economy in the first instance or to a government program in the second instance.

There are many government programs that are oriented to:

- Activities where **benefits are broadly shared** and not effectively captured by the free-market system. The community college system and public transit services are examples of such programs.
- Providing a **safety net** to support people in meeting basic needs and, when possible, enabling them to return to being productive members of society. Human service programs including those for people who are elderly or have disabilities would fall into this category (Area Agencies on Aging provide a wide range of services, from Meals on Wheels to transportation to ombudsman services; Medicaid services including medical services and long term care services for the aged and for individuals with disabilities are an important set of services in this category.)
- Providing **workforce training and retraining** and other tools to enable individuals to participate in the working world. Many of these programs are covered by the Workforce Investment and Opportunity Act and include partnerships with businesses and colleges to build and maintain a strong workforce. Workforce training is an important component of Veterans programs. Vocational rehabilitation address similar needs among the population that has disabilities.

Some programs are operated directly by the Federal government. A key example is programs operated by the Veterans' Administration. Head Start programs are also typically funded and operated by the Federal level, although there are some partnerships with states. Other programs flow to the State. In Arizona, the State directly administers most human service and labor/employment programs and provide matching funds for the Federal government's primary funding.

An important result of this is that while the residents in a locality benefit from the direct provision of service, many of the benefits noted accrue to the Federal and State governments. Splitting the costs and benefits between different parties makes it more difficult to create a rational policy for all parties. An example is that to the extent that a senior is able to continue living at home because there is specialized transportation to take the senior to get groceries, to medical appointments, and for social activities. Such programs can save the Federal and State governments money in long-term care costs in addition to improving the quality of life for the senior. The cost of providing the transportation falls roughly 50% to the Federal government and 50% to local entities. In states where there is state funding for public transit, the state may assume most of the cost. In Arizona and other states that do not provide funding for transportation, the costs fall to local governments. This also assumes that there are adequate funds available in the Federal Transit Administration program to use for the service, and often this is not the case. When there are not adequate funds available, localities are asked to pay more or all of the costs.

It is also useful to look at both the value accruing to the local government versus the state and federal governments. Where benefits are shared they have been divided equally. More work would be needed to determine an actual percentage split. Table 3.7 shows that about \$1.9 million accrue to the local community while an estimated \$1.1 million accrues to state and federal governments for a total benefit of \$3.18 for each dollar invested – based on a \$950,000 investment.

The proposed operating budget for Prescott Valley splits the costs between the local and federal, with about \$425,000 coming from each. Based on Table 3.7, this means the local benefit of local investments would be about \$4.54 for each local dollar invested while the benefits accruing to the state and federal governments would be about \$2.57 for each federal dollar invested.

Table 3.7 Annual Benefits According to Where Benefits Accrue

Category	Total	Local	State/Federal
Job access	\$177,000	\$88,500	\$88,500
Educational access	\$90,000	\$90,000	
Business productivity	\$100,000	\$100,000	
Tax revenue	\$490,000	\$245,000	\$245,000
Volunteer time	\$1,280	\$1,280	
Income from jobs	\$934,500	\$934,500	
Auto savings	\$75,000	\$75,000	
Chauffeur savings	\$152,300	\$152,300	
Reduce vehicles	\$137,000	\$137,000	
Cost of medical trips	\$72,000	\$72,000	
Public assistance payments	\$369,000		\$369,000
Avoided long-term care	\$355,000		\$355,000
Health visits	\$52,500	\$26,250	\$26,250
Reduced EMS	\$16,000	\$8,000	\$8,000
TOTAL	\$3,021,580	\$1,929,830	\$1,091,750

3.6 Conclusion

The documented benefits for Prescott Valley are well within the range shown by other research. For an annual operating expenditure of \$950,000 in transit services, the economic benefit is estimated at \$3.02 million annually. This equates to \$3.18 in economic benefits for every \$1.00 invested. The multiplier effect of the investment is not routinely counted in the estimates presented here so this remains a conservative number; many categories of possible savings were also not included. A rule of thumb for rural areas is about \$3 in benefits for each \$1 invested, suggesting local numbers converge with other research findings.

4 Tracking Metrics to Manage Mobility: Framework for Yavapai County

As Sections 2 and 3 outlined, there are benefits to individuals and communities that extend across funding, operational and jurisdictional boundaries. While it is a challenge to collaborate across these boundaries, the objective of this section is to identify the ways in which progress towards common goals can be measured. Identifying common goals and measurable outcomes towards these goals can provide an actionable, adaptable framework to meet these challenges over time. With more data on the access and utilization of healthcare, jobs and education in the Central Yavapai region, more accurate estimates could be obtained for the values reported in Section 3 and summarized in table 3.7. The share of benefits to the local versus state and federal levels could also be further refined depending on the types of funding available for each benefit category.

A diverse group of agencies have an interest in various transportation objectives, as illustrated in Figure 4.1. Transportation is valuable to each of these entities in meeting their primary mission. A useful framework is to consider the degree of access individuals have to various services or activities, focusing on individuals who do not have access to an automobile. Some stakeholders are primarily interested in one type of access while others are interested in multiple types. For example, Arizona's Long-term Care Services (ALTCs) or the Veterans Administration programs for the homeless are programs interested in the range of services needed to support people living independently in their own homes. It is important to also note that a family of transportation services is needed to serve public transportation needs: including safe walking or bicycle paths, general public transit, vanpools, door-to-door services and door-through-door services.

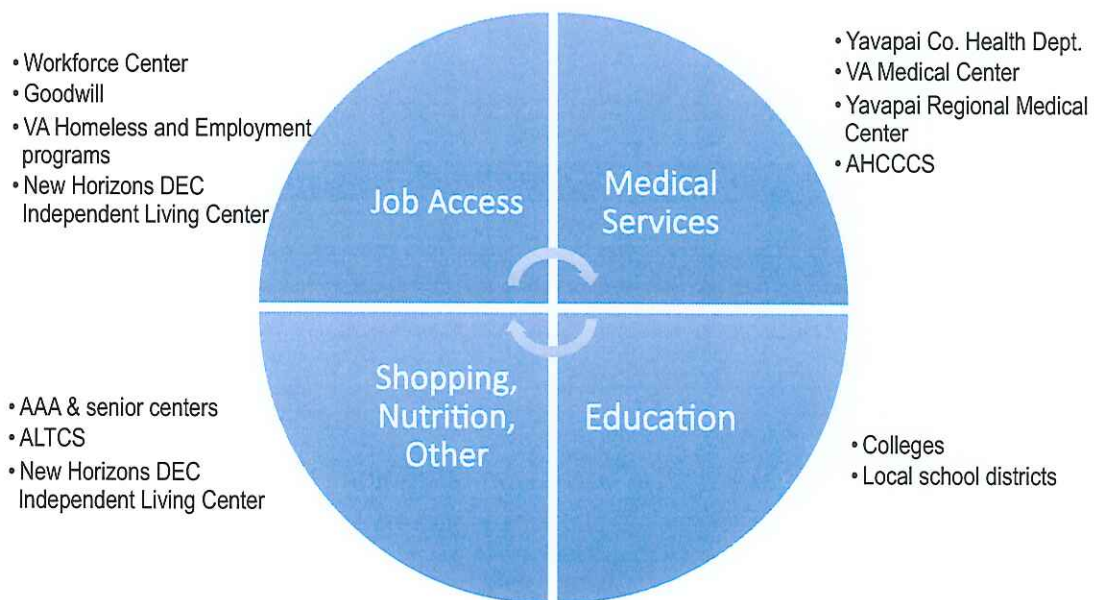


Figure 4.1 Example Stakeholders for Access to Activities

4.1 Collecting and Tracking Data

A variety of items that reflect the value of transit and ways to measure that value have been identified in sections 2 and 3 of this report. They are summarized in Table 4.1 so that stakeholders may select appropriate measures.

In addition to the items identified in Table 4.1, there are common data sources for transportation services such as ridership and service levels, productivity, and cost measures. These reflect data that is regularly collected by transportation providers. Such data is an important part of the equation in understanding the value of the investment in each specific transportation service, and in the comparative value of each service.

In identifying metrics that can be used to measure progress towards a goal, there are some key items to keep in mind.

- Identify information that is already tracked somewhere else and can be re-purposed. This might be national information or it might be state or local information.
- Use measures that serve dual purposes. The dual purpose might be for transportation purposes and for the purposes of the human service or other agency that would be responsible for gathering it.
- Build a solid understanding of the goals and develop a consensus that they are worthwhile. You will need supporters within the agencies who are able to make a convincing argument. They need to know:
 - What information is needed?
 - Why is it needed and how will it be used?
 - How will their clients or program benefit?
 - How will it be collected? (Hopefully with little or no additional staff work.)
- Allow time to work through the individual agency processes to gain approval to gather the data or make changes.
- Keep it simple and start small. Even one very specific question can be useful for building metrics.
- Report back to stakeholders on the metrics so they can see the benefits and the trends.

Agencies in the field have many demands on their time, and they often are under-staffed. In addition, they often have very good reasons for doing things the way they do them. Even if a particular item is simply measured a certain way for historical reasons, they may have management or a board that is used to seeing certain information. The reports and information generated from existing measures could be compared to potential measures to determine which could be adjusted.

At the same time, some things are not routinely tracked or could be tracked in a different way. In fact, it may serve management purposes to make such a change. Agencies do change how they track information on a regular basis.

Table 4.1 Summary of Potential Measures

Value	Possible Measures	Comments on Data Sources
Access to medical services	<ul style="list-style-type: none"> • Appointments missed due to lack of transportation • Medical trips that should be made vs. medical trips that are made (e.g. I should visit doctor biweekly, but go monthly due to transportation constraints. • Readmission rates to hospitals • EMS calls and type of medical care delivered • Medicaid/AHCCCS expenses in various localities – to compare costs between communities with and without transit. • Current modes used to access care and alternatives available • Health statistics from county epidemiologist 	<ul style="list-style-type: none"> • No known data, especially that has transportation as reason. • No known data, but might be possible for transportation providers to gather some. Taxi costs can be a factor in deciding number of trips to take. • Does collected data on readmission provide any indication of the reasons for lack of follow-up care? • What information on AHCCCS transportation costs are available? Any by locality?
Access to employment	<ul style="list-style-type: none"> • Work missed or jobs lost due to lack of transportation • Inability to take jobs more than 5-miles from home. • Job search time • Job tenure • Means of transportation to work (e.g. friend, family member, bus) • Trip purposes or destinations (from transportation providers) • Missed appointments for employment services due to transport 	<ul style="list-style-type: none"> • Identify potential sources of information on role of transportation in: <ul style="list-style-type: none"> ◦ Job tenure ◦ Job search locations • Census data on mode of transportation to work, travel time. • Census data on HH auto availability • Travel survey diaries may be a source of information • Workforce Center and other job placement service statistics. • Bureau of Labor Statistics may deepen understanding
Access to groceries, meals, shopping	<ul style="list-style-type: none"> • Trip purposes or destinations • Attendance at meal sites • Meals on Wheels delivered 	<ul style="list-style-type: none"> • From transportation providers – data would need to be collected uniformly and manipulated.
Access to education: colleges and universities	<ul style="list-style-type: none"> • Mode share for access to classes for students, faculty, and staff • Parking passes sold / parking counts • Trip purposes or destinations (from transportation providers) 	<ul style="list-style-type: none"> • Identify the available information for showing trends or comparisons to areas with public transit and/or safe biking facilities available.
Access to education: local school districts	<ul style="list-style-type: none"> • Cost of transportation spending per pupil • Student mode choice to school • Student attendance and late arrival 	<ul style="list-style-type: none"> • Identify the available information to show trends and costs that potentially could be avoided.
Ability to live independently: This includes access to medical services, access to groceries, and access to other activities such as church, socialization, exercise.	<ul style="list-style-type: none"> • See “access to medical care” and “access to groceries, shopping.” • Track additional months of independent living with adequate transportation and the transitions to long-term care where transportation is a key factor. • Modes used by home care aide/nurse, if applicable 	<ul style="list-style-type: none"> • Consider adjusting in-home assessment forms used to determine services needed by elderly clients and if they can continue to live in their own homes or if long-term care is needed, to track role of transportation.

A key challenge to implementation is working across multiple organizations to gather data for decision making. This requires consistency in data collection, using the same definitions so that data can be compared. Some agencies may have the ability to adjust data and for others the decisions may be made at the state or federal level.

Some metrics listed in Table 4.1 can be collected from routine statistics, although these can be dated, or by studying budgets and spending among various programs. Other measures listed in Table 4.1 can be determined by asking questions of clients and patients before or after services are provided.

4.2 Options to Streamline Existing Data and Obtain New Data

Adjusting existing data collection mechanisms does not need to be a complicated process. Once goals are established and the mobility management community agrees on a few metrics, existing sources of data can be adjusted and/or new data gathering means could be adopted. Below are some options for gathering data; several of these could be combined to get a more comprehensive picture of mobility options and value in Yavapai County.

1. Use the data that is routinely collected for management decision-making in various programs. This data may need to be modified to provide uniformity or to allow comparisons across programs. Some effort may also be necessary to manipulate the data to tell a story that carries across programs. For transportation services this data includes ridership, hours and miles of service, and operating and capital costs. In an area such as Yavapai County where there are a variety of types of providers – rural public transit, volunteer driver programs, and specialized transportation, an effort will be needed to assure that the information being tracked by various providers is comparable, with each using similar, if not the same, definitions. This may be as basic as agreeing upon the value of a volunteer driver hour and treating these values the same in reporting budgets.
2. Collect data in planning projects and routine surveys. Many programs regularly survey clientele to discover more about services that are needed, the effectiveness of existing services, and how services are used. The Area Agency on Aging completes a plan every 4-5 years, and a client survey is included as part of this planning process. Similarly, the Community Services Block Grant programs have extensive public involvement in their planning process that occurs every 4-5 years. A Health Impact Assessment, such as the one underway in Yavapai County is another source of data. Transit agencies typically do rider surveys every five years or so to gather detailed information on items such as trip purpose or frequency of use - items that are not part of the data collected on a daily basis.
3. Conduct special surveys to build an understanding of certain facets of a program. For example, surveying for one month the trip purposes or other detail on riders who use the Town of Prescott Valley taxi voucher program would build an understanding of how this program relates to other services. It may be something that is useful to do one month a year, to illustrate trends, but likely it is not the type of information that would need to be collected on an ongoing basis.

4. Adapt existing mechanisms for gathering information, adding or modifying a few questions, to provide a broader understanding of the role of transportation in assisting the program in meeting the needs of its clients. For example, specialized transportation providers could ask:
 - a. Have you used any other means (drive self, ride from a friend) to access this trip purpose (medical, grocery, shopping) since the last time we served you?
 - b. Did you cancel or reschedule any trips as a result of not being able to find a ride?
 - i. Did you cancel or reschedule a trip for ANOTHER reason? (important to distinguish between travel related causes).

For Goodwill and other groups who assist job-seekers with resume prep and job search assistance, asking each client such questions will also assist in identifying long-term impacts of an individuals' inability to find a ride to work. Questions for job-seekers could include:

- a. What modes of transportation are currently available and realistic for you to get to work?
- b. How long have you been looking for a job?

Questions need to be phrased in a way that protects clients' privacy and do not give the appearance of putting their search at risk.

4.3 Tracking Trends in Yavapai County

Gathering several neutral sources of data (as were presented in Sections 2 and 3), a Mobility Manager in Yavapai County could build a simple spreadsheet tool in order to track trends. Transit service reports, annual surveys from human services and government agencies, and customer/client surveys conducted by various interest groups could feed into this spreadsheet to be tracked over time. It may take several years to develop a complete picture of trends and how they are evolving as mobility options change, but the exercise of putting numbers in a document would also help guide long-term goals and track progress towards coordination among stakeholders.

OTHER COMMUNITY EXAMPLES

Over the last several years, the research and practicing communities have recognized a need to track the economic impact of transit investment at the same level of detail as highway projects (Economic Development Research Group, 2016). To meet this need, the Transportation Project Impact Case Studies (T-PICS) site was created to house case studies regarding how transit projects have impacted economic vitality. As of this August 2016 writing, only urban and suburban case studies for capital projects are available, but the T-PICS website may be a valuable tool as more case studies are shared: <http://transit.tpics.us/>. As more case studies are added, the T-PICS site may be a useful resource for additional information.

Groups such as Easter Seals, United We Ride and the National Center for Mobility Management have piloted projects (linking health and transportation) nationally to provide and communicate transportation options. The Missouri Rural Health Association is considered to be among the leaders in efforts to build a statewide Culture of Health, linking health outcomes to other government spending (see e.g. MORHA 2016).

A program called CAPABLE – Community Aging in Place, Advancing Better Living for Elders – is undergoing demonstrations in Baltimore, Maryland (Neergaard, 2016). Two separate studies funded by the Center for Medicare and Medicaid Innovation and the National Institutes of Health are assessing how effective home modifications and strategies for daily living are at keeping seniors in their own homes for longer. It is expected that low cost interventions such as banisters, lowering shelves, and providing assistive devices at the recommendation of occupational therapists can reduce the burdens of remaining at home. These results will be something for the coordinating council to watch as they are released.

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