

# The Impact of Maintaining a Viable Home Care and Hospice System on Business Activity in Texas

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## Executive Summary

- Home care is an essential aspect of providing health and related assistance to aged and disabled persons. For many, help with daily tasks may be enough to allow them to remain at home and in their communities.
- The cost savings associated with in-home care relative to nursing facilities is well documented. Enhancing funding for home- and community-based care would not only better meet the need for care, but would also lead to cost savings compared to other options for aging and disabled persons to receive the assistance they require. Evidence also suggests modest additional savings in terms of reduced acute care outlays.
- The projected savings associated with maintaining a viable home care system would lead to an increase in business activity. When multiplier effects are considered, economic benefits are projected to include nearly **\$2.2 billion** in gross product and **22,000** job-years of employment in Texas over the 2023-2031 period.
- Incremental business activity as the benefits of the improved efficiency in care delivery flow through the economy would lead to dynamic increases in tax receipts to the State over and above the net expense reductions, as well as gains to local governmental entities including counties, cities, schools, and special districts.
- The Perryman Group estimates that the potential fiscal benefits would include approximately **\$2.2 billion** for the State (with most of the amount due to cost savings) and **\$101.9 million** for local governments over the 2023-2031 period.
- Investments in a sustainable system can also generate benefits by helping to reduce incidents such as emergency room visits, hospital admissions, and hospital readmissions. Similarly, efforts to facilitate lower caseloads for workers can lead to improved health outcomes.
- The home health system is already significantly strained due to insufficient funding. Demand for these services will expand in the future along with growth and aging of the Texas population. Given current and anticipated labor market conditions, maintaining the existing pay scale without upward adjustments would result in a shortage of approximately 150,000 home health workers (about 40%) by 2031. Such a situation is clearly not sustainable.
- **Maintaining a viable home health complex is a critical element of the state's future, bringing billions of dollars in output and fiscal resources and tens of thousands of jobs and accruing to the benefit of all Texans.**

# Introduction

Home care is an essential aspect of providing health and related assistance to aged and disabled persons. For many, help with daily tasks may be enough to allow them to remain at home and in their communities. Attendants can also help prevent escalation of health issues. Home care can reduce the need for more expensive treatments such as emergency room visits and admissions to the hospital or more costly care settings such as nursing facilities. The Texas Health and Human Services Commission estimates that the average monthly cost per client utilizing community care was \$1,693 in 2019, compared to

\$3,766 per month for those in nursing facilities.<sup>1</sup>

**Home care is an essential aspect of providing health and related assistance to aged and disabled persons. For many, help with daily tasks may be enough to allow them to remain at home and in their communities.**

More than 300,000 Texans receive home care through long-term services and support programs such as Medicaid.<sup>2</sup> Demand for these services will expand in the future along with growth and aging of the Texas

population. The Texas Demographic Center projects that the state population will expand from an estimated 30.7 million in 2022 to reach 34.9 million in 2030, 40.7 million in 2040, and 47.3 million in 2050. Growth will be particularly strong in older age groups, with the number of residents aged 80 or older rising approximately 50% between 2022 and 2030 (from 0.9 million to nearly 1.4 million) and almost tripling by 2050 to reach 2.7 million.<sup>3</sup> A growing and aging population will increase the need for home care.

Labor shortages are a notable challenge in ensuring adequate capacity to provide the assistance required. Nursing shortages are expected to become increasingly problematic in the future. Texas will face a shortage of most nurse types by 2032 according to the Texas Department of State Health

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<sup>1</sup> Texas Health and Human Services Commission, Community Attendant Workforce Development Strategic Plan, November 2020, p. 15.

<sup>2</sup> Texas Health and Human Services Commission, Community Attendant Workforce Development Strategic Plan, November 2020, p. 7.

<sup>3</sup> Texas Demographic Center, Texas Population Projections Program, (n.d.), <https://www.demographics.texas.gov/Data/TPEPP/Projections/>, accessed 7/28/2022.

Services, including shortfalls of 12,572 Licensed Vocational Nurses (LVN) and 57,012 Registered Nurses (RN).<sup>4</sup> The highest percentages of nurses work in hospitals (41.1%), with 15.4% in nursing, long-term care, and assisted living facilities; a significant number also provide home health services (15.3%).<sup>5</sup> In the current labor shortage environment, it is crucial to ensure that labor resources are used as efficiently as possible. To the extent that home health direct care workers can prevent patients from needing more intense care or admission to a hospital or nursing facility through preventive measures and other assistance, nursing time requirements for LVNs and RNs could be reduced, thus helping to ameliorate the shortage.

**The cost savings associated with in-home care relative to nursing facilities is well documented, yet the current system is extremely fragile. Increasing funding to the home- and community-based care system could ensure its viability and lead to notable economic and fiscal benefits.**

Although needed training for direct care home health workers can be easier and faster to attain than a nursing degree, such direct care workers are also in short supply. Direct care workers assist older adults and people with disabilities with essential daily tasks and activities not only in their homes, but also in assisted living and nursing homes. Tens of thousands of

additional direct care workers will be needed, particularly those who provide care in homes, due to consumer preferences for home and community-based services.<sup>6</sup>

This situation is made worse by the fact that there is already a shortage in home health workers which is worsening over time. According to data compiled by the Texas Workforce Commission (TWC), the current demand for home health workers in Texas is 320,777, which is in line with the estimate of 320,000 determined by the Health and Human Services

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<sup>4</sup> Texas Department of State Health Services, Updated Nurse Supply and Demand Projections 2018-2032, (n.d.), <https://dshs.texas.gov/chs/cnws/WorkforceReports/2020-Updated-Nurse-Supply-and-Demand-Projections.pdf>, accessed 7/29/2022.

<sup>5</sup> JobsEQ as reported by Jessica Donald and Lisa Minton in Fiscal Notes, Texas Comptroller of Public Accounts, Nursing in Texas -- Charting the State's Nursing Profession, April 2022, <https://comptroller.texas.gov/economy/fiscal-notes/2022/apr/nursing.php>.

<sup>6</sup> PHI, Direct Care Workers in the United States: Key Facts 2021, September 7, 2021, <https://www.phinational.org/resource/direct-care-workers-in-the-united-states-key-facts-2/>.

Commission (HHSC). According to the Bureau of Labor Statistics, the current supply is about 4.5% below desired levels.

Based on anticipated growth in the population served, HHSC projects the demand for 394,000 workers by 2031 (the TWC projection is somewhat higher). The current analysis by The Perryman Group reveals that, given current and anticipated labor market conditions, maintaining the existing pay scale without upward adjustments would result in a shortage of approximately 150,000 home health workers (about 40%) by 2031. Such a situation is clearly not sustainable.

The cost savings associated with in-home care relative to nursing facilities is well documented,<sup>7</sup> yet the current system is extremely fragile. The compensation rates are extremely low, turnover is high, administrative allowances are inadequate to support operations, and the demand for services is increasing with a rapidly expanding older population. This situation is exacerbated by both the workforce shortage across all segments of the economy (thus providing alternative opportunities for potential home care workers) and inflationary pressures. The number of home health workers is already insufficient to meet demand, and future growth in demand for services will generate additional needs. It is unlikely that an adequate number of caregivers and provider organizations can be sustained under present conditions.

The Perryman Group (TPG) was recently asked to evaluate the potential economic benefits of increasing funding to support and sustain home- and community-based care. The results indicate that the State would see notable gains in business activity and significant net fiscal benefits – representing billions of dollars and tens of thousands of jobs – due to the cost savings and other favorable outcomes which could be achieved.

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<sup>7</sup> See, for example, Texas Health and Human Services Commission, Community Attendant Workforce Development Strategic Plan, November 2020, p. 15.

## Potential Direct Savings

Underfunding the home health and hospice system causes excess costs to the State in several ways. First, hourly wage rates are too low to attract enough workers to meet home care needs. Similarly, administrative reimbursements are below the levels needed for a sustainable system. If these issues are not addressed, the result will be more patients requiring care in more expensive settings such as nursing homes. In addition, adequate home health can modestly reduce State expenses for acute care.

In order to estimate the economic consequences of maintaining the existing hourly rates and administrative fees relative to developing a more sustainable approach, TPG initially developed an econometric analysis to estimate the elasticity of supply in the relevant labor market segment. The results of this model may then be combined with projections of expected demand for home health workers based on projected patient needs over the Fiscal Year (FY) 2023-2031 period as determined by the HHSC.<sup>8</sup> This information may also be used to estimate (1) the shortfall in workers and resulting necessity of treating additional patients in nursing facilities and (2) the increase in wage cost necessary to attract a supply of workers sufficient to meet expected needs. Based on data regarding typical administrative expenses as a proportion of total outlays and estimates of the current inadequacy in funding provided by HHSC, the needed incremental resources may also be determined.

Once the calculations described above are completed, the added cost of increased nursing home utilization is determined as the product of (1) the differential between projected demand and supported supply under current compensation patterns and (2) the added cost of nursing facilities. Over the relevant period, this increase in cost is found to be approximately \$19.005 billion over the relevant period (in constant 2022 dollars). Based on current baseline projections for inflation in Texas derived from the Texas submodel of the US Multi-Regional Econometric Model, the current-dollar cost over the period is approximately \$22.836 billion.

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<sup>8</sup> Texas Health and Human Services Commission, Community Attendant Workforce Development Strategic Plan, November 2020.

In order to assess the alternative cost of maintaining a viable and sustainable home health care system, TPG calculated (1) the required compensation increases to attract the needed workers and (2) the added administrative expense outlays necessary to assure system viability. The basic hourly compensation level would need to increase from \$8.11 to \$11.80 per hour in constant dollars over the analysis period to attract the needed workers. Adjusted for inflation, the nominal rate would need to rise over time to \$15.09. Note that this amount is consistent with recent proposals to increase payment rates in stages to reach \$15.00 per hour.

The total incremental cost of the workforce and administrative fees over the 2023-2031 period is estimated to be approximately \$13.829 billion in constant 2022 dollars (\$16.580 billion in current dollars). Thus, the net savings obtained from maintaining a viable home health program over the period is estimated to be \$5.175 billion (\$6.256 billion in current dollars).

The overall cost savings estimated above are related to programs which are

The estimated resources which would be available to the State of Texas from cumulative (2023-2031) savings related to site of care which a viable home health system would support include almost **\$2.0 billion** in constant 2022 dollars and **\$2.4 billion** on a current-dollar basis.

supported by a combination of State and Federal funds. The estimated cumulative savings that represent resources which would then be available to the State of Texas include \$1.994 billion in constant 2022 dollars (\$2.410 billion in current dollars). These resources thus become available to provide for other public needs or to be returned to taxpayers. In either case, they represent a net increase in the level of economic

activity that occurs within the state.

To illustrate the full effects of this increase in the efficiency of health care delivery, the impact of returning these funds for use in the private sector is examined. The amounts are allocated based on business and personal tax incidence by sector based on information obtained from the Comptroller of Public Accounts and fully adjusted for leakages from the state economy. The business tax savings are allocated across approximately 500 detailed industrial sectors, while individual outlays reflect typical consumer expenditure patterns within the state.



The reduction in acute care costs which could be achieved is based on empirical studies of the effect of home care in reducing the need for acute care among patients. The total direct savings over the 2023-2031 period is estimated to be \$98.867 million in 2022 dollars (\$119.5 million in current dollars). The State-funded portion is projected to include \$38.088 million in 2022 dollars and \$46.944 million on a current-dollar basis.

The total economic benefits of these savings (not only direct, but also indirect and induced) were then quantified in the manner described above.

## Economic Benefits

Any economic stimulus leads to dynamic responses across the economy. The Perryman Group has developed complex and comprehensive models over the past four decades to measure these dynamic responses.

In this instance, enhancing funding for home- and community-based care would not only better meet the need for care, but would also lead to cost savings compared to other options for aging and disabled persons to receive

the assistance they require.

Methods used in this analysis are summarized on page 9, with additional detail in Appendix A.

The Perryman Group estimated the potential benefits over the 2023-2031 period of increasing State funding to maintain a viable home health and hospice system. The projected savings would lead to an increase in business activity,

**The Perryman Group estimates that the economic benefits of maintaining a viable home health system would include nearly \$2.2 billion in gross product and almost 22,000 job-years of employment in Texas over the 2023-2031 period.**

and when multiplier effects are considered, economic benefits are projected to include nearly **\$2.2 billion** in gross product and almost **22,000** job-years of employment in Texas over the 2023-2031 period. A job-year is the equivalent of one person working for one year, though it could be multiple individuals working partial years. The vast majority of benefits are related to patterns in the site of care and the relative cost of home health care and nursing facilities.

Economic benefits are spread across the entire economy, as indicated in Appendix B.

## The Estimated Cumulative (FY 2023-2031) Net Impact Associated with Maintaining a Viable Home Health and Hospice System on Business Activity in Texas

	<b>Total Expenditures</b> (Millions of 2022 Dollars)	<b>Gross Product</b> (Millions of 2022 Dollars)	<b>Personal Income</b> (Millions of 2022 Dollars)	<b>Employment</b> (Job-Years)
Site of Care	+\$4,463.1 m	+\$2,111.0 m	+\$1,285.7 m	+21,579.9
Acute	+\$85.3 m	+\$40.3 m	+\$24.6 m	+412.3
<b>TOTAL</b>	<b>+\$4,548.3 m</b>	<b>+\$2,151.3 m</b>	<b>+\$1,310.2 m</b>	<b>+21,992.2</b>

Note: Based on potential savings from higher utilization of home health compared to more expensive care settings, potential savings in acute care costs for home health patients, and The Perryman Group's estimates of related multiplier effects. A job-year is one person working for a year, though it could be multiple individuals working partial years. Monetary values given in millions of constant 2022 US dollars. Components may not sum to total due to rounding. Additional definitions of terms and explanation of methods and assumptions may be found on page 9 of this report and in Appendix A, with results by industry in Appendix B.

Source: US Multi-Regional Impact Assessment System, The Perryman Group

## Measuring Economic and Fiscal Benefits

Any economic stimulus, whether positive or negative, generates multiplier effects throughout the economy. In this instance, maintaining a viable home care system leads to cost savings compared to care received in other settings. These savings are then available to be spent for other priorities or can be returned to taxpayers and spent. Additional spending and the related economic activity generate tax receipts to the State and local governments. Further detail regarding methods and assumptions is provided in the Appendix.

The Perryman Group's dynamic input-output assessment system (the US Multi-Regional Impact Assessment System, which is described in further detail in the Appendices to this report) was developed by the firm about 40 years ago and has been consistently maintained and updated since that time. The model has been used in thousands of analyses for clients ranging from major corporations to government agencies and has been peer reviewed on multiple occasions. The impact system uses a variety of data (from surveys, industry information, and other sources) to describe the various goods and services (known as resources or inputs) required to produce another good/service. This process allows for estimation of the total economic impact (including multiplier effects) of the proposed development. The models used in the current analysis reflect the specific industrial composition and characteristics of the Texas economy.

Total economic effects are quantified for key measures of business activity (further explained in the Appendix):

- **Total expenditures** (or total spending) measure the dollars changing hands as a result of the economic stimulus.
- **Gross product** (or output) is production of goods and services that will come about in the area as a result of the activity. This measure is parallel to the gross domestic product numbers commonly reported by various media outlets and is a subset of total expenditures.
- **Personal income** is dollars that end up in the hands of people in the area; the vast majority of this aggregate derives from the earnings of employees, but payments such as interest and rents are also included.
- **Job gains** are expressed as job-years of employment for temporary stimuli such as construction and jobs for ongoing effects.

Monetary values were quantified on a constant (2022) basis to eliminate the effects of inflation as well as a current-dollar (not inflation adjusted) basis in many instances.

## Fiscal Benefits

As discussed above, adequately funding home health care would lead to notable cost savings to the State. In addition, cost savings would generate incremental business activity as the benefits of the improved efficiency in care delivery flow through the economy. This stimulus would lead to dynamic increases in tax receipts to the State over and above the net expense reductions, as well as gains to local governmental entities including counties, cities, schools, and special districts.

For example, the retail sales and hotel occupancy increase as a result of the economic stimulus measured in this study was quantified. A portion of the

The Perryman Group estimates that the potential fiscal benefits of a sustainable home health system would include approximately **\$2.2 billion** for the State (with most of the amount due to cost savings) and **\$101.9 million** for local governments over the 2023-2031 period.

retail sales are taxable, leading to increased receipts to the State and local taxing entities.

Moreover, additional room nights provide occupancy tax resources.

Economic benefits also affect property tax values. Higher incomes increase housing demand, leading to higher taxable values as well as

additional need for houses. In addition, increased retail sales

and incomes enhance the need for commercial space such as restaurants, retail outlets, and personal service facilities. Higher property values increase taxes to counties, cities, school districts, and other local taxing entities.

When the total economic effects are considered (such as those measured in this study), the gains in taxes from these sources are significant. The Perryman Group estimates that the potential fiscal benefits would include approximately **\$2.2 billion** for the State (with most of the amount due to cost savings) and **\$101.9 million** for local governments over the 2023-2031 period.

## Other Potential Benefits

The Perryman Group also examined the potential benefits of reducing potentially preventable incidents and worker caseloads.

### *Reductions in Potentially Preventable Incidents*

Investments in home care can help prevent health problems from escalating, reducing the need for emergency room visits, hospital admissions, and hospital readmissions. The Perryman Group examined hypothetical scenarios assuming a 10% reduction in various types of incidents could be achieved within the home health and hospice system. Typical costs of each category of incident, as determined by HHSC, were utilized to project overall savings which could be achieved by such a reduction.

### The Estimated Cumulative (FY 2023-2031) Savings Associated with Hypothetical 10% Reductions in Potentially Preventable Incidents Associated with Maintaining a Viable Home Health and Hospice System on Business Activity in Texas

	<b>Total Expenditures</b> (Millions of 2022 Dollars)	<b>Gross Product</b> (Millions of 2022 Dollars)	<b>Personal Income</b> (Millions of 2022 Dollars)	<b>Employment</b> (Job-Years)
Emergency Department Visits	\$36.103	\$17.076	\$10.400	175
Hospital Admissions	\$63.102	\$29.846	\$18.178	305
Hospital Readmissions	\$40.757	\$19.278	\$11.741	197

Note: Based on potential savings associated with a hypothetical 10% reduction in incidents and typical costs by type of incident and The Perryman Group's estimates of related multiplier effects. A job-year is one person working for a year, though it could be multiple individuals working partial years. Monetary values given in millions of constant 2022 US dollars. Additional definitions of terms and explanation of methods and assumptions may be found on page 9 of this report and in Appendix A, with results by industry in Appendix B.

Source: US Multi-Regional Impact Assessment System, The Perryman Group

The related savings and fiscal benefits are described in the following table.



## Estimated Cumulative (FY 2023-2031) Fiscal Effects of a Hypothetical 10% Reduction in Potentially Preventable Incidents Associated with Maintaining a Viable Home Health and Hospice System

	<b>Total Direct Savings</b> (Millions of 2022 Dollars)	<b>Texas Portion of Direct Savings</b> (Millions of 2022 Dollars)	<b>Total State of Texas Fiscal Benefit</b> (Millions of 2022 Dollars)	<b>Local Government Entity Benefits</b> (Job-Years)
Emergency Department Visits	\$41.863	\$16.127	\$17.479	\$0.817
Hospital Admissions	\$73.171	\$28.188	\$30.551	\$1.427
Hospital Readmissions	\$47.260	\$18.207	\$19.733	\$0.922

Note: Based on potential savings associated with a hypothetical 10% reduction and the fiscal effects of increased business activity as described in this report. In millions of constant 2022 US dollars.  
Source: The Perryman Group

### *Reduced Caseloads*

Reducing worker caseloads could allow for more attention to patients, resulting in benefits including improved outcomes. The Perryman Group estimated the potential effects of reducing typical caseloads from 11 to nine in terms of improved health outcomes. The lower caseload would put Texas in line with other large states. This analysis was based on studies of the effects of improved home health working conditions on hospitalizations and community releases. When multiplier effects are considered such a caseload reduction has the potential to lead to economic benefits of \$989.0 million in gross product and 10,110 job-years of employment. (Note that there would be additional costs associated with these improvements)

## The Estimated Cumulative (FY 2023-2031) of Impact of Improved Health Outcomes Associated with Reduced Case Loads (from 11 to 9) Associated with a Home Health and Hospice System on Business Activity in Texas

	<b>Total Expenditures</b> (Millions of 2022 Dollars)	<b>Gross Product</b> (Millions of 2022 Dollars)	<b>Personal Income</b> (Millions of 2022 Dollars)	<b>Employment</b> (Job-Years)
	\$2,090.954	\$988.992	\$602.331	10,110

Note: Based on estimated improvements in health outcomes and The Perryman Group's estimates of related multiplier effects. A job-year is one person working for a year, though it could be multiple individuals working partial years. Monetary values given in millions of constant 2022 US dollars. Additional definitions of terms and explanation of methods and assumptions may be found on page 9 of this report and in Appendix A, with results by industry and on a current-dollar basis in Appendix B.

Source: US Multi-Regional Impact Assessment System, The Perryman Group

The overall savings associated with this reduction in caseloads would include an estimated \$2.425 billion over the 2023-2031 period, with direct savings to the State of \$934.053 million. The total fiscal benefits include \$1.012 billion to the State (including direct savings) and \$47.298 million to local government entities across Texas.



## Conclusion

The expansion and aging of the Texas population is destined to increase the need for care. Home- and community-based care is often the preferred option for those needing assistance. At the same time, it costs less than

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other settings such as nursing homes. Other beneficial outcomes could include reducing preventable incidents and reducing worker caseloads could also lead to positive effects for the State.

Despite these advantages, the home health system is already

significantly strained due to insufficient funding. Increasing available resources can help meet unmet needs as well as create a sustainable system to provide for future workforce and provider system demands. At the same time, it can lead to cost savings to the State as well as an increase in economic activity. Maintaining a viable home health complex is a critical element of the state's future, bringing billions of dollars in output and fiscal resources and tens of thousands of jobs and accruing to the benefit of all Texans.

## Appendix A: Methods Used

The US Multi-Regional Impact Assessment System (USMRIAS) measures multiplier effects of economic stimuli. The USMRIAS was developed and is maintained by The Perryman Group. This model has been used in thousands of diverse applications across the country and has an excellent reputation for accuracy and credibility; it has also been peer reviewed on multiple occasions and has been a key factor in major national and international policy simulations.

The basic modeling technique is known as dynamic input-output analysis, which essentially uses extensive survey data, industry information, and a variety of corroborative source materials to create a matrix describing the various goods and services (known as resources or inputs) required to produce one unit (a dollar's worth) of output for a given sector. Once the base information is compiled, it can be mathematically simulated to generate evaluations of the magnitude of successive rounds of activity involved in the overall production process.

There are two essential steps in conducting an input-output analysis once the system is operational. The first major endeavor is to accurately define the levels of direct activity to be evaluated. The process for determining potential direct cost savings and other segments of the analysis is presented in the report.

These inputs were used in a simulation of the USMRIAS to measure total overall economic effects of the direct stimulus. The system used reflects the unique industrial structure of the Texas economy.

### Model Structure

The USMRIAS is somewhat similar in format to the Input-Output Model of the United States which is maintained by the US Department of Commerce. The model developed by TPG, however, incorporates several important enhancements and refinements. Specifically, the expanded system includes (1) comprehensive 500-sector coverage for any county, multi-county, or urban region; (2) calculation of both total expenditures and value-added by industry and region; (3) direct estimation of expenditures for multiple basic input choices (expenditures, output, income, or employment); (4) extensive parameter localization; (5) price adjustments for real and nominal assessments by sectors and areas; (6) comprehensive measurement of the induced impacts associated with payrolls and consumer spending; (7) embedded modules to estimate multi-sectoral direct spending effects; (8) estimation of retail spending activity by consumers; and (9)

comprehensive linkage and integration capabilities with a wide variety of econometric, real estate, occupational, and fiscal impact models.

The impact assessment (input-output) process essentially estimates the amounts of all types of goods and services required to produce one unit (a dollar's worth) of a specific type of output. For purposes of illustrating the nature of the system, it is useful to think of inputs and outputs in dollar (rather than physical) terms. As an example, the construction of a new building will require specific dollar amounts of lumber, glass, concrete, hand tools, architectural services, interior design services, paint, plumbing, and numerous other elements. Each of these suppliers must, in turn, purchase additional dollar amounts of inputs. This process continues through multiple rounds of production, thus generating subsequent increments to business activity. The initial process of building the facility is known as the *direct effect*. The ensuing transactions in the output chain constitute the *indirect effect*.

Another pattern that arises in response to any direct economic activity comes from the payroll dollars received by employees at each stage of the production cycle. As workers are compensated, they use some of their income for taxes, savings, and purchases from external markets. A substantial portion, however, is spent locally on food, clothing, health care services, utilities, housing, recreation, and other items. Typical purchasing patterns in the relevant areas are obtained from the Center for Community and Economic Research *Cost of Living Index*, a privately compiled inter-regional measure which has been widely used for several decades, and the *Consumer Expenditure Survey* of the US Department of Labor. These initial outlays by area residents generate further secondary activity as local providers acquire inputs to meet this consumer demand. These consumer spending impacts are known as the *induced effect*. The USMRIAS is designed to provide realistic, yet conservative, estimates of these phenomena.

Sources for information used in this process include the Bureau of the Census, the Bureau of Labor Statistics, the Regional Economic Information System of the US Department of Commerce, and other public and private sources. The pricing data are compiled from the US Department of Labor and the US Department of Commerce. The verification and testing procedures make use of extensive public and private sources.

Impacts are typically measured in constant dollars to eliminate the effects of inflation.

The USMRIAS is also integrated with a comprehensive fiscal model, which links the tax payments by industry to the specific rates and structures associated with the relevant State and local governmental authorities.

## Measures of Business Activity

The USMRIAS generates estimates of total economic effects on several measures of business activity. Note that these are different ways of measuring the same impacts; they are not additive.

The most comprehensive measure of economic activity is **Total Expenditures**. This measure incorporates every dollar that changes hands in any transaction. For example, suppose a farmer sells wheat to a miller for \$0.50; the miller then sells flour to a baker for \$0.75; the baker, in turn, sells bread to a customer for \$1.25. The Total Expenditures recorded in this instance would be \$2.50, that is,  $\$0.50 + \$0.75 + \$1.25$ . This measure is quite broad but is useful in that (1) it reflects the overall interplay of all industries in the economy, and (2) some key fiscal variables such as sales taxes are linked to aggregate spending.

A second measure of business activity is **Gross Product**. This indicator represents the regional equivalent of Gross Domestic Product, the most commonly reported statistic regarding national economic performance. In other words, the Gross Product of Texas is the amount of US output that is produced in that state; it is defined as the value of all final goods produced in a given region for a specific period of time. Stated differently, it captures the amount of value-added (gross area product) over intermediate goods and services at each stage of the production process, that is, it eliminates the double counting in the Total Expenditures concept. Using the example above, the Gross Product is \$1.25 (the value of the bread) rather than \$2.50. Alternatively, it may be viewed as the sum of the value-added by the farmer, \$0.50; the miller, \$0.25 ( $\$0.75 - \$0.50$ ); and the baker, \$0.50 ( $\$1.25 - \$0.75$ ). The total value-added is, therefore, \$1.25, which is equivalent to the final value of the bread. In many industries, the primary component of value-added is the wage and salary payments to employees.

The third gauge of economic activity used in this evaluation is **Personal Income**. As the name implies, Personal Income is simply the income received by individuals, whether in the form of wages, salaries, interest, dividends, proprietors' profits, or other sources. It may thus be viewed as the segment of overall impacts which flows directly to the citizenry.

The final aggregates used are **Jobs and Job-Years**, which reflect the full-time equivalent jobs generated by an activity. For an economic stimulus expected to endure (such as the ongoing operations of a facility), the Jobs measure is used. It should be noted that, unlike the dollar values described above, Jobs is a "stock" rather than a "flow." In other words, if an area produces \$1 million in output in 2019 and \$1 million in 2020, it is appropriate to say that \$2 million was achieved in the 2019-20 period. If the same area has 100 people working in 2019 and 100 in 2020, it only has 100 Jobs. When a flow of

jobs is measured, such as in a construction project or a cumulative assessment over multiple years, it is appropriate to measure employment in Job-Years (a person working for a year, though it could be multiple individuals working for partial years). This concept is distinct from Jobs, which anticipates that the relevant positions will be maintained on a continuing basis.

## Appendix B: Results by Industry

### Potential Impact of Cost Savings

#### The Estimated Cumulative (FY 2023-2031) Net Impact of Site of Care Patterns Associated with Maintaining a Viable Home Health and Hospice System on Business Activity in Texas

##### Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Job Years*
Agriculture	+\$84.8 m	+\$24.2 m	+\$15.9 m	+215.9
Mining	+\$165.2 m	+\$37.9 m	+\$19.5 m	+93.9
Utilities	+\$291.0 m	+\$65.3 m	+\$28.5 m	+105.7
Construction	+\$142.6 m	+\$72.1 m	+\$59.4 m	+722.5
Manufacturing	+\$703.0 m	+\$219.1 m	+\$123.5 m	+1,555.8
Wholesale Trade	+\$171.4 m	+\$115.9 m	+\$66.9 m	+657.7
Retail Trade*	+\$916.0 m	+\$690.2 m	+\$401.8 m	+10,611.1
Transportation & Warehousing	+\$145.9 m	+\$96.1 m	+\$63.6 m	+750.6
Information	+\$124.5 m	+\$76.9 m	+\$32.8 m	+254.4
Financial Activities*	+\$924.5 m	+\$238.4 m	+\$86.3 m	+766.3
Business Services	+\$234.8 m	+\$146.4 m	+\$119.4 m	+1,259.8
Health Services	+\$204.9 m	+\$143.8 m	+\$121.6 m	+1,741.8
Other Services	+\$354.5 m	+\$184.6 m	+\$146.4 m	+2,844.3
<b>Total, All Industries</b>	<b>+\$4,463.1 m</b>	<b>+\$2,111.0 m</b>	<b>+\$1,285.7 m</b>	<b>+21,579.9</b>

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in millions of 2022 US dollars. A job-year is equivalent to one person working for one year.

Components may not sum due to rounding. Retail Trade includes Restaurants, Financial Activities includes Real Estate.

## The Estimated Cumulative (FY 2023-2031) Net Impact of Acute Cost Savings Associated with Maintaining a Viable Home Health and Hospice System on Business Activity in Texas

Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Job Years*
Agriculture	+\$1.6 m	+\$0.5 m	+\$0.3 m	+4.1
Mining	+\$3.2 m	+\$0.7 m	+\$0.4 m	+1.8
Utilities	+\$5.6 m	+\$1.2 m	+\$0.5 m	+2.0
Construction	+\$2.7 m	+\$1.4 m	+\$1.1 m	+13.8
Manufacturing	+\$13.4 m	+\$4.2 m	+\$2.4 m	+29.7
Wholesale Trade	+\$3.3 m	+\$2.2 m	+\$1.3 m	+12.6
Retail Trade*	+\$17.5 m	+\$13.2 m	+\$7.7 m	+202.7
Transportation & Warehousing	+\$2.8 m	+\$1.8 m	+\$1.2 m	+14.3
Information	+\$2.4 m	+\$1.5 m	+\$0.6 m	+4.9
Financial Activities*	+\$17.7 m	+\$4.6 m	+\$1.6 m	+14.6
Business Services	+\$4.5 m	+\$2.8 m	+\$2.3 m	+24.1
Health Services	+\$3.9 m	+\$2.7 m	+\$2.3 m	+33.3
Other Services	+\$6.8 m	+\$3.5 m	+\$2.8 m	+54.3
<b>Total, All Industries</b>	<b>+\$85.3 m</b>	<b>+\$40.3 m</b>	<b>+\$24.6 m</b>	<b>+412.3</b>

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in millions of 2022 US dollars. A job-year is equivalent to one person working for one year.

Components may not sum due to rounding. Retail Trade includes Restaurants, Financial Activities includes Real Estate.

**The Estimated Cumulative (FY 2023-2031) Total Net Impact Associated with Maintaining a Viable Home Health and Hospice System on Business Activity in Texas**  
Results by Industry

<b>Industry</b>	<b>Total Expenditures</b>	<b>Gross Product</b>	<b>Personal Income</b>	<b>Job Years*</b>
Agriculture	+\$86.4 m	+\$24.7 m	+\$16.2 m	+220.1
Mining	+\$168.4 m	+\$38.6 m	+\$19.9 m	+95.7
Utilities	+\$296.5 m	+\$66.5 m	+\$29.0 m	+107.8
Construction	+\$145.3 m	+\$73.5 m	+\$60.6 m	+736.4
Manufacturing	+\$716.4 m	+\$223.3 m	+\$125.8 m	+1,585.5
Wholesale Trade	+\$174.6 m	+\$118.2 m	+\$68.1 m	+670.2
Retail Trade*	+\$933.5 m	+\$703.4 m	+\$409.5 m	+10,813.9
Transportation & Warehousing	+\$148.6 m	+\$98.0 m	+\$64.8 m	+765.0
Information	+\$126.9 m	+\$78.4 m	+\$33.5 m	+259.3
Financial Activities*	+\$942.2 m	+\$242.9 m	+\$88.0 m	+780.9
Business Services	+\$239.3 m	+\$149.2 m	+\$121.7 m	+1,283.9
Health Services	+\$208.8 m	+\$146.6 m	+\$123.9 m	+1,775.0
Other Services	+\$361.3 m	+\$188.1 m	+\$149.2 m	+2,898.7
<b>Total, All Industries</b>	<b>+\$4,548.3 m</b>	<b>+\$2,151.3 m</b>	<b>+\$1,310.2 m</b>	<b>+21,992.2</b>

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in millions of 2022 US dollars. A job-year is equivalent to one person working for one year.

Components may not sum due to rounding. Retail Trade includes Restaurants, Financial Activities includes Real Estate.



**Potential Impact of Reductions in Potentially Preventable Incidents****The Estimated Cumulative (FY 2023-2031) Impact of a 10% Reduction in Potentially Preventable Hospital Admissions (PPA) Associated with the Population Served by the Home Health and Hospice System on Business Activity in Texas: Millions of 2022 Dollars**

Results by Industry

<b>Industry</b>	<b>Total Expenditures</b>	<b>Gross Product</b>	<b>Personal Income</b>	<b>Job Years*</b>
Agriculture	+\$1.2 m	+\$0.3 m	+\$0.2 m	+3.1
Mining	+\$2.3 m	+\$0.5 m	+\$0.3 m	+1.3
Utilities	+\$4.1 m	+\$0.9 m	+\$0.4 m	+1.5
Construction	+\$2.0 m	+\$1.0 m	+\$0.8 m	+10.2
Manufacturing	+\$9.9 m	+\$3.1 m	+\$1.7 m	+22.0
Wholesale Trade	+\$2.4 m	+\$1.6 m	+\$0.9 m	+9.3
Retail Trade*	+\$13.0 m	+\$9.8 m	+\$5.7 m	+150.0
Transportation & Warehousing	+\$2.1 m	+\$1.4 m	+\$0.9 m	+10.6
Information	+\$1.8 m	+\$1.1 m	+\$0.5 m	+3.6
Financial Activities*	+\$13.1 m	+\$3.4 m	+\$1.2 m	+10.8
Business Services	+\$3.3 m	+\$2.1 m	+\$1.7 m	+17.8
Health Services	+\$2.9 m	+\$2.0 m	+\$1.7 m	+24.6
Other Services	+\$5.0 m	+\$2.6 m	+\$2.1 m	+40.2
<b>Total, All Industries</b>	<b>+\$63.1 m</b>	<b>+\$29.8 m</b>	<b>+\$18.2 m</b>	<b>+305.1</b>

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in millions of 2022 US dollars. A job-year is equivalent to one person working for one year.

Components may not sum due to rounding. Retail Trade includes Restaurants, Financial Activities includes Real Estate.

**The Estimated Cumulative (FY 2023-2031) Impact of a 10% Reduction in Potentially Preventable Hospital Readmissions (PPR) Associated with the Population Served by the Home Health and Hospice System on Business Activity in Texas: Millions of 2022 Dollars**

Results by Industry

<b>Industry</b>	<b>Total Expenditures</b>	<b>Gross Product</b>	<b>Personal Income</b>	<b>Job Years*</b>
Agriculture	+\$0.8 m	+\$0.2 m	+\$0.1 m	+2.0
Mining	+\$1.5 m	+\$0.3 m	+\$0.2 m	+0.9
Utilities	+\$2.7 m	+\$0.6 m	+\$0.3 m	+1.0
Construction	+\$1.3 m	+\$0.7 m	+\$0.5 m	+6.6
Manufacturing	+\$6.4 m	+\$2.0 m	+\$1.1 m	+14.2
Wholesale Trade	+\$1.6 m	+\$1.1 m	+\$0.6 m	+6.0
Retail Trade*	+\$8.4 m	+\$6.3 m	+\$3.7 m	+96.9
Transportation & Warehousing	+\$1.3 m	+\$0.9 m	+\$0.6 m	+6.9
Information	+\$1.1 m	+\$0.7 m	+\$0.3 m	+2.3
Financial Activities*	+\$8.4 m	+\$2.2 m	+\$0.8 m	+7.0
Business Services	+\$2.1 m	+\$1.3 m	+\$1.1 m	+11.5
Health Services	+\$1.9 m	+\$1.3 m	+\$1.1 m	+15.9
Other Services	+\$3.2 m	+\$1.7 m	+\$1.3 m	+26.0
<b>Total, All Industries</b>	<b>+\$40.8 m</b>	<b>+\$19.3 m</b>	<b>+\$11.7 m</b>	<b>+197.1</b>

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in millions of 2022 US dollars. A job-year is equivalent to one person working for one year. Components may not sum due to rounding. Retail Trade includes Restaurants, Financial Activities includes Real Estate.

**The Estimated Cumulative (FY 2023-2031) Impact of a 10% Reduction in Potentially Preventable Emergency Department Visits Associated with the Population Served by the Home Health and Hospice System on Business Activity in Texas: Millions of 2022 Dollars**

Results by Industry

<b>Industry</b>	<b>Total Expenditures</b>	<b>Gross Product</b>	<b>Personal Income</b>	<b>Job Years*</b>
Agriculture	+\$0.7 m	+\$0.2 m	+\$0.1 m	+1.7
Mining	+\$1.3 m	+\$0.3 m	+\$0.2 m	+0.8
Utilities	+\$2.4 m	+\$0.5 m	+\$0.2 m	+0.9
Construction	+\$1.2 m	+\$0.6 m	+\$0.5 m	+5.8
Manufacturing	+\$5.7 m	+\$1.8 m	+\$1.0 m	+12.6
Wholesale Trade	+\$1.4 m	+\$0.9 m	+\$0.5 m	+5.3
Retail Trade*	+\$7.4 m	+\$5.6 m	+\$3.3 m	+85.8
Transportation & Warehousing	+\$1.2 m	+\$0.8 m	+\$0.5 m	+6.1
Information	+\$1.0 m	+\$0.6 m	+\$0.3 m	+2.1
Financial Activities*	+\$7.5 m	+\$1.9 m	+\$0.7 m	+6.2
Business Services	+\$1.9 m	+\$1.2 m	+\$1.0 m	+10.2
Health Services	+\$1.7 m	+\$1.2 m	+\$1.0 m	+14.1
Other Services	+\$2.9 m	+\$1.5 m	+\$1.2 m	+23.0
<b>Total, All Industries</b>	<b>+\$36.1 m</b>	<b>+\$17.1 m</b>	<b>+\$10.4 m</b>	<b>+174.6</b>

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in millions of 2022 US dollars. A job-year is equivalent to one person working for one year. Components may not sum due to rounding. Retail Trade includes Restaurants, Financial Activities includes Real Estate.

*Potential Impact of Reduced Caseloads*

**The Estimated Cumulative (FY 2023-2031) of Impact of Improved Health Outcomes Associated with Reduced Case Loads (from 11 to 9) Associated with Home Health and Hospice System on Business Activity in Texas: Millions of 2022 Dollars**

Results by Industry

<b>Industry</b>	<b>Total Expenditures</b>	<b>Gross Product</b>	<b>Personal Income</b>	<b>Job Years*</b>
Agriculture	+\$39.7 m	+\$11.4 m	+\$7.5 m	+101.2
Mining	+\$77.4 m	+\$17.7 m	+\$9.2 m	+44.0
Utilities	+\$136.3 m	+\$30.6 m	+\$13.3 m	+49.5
Construction	+\$66.8 m	+\$33.8 m	+\$27.8 m	+338.5
Manufacturing	+\$329.4 m	+\$102.7 m	+\$57.8 m	+728.9
Wholesale Trade	+\$80.3 m	+\$54.3 m	+\$31.3 m	+308.1
Retail Trade*	+\$429.1 m	+\$323.4 m	+\$188.2 m	+4,971.3
Transportation & Warehousing	+\$68.3 m	+\$45.0 m	+\$29.8 m	+351.7
Information	+\$58.4 m	+\$36.0 m	+\$15.4 m	+119.2
Financial Activities*	+\$433.1 m	+\$111.7 m	+\$40.5 m	+359.0
Business Services	+\$110.0 m	+\$68.6 m	+\$56.0 m	+590.2
Health Services	+\$96.0 m	+\$67.4 m	+\$57.0 m	+816.0
Other Services	+\$166.1 m	+\$86.5 m	+\$68.6 m	+1,332.6
<b>Total, All Industries</b>	<b>+\$2,091.0 m</b>	<b>+\$989.0 m</b>	<b>+\$602.3 m</b>	<b>+10,110.3</b>

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in millions of 2022 US dollars. A job-year is equivalent to one person working for one year.

Components may not sum due to rounding. Retail Trade includes Restaurants, Financial Activities includes Real Estate.