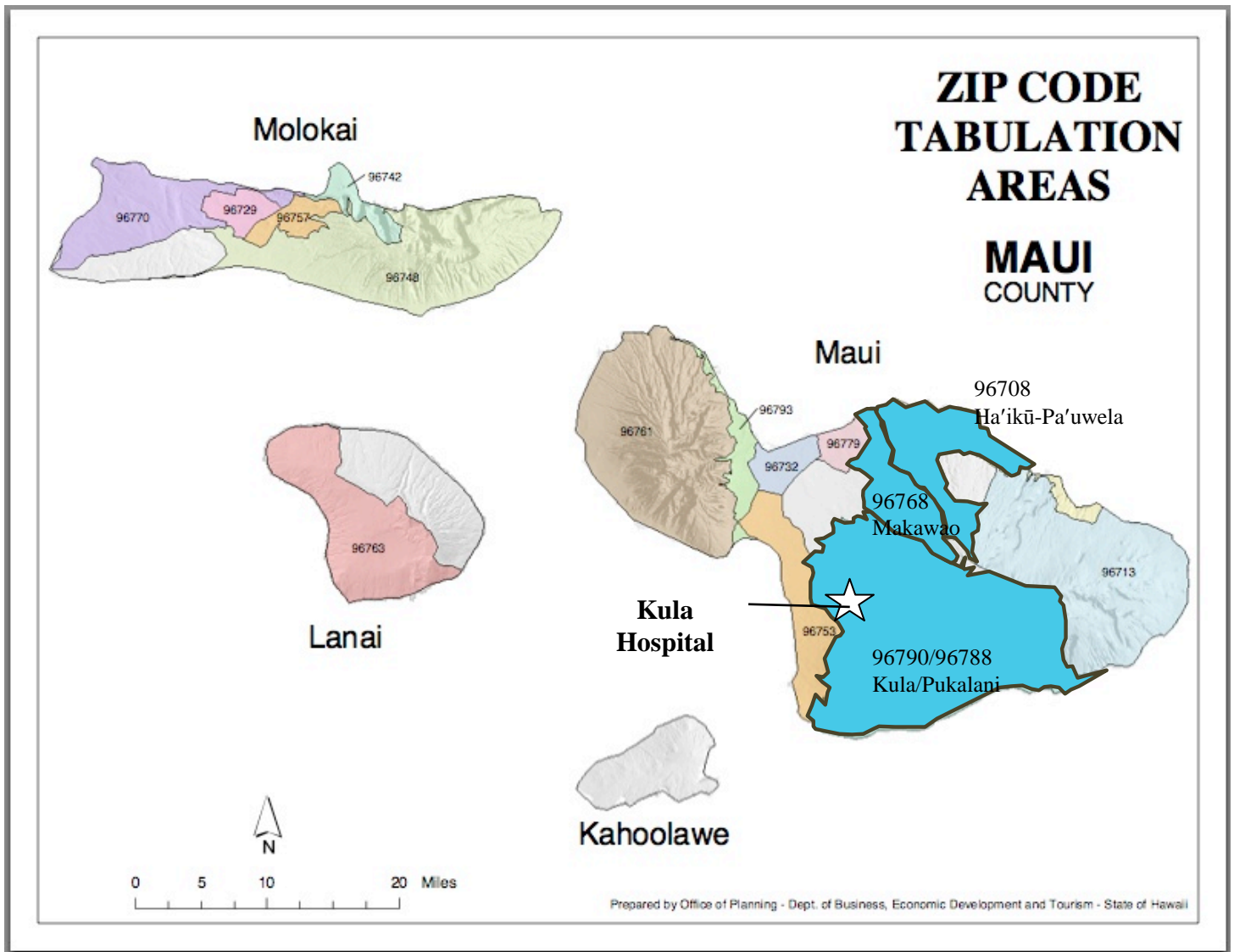


The Economic Impact of Kula Hospital in Maui County, Hawai'i



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January 2013

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Kula Hospital

and

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Medical facilities have a tremendous medical and economic impact on the community in which they are located. This is especially true with health care facilities, such as hospitals and nursing homes. These facilities not only employ a number of people and have a large payroll, but they also draw into the community a large number of people from rural areas that need medical services and may also attract visitors to the area through tourism activities. The overall objective of this study is to measure the economic impact of health services on the medical service area of Kula Hospital in Maui County, Hawai'i. The specific objectives of this report are to:

- 1.** Discuss the importance of health care services to rural development, including national health trend data;
- 2.** Identify the medical service area and review the demographic and economic data;
- 3.** Summarize the direct economic activities of the health services in the medical service area of Kula Hospital;
- 4.** Present concepts of community economics and multipliers; and
- 5.** Estimate the economic impact of the health services in the medical service area of Kula Hospital in Maui County, Hawai'i.

No recommendations will be made in this report.

Health Services and Rural Development

The relationship between health care services and rural development is often overlooked. At least three primary areas of commonality exist. A strong health care system can help attract and maintain business and industry growth, and attract and retain retirees. A strong health care system also creates jobs in the local area.

Services that Impact Rural Development

Type of Growth	Services Important to Attract Growth
Business and Industry	Health and Education
Retirees	Health and Safety

Studies have found that quality-of-life (QOL) factors are playing a dramatic role in business and industry location decisions. Among the most significant of the QOL variables are health care services, which are important for at least three reasons.

Business and Industry Growth

First, as noted by a member of the Board of Directors of a community economic development corporation, the presence of good health and education services is imperative to business and industrial leaders as they select a community for location. Employees and participating management may offer strong resistance if they are asked to move into a community with substandard or inconveniently located health services.

Secondly, when a business or industry makes a location decision, it wants to ensure that the local labor force will be productive and a key factor in productivity is good health. Thus, investments in health care services can be expected to yield dividends in the form of increased labor productivity.

The cost of health care services is the third factor that is considered by business and industry in development decisions. Research shows that corporations take a serious look at health care costs in determining site locations. Sites that provide health care services at a lower cost were given higher consideration for new industry than sites with much higher health care costs.

Health Services and Attracting Retirees

A strong and convenient health care system is important to retirees, a special group of residents whose spending and purchasing can be a significant source of income for the local economy. Many rural areas have environments that enable them to be in a good position to attract and retain retirees (e.g., moderate climate and outdoor activities). The amount of spending embodied in this population, including the purchasing power associated with Social Security, Medicare, and other transfer payments, is substantial. Additionally, middle and upper income retirees often have substantial net worth. Although the data are limited, several studies suggest health services may be a critical variable that influences the location decision of retirees. For example, one study found that four items were the best predictors of retirement locations: safety, recreational facilities, dwelling units, and health care. Another study found that nearly 60 percent of potential retirees said health services were in the “must have” category when considering a retirement community. Only protective services were mentioned more often than health services as a “must have” service.

Health Services and Job Growth

A factor important to the success of rural economic development is job creation. ***The health care sector is an extremely fast growing sector, and based on the current demographics, there is every reason to expect this trend to continue.*** Data in **Table 1** provide selected

expenditure and employment data for the United States. Several highlights from the national data are:

- In 1970, health care services as a share of the national gross domestic product (GDP) were 7.2 percent and increased to 17.9 percent in 2010;
- Per capita health expenditures have increased from \$356 in 1970 to \$8,402 in 2010, an increase of an average of 56.5 percent per year over the forty years from 1970 to 2010;
- Employment in the health sector increased 351.4 percent from 3.1 million employees in 1970 to 13.8 million employees in 2010; and
- Health care employment has increased an average of 2.7 percent per year from 2001 to 2010.

The U.S. Department of Health and Human Services, Centers for Medicare and Medicaid Services, project substantial increases in health care expenditures from 2015 through 2021.

Health care expenditures are projected to be 18.4 percent of GDP in 2017 and 19.6 percent of GDP in 2021. Per capita health care expenditures are projected to increase to \$11,360 in 2017 and to \$14,103 in 2021. Total health expenditures are projected to increase to nearly \$4.8 trillion in 2021.

Figure 1 illustrates 2010 health expenditures by percent of GDP and by type of health service. Health services represented 17.9 percent of national GDP in 2010. The largest category of health services was hospital care with 31.0 percent of the total and the second largest category was physician services with 26.0 percent of the total.

Table 1
United States Health Expenditures and Employment Data
1970-2010; Projected for 2015-2021

Year	Total Health Expenditures (\$Billions)	Per Capita Health Expenditures (\$)	Health as % of GDP (%)	Health Sector Employment (000)	Avg. Annual Increase in Employment (%)
1970	74.9	356	7.2%	3,052 ^a	
1980	255.8	1,110	9.2%	5,278 ^a	6.6%
1990	724.3	2,854	12.5%	7,814 ^a	4.4%
2000	1,377.2	4,878	13.8%	10,858 ^a	3.5%
2001	1,494.1	5,241	14.5%	11,118 ^b	
2003	1,774.3	6,114	15.9%	11,817 ^b	3.1%
2005	2,029.1	6,868	16.1%	12,314 ^b	2.1%
2007	2,297.1	7,628	16.4%	12,947 ^b	2.6%
2008	2,403.9	7,911	16.8%	13,290 ^b	2.6%
2009	2,495.8	8,149	17.9%	13,543 ^b	1.9%
2010	2,593.6	8,402	17.9%	13,777 ^b	1.7%
				Average Annual Increase 2001 to 2010	2.7%
Projections					
2015	3,307.6	10,272	18.2%		
2017	3,723.3	11,360	18.4%		
2019	4,207.3	12,618	18.9%		
2021	4,781.0	14,103	19.6%		

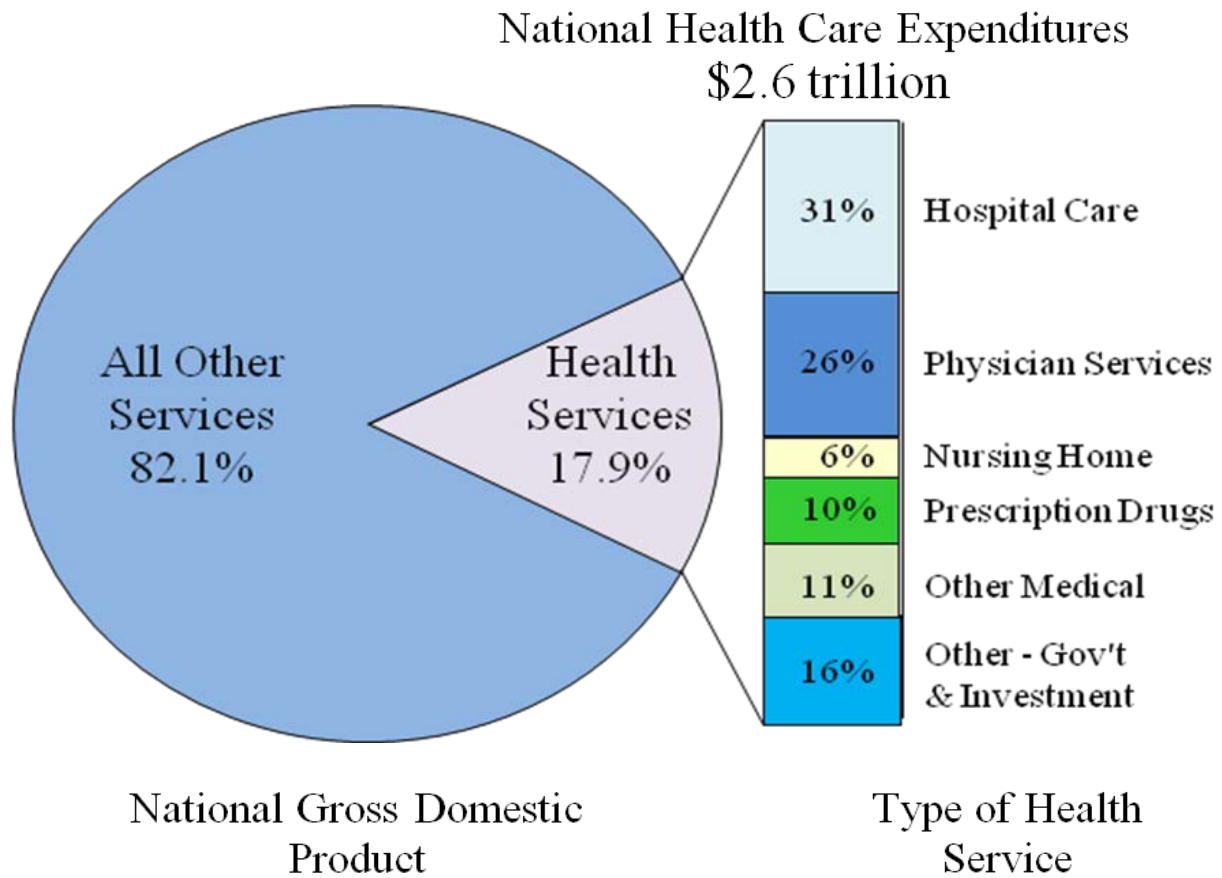
SOURCES: Bureau of Labor Statistics (www.bls.gov [December 2012]); U.S. Department of Health and Human Services, Centers for Medicare and Medicaid Services, National Health Expenditures 1960-2010 and National Health Expenditure Projections 2011-2021 (<http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsHistorical.html> [December 2012]).

N/A - Not Available.

^a Based on Standard Industrial Classification (SIC) codes for health sector employment.

^b Based on North American Industrial Classification System (NAICS) for health sector employment.

Figure 1.
National Health Expenditures
as a Percent of Gross Domestic Product
and by Health Service Type, 2010



Medical Service Area Demographic and Economic Data

Zip code tabulation area data will be utilized in the IMPLAN model to generate the multipliers that will be representative of the medical service area (MSA) of Kula Hospital. Zip code tabulation area data are presented in the next tables to show the population, population by race, and population by age. The MSA of Kula Hospital is located in Maui County on the island of Maui (**Figure 2**). The MSA of Kula Hospital includes the following zip codes and corresponding zip code areas:

<u>Zip Code</u>	<u>Zip Code Area</u>
96708	Ha'ikū-Pa'uwela
96768	Makawao
96790/96788	Kula/Pukalani

The 2000 and 2010 U. S. Census Bureau populations by zip code tabulation area for the MSA of Kula Hospital are illustrated in **Table 2**. The total population for the MSA was 31,162 in 2000 and 35,953 in 2010, representing an increase of 15.4 percent. The table also shows the population of Maui County and the State of Hawai'i for the census years, as well as projections from 2015 through 2035. Maui County increased from 2000 to 2010 by 20.9 percent and the state increased 12.3 percent. Maui County and the State of Hawai'i are projected to continue to increase in population through 2035.

Table 3 illustrates the race breakdowns for the MSA. According to the 2000 Census, the MSA had 47.3 percent of the population reported as "White," the largest race group. The second largest race group was "Other" with 26.8 percent; this group includes Asian Americans, Native Hawai'ians, Pacific Islanders, and all others. Persons of "Two or More Races" was the third largest race group and included another 25.1 percent of the population. The 2010 Census data show a slight decrease in the percent of "White" and "Other," while the percent of persons of two

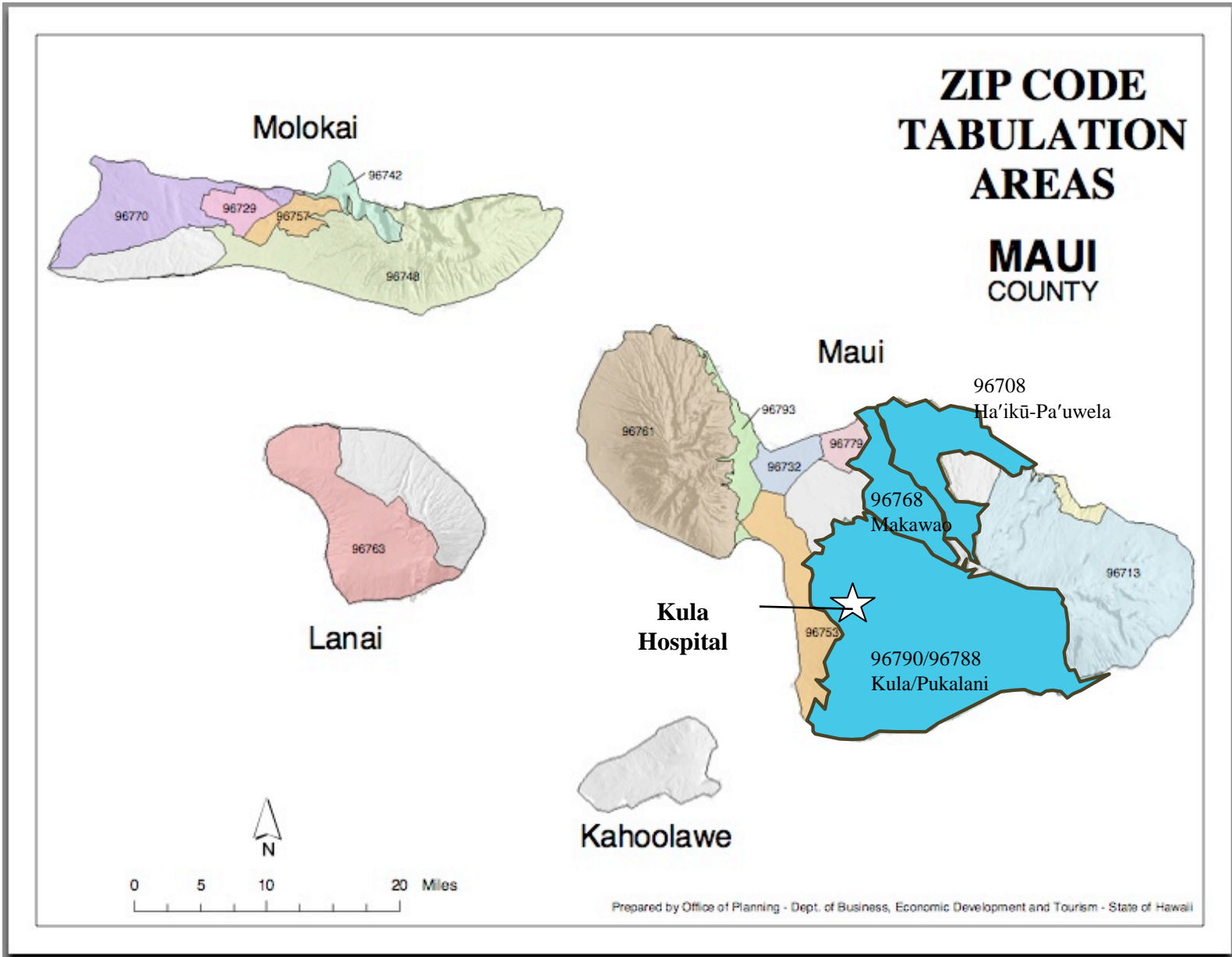


Figure 2
Medical Service Area by Zip Codes for Kula Hospital

Table 2
Population by Zip Code Tabulation Areas*
for the Medical Service Area (MSA) of Kula Hospital and
Population and Projections for Maui County and State of Hawai'i

Zip Code Tabulation Area Populations	2000 Census	2010 Census	% Change 2000 to 2010
96708 Ha'ikū-Pa'uwela	8,595	10,220	18.9%
96768 Makawao	15,877	17,668	11.3%
96790/96788 Kula/Pukalani	<u>6,690</u>	<u>8,065</u>	<u>20.6%</u>
Total Medical Service Area	<u>31,162</u>	<u>35,953</u>	<u>15.4%</u>
Maui County	128,094	154,834	20.9%
State of Hawai'i	1,211,537	1,360,301	12.3%
County and State Population Projections	Projections		% Change from 2010
Maui County			
2015	168,000		8.5%
2020	181,000		16.9%
2025	194,200		25.4%
2030	207,300		33.9%
2035	220,200		42.2%
State of Hawai'i			
2015	1,418,300		4.3%
2020	1,481,200		8.9%
2025	1,543,200		13.4%
2030	1,602,300		17.8%
2035	1,657,500		21.8%

SOURCE: Census populations, U. S. Census Bureau (www.census.gov [December 2012]); County and state projections, Hawai'i Department of Business, Economic Development, and Tourism (<http://www.hawaii.gov/dbedt/info/visitor-stats/> [December 2012]).

*ZIP Code Tabulation Areas (ZCTAs) are generalized area representations of United States Postal Service (USPS) zip code service areas.

Table 3
Population by Zip Code Tabulation Areas (ZCTAs)* for Race and Ethnic Groups
for the Medical Service Area (MSA) of Kula Hospital

Zip Code	Zip Code Area	White	Black	Native American ¹	Other ²	Two or more Races ³	Totals	Hispanic Origin ⁴
2000 Census								
96708	Ha'ikū- Pa'uwela	4,893	50	43	1,512	2,097	8,595	689
96768	Makawao	6,090	53	61	5,131	4,542	15,877	1,561
96790/96788	Kula/Pukalani	<u>3,759</u>	<u>15</u>	<u>30</u>	<u>1,694</u>	<u>1,192</u>	<u>6,690</u>	<u>358</u>
2000 Census Totals		<u>14,742</u>	<u>118</u>	<u>134</u>	<u>8,337</u>	<u>7,831</u>	<u>31,162</u>	<u>2,608</u>
2000 % of Total		<u>47.3%</u>	<u>0.4%</u>	<u>0.4%</u>	<u>26.8%</u>	<u>25.1%</u>	<u>100.0%</u>	<u>8.4%</u>
2010 Census								
96708	Ha'ikū- Pa'uwela	6,092	42	54	1,703	2,329	10,220	1,083
96768	Makawao	6,660	72	87	5,295	5,554	17,668	2,258
96790/96788	Kula/Pukalani	<u>4,066</u>	<u>44</u>	<u>32</u>	<u>1,976</u>	<u>1,947</u>	<u>8,065</u>	<u>646</u>
2010 Census Totals		<u>16,818</u>	<u>158</u>	<u>173</u>	<u>8,974</u>	<u>9,830</u>	<u>35,953</u>	<u>3,987</u>
2010 % of Total		<u>46.8%</u>	<u>0.4%</u>	<u>0.5%</u>	<u>25.0%</u>	<u>27.3%</u>	<u>100.0%</u>	<u>11.1%</u>
Percent Change from 2000 to 2010								
Percent Change		<u>14.1%</u>	<u>33.9%</u>	<u>29.1%</u>	<u>7.6%</u>	<u>25.5%</u>	<u>15.4%</u>	<u>52.9%</u>

SOURCE: 2000 and 2010 census populations by zip code tabulation areas, U. S. Census Bureau (www.census.gov [January 2013])

*Zip Code Tabulation Areas (ZCTAs) are generalized area representations of United States Postal Service (USPS) zip code service areas.

¹ Native American includes American Indians and Alaska Natives.

² Other is defined as Asian Americans, Native Hawai'ians, Pacific Islanders and all others.

³ Two or more races indicates a person is included in more than one race group; it was introduced as a new category in the 2000 Census.

⁴ Hispanic population is not a race but rather a description of ethnic origin; Hispanics are included in the five race groups.

NA = Not Available.

or more races increased. The persons of Hispanic origin represented 8.4 percent of the 2000 population and increased to 11.1 percent in 2010. Comparing the 2000 and 2010 Census data, the group with the largest percent increase was the “Hispanic origin,” increasing 52.9 percent; the “Black” race group had the second largest growth with 33.9 percent and the Native American was the third largest percent increase with 29.1 percent.

Table 4 illustrates the age breakdowns for each of the zip code tabulation areas and for the total MSA. When comparing the 2000 and 2010 Census data, the age groups that increased from 2000 to 2010 included the age 65 and older increasing from 9.4 percent of the total population to 11.6 percent; the age 45-64 age group increasing from 27.0 percent to 33.1 percent, and the age 20-24 age group increasing from 4.6 percent to 5.0 percent of the total population. The age groups with the largest percent change from 2000 to 2010 were the age 65 and older group with 43.0 percent, age 45-64 age group with 41.3 percent and the age 20-24 age group with 25.6 percent.

Table 4
Population by Zip Code Tabulation Areas (ZCTAs)* for Age Groups
for the Medical Service Area (MSA) of Kula Hospital

Zip Code	Zip Code Area	Age Groups						Totals
		0-14	15-19	20-24	25-44	45-64	65+	
2000 Census								
96708	Ha'ikū-Pa'uwela	1,853	542	453	2,920	2,252	575	8,595
96768	Makawao	3,580	1,262	792	4,817	3,973	1,453	15,877
96790/96788	Kula/Pukalani	<u>1,209</u>	<u>429</u>	<u>186</u>	<u>1,791</u>	<u>2,186</u>	<u>889</u>	<u>6,690</u>
2000 Census Totals		<u>6,642</u>	<u>2,233</u>	<u>1,431</u>	<u>9,528</u>	<u>8,411</u>	<u>2,917</u>	<u>31,162</u>
2000 % of Total		<u>21.3%</u>	<u>7.2%</u>	<u>4.6%</u>	<u>30.6%</u>	<u>27.0%</u>	<u>9.4%</u>	<u>100.0%</u>
2010 Census								
96708	Ha'ikū-Pa'uwela	1,893	570	505	2,840	3,460	952	10,220
96768	Makawao	3,384	1,186	985	4,591	5,428	2,094	17,668
96790/96788	Kula/Pukalani	<u>1,394</u>	<u>471</u>	<u>307</u>	<u>1,769</u>	<u>2,998</u>	<u>1,126</u>	<u>8,065</u>
2010 Census Totals		<u>6,671</u>	<u>2,227</u>	<u>1,797</u>	<u>9,200</u>	<u>11,886</u>	<u>4,172</u>	<u>35,953</u>
2010 % of Total		<u>18.6%</u>	<u>6.2%</u>	<u>5.0%</u>	<u>25.6%</u>	<u>33.1%</u>	<u>11.6%</u>	<u>100.0%</u>
Percent Change from 2000 to 2010								
Percent Change		<u>0.4%</u>	<u>-0.3%</u>	<u>25.6%</u>	<u>-3.4%</u>	<u>41.3%</u>	<u>43.0%</u>	<u>15.4%</u>

SOURCE: 2000 and 2010 census populations by zip code tabulation areas, U. S. Census Bureau (www.census.gov [December [2012]])
 *Zip Code Tabulation Areas (ZCTAs) are generalized area representations of United States Postal Service (USPS) zip code service areas.

The Direct Economic Activities

The economic impact of Kula Hospital on the MSA economy is measured by employment, payroll, and construction activities. Kula Hospital provided the direct economic activity data presented in **Table 5**. For 2012, the total full-time, part-time, and contract employment was 217 with wages, salaries, and benefits and contract labor costs of \$17.0 million. Wages, salaries, and benefits and contract labor costs (and/or proprietor income, when applicable) will be referred to as “income” throughout the rest of the study.

Kula Hospital had construction activities of \$1.9 million in 2011, \$1.0 million in 2012, and \$4.4 million in 2013. Based on the 2012 construction activity of \$1.0 million, IMPLAN data were utilized to estimate the construction employment and construction income. Employment was estimated to be eight construction employees with construction income of \$476,032. The average annual salary from construction activities is estimated at \$59,504. These data reflect the direct economic activities of Kula Hospital.

Many rural communities have a large number of elderly, and the ranchers and farmers often retire in the towns. Thus, hospital facilities are an important component of the health sector. In summary, Kula Hospital is vitally important as a community employer and important to the community's economy. The hospital employs a large number of residents. The hospital and the employees in the hospital purchase a large amount of goods and services from businesses in the MSA. These impacts are referred to as secondary impacts or benefits to the economy. Before the secondary impacts of the hospital are discussed, basic concepts of community economics will be discussed.

Table 5
Direct Economic Activities
of Kula Hospital, Maui County, Hawai'i

Operations	
2012 Operations Employment (Full- and part-time & Contract)	217
2012 Income (Wages, Salaries, & Benefits/Contract Labor)	\$17,011,908
Construction	
2011	\$1,864,884
2012	\$1,000,730
2013	\$4,430,400
Estimated 2012 Construction Employment	8
Estimate 2012 Construction Income	\$476,032

SOURCE: Local operations employment and income data and construction data provided by Kula Hospital.

Some Basic Concepts of Community Economics and Income and Employment Multipliers

Figure 3 illustrates the major flow of goods, services, and dollars of any economy. The foundation of a community's economy are those businesses which sell some or all of their goods and services to buyers outside of the community. Such a business is a basic industry. The flow of products out of, and dollars into, a community are represented by the two arrows in the upper right portion of **Figure 3**. To produce these goods and services for "export" outside the community, the basic industry purchases inputs from outside of the community (upper left portion of **Figure 3**), labor from the residents or "households" of the community (left side of **Figure 3**), and inputs from service industries located within the community (right side of **Figure 3**). The flow of labor, goods, and services in the community is completed by households using their earnings to purchase goods and services from the community's service industries (bottom of **Figure 3**). The interrelationships shown in **Figure 3** illustrate that a change in any one segment of a community's economy will have reverberations throughout the entire economic system of the community.

Consider, for instance, the closing of a hospital. The services section will no longer pay employees and dollars going to households will stop. Likewise, the hospital will not purchase goods from other businesses and dollar flow to other businesses will stop. This decreases income in the "households" segment of the economy. Since earnings would decrease, households decrease their purchases of goods and services from businesses within the "services" segment of the economy. This, in turn, decreases these businesses' purchases of labor and inputs. Thus, the change in the economic base works its way throughout the entire local economy.

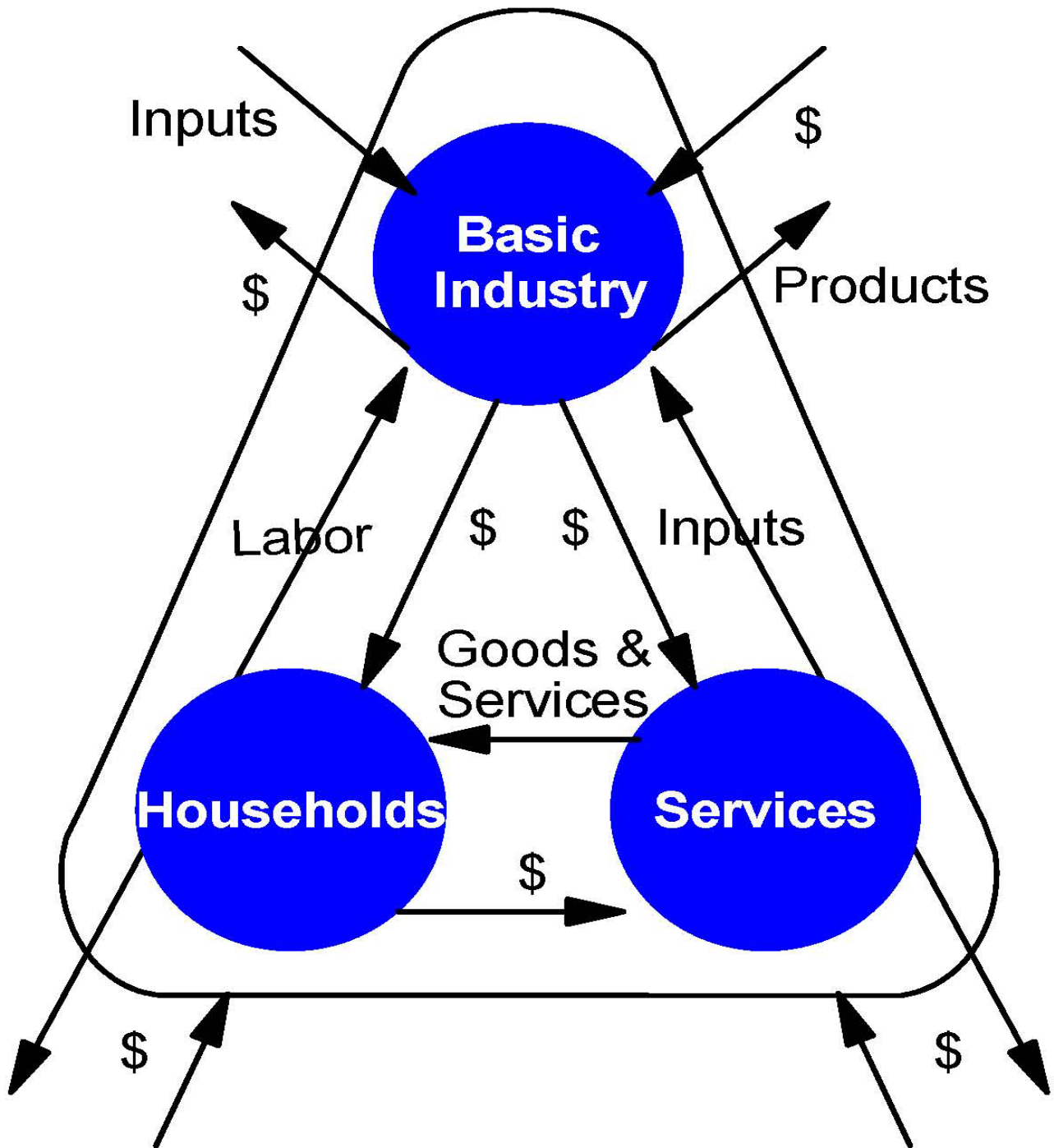


Figure 3.
Community Economic System

The total impact of a change in the economy consists of direct, indirect, and induced impacts. Direct impacts are the changes in the activities of the impacting industry, such as the closing of a hospital. The impacting business, such as the hospital, changes its purchases of inputs as a result of the direct impact. This produces an indirect impact in the business sectors. Both the direct and indirect impacts change the flow of dollars to the community's households. The households alter their consumption accordingly. The effect of this change in household consumption upon businesses in a community is referred to as an induced impact.

A measure is needed that yields the effects created by an increase or decrease in economic activity. In economics, this measure is called the multiplier effect. Multipliers are used in this report. An employment multiplier is defined as:

the ratio between direct employment, or that employment used by the industry initially experiencing a change in final demand and the direct, indirect, and induced employment.

An employment multiplier of 3.0 indicates that if one job is created by a new industry, 2.0 jobs are created in other sectors due to business (indirect) and household (induced) spending.

Secondary Impacts of Kula Hospital

Employment and income multipliers for the area have been calculated using the IMPLAN model. The model was developed by the U.S. Forest Service and allows for development of zip code area multipliers. **Appendix A** includes additional information on the model and the IMPLAN data.

Kula Hospital creates employment through operations and construction activities. The employment multiplier for the hospital operations component is 1.39 (**Table 6**). This indicates that for each job created in that sector, a 0.39 job is created throughout the area due to business (indirect) and household (induced) spending. Applying the employment multiplier to the hospital employment of 217 yields an estimate of the hospital’s employment impact on the MSA (**Table 6**). ***Kula Hospital has a total employment impact of 302 employees from operations in 2012*** ($217 \times 1.39 = 302$). The secondary impact of Kula Hospital is 85 employees ($217 \times 0.39 = 85$); these are the jobs created in other industry sectors in the economy of the MSA as a result of the spending of Kula Hospital and the spending of the hospital employees.

Table 6
Total Employment Impact
of Kula Hospital in Maui County, Hawai’i

Health Care Component	Number of Employees	Employment Multiplier	Secondary Employment Impact	Total Employment Impact
From Operations	217	1.39	85	302
From Construction	<u>8</u>	1.35	<u>3</u>	<u>11</u>
Totals	<u>225</u>		<u>88</u>	<u>313</u>

SOURCE: Local employment data and construction data provided by Kula Hospital; employment multipliers from IMPLAN and construction employment derived from IMPLAN data, Minnesota IMPLAN Group, Inc.

The 2012 construction activities resulted in an estimated 8 jobs. These construction jobs worked directly on hospital construction activities. These construction companies and construction workers also have secondary impacts that are measured by multipliers. The construction employment multiplier for the MSA is 1.35. Thus, three secondary jobs are created in other businesses due to construction activities of Kula Hospital. ***Total jobs created by hospital construction activities are eleven. In 2012, combined operations and construction activities of Kula Hospital generated 313 jobs in the MSA economy.***

Data on the income impact of Kula Hospital are presented in **Table 7**. Kula Hospital reported income from operations of \$17.0 million in 2012. Using the hospital income multiplier of 1.22, Kula Hospital generated secondary income in other businesses of \$3.7 million. ***In 2012, the total income impact of Kula Hospital from operations was \$20.8 million on the economy of the medical service area.***

Income generated directly by construction workers engaged in hospital construction activities is estimated at \$476,032. Applying the construction income multiplier of 1.23, hospital construction activities were estimated to generate \$109,487 in income in other businesses. ***In 2012, Kula Hospital generated a total income impact from hospital construction activities of \$585,519 in the MSA economy. In 2012, combined operations and construction activities of Kula Hospital generated \$21.3 million in income impact on the MSA economy.***

Table 7
Total Income Impact
of Kula Hospital in Maui County, Hawai'i

Health Care Component	Direct Income	Income Multiplier	Secondary Income Impact	Total Income Impact
From Operations	\$17,011,908	1.22	\$3,742,620	\$20,754,528
From Construction	<u>\$476,032</u>	1.23	<u>\$109,487</u>	<u>\$585,519</u>
Totals	<u>\$17,487,940</u>		<u>\$3,852,107</u>	<u>\$21,340,047</u>

SOURCE: Local income data and construction data from Kula Hospital; income multipliers from IMPLAN and construction income derived from IMPLAN data, Minnesota IMPLAN Group, Inc.

Summary

Kula Hospital has significant impacts on the economy of the zip code medical service area in Maui County, Hawai'i. From operations, Kula Hospital employs 217 full- and part-time and contract employees and generates \$17.0 million in wages, salaries, benefits, and contract labor costs (income). When the secondary benefits are included, the total employment impact is 302 jobs and the total income impact is \$20.8 million. These economic impacts are critical to the economy of the medical service area. The employment and income impacts from operating activities are annual and will continue each and every year that Kula Hospital remains in operation in the future. These are long term economic benefits to the local economy.

The construction activities of Kula Hospital vary year to year but also have significant impacts on the economy of the medical service area. During 2012, Kula Hospital had construction of \$1.0 million, resulting in eight construction employees with income of \$0.5 million. The total impact of construction for 2012 was 11 employees and \$0.6 million in income. Construction activities only occur during the year of construction.

The fact that Kula Hospital provides quality care with outstanding technology enhances the opportunity to attract new business and industry to the local economy. This could, in turn, result in new jobs and new families moving into the area. Also, research clearly states that retirees are attracted to communities with quality health care services. All of these factors illustrate that Kula Hospital is critically important to the economic growth of the medical service area. Given this, not only do health care services contribute to the health and wellness of the residents but, also, to the overall strength of the economy of the medical service area.

APPENDIX A

**IMPLAN Software and Data
from Minnesota IMPLAN Group, Inc. (MIG):**

**Model and Data Used
to Derive Multipliers**

**IMPLAN Software and Data from Minnesota IMPLAN Group, Inc. (MIG):
Model and Data Used to Derive Multipliers**

A Review of Input-Output Analysis

Input-output (I/O) (Miernyk, 1965) was designed to analyze the transactions among the industries in an economy. These models are largely based on the work of Wassily Leontief (1936). Detailed I/O analysis captures the indirect and induced interrelated circular behavior of the economy. For example, an increase in the demand for health services requires more equipment, more labor, and more supplies, which, in turn, requires more labor to produce the supplies, etc. By simultaneously accounting for structural interaction between sectors and industries, I/O analysis gives expression to the general economic equilibrium system. The analysis utilizes assumptions based on linear and fixed coefficients and limited substitutions among inputs and outputs. The analysis also assumes that average and marginal I/O coefficients are equal.

Nonetheless, the framework has been widely accepted and used. I/O analysis is useful when carefully executed and interpreted in defining the structure of an area, the interdependencies among industries, and forecasting economic outcomes.

The I/O model coefficients describe the structural interdependence of an economy. From the coefficients, various predictive devices can be computed, which can be useful in analyzing economic changes in a state, an area or a county. Multipliers indicate the relationship between some observed change in the economy and the total change in economic activity created throughout the economy.

The basis of IMPLAN was developed by the U. S. Forest Service to construct input/output accounts and models. The complexity of this type of modeling had hindered

practitioners from constructing models specific to a community requesting an analysis. The University of Minnesota utilized the U.S. Forest Service model to further develop the methodology and expand the data sources to form the model known as IMPLAN. The founders of IMPLAN, Scott Lindall and Doug Olson, joined the University of Minnesota in 1984 and, as an outgrowth of their work with the University of Minnesota, entered into a technology transfer agreement with the University of Minnesota that allowed them to form Minnesota IMPLAN Group, Inc. (MIG).

Minnesota IMPLAN Group, Inc. (MIG) – IMPLAN Software and Data

At first, MIG focused on database development and provided data that could be used in the Forest Service version of the software. In 1995, MIG took on the task of writing a new version of the IMPLAN software from scratch that extended the previous Forest Service version by creating an entirely new modeling system – an extension of input-output accounts and resulting Social Accounting Matrices (SAM) multipliers. Version 2 of the new IMPLAN software became available in May of 1999. MIG has continued to develop the software and now has available IMPLAN Version 3 Software System, the new economic impact assessment software system.

With IMPLAN Version 3 software, MIG changed the packaging of products. Versions 3 utilizes 2007 or later data. When data are ordered, the data cost plus shipping are your only costs. Version 3.0 software and the new IMPLAN appliance are included in the cost of the data. There are no additional fees to upgrade to IMPLAN Version 3.0. Data files are licensed to an individual user. Version 2 is no longer compatible with 2008 and later data sets.

Version 3 allows the user to do much more detailed analyses. Users can continued to create detailed economic impact estimates. Version 3.0 takes the analysis further, providing a new method

for estimating regional imports and exports is being implemented - a trade model. IMPLAN can construct a model for any state, region, area, county, or zip code area in the United States by using available national, state, county, and zip code level data. Impact analysis can be performed once a regional input/output model is constructed.

For more information about Minnesota IMPLAN Group, Inc., contact MIG by phone at 651-439-4421, by email at info@implan.com, or review their website at www.implan.com.

IMPLAN Multipliers

Five different sets of multipliers are estimated by IMPLAN, corresponding to five measures of regional economic activity. These are: total industry output, personal income, total income, value added, and employment. Two types of multipliers are generated. Type I multipliers measure the impact in terms of direct and indirect effects. Direct impacts are the changes in the activities of the focus industry or firm, such as the closing of a hospital. The focus business changes its purchases of inputs as a result of the direct impacts. This produces indirect impacts in other business sectors. However, the total impact of a change in the economy consists of direct, indirect, and induced changes. Both the direct and indirect impacts change the flow of dollars to the households. Subsequently, the households alter their consumption accordingly. The effect of the changes in household consumption on businesses in a community is referred to as an induced effect. To measure the total impact, a Type II (or Type SAM) multiplier is used. The Type II multiplier compares direct, indirect, and induced effects with the direct effects generated by a change in final demand (the sum of direct, indirect, and induced divided by direct).

References

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