

June 2017

Employment and Wage Earnings in Licensed Marijuana Businesses

Revised June 29, 2017 for technical corrections

In November 2012, Washington State voters passed Initiative 502 (I-502) which legalized recreational marijuana sales to adults and mandated the Washington State Liquor and Cannabis Board (LCB) to oversee the recreational market.¹ The initiative also directed the Washington State Institute for Public Policy (WSIPP) to evaluate the impact of the law on Washington's population and economy. WSIPP is required to produce reports for the legislature in 2015, 2017, 2022, and 2032. The next required report, due September 1, 2017, will contain the preliminary results of outcome analyses.

In April 2017, WSIPP's Board of Directors approved a contract between WSIPP, the LCB, and the Washington State Employment Security Department (ESD) to complete an analysis of employment in state-licensed marijuana businesses. This supplemental report, produced in advance of the required 2017 report, describes employment in Washington State businesses that have been issued marijuana licenses.

This report is organized as follows: [Section I](#) provides background information on licensed marijuana businesses, [Section II](#) describes our methodology, [Section III](#) presents our findings, and [Section IV](#) notes limitations of this report.

¹ Initiative Measure No. 502; Full text available at <http://apps.leg.wa.gov/documents/billdocs/2011-12/Pdf/Initiatives/Initiatives/INITIATIVE%20502.pdf>.

Summary

The Washington State Institute for Public Policy is directed to conduct an evaluation and benefit-cost analysis of the implementation of I-502, which legalizes recreational marijuana use for adults within the state. As a supplemental step, we analyzed employment and wage data for employees in marijuana businesses.

We used data from The Washington State Liquor and Cannabis Board (LCB) combined with Unemployment Insurance (UI) wage data from the Washington State Employment Security Department (ESD) to analyze employment in Washington State businesses that have been issued marijuana licenses.

Findings. Overall, 53% of licensed marijuana businesses reported paying UI-covered wages in at least one calendar quarter between 2014 and 2016. Over that period, licensed marijuana businesses reported employing an increase in employees equivalent to 6,049 full-time (FTE) positions and paid total wages of \$286.1 million in inflation-adjusted dollars.

There has been considerable growth in employment and wages for licensed marijuana businesses over this period, with nearly 20% of total wages paid in the three years since market inception falling in the last quarter of 2016. The median hourly wage in Q4 2016 was \$13.44.

Employment and wages vary by the type of licensed marijuana business, the size of the business, and by county within Washington State.

There are several limitations to this report, and figures should be interpreted with care. We have taken a conservative approach to estimation wherever possible.

I. Background

Initiative 502 was passed on November 6, 2012, and took effect on December 6, 2012. The initiative directed the LCB to develop rules to regulate the new legal marijuana supply system. In October 2013, the LCB adopted the first set of rules regarding licenses for different types of businesses in the legal system, the application process, requirements, and reporting. These rules capped the number of retail licenses for the state at 334, with specific allotments for each city and county based on estimates of cannabis demand. Producer and processor licenses were not similarly apportioned—the LCB determined that the market would drive the number of non-retail licensees.

Initial license applications were accepted from November to December 2013. The first producer and processor licenses were issued in March 2014. The first non-medical marijuana retail store opened on July 8, 2014.

The 2015 Legislature passed legislation to regulate medical cannabis through the newly established non-medical cannabis regulatory structure. Subsequent rulemaking added 222 retail licenses to the statewide cap, for a total of 556 possible licensed retailers. Given the number of licensed producers who were still engaged in the licensing process, the LCB determined that there was no need for additional plant canopy. LCB opened a new application window for retailers from October 2015 to March 2016 and issued the first licenses in December 2015. Unlicensed dispensaries had to close by July 1, 2016.

License types and tribal compacts

This report focuses on four types of marijuana business licenses offered by the LCB.²

Producer licenses permit businesses to “produce, harvest, trim, dry, cure, and package marijuana into lots for sale at wholesale to marijuana processor licensees and to other marijuana producer licensees.”³

Processor licenses permit businesses to “process, dry, cure, package, and label usable marijuana, marijuana concentrates, and marijuana-infused products for sale at wholesale to marijuana processors and marijuana retailers.”⁴

Retailer licenses permit businesses to “sell only usable marijuana, marijuana concentrates, marijuana-infused products, and marijuana paraphernalia at retail in retail outlets to persons twenty-one years of age and older.”⁵ Retail licensees may also obtain a medical marijuana endorsement which allows them to sell Department of Health (DOH)-compliant products to qualifying patients and designated providers.⁶ Note that retail licenses may not

² The LCB also offers cooperative registrations and research licenses, neither of which employs people by definition. They are not considered further in this report. Cooperative registrations permit marijuana cooperatives, which replaced collective gardens. Marijuana cooperatives allow up to four qualifying patients to grow marijuana when they do not live within one mile of a marijuana retailer. Research licenses permit licensees to produce, process, or possess marijuana to conduct scientific research on marijuana and marijuana-derived products.

³ WAC 314-55-075.

⁴ WAC 314-55-077.

⁵ WAC 314-55-079.

⁶ WAC 246-70. Endorsements were not effective until July 1, 2016. Businesses with the added medical marijuana

be held in combination with any other type of marijuana license.

Transportation licenses permit businesses to transport marijuana from one licensee to another. Transport licensees are not permitted to maintain a marijuana inventory and must complete all deliveries within 48 hours. A transportation licensee may not produce, process, or sell marijuana.

A business may hold multiple marijuana licenses, subject to certain restrictions. Specifically, at any point in time a business may hold:

- up to three retail licenses;⁷ or
- up to three processor licenses,⁸ alone or in combination with a producer license.⁹

Note that “a currently licensed marijuana producer may submit an application to add a marijuana processor license at the location of their producer license providing they do not already hold three processor licenses.”¹⁰ These licenses are listed as producer/processor in the data provided by the LCB.

Marijuana licenses are associated with a physical location. In order for a licensed marijuana business to move to another physical location, that business must apply

endorsement must meet additional requirements set by DOH. See 2SSB 5052. Sec. 10 & Sec. 17.

⁷ WAC 314-55-081 (3).

⁸ WAC 314-55-077 (14).

⁹ WAC 314-55-077 (13). WAC 314-55-075 states “any entity and/or principals within any entity are limited to no more than three marijuana producer licenses.” However, interim Policy BIP-02-2014 limited “any entity and/or principals within any entity to one marijuana producer license”.

¹⁰ WAC 314-55-077(13).

for a marijuana license of the appropriate type for the new location.¹¹

Washington State also held separate tribal compacts in lieu of licensure in 2016. The tribal compacts govern the production, processing, purchase, and sale of marijuana on the Tribe’s land, while recognizing the sovereignty of the Tribes. The LCB has completed negotiations with four Tribes and is in the negotiation process with several others. For ease, we refer to tribal compacts as “licensed businesses” throughout this report.

Licensed marijuana businesses

As of April 11, 2017, the date data were extracted to conduct this analysis, a total of 2,020 licenses have been issued to 1,703 unique businesses (summarized in [Exhibit 1](#) below).

Exhibit 1

Number of Marijuana Licenses Ever Issued to Businesses (as of April 11, 2017)

License type	Licenses	Businesses
Total	2,020	1,703
Producer/processor*	1,438	1,268
Retail	572	425
Transportation	7	7
Tribal compacts	3	3

Note:

*Includes 1) businesses that held a producer only license, 2) businesses that held a processing only license, 3) businesses that held a producer and processor license for operations in separate physical locations, and 4) businesses that held a dual producer/processor license for operations that take place at the same physical location. Grouping all businesses with a producer and/or processor license together allows us to present more granular information throughout the report.

¹¹ WAC 315-55-125.

II. Research Methods

This report is designed to provide descriptive information only. It is not designed to answer questions about the net effect of legal marijuana on jobs or on the Washington State economy as a whole. We limit our analysis to those businesses that have received a marijuana license and describe their employment and wages paid over time.

In particular, we examine how large these businesses are, how many jobs they have created,¹² how many employees they have, and how much these employees are paid. We also explore the above separately for each type of licensed marijuana business and each county, to the extent we can do so while protecting the privacy of individuals and businesses.

To answer these questions, we use data from the LCB to identify all businesses that have been issued a marijuana license, which type of license(s) they have been issued, and the physical location associated with each license. These data are combined with ESD Unemployment Insurance (UI)¹³ wage data covering the period between January 1, 2011 and December 31, 2016.¹⁴

¹² Note that job creation is limited to the job growth within these businesses. It does not necessarily reflect net job creation within the economy, which is beyond the scope of this report.

¹³ ESD does not certify the accuracy of the data.

¹⁴ The Unified Business Identifier (UBI) number, reported in both LCB and ESD UI data, was used to match employees to businesses.

The resulting combined data set allows us to identify, by calendar quarter:

- The number of businesses that reported UI-covered employees and wages;
- What type of license(s) each business had;
- The location of each business;
- The number of people each business employed;
- The number of hours each individual worked; and
- The total quarterly wages that each business reported paying each employee.

Scope of analysis

We describe the reported employment-related activity for all businesses that have had a marijuana license at any point in time. Our primary period of analysis is the period in which these businesses could have had a marijuana license—January 1, 2014 through December 31, 2016, which is the most current data available. In order to give our best approximation of the current state of employment-related activity for marijuana-licensed businesses, we provide detailed descriptions of employment and wages for these businesses in the final quarter of 2016.

To capture changes in employment that take place since licenses were first issued, we compare total reported activity in the last quarter of 2013—the quarter before the

first marijuana licenses were issued—to the last quarter of 2016.¹⁵

In addition, some licensed marijuana businesses may have been active¹⁶ before they received a marijuana license—for example a producer may have been growing another crop prior to entering the marijuana market. For comparison purposes, we describe the employment-related activity of these businesses for calendar years 2011-2013.

All businesses that have employees are required to report wage information to ESD under the UI program. However, there are a few exceptions. Notably, small-farm operators with a quarterly payroll of less than \$20,000 and fewer than ten employees do not report their spouse, children under 18, or student workers; business owners do not report themselves; and sole proprietors do not report themselves, their spouses, or their unmarried children under 18. In addition, certain types of employees may not be eligible for unemployment benefits, and therefore may not be reported—including independent contractors, self-employed individuals, and certain commissioned salespeople.¹⁷ Data on these types of businesses and individuals are not captured in this descriptive analysis.

¹⁵ It was not possible to limit our analysis to the reported activity for each business based on the quarter in which they received a marijuana license due to data quality limitations.

¹⁶ A business is considered “active” if it reported paying any employees any wages in a calendar quarter.

¹⁷ “Unemployment Insurance Tax Information: A handbook for Washington state employers,” October 2014, Employment Security Department. <https://www.esd.wa.gov/employer-taxes#reporting>. This is not an exhaustive list of exemptions. Additional information regarding the Unemployment Insurance program in Washington State is available from ESD.

Our report is based on businesses that have received at least one marijuana license. Some of these businesses have multiple physical locations, and some of these businesses may also conduct activities that are not related to legal recreational marijuana. We include all reported employees for these businesses, regardless of where the employees work or what they do.

Because our report is limited to licensed marijuana businesses and their reported employees, our data and analysis exclude secondary and/or ancillary industries;¹⁸ wages earned in the black market or under-the-table; and other unreported activities.

This report does not establish a cause-and-effect relationship between the legal marijuana industry and employment or wages. Rather, the data we present describes the reported employment-related activity of businesses that have received a marijuana license and provides contextual information on the employment-related activity of those businesses before it was possible for them to have received a marijuana license. Further, this analysis does not inform us about *if* or *how* the legal marijuana industry has affected the overall state economy.

Wages have been adjusted for inflation to 2016 dollars based on the U.S. Implicit Price Deflator for Personal Consumption Expenditures.¹⁹ For reference, wages are presented in nominal dollars in the appendix.

¹⁸ This includes, but is not limited to, security, consulting, legal, and other contracted activities.

¹⁹ U.S. Bureau of Economic Analysis, Personal consumption expenditures (implicit price deflator) [DPCERD3A086NBEA], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/DPCERD3A086NBEA>, June 14, 2017.

Geographical definition

For the county-level descriptions, we assign business location based on their physical address in LCB data in the final quarter of 2016. Businesses with licensed operations²⁰ in multiple counties are discussed separately. These businesses account for 7.5% of active marijuana businesses in Q4 2016. We do not allocate the wages or employees between the affected counties, as we do not have a satisfactory empirical basis on which to do so. Thus the actual wages and employment in a given county may be higher than the figures reported in the county-level tables.

Calculated statistics

Employees and FTE. UI data are measured on a quarterly basis, so it is not possible to determine how wages paid and hours worked are distributed throughout the quarter. It is not possible to determine if an individual with the equivalent of half-time employment for the quarter actually worked half time over the entire quarter or if they worked full time for half the quarter.

To address this limitation, we report both the total number of individuals who worked any number of hours in the quarter at each business (i.e. “employees”) and the full time equivalent (FTE) of the total hours worked by all employees in a quarter. The FTE calculation assumes a typical 40-hour work week, which comes to an approximate average of 520 hours per quarter. For annual time periods we report annual FTE—which is calculated in the same manner as the quarterly FTE, but over the entire year.

In cases where the same individual worked for multiple businesses in a given quarter, we count that individual as an employee at each of the businesses. Thus the number of unique individuals who have worked for any licensed marijuana business is likely less than the total number of employees we report for all licensed marijuana businesses.

The FTE calculation is a more conservative estimator of business size and growth. For this reason we prefer to rely on FTE when calculating business size.

Job creation/loss. We present two figures to estimate job creation or loss for licensed marijuana businesses: the net change in the number of employees who worked in the businesses between Q4 2013 and Q4 2016, and the net change in FTE over the same period. This method captures the net change in employment and FTE that occur between January 1, 2014 and December 31, 2016, which is the primary period of our analysis. These figures are not comparable to official net job creation statistics, which are calculated based on the number of employees reported in the final month of each quarter and use a different data source.

²⁰ Licensed operations include all locations with an unexpired license in the final quarter of 2016.

Business size reflects the calculated FTE for the business. This produces a conservative estimate of business size and is not comparable to official statistics, which are based on the number of employees reported in the final month of each quarter and use a different data source.

Total wages are the sum of all wages paid during the identified period.

Total quarterly wages are the sum of all wages paid by the identified businesses during the identified quarter. Quarters are calendar quarters: Q1: Jan-Mar; Q2: Apr-Jun; Q3: Jul-Sep; and Q4: Oct-Dec.

The hourly wage rate is the total wages paid to an employee in a quarter, divided by total hours worked by that employee in the same quarter.

The median hourly wage is the 50th percentile of the hourly wage rates calculated above. Half of all employees received an hourly wage of less than or equal to the median and half received a wage that was more than or equal to the median.

The average hourly wage is computed by dividing the total quarterly wages by the total hours worked in the quarter.

III. Findings

We present findings for all Washington State businesses that have received a marijuana license in [Subsection A](#). In [Subsection B](#) we present findings for each type of licensed marijuana business. County-level figures may be found in the Appendices, as applicable.

In each subsection we first present our findings for the number of jobs created and wages paid by licensed-marijuana businesses between January 1, 2014 and December 31, 2016.

Not all businesses that hold marijuana licenses were active during the period of analysis. There are multiple potential reasons for this, including: 1) a business may be in active operation but not employ UI-covered individuals (e.g. a sole proprietorship that does not employ anyone other than themselves and/or their spouse); 2) a business may have received their license but not yet completed their start up activities to enter complete operations; or 3) a business could have failed to report UI-covered employees.

Just over half of businesses that have received a marijuana license reported employing at least one UI-covered employee. [Exhibit 2](#) summarizes the number of businesses that have received each type of license and how many were active in at least one quarter between January 1, 2011 and December 31, 2016.

Exhibit 2

Ever-Licensed vs. Active Businesses,
by License Type

License type	Licensed businesses	Active businesses [^]	
	#	#	%
Total	1,703	904	53.1%
Producer and/or processor	1,268	602	47.5%
Retail	425	299	70.4%
Transportation	7	*	*
Tribal compact	3	*	*

Notes:

[^]Includes all businesses that ever received a marijuana license and reported employing at least one UI-covered employee between Jan. 1, 2011 and Dec. 31, 2016.

*Information redacted to protect the privacy and confidentiality of individual businesses and/or tribal compacts.

Given that some of these businesses were in operation prior to receiving marijuana licensure, we also report employment and wage information for these businesses for the three preceding years (2011-2013) for context.

We then describe reported employment and wages for active licensed marijuana businesses in the most recent quarter—the final quarter of 2016.

A) All Licensed Marijuana Businesses

As of April 11, 2017, a total of 1,703 businesses had received at least one marijuana license. Of these businesses, 904 were active in at least one calendar quarter between 2011 and 2016.

Of the 904 active businesses, 52 were active in the quarter prior to the issuance of the first marijuana licenses. In the final quarter of 2013, the quarter immediately preceding the issuance of the first marijuana licenses, these businesses had 480 employees, the equivalent of 177.68 FTE, and paid \$1,772,050 in wages.

Overall, 693 licensed marijuana businesses were active in Q4 2016. These businesses had 10,894 employees in Q4 2016, the equivalent of 6,227.06 FTE. This is an increase of 10,414 employees (the equivalent of 6,049.38 FTE) during the analysis period.

Exhibit 3 below displays the total active businesses, by quarter between January 1, 2011 and December 31, 2016. Exhibit 4 on the following page displays the annual FTE for these businesses.

Exhibit 3

All Active Licensed Marijuana Businesses, by Calendar Quarter
(Calendar Years 2011-2016)

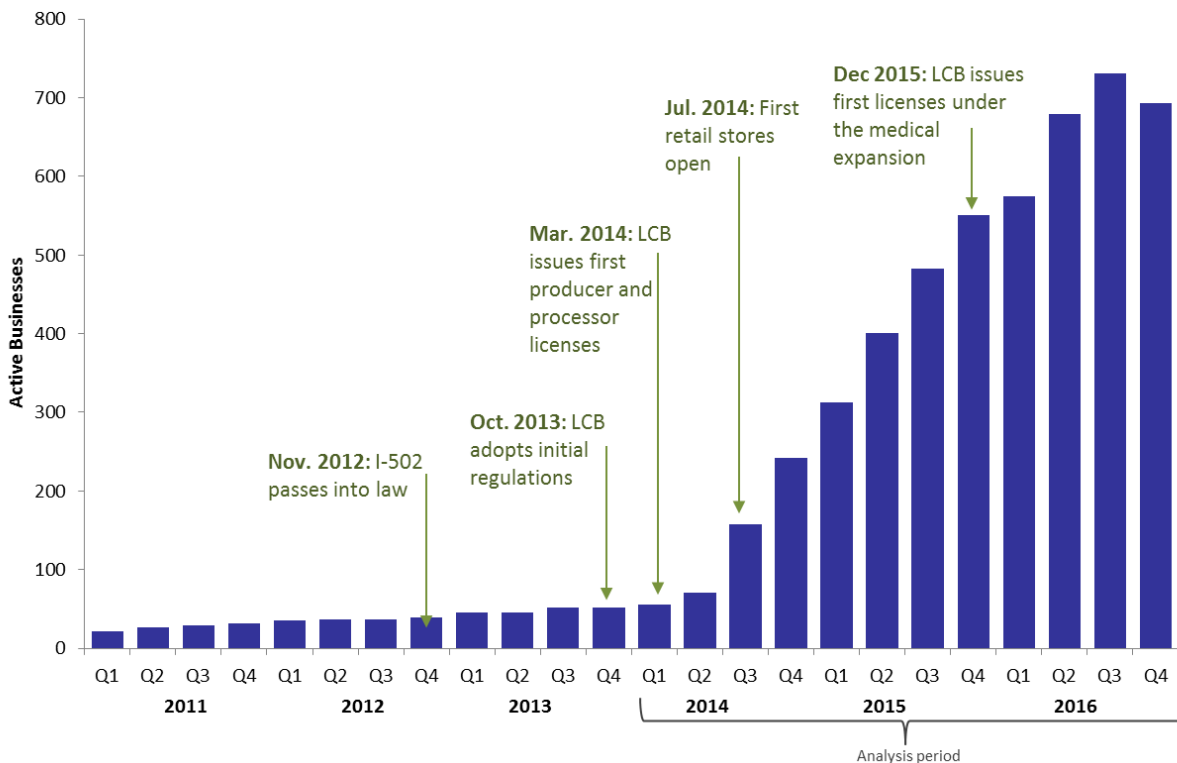
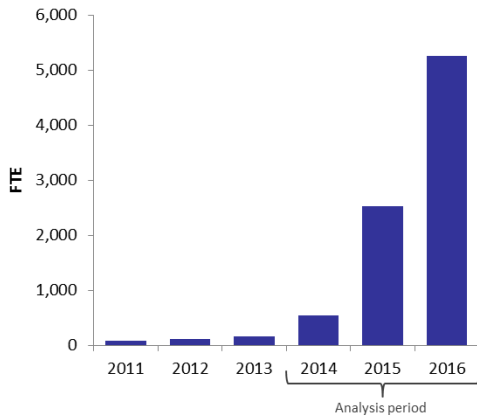


Exhibit 4

Total Annual FTE: All Active Businesses
(Calendar Years 2011-2016)



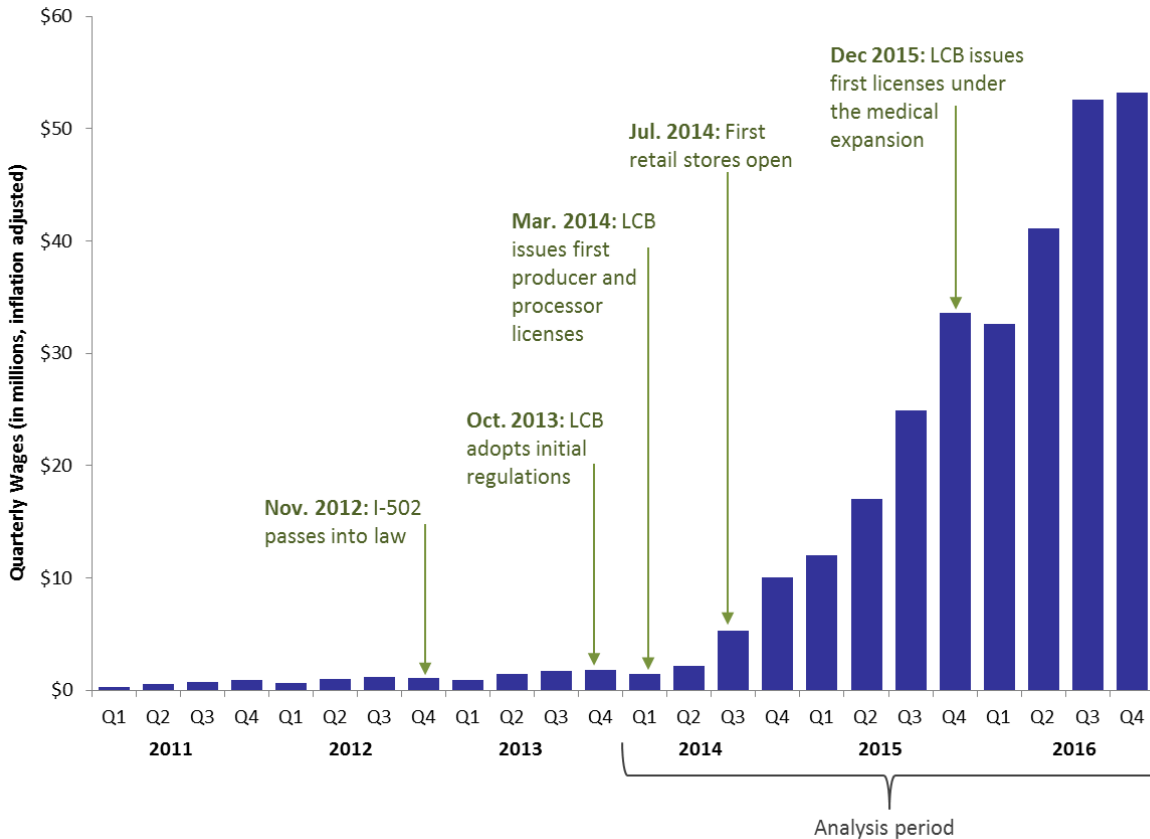
Between January 1, 2014 and December 31, 2016 licensed marijuana businesses paid the equivalent of \$286,135,696 in wages.

Exhibit 5 displays the total wages paid by these businesses, by quarter between January 1, 2011 and December 31, 2016.

Appendix Section I contains historical data, by quarter, on the number of active businesses, employment, and wages.

Exhibit 5

Quarterly Wages Paid to All Licensed Marijuana Businesses (in Millions)
(Calendar years 2011-2016, adjusted for inflation to 2016 dollars)



Employment and wages in Q4 2016

As illustrated in Exhibits 3 through 5, licensed marijuana businesses have grown considerably over the analysis period. For example, licensed marijuana businesses employed 66% more FTE and paid 63% more in wages in the last quarter of 2016 than in the first quarter of 2016.

In the final quarter of 2016, licensed marijuana businesses had 10,894 employees, the equivalent of 6,227.06 FTE, and paid \$53,250,842 in wages. Exhibit 6 summarizes the variation in employment and wages in Q4 2016 by business size.

Employees were paid an average wage of \$16.45 per hour. The median wage was \$13.44. The average wage is higher than the median wage because a few highly paid workers lifted the average above the median.

On average, licensed marijuana businesses employed the equivalent of 8.99 FTE in the final quarter of 2016. Over one-third of businesses had fewer than 4 FTE. Roughly one third of businesses employed more than 9 FTE, and these businesses account for nearly three-quarters of the total FTE employed.

Exhibit 6

Employment and Wages for All Active Businesses, by Business Size
(Fourth Quarter of 2016)

Business size (number of FTE)	Number of businesses	Number of FTE	Number of employees	Wages		
				Average hourly	Median hourly	Total
Total*	693	6,227.06	10,894	\$16.45	\$13.44	\$53,250,844
0-4.00	264	499.43	1,546	\$17.14	\$13.00	\$4,450,718
4.01-9.00	193	1,223.20	2,291	\$15.64	\$13.10	\$9,950,194
9.01-19.00	171	2,188.72	3,659	\$17.07	\$13.85	\$19,428,487
19.01+	62	2,293.10	3,367	\$16.07	\$13.47	\$19,158,486

Note:

* The sum of the businesses sizes is less than the total. Tribal compacts and businesses with a transportation license have been excluded from the breakouts in order to protect privacy and confidentiality.

B) License Type

We now present subgroup findings for businesses with a retail license and for businesses that have a producer and/or processor license. In [Appendix AII](#) we present county-level figures for these two groups (to the extent that we are able to do so while protecting the privacy and confidentiality of individual businesses).

The vast majority of businesses that hold a producer and/or processor license have either a producer/processor license or both a producer license and a processor license. Grouping all businesses with a producer and/or processor license together allows us to present more granular information.

In order to protect business privacy and confidentiality, we do not present separate findings for transportation-licensed businesses or data for tribal compacts.

Producers and/or processors

Of the 1,268 businesses that received a producer and/or processor license, 602 were active in at least one calendar quarter between 2014 and 2016.

[Exhibit 7](#) below displays the FTE employed by these businesses, by year between 2011 and 2016.

[Exhibit 8](#) on the following page displays the total active businesses, by quarter between January 1, 2011 and December 31, 2016.

[Exhibit 9](#) on the following page displays the total wages paid by these businesses, by quarter between January 1, 2011 and December 31, 2016.

Exhibit 7
Total Annual FTE:
Producers and/or Processors
(Calendar Years 2011-2016)

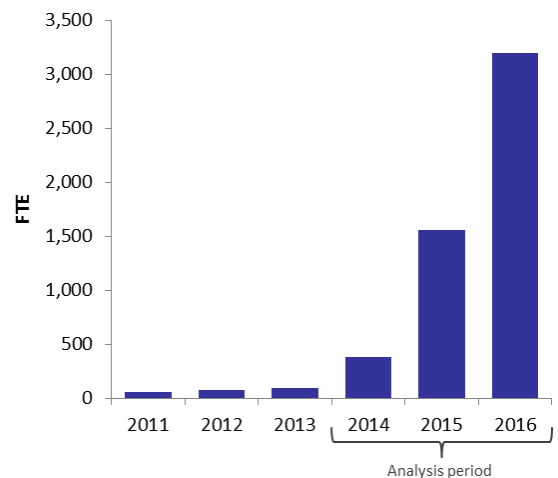


Exhibit 8

Active Businesses, by Calendar Quarter
Producers and/or Processors
(Calendar Years 2011-2016)

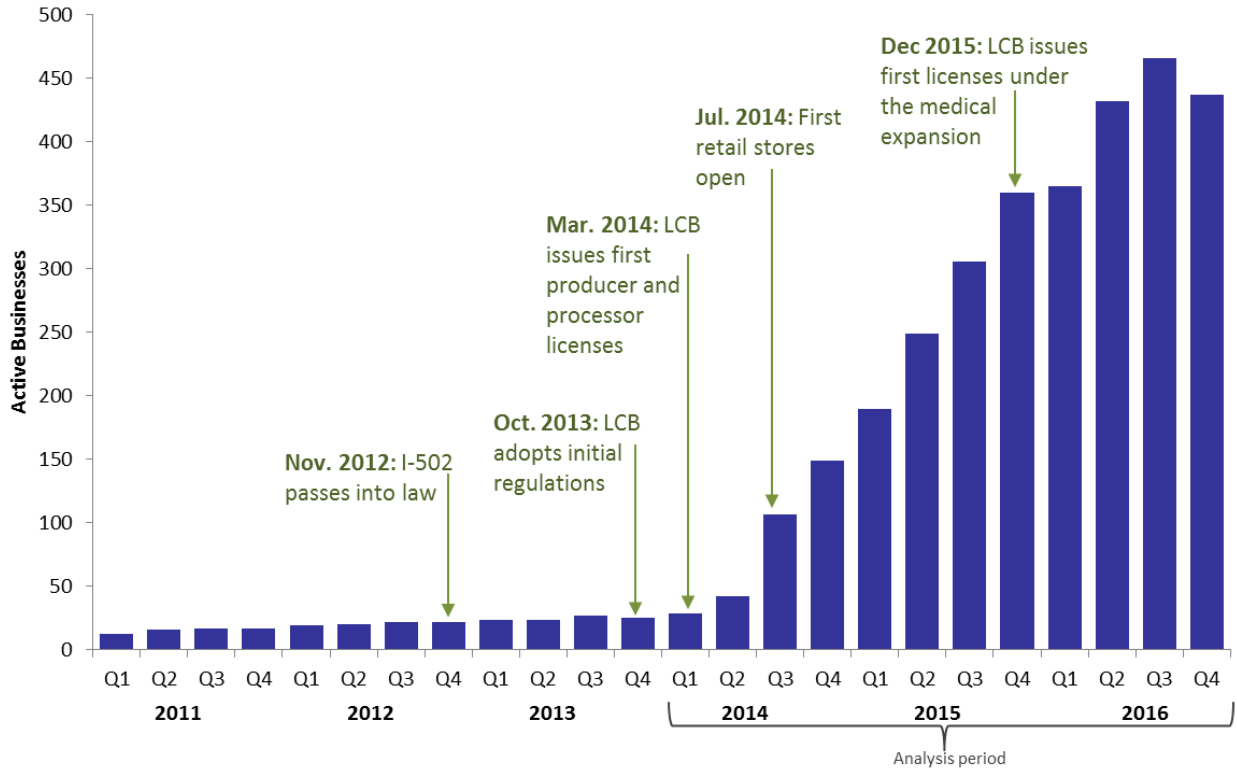
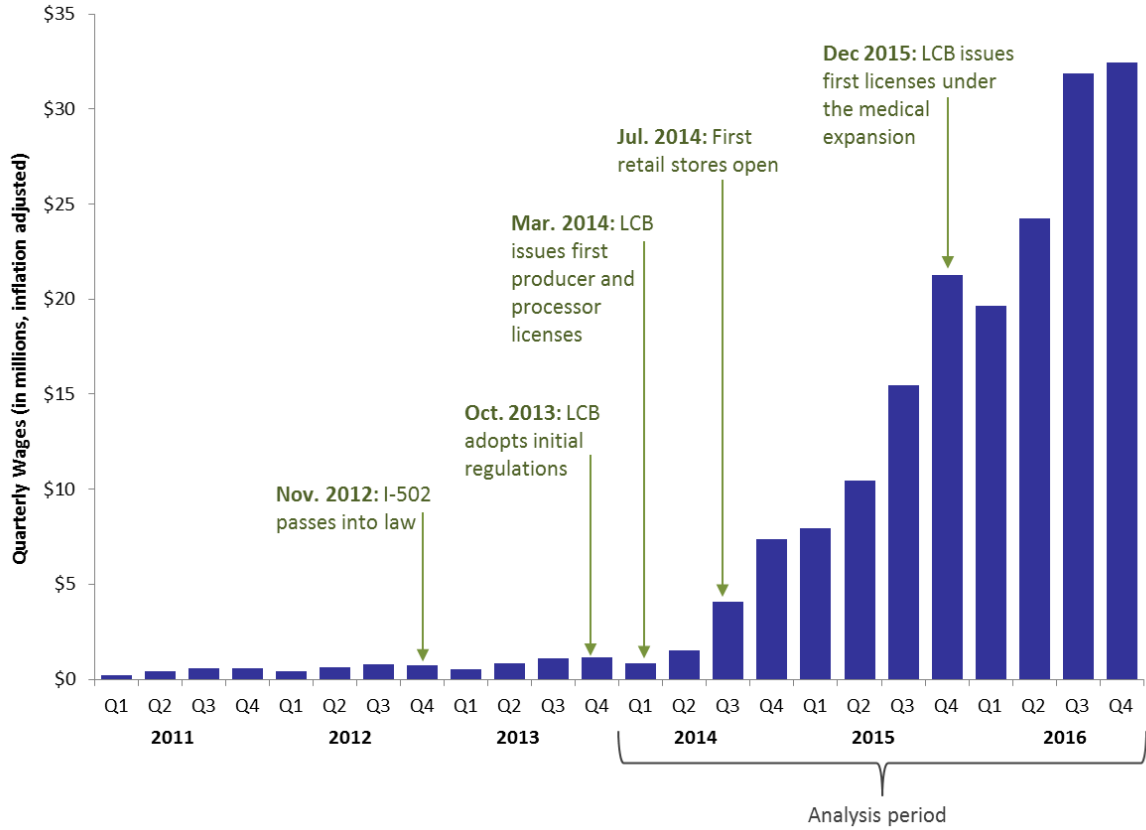


Exhibit 9

Reported Quarterly Wages: Producers and/or Processors
 (in millions, inflation-adjusted to 2016 dollars)
 (Calendar years 2011-2016)



Employment and wages in Q4 2016

As illustrated in Exhibits 7 through 9, licensed marijuana businesses with a producer and/or processor license have grown considerably over the analysis period. For example, these businesses paid 65% more wages in the final quarter of 2016 than they did in the first quarter.

In the final quarter of 2016, 437 producer and/or processor businesses were active; employed 6,885 people, the equivalent of 3,833.30 FTE; and paid \$32,440,635 in wages. Exhibit 10 summarizes the variation in employment and wages by business size.

Employees were paid an average wage of \$16.27 per hour. The median wage was \$12.98. The average wage is higher than the

median wage because a few highly paid workers lifted the average above the median.

Most producers and/or processors are small businesses. These businesses employed an average of 8.77 FTE in the final quarter of 2016. Nearly half of these businesses employed four or fewer FTE. Roughly 30% of producers and/or processors employed at least 9 FTE, and these businesses employed 75% of the total FTE employed by producers and/or processors. While on average producers and/or processors are smaller than businesses with a retail license, the largest licensed marijuana businesses are producers and/or processors and there is a wider range of business size in this category.

Exhibit 10

Employment and Wages for Producers and/or Processors, by Business Size
(Fourth Quarter of 2016)

Business size (number of FTE)	Number of businesses	Number of FTE	Number of employees	Wages		
				Average hourly	Median hourly	Total
Total	437	3,833.30	6,885	\$16.27	\$12.98	\$32,440,635
0-4.00	213	373.04	1,237	\$17.41	\$12.99	\$3,376,902
4.01-9.00	92	572.68	1,175	\$15.96	\$12.99	\$4,752,282
9.01-19.00	92	1,213.00	2,104	\$16.67	\$12.85	\$10,516,389
19.01+	40	1,674.58	2,369	\$15.84	\$13.00	\$13,795,061

Retailers

Of the 425 businesses that received a retail license, 299 were active in at least one calendar quarter during the analysis period.

Exhibit 11 displays the total FTE employed by these businesses, by year between 2011 and 2016.

Exhibit 12 below displays the total active businesses, by quarter between January 1, 2011 and December 31, 2016.

Exhibit 13 on the following page displays the total wages paid by these businesses, by quarter between January 1, 2011 and December 31, 2016.

Exhibit 11
Annual FTE: Retailers
(Calendar Years 2011-2016)

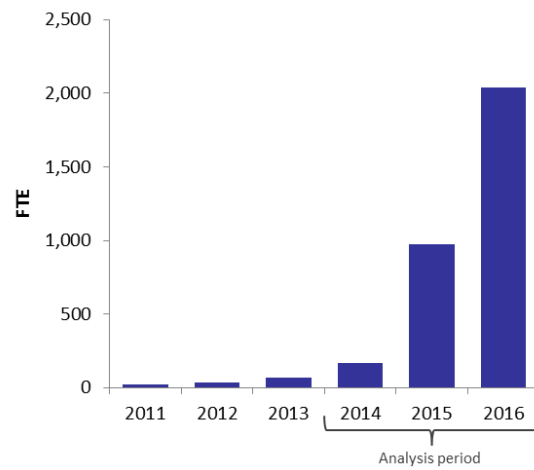


Exhibit 12
Active Businesses, by Calendar Quarter Retailers
(Calendar Years 2011-2016)

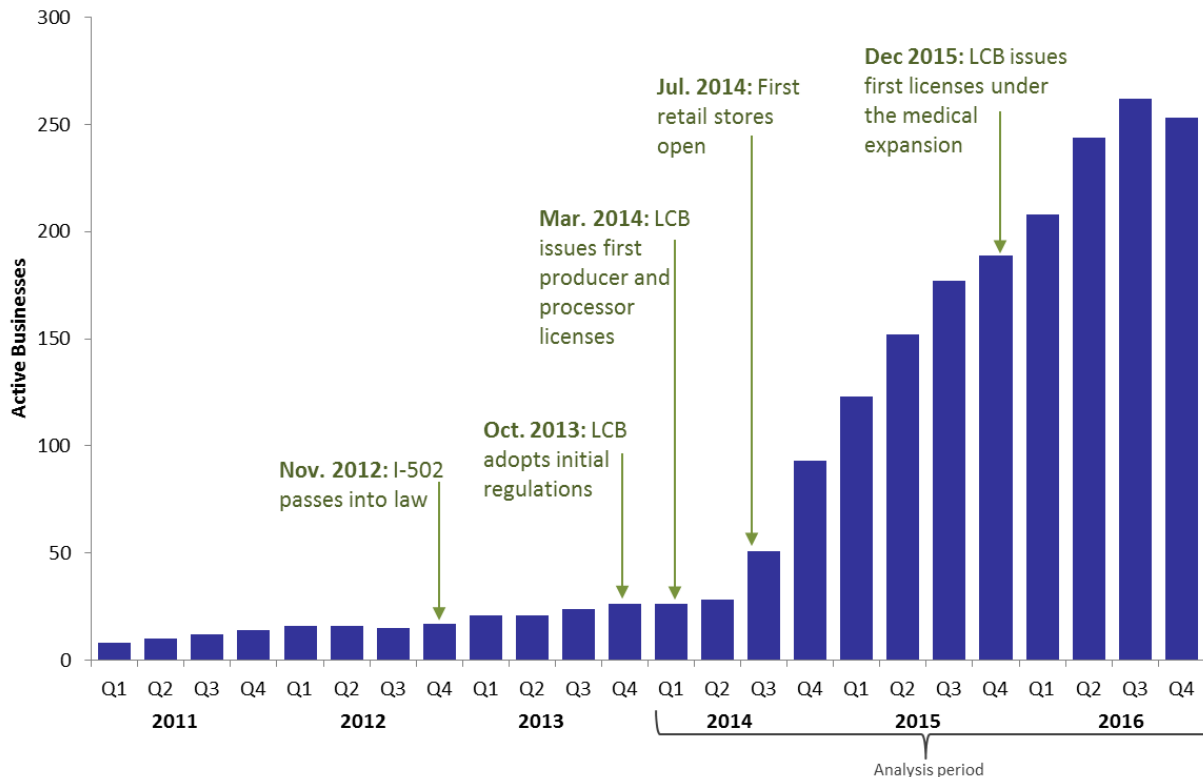
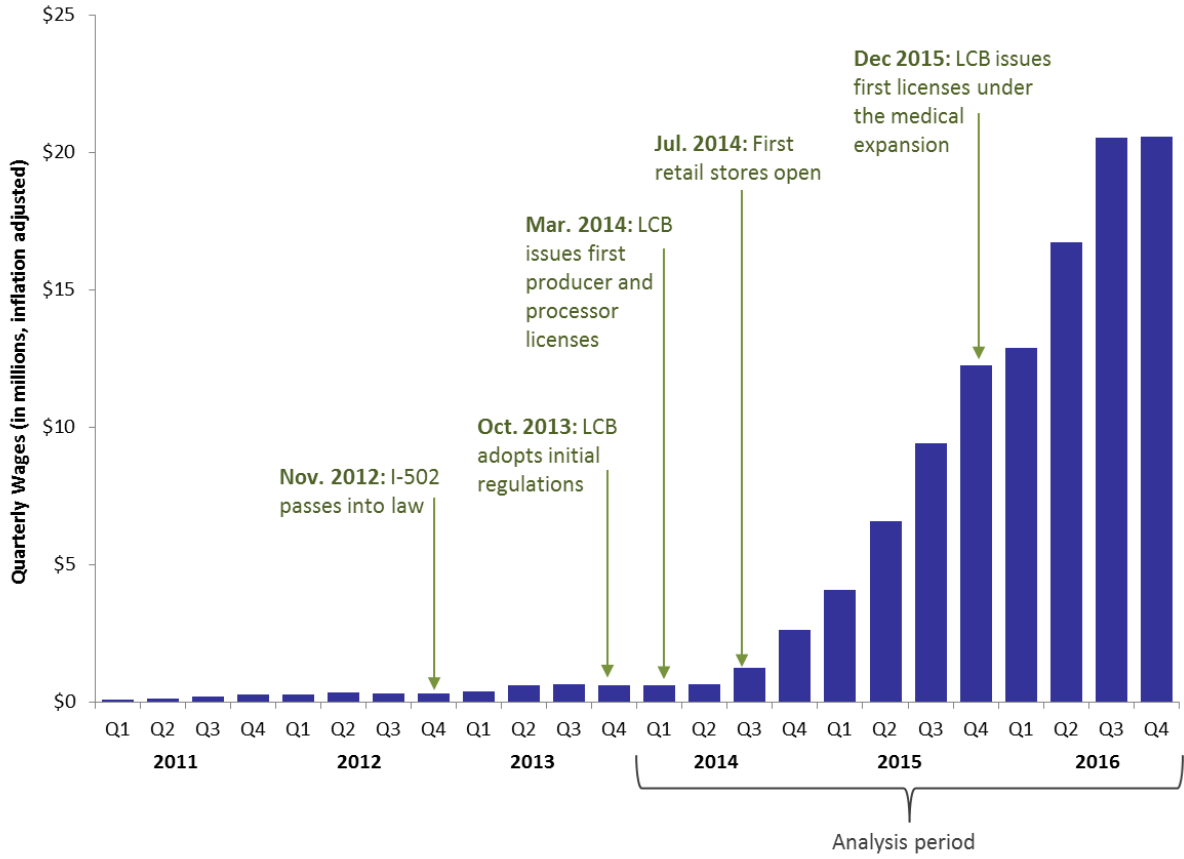


Exhibit 13

Reported Quarterly Wages: Retailers (In Millions, Inflation-adjusted to 2016 Dollars)
(Calendar Years 2011-2016)



Employment and wages in Q4 2016

As illustrated in Exhibits 11 through 13, licensed marijuana businesses with a retailer license have grown considerably over the analysis period. For example, these businesses paid 60% more wages in the final quarter of 2016 than they did in the first quarter.

In the final quarter of 2016, 253 retail businesses were active; had 3,978 employees, the equivalent of 2,371.15 FTE; and paid \$20,547,250 in wages. Exhibit 14 summarizes the variation in employment and wages by business size.

Employees were paid an average wage of \$16.66 per hour. The median wage was \$14.05. The average wage is higher than the median wage because a few highly paid workers lifted the average above the median. On average, retailers paid a higher median hourly wage than businesses with a producer and/or processor license.

Most retailers were small businesses; 60% employed 9 or fewer 11 FTE, accounting for roughly a third of total retail FTE. Retailers employed an average of 9.37 FTE in the final quarter of 2016.

Exhibit 14

Reported Employment and Wages: Retailers (Fourth Quarter of 2016)

Business size (number of FTE)	Number of businesses	Number of FTE	Number of employees	Wages		
				Average hourly	Median hourly	Total
Total	253	2,371.15	3,978	\$16.66	\$14.05	\$20,547,250
0-4.00	51	126.39	309	\$16.34	\$13.10	\$1,073,816
4.01-9.00	101	650.51	1,116	\$15.37	\$13.28	\$5,197,912
9.01-19.00	79	975.72	1,555	\$17.57	\$14.98	\$8,912,097
19.01+	22	618.53	998	\$16.68	\$14.56	\$5,363,425

I. Limitations

This descriptive report is limited to businesses that 1) received at least one marijuana license and 2) reported the number of people they employed and the wages they paid to the Washington State Unemployment Insurance (UI) program. This method may either undercount or overcount legal employment and wages in licensed marijuana businesses.

Due to the nature of the data, we do not capture multiple types of legal employment that may be occurring within the legal marijuana industry, which would result in an undercount of legal employees and wages in licensed marijuana businesses. It is also important to note that the reported wages include tips that are reported for federal income-tax purposes but do not include other forms of earnings or compensation—e.g., earnings for independent contractors, employee-exercised stock options, or health care benefits.

Similarly, due to data limitations we were not able to compare employment and wages paid by individual businesses before they received a marijuana license to employment and wages paid by the same business after it received a license. Nor were we able to examine if employment and wages changed for an individual business if its marijuana license closed. If businesses employed people or paid wages during these periods, those figures are included in our numbers. This may represent an overcount of legal employment in licensed marijuana businesses. Given that most licensed marijuana businesses were new businesses during the analysis period, we think that this effect is likely negligible.

This report is not an analysis of the legal marijuana industry. We were unable to distinguish if a licensed business conducted an activity unrelated to the marijuana industry or for which part of a business an employee worked. If a business conducted an unrelated activity, the employment and wages associated with that unrelated activity are included in our figures.

On the other hand, we do not include many forms of legal employment and wages that may be associated with the legal marijuana industry, such as jobs and earnings associated with secondary or ancillary markets. Similarly, this report does not attempt to disentangle interactions with the black market.

This report provides descriptive information only. It is not designed to answer questions about the net effect of legal marijuana on jobs or on the Washington State economy as a whole. The report does not establish a cause and effect relationship between licensed marijuana businesses and employment or wages paid. It is possible that these businesses would have operated some other form of business instead, had there not been a marijuana industry to operate in.

Finally, the employee figures should be interpreted with care. They should not be interpreted as the total number of people who have ever worked in a licensed marijuana business. Some individuals worked for multiple licensed marijuana businesses. The number of individuals who have ever worked for one of these businesses will be lower than the total employee figures.

Similarly, these employee figures should be interpreted with care when considered as a proxy for job creation. Few individuals worked for two consecutive quarters in the same licensed marijuana business and even fewer worked three consecutive quarters for the same business. This may be indicative of the rapid pace of growth in these

businesses. However, it may also indicate substantial employee-level churn in these businesses rather than the creation of new jobs. For this reason, we prefer to rely on the more conservative FTE figures when calculating business size.

Appendices

Employment and Wage Earnings in Licensed Marijuana Businesses

Appendix	
I.	Historical Employment and Wage Data.....22
II.	Geographic Distributions.....24

I. Historical Employment and Wage Data

Exhibit A1

Annual Wages and Employment: All Active Businesses

Year	Active businesses [^]	Annual FTE	Total wages (in nominal dollars)	Inflation adjusted wages*
2011	35	76.38	\$2,294,489	\$2,439,342
2012	46	114.05	\$3,653,403	\$3,811,869
2013	59	168.16	\$5,710,525	\$5,880,038
2014	257	547.50	\$18,678,195	\$18,947,544
2015	582	2,526.23	\$86,603,696	\$87,546,175
2016	844	5,256.47	\$179,641,977	\$179,641,977

Notes:

Includes all license types and tribal compacts.

[^] A business is considered "active" if it reported paying any employees any wages in a calendar quarter.

* Total wages were adjusted to constant-dollar (2016) wages using the U.S. Implicit Price Deflator for Personal Consumption Expenditures (U.S. Bureau of Economic Analysis, Personal consumption expenditures (implicit price deflator) [DPCERD3A086NBEA], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/DPCERD3A086NBEA>, June 14, 2017.).

Exhibit A2

Quarterly Wages and Employment: All Active Businesses

Year	Quarter	Active businesses [^]	Total employees	Total FTE	Total wages (in nominal dollars)	Inflation adjusted wages*
2011	Q1	21	92	38.62	\$270,917	\$288,020
	Q2	26	148	74.58	\$511,163	\$543,434
	Q3	29	196	100.59	\$705,345	\$749,873
	Q4	31	413	90.78	\$807,064	\$858,014
2012	Q1	35	200	79.24	\$634,550	\$662,074
	Q2	36	226	122.69	\$946,895	\$987,966
	Q3	37	374	144.39	\$1,079,335	\$1,126,151
	Q4	39	282	109.96	\$992,623	\$1,035,678
2013	Q1	45	263	107.98	\$879,218	\$905,317
	Q2	45	389	177.60	\$1,410,012	\$1,451,867
	Q3	52	479	207.73	\$1,700,330	\$1,750,803
	Q4	52	480	177.68	\$1,720,965	\$1,772,051
2014	Q1	56	365	180.15	\$1,433,207	\$1,453,875
	Q2	71	564	257.18	\$2,132,176	\$2,162,923
	Q3	158	1,562	624.09	\$5,251,641	\$5,327,372
	Q4	242	2,728	1,113.06	\$9,861,171	\$10,003,374
2015	Q1	313	2,823	1,382.48	\$11,862,850	\$11,991,950
	Q2	401	4,009	1,984.08	\$16,861,350	\$17,044,847
	Q3	483	5,773	2,855.37	\$24,640,195	\$24,908,346
	Q4	551	7,677	3,840.13	\$33,239,301	\$33,601,033
2016	Q1	575	7,008	3,809.86	\$32,650,105	\$32,650,105
	Q2	679	8,797	4,839.99	\$41,149,125	\$41,149,125
	Q3	731	10,893	6,135.45	\$52,591,904	\$52,591,904
	Q4	693	10,894	6,227.06	\$53,250,842	\$53,250,842

Notes:

Includes all license types and tribal compacts.

[^] A business is considered "active" if it reported paying any employees any wages in a calendar quarter.

*Total wages were adjusted to constant-dollar (2016) wages using the U.S. Implicit Price Deflator for Personal Consumption Expenditures (U.S. Bureau of Economic Analysis, Personal consumption expenditures (implicit price deflator) [DPCERD3A086NBEA], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/DPCERD3A086NBEA>, June 14, 2017.).

II. Geographic Distributions

County-level variation. The majority of employees and wages paid by marijuana licensed-businesses in Q4 2016 are located in counties with the largest populations. Exhibits A3 through A6 below illustrate the geographical distribution of employees, wages, average business size, and median wages for businesses that are wholly located within a single county. Additional county-level data is included in Exhibits A7-A9.

Several businesses have licensed operations in multiple counties. These businesses account for approximately 7% of all active businesses and 8% of all employees in Q4 2016. A greater percentage of active businesses with retail licenses have operations in multiple counties compared to businesses with producer and/or processor licenses, 11% and 5% respectively.

Exhibit A3

Total FTE, by County
Retailers, Producers, and/or Processors
(Fourth Quarter of 2016)

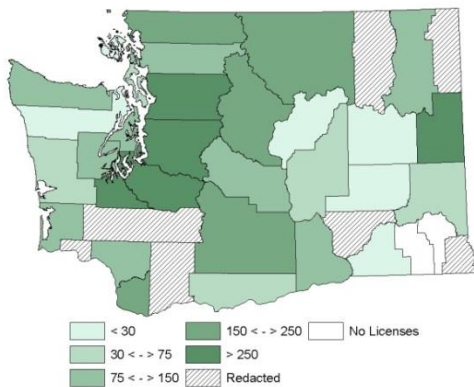


Exhibit A5

Total Wages Paid, by County
Retailers, Producers, and/or Processors
(Fourth Quarter of 2016)

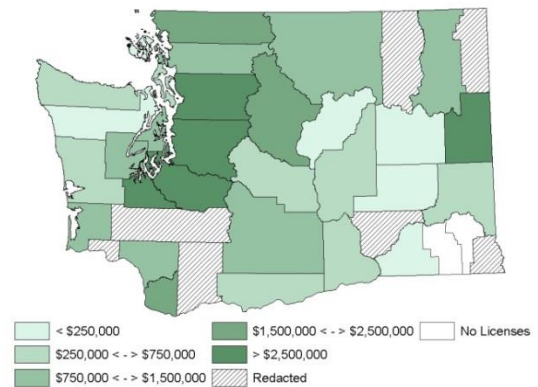


Exhibit A4

Average Business Size, by County
Retailers, Producers, and/or Processors
(Fourth Quarter of 2016)

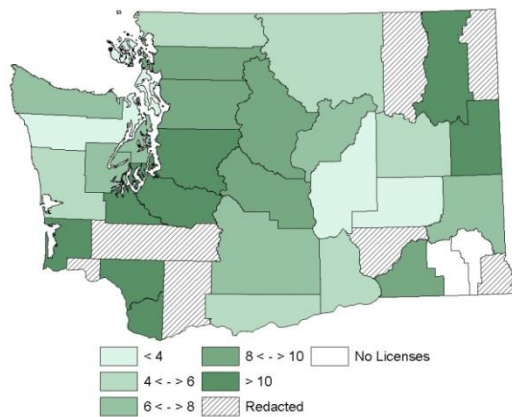


Exhibit A6

Median Wage Paid, by County
Retailers, Producers, and/or Processors
(Fourth Quarter of 2016)

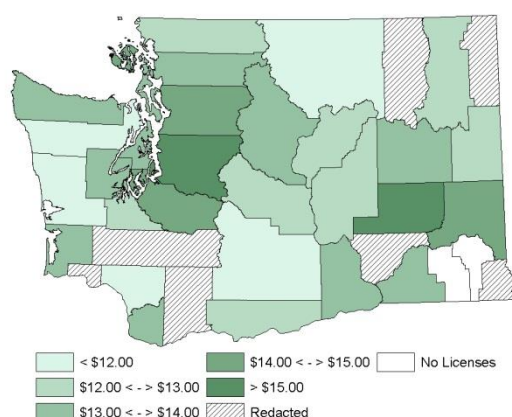


Exhibit A7

Businesses Characteristics for All Retailers, Producer and/or Processor, by County (Fourth Quarter 2016)

County	Active businesses [^]	Average business size ^{^^}	Employees		Wages		
			Employees	FTE	Total	Average hourly wage	Median hourly wage
Adams	8	3.59	50	28.71	\$239,441	\$16.04	\$15.40
Asotin	*	*	*	*	*	*	*
Benton	13	5.90	158	76.70	\$604,360	\$15.15	\$13.01
Chelan	20	9.43	402	188.52	\$1,512,693	\$15.43	\$13.50
Clallam	11	7.08	120	77.83	\$622,665	\$15.39	\$13.41
Clark	19	11.70	332	222.35	\$1,917,606	\$16.58	\$13.01
Columbia	**	**	**	**	**	**	**
Cowlitz	13	10.56	260	137.28	\$969,717	\$13.58	\$11.98
Douglas	4	6.40	48	25.61	\$207,961	\$15.62	\$12.40
Ferry	*	*	*	*	*	*	*
Franklin	*	*	*	*	*	*	*
Garfield	**	**	**	**	**	**	**
Grant	18	3.41	151	61.43	\$562,355	\$17.61	\$12.17
Grays Harbor	13	5.21	121	67.70	\$482,299	\$13.70	\$12.00
Island	8	3.75	46	30.04	\$296,153	\$18.96	\$14.00
Jefferson	7	3.80	52	26.60	\$227,982	\$16.48	\$11.81
King	103	10.77	1813	1,109.49	\$10,726,331	\$18.59	\$15.70
Kitsap	17	7.01	167	119.23	\$1,089,734	\$17.58	\$13.95
Kittitas	10	8.41	140	84.07	\$609,136	\$13.93	\$12.42
Klickitat	9	4.84	106	43.58	\$348,845	\$15.39	\$12.80
Lewis	*	*	*	*	*	*	*
Lincoln	5	4.44	37	22.18	\$185,515	\$16.08	\$13.89
Mason	17	7.25	200	123.24	\$1,116,219	\$17.42	\$13.97
Okanogan	27	5.69	432	153.55	\$1,128,862	\$14.14	\$11.98
Pacific	10	13.20	187	132.01	\$1,240,388	\$18.07	\$13.55
Pend Oreille	*	*	*	*	*	*	*
Pierce	31	10.03	519	311.07	\$3,001,146	\$18.55	\$14.97
San Juan	3	1.73	18	5.18	\$43,642	\$16.19	\$14.96
Skagit	14	8.51	176	119.13	\$1,045,829	\$16.88	\$13.82
Skamania	*	*	*	*	*	*	*
Snohomish	50	10.00	804	500.23	\$4,469,822	\$17.18	\$14.97
Spokane	78	11.38	1469	887.64	\$6,931,520	\$15.02	\$12.22
Stevens	13	10.37	235	134.80	\$1,063,549	\$15.17	\$12.04
Thurston	34	15.09	715	513.09	\$4,262,466	\$15.98	\$12.97
Wahkiakum	*	*	*	*	*	*	*
Walla Walla	3	9.14	42	27.41	\$219,212	\$15.38	\$13.83
Whatcom	43	4.89	424	210.36	\$1,666,704	\$15.24	\$12.87
Whitman	6	6.66	70	39.97	\$333,645	\$16.05	\$14.92
Yakima	25	6.98	538	174.45	\$1,310,778	\$14.45	\$12.00
Multi-county businesses	52	10.04	982	522.11	\$4,315,412	\$15.89	\$12.97
Total	690	8.99	10,863	6,204.45	\$52,987,884	\$16.42	\$13.42

Notes:

* Information redacted to protect the privacy and confidentiality of individual businesses.

** No marijuana licenses were issued to businesses in this county.

[^] A business is considered "active" if it reported paying any employees any wages in a calendar quarter.

^{^^} Business size determined by the business's total FTE in the quarter.

Exhibit A8

**Businesses Characteristics for Producers and/or Processors, by County
(Fourth Quarter 2016)**

County	Active businesses [^]	Average business size ^{^^}	Employees		Wages		
			Employees	FTE	Total	Average hourly wage	Median hourly wage
Adams	*	*	*	*	*	*	*
Asotin	*	*	*	*	*	*	*
Benton	*	*	*	*	*	*	*
Chelan	17	10.47	379	178.07	\$1,436,118	\$15.51	\$13.60
Clallam	4	8.91	53	35.65	\$289,175	\$15.60	\$13.28
Clark	12	8.34	161	100.05	\$936,196	\$18.00	\$13.79
Columbia	**	**	**	**	**	**	**
Cowlitz	9	8.38	119	75.44	\$511,623	\$13.04	\$11.31
Douglas	*	*	*	*	*	*	*
Ferry	*	*	*	*	*	*	*
Franklin	*	*	*	*	*	*	*
Garfield	**	**	**	**	**	**	**
Grant	*	*	*	*	*	*	*
Grays Harbor	6	4.96	64	29.78	\$200,943	\$12.97	\$10.65
Island	*	*	*	*	*	*	*
Jefferson	*	*	*	*	*	*	*
King	45	8.00	544	359.86	\$3,916,778	\$20.93	\$16.65
Kitsap	3	4.45	17	13.36	\$136,439	\$19.64	\$19.96
Kittitas	*	*	*	*	*	*	*
Klickitat	6	5.59	91	33.55	\$280,232	\$16.06	\$12.85
Lewis	*	*	*	*	*	*	*
Lincoln	*	*	*	*	*	*	*
Mason	12	8.43	163	101.14	\$946,514	\$18.00	\$14.67
Okanogan	24	6.16	413	147.90	\$1,090,854	\$14.18	\$11.99
Pacific	*	*	*	*	*	*	*
Pend Oreille	*	*	*	*	*	*	*
Pierce	14	7.06	172	98.87	\$1,105,717	\$21.51	\$16.00
San Juan	*	*	*	*	*	*	*
Skagit	9	9.50	124	85.54	\$783,593	\$17.62	\$14.12
Skamania	*	*	*	*	*	*	*
Snohomish	27	9.66	413	260.76	\$2,341,941	\$17.27	\$15.00
Spokane	60	12.01	1189	720.68	\$5,302,554	\$14.15	\$12.03
Stevens	*	*	*	*	*	*	*
Thurston	25	17.75	601	443.78	\$3,703,324	\$16.05	\$12.62
Wahkiakum	*	*	*	*	*	*	*
Walla Walla	*	*	*	*	*	*	*
Whatcom	30	4.59	283	137.76	\$1,085,652	\$15.16	\$12.50
Whitman	*	*	*	*	*	*	*
Yakima	21	7.05	489	148.12	\$1,082,682	\$14.06	\$11.98
Multi-county businesses	24	11.62	554	278.79	\$2,385,072	\$16.45	\$12.69
Total	437	8.77	6,885	3,833.30	\$32,440,635	\$16.27	\$12.98

Notes:

* Information redacted to protect the privacy and confidentiality of individual businesses.

** No marijuana licenses were issued to businesses in this county.

[^] A business is considered "active" if it reported paying any employees any wages in a calendar quarter.

^{^^} Business size is based on the business's FTE in the quarter.

Exhibit A9

**Businesses Characteristics for All Retailers by County
(Fourth Quarter 2016)**

County	Active businesses [^]	Average business size ^{^^}	Employees		Total	Wages	
			Employees	FTE		Average hourly wage	Median hourly wage
Adams	*	*	*	*	*	*	*
Asotin	*	*	*	*	*	*	*
Benton	*	*	*	*	*	*	*
Chelan	3	3.48	23	10.45	\$76,574	\$14.09	\$11.99
Clallam	7	6.03	67	42.18	\$333,490	\$15.20	\$13.66
Clark	7	17.47	171	122.31	\$981,410	\$15.43	\$12.99
Columbia	**	**	**	**	**	**	**
Cowlitz	4	15.46	141	61.84	\$458,094	\$14.25	\$12.00
Douglas	*	*	*	*	*	*	*
Ferry	**	**	**	**	**	**	**
Franklin	*	*	*	*	*	*	*
Garfield	**	**	**	**	**	**	**
Grant	*	*	*	*	*	*	*
Grays Harbor	7	5.42	57	37.91	\$281,356	\$14.27	\$13.37
Island	4	6.48	37	25.94	\$267,421	\$19.83	\$14.28
Jefferson	*	*	*	*	*	*	*
King	58	12.92	1269	749.63	\$6,809,553	\$17.47	\$15.37
Kitsap	14	7.56	150	105.87	\$953,294	\$17.32	\$13.72
Kittitas	*	*	*	*	*	*	*
Klickitat	3	3.34	15	10.02	\$68,613	\$13.16	\$12.60
Lewis	*	*	*	*	*	*	*
Lincoln	*	*	*	*	*	*	*
Mason	5	4.42	37	22.10	\$169,705	\$14.77	\$13.08
Okanogan	3	1.88	19	5.65	\$38,008	\$12.94	\$9.98
Pacific	*	*	*	*	*	*	*
Pend Oreille	*	*	*	*	*	*	*
Pierce	17	12.48	347	212.20	\$1,895,429	\$17.18	\$13.77
San Juan	*	*	*	*	*	*	*
Skagit	5	6.72	52	33.59	\$262,237	\$15.01	\$13.03
Skamania	*	*	*	*	*	*	*
Snohomish	23	10.41	391	239.48	\$2,127,882	\$17.09	\$14.54
Spokane	18	9.28	280	166.96	\$1,628,967	\$18.76	\$13.28
Stevens	*	*	*	*	*	*	*
Thurston	9	7.70	114	69.31	\$559,142	\$15.51	\$14.96
Wahkiakum	**	**	**	**	**	**	**
Walla Walla	*	*	*	*	*	*	*
Whatcom	13	5.58	141	72.60	\$581,052	\$15.39	\$13.69
Whitman	*	*	*	*	*	*	*
Yakima	4	6.58	49	26.32	\$228,097	\$16.66	\$13.77
Multi-county businesses	28	8.69	428	243.31	\$1,930,340	\$15.26	\$13.10
Total	253	9.37	3,978	2,371.15	\$20,547,250	\$16.66	\$14.05

Notes:

* Information redacted to protect the privacy and confidentiality of individual businesses.

** No marijuana licenses were issued to businesses in this county.

[^] A business is considered "active" if it reported paying any employees any wages in a calendar quarter.

^{^^} Business size is based on the business's total FTE in the year quarter.

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