OCCUPATIONAL LICENSURE IN THE STATES

September, 2019

Contents

Background

For several years, license data collection, formatting, and consolidation has been a deliverable of the WIGS grant for states. Collection of the data is difficult since many states don't keep the information in a central repository and the authority to license is spread across different departments. The division between occupations and industries is also not one that many agencies make – they tend to be licensing an activity whether done by an individual or a company. There also hasn't been much of a demand for the data – it's not distributed back to states from the Analyst Resource Center (ARC) (the aggregator of the data) and only more recently has it been picked up by CareerOneStop to be made public on their site. The guidance for the creation and submission of the data was limited to the table structure – no definitions were offered, or suggestions as to coding or resolution of common data problems. As a result data submission has been inconsistent – both in terms of frequency and in data quality.

Revisions and Improvements

The original incarnation of the ARC license database operated under the assumption that every state would maintain license data in a comparable structure and all that would happen centrally was the compilation of those states. Unfortunately, many states don't have a central source of license data and the documentation available to help them create the database was minimal since it varies so much from state to state. That left individuals whose regular job duties may have little to do with licensure or occupations to answer questions about scope and definitions themselves. The result was that the data from different states – no matter how meticulously collected, coded, and maintained – was not comparable. This project looked at ways to identify those inconsistencies, find common ground between states, and implement changes to the program to prevent them in the future.

Definitions

The best available definition of an occupational license in use in the LMI world is that a license

1. "Is a credential awarded by a governmental licensing agency based on pre-determined criteria

2. The criteria may include some combination of degree attainment, certifications, educational certificates, assessments (including state-administered exams), apprenticeship programs, or work experience

3. Conveys a legal authority to work in an occupation"

From https://www.bls.gov/cps/certifications-and-licenses-faqs.htm#difference

There are two particular points of the definition that can sometimes be at odds with the kind of licensing data available to states.

First, the requirement that there be some kind of qualification passed. Many states have what would be more properly termed "registries" – people working in an occupation are required to submit paperwork and keep current contact information on file for the purpose of ensuring that they're adequately insured or that they're collecting required information or so that the state has a record of their activities.

Second, the relationship to an occupation can be somewhat hazy. Some states may allow licensees to be either businesses or individuals. A business may be required to certify that they have a valid license-holder of a certain type on staff. Different industries may have different types of businesses – plumbers, for example, are often owner-operators and the license may not distinguish between businesses and individuals, while engineers more often work for larger firms and tend to be clearly licensed as individuals. Source data often doesn't make this distinction and LMI offices may need to make a judgment call on whether or not to include

a license. Similarly, individuals may be licensed for activities that may or may not be required by their employer. Driver's licenses are the most obvious example.

The way this was resolved was to clearly include the definition in the guidance for states and to add a license type indicator field. This allows us to filter out some of the information that doesn't quite match the definition without losing it.

Occupational Coding

Because state governing bodies rarely set out to license an occupation, but instead focus on an activity to be licensed, there are many situations where a license may not clearly match an occupation, and yet still be necessary to practice that occupation. For example, many states license "Aerial Applicators", who are people who apply pesticides and fertilizers from small planes. In some states, that would be assigned to Pilot. In others, it would be Farm Workers, and in others it would be Pesticide Handlers. All are potentially valid, but the difference in interpretation made it nearly impossible to compare what was licensed in one state to another.

Teachers would be another example – ONET has several different occupations for teachers – they break out preschool, kindergarten, elementary, middle school, and secondary school. They have special education teachers at each level, and career and technical education teachers for middle and secondary schools. They also have a variety of administrative positions some of which may be filled exclusively by teachers (coaches, for example). States usually only have a handful of teacher licenses, possibly distinguishing between elementary and secondary school teachers, but no further. If they applied a single occupation to each license or even everything at that level, it would appear they didn't license certain types of teachers – for example, a significant number of states didn't have any licenses coded to Middle School Teachers. That didn't mean you could work as a middle school teacher without a license, only that the occupation coding was not meaningful.

Rules for how to handle those situations have been created for commonly licensed occupations to resolve these kinds of problems. Occupational coding is now being done centrally, which both reduces the workload on states and ensures more consistent coding across states. There are still oddities – licenses that don't quite apply and unusual circumstances - but on the whole the data is much more comparable. To facilitate this, there's a first pass with an Autocoder that identifies key words commonly associated with a particular kind of license, then there's manual review.

Links

Web links change more frequently than every two years (which is the most frequent that we'd get new submissions from states) and many states don't submit that often. Even when they do, sometimes they don't review every link and they may resubmit corrected data. The result is that a lot of the URLs associated with licenses or licensing authorities in the database were broken and repairing them was labor intensive and often had to be done repeatedly.

To resolve this problem, we started storing corrected links separately so updates don't automatically overwrite improved data. We also created a link checker that will automatically identify broken links. A different version was available before, but it required data to be uploaded to the website first and had a cumbersome output format, so the new link checker dramatically reduces the amount of time necessary to fix links.

Alternate Data Sources

There are a number of other projects out there to identify and track occupational licensure.

The three that had useful data sets were:

[Center for the Study of Occupational Regulation (CSOR)](#) – This was being built gradually, one occupation at a time, starting with lower-skilled occupations. It collects extensive additional variables but starts with jobs that may not line up with occupational coding structures.

[National Conference of State Legislatures (NCSL)](#) – This was a project that was attempting to identify licenses from a review of legislative code. They picked a selected list of occupations with an emphasis on technical jobs. It collects many additional variables.

Institute for Justice's "[License to Work](#)" report – this is an extensive report that's updated annually. They focus on regulations that create a burden for workers and collect many fewer variables than the others but have a broader scope of occupations that they look at.

Missing Licenses

Despite the improved coding, it was still fairly clear that some states had not submitted licenses associated with occupations that very likely are licensed. Sometimes this is because of a difference in definition and sometimes it's due to an oversight. Regardless, the alternate data sources described above were useful for systematically reviewing the existing data set for missing data. Once their license groupings were coded to the appropriate occupation, the ones that were absent from the state-submitted data were reviewed. In the short term, a license is added to the data set with a note that it's "likely licensed" but needs further confirmation. As states submit new data, they're asked to confirm or negate those added licenses.

Once the occupational coding and the additional licenses above were added, we reviewed the occupations licensed by states. Where licensure was very common but a few states did not have the license, it was checked. Sometimes it was genuine – Oklahoma is the only state without an Acupuncture license, Alaska is the only state that doesn't license Respiratory Therapists, and Colorado is the only state to tie funeral service licenses to businesses rather than individuals – other times there needed to be a correction to the occupational coding, and sometimes it just needed to be added. These are stored separately from the state submitted data so they're not overwritten with new submittals and for ease of troubleshooting.

Finally, federal licenses have no submitter – they're maintained centrally. To check them, we started with state submitted licenses that referenced a licensing authority that appeared to be national (federal or US in the name fields) and checked those agencies to see if it was truly a federal license. The agencies that had data added were the Federal Communications Commission (FCC), FINRA, Insurance registry, and Commercial Drivers Licenses (CDLs) – while CDLs are managed at the state (or city in the case of Hawaii) level, they're both necessary to hold certain occupations and not closely tied to any one occupation so few states included them. It was easiest and most consistent just to add them for every state.

Additional Variables

Because the description field was a long, undefined text box, states interpreted its use in many different ways. Some had very extensive descriptions, others had no descriptions or a generic message such as "see website for details". Breaking this out into the essential information in a way that's easier to filter was necessary to make the data as a whole more useful. To this end, we added 10 new indicator fields, with codes for 3 to 4 descriptive options. They're general enough to make it possible to maintain them,

but specific enough that researchers and job seekers can get a much better sense of the requirements than the license description field gave them.

These include a license type field, to distinguish between business, add-on, or regular licenses; an exam field to indicate if a test is required; education to indicate whether a degree is required; continuing education to indicate if license holders will have to pass ongoing requirements; certification to identify those licenses that are closely tied to certifications; experience to help determine if that's a requirement; criminal to identify those licenses prohibited to people with prior convictions; physical for when a physical requirement is in place; veteran for when there's a veteran preference; and inactive, for the handful of licenses that have been replaced but have grandfathered licensees. Additionally, a "LicenseUpdated" field was added to help determine how recently new data was submitted. As it's currently being used, this is an indication of the date of last submission.

Pulling it all together

In the diagram below, the improvements made to the process are displayed along with their connections and when they're added to the overall data set. Priority is always given to state-submitted or ARC-collected data over information that comes from alternate sources or is imputed as likely.

Each box is a separate resource – the connectors show what they're related to to produce outputs. The dotted lines around boxes indicate that a computation is occurring – in most cases, how the data is related is stored as a view so that it's automatically updated as soon as new data is added. This still requires an export at the end to share the final version of the data with states and CareerOneStop, but it helps to visualize the ways the source is identified, protected, and prioritized so that we can enrich our data without losing the really excellent content already there.

CSOR

Existing License Desc

NCSL

License to Work

Combined additional variables

ARC-collected licenses (gaps)

License Links

License +

License

LicXOcc centrally coded

LicAuth Links

LicAuth

Final LicAuth
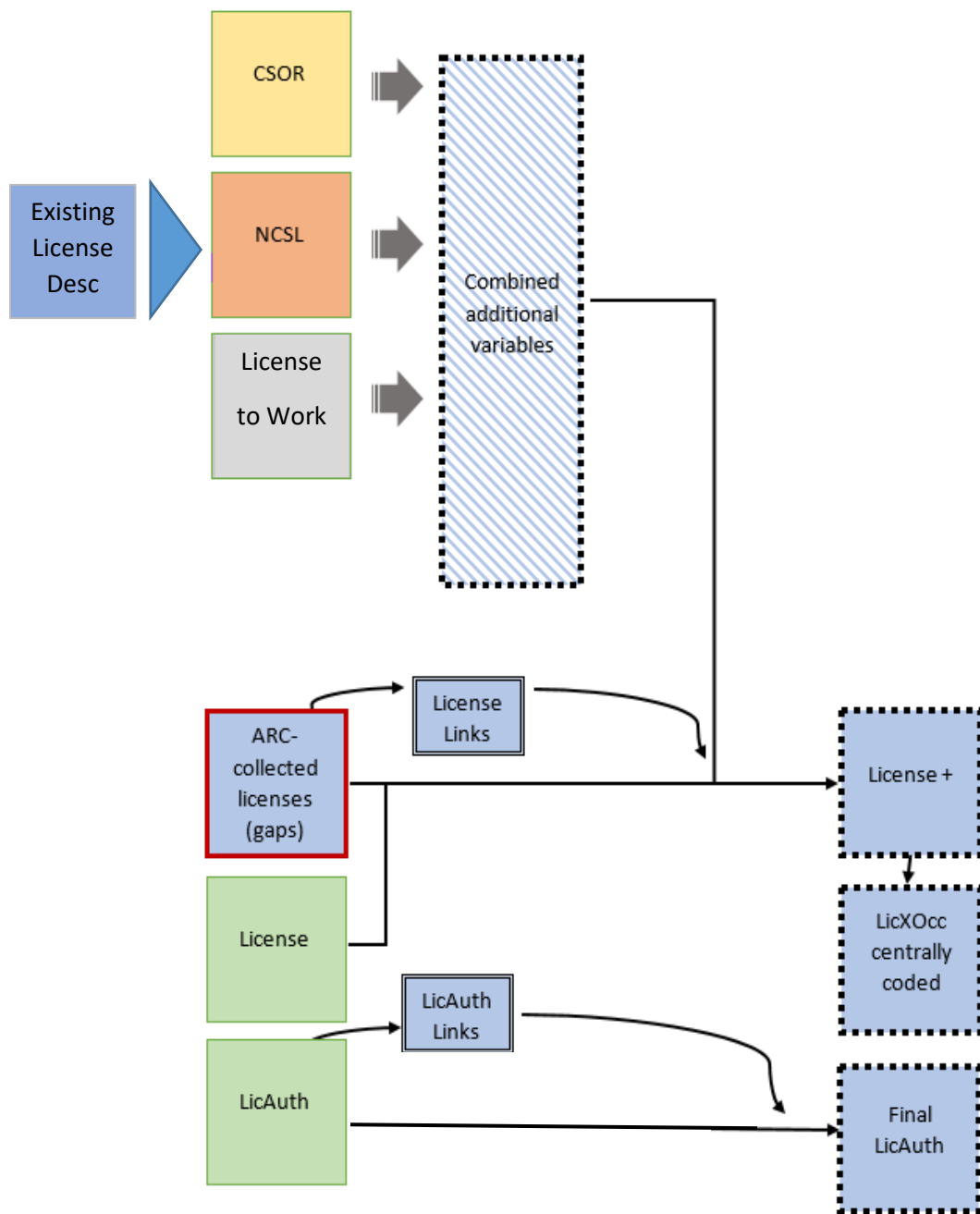
Limitations of use

Despite the checks and the improvements, there's still room for improvement. Particularly in certain areas (trades, fishing licenses, sales), coding can be improved and some licenses should probably be excluded as not strictly meeting the definition of occupational licenses. We're much closer, but further research projects and review should happen to ensure that we continue to add and clean content systematically.

Improving Coverage

In looking for licenses that weren't in the data set we used a number of different approaches. First, we considered licensing authorities. Many states leave boards or departments largely independent in their licensure role, with no obligation to share details with a central tracking agency and potentially without a departmental affiliation or much of a web presence. Because of this it's easy for a licensing authority to be missed by the people collecting the information. To remedy that, we reviewed the types of boards each state had to see if they were missing an entire category of licenses, and we did a broader approach of using web scraping to return state boards. The second approach was to look at the licenses themselves and compare them to licenses found by other organizations working on occupational licensure. Finally, we reviewed common licenses and manually looked at states that lacked them.

Licensing Authorities

The biggest challenge with licensing authorities is in understanding their structure. Some states will have a general Regulatory department and all boards fall under it. Some states will have all the medical or business licenses organized that way but other categories are completely unconnected and handled differently. Other states have no consistency between boards or departments at all. States then label the boards they find inconsistently. If the Department of Education supervises three licensing boards – Board of Teaching, Board of Library Science, and Board of School Administration – some states would assign all licenses to a single "Department of Education" licensing authority and others would break them out separately. As a consequence, knowing that the Board of Library Science exists for a given state but that it's not in the licauth table does not necessarily mean that its licenses are not included. So while the results of web scraping were manually reviewed to prevent duplication, they were not so closely examined that we can guarantee they're all valid additions to the data set. However, we're asking states to review them when it comes time to next submit and expect to confirm or remove them all in the next submission cycle.

	Distinct Licensing Authorities by Source							
State		State Submit	Central Collect	Obtained Via Scraping	Total	Percent from State	Percent Centrally Collected	Percent Scraped from Web
00	US	9	2	0	11	81.8	18.2	0.0
01	Alabama	60	1	1	62	96.8	1.6	1.6
02	Alaska	74	1	0	75	98.7	1.3	0.0
60	American Samoa	0	2	4	6	0.0	33.3	66.7
04	Arizona	49	1	0	50	98.0	2.0	0.0
05	Arkansas	86	1	0	87	98.9	1.1	0.0
06	California	71	1	1	73	97.3	1.4	1.4
08	Colorado	41	1	6	48	85.4	2.1	12.5
09	Connecticut	29	2	20	51	56.9	3.9	39.2
10	Delaware	44	1	0	45	97.8	2.2	0.0
11	District of Columbia	4	4	17	25	16.0	16.0	68.0
12	Florida	10	1	23	34	29.4	2.9	67.6
13	Georgia	49	1	5	55	89.1	1.8	9.1
66	Guam	12	1	0	13	92.3	7.7	0.0
15	Hawaii	45	16	0	61	73.8	26.2	0.0
16	Idaho	63	1	1	65	96.9	1.5	1.5
17	Illinois	30	1	18	49	61.2	2.0	36.7

18	Indiana	51	1	1	53	96.2	1.9	1.9
19	Iowa	56	1	0	57	98.2	1.8	0.0
20	Kansas	31	1	1	33	93.9	3.0	3.0
21	Kentucky	71	1	2	74	95.9	1.4	2.7
22	Louisiana	78	1	3	82	95.1	1.2	3.7
23	Maine	29	1	20	50	58.0	2.0	40.0
24	Maryland	50	3	5	58	86.2	5.2	8.6
25	Massachusetts	64	1	0	65	98.5	1.5	0.0
26	Michigan	127	1	2	130	97.7	0.8	1.5
27	Minnesota	51	1	4	56	91.1	1.8	7.1
28	Mississippi	20	4	9	33	60.6	12.1	27.3
29	Missouri	39	2	2	43	90.7	4.7	4.7
30	Montana	57	1	0	58	98.3	1.7	0.0
31	Nebraska	55	1	0	56	98.2	1.8	0.0
32	Nevada	63	1	2	66	95.5	1.5	3.0
33	New Hampshire	73	2	1	76	96.1	2.6	1.3
34	New Jersey	80	1	0	81	98.8	1.2	0.0
35	New Mexico	50	1	0	51	98.0	2.0	0.0
36	New York	64	1	5	70	91.4	1.4	7.1
37	North Carolina	152	1	4	157	96.8	0.6	2.5
38	North Dakota	47	1	0	48	97.9	2.1	0.0
69	Northern Mariana Islands	4	2	0	6	66.7	33.3	0.0
39	Ohio	40	1	2	43	93.0	2.3	4.7
40	Oklahoma	49	1	2	52	94.2	1.9	3.8
41	Oregon	65	1	5	71	91.5	1.4	7.0
42	Pennsylvania	29	2	1	32	90.6	6.3	3.1
72	Puerto Rico	0	59	0	59	0.0	100.0	0.0
44	Rhode Island	37	2	15	54	68.5	3.7	27.8
45	South Carolina	42	2	2	46	91.3	4.3	4.3
46	South Dakota	38	2	1	41	92.7	4.9	2.4
47	Tennessee	89	1	0	90	98.9	1.1	0.0
48	Texas	56	3	2	61	91.8	4.9	3.3
49	Utah	12	1	12	25	48.0	4.0	48.0
50	Vermont	63	1	1	65	96.9	1.5	1.5
78	Virgin Islands	0	3	13	16	0.0	18.8	81.3
51	Virginia	37	1	2	40	92.5	2.5	5.0
53	Washington	14	1	17	32	43.8	3.1	53.1
54	West Virginia	39	1	4	44	88.6	2.3	9.1
55	Wisconsin	55	1	0	56	98.2	1.8	0.0
56	Wyoming	46	1	1	48	95.8	2.1	2.1

Licenses

For individual licenses, existing data was cross-referenced both with existing alternate data sources and with other states. Where there was some indication that an occupation should be licensed (widely licensed in other states, present in another data set), a generic license was added and assigned to the appropriate occupational code. These additions are maintained separately from the core data product so that they're not overwritten as new data submissions come in, and so that states can be alerted to

likely new licenses. The licenses added centrally were federal securities licenses, Commercial Drivers Licenses (CDLs), and a handful of selected occupations including Architects, Landscape Architects, and Surveyors, Engineers, and Attorneys. The data set did not include licenses for Puerto Rico, either, and those were added centrally.

		License Source				Occupation Summary			
State		State Submit	Central Collect	Alternate Source	Total	Pct of Licenses Added	Pct of Distinct Occs Added	Number of Occs Licensed	Rank (highest to lowest)	Last Submit
01	Alabama	87	1	9	97	10.3%	6.3%	186	43	Pre 2015
02	Alaska	128	1	10	139	7.9%	6.1%	210	27	Sep-18
04	Arizona	108	1	10	119	9.2%	6.4%	200	33	Sep-13
05	Arkansas	304	1	4	309	1.6%	2.9%	243	10	Jul-19
06	California	356	1	6	363	1.9%	3.3%	274	3	Oct-18
08	Colorado	108	1	19	128	15.6%	10.6%	207	28	Pre 2015
09	Connecticut	339	3	9	351	3.4%	4.6%	282	2	Jul-17
10	Delaware	226	1	16	243	7.0%	10.1%	187	42	Oct-18
11	DC	44	13	21	78	43.6%	17.9%	153	51	Jun-16
12	Florida	190	1	15	206	7.8%	8.2%	220	24	Pre 2015
13	Georgia	176	1	13	190	7.4%	7.9%	203	30	Oct-17
15	Hawaii	74	4	6	84	11.9%	5.1%	176	46	Sep-18
16	Idaho	157	1	5	163	3.7%	4.1%	192	39	Mar-18
17	Illinois	387	14	9	410	5.6%	4.5%	310	1	Oct-14
18	Indiana	254	1	8	263	3.4%	4.6%	240	11	Pre 2015
19	Iowa	123	1	8	132	6.8%	5.5%	197	34	Jun-18
20	Kansas	100	1	11	112	10.7%	6.2%	225	20	Jun-13
21	Kentucky	248	1	5	254	2.4%	3.6%	221	23	Jun-18
22	Louisiana	102	1	20	123	17.1%	10.0%	229	16	Oct-17
23	Maine	368	1	16	385	4.4%	8.2%	231	15	Pre 2015
24	Maryland	117	8	45	170	31.2%	24.3%	201	31	Pre 2015
25	Massachusetts	127	1	14	142	10.6%	6.9%	245	9	May-18
26	Michigan	242	1	3	246	1.6%	2.2%	270	4	Nov-15
27	Minnesota	341	1	8	350	2.6%	4.0%	269	5	Oct-18
28	Mississippi	60	7	20	87	31.0%	22.6%	163	50	Jul-19
29	Missouri	125	3	10	138	9.4%	8.0%	173	48	Sep-18
30	Montana	160	1	9	170	5.9%	5.9%	201	32	Sep-18
31	Nebraska	189	1	3	193	2.1%	2.6%	227	19	Jul-19
32	Nevada	166	1	12	179	7.3%	6.4%	233	14	Jan-16
33	New Hampshire	149	1	9	159	6.3%	5.1%	237	13	Mar-18
34	New Jersey	194	1	9	204	4.9%	4.5%	261	7	Jun-13
35	New Mexico	195	1	8	204	4.4%	4.9%	225	21	Jan-18
36	New York	150	1	11	162	7.4%	6.5%	212	26	Jun-19
37	North Carolina	398	1	1	400	0.5%	1.5%	266	6	Jul-19
38	North Dakota	123	1	11	135	8.9%	7.1%	196	35	Apr-18
39	Ohio	88	1	24	113	22.1%	13.7%	196	36	Apr-17
40	Oklahoma	261	1	6	268	2.6%	4.2%	213	25	Jun-18
41	Oregon	311	1	12	324	4.0%	6.0%	247	8	Apr-18
42	Pennsylvania	110	8	25	143	23.1%	16.7%	173	49	Jan-17
44	Rhode Island	154	1	13	168	8.3%	6.9%	228	17	Mar-18
45	South Carolina	183	2	11	196	6.6%	7.7%	195	37	Jun-13

46	South Dakota	183	3	1	187	2.1%	2.2%	228	18	Jul-17
47	Tennessee	199	1	6	206	3.4%	4.0%	223	22	Sep-18
48	Texas	93	11	16	120	22.5%	15.8%	194	38	Jul-19
49	Utah	98	1	7	106	7.5%	5.3%	186	44	Nov-17
50	Vermont	107	0	10	117	8.5%	5.3%	188	41	Oct-17
51	Virginia	94	1	13	108	13.0%	8.5%	189	40	May-14
53	Washington	160	1	14	175	8.6%	8.3%	205	29	Jun-16
54	West Virginia	86	2	33	121	28.9%	21.3%	174	47	Pre 2015
55	Wisconsin	297	1	6	304	2.3%	3.7%	239	12	May-17
56	Wyoming	98	1	5	104	5.8%	4.3%	185	45	Oct-17

Occupations that are Universally Licensed

As part of the review process, the number of states that license a given occupation is examined to see if there is any license that regulates that occupation. In the table below, records are restricted to the 50 states and Washington DC, so the total possible is 51. These are all occupations where at least 48 of those have a license. In some cases where the number is below 51 it's been confirmed – Colorado doesn't license Funeral Service Managers except through the business license. In some cases (psychologists and counselors) there are related detailed licenses but it's unclear if the license encompasses more than one ONET occupation. In several cases, the missing license is in Washington DC and it's unclear if the lack is because of their unique geographic and political circumstances or if it needs to be added. In any case, occupational licensure of these occupations is so common as to be universal.

ONET Code		Title	Number of States
	11	Management	
	11902100	Construction Managers	51
	11906100	Funeral Service Managers	49
	11911100	Medical and Health Services Managers	51
	13	Business and Financial Operations	
	13201101	Accountants	51
	13202102	Appraisers, Real Estate	51
	17	Architecture and Engineering	
	17101100	Architects, Except Landscape and Naval	51
	17101200	Landscape Architects	51
	17102200	Surveyors	51
	17201100-17219911	All Engineers	49-51
	19	Life, Physical, and Social Science	
	19303101	School Psychologists	48
	19303102	Clinical Psychologists	51
	19303103	Counseling Psychologists	48
	19303200	Industrial-Organizational Psychologists	48
	19303900	Psychologists, All Other	48
	19303901	Neuropsychologists and Clinical Neuropsychologists	48
	21	Community and Social Service	
	21101100	Substance Abuse and Behavioral Disorder Counselors	49

21101300	Marriage and Family Therapists	51
21101400	Mental Health Counselors	51
21102100	Child, Family, and School Social Workers	51
21102200	Healthcare Social Workers	51
21102300	Mental Health and Substance Abuse Social Workers	51
23	**Legal**	
23101100	Lawyers	51
25	**Educational Instruction and Library**	
25119400	Vocational Education Teachers, Postsecondary	50
25201200	Kindergarten Teachers, Except Special Education	51
25202100	Elementary School Teachers, Except Special Education	51
25202200	Middle School Teachers, Except Special and Career/Technical Education	51
25202300	Career/Technical Education Teachers, Middle School	51
25203100	Secondary School Teachers, Except Special and Career/Technical Education	51
25203200	Career/Technical Education Teachers, Secondary School	51
25205200	Special Education Teachers, Kindergarten and Elementary School	51
25205300	Special Education Teachers, Middle School	51
25205400	Special Education Teachers, Secondary School	51
29	**Healthcare Practitioners and Technical**	
29101100	Chiropractors	51
29102100	Dentists, General	51
29102200	Oral and Maxillofacial Surgeons	51
29102300	Orthodontists	51
29102400	Prosthodontists	51
29102900	Dentists, All Other Specialists	51
29104100-29106912	Doctors	51
29107100	Physician Assistants	51
29108100	Podiatrists	51
29112200	Occupational Therapists	51
29112300	Physical Therapists	51
29112600	Respiratory Therapists	50
29112700	Speech-Language Pathologists	51
29113100	Veterinarians	51
29114100	Registered Nurses	51
29114104	Clinical Nurse Specialists	49
29115100	Nurse Anesthetists	51
29116100	Nurse Midwives	50
29117100	Nurse Practitioners	51
29118100	Audiologists	50
29119901	Acupuncturists	50
29202100	Dental Hygienists	51

29204100	Emergency Medical Technicians and Paramedics	51
29206100	Licensed Practical and Licensed Vocational Nurses	51
29209200	Hearing Aid Specialists	51
29909100	Athletic Trainers	51
31	**Healthcare Support**	
31201100	Occupational Therapy Assistants	51
31201200	Occupational Therapy Aides	51
31202100	Physical Therapist Assistants	51
31901100	Massage Therapists	48
31909100	Dental Assistants	51
39	**Personal Care and Service**	
39403100	Morticians, Undertakers, and Funeral Directors	49
39501100	Barbers	48
39501200	Hairdressers, Hairstylists, and Cosmetologists	51
41	**Sales and Related**	
41302100	Insurance Sales Agents	51
41902100	Real Estate Brokers	48
41902200	Real Estate Sales Agents	51
51	**Production**	
51803100	Water and Wastewater Treatment Plant and System Operators	50
53	**Transportation and Material Moving**	
53302100	Bus Drivers, Transit and Intercity	51
53302200	Bus Drivers, School or Special Client	51
53303200	Heavy and Tractor-Trailer Truck Drivers	51

Occupational groupings that have no representatives on the list include:

- 15 Computer and Mathematical
- 27 Arts, Design, Entertainment, Sports, and Media
- 33 Protective Service
- 35 Food Preparation and Serving Related
- 37 Building and Grounds Cleaning and Maintenance
- 43 Office and Administrative Support
- 45 Farming, Fishing, and Forestry
- 47 Construction and Extraction
- 49 Installation, Maintenance, and Repair

Protective service is regulated, but it's unclear at what level. Police and Fire are largely government employees and may be subject to regulation at the state or city level, but it could be determined by the agency rather than being a general occupational license – some states do include them.

Construction is excluded because most contractors are coded to construction managers.

The main outlier on that list is Computer and Mathematical, which has very few licensed occupations in any state. These are also the occupations that have the most available certifications and though they're high-skilled they're rarely directly customer-facing. It's possible this is an example of what self-regulation in credentialing would look like, or it may be that they're under-represented because many are relatively recent occupations, or occupations that have recently grown and transformed.

For more details on how individual occupations were handled, please see Appendix A: Detailed Occupations.

What are the common characteristics of licensed occupations?

Occupations that have an associated license may not necessarily require the license to work in the field; sometimes only the supervising worker needs the license, or sometimes the license is only required in certain industries, and sometimes the license is only required for parts of the job or to present oneself as a "Licensed…" occupation. This is important to recognize when relating licensed occupations back to wage and employment data – the Percent of Workers is an upper limit of workers who may require a license, not of those who definitely do.

To compare wages of licensed occupations vs unlicensed without access to a survey of license holders, we matched the occupation with an associated license to the statewide OES data (employment and wage). The wages were weighted using the employment count and averaged based on their licensed or unlicensed status.

Overall, licensed occupations are better paid than average in every state. This is likely a function of only supervisory employees having to obtain the licenses and the types of occupations that tend to be licensed rather than an indication that the license itself increases wages. The majority of states license occupations that cover between 20 and 40 percent of state employment.

One caveat to the table below is that some states license occupations within a specific industry. The best example would be the Gaming industry – often, all workers in a casino need a license. When coded to occupation, this means that very common occupations (restaurant servers, janitorial staff) have an associated license. For states that license gaming workers then have an inflated percentage of potentially licensed workers in this table – all of the top 10 states by rank have regulated casinos or race tracks.

| State | | OES Year | Unlicensed | | Licensed | | Rank |
			Weighted Average Wage	Percent of Workers	Weighted Average Wage	Pct of Jobs that may Req License	
00	Federal	2018	$22.49	92.3%	$34.53	7.1%	
01	Alabama	2018	$18.27	78.2%	$25.40	20.4%	46
02	Alaska	2018	$22.94	68.0%	$31.91	28.2%	18
04	Arizona	2018	$20.61	77.1%	$28.79	21.4%	41
05	Arkansas	2018	$16.67	65.7%	$22.28	32.9%	11
06	California	2018	$24.58	71.9%	$32.31	26.9%	21
08	Colorado	2018	$22.11	68.4%	$32.39	29.6%	16
09	Connecticut	2018	$23.86	49.1%	$29.93	48.7%	1
10	Delaware	2018	$21.97	71.1%	$27.85	22.5%	36
11	District of Columbia	2018	$38.24	80.1%	$51.84	16.8%	50

12	Florida	2018	$19.48	69.6%	$24.34	28.7%	17
13	Georgia	2018	$21.13	72.8%	$23.36	25.4%	27
15	Hawaii	2018	$22.82	75.5%	$26.50	21.4%	42
16	Idaho	2018	$17.84	77.6%	$25.15	19.9%	47
17	Illinois	2018	$20.82	50.8%	$26.96	46.9%	2
18	Indiana	2018	$18.96	62.7%	$22.81	36.2%	8
19	Iowa	2018	$18.99	75.6%	$25.32	23.3%	33
20	Kansas	2018	$19.36	62.6%	$21.97	34.8%	9
21	Kentucky	2018	$17.37	72.6%	$25.12	26.0%	24
22	Louisiana	2018	$17.23	68.1%	$23.82	29.8%	15
23	Maine	2018	$19.28	74.7%	$26.04	23.6%	31
24	Maryland	2018	$23.51	72.2%	$34.49	25.8%	25
25	Massachusetts	2018	$26.08	54.7%	$31.63	44.0%	5
26	Michigan	2018	$20.14	55.4%	$24.87	41.8%	6
27	Minnesota	2018	$21.83	62.0%	$27.84	36.4%	7
28	Mississippi	2018	$16.35	81.8%	$22.79	16.3%	51
29	Missouri	2018	$19.76	80.8%	$26.71	17.7%	49
30	Montana	2018	$18.06	75.7%	$25.07	22.0%	38
31	Nebraska	2018	$19.48	68.1%	$24.24	30.2%	14
32	Nevada	2018	$19.38	73.9%	$25.45	24.0%	30
33	New Hampshire	2018	$20.16	71.8%	$32.08	26.9%	20
34	New Jersey	2018	$24.93	53.5%	$26.65	45.2%	4
35	New Mexico	2018	$17.93	71.0%	$26.58	26.3%	22
36	New York	2018	$26.80	73.9%	$28.62	25.4%	26
37	North Carolina	2018	$20.04	67.2%	$24.04	31.9%	12
38	North Dakota	2018	$21.14	76.2%	$26.30	21.2%	44
39	Ohio	2018	$20.48	74.2%	$24.58	25.0%	29
40	Oklahoma	2018	$18.10	73.0%	$26.01	25.4%	28
41	Oregon	2018	$22.62	63.9%	$24.63	34.7%	10
42	Pennsylvania	2018	$21.07	76.0%	$26.76	23.2%	34
44	Rhode Island	2018	$26.08	92.2%	$32.93	45.8%	3
45	South Carolina	2018	$18.15	79.8%	$25.27	19.1%	48
46	South Dakota	2018	$16.89	71.8%	$24.18	26.1%	23
47	Tennessee	2018	$19.16	71.6%	$22.55	27.2%	19
48	Texas	2018	$19.89	75.4%	$29.77	23.3%	32
49	Utah	2018	$20.36	75.7%	$25.21	22.4%	37
50	Vermont	2018	$26.56	204.1%	$26.09	20.8%	45
51	Virginia	2018	$23.50	74.0%	$29.99	22.7%	35
53	Washington	2018	$24.84	76.8%	$33.77	21.2%	43
54	West Virginia	2018	$17.42	75.7%	$24.79	21.9%	39
55	Wisconsin	2018	$19.58	67.3%	$25.17	31.6%	13
56	Wyoming	2018	$20.45	76.4%	$26.32	21.6%	40
66	Guam	2018	$15.03	77.4%	$16.41	11.0%	52
72	Puerto Rico	2018	$12.64	93.9%	$20.31	3.2%	54
78	Virgin Islands	2018	$18.13	74.3%	$35.40	2.0%	55

Note: US territories data may be incomplete. United States is low because few occupations are licensed at a federal level and some federal licenses are military specific, which are not in the OES universe.

Future Enhancements

Data Cleaning

A lot of states submitted one license for each occupation, even where there is no actual distinction between an electrical and a civil engineering license, for example. The result is that licenses appear to be missing, either a result of the conversion to ONET coding or because changes don't get correctly adopted as things change. Additional guidance explaining the difference between the license and the licxocc may help future submissions.

There are also problems with data quality – sometimes license descriptions are unpopulated, sometimes there are typos in titles and descriptions, and sometimes license titles are unhelpful ("Secondary") for example. These kinds of issues need to be corrected at the state level so that cleaning efforts aren't overwritten as states re-submit data that has not incorporated the changes. However, the changes made in this project make it easier to identify those kinds of failings in the current data and also make it easier for states to have meaningful content – the indicator fields are easier for states to use than the description field.

Reciprocity and Veterans preference

While a few states have broad reciprocity agreements, the vast majority of such arrangements are actually handled at the license level. A license by endorsement or non-resident license may be an option for license holders from other states, particularly in high-skilled certified occupations. Identifying and quantifying those arrangements for more than 9000 licenses is a future endeavor, for when we've improved the data quality sufficiently to have more of that information to start with.

Certifications

Many licenses are closely tied to certifications. We've collected some of the most significant of those and related it back to the existing CareerOneStop certifications data, but because all of that information is collected centrally, the focus was on the most common such arrangements. In the future, more data could be collected.

Industry Classifications

Some licenses apply only to workers in a particular industry; Casino workers, for example, have to obtain a license no matter their occupation in several states, which means that there are licenses for waitresses and cleaning staff in those states. While we've identified the major groups to associate with industries, a systematic review hasn't been completed. Being able to distinguish the circumstances in which an occupation would be licensed would improve the use value of the data and allow us to filter out a lot of those special case licenses.

Licensing Authorities

As part of this project, we added licensing authorities to the database that were obtained through web scraping. Some of those are orphaned – they have no associated licenses. Those need to be further reviewed and any licenses tied to them added to the database.

Trades

Coverage of occupations in the trades may be more consistent than for white collar workers because of how states distinguish between business and occupational licenses. A more systematic method for identifying the overlap could be developed.

Time Series

Right now we have the current snapshot of licenses as well as prior versions dating back to 2018. As the data quality and review gets more consistent, it would be nice to be able to create a time series to track changes to the licensed occupations going forward. There's more complexity in that, since distinguishing between a poorly coded or missing license and a genuine change in requirements is not a simple task, but hopefully it can eventually be tracked.

Territories

The US Territories have spotty data and unknown last submission dates. Puerto Rico has been collected, but the other territories need further review.

National

Federal licenses are added as we identify different areas that do have national oversight. Unfortunately, there's not a central repository of that information, and knowing what to search for remains a problem.

Research

There's a lot still to be explored analyzing the types of occupations that are licensed and their ONET characteristics. There's a lot more depth that can be explored looking at wages and coverage, as well – for example, is the reason Connecticut has a much higher percent of workers potentially in need of a license because they license more occupations, or because they have a disproportionate share of workers in a heavily licensed industry – e.g. financial and securities. Another direction to investigate would be comparing to CPS survey results about how many workers say they have a license to see if there are any particular inconsistencies. Finally, comparing the indicator values and certifications crosswalk across states to see how similar licensure requirements are for different occupations could be well worth investigating. Appendix B summarizes some of the ONET categories that could be useful.

Appendix A: Detailed Occupations

Airplanes

Pilots and other airplane-related occupations are regulated nationally by the Federal Aviation Administration (FAA), but there are satellite offices in many states. Because they're required to work, some states have interpreted them as state licenses and included the license, along with the local office, as state data. When we weed those out, the majority of state-licensed pilot and airplane-related occupations are managed by Agriculture departments – they are aerial pesticide pilots and applicators. Airline pilot is well-represented in the table below, as well, but most of those are vague listings and occupation codes are assigned broadly to them.

stfips	areaname	fed	Air Control	Air Dispatch	Airline Pilot	Air Mechanic	Air Operations	Commercial Pilot
0	US	Fed	1	1	6	1	0	2
28	Mississippi	State	0	0	4	0	0	3
6	California	State	1	0	2	0	0	1
37	North Carolina	State	0	0	2	0	0	2
41	Oregon	State	0	0	2	0	0	1
45	South Carolina	State	0	0	2	0	0	1
5	Arkansas	State	0	0	0	0	0	2
26	Michigan	State	0	0	0	0	2	0
27	Minnesota	State	0	0	0	0	0	1
4	Arizona	State	0	0	0	0	0	1
47	Tennessee	State	0	0	0	0	0	1

Referring to Federal Aviation Association in State Listing

stfips	areaname	fed	Air Control	Air Dispatch	Airline Pilot	Air Mechanic	Air Operations	Commercial Pilot
37	North Carolina	Fed	0	1	6	1	0	3
1	Alabama	Fed	1	0	4	1	0	1
20	Kansas	Fed	0	0	4	1	0	1
31	Nebraska	Fed	0	0	2	1	0	3
56	Wyoming	Fed	0	0	4	1	0	1
12	Florida	Fed	0	0	2	2	0	1
2	Alaska	Fed	0	1	2	1	0	1
32	Nevada	Fed	0	0	2	1	0	1
30	Montana	Fed	0	0	2	1	0	1
49	Utah	Fed	0	0	2	1	0	1

Auto Mechanics

A number of auto maintenance occupations are licensed in states. Some very specific occupations are licensed in only one state (auto glass installers, vehicle registration inspectors), others have vague associated information but are likely business licenses (including the terms "manufacturer", coded to Mechanic, and "dealer", coded to Retail Sales). Emissions inspectors are the most reliable of the auto maintenance occupational licenses, but they're restricted to only a handful of states.

stfips	areaname	CarGlass	CarInspect	CarMechanic	CarSale	Emissions
8	Colorado	0	0	0	6	0
9	Connecticut	5	0	0	1	0
5	Arkansas	0	0	0	6	0
42	Pennsylvania	0	0	1	4	0
6	California	0	1	0	2	1
17	Illinois	0	0	1	3	0
13	Georgia	0	0	0	3	0
47	Tennessee	0	0	1	2	0
37	North Carolina	0	0	0	2	1
34	New Jersey	0	0	0	0	2
27	Minnesota	0	0	1	1	0
31	Nebraska	0	0	0	1	0
32	Nevada	0	0	0	1	0
49	Utah	0	0	0	1	0
55	Wisconsin	0	0	0	1	0
15	Hawaii	0	0	0	1	0
21	Kentucky	0	0	0	1	0
22	Louisiana	0	0	0	1	0
24	Maryland	0	0	0	0	1

25-1194.00   Vocational Education Teachers, Postsecondary

There's a lot that falls under here, some of which might be tied to provider rather than individual. Beyond instructors at vocational colleges, this also includes self-defense instructors, firearms instructors, police instructors, real estate instructors, defensive driving instructors, but mostly barber instructors

Notary Public

Notaries are people who facilitate the signing of official documents, verifying identity and keeping a record of their signatures. It's not a profession, but a qualification that people working in banks and local government often obtain. According to the National Notary Association, every state has the qualification, but only 11 have submitted data along with their occupational licenses. These have been coded to Tellers and Office and Administrative Workers, All other and their license type has been assigned to "Secondary License" so they can be filtered out rather than adding more.

Architects and Technical

Every state licenses landscape architects, architects, and surveyors. About half license interior designers and environmental science technicians and geologists. A handful license land conservation officers and landfill operators (might be a business license, but coded to general and operations managers). A couple license archeologists and software developers.

General and Operations Managers	11
Range Managers	6

Soil and Water Conservationists		6			
Environmental Science and Protection Technicians, Including Health		23			
Interior Designers		24			
Landscape Architects		51			
Geoscientists, Except Hydrologists and Geographers		29			
Architects, Except Landscape and Naval		51			
Archeologists		2			
Surveyors		51			
Software Developers, Systems Software		1			

Contractors

Contractors are dubious, since they're often business licenses and sometimes only the supervising person needs an occupational license. They also tend to require bonds and insurance – they're at least partially there to confirm their ability to repay damages rather than their qualifications to do the work. Many of these categories get assigned broadly to 2 or 3 occupations, since it's difficult to narrow it more than that.

AboveGround	2	Foundation	4	PumpAndWell	14		
Asbestos	26	Gas	12	Radon	5		
BoilerPlumber	3	GenContractor	30	RefrigMech	11		
BuildingInspect	38	HazardousMat	18	Roof	6		
Carpenter	4	HVAC	35	SanitarySewer	12		
Concrete	4	ManfdHome	22	Scaffolding	1		
Crane	12	Mason	3	SheetMetal	7		
Deck	1	MedicalGas	4	SidingCeiling	3		
Drywall	3	MineForeman	13	Solar	7		
EarthMoving	3	Mining	10	SteamEngineer	15		
Electrician	46	Painter	4	Steel	4		
Elevator	25	PaperHanging	1	Tile	2		
EnvComp	20	PipeFitter	31	WasteWater	40		
Explosive	21	Plaster	3	Weatherization	1		
Fencing	1	Plumber	42	Welder	6		
Floor	4	PoolAndSpa	3	Window	4		

Death

Another industry that's heavily regulated is the funeral industry. It's very inconsistent which occupation titles require a license – some are broad and seem to cover many tasks and others are very specific. Funeral workers are pretty broad in scope. While embalmers and morticians and funeral service managers are often explicitly licensed, Cemetery Grounds Workers, Cemetery Plot Sales, Funeral Insurance and some specific types of funeral attendants show up under many different names but too

infrequently to be clear that it's the same activity being regulated across many states. These wind up in general occupations (Personal Care, All Other or Sales Representatives) and may be more easily identified once they're assigned an industry.

Coroners	4
Embalmers	31
Funeral Attendants	18
Funeral Service Managers	49
Grounds Maintenance Workers, All Other	1
Morticians, Undertakers, and Funeral Directors	49
Personal Care and Service Workers, All Other	2
Sales Representatives, Services, All Other	11

Taxidermists and Tattoo Artists

These don't have specific associated occupations and both get rolled in under Artists and Related Workers, All Other, however, both are fairly prevalent in terms of the number of states that license them. Tattoo artists and body piercers are also coded to Personal Care and Service Workers, All Other.

Tattoo	21
Taxidermist	15

Cosmetologist

Cosmetology is universally licensed, but the structure of the license (or how it's submitted) varies quite a bit. As a result, the various cosmetology occupations have a lot of duplication – some licenses are assigned to multiple occupations. The ones that are not may roll a secondary function into the main license, but it's not being picked up because the title is different. It would be safe to assume that if workers are touching customers' face or hair they likely need to meet some kind of regulatory requirements.

Artists and Related Workers, All Other	9
Barbers	49
Hairdressers, Hairstylists, and Cosmetologists	52
Makeup Artists, Theatrical and Performance	9
Manicurists and Pedicurists	43
Personal Care and Service Workers, All Other	34
Shampooers	8
Skincare Specialists	45

Legal Occupations

Attorneys are universally licensed and many states have a non-resident or temporary option for attorneys relocating to their state. One state also licenses paralegals. Bail Bondsmen are licensed frequently and are coded to Finanacial Specialists, All Other. Court Reporters and Process Servers are licensed in most states

stfips	areaname	Attorney	BailBond	CourtReport	Lobbyist	PvtInvestigator
5	Arkansas	1	1	1	1	3
9	Connecticut	2	3	2	1	1
37	North Carolina	1	3	0	1	2
32	Nevada	1	2	2	0	1
33	New Hampshire	1	2	1	1	1
6	California	1	3	1	0	1
53	Washington	2	0	2	0	2
13	Georgia	1	0	0	0	4
17	Illinois	1	0	2	1	1
19	Iowa	1	1	1	0	2
22	Louisiana	1	0	1	0	3
38	North Dakota	1	1	0	1	2
40	Oklahoma	1	2	1	0	1
41	Oregon	1	0	1	1	2
26	Michigan	1	1	1	1	1
27	Minnesota	1	1	0	1	1
30	Montana	1	0	1	0	2
31	Nebraska	1	0	1	1	1
34	New Jersey	1	1	1	0	1
35	New Mexico	1	0	0	0	3
2	Alaska	1	0	1	0	2
4	Arizona	1	0	2	0	1
12	Florida	1	1	0	0	2
47	Tennessee	1	0	1	0	2
48	Texas	1	0	2	0	1
49	Utah	1	1	1	0	1
44	Rhode Island	1	1	0	1	0
55	Wisconsin	1	0	0	1	1
20	Kansas	1	0	1	0	1
21	Kentucky	1	0	1	0	1
15	Hawaii	1	0	1	0	1
16	Idaho	1	1	1	0	0
36	New York	1	0	1	0	1
24	Maryland	1	0	0	1	1
25	Massachusetts	1	0	0	0	1
28	Mississippi	2	0	0	0	0
29	Missouri	2	0	0	0	2
39	Ohio	1	0	0	0	1
23	Maine	1	0	0	0	1
8	Colorado	1	1	0	0	0
54	West Virginia	1	0	0	0	1

50	Vermont	1	0	0	0	1
51	Virginia	1	0	0	0	0
46	South Dakota	2	1	0	0	0
56	Wyoming	1	0	0	0	0
66	Guam	1	0	0	0	0
69	Northern Mariana Islands	1	0	0	0	0
1	Alabama	1	0	0	0	0
10	Delaware	1	0	0	0	0
18	Indiana	1	0	0	0	0
42	Pennsylvania	1	0	0	0	0
11	District of Columbia	1	0	0	0	0
72	Puerto Rico	1	0	0	0	0
78	Virgin Islands	1	0	0	0	0
60	American Samoa	1	0	0	0	0
45	South Carolina	1	0	0	0	0

Hazardous materials abatement

Some construction occupations can get licenses for handling toxic materials. Mostly these are Explosives, Lead, Asbestos, and Radon.

These are coded to

19409100 Environmental Science and Protection Technicians, Including Health
47213100 Insulation Workers, Floor, Ceiling, and Wall
47213200 Insulation Workers, Mechanical
47404100 Hazardous Materials Removal Workers
47503100 Explosives Workers, Ordnance Handling Experts, and Blasters

stfips	areaname	Explosive	HazardousMat (mostly lead)	Asbestos	Radon
9	Connecticut	4	13	6	0
55	Wisconsin	8	8	3	0
17	Illinois	4	5	5	4
5	Arkansas	0	7	4	0
33	New Hampshire	1	6	3	0
34	New Jersey	1	3	2	4
40	Oklahoma	1	5	3	0
19	Iowa	1	4	2	2
26	Michigan	0	5	4	0
27	Minnesota	0	6	3	0
21	Kentucky	2	6	0	0
42	Pennsylvania	0	5	3	0

stfips	areaname				
6	California	3	1	3	0
44	Rhode Island	1	3	0	2
50	Vermont	1	2	1	0
37	North Carolina	0	0	4	0
12	Florida	0	0	4	0
25	Massachusetts	0	3	1	0
31	Nebraska	0	1	2	1
24	Maryland	1	0	2	0
46	South Dakota	0	0	3	0
47	Tennessee	2	0	0	0
35	New Mexico	1	0	1	0
36	New York	1	0	1	0
2	Alaska	1	0	1	0
8	Colorado	0	0	2	0
10	Delaware	0	0	2	0
20	Kansas	1	0	0	0
23	Maine	1	0	0	0
32	Nevada	1	0	0	0
30	Montana	1	0	0	0
48	Texas	0	0	1	0
51	Virginia	1	0	0	0
54	West Virginia	0	0	1	0
41	Oregon	0	1	0	0

Fire

Most states don't explicitly license fire fighters, though departments do have standards and academies to train professionals in the field. More frequently, Fire suppression system installers and designers and salespeople are licensed. Fire inspectors are also sometimes licensed. Because ONET doesn't distinguish between Fire Alarms and other Security Systems (and neither do some licenses), Alarm Systems in this case includes security systems that have no explicit fire protection purpose. Most, however, do mention fire.

stfips	areaname	FireFighter	FireForest	FireInspect	FireProtect	AlarmSystems
40	Oklahoma	0	0	1	0	21
5	Arkansas	1	1	1	1	6
9	Connecticut	1	3	0	6	0
34	New Jersey	1	2	1	3	2
26	Michigan	1	0	0	1	4
27	Minnesota	1	1	0	4	0
12	Florida	0	0	0	0	5
6	California	0	1	0	2	2
39	Ohio	2	2	1	0	0
47	Tennessee	0	0	0	0	5

stfips	areaname					
44	Rhode Island	0	1	0	1	2
17	Illinois	1	1	0	0	2
31	Nebraska	0	0	0	2	1
1	Alabama	1	1	0	0	1
21	Kentucky	0	0	0	0	3
37	North Carolina	0	0	0	0	3
45	South Carolina	0	0	0	0	2
48	Texas	0	0	0	0	2
50	Vermont	0	0	0	0	2
51	Virginia	0	0	1	1	0
55	Wisconsin	0	0	0	1	1
33	New Hampshire	1	1	0	0	0
19	Iowa	0	0	0	1	1
30	Montana	0	0	0	1	1
32	Nevada	0	0	0	1	0
22	Louisiana	0	0	0	0	1
23	Maine	0	0	0	1	0
25	Massachusetts	0	0	0	0	1
13	Georgia	0	0	0	0	1
49	Utah	0	0	0	0	1
41	Oregon	0	1	0	0	0
42	Pennsylvania	0	0	1	0	0
36	New York	0	0	0	0	1

Police and Security workers, Forensic specialists, Locksmiths

Security professionals are often licensed, but there are many specific occupations within the broad category which are inconsistently licensed. Locksmiths are sometimes (though there may be city licenses that are not included in the data). Corrections officers, detention officers, and jailers are sometimes licensed, though they may be subject to department-level credentialing rather than state licenses. Peace officers, police, and probation officers are the same. Forensic Technicians are licensed in many states, but the category includes many types of jobs - Polygraph (most common), Closed Circuit Television Managers, Blood Alcohol Analyzers, and Drug Lab Cleanup Workers. Security workers are usually explicitly licensed by the setting the work in – private business, schools, or courts. It also includes different tiers within the profession, with managers sometimes explicitly broken out, or canine security handlers.

stfips	areaname	LockSmith	Corrections	ForensicTech	PeaceOff	Probation	Security
17	Illinois	1	1	5	2	0	4
40	Oklahoma	3	0	5	1	0	1
41	Oregon	1	1	2	1	1	2

47	Tennessee	2	0	2	0	1	3
16	Idaho	0	4	0	1	3	0
5	Arkansas	0	0	1	2	0	4
6	California	4	0	0	0	0	3
35	New Mexico	0	0	1	1	0	5
37	North Carolina	2	0	2	0	1	1
53	Washington	0	0	2	0	0	3
26	Michigan	0	1	3	0	1	0
23	Maine	0	0	4	0	0	0
24	Maryland	0	2	0	1	1	0
21	Kentucky	0	0	2	2	0	0
4	Arizona	0	1	1	1	0	1
9	Connecticut	1	0	0	2	0	1
12	Florida	0	2	0	1	0	1
38	North Dakota	0	0	0	1	0	3
51	Virginia	0	0	1	0	0	3
56	Wyoming	0	2	0	1	0	0
32	Nevada	0	0	1	0	0	2
33	New Hampshire	0	1	0	1	0	1
49	Utah	0	0	1	0	1	1
22	Louisiana	0	0	2	0	0	1
27	Minnesota	0	0	0	1	0	2
19	Iowa	0	0	1	0	0	1
13	Georgia	0	0	0	0	0	2
1	Alabama	0	0	1	1	0	0
48	Texas	0	0	1	1	0	0
34	New Jersey	1	0	0	0	0	1
30	Montana	0	0	0	0	0	2
31	Nebraska	0	0	1	1	0	0
36	New York	0	0	0	0	0	2
39	Ohio	0	0	0	0	0	1
46	South Dakota	0	0	1	0	0	0
50	Vermont	0	0	1	0	0	0
54	West Virginia	0	0	1	0	0	0
55	Wisconsin	0	0	0	0	0	1
2	Alaska	0	0	0	0	0	1
8	Colorado	0	0	0	1	0	0
29	Missouri	0	0	0	1	0	0

Fireworks

15 states license fireworks handlers at the state level. 19 states license fishing, hunting, or backwoods guides and outfitters.

Fireworks   15
Guide   19

Animals

Licensure of Veterinarians is universal, veterinary technicians is very high. Horse and Dog Racing has many occupations for the care of animals, and they're licensed in 14 states. Trainers are also associated with the racing industry. Some states allow licensure of euthanasia technicians without otherwise being veterinary staff and they're licensed as animal control workers. Animal breeders are largely agricultural. Veterinary Technologists and Technicians are somewhat underreported, with four states having to have their license added after licenses were found in alternate data sources.

Animal Breeders	3
Animal Control Workers	4
Animal Trainers	4
Nonfarm Animal Caretakers	14
Veterinarians	52
Veterinary Assistants and Laboratory Animal Caretakers	3
Veterinary Technologists and Technicians	40

Casino and Gambling establishment (horse or greyhound racing) workers

Casinos tend to be licensed in three tiers – 1) all workers at the casino, including servers and retail sales and in the case of riverboat casinos, boat operators, 2) gambling-specific occupations like card dealers or pit managers, and 3) management and oversight occupations including bookkeepers and closed circuit television operators.

Not every state allows gambling generally or casinos specifically, so the states that license occupations in the industry are limited.

Lab technicians

Some states license lab workers handling genetic material or stem cells, some license them if they're working with radioactive material, soil scientists

Weighers

Fourteen states license "Weighers" or "Weighmasters". By description, many of them aren't limited to weighing one particular product, and they seem to be some of the oldest licenses on the books. The only product that is mentioned when the license is more specific, though, is agricultural products. As a result, these are coded to 45-2041.00 Graders and Sorters, Agricultural Products. Examples of license titles follow.

CERTIFIED PUBLIC WEIGHER
Certified Weigher's License
General Sampler's and Weigher's License
Limited Sampler's and Weigher's License

Milk Sampler - Weigher
MILK SAMPLER AND WEIGHER
MILK WEIGHER AND SAMPLER, BULK
PUBLIC WEIGHMASTER
Public Weighmaster
Weighmaster
Weighmaster, Public
Weighmaster, Public and Deputy (License)

Dealers

- Ag products
- Animals
- Bait, fish

- Hunting/trapping products
- Manufactured homes
- Pesticides

Trees

Arborists, forestry, tree farms

Hearing Aid Dispenser

Speech Pathologists and Audiologists are universally licensed but most states also have a secondary audiology license. It's often specifically a Hearing Aid Dispenser, but sometimes it appears to be an Audiology assistant with specific permissions regarding hearing aids. Sometimes they're described as hearing aid fitters instead.

CDLs and Professional Drivers

Per the Federal Motor Carrier Safety Administration (FMCSA), all states issue their own Commercial Driver's License (CDL) in compliance with federal standards. A CDL is a prerequisite for many types of jobs. In the following table, the count of CDLs includes licenses with either "commercial" and "driver" or "CDL" in the title. While relatively few states included a license by that name, all but 15 included some sort of large truck license. Bus driver licenses were nearly as popular, with Limo/Chauffer/Taxi licenses next, then Crane operators. Tow truck operators were infrequently licensed, but that may typically be a municipal or business license.

Because of the inconsistency in how CDLs are handled by state submissions, we collected it centrally for all states. CDLs (centrally collected) are assigned to Bus Drivers (School and Transit) and to Heavy Truck Drivers.

Some states also have Crane Operators, Taxis, Tow Truck drivers, or Limo Drivers licensed. Those show up infrequently.

Radio

From the Federal Communications Commission (FCC) site:

> *The FCC is responsible for managing and licensing the electromagnetic spectrum for commercial users and for non-commercial users including: state, county and local governments. This includes public safety, commercial and non-commercial fixed and mobile wireless services, broadcast television and radio, satellite and other services. In licensing the spectrum, the Commission promotes efficient and reliable access to*

the spectrum for a variety of innovative uses as well as promotes public safety and emergency response.

For the most part our data set reflects this. One state submitted a series of certifications as licenses (they may be required in the state, but they're associated with a Professional organization instead of a licensing board and so will be excluded from the final data set.

Some radio operators (those working on boats) are licensed by the US Coast Guard instead of the FCC.

Agriculture

While farmers and laborers aren't often regulated, a number of occupations related to agriculture are. Agricultural products (often explicitly dairy) are regulated about half the time. Specific types of agriculture are regulated in some states (aquaculture, trees, fishing, and nursery workers) about half the time. Occupations that involve natural resources – beekeepers, hunters, and wildlife rehabilitators or control workers – are regulated occasionally.

The most common agricultural occupations that are regulated, though, are those dealing with pesticides – handlers and applicators, as well as those selling pest management (pest control and farm advisors). Soil testers and scientists are also regulated about a quarter of the time.

AgBuyers	14	Florist	10
Aquaculture	5	Forester	14
Arborist	8	Hunter	13
BeeKeeper	2	PestControl	13
DairyProducts	23	PesticideHandler	30
FarmAdvis	12	SoilTester	12
Fish	17	Wildlife	6

Sales

A lot of states license salespeople. Generally, this is specific – like Auctioneers, Collections agents and debt settlement, and Pawnbrokers. Some types of instructors/for profit class operators are licensed (Drivers education, Firearms training). Then there's a broader Dealer Sales category. While the occupations are all clearly sales (or business licenses in disguise), it's heavily dependent on what they're selling. Some examples include – Home Medical Equipment, iterant vendors, agricultural products, furniture, currency exchange or money transmittal, lottery, vehicles, gold, and scrap metal.

Auctioneer	20
DealerSales	34
DebtCollection	17
DriversEd	18
Firearms	2
Pawnbroker	2

Other

There are a handful of licenses that don't quite fit into other categories –

Blacksmiths   BLACKSMITH

Blacksmiths   BLACKSMITH APPRENTICE
Blacksmiths   Horse Racing Blacksmith
Farmers   Organic Farmer
OSHA   CERTIFIED HEALTH OFFICER
OSHA   CERTIFIED INDUSTRIAL HYGIENIST
OSHA   Certified Prevention Specialist
OSHA   Industrial Hygienist
OSHA   Industrial Hygienist, Certified
OSHA   PREVENTION SPECIALIST
OSHA   PREVENTION SPECIALIST IN TRAINING
OSHA   PUBLIC HEALTH OFFICER
OSHA   Workplace Safety and Loss Prevention Consultant

Which occupations are not consistently licensed?

This is different from above, because some occupations are interesting because they're unique to a state – Construction Pilot Driver in Montana, for example.

Wildlife rehab

Hotels and Property Management

A handful of states license property management tasks, either associated with real estate management or condo associations, or hotel management in casinos.

Lodging Managers	4
Maids and Housekeeping Cleaners	1
Property, Real Estate, and Community Association Managers	4

Garbage

Some states license garbage haulers or disposers. The disposers are mostly landfills, so likely business licenses and are coded to general and operations managers. The haulers may also be business licenses, but they're coded to refuse and recyclable material collectors.

General and Operations Managers	7
Refuse and Recyclable Material Collectors	6

Pool and ride operators

Two states license Amusement Ride inspectors, 8 license ride or pool attendants, 2 license lifeguards, though one refers applicants to the local American Red Cross office, so that may instead be a requirement for businesses to employ certified staff.

Add-on licenses

Some licenses are for performing a particular job function, that's either not a typical part of the occupation or applies to many occupations. Notary Public, Expanded Role LPN Intravenous Therapy, aerial applicator, certified public accountant

Appendix B: ONET Tasks and Job Zones

Experts

This uses the importance value (scale of 1-5)

4.A.4.a.1   Interpreting the Meaning of Information for Others

Translating or explaining what information means and how it can be used.

Caretakers

This uses the importance value (scale of 1-5)

4.A.4.a.5   Assisting and Caring for Others

Providing personal assistance, medical attention, emotional support, or other personal care to others such as coworkers, customers, or patients.

Sales

This uses the importance value (scale of 1-5)

4.A.4.a.6   Selling or Influencing Others

Convincing others to buy merchandise/goods or to otherwise change their minds or actions.

Responsibility and leadership

This uses the highest of the scores for the following (scale of 1-5):

4.C.1.b.1.g   Coordinate or Lead Others

How important is it to coordinate or lead others in accomplishing work activities in this job?

4.C.1.c.1   Responsible for Others' Health and Safety

How much responsibility is there for the health and safety of others in this job?

4.C.1.c.2   Responsibility for Outcomes and Results

How responsible is the worker for work outcomes and results of other workers?

Vehicles and equipment

This uses the highest of the scores for the following (scale of 1-5):

4.C.2.a.1.e   In an Open Vehicle or Equipment

How often does this job require working in an open vehicle or equipment (e.g., tractor)?

4.C.2.a.1.f   In an Enclosed Vehicle or Equipment

How often does this job require working in a closed vehicle or equipment (e.g., car)?

Hazards

This uses the highest of the scores for the following (scale of 1-5):

4.C.2.b.1.d   Exposed to Contaminants

How often does this job require working exposed to contaminants (such as pollutants, gases, dust or odors)?

4.C.2.b.1.f   Exposed to Whole Body Vibration

How often does this job require exposure to whole body vibration (e.g., operate a jackhammer)?

4.C.2.c.1.a   Exposed to Radiation

How often does this job require exposure to radiation?

4.C.2.c.1.b   Exposed to Disease or Infections

How often does this job require exposure to disease/infections?

4.C.2.c.1.c   Exposed to High Places

How often does this job require exposure to high places?

4.C.2.c.1.d   Exposed to Hazardous Conditions

How often does this job require exposure to hazardous conditions?

4.C.2.c.1.e   Exposed to Hazardous Equipment

How often does this job require exposure to hazardous equipment?

Skills

This is a composite score of education, experience and on the job training. First the categories were recoded to the following:

2.D.1	RL	1	High school diploma or less
2.D.1	RL	2	Post-secondary training less than four-year degree
2.D.1	RL	3	Bachelor's Degree
2.D.1	RL	4	Beyond a Bachelor's Degree
3.A.1	RW	1	None
3.A.1	RW	2	Less than one year
3.A.1	RW	3	One to four years
3.A.1	RW	4	More than four years
3.A.3	OJ	1	None
3.A.3	OJ	2	Up to one month
3.A.3	OJ	3	Less than one year but more than one month
3.A.3	OJ	4	More than one year

Values are the percent of jobs requiring, so by collapsing the categories into broader skill categories, I just summed the totals.

Next, any skill category with more than 25% of the total was assigned a score commensurate with its category – so if 30% of jobs required a high school diploma, then high school diploma would be worth 1. If 26% of jobs required Beyond a Bachelor's degree, then there would be a score of 4. If more than one category was required by more than 25% of jobs, then the two scores would be averaged. In the example above – 1+4/2=2.5.

Finally, the highest of all three scores (for on-the-job training, education, and experience) was taken to get a single indicator of high-skilled work (scale of 1-4).