Occupational Requirements Survey

The **Occupational Requirements Survey (ORS)** is an establishment-based survey conducted by the Bureau of Labor Statistics (BLS). The ORS publishes job-related information regarding physical demands; environmental conditions; education, training, and experience; as well as cognitive and mental requirements. Current ORS data products and additional information can be found at www.bls.gov/ors.

Quick Facts: Occupational Requirements Survey	
Subject areas	Job requirements
Key measures	Environmental conditions Physical demand Cognitive and mental requirements Education, training, and experience
How the data are obtained	Survey of businesses and governments
Classification system	Industry, Occupation
Periodicity of data availability	Annual
Geographic detail	National
Scope	Private sector, State and local government
Key products	• News releases • Occupational group profiles • Database query tool
Program webpage	www.bls.gov/ors

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Concepts

The ORS provides insight into the presence and duration of specific physical demands and environmental conditions, presence of cognitive and mental requirements, as well as the amount of education, training, and experience needed to perform in the occupation.[1]

The ORS groups data elements into four main categories:

• Physical demands

• Environmental conditions

• Education, training, and experience

• Cognitive and mental requirements

It is important to note that the ORS is designed to capture information regarding what is required to perform the critical job function of selected jobs. The survey does not focus on specific capabilities or experiences that individual workers have if the employer does not require them. For example, a job may require a bachelor's degree, but a worker performing the job may have a doctoral degree (Ph.D.). In this case, the ORS would capture the requirement of this particular job as being a bachelor's degree. The distinction is significant because the desired outcome of the survey is to portray job requirements, not the characteristics of the workers. See the Data sources section for more detail on what occupational requirements are collected.

The ORS is an establishment-based survey and establishments in the 50 states and the District of Columbia in the private sector and state and local government are eligible for selection. Major exclusions from the survey are workers in federal and quasi-federal agencies, military personnel, agriculture workers, workers in private households, the self-employed, volunteers, unpaid workers, individuals receiving long-term disability compensation, and those working overseas. Individuals who set their own pay, such as business owners, and family members who are paid token wages are also excluded.

The following sections provide definitions of key concepts and further explanation regarding occupational selection and estimation processes used for this survey. For more detailed definitions of survey terminology, please refer to the ORS Collection Manuals.

Key concepts and definitions

Accommodation. A modification or adjustment to a job or change in the work environment that enables a person with a disability to compete equally or carry out the occupational tasks as generally performed. The ORS only collects information on requirements based on how workers perform without accommodations, as not all employers can offer the same accommodations.

Cognitive and mental requirements. The requirements related to a worker's need to use judgment, make decisions, and adapt to changes on the job.

Contractors. People working onsite at a surveyed establishment, but paid by a contractor, are not included in data collection from the establishment unless the contractor is part of the sample. If the contractor belongs to the sample, the ORS collects data on those jobs with employees of the contractor who are working offsite at other establishments, as well as those working onsite. To be included in the ORS, employees in sampled occupations must receive payments (cash, check, or direct deposit payments) from the establishment for services performed and the establishment must pay the employer's portion of Medicare taxes on those individuals' wages.

Critical job function. The main purpose of the job. It consists of critical tasks that are integral to the job. The job would not exist without the critical job function(s), which is the primary pay factor for the job.

Critical tasks. An activity workers must perform to carry out their critical job function(s). A task is critical when it is a required component of the critical job function(s).

Duration Levels. The scale used to categorize the amount of time a worker performs a physical demand or is exposed to an environmental condition. For more information see the Calculation section.

Education, training, and experience. In ORS, these together are known as specific vocational preparation (SVP) and refer to the amount of preparation time required for a typical worker to learn the techniques, acquire the information, and develop the skill needed for average performance in a specific job. The preparation time includes all time spent acquiring the minimum level of formal education required, pre-employment training including certifications and licenses, on-the-job training, and prior work experience.

Environmental conditions. Refer to the various tangible or concrete hazards or difficulties that are in the vicinity of which a job is performed. The presence and, in most cases, duration of these conditions are collected. For more information about individual environmental elements, see the ORS Visual Overview for Environmental Conditions and the appendixes in the Calculation section.

Establishment. A single economic unit that engages in one, or predominantly one, type of economic activity. For private industries in the survey, the establishment is usually a single physical location, such as a mine, a factory, an office, or a store, where they produce goods or provide services. The number of workers in an establishment includes workers on paid vacation or other types of leave; salaried officers, executives, and staff members of incorporated firms; employees temporarily assigned to other units; and noncontract employees for whom the reporting unit is the permanent duty station, regardless of whether that unit issues their paychecks.

- For private industry, if a sampled establishment is owned by a larger entity with many locations, only the employment and characteristics of the establishment selected for the sample are considered for the survey.
- For state and local governments, an establishment can include more than one physical location, such as a school district or a police department.

Full-time or part-time status. For the ORS, full-time or part-time status is not determined by the number of hours worked, but is based on the establishment's definition of those terms.

Incentive-based pay. Incentive workers are those whose wages are based at least partially on productivity payments, such as piece rates, commissions, and production bonuses.

Job. A position of employment at an establishment in which one or more workers are employed. It is characterized by its main function and any work tasks in support of that function. The term job refers to a single position in a single establishment, but an establishment may have more than one worker in that job on their payroll. For example, a restaurant may have 20 waiters all serving the same function and performing identical tasks. ORS considers all 20 of those waiters to be duplicates of the same job at that worksite. Because ORS focuses on the requirements of a job but is weighted by the amount of workers employed in that job, "jobs" and "workers" may be used interchangeably in ORS publications.

Job demands: The knowledge and physical actions required to perform critical tasks, as well as environmental conditions experienced while completing critical job tasks.

Modes. In this survey, modes for certain job requirement categories are calculated so that the user may identify the estimate within a category that has the largest weighted number of workers, which is essentially the most common value within that category. See the Calculation section for more information. These estimates are presented in the data via a footnote in the multi-screen data tool, as well as in the excel spreadsheet of data.

Nonunion workers. A nonunion worker is an employee in an occupation not meeting all of the ORS-defined conditions for union coverage.

Occupation. A generalized job or family of jobs common to many industries and areas, such as an economist or carpenter. An occupation is different from a job because it refers to a profession or trade in general, and not a single position in a single establishment. The Standard Occupational Classification (SOC) system classifies occupations to the six-digit level. The ORS further classifies occupations by eight-digit codes used by O*NET's detailed occupational taxonomy referred to as "O*NET-SOC 2010 Occupations" when available. Military specific occupations (55-0000.00) are out of scope for the ORS.

Percentage of workers. The number of workers in a given domain (such as an occupation) that has a certain requirement divided by the total number of workers in that domain. For example, the number of teachers who are required to reach overhead divided by the total number of teachers equals the percentage of teachers with that requirement. For more information see the Calculation section.

Percentiles. Percentiles (10th, 25th, 50th-median, 75th, and 90th) are used for estimates with continuous values, such as hours spent sitting, or days of prior work experience required. More detailed information is included in the Calculation section.

Physical demands. Refer to the physical activities required to perform occupational tasks. The presence and, in some cases, duration of these activities are collected. For more information on individual demands, see the ORS Visual Overview for Physical Demands or Exhibits 7 and 8 in the Calculation section.

Time-based pay. Time-based workers are those whose wages are based solely on an hourly rate or salary.

Union workers. The ORS defines a union worker as any employee in a union occupation who satisfies all of the following conditions: a labor organization is recognized as the bargaining agent for all workers in the occupation; wage and salary rates are determined through collective bargaining or negotiations; and settlement terms, which must include earnings provisions and may include benefit provisions, are embodied in a signed, mutually binding collective bargaining agreement.

NOTES

[1] The ORS program is collecting data for cognitive and mental requirements and will publish them for the 2019 reference period. BLS did not collect or publish cognitive and mental requirements for the 2018 reference period in order to align the collection questions to the job requirements.

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Data Sources

Bureau of Labor Statistics (BLS) field economists are extensively trained and given detailed instructions on data collection techniques. They employ a variety of methods, including personal visits, mail, telephone, and email, to obtain data from Occupational Requirements Survey (ORS) respondents. Field economists do not use paper or online questionnaires to collect these data; instead, they rely on a conversational interview and descriptive documents, such as task lists, to collect information on occupational requirements from respondents. Respondents are typically human resources managers or specialists, occupational safety managers, or supervisors. Field economists collect each sample over a 1-year period and perform the following activities:

- The field economist verifies that the North American Industry Classification System (NAICS) industry code that identifies that the primary business activity of the establishment is correct.
- Establishment respondents provide a list of employees or a list of job titles with employee counts to the economists. If the field economist is provided with a list of employees, jobs are selected using equal probability sampling to select a sampled job, where each employee on the list has an equal chance of selection. If the field economist is provided a list of job titles and employee counts, jobs are selected using probability proportional to size sampling, where the greater the number of employees associated with a job title, the more likely the job will be selected.
- The field economist uses the tasks, knowledge required, controls and complexity, contacts, and environmental conditions of the job to determine the correct occupation code and work level for each sampled job based on the job description and type of work performed. (For more information on pay factors and work levels, see National Compensation Survey: Guide for Evaluating Your Firm's Jobs and Pay).
- The field economist determines how many employees in the establishment can be defined by the occupational code for the sampled job.
- The field economist examines whether workers in the sampled job work full- or part-time, are classified as union or nonunion workers, and whether they are paid on a time- or incentive-basis.
- The field economist collects data on the usual work schedule of each sampled job. The usual work schedule includes the daily and weekly hours and annual number of weeks workers in the sampled job are expected to perform.
- The field economist collects data on job requirements that pertain to the sampled job's physical demands; environmental conditions; education, training, and experience; and cognitive and mental requirements. Field economists refer to a list of tasks provided by respondents to understand the relationship between job demands and occupational data needed for collection. They only include in collection the critical tasks that support the job's critical function.

Confidentiality

All data collected in the ORS are subject to the BLS confidentiality requirements that prevent the disclosure of identifying information. Data collected from the ORS are used solely for statistical purposes. BLS has a strict confidentiality policy which ensures that the survey sample composition, lists of reporters, and names of respondents will be kept confidential. In addition, the policy assures respondents that published figures will not reveal the identity of any specific respondent and will not allow the data of any specific respondent to be identified. Each published estimate is screened to ensure that it meets these confidentiality requirements.

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Design

Occupational Requirements Survey (ORS) data are collected from a national probability sample selected in two stages: (1) a probability sample of establishments and (2) a probability sample of occupations (PSO) within sampled establishments. Probability samples are subject to sampling and nonsampling errors, which are discussed in the Calculation section.

Selecting sample establishments (stage 1)

In stage 1, the ORS uses a probability proportional to size (PPS) technique to select a sample of private industry and state and local government establishments from across the nation. The larger the establishment, the greater its chance of being selected. Establishments from all 50 states and the District of Columbia are eligible for selection. ORS stratifies the establishments by 23 major industry groups and ownership (private industry and state and local government) and the ORS program implicitly stratifies within each sampling cell for 24 geographic areas. The 24 geographic areas represent the 15 largest metropolitan areas and the 9 census divisions. More detailed information on ORS sample design can be found in the sample design portion of the Research section on the public ORS website.

Each sampled establishment has an assigned 6-digit industry code from the North American Industry Classification System (NAICS). When a single physical location encompasses two or more distinct economic activities, the industry code assigned is based on the establishment's principal product or products, whether produced or distributed, or the principal services rendered by the establishment. When determining the principle product or service rendered, employment is used to determine the primary business activity and assign an industry code. When the primary activity cannot be determined by employment then it's determined based on the revenue generated.

The *sampling frame*, or *universe*, is the list of establishments from which the survey sample is selected. The ORS establishment sample is drawn from the Quarterly Census of Employment and Wages (QCEW) and units reporting to the Railroad Retirement Board.

Sample groups

To maximize the amount of publishable information, BLS combined data across three samples collected over a 3-year period to produce the 2018 estimates. The total sample included approximately 25,300 establishments and estimates represent about 140,800,000 civilian workers.

Probability sampling of occupations within sampled establishments (stage 2)

The ORS collects data about requirements of jobs from sampled establishments. In stage 2, field economists use a four-step process to select and classify jobs for which data are to be collected from the sampled establishment.

Step 1: Field economists receive the establishment's complete list of employees and their job titles and perform the PSO technique. The field economist uses the PSO technique to randomly select the jobs for which data are to be collected. This process ensures that the probability of selecting a given job is proportional to the number of workers in the job at the establishment. (See Data sources section for more information.) The number of jobs selected for data collection is based on the establishment's employment size, according to the following criteria:

Table 1. Probability selection of occupations (PSO) technique

PSO category	Establishment size		
Number of employees	1–49	50–249	250 or more
Number of jobs selected	Up to 4	6	8

Note: Exceptions include state and local government units, for which up to 20 jobs may be selected.
Source: U.S. Bureau of Labor Statistics.

Step 2: Field economists classify the sampled jobs into occupations based on the workers' actual job duties and responsibilities, not on their job titles or specific education. For example, an employee trained as an engineer but working as a drafter, is reported as a drafter. Field economists classify employees who perform the duties of two or more distinct occupations as working in the occupation that requires the highest level of skill or in the occupation in which the employee spends the most time if there is no measurable difference in skill requirements. Each sampled job is classified by the Standard Occupational Classification (SOC) system to the 6-digit level, and further designated by an 8-digit code in the Occupational Information Network's (O*NET) detailed occupational taxonomy when available. These are referred to as O*NET-SOC 2010 occupations. This code is part of a hierarchical structure as shown in the following exhibit.

Exhibit 1. Hierarchical classification structure

Exhibit 2. Hierarchical classification of occupations (example)

Level of detail	O*NET-SOC 2010 code	Occupation title
2-digit	17-0000.00	Engineering occupations
3-digit	17-3000.00	Drafters, engineering technicians, and mapping technicians
5-digit	17-3010.00	Drafter
6-digit	17-3011.00	Architectural and civil drafters
8-digit	17-3011.01	Architectural drafters
	17-3011.02	Civil drafters
Source: U.S. Bureau of Labor Statistics.		

The 1,110 O*NET-SOC 2010 occupations are grouped under and include the 840 Standard Occupational Classification (SOC) detailed occupations. SOC detailed occupations are grouped under broad occupations; broad occupations are part of a minor group, and minor groups are part of a major group. The example above shows the hierarchy of 'architectural drafters' and 'civil drafters' O*NET-SOC 2010 occupations.

The SOC designates 23 major groups and there are 1,110 O*NET-SOC 2010 occupations within these 23 groups. For the purposes of the ORS, occupations can fall into 22 major groups and 1,090 occupations; only the major group designating military-specific occupations is excluded (code 55-0000.00 and detailed occupations within this major group).

Step 3: Identification of occupational attributes of the worker in the sampled job, such as full-time or part-time status, union or nonunion status, and whether the work is paid on a time or incentive basis. The field economist records specific occupational attributes of the worker in the sampled job. For definitions of occupational attributes, see the Concepts section.

Step 4: Field economists evaluate the job to determine the work level of its duties and responsibilities using a point-factor system. This is a system of points based on the following factors:

- Knowledge
- Job controls and complexity
- Contacts
- Physical environment

Each factor consists of several points and a description. Field economists evaluate the duties and responsibilities of the job, taking into account work performed and the skills, education, and training required for the job. Points are then totaled to determine the overall work level for the job. Generally, the greater the impact, complexity, or difficulty of the factor, the higher the number of points assigned, and the higher the work level. Some occupations, such as those listed in the exhibit below, cannot be "leveled" because points cannot be determined for all four factors. Thus, a level cannot be determined.

Exhibit 3. Jobs that cannot be leveled

O*NET-SOC 2010 code	Occupation title
11-1031.00	Legislators

Exhibit 3. Jobs that cannot be leveled

O*NET-SOC 2010 code	Occupation title
27-1013.00	Fine artists, including painters, sculptors, and illustrators
23-1021.00	Administrative law judges, adjudicators, and hearing officers
23-1022.00	Arbitrators, mediators, and conciliators
23-1023.00	Judges, magistrate judges, and magistrates
27-2011.00	Actors
27-2012.00	Producers and directors
27-2012.01	Producers
27-2012.02	Directors-stage, motion pictures, television, and radio
27-2012.03	Program directors
27-2012.04	Talent directors
27-2012.05	Technical directors/managers
27-2021.00	Athletes and sports competitors
27-2022.00	Coaches and scouts
27-2023.00	Umpires, referees, and other sports officials
27-2031.00	Dancers
27-2032.00	Choreographers
27-2041.00	Music directors and composers
27-2041.01	Music directors
27-2041.04	Music composers and arrangers
27-2042.00	Musicians and singers
27-2042.01	Singers
27-2042.02	Musicians, instrumental
27-2099.00	Entertainers and performers, sports and related worker, all other
27-3011.00	Radio and television announcers
27-3012.00	Public address systems and other announcers
41-9012.00	Models
Source: U.S. Bureau of Labor Statistics.	

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Calculation

The Occupational Requirements Survey (ORS) provides estimates of job requirements and categories within each requirement have estimates conveyed as the percentage of workers, the mean (in hours, days, percentage of a workday, or pounds), percentile, or mode for each occupation or occupational group. See Exhibit 7 at the end of this section for a full list of occupational requirements with published estimates as well as a list of the various types of estimates.

Most physical demands and environmental conditions last for a specified duration of time. These correspond with the amount of time that a worker performs a physical demand or the length of exposure to an environmental condition. The table below provides the duration levels with the corresponding percent of the workday that workers perform physical demands or are exposed to environmental conditions. Also see Exhibit 8 at the end of this section for a list of job requirements with duration levels.

Table 2. Duration levels and the percent of the workday associated with each level

Duration level	Presence of the requirement in the workday
Not present	Requirement is not present and there is no duration
Seldom	Up to 2 percent of the workday
Occasionally	2 percent and up to 1/3 of the workday
Frequently	1/3 up to 2/3 of the workday
Constantly	2/3 or more of the workday
Source: U.S. Bureau of Labor Statistics.	

BLS calculates a percentage-of-workers estimate for each duration level. In addition, estimates of some physical demands use means and percentiles to convey duration, such as sitting and standing/walking. For example, BLS measures sitting in hours, so mean and percentile estimates (10th, 25th, 50th, 75th, and 90th percentiles) are calculated for both hours and the percentage of the workday spent sitting for a specific occupation or occupational group. BLS also calculates mean and percentile estimates for education, training, and experience requirements.

For physical demands and environmental conditions, BLS identifies the mode (the duration level with the largest weighted number of workers).

The general formulas used to calculate these estimates are shown below. The type of estimator used depends on the job requirement and whether it is categorical or continuous. For categorical job requirement estimates, BLS calculates a percentage of workers and mode estimates for these percentages. For continuous job requirement estimates (such as duration in hours or days and maximum weight lifted or carried elements), BLS calculates mean and percentile estimates.

For other job requirements that do not have duration levels associated with them, BLS still determines the mode; however, it is calculated across all categories for the specific job requirement. For example, the minimum education that is the most common for security guards is a high school diploma.

Percentage of workers. The formula for the percentage of workers with a given job requirement out of all workers in the domain (such as an occupation) is

$$\frac{\sum_{i=1}^{I}\sum_{g=1}^{G_i} OccFW_{ig} \times X_{ig} \times Z_{ig}}{\sum_{i=1}^{I}\sum_{g=1}^{G_i} OccFW_{ig} \times X_{ig}} \times 100$$

where:

I is the total number of establishments,

G_i is the total number of sampled jobs in establishment i,

i is the establishment,

g is the occupation within establishment i,

$OccFW_{ig}$ is the final sampled job weight for occupation g in establishment i.

X_{ig} is 1 if sampled job ig meets the condition set in the domain (denominator) condition and 0 otherwise.

Z_{ig} is 1 if sampled job ig meets the condition set in the requirement condition and 0 otherwise.

Average (mean). The formula for the average (mean) estimate of a job requirement is

$$\frac{\sum_{i=1}^{I}\sum_{g=1}^{G_i} OccFW_{ig} \times X_{ig} \times Z_{ig} \times Q_{ig}}{\sum_{i=1}^{I}\sum_{g=1}^{G_i} OccFW_{ig} \times X_{ig} \times Z_{ig}} \times 100$$

where:

I is the total number of establishments,

G_i is the total number of sampled jobs in establishment i,

i is the establishment,

g is the occupation within establishment i,

$OccFW_{ig}$ is the final sampled job weight for occupation g in establishment i.

X_{ig} is 1 if worker *ig* meets the condition set in the domain (denominator) condition and 0 otherwise.

Z_{ig} is 1 if worker *ig* meets the condition set in the requirement condition and 0 otherwise.

Q_{ig} is the value of a quantity for a specific requirement for occupation *g* in establishment *i.*

Percentiles. The following percentiles *p* are calculated: 10th, 25th, 50th (median), 75th, and 90th. The *p*th percentile is the value Q_{ig}, where the value of a quantity is for a specific category for occupation *g* in establishment *i,* such that

- the sum of final sampled job weights ($OccFW_{ig}$) across sampled jobs with a value less than Q_{ig} is less than *p* percent of all final sampled job weights and
- the sum of final sampled job weights ($OccFW_{ig}$) across sampled jobs with a value more than Q_{ig} is less than (100 – *p*) percent of all final sampled job weights.

It is possible that there is no specific sampled job *ig* for which both of these properties hold. This occurs when there exists a sampled job for which the $OccFW_{ig}$ of records whose value is less than Q_{ig} equals *p* percent of the total weighted sampled job employment. In that situation, the *p*th percentile is the average of Q_{ig} and the value of the sampled job with the next-lowest value.

Mode. The mode is the highest percentage estimate within a job requirement category.

Education, training, and experience

Although BLS bases most of the estimates for job requirements on establishment responses about the selected jobs' various tasks, some require an additional level of calculation. One of these is the Specific Vocational Preparation (SVP) level which is the amount of preparation time required for the worker to develop the skills needed to perform the job. The job requirements that contribute to this preparation time are the minimum education level with respect to formal degree types, pre-employment training, previous work experience, and required on-the-job training. These requirements' associated time are then aggregated and used to determine the SVP level needed for the job. The table below shows these levels.

Exhibit 4. Preparation time necessary for each specific vocational level

Specific Vocational Preparation level	Preparation time
1	Short demonstration only (4 hours or less)
2	Anything beyond short demonstration up to and including 1 month
3	Over 1 month up to and including 3 months
4	Over 3 months up to and including 6 months
5	Over 6 months up to and including 1 year
6	Over 1 year up to and including 2 years
7	Over 2 years up to and including 4 years
8	Over 4 years up to and including 10 years
9	Over 10 years

Exhibit 4. Preparation time necessary for each specific vocational level

Specific Vocational Preparation level	Preparation time
Source: U.S. Bureau of Labor Statistics.	

Strength

BLS derives strength estimates from several job requirements' estimates; and measures it with five levels: sedentary, light work, medium work, heavy work, and very heavy work. The levels are determined by how much weight a worker is required to lift or carry, how often, and whether standing or walking is required as part of the workday, in some special cases. BLS determines the strength level when at least one of the lifting or carrying conditions shown in the table below are satisfied, or as defined by the "Strength Level - Special Cases" table. The highest strength level satisfied is the level that represents that sampled job. For example, if a job requires a worker to lift or carry 11–20 pounds occasionally, then it is classified as light work. However, if that same job were to require lifting or carrying that same weight *frequently*, then it is medium work.

Exhibit 5. Determining strength level based on duration of lifting or carrying

Strength level	Duration of lifting or carrying			
	Seldom	Occasionally	Frequently	Constantly
Light work	11-20 pounds	11-20 pounds	1-10 pounds	Negligible weight
Medium work	21-50 pounds	21-50 pounds	11-25 pounds	1-10 pounds
Heavy work	51-100 pounds	51-100 pounds	26-50 pounds	11-20 pounds
Very heavy work	>100 pounds	>100 pounds	>50 pounds	>20 pounds
Source: U.S. Bureau of Labor Statistics.				

As noted, there are special cases for strength. The following table outlines the special cases. In instances where field economists are unable to determine certain job requirements from the respondent, they record these data as "unknown" and strength level handle derivation through imputation. See the section "Weighting, imputation, and benchmarking" for more information.

Exhibit 6. Special cases for calculating strength level

Strength level	Description
Unknown	If it is unknown whether lifting or carrying occurs occasionally, frequently, or constantly or none of the conditions in the strength level chart are met and standing or walking or sitting are unknown.
Sedentary	If none of the conditions in the strength level chart are met and standing or walking occurs less than or equal to 1/3 of the work schedule.
Light work	If none of the conditions in the strength chart are met and does not meet the special conditions for unknown or sedentary.

Exhibit 6. Special cases for calculating strength level

Strength level	Description
Source: U.S. Bureau of Labor Statistics	

Weighting, imputation, and benchmarking

ORS faces obstacles with nonresponse and sampling frame coverage. Nonresponse occurs because participation in the survey is voluntary as a company official may refuse to participate and the associated establishment would then be “nonresponding.” An establishment is “responding” if it provided information for at least one usable sampled job. Some establishments selected from the sampling frame may be out of the scope of the survey or may have gone out of business. The ORS program addresses both of these sampling frame coverage problems with adjustments.

In order to address nonresponse, specifically unit and item nonresponse, the ORS program adjusts the weights of the responding establishments and imputes missing data values during the estimation process. To mitigate the effects of sampling frame coverage issues, the ORS program using benchmarking. Both of these are done to ensure that occupational requirement estimates are representative of requirements for civilian workers. This section will describe the different nonresponse and sampling frame problems that arise and the weighting, imputation, and benchmarking methods that BLS implements to account for these problems.

Weighting

BLS adjusts for unit (establishment) nonresponse. A “nonresponding” establishment is one that is unable to provide at least one usable sampled job. BLS treats establishment nonresponse with adjustments that redistribute the weights of nonrespondents to similar respondents. BLS groups similar respondents into cells that are defined by characteristics such as the industry, size class, and geographic area of the establishment. For example, if the nonresponding establishment was in the manufacturing industry and had an employment of 350 workers, ORS would adjust the weights of responding manufacturing establishments with 250–499 workers during estimation. Applied at the establishment level, this adjustment is a nonresponse adjustment factor (NRAF), and it is calculated using the following formula:

$$NRAF = \frac{\sum A + \sum B}{\sum A}$$

where:

$\sum A$ =weighted employment of all usable establishments in the nonresponse cell

$\sum B$ = weighted employment of all viable but not usable establishments in the nonresponse cell

If there are no responding establishments to reweight within the industry/employment group, then additional responding units from similar geographic areas are considered. Establishments no longer in operation or out of the scope of the survey, and establishments with no workers within the scope of the survey, are considered unviable and excluded from survey estimates.

Situations also arise in which BLS adjusts weights for sampled job nonresponse, which is a situation in which an establishment does not provide any occupational requirements data for a given sampled job. BLS addresses sampled job nonresponse during the interview with an adjustment that redistributes the weights of nonresponding sampled jobs to responding sampled jobs in the same occupational group, ownership, industry, and size class.

BLS applies additional adjustment factors to special situations that may have occurred during data collection. For example, when a sample unit is one of two establishments owned by a given company and the respondent provides data for both locations combined instead of data for the sampled unit, BLS adjusts the weight of the sampled unit to reflect the employment data for the sampled unit.

Imputation

Item nonresponse is a situation in which an establishment responds to the survey but is unable or unwilling to provide some of the occupational requirements data for a given sampled job. Item nonresponse is addressed through item imputation in certain situations. Item imputation replaces missing values for an item or items with values derived from sampled jobs within similar establishments with similar worker characteristics that have a value for the item. For ORS estimates, items with missing values are imputed within groups of ORS job requirements that are related. For example, one ORS group refers to categorical variables only and includes such requirements as hearing, vision, and driving. Within the group, BLS imputes values by a process that matches sampled jobs using occupational information from similar occupations in similar establishments. Imputation of one group of ORS requirements does not affect the imputation for any other group.

BLS uses additional imputation procedures to align previously collected data with current survey definitions. Where possible, 3 years of ORS samples are included in the estimates, the scope changes implemented before the third year of collection resulted in conceptual inconsistencies for most physical-demand and environmental-conditions requirements across the 3 years. Because of scope change, the first 2 years of the sample were imputed based on response distributions from occupational requirements data collected during the third year. To achieve this, BLS used a multiple imputation approach employing an iterative logistic regression imputation procedure. BLS created several sets of imputations, added the third year of collected data to each set, calculated estimates for each set, and averaged the estimates across the sets to create final ORS estimates.

Benchmarking

BLS uses benchmarking to adjust the weight of each establishment in the survey and match the most current distribution of employment by industry. The ORS establishment sample is drawn from the Quarterly Census of Employment and Wages (QCEW) Longitudinal Database and a file of units reporting to the Railroad Retirement Board, and the Current Employment Statistics (CES) survey. The QCEW and the railroad information provide historical employment data, but since these sources do not have current employment data, BLS uses CES to

make an adjustment to employment. The benchmark process updates the initial establishment weights, assigned during sampling, by current employment. Benchmarking ensures that survey estimates reflect the most current industry composition–that is the employment counts in proportions consistent with private industry, state government, and local government sectors (hereafter, ownership).

As an example of the benchmarking process, 40 private industry, 10 local government, and 5 state government units in the service sector were selected from the ORS sampling frame. These units consist of establishments employing 200,000 private workers, 30,000 local government workers, and 10,000 state government workers. If, by the time of survey processing, the private service sector experienced an employment increase of 10,000 workers (5 percent) and there is no increase in employment in the service sectors of state and local government, then the sample would underrepresent current employment in the private industry service sector in the absence of benchmarking. In this example, ORS would adjust the sample weights of the 40 service sector firms in private industry to ensure that the number of workers in establishments in the sampling frame rises to 210,000. The ownership employment counts for the private industry service sector would then reflect the current proportions of 84 percent for private industry, 12 percent for local government, and 4 percent for state government employment.

For more information, see the Estimation and Validation within the Research section of the ORS website.

Reliability of ORS estimates

To assist users in confirming the reliability of ORS estimates, BLS publishes standard errors. Standard errors provide users with a measure of the precision of an estimate to ensure that it is within an acceptable range for their intended purpose. The standard errors are calculated from collected and imputed data. BLS is researching methods for estimating the variance excluding imputed values. For additional information, see www.bls.gov/ors/se.htm.

BLS derives ORS estimates from sampled jobs within responding establishments. Two types of errors are possible in an estimate based on a sample survey: sampling and nonsampling errors. Sampling errors occur because the sample makes up only a part of the population it represents. The sample used for the survey is one of a number of possible samples that could have been selected under the sample design, each producing its own estimate. A measure of the variation among sample estimates is the standard error. Nonsampling errors are data errors that stem from any source other than sampling error, such as data collection errors and data-processing errors.

Standard errors can be used to measure the precision with which an estimate from a particular sample approximates the expected result of all possible samples. The chances are about 68 out of 100 that an estimate from the survey differs from a complete population figure by less than the standard error. The chances are about 90 out of 100 that this difference is less than 1.6 times the standard error. Statements of comparison appearing in ORS publications are significant at a level of 1.6 standard errors or better. This means that, for differences cited, the estimated difference is more than 1.6 times the standard error of the difference.

The ORS program uses balanced repeated replication (BRR) to estimate the standard error. The procedure for BRR entails first partitioning the sample into variance strata composed of a single sampling stratum or clusters of sampling strata, and then splitting the sample units in each variance stratum evenly into two variance primary sampling units (PSUs). Next, ORS chooses half-samples so that each contains exactly one variance PSU from each variance stratum. Choices are not random but are designed to yield a “balanced” collection of half-samples. By using half-samples, we can compute a “replicate” estimate with the same formula for the regular, or “full-sample,” estimate, except that the final weights are adjusted. If a unit is in the half-sample, its weight is multiplied by (2 – *k*); if not, its weight is multiplied by *k*. For all ORS publications, *k* = 0.5, so the multipliers are 1.5 and 0.5.

The BRR estimate of the standard error with *R* half samples is

$$SE\left(\hat{Y}\right) = \sqrt{\frac{1}{R(1-k)^2}\sum_{r=1}^{R}(\hat{Y}_r - \hat{Y})^2},$$

where:

the summation is over all replicates of half-samples $r = 1,\ldots,R$,

$\hat{Y}_r$ is the *r*th replicate estimate, and

$\hat{Y}$ is the full-sample estimate.

Quality assurance programs mitigate collection and processing errors using data collection reinterviews, observed interviews, computer edits of the data, and systematic professional review of the data. These programs also serve as a training device to provide feedback to field economists, or data collectors, on errors and the sources of errors that can be remedied by improved collection instructions or computer-processing edits. Field economists receive extensive training to maintain high standards in data collection.

Once estimates of occupational requirements are produced, the estimates are validated. The focus of the validation is to compare the estimates with expectations for them. Expectations are based on values of the ORS estimates from prior years as well as similar estimates from other sources of data, such as the Occupational Information Network (O*NET). In addition, ORS estimates between similar occupations are compared.

BLS investigates estimates that deviate from their expectations to ensure that their underlying data are consistent with ORS collection procedures, and that their calculation is consistent with ORS statistical procedures. They designate estimates that are consistent with these procedures as “fit-for-use” for publication.

Before publishing any estimate, BLS reviews it to make sure that it meets specified statistical reliability and confidentiality requirements. The review prevents the publication of an estimate that has a large standard error or

that could reveal information about a specific establishment. See data review and estimate validation for additional information.

Exhibit 7. List of calculated occupational requirements by category and estimate type

Occupational requirement	Categorical		Continuous	
Physical demands	Percentage	Mode	Mean	Percentile [1]
Sitting or standing and walking				
Standing and walking	…	…	√	√
Sitting	…	…	√	√
Sitting vs standing at will	√	√	…	…
Auditory and vision				
Hearing				
One on one	√	√	…	…
Group	√	√	…	…
Telephone	√	√	…	…
Other sounds	√	√	…	…
Pass a hearing test	√	√	…	…
Vision				
Near visual acuity	√	√	…	…
Far visual acuity	√	√	…	…
Peripheral vision	√	√	…	…
Verbal communication	√	√	…	…
Driving	√	√	…	…
Climbing				
Ramps/stairs: structural only	√	√	…	…
Ramps/stairs: work-related	√	√	…	…
Ladders/ropes/scaffolds	√	√	…	…
Lifting and carrying				
Strength	√	√	…	…
Weight (range) lifted/carried- seldom	√	√	…	…
Weight (range) lifted/carried - occasionally	√	√	…	…
Weight (range) lifted/carried - frequently	√	√	…	…
Weight (range) lifted/carried - constantly	√	√	…	…
Most weight ever lifted/carried (pounds)	…	…	√	√
Reaching and manipulation				
Reaching overhead	√	√	…	…
One or both	√	√	…	…
Reaching at or below the shoulder	√	√	…	…
One or both	√	√	…	…
Foot/leg controls	√	√	…	…
One or both	√	√	…	…
Gross manipulation	√	√	…	…
One or both	√	√	…	…
Fine manipulation	√	√	…	…
One or both	√	√	…	…
Keyboarding: traditional	√	√	…	…
Postural				

Exhibit 7. List of calculated occupational requirements by category and estimate type

Occupational requirement	Categorical		Continuous	
Crawling	√	√	…	…
Crouching	√	√	…	…
Stooping	√	√	…	…
Kneeling	√	√	…	…
Pushing and pulling				
With hand/arm	√	√	…	…
One or both	√	√	…	…
With foot/leg	√	√	…	…
One or both	√	√	…	…
With feet only	√	√	…	…
One or both	√	√	…	…
Environmental conditions				
Extreme Cold (non-weather related)	√	√	…	…
Extreme Heat (non-weather related)	√	√	…	…
Wetness (non-weather related)	√	√	…	…
Humidity	√	√	…	…
Heavy vibration	√	√	…	…
High, exposed places	√	√	…	…
Proximity to moving mechanical parts	√	√	…	…
Outdoors	√	√	…	…
Hazardous contaminants	√	√	…	…
Noise Intensity Level	√	√	…	…
Education, training, and experience				
Specific vocational preparation (SVP)	√	√	…	…
Minimum formal education or literacy required				
Degree by type	√	√	…	…
Associates degree time (days)	…	…	√	√
Vocational associates degree time (days)	…	…	√	√
High school vocational time (days)	…	…	√	√
Literacy (if no high school required)	√	√	…	…
Other training and experience				
Pre-employment training (license, certification, other)	√	√	√	√
Prior work experience	√	√	√	√
Post-employment training	√	√	√	√
Pre-employment training (certification)	√	√	√	√
Pre-employment training (license)	√	√	√	√
Pre-employment training (educational certification)	√	√	√	√
Pre-employment training (other)	√	√	√	√

Exhibit 7. List of calculated occupational requirements by category and estimate type

Occupational requirement	Categorical	Continuous
Footnotes: (1) Percentile estimates are calculated at the 10th, 25th, 50th (median), 75th, and 90th. Note: √ = Potential estimate for occupational requirement and … = No estimate for this occupational requirement. Source: U.S. Bureau of Labor Statistics.		

Exhibit 8. List of calculated physical and environmental occupational requirements with duration

Occupational requirement	Duration levels (1) calculated
Physical demands	
Sitting or standing and walking	
Standing and walking	(2)
Sitting	(2)
Auditory and vision	
Verbal communication	√
Climbing	
Ramps/stairs: work-related	√
Ladders/ropes/scaffolds	√
Reaching and manipulation	
Reaching overhead	√
Reaching at or below the shoulder	√
Foot/leg controls	√
Gross manipulation	√
Fine manipulation	√
Keyboarding: traditional	√
Postural	
Crawling	√
Crouching	√
Stooping	√
Kneeling	√
Pushing and pulling	
With hand/arm	√
With foot/leg	√
With feet only	√
Environmental conditions	
Extreme cold (non-weather related)	√
Extreme Heat (non-weather related)	√
Wetness (non-weather related)	√
Humidity	√
Heavy vibration	√
High, exposed places	√
Proximity to moving mechanical parts	√
Outdoors	√
Hazardous contaminants	√

Exhibit 8. List of calculated physical and environmental occupational requirements with duration

Occupational requirement	Duration levels [1] calculated
Footnotes: [1] Duration levels include seldom, occasionally, frequently, and constantly, as described earlier in this section. [2] Available as a continuous estimate. Note: v = Potential estimate for occupational requirement. Source: U.S. Bureau of Labor Statistics.	

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Presentation

Occupational Requirement Survey (ORS) news releases, data, and other information can be found at www.bls.gov/ors. The primary purpose of collecting ORS data is to provide a comprehensive dataset on the physical demands; environmental conditions; education, training, and experience; and cognitive and mental requirements for jobs in the U.S. economy by detailed occupations. Users may include

- Jobseekers
- Researchers
- Insurance companies
- Advocacy organizations
- Data users within nonprofits
- Employment agencies
- State and federal agencies
- Disability community
- Vocational experts
- Human resource professionals
- Medical professionals
- Actuaries

ORS data are used for a variety of purposes:

- Assisting the Social Security Administration in its disability adjudication process
- Using data for new opportunities in research, such as in academia or government
- Tracking the nature of work
- Benchmarking job descriptions or developing targeted recruiting plans
- Helping insurance companies assess risk management
- Assisting temporary-help firms to properly match an employee to job openings

Accessing data

The complete set of 2018 ORS data can be found at https://www.bls.gov/ors/data.htm. On-screen query tools and flat files are available for data users. Flat files can be downloaded at https://download.bls.gov/pub/time.series/or/, which also includes a description of these files and the structure of ORS series. In addition, occupational profiles providing an overview of job requirements for a specific occupation are available.

Although the occupational requirements data may have many uses, it is important to remember the estimate limitations. The data are subject to sampling error, which may cause deviations from the results that would be obtained if the actual requirements for jobs in all establishments could be used. Nonsampling error is present in surveys as well. See the Calculation section for more information. Also, the current imputation process used by ORS remains under development and may be refined in the future. To assist users in ascertaining the reliability of the ORS estimates, standard errors are available with the estimates released through the public data query tools and complete ORS dataset.

Corrections policy

The estimates published in 2018 reflect data collected over a 3-year period, consisting of three separately selected samples. The published data for the third year are final for this set of published information. In the event that BLS identifies estimation, collection, or processing errors which result in statistically significant different estimates, BLS will identify the incorrect estimates and provide a notice to users on the BLS errata page regarding whether the error will be suppressed or corrected.

Last Modified Date: April 30, 2019

History

Timeline Events:

October 2012: Occupational Requirements Survey (ORS) established as a test survey

November 2012: Phase 1 test: Initial proof of concept

January 2013: Phase 2 test: Collection protocol testing

April 2013: Phase 3 test: Broad scale testing

November 2013: Observations test conducted concurrently with other FY 2014 tests

November 2013: ORS-only Efficiency Innovations test

November 2013: Central Office Elements test

December 2013: National Compensation Survey (NCS)/ORS Joint Collection test

December 2013: New Data Element tests

February 2014: Alternative Modes test

October 2014 – September 2015: Pre-production testing

June 2015: Job Observations pilot test

September 2015 – December 2016: First year of production data collection and estimation

December 2016: Published estimates from first production sample

June 2017 – September 2017: Job Observations test

September 2017: Narrowed the scope of collection from work as generally performed to work based on critical tasks in support of critical job functions; began testing of the revised cognitive and mental requirements questions

November 2017: Published estimates combining two samples of collected data

September 2018: Began collection of revised cognitive and mental requirements as well as started collecting the first of five samples

February 2019: Published estimates combining three samples of data

The Social Security Administration (SSA) contracted with BLS to produce occupational data that would describe the requirements of an occupation. These data will aid SSA in determining eligibility for Social Security Disability Insurance (SSDI) and Supplemental Security Income (SSI) disability benefits for applicants. During the developmental stages of the Occupational Requirements Survey (ORS), BLS identified its existing infrastructure already available to coordinate with the ORS. That framework had the capability to manage and implement a new survey to meet data needs as well as systems and processes to support all the steps of the survey. In addition, field economists who work on the National Compensation Survey (NCS) were already familiar with collecting data elements similar to those ORS captures. For example, the NCS classifies each job selected using the Standard Occupational Classification System (SOC), collects worker characteristics (such as bargaining status and part-time or full-time workers), and determines industry classification using the North American Industry Classification System (NAICS) for sampled establishments. BLS is collecting and publishing information on the knowledge required to perform the job, job controls provided, the complexity of tasks, the contacts made by workers, and the physical environment where the work is performed. After the initial assessment of whether BLS could collect job requirements, BLS began testing the collection of these requirements (as described below).

Testing

BLS established ORS as a test survey in FY 2013 (that is, during October 1, 2012–September 30, 2013). In FY 2013 and 2014, several feasibility tests were performed to assess the viability of collecting data on occupational requirements using the platform currently used by the NCS.

In FY 2013, testing was conducted in three phases: The main objective of phase 1 was to ensure that BLS field economists knew how to describe the survey and find respondents for the ORS data elements. BLS also created and tested an initial set of data collection protocols and collection aides. In phase 2, BLS expanded the number of field economists that could describe and collect ORS data while obtaining additional information not included in phase 1. Phase 2 testing also evaluated the effectiveness of collection tools. The primary goal of phase 3 was to test whether field economists could collect ORS data elements and relevant information across the country in a uniform and efficient manner. Also during phase 3, BLS tested the feasibility of collecting both ORS and NCS elements, adding more ways to conduct ORS interviews, including new data capture systems and review procedures, and establishing the Central Office Collection (COC). Some companies have special arrangements with BLS regarding the manner in which data should be collected for their individual establishments. Therefore, a COC may require permission and coordination from headquarters in order to proceed with collecting data. Test objectives were successfully met in these phases, and the findings from these tests suggested that the collection of the ORS data was viable.

As a result of FY 2013 testing, areas were identified where further testing was needed before moving to full-scale production. In FY 2014, five feasibility tests were completed to refine ORS methodology tested in previous phases:

1. The ORS-only Efficiency Innovations Test refined the methods to develop more efficient approaches for data collection as identified during FY 2013 testing.

2. The NCS/ORS Joint Collection test determined how to best collect occupational requirements data elements and NCS data elements from the same establishment.
3. The New Data Element tests determined the new cognitive and mental requirements work data elements and evaluated the use of occupational task lists as developed by the Department of Labor, Employment and Training Administration (ETA), and Occupational Information Network (O*NET) program during data collection.
4. The Central Office Collection (COC) test determined how best to collect occupational requirements data elements from large firms and state governments.
5. The Alternative Modes test determined how to collect occupational requirements data elements efficiently (such as via phone, email, or fax) when a personal visit is not possible.

These tests provided evidence that the NCS platform could be adapted to ORS data collection and demonstrated the effectiveness of the revised materials and procedures.

Testing activities in FY 2013 and 2014 laid the foundation for the preproduction test conducted in FY 2015. Unlike the earlier tests, which were small-scale, testing a subset of data elements or the viability of different collection methods, the preproduction test was designed as a relatively large-scale, nationally representative test of ORS data collection. The sampling, data collection, procedures, and review were designed to mimic what would occur during ORS production. The results from the ORS preproduction test demonstrated that data on occupational requirements could be collected using the processes established by BLS. As a result of the preproduction test, some changes and refinements to several of the elements were made before the implementation of a move to production.

Detailed information on completed tests and other testing activities can be found in the Research section of the ORS website.

Change in scope of collection

Initially, BLS and SSA agreed to define the scope of collection as how work is “generally performed” in each establishment. This meant BLS collected requirements related to all aspects of work, including job functions that were incidental or not specific to one job and were unrelated to the primary hiring and pay factors of jobs.

Historically, SSA relied upon information from the DOT and its companion the Selected Characteristics of Occupations (SCO). The data from these publications appear to show a narrower scope for data collection. DOT data appears to show that analysts only rated work requirements that pertained to the hiring and pay factors of jobs.

Beginning with the third year of collection, BLS has taken steps to revise current procedures to align more closely with a narrower scope of work that pertains to the hiring and pay factors of the job. The revised scope of work is limited to only tasks related to the “critical job function” (i.e., the reason the job exists). These tasks must be expected and usual, now defined as “critical.” In addition, after reviewing the duration data in the first published results which included point estimates, respondent-determined ranges, and SSA-defined ranges, BLS determined collection of duration data only in the SSA-defined ranges would more accurately reflect duration of job demands. By adjusting the parameters of what work is included to only that of the critical functions of jobs and specifying

duration ranges, the BLS expects to more accurately capture job requirements while still identifying changes in the way work is performed in the modern economy.

The estimates published for the 2018 reference year reflect the more narrow scope of work.

Publication

The 2018 estimates are from three samples of collected data. BLS did not collect the cognitive and mental requirements during the third year in order to better refine collection procedures and concepts related to these job requirements. Additional detail for pre-employment training estimates are available with this release. For more information on the types of estimates that were eligible for publication, see the Calculation section.

Archives

- March 29, 2017
- June 13, 2018

Last Modified Date: April 29, 2019

More Information

Additional information on the Occupational Requirements Survey (ORS) is available on the ORS website: www.bls.gov/ors/.

ORS estimates are available on the BLS website:

- Database query tools from the BLS LABSTAT database,
- Latest news release,
- Complete ORS dataset with all current data, and
- Occupation group profiles.

For more information on ORS, see the list of questions and answers.

Email: Contact us

Telephone: (202) 691-6199 (Monday–Friday, 8:30 a.m.–4:30 p.m. ET)

Services for individuals with a sensory impairment

Information voice phone: (202) 691-5200

The Federal Relay Service: 1-800-877-8339

Write or personal visit

Bureau of Labor Statistics
Occupational Requirements Survey
2 Massachusetts Ave., N.E. - Suite 4160
Washington, D.C. 20212-0001

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