OMB SUPPORTING STATEMENT
PART B: COLLECTION OF INFORMATION EMPLOYING STATISTICAL METHODS

B.1. Respondent Universe and Sampling

a. Selection of participants

This section describes, for both the address-based sampling (ABS) sample of all nonexempt workers and the respondent-driven sampling (RDS) sample of workers in 10 low-wage industries, the respondent universe and sampling methods.

The goal of the National Worker Survey is to produce estimates of minimum wage, overtime, and hours worked violations for all covered, nonexempt workers and for workers in several low-wage industries. These industries were identified as among those that employ the largest numbers of nonexempt workers where the average hourly wages are less than the national average hourly wage. This task is difficult because there is no frame of workers by industry, the percentage of workers in some low-wage industries is very small relative to the U.S. population, and low-income households are less likely to respond to surveys.[1] A very large sample would be required to capture sufficient numbers of workers in low-wage industries to produce precise estimates at the industry level, and screening for workers in these industries would be very expensive. As a result, the National Worker Survey will use a "hybrid" sample design with address-based sampling (ABS) to sample all covered, nonexempt workers and web-based respondent-driven sampling (RDS) to sample workers in 10 industries who are likely to be under-represented in the ABS. These industries are: construction, child day care services, grocery stores and supermarkets, home health care, hotels and motels, investigative and security services, nursing homes, restaurants and other food services, retail, and building services.

ABS uses the U.S. Postal Service (USPS) lists of all residential delivery addresses to select a sample of homes, giving every household a chance to be surveyed.[2] ABS uses a push-to-web approach for administering the survey, which involves the use of mail contact to encourage (push) respondents to complete the web questionnaire. The invitation letter will ask that the employed adult (age 18 or older) in the household go online to complete a brief screener. If there is more than one employed adult, the one with the next birthday will be asked to complete the screener. The screener will screen the employed adult into the survey based on the following criteria about their *main job*, or the job where they work the most hours, if they have more than one job: employed in the job at least four weeks; employed in the private sector; not self-employed or an independent contractor;[3] and nonexempt from the FLSA. Nonexempt

[1] Rothbaum, J. and Bee, A. (2022, September 13). How Has the Pandemic Continued to Affect Survey Response? Using Administrative Data to Evaluate Nonresponse in the 2022 Current Population Survey Annual Social and Economic Supplement. U.S. Census Bureau. https://www.census.gov/newsroom/blogs/research-matters/2022/09/how-did-the-pandemic-affect-survey-response.html

[2] Battaglia, M.P., Dillman, D.A., Frankel, M.R., Harter, R., Buskirk, T.D., McPhee, C.B., DeMatteis, J.M., and Yancey, T. (2016). Sampling, data collection, and weighting procedures for address-based sample surveys. *Journal of Survey Statistics and Methodology*, https://doi.org/10.1093/jssam/smw025

[3] Worker misclassification can be understood as the practice, intended or unintended, of treating a worker who is an employee under the law as something other than an employee (i.e., an independent contractor), depriving the employee of their legal wage entitlements, including minimum wage and/or overtime. Independent contractors who are potentially misclassified as indicated by two screening questions will be included in the survey to examine potential FLSA violations among this group.

from the FLSA will be determined by whether workers meet the salary basis, salary level, and job duties tests for the administrative, executive, or professional (or "white collar") exemptions as well as the computer, outside sales, and highly compensated employee exemptions. The target number of completed surveys for the ABS sample is 4,048.

RDS is a network sampling approach for recruiting hard-to-reach or "hidden" populations in which respondents or "seeds" refer eligible members of their social networks to participate in the survey.[4] These recruits are in turn provided with coupons that they use to recruit other eligible members. In this way, the sample can grow through referral waves. RDS has been used in studies since the 1990's and adopted by the Centers for Disease Control and Prevention (CDC), the World Health Organization, and other government agencies. OMB has approved previous studies that use RDS. One prominent and ongoing example is the CDC's National HIV Behavioral Surveillance (NHBS), an ongoing surveillance system to assess HIV prevalence and factors associated with HIV among "hidden" populations at high risk for HIV, including men who have sex with men, people who inject drugs, and heterosexually active persons at increased risk for HIV (0920-0770). This study has successfully recruited participants using RDS for 20 years. Other OMB-approved RDS studies include Injection Behaviors among Young Persons in Rural/Suburban Settings (0920-0840), the Agency for Toxic Substances and Disease Registry (ATSDR) Biomonitoring of Great Lakes Populations Program (0923-17IY), and the Peace Corps Volunteer Long-Term Health Outcomes Study (0420-0557).

RDS typically begins with a convenience sample of seeds (the original members of the sample) that are asked to recruit eligible members of their social networks. This can result in "seed bias" if the recruits are similar to the seeds that recruited them, which is similar to clustering in other sample designs. Short chains (only a few waves) exhibit greater seed bias, and inference from RDS data requires that the "seeds" (the original members of the sample) will generate sufficiently long chains to eliminate potential bias.[5] One strategy to reduce the impact of possible seed bias is referred to as a "burn-in period" where initial waves are discarded from analysis.[6] In this hybrid approach, the seeds will be drawn from the ABS sample (rather than a convenience sample) to eliminate the possibility of bias associated with the use of an initial convenience sample and inefficiency of having to eliminate initial waves from analysis. Using random sampling for seeds has been shown to produce estimates similar to those from probability samples.[7]

All ABS respondents or "seeds" will be asked to recruit up to five individuals whom they know who work in 10 low-wage industries. The seeds will be provided with electronic coupons (e-coupons), which

[4] Heckathorn, D.D. (1997). "Respondent-driven sampling: A new approach to the study of hidden populations." *Social Problems* 44: 174–199, https://doi.org/10.2307/3096941.

[5] Gile K.J., Johnston L.G., Salganik M.J. (2014). Diagnostics for Respondent-driven Sampling. *J R Stat Soc Ser A Stat Soc.*, *178*(1):241-269, https://doi.org/10.1111/rssa.12059

[6] Gile K.J., Handcock M.S. (2010). Respondent-Driven Sampling: An Assessment of Current Methodology. *Sociol Methodol.*, 40(1):285-327, https://doi.org/10.1111/j.1467-9531.2010.01223.x

[7] Agans, R. P., Zeng, D., Shook-Sa, B. E., Boynton, M. H., Brewer, N. T., Sutfin, E. L., Goldstein, A. O., Noar, S. M., Vallejos, Q., Queen, T. L., Bowling, J. M., and Ribisl, K. M. (2021). Using social networks to supplement RDD telephone surveys to oversample hard-to-reach populations: A new RDD+RDS approach. *Sociological Methodology*, *51*(2):270-289, https://doi.org/10.1177/00811750211003922; Michaels, S., Pineau, V., Reimer, B., Ganesh, N., and Dennis, J. M. (2019). Test of a hybrid method of sampling the LGBT population: Web respondent driven sampling with seeds from a probability sample. *Journal of Official Statistics*, *35*(4):731-752, https://doi.org/10.2478/jos-2019-0031.

are survey invitations that they can send via email or text. This is referred to as the "first wave" of recruitment. The "recruits" who complete the survey will become "recruiters" and be asked to recruit up to five individuals, and so on. RDS will continue for several waves until 400 completed surveys in each industry is achieved, for a total of 4,000 completed surveys. The number of waves needed to achieve the sample size of 400 will vary across industry. The RDS approach facilitates estimation of violation prevalence by industry by bringing respondents who work in the selected industries into the total sample, since the numbers of these types of workers in the ABS are likely to be far too small to yield enough workers to produce reliable estimates.[8]

ABS. The respondent universe from which the ABS sample of all nonexempt workers will be taken is comprised of workers who meet the following criteria:

- Age 18 or older;
- Employed at their current job for at least four weeks;
- Work in the private sector;
- Not self-employed or an independent contractor; and
- Nonexempt from the Fair Labor Standards Act (FLSA) minimum wage and overtime provisions. [9]

[8] For example, several of the industries comprise 1 to 2 percent of all nonexempt workers. A probability sample of 4,048 nonexempt workers would yield only about 80 complete surveys from workers in an industry that comprised 2 percent of all nonexempt workers. A sample size of 80 would yield precision for violation estimates that are considerably higher than the conventionally accepted ±5 percentage points.

[9] U.S. Department of Labor (2019, August). Fact Sheet #17A: Exemption for Executive, Administrative, Professional (EAP), Computer & Outside Sales Employees Under the Fair Labor Standards Act (FLSA). https://www.dol.gov/agencies/whd/fact-sheets/17a-overtime. DOL issued a new rule that raises the salary threshold for exemption to $1,128 per week effective January 1, 2025. Given that the rule is facing legal challenges, we propose that the current data collection use the $684 threshold. Basing the eligibility criteria on the new rule could lead to overestimates of potential violations if the new rule is not consistently applied. However, we will reevaluate the decision and may file an OMB amendment if necessary to change the eligibility criteria. https://www.dol.gov/agencies/whd/overtime/salary-levels

Although the FLSA includes child labor provisions, minors younger than age 18 are excluded from the target population because estimating child labor violations requires a different survey design and is best suited for future data collection efforts. Workers who have been employed at their current job for less than four weeks are excluded from the target population because many of the questions ask about work experiences in the past four weeks. Asking about work experiences in a specific time period is necessary to estimate the prevalence, severity, and frequency of potential violations. Workers in federal, state, and local government are excluded as the U.S. Department of Labor (DOL) does not intend to use the data to inform compliance and education efforts with government agencies. The self-employed and independent contractors will be screened out because they are not eligible for FLSA with one exception. Potentially misclassified independent contractors will be identified using a brief two-question screen and included in the survey to examine the extent to which this group experiences potential FLSA violations.

Additionally, eligible workers must be nonexempt from the FLSA. Workers are generally considered exempt if they earn at least $684 per week on a salary (or fee) basis and perform exempt job duties. FLSA exempt status is complex and subject to measurement error when captured in a survey. While determining salary is relatively straightforward, job duties are more complex. Some past studies using the Current Population Survey (CPS) have used occupation to assign a probability that a worker is nonexempt.[10] Real-time coding of responses to open-ended occupation questions asked in a screener would potentially be fraught with measurement error. Instead, the screener will ask respondents several questions to determine whether they have executive, administrative, or professional (EAP) job duties (Attachment A). If workers (a) are paid on a salary basis, (b) earn at least $684 per week, and (c) have EAP job duties, we will assume they are exempt and ineligible for the survey. If a worker indicates that they are a computer professional and earn at least $684 per week on a salary basis they will be exempt and ineligible.[11] If a worker indicates that they work in outside sales they will also be exempt and ineligible.[12] Finally, the highly compensated employee exemption states that employees making more than $107,432 per year on a salary basis only have to pass a limited duties test to be considered exempt.[13] We will exclude from the survey all workers who earn more than $100,000 per year on a salary basis as these workers are extremely likely to be exempt from the FLSA.

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[10] Cooper, D., and Kroeger, T. (2017, May 10). Employers steal billions from workers' paychecks each year: Survey data show millions of workers are paid less than the minimum wage, at significant cost to taxpayers and state economies. Economic Policy Institute. https://www.epi.org/publication/employers-steal-billions-from-workers-paychecks-each-year/; Eastern Research Group Inc. (ERG) (2014). *The social and economic effects of wage violations: Estimates for California and New York* (Contract number DOLU139634375). Department of Labor. https://www.dol.gov/sites/dolgov/files/OASP/legacy/files/WageViolationsReportDecember2014.pdf

[11] The FLSA also exempts computer professionals who are paid on an hourly basis not less than $27.63 per hour. The screener does not include these additional screens because it would be too complex. Therefore, some hourly computer professionals may be included in the survey. See U.S. Department of Labor (2024). Fact Sheet #17E:Exemption for Employees in Computer-Related Occupations Under the Fair Labor Standards Act (FLSA). https://www.dol.gov/agencies/whd/fact-sheets/17e-overtime-computer

[12] The salary basis and salary level tests do not apply to outside sales professionals. See U.S. Department of Labor (2024, August). Fact Sheet #17F: Exemption for Outside Sales Employees Under the Fair Labor Standards Act (FLSA). https://www.dol.gov/agencies/whd/fact-sheets/17f-overtime-outside-sales

[13] U.S. Department of Labor (2024, August). Fact Sheet #17H: Highly-Compensated Employees and the Part 541 Exemption Under the Fair Labor Standards Act (FLSA). https://www.dol.gov/agencies/whd/fact-sheets/17h-overtime-highly-compensated

It is not possible to account for all possible exemptions under the FLSA. Physicians and lawyers are exempt from FLSA regardless of whether they meet the other tests, as are elementary and secondary school administrators and teachers. Conversely, police and firefighters are nonexempt unless they have supervisor duties. Another complication is that there are occupations that are exempt from the overtime but not minimum wage provisions. It is not possible for the screener to consider all of the possible reasons for exemption and instead focuses on broadly identifying those workers likely to be exempt. The EAP or "white collar" exemptions account for most exemptions. To address the possibility that some exempt workers are determined to be "eligible" for the survey, the extended survey will include standard open-ended industry and occupation questions found in labor market surveys that can be used to potentially identify such workers and exclude their responses.

There are no publicly available data on the number of workers who are nonexempt *and* meet the additional target population criteria (e.g., age 18 or older, employed in their current job for at least four weeks, and employed in the private sector). According to the U.S. Bureau of Labor Statistics (BLS), in July 2024, the total number of civilian employed was 161,266 thousand.[14] Among these, 2,139 thousand were ages 16 to 17 and 21,607 thousand were government workers and not included in the target population. Using these data, we estimate that the number of workers who are age 18 or older and in the private sector is 137,520 thousand.[15] In terms of exemptions, one study found that 70% of the *jobs* in California were nonexempt from minimum wage and 57% were nonexempt from overtime and 65% of the jobs in New York were nonexempt from minimum wage.[16] To arrive at these estimates, the authors assigned each occupation a probability of being exempt based on data provided by DOL. As shown in Exhibit 1, assuming that 60% of workers are nonexempt, we estimate the total size of the eligible universe to be 82,512 thousand adults. This represents 30.7% of the civilian population of 268,644.[17] This estimate may be an upper bound because it does not exclude those who have been employed in their current job for less than four weeks.

Exhibit 1. Respondent universe for the ABS sample of nonexempt workers

Group	Respondent Universe (in 1,000s)
Civilian population	268,644
Employed	161,266
Employed adults ages 18 and older (adult workers)	159,127
Adult workers in the private sector	137,520
Civilian, nonexempt adult workers in the private sector	82,512
Nonexempt workers as a percent of all civilian workers ages 18 and older	60.0%

[14] U.S. Bureau of Labor Statistics (2024, August 2). The Employment Situation – July 2024. https://www.bls.gov/news.release/pdf/empsit.pdf

[15] This calculation assumes no overlap in the proportion of workers who are 16 to 17 and working for a government agency.

[16] Eastern Research Group Inc. (ERG) (2014). *The social and economic effects of wage violations: Estimates for California and New York* (Contract number DOLU139634375). Department of Labor. https://www.dol.gov/sites/dolgov/files/OASP/legacy/files/WageViolationsReportDecember2014.pdf

[17] U.S. Bureau of Labor Statistics (2024, August 2). The Employment Situation – July 2024. https://www.bls.gov/news.release/pdf/empsit.pdf

Nonexempt workers as a percent of civilian population	30.7%

An alternative source of information are calculations performed by DOL's contractor using the 2017 to 2019 CPS Annual Earnings File (also known as the Merged Outgoing Rotation Groups). We first identified all individuals who met the following criteria:

1. Age 18 or older;
2. Employed;
3. Employed in private, non-farm industries (e.g., not a government employee);
4. Civilian (not in the military);
5. Not self-employed; and
6. Not a manager, supervisor, or technical worker (based on census occupation code).[18]

[18]The following census occupation codes were excluded because they are management, "white collar," or other occupations that are likely to be exempt: 0010-2440, 2555-3550, 3700-3735, 4000-4010, 4200-4210, 4330, 4700-4710, 5000, 6005, 6200, 7000, 7700, 9005, and 9840. The occupations corresponding to these codes can be found at: https://cps.ipums.org/cps/codes/occ_20112019_codes.shtml

Based on these calculations, the estimated universe size of nonexempt workers is 67.8 million adult workers. This number is less than the estimate of 82.5 million adult workers derived from extrapolating the proportions of nonexempt jobs in California and New York to employed workers at the national level. This difference is likely due to differences in how EAP job duties were determined. In the study that examined nonexempt jobs in California and New York, jobs were determined to be exempt or nonexempt based on probabilities. In contrast, in the current analysis we had to rely on occupation rather than job duties to determine which workers may be exempt, and a given occupation may include both exempt and nonexempt workers. We were liberal in excluding occupations that were likely to include "white collar" workers who would be exempt under the EAP exemptions of the FLSA. Therefore, this estimate should be considered a lower bound. The National Worker Survey will provide a more accurate estimate of the number of workers who are nonexempt by weighting the number of respondents who are eligible based on the screener.

For the ABS, to achieve 4,048 complete surveys, we will select a sample of 115,000 addresses to account for ineligibility and nonresponse to the survey. The sample will be selected systemically using a geographic sort by ZIP Code to obtain a proportional allocation across the U.S. The invitation letter will ask that the employed adult in the household complete the screener. Including the key screening criteria in the letter will guide employed individuals to the survey, thereby reducing the number of ineligible respondents and increasing the number of completed surveys.[19] If there is more than one employed adult in the household, the screener will instruct the one with the next birthday to complete the screener (which aligns with the principle of randomized selection). The invitation letter included in this package was cognitively tested to verify that the instructions were clear and would result in the proper selection of respondents within households. The sample design will yield 4,048 completed surveys with nonexempt workers. Section B.2 discusses the rationale for this final sample size. Exhibit 2 shows that we assume that 88% of the addresses will be occupied,[20] and that 10% of households will respond to the screener.[21] Among those who respond to the screener, 40% will have a nonexempt worker who is eligible for the survey.[22] We assume that everyone who is eligible in the screener will complete the extended survey because they took the initiative to present for eligibility screening, and eligible adult workers will be immediately directed to the survey.

[19]We considered including additional eligibility criteria in the letter, such as having been employed at the current job for at least four weeks and not being self-employed. However, including these additional criteria would likely make the instructions too complex.

[20] DeMatteis, J.M. (2019). Computing "e" in self-administered address-based sampling studies. *Survey Practice, 12*(1), https://doi.org/10.29115/SP-2019-0002.

[21] Pew Research Center (2021). Jewish Americans in 2020. https://www.pewresearch.org/religion/2021/05/11/jewish-americans-in-2020/

[22]The 82.5 million adult workers who are nonexempt are 31% of the civilian noninstitutionalized population of 268.6 million. Since there are roughly 2 adults per household, we estimate that roughly 40% of households will have one or more nonexempt adult workers (lower than the 31% times 2 adults per household). All else being equal, we believe it is better to be conservative in our assumptions about how much sample will need to be released in the event that the response rate is lower than expected.

Exhibit 2. ABS sample sizes

	Assumption	Number
Sampled addresses	---	115,000
Percent occupied	88%	101,200
Percent responding	10%	10,120
Percent eligible (covered, non-exempt)	40%	4,048

RDS. The target population for the RDS sample is workers in 10 industries. These industries were selected for inclusion because they are among the largest industries that pay workers below the median national wage for all nonexempt workers.[23] These workers are a subset of the target population for the ABS sample of all nonexempt workers. As shown in Exhibit 3, based on BLS data, the estimated number of nonexempt workers in these industries ranges from about 806,000 in Investigative and security services to 12.7 million in retail.[24] Several of the industries employ a small fraction of all nonexempt workers and an even smaller fraction of the civilian noninstitutionalized population, underscoring the need to use RDS to sample workers in these industries. For example, nonexempt workers in investigative and security services are less than 1% of the civilian population. A random sample of 4,048 households would be expected to result in 40 completed surveys from nonexempt workers in investigative and security services. Such a small sample size precludes precise inferences about potential violations in these industries or making comparisons between industries.

In RDS, respondents are selected not from a sampling frame but from a social network of existing members of the sample. ABS respondents, regardless of the industry in which they are employed, will be "seeds" (the original members of the sample) that are asked to recruit eligible members of their social networks. As discussed in Section A.2, whereas RDS typically starts with a convenience sample, selecting the seeds from the ABS sample eliminates the possibility of seed bias associated with the use of an initial convenience sample and inefficiency of having to eliminate initial waves from analysis due to possible bias. Using random sampling for seeds has been shown to produce estimates similar to those from probability samples.[25] All ABS respondents will be asked to recruit up to five individuals they know working in the 10 industries.[26] The seeds will be provided with electronic coupons (e-coupons), which are invitations that they can send to eligible individuals via email or text. This is referred to as the "first wave" of recruitment. The "recruits" will become "recruiters" and will be asked to recruit up to five individuals. RDS will continue until a sample size of 400 in each industry is achieved. Recruiters will be asked to identify potential recruits in each industry starting with rarest industry and moving to the next rarest until they identifies up to 5 recruits.[27] Of the five recruits, recruiters will be asked to have no more

[23] Using the CPS, we calculated the median hourly wage for all nonexempt workers and for each 4-digit census industry code and identified the largest industries with wages below the median hourly wage for all nonexempt workers.

[24] U.S. Bureau of Labor Statistics (2024, January 26). Table 18. Employed persons by detailed industry, sex, race, and Hispanic or Latino ethnicity. https://www.bls.gov/cps/cpsaat18.htm

[25] Agans, R. P., Zeng, D., Shook-Sa, B. E., Boynton, M. H., Brewer, N. T., Sutfin, E. L., Goldstein, A. O., Noar, S. M., Vallejos, Q., Queen, T. L., Bowling, J. M., and Ribisl, K. M. (2021). Using social networks to supplement RDD telephone surveys to oversample hard-to-reach populations: A new RDD+RDS approach. *Sociological Methodology*, *51*(2):270-289, https://doi.org/10.1177/00811750211003922; Michaels, S., Pineau, V., Reimer, B., Ganesh, N., and Dennis, J. M. (2019). Test of a hybrid method of sampling the LGBT population: Web respondent driven sampling with seeds from a probability sample. *Journal of Official Statistics*, *35*(4):731-752, https://doi.org/10.2478/jos-2019-0031.

[26] ABS respondents can recruit eligible participants who live in the same household. Thus, if an eligible household member is not selected to complete the screener using the next birthday method, they can be recruited by the ABS respondent.

[27] The RDS sample will be fielded in five replicates (releases) and the list of industries will be refined across these replicates by dropping those that are already have achieved 400 completes while prioritizing those with the fewest completes.

than two per industry and no recruits who are coworkers (i.e., who work for their employer) to reduce homophily due to clustering, which can increase the standard errors of RDS estimates.[28]

Exhibit 3. Respondent universe for the RDS sample of workers in low-wage industries

Industry	Persons Covered by the Data Collection (in '000s)[1]	Nonexempt workers in industry as a percent of all nonexempt workers	Nonexempt workers in industry as a percent of civilian population	Expected number of ABS respondents in industry[2]
Construction	10,706	13.0%	4.0%	526
Child day care services	1,342	1.6%	0.5%	65
Grocery stores and supermarkets	2,191	2.7%	0.8%	109
Home health care	1,248	1.5%	0.5%	61
Hotels and motels[3]	1,067	1.3%	0.4%	53
Investigative and security services	806	1.0%	0.3%	40
Nursing homes	1,200	1.5%	0.4%	61
Restaurants and other food services	8,343	10.1%	3.1%	409
Retail (excluding grocery stores)	12,685	15.4%	4.7%	623
Services to buildings and dwellings	1,512	1.8%	0.6%	73
Total	**41,100**	**49.8%**	**15.3%**	**2,016**

[1]For the purposes of these calculations, we assume that 86% of the workers in these industries are age 18 or older and employed in the private sector. We also assume that 90% are nonexempt based on the percentage of occupations within each industry that are not managerial.

[2] We multiplied the number of nonexempt workers in the industry as a percentage of all nonexempt workers by the ABS sample size of 4,048. This calculation assumes that workers in these 10 industries have the same response rates to the survey as workers in other industries.

[3] Hotels and motels is a subset of the accommodation industry. The estimated universe is based on the accommodation industry.

b. Response rates

This section discusses the response rates expected for each recruitment approach used in the study.

[28] Homophily occurs when study participants recruit other participants who are like themselves. Multiple referrals from a respondent from the same industry are likely to be from the same employer and would provide little additional information. While many RDS studies give a maximum of three coupons to avoid reaching the sample size before equilibrium (i.e., the point at which the sample becomes independent from the seeds), wide rather than long recruitment chains are not a concern when the seeds are from a probability sample because early waves of respondents are already well-mixed within the population.

ABS. Our expected response rate for the ABS sample of 10% is consistent with response rates from recent ABS sample surveys. Over the past couple of decades, there has been extensive literature reporting on declines in survey response rates. Even following the pandemic impacts of 2020, response rates continue to decline.[29] Below are response rates for recent ABS sample surveys that used a mail push-to-web design:

- The 2023 Baltimore Area Survey, which offered $2 pre-paid and $5 post-paid incentives, had a 13.5% response rate.[30]
- The 2022 Religion Among Asian Americans Survey, which offered $2 pre-paid and $10 post-paid incentives, had a 13.3% response rate.[31]
- The 2021-2022 California Health Interview Survey, which offered a $2 pre-incentive, received an 8.6% response rate among adults.[32]
- The 2022 Health Information National Trends Survey (HINTS) offered four mailings (i.e., initial invite, reminder postcard, two follow-up mailings) and added a third follow-up mailing due to lower than anticipated response. Respondents were offered a $10 bonus incentive to complete the survey via the web. In the added third follow-up mailing to help boost response, a $30 post-paid incentive was offered. With these efforts, they obtained a 28% response rate.[33]

[29] Krieger N., LeBlanc M., Waterman P.D., Reisner S.L., Testa C., Chen J.T. (2023). Decreasing survey response rates in the time of COVID-19: Implications for analyses of population health and health inequities. *Am J Public Health*, 113(6): 667–670, https://doi.org/10.2105/AJPH.2023.307267

[30] Bader, M., McComas, M., Williams, A., Beal, M., Huffman, T. A., Locke, D., Montgomery, M. A., Parker, A., and Truiett-Theodorson, R. (2023). A portrait of Baltimore: Results of the 2023 Baltimore Area Survey. Johns Hopkins University. https://21cc.jhu.edu/wp-content/uploads/sites/64/a-portrait-of-baltimore.pdf

[31] Pew Research Center. (2023, October 11). *Methodology: Asian American religion*. Pew Research Center's Religion & Public Life Project. https://www.pewresearch.org/religious-landscape-study/2023/10/11/methodology-asian-american-religion/

[32] Sherr, S., Best, J., Goyle, A., Langdale, K., Engle-Bauer, M., and Harrell, V. (2023). California Health Interview Survey: CHIS 2021-2022 methodology series, report 4: Response rates. UCLA Center for Health Policy Research. https://healthpolicy.ucla.edu/sites/default/files/2023-09/chis_2021_2022_methodologyreport4_responserates_final_09112023.pdf

[33] National Cancer Institute. (2023). Health Information National Trends Survey 6 (HINTS 6) Methodology Report. Bethesda, MD: National Cancer Institute. https://hints.cancer.gov/docs/methodologyreports/HINTS_6_MethodologyReport.pdf

RDS. It is impossible to measure response rates in RDS. This is because the denominator required for calculating response rates includes all potential recruits to whom the recruiter sent e-coupons. Recruiters may have requested e-coupons but not distributed them. The coupon redemption rate is often used as a proxy. The coupon redemption rate is defined as the number of completed surveys divided by the number of coupons provided to recruiters (i.e., the number of email or text message sent to recruiters). Previous studies using web-based RDS find that one-third to one-half of coupons are redeemed.[34] Therefore, we assume an overall coupon redemption rate of 30%, which is consistent with other studies.[35] The RDS methods used in the National Worker Survey were developed precisely to reach hard-to-reach populations for which a sampling frame does not exist, and the expected redemption rates are within the range of those achieved in other studies using these non-probability sampling methods.

B.2. Procedures for the collection of information

a. Statistical Methodology for Stratification and Sample Selection

[34] Heckathorn, D.D. (2002). Respondent-driven sampling II: Deriving valid population estimates from chain-referral samples of hidden populations. *Social Problems*, 49(1):11-34, https://doi.org/10.1525/sp.2002.49.1.11; Johnston L.G., Sabin K., Mai Thu Hien, and Phame Thi Houng. (2006). Assessment of respondent driven sampling for recruiting female sex workers in two Vietnamese cities: Reaching the unseen sex worker. *Journal of Urban Health, 83*(7):i16-i28, https://doi.org/10.1007/s11524-006-9099-5; Ramirez-Valles J., Heckathorn D., Vazquez R., Diaz R.M., and Carlson R. (2005). From networks to populations: The development and application of respondent-driven sampling among IDUs and Latino gay men. *AIDS and Behavior, 9*(4):387-402, https://doi.org/10.1007/s10461-005-9012-3; Stormer A., Tun W., Guli L., Harxhi A., Bodanovskaia Z., Yakovleva A., Rusakova M., Levina O., Bani R., Rjepaj K., and Bino S. (2006). An analysis of respondent driven sampling with Injection Drug Users (IDU) in Albania and the Russian Federation. *J Urban Health, 83*(6 Suppl):i73-82, https://doi.org/10.1007/s11524-006-9105-y; Wang, J.C., Carlson, R.G., Falck, R.S., Siegal, H.A., Rahman, A. and Li, L.N. (2005) Respondent-Driven Sampling to Recruit MDMA Users: A Methodological Assessment. *Drug and Alcohol Dependence, 78*, 147-157, https://doi.org/10.1016/j.drugalcdep.2004.10.011; Yeka W, Maibani–Michie G, Prybylski D, and Colby D. (2006). Application of respondent driven sampling to collect baseline data on FSWs and MSM for HIV risk reduction interventions in two urban centres in Papua New Guinea. *Journal of Urban Health 83*:60-72, https://doi.org/10.1007/s11524-006-9103-0; Bengtsson, L., Lu, X., Nguyen, Q. C., Camitz, M., Hoang, N. L., Nguyen, T. A., ... and Thorson, A. (2012). Implementation of web-based respondent-driven sampling among men who have sex with men in Vietnam. *PloS one, 7*(11), e49417, https://doi.org/10.1371/journal.pone.0049417; Lee, S., Suzer-Gurtekin, T., Wagner, J., and Valliant, R. (2017). Total survey error and respondent driven sampling: focus on nonresponse and measurement errors in the recruitment process and the network size reports and implications for inferences. *Journal of Official Statistics*, *33*(2), 335-366, https://doi.org/10.1515/jos-2017-0017.

[35] Because recruiters are instructed to invite peers who meet the general eligibility criteria, it is expected that at least 80% of those completing the screener will be eligible.

ABS. ABS uses the U.S. Postal Service (USPS) lists of all residential delivery addresses to select a sample of homes, giving every household a chance to be surveyed. Like virtually every household survey in the United States including the CPS, ABS does not cover the institutional population; in addition, its coverage of group quarters and those without permanent residences is very limited. The ABS frame is used in most national household surveys because it has a very high coverage of people who live in households, 99% or higher.[36] Our sampling vendor, Market Systems Group (MSG), has expanded the postal data to include census geography (i.e., tract, block group, and block based on the 2020 census definition). The ABS frame has become so complete that the U.S. Census Bureau uses it as the initial list of households for the decennial census.[37] The sampling frame of addresses will be ordered by ZIP Code, and then a systematic sample will be selected using an interval to achieve the target of 115,000 addresses. The result will be a proportional sample of addresses across the U.S. with equal probability of selection.

RDS. Sample selection in the RDS is led by study participants. There is no stratification or sample selection for the RDS. We expect that the number of waves that it will take to achieve the sample size of 400 in each industry will vary by industry. 'Less rare' industries may reach a sample size of 400 in one or two waves whereas more rare industries may require 6 or 7 waves. In addition to the coupon redemption rate, another key assumption is whether the respondent knows any workers in the industry (the identification rate). As shown in Exhibit 4, for a less rare industry, we assume that 25% of the 4,048 ABS respondents know a worker in the industry, and on average, they each know 1.5 people in the industry. With these assumptions, at the end of wave 1, there will be about 455 RDS completes in this industry (4,048 ABS respondents * 25% identification rate * 1.5 workers known * 30% redemption rate). For a 'more rare' industry, we assume that only 5% of the 4,048 ABS respondents know any workers in the industry.[38] At the end of wave 1, there will be about 91 RDS completes in this industry (4,048 ABS respondents * 5% identification rate * 1.5 workers known * 30% redemption rate). The same assumptions apply to the second and subsequent waves, except we assume that recruiters know others in the same industry at a much higher rate (the initial identification rate of 5% is increased to 75%). As a result of applying this rate, at the end of seventh wave there would be 521 completed surveys in the industry.

Exhibit 4. RDS completes after one wave for 'less rare' and 'more rare' industries

	Less rare industry	More rare industry
Number of ABS respondents	4,048	4,048
Identification rate (% of ABS respondents who know a worker in	25%	5%

[36] Iannacchione, V. G. (2011). The changing role of address-based sampling in survey research. *Public Opinion Quarterly*, *75*(3), 556–575, https://doi.org/10.1093/poq/nfr017; Battaglia, M.P., Dillman, D.A., Frankel, M.R., Harter, R., Buskirk, T.D., McPhee, C.B., DeMatteis, J.M., and Yancey, T. (2016). Sampling, data collection, and weighting procedures for address-based sample surveys. *Journal of Survey Statistics and Methodology*, *4*:4, 476–500, https://doi.org/10.1093/jssam/smw025.

[37] U.S. Census Bureau (2019). Current Population Survey Design and Methodology Technical Paper 77. https://www2.census.gov/programs-surveys/cps/methodology/CPS-Tech-Paper-77.pdf

[38] Unfortunately, there is no literature to inform assumptions about the identification rate. In the formative research, we asked respondents how many eligible people they knew who worked in each industry. The percentage of participants who knew someone in each industry ranged from 42% for building services to 88% for food service. While the formative research participants may have been more socially connected than the average worker, we believe that identification rates of 5% and 25% for small and large industries, respectively, is conservative.

industry)		
Number of ABS respondents who know a worker in industry	1,012	202
Among ABS respondents who know a worker in industry, average number of workers they know	1.5	1.5
Number of e-coupons provided	1,518	304
Redemption rate (% of e-coupons used)	30%	30%
Number of completes	455	91

Although the number of waves needed to achieve a sample of 400 per industry will vary depending on the identification and redemption rates, we hope to achieve the required sample in the fewest waves possible, thereby benefitting from the randomization of the ABS sample. Traditional RDS requires multiple waves to reduce the dependence on the typically used nonrandom seeds. In our situation, the seeds are random, and fewer waves increase the precision. This precision increase is attained because each ABS seed is essentially a cluster, and smaller sample sizes within clusters lead to greater precision. The traditional sampling intracorrelation coefficient is very similar to the RDS concept of homophily. If homophily is large, the precision is improved by limiting the number of respondents from the same seed. Our procedures are intended to accomplish this. The management of the sample and releases will monitor and control the process to limit the number of RDS waves by industry if needed.

b. Estimation Procedures

Based on the assumption that one's network size affects their selection probability in RDS (e.g., persons who know more people in the target population are more likely to be recruited in an RDS study than their counterpart), existing RDS estimators use the network size as an adjustment factor that accounts for differential selection probabilities.[39] The basis of this adjustment is the answer to the network size questions asked in RDS surveys (e.g., How many people do you know who work in this industry?). Over the past two decades, RDS estimators for estimating a proportion have undergone several revisions to decrease bias and increase variability.[40] We will use a third-generation estimator, Gile's sequential sampling (SS) estimator.[41] It is considered a design-assisted estimator and attempts to minimize potential bias due to homophily and can estimate confidence intervals. To account for sampling multiple populations (industries), the SS estimator will be modified such that the weight will be the number of persons the recruiter knows in each industry times the size of the industry. This weight better reflects the 'visibility' or degree of connectedness of the respondent to the specific industry. In this study, we have random seeds drawn from an ABS sample and do not expect high homophily. A simulation conducted by DOL's contractor showed that the SS estimator results in low bias even when homophily is moderate to high. See Section B.4 for further details on the simulation.

c. Statistical Power/Degree of Accuracy Needed

[39] Heckathorn (2002); Volz E., and Heckathorn D.D. (2008). Probability based estimation theory for respondent driven sampling. *Journal of Official Statistics* 24(1): 79–97, https://www.proquest.com/scholarly-journals/probability-based-estimation-theory-respondent/docview/1266794018/se-2.

[40] Léon, L., Des Jarlais, D., Jauffret-Roustide, M., and Le Strat, Y. (2016). Update on respondent-driven sampling: Theory and practical considerations for studies of persons who inject drugs. *Methodological Innovations*, *9*, *https://doi.org/10.1177/2059799116672878*; Fellows, I.E. (2022). On The Robustness Of Respondent-Driven Sampling Estimators To Measurement Error, *Journal of Survey Statistics and Methodology*, 10(2): 377–396, https://doi.org/10.1093/jssam/smab056.

[41] Gile, K.J. (2011). Improved inference for respondent-driven sampling data with application to HIV prevalence estimation. *Journal of the American Statistical Association*, *106*(493), 135-146, https://doi.org/10.1198/jasa.2011.ap09475; Gile, K.J. and Handcock, M.S. (2015). Network model-assisted inference from respondent-driven sampling data. *Journal of the Royal Statistical Society Series A: Statistics in Society*, *178*(3), 619-639, https://doi.org/10.1111/rssa.12091; Spiller M.W., Gile K.J., Handcock M.S., et al. (2017). Evaluating Variance Estimators for Respondent-Driven Sampling. *J Surv Stat Methodol* 2017; 2017: smx018, https://doi.org/10.1093/jssam/smx018

The National Worker Survey will consist of two samples: an ABS sample of *all nonexempt workers* and an RDS sample of workers in 10 industries. The ABS sample will have a sample size of at least 4,048 workers at the national level. The RDS sample will have a sample of 400 workers in each industry, for a total of 4,000. In this section we estimate the precision levels for proportions and power for comparisons between groups.

ABS. For the ABS sample, the design effect should be relatively small because the sample design does not include oversampling of workers with certain characteristics or geographic areas. The selection of one eligible adult worker in the household and the weighting to adjust for differential nonresponse across demographic groups will contribute to the design effect. The ABS respondents will be raked to population characteristics of the total nonexempt workforce derived from the most recent CPS file. The characteristics considered for raking include age, sex, race, education, and region. These adjustments will likely reduce any nonresponse bias and make the estimates conform to those known from the CPS. Taking into account these weighting adjustments, we anticipate a design effect of 1.2.

Given that the National Worker Survey is the first of its kind, few national studies serve as a guidepost for population proportions for estimating precision. One study using the CPS found that the rate of minimum wage violations as a percentage of nonexempt jobs was 3.5% to 3.8% in California and 3.5% to 6.5% in New York.[42] Another national study found that 12% of all nonexempt workers were not paid time-and-a-half for overtime.[43] Exhibit 5 presents precision estimates for national proportions ranging from 5% to 50% for sample sizes ranging from 400 to 4,000. The precision for a national proportion of 50% is shown because it is the most conservative. For a proportion of 50% and a sample size of 4,000, the precision will be less than ±1.7%. Exhibit 5 shows the sample size will also provide precise estimates for subgroups based on worker characteristics. For example, for a subgroup of 400 (10% of workers) and a proportion of 50%, the precision will be ±5.4%.

Exhibit 5. Precision estimates for the ABS sample of all nonexempt workers and subgroups for different estimated proportions

	Population Proportion							
Group Size	5%	10%	15%	20%	25%	30%	40%	50%
400	± 2.3%	± 3.2%	± 3.8%	± 4.3%	± 4.6%	± 4.9%	± 5.3%	± 5.4%
800	± 1.7%	± 2.3%	± 2.7%	± 3.0%	± 3.3%	± 3.5%	± 3.7%	± 3.8%
1,200	± 1.4%	± 1.9%	± 2.2%	± 2.5%	± 2.7%	± 2.8%	± 3.0%	± 3.1%
1,600	± 1.2%	± 1.6%	± 1.9%	± 2.1%	± 2.3%	± 2.5%	± 2.6%	± 2.7%
2,000	± 1.0%	± 1.4%	± 1.7%	± 1.9%	± 2.1%	± 2.2%	± 2.4%	± 2.4%
4,000	± 0.7%	± 1.0%	± 1.2%	± 1.4%	± 1.5%	± 1.6%	± 1.7%	± 1.7%

[42] Eastern Research Group Inc. (ERG) (2014). *The social and economic effects of wage violations: Estimates for California and New York* (Contract number DOLU139634375). Department of Labor. https://www.dol.gov/sites/dolgov/files/OASP/legacy/files/WageViolationsReportDecember2014.pdf

[43] Rohwedder, S. and J.B. Wenger. (2015). The Fair Labor Standards Act: Worker Misclassification and the Hours and Earnings Effects of Expanded Coverage. RAND Corporation: Santa Monica, CA. https://www.rand.org/content/dam/rand/pubs/working_papers/WR1100/WR1114/RAND_WR1114.pdf

The large sample size also supports comparisons between and within groups. Exhibit 6 presents the magnitude of differences that can be detected with 80% power at the alpha 0.05 level. For example, the first row presents the difference in proportions that could be detected for two subgroups of 400 when the estimated proportion in one of the groups is 50%. When the estimated proportion in one of the groups is 50%, a two-group test will have 80% power to detect a difference of 7.5 percentage points. For two subgroups of 1,000, a two-group test will have 80% power to detect a difference of 4.8 percentage points.

Exhibit 6. Statistical power for differences of proportions tests for different subgroup sizes

	Population Proportion		
Subgroup Size	**5%**	**25%**	**50%**
400	± 3.8%	± 6.8%	± 7.5%
1,000	± 3.0%	± 4.3%	± 4.8%

RDS. The RDS is expected to yield a sample of 400 workers in each industry, for a total of 4,000 workers. A design effect must be assumed to account for the nonrandom nature of the sampling in RDS. Following guidance in the RDS literature, the calculations assume a design effect of 2.0.[44] Research focusing on workers in low-wage industries (as opposed to all nonexempt workers) has produced a wider range of estimates of violations. For example, a 2009 study found that 12% of workers worked through a meal break without pay, 26% of workers were not paid minimum wage, 19% were not paid time-and-half for overtime, and 17% were not paid for work off-the-clock. However, just 2.3% experienced an improper deduction and 4.6% reported employer retaliation.[45] As shown in Exhibit 7, for an estimated proportion of 50%, a sample size of 400 per industry would yield a precision of ± 6.9%. For an estimated proportion of 25%, the precision will be ± 6.0% and for a proportion of 10%, the precision will be ± 4.2%.[46]

Exhibit 7. Precision of estimates for different proportions and subgroup sizes for the combined ABS and RDS sample

	Population Proportion		
Group Size	10%	25%	50%
380	± 4.3%	± 6.2%	± 7.1%
400	± 4.2%	± 6.0%	± 6.9%

[44] Salganik M.J. (2006). Variance estimation, design effects, and sample size calculations for respondent-driven sampling. *J Urban Health 83*:98–112, https://doi.org/10.1007/s11524-006-9106-x; Wejnert C., Pham H., Krishna N., Le B., and DiNenno E. (2012). Estimating design effect and calculating sample size for respondent-driven sampling studies of injection drug users in the United States. *AIDS Behav., 16*(4):797–806, https://doi.org/10.1007/s10461-012-0147-8; Johnston L.G., Chen Y-H., Silva-Santisteban A., and Raymond H.F.. (2013). An empirical examination of respondent driven sampling design effects among HIV risk groups from studies conducted around the world. *AIDS Behav., 17*(6):2202–10, https://doi.org/10.1007/s10461-012-0394-8.

[45] Bernhardt, A., Milkman, R., Theodore, N., Heckathorn, D., Auer, M., DeFilippis, J., González, A. L., Narro, V., Perelshteyn, J., Polson, D., and Spiller, M. (2009). Broken Laws, Unprotected Workers: Violations of Employment and Labor Laws in America's Cities. National Employment Law Project. https://www.nelp.org/insights-research/broken-laws-unprotected-workers-violations-of-employment-and-labor-laws-in-americas-cities/

[46] However, as discussed in Section B.4, a simulation conducted by DOL's contractor found that the design effect varies across industries and ranges from 1 to 1.6. All else being equal, we believe it is better to be conservative when assuming a design effect.

420	± 4.1%	± 5.9%	± 6.8%

The RDS will also support comparisons between industry groups. Considering the assumed design effects, Exhibit 8 presents the magnitude of differences that can be detected for two subgroups of 400 with 80% power at the alpha 0.05 level. When the estimated proportion in one of the groups is 50%, a two-group test will have 80% power to detect a difference of 9.7 percentage points. When the estimated proportion is 25%, a two-group test will have 80% power to detect a difference of 8.9 percentage points. When the estimated proportion is 10%, we can detect a difference of 6.6 percentage points.

Exhibit 8. Statistical power for differences of proportions tests between industries

	Population Proportion		
Group Size	**10%**	**25%**	**50%**
400	± 6.6%	± 8.9%	± 9.7%

d. Data Collection Methods

The data collection will begin with the ABS sample. We will use a push-to-web approach to administer the survey, which involves the use of mail contact to encourage (push) respondents to complete the web questionnaire. A web invitation packet will be addressed to the residents at the sampled address and will include an invitation letter on DOL letterhead with web access information, including a uniform resource locator (URL) and quick response (QR) code for completing the survey on a mobile device, a unique personal identification number (PIN) to access the survey, a $2 pre-incentive, and a one-page frequently asked questions. Materials will be printed in both English and Spanish and provide information on how to take the survey in additional languages (see Section B.3). The letter will also explain that if they are eligible and complete the survey, they will get an additional $40 and that they will receive $20 for each recruit who completes the survey.

The specific contact protocol is outlined in the steps below:

- **Week 1 –** Mail the invitation packet, including the $2 pre-incentive, first class.
- **Week 2 –** Mail reminder fold-over postcard to nonrespondents.
- **Week 3 –** Mail reminder fold-over postcard to nonrespondents.
- **Week 4 –** Mail nonresponse letter.
- **Week 7 –** Mail final reminder fold-over postcard.

ABS respondents or seeds will be asked to recruit up to five individuals whom they know work in the low-wage industries. This is referred to as the "first wave" of RDS recruitment. Seeds will be asked how many people they know who work in each low-wage industry. As described in Section B.1, we will ask the seeds about each industry separately in order from the smallest population size to the largest in an attempt to achieve 400 completes for the hardest-to-reach industries first, and seeds will be able refer up to two per industry in order to minimize homophily. Once five referrals have been received, the survey will continue to ask about how many people the respondent knows in the remaining industries. As described in Section B.2, these data enable us to estimate the size of respondents' personal networks for weighting.

For recruiters, we will offer the option to receive e-coupons via email or text message. We believe that indirect email (e.g., the research team emails or texts the invitations to recruiter, which can be forwarded to recruits) will be more effective than direct email (e.g., the recruiter provides email address or phone number of recruits and research team contacts the recruits). A web-based RDS study of young adult drug users found that asking seeds to provide the email addresses of friends was unsuccessful, which the researchers attributed to threats to confidentiality and privacy and spam filtering of email invitations.[47] Another study found that individuals were more likely to prefer a personal email, both for recruiting and being invited, than an anonymous email from the researchers.[48] E-coupons will include an invitation to participate, a URL, and PIN to access the survey. Recruits will enter the unique e-coupon referral codes to access the screener. This PIN will allow us to link them to their recruiters in the survey database. E-coupons will expire after 7 days to control the pace of recruitment and allows us to end recruitment once industry sample sizes are achieved.

These recruits will then become recruiters themselves and will each be asked to recruit up to five individuals they know who work in the 10 industries. We expect RDS to continue for several waves and will monitor the number of workers referred in each industry as the target number of completes is reached.

The sampled addresses will be randomly assigned to five release groups. Release groups will be used to control the timing and amount of sample released, and early release groups will be used to refine the data collection for later release groups. The list of industries will be refined across the sample replicates by dropping those that already have achieved 400 completes while prioritizing those with the fewest completes. The first replicate will illuminate the number of RDS waves needed to reach the sample size. The first release group will include the digital incentive experiment discussed in Section B.4.

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[47] Bauermeister J.A., Zimmerman M.A., Johns M.M., Glowacki P., Stoddard S., and Volz E. (2012). Innovative recruitment using online networks: lessons learned from an online study of alcohol and other drug use utilizing a web-based, respondent-driven sampling (webRDS) strategy. *J Stud Alcohol Drugs, 73*(5):834-8, https://doi.org/10.15288/jsad.2012.73.834.

[48] Diexer S., Teslya A., Buskens V., Matser A., Stein M., and Kretzschmar M.E. (2023). Improving web-based respondent-driven sampling performance among men who have sex with men in the Netherlands. *PLOS Digit Health, 2*(2):e0000192, https://doi.org/10.1371/journal.pdig.0000192.

Web-based RDS has advantages over traditional RDS. The internet provides increased anonymity, overcomes barriers associated with in-person recruitment, and is efficient for researchers.[49] However, one disadvantage of web-based RDS is the potential for cheating. RDS may be especially susceptible to fraud when monetary incentives are provided, compromising the validity of the findings.[50] There is a dearth of data on the extent of fraud in online survey research generally and RDS specifically, and studies rarely explain the steps taken to prevent fraud. One RDS study of men who have sex with men in Kentucky found that 29% of the surveys were identified as fraud, suggesting that researchers need to be vigilant about fraud in an effort to protect data integrity.[51]

Two types of fraud may occur in web-based RDS.[52] First, individuals may complete the survey more than once. This is known as duplicate fraud. These individuals may be eligible or ineligible for the survey. For example, rather than forwarding the e-coupons that we send to referrals in the target industries, a respondent may keep the e-coupons and use them to complete the survey up to five more times. Another type of fraud occurs when ineligible individuals may provide false answers to screening questions to gain access to the survey and receive the incentive. For example, an ineligible individual may indicate that they work in one of the target industries to gain access to the survey and receive the incentive.[53] Ineligibility fraud is much more difficult to prevent and detect than duplicate fraud. We will implement fraud mitigation both during data collection (fraud prevention) and after data collection (fraud detection).

Exhibit 9 shows the strategies that we will use to prevent duplicate and ineligibility fraud during the data collection. It is important to note that strategies designed to prevent fraud necessarily make it more difficult for eligible respondents to complete the survey. Therefore, fraud prevention strategies must be balanced against response rates. Also, no single set of methods can prevent fraud entirely, and no single set of methods is appropriate for a given survey. These strategies are based on those used by recent web-based RDS studies.[54]

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[49] Helms Y.B., Hamdiui N., Kretzschmar M.E.E., Rocha L.E.C., van Steenbergen J.E., Bengtsson L., Thorson A., Timen A, and Stein M.L. (2021). Applications and recruitment performance of web-based respondent-driven sampling: Scoping review. *J Med Internet Res*, *23*(1):e17564, doi: 10.2196/17564; Wejnert, C., & Heckathorn, D. D. (2008). Web-based network sampling: Efficiency and efficacy of respondent-driven sampling for online research. *Sociological Methods & Research*, *37*(1), 105–134, https://doi.org/10.1177/0049124108318333.

[50] Traditional in-person RDS is not immune to fraud. See Tyldum G., Johnston L. (eds). (2014). *Applying Respondent Driven Sampling to Migrant Populations: Lessons from the Field.* Palgrave Macmillan UK.

[51] Ballard A.M., Cardwell T., and Young A.M. (2019). Fraud detection protocol for web-based research among men who have sex with men: Development and descriptive evaluation. *JMIR Public Health Surveill*, *5*(1):e12344, https://doi.org/10.2196/12344.

[52] Sosenko F.L. and Bramley G. (2022). Smartphone-based Respondent Driven Sampling (RDS): A methodological advance in surveying small or 'hard-to-reach' populations. *PLoS One*, *17*(7):e0270673, https://doi.org/10.1371/journal.pone.0270673.

[53] In general, all of the fraud concerns are less likely for ABS because only one unique PIN is mailed to each household and the eligibility criteria are unknown to respondents.

[54] Karuchit S., Thiengtham P., Tanpradech S., Srinor W., Yingyong T., Naiwatanakul T., Northbrook S., Hladik W. A (2024). Web-Based, Respondent-Driven Sampling Survey Among Men Who Have Sex With Men (Kai Noi): Description of Methods and Characteristics. *JMIR Form Res*. 8:e50812, https://doi.org/10.2196/50812.

Exhibit 9. Proposed Fraud Prevention Strategies

Method of Prevention	Purpose
Duplicate Fraud	
Block IP addresses from outside of the U.S.	Prevents respondents from outside of the U.S.
Use of unique referral code on e-coupon which can be used only once	Prevents individuals without a code from completing the survey
Place a cookie on the browser that would not allow individuals to access the survey more than once	Prevents individuals from completing the survey more than once on the same device
Statement in informed consent that if individuals take the survey more than once, they will not receive incentives more than once	May deter individuals who want to take the survey more than once from participating
Send a one-time passcode (OTP) to respondents' mobile phone numbers for authentication	Reduces the risk of duplicate survey completion
Ineligibility Fraud	
Ineligible individuals based on the screener denied access to full survey	Prevents ineligible respondents from completing the survey
Individuals must answer most screener questions before being informed that they are ineligible	Prevents ineligible respondents from "learning" the specific eligibility criteria and trying again
Disable use of the back button and deny access to those who close out the screener	Participant cannot go back to answer questions with false answers in an effort to get screened into the survey
Informed consent will state that individuals who provide false answers will not receive the incentive	May deter individuals from pretending to be eligible

We will also implement fraud detection strategies using data collected in the survey as well as survey paradata to detect fraud and exclude responses after data collection is complete. We will use the following criteria to flag surveys as suspicious and assign each survey a specific number of points if it meets each criteria:

a. Duplicate contact information (e.g., email address, phone number, mailing address) across multiple surveys (2 points)
b. Recruiter and recruit completed the survey from the same IP address (1 point)
c. Too short a time between the e-coupon being sent to the recruiter and the survey being completed by the recruit (1 point)
d. Answering an attention filter question incorrectly (1 point)
e. Survey completed in too short a time (1 point)
f. Demographic characteristics about the recruit provided by the recruiter do not match the demographic characteristics reported by the recruit themselves (e.g., industry, sex, race) (1 point)

We will assign a survey a score of up to 7 points based on the criteria above. A score of 2 or more will be considered likely fraud and excluded from the data set. All surveys down the chain of a survey that is likely fraud will also be excluded. We will compare estimates for the full sample with a sample excluding those surveys flagged as likely fraud. Respondents who provide contact information to receive the e-coupons or incentive (e.g., phone number, email address, or mailing address) that duplicates contact information in another survey will not be provided an incentive.

e. Any Use of Periodic (Less Frequent Than Annual) Data Collection Cycles to Reduce Burden

The National Worker Survey is a one-time data collection effort and will not require periodic data collection cycles.

B.3. Methods to Maximize Response Rates and to Deal With Issues of Nonresponse

For the National Worker Survey, the following section discusses proposed methods to maximize survey response rates and describes multiple methods to evaluate survey nonresponse.

Methods to Maximize Response Rates

ABS. While we will make every effort to achieve a high response rate, some amount of nonresponse is unavoidable. Several strategies will be used to increase response to the National Worker Survey ABS sample:

- Respondent contact letters and emails have been carefully designed to emphasize the importance of the study and pique interest in the subject matter. The invitation letter was tested with eligible workers in cognitive interviews.
- The study invitation letter will be signed by a government official. The status of DOL as a U.S. government agency increases the legitimacy of the survey, which is in turn associated with higher response rates.[55]
- Emphasizing privacy in the contact letters and emails.
- Including Frequency Asked Questions in the invitation letter and on the survey website.
- The web survey will be accessible using any device (laptop, desktop computer, smartphone, or tablet) and accessible using screen reading technologies.
- The survey will be available in multiple languages including Spanish, Chinese, and Vietnamese.
- A series of reminders will be sent to encourage participation and a field period of eight weeks should allow sufficient time for households to respond to the survey.
- The survey length will be no longer than 30 minutes. A sizable body of evidence finds that longer surveys are associated with lower response rates and lower-quality data due to respondent fatigue.[56]

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[55] Fox, R. J., Crask, M. R., and Kim, J. (1988). Mail Survey Response Rate: A Meta-Analysis of Selected Techniques for Inducing Response. *Public Opinion Quarterly*, 52(4), 467–491, https://doi.org/10.1086/269125; Goyder, J.C. (1987). *The Silent Minority: Nonrespondents on Sample Surveys.* Boulder, CO: Wesview Press; Groves, R. M., Cialdini, R. B., and Couper, M. P. (1992). Understanding the decision to participate in a survey. *Public Opinion Quarterly, 56*(4), 475–495, https://doi.org/10.1086/269338.

[56] Crawford, S. D., Couper, M. P., and Lamias, M. J. (2001). Web surveys: Perceptions of burden. *Social Science Computer Review, 19*(2), 146–162, https://doi.org/10.1177/089443930101900202; Kaplowitz, M. D., Lupi, F., Couper, M. P., and Thorp, L. (2012). The effect of invitation design on web survey response rates. *Social Science Computer Review, 30(*3), 339-349, https://doi.org/10.1177/0894439311419084; Marcus, B., Bosnjak, M., Lindner, S., Plischenko, S., and Schutz, A. (2007). Compensating for low topic interest and long surveys. *Social Science Computer Review 25*:372-83, https://doi.org/10.1177/0894439307297606; Peytchev, A. (2009). Survey breakoff. *Public Opinion Quarterly, 73*(1): 74–97, https://doi.org/10.1093/poq/nfp014; Vehovar, V. and Čehovin, G. (2014). Questionnaire Length and Breakoffs in Web Surveys: A Meta Study. Presented at the 7th Internet Survey Methodology Workshop, South Tyrol, Italy; Yan, T., Conrad, F.G., Tourangeau, R. and Couper, M.P. (2011). Should I stay or should I go: The effects of progress feedback, promised task duration, and length of questionnaire

- DOL's contractor will staff a help desk Monday through Friday, from 9 am to 5 pm ET. Calls outside of office hours will be picked up by a messaging system and returned within 24 hours.
- Respondents will receive a $2 bill as an incentive to participate in the survey and a $40 incentive for completing the survey. See Section A.9 of the supporting statement for more information on incentives.

RDS. Individuals recruited by RDS may be more likely to participate than if a research team member had recruited them to the extent that recruitment by a peer implies endorsement of the survey by that peer. In addition, we will employ the following strategies that the literature on RDS has found to be important factors related to recruitment success:

- The survey will take no longer than 30 minutes to complete. RDS studies have found that the time required to complete the survey is an important factor for recruiters to decide if they want to forward an invitation to potential recruits, and one study found that recruits preferred a shorter survey to a higher incentive.[57]
- E-coupons will be provided by recruiters' choice of either email or text message. Providing multiple options for receiving e-coupons has been shown to be related to referral chain growth.[58]
- E-coupons will be sent via indirect email (e.g., the research team emails or texts invitations to the recruiter, which can be forwarded to recruits) rather than direct email (e.g., the recruiter provides email addresses or phone numbers of recruits and research teams contact the recruits). Web-based RDS studies have found that asking recruiters to provide the email of recruits is unsuccessful due to threats to confidentiality and privacy as well as spam filtering of email invitations.[59] In addition, individuals may be more likely to prefer a personal email, both for recruiting and being invited, than an anonymous email from the researchers.[60]
- A reminder will be sent to recruiters who have not used one or more of the e-coupons before it expires asking them to forward the e-coupon and reminding them about the incentive.
- We will consider increasing the number of e-coupons in later release groups, if needed, which will allow more productive seeds with larger networks to recruit more participants.
- Recruiters will receive a $20 incentive for each eligible recruit who completes the survey. See Section A.9 for more information on incentives. In addition, an incentive experiment will evaluate the efficacy and appropriateness of digital versus mailed incentives on RDS recruitment. See Section B.4 for a description of the experiment.
- If a respondent indicates that they do not want to recruit, we will ask for the reasons why. This information will be used to refine the procedures in later replicates.

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on completing web surveys. *International Journal of Public Opinion Research 23*:131-47, https://doi.org/10.1093/ijpor/edq046.

[57] Diexer et al. (2023)

[58] Bauermeister et al. (2012)

[59] Bauermeister et al. (2012)

[60] Diexer et al. (2023)

Nonresponse Bias Analysis

Nonresponse bias analyses examine the effect differential nonresponse might have on the estimates. Although the potential for bias theoretically is higher when nonresponse is higher, whether bias exists in the data also depends upon the differences in the characteristics of those who respond and those who do not respond, as well as the effectiveness of the adjustments that are used to modify the weights to account for the nonresponse. Many approaches can be used to study various aspects of unit nonresponse bias. Each approach has limitations, but we plan to use several approaches to help uncover consistent and substantial nonresponse biases if they exist.

ABS. Two methods will be used to examine the potential for nonresponse bias in the estimates from the ABS sample of the total nonexempt population: (1) a comparison of estimates from the ABS survey to those produced using CPS data; and (2) a comparison of estimates produced using weights that include adjustments for nonresponse to estimates produced using weights without nonresponse adjustments.

In the first method, the DOL contractor will identify items from the CPS to be used in the comparisons. While the CPS does not collect specific data on violations in the survey, items that are as correlated as possible with the key estimates will be selected and analyzed. This analysis final weight will be used for the respondents to the ABS. In the second method, estimates using the final or nonresponse-adjusted ABS weights will be compared with estimates weighted by the base weight. The magnitude of the differences in these comparisons will indicate the potential that substantial (or inconsequential) nonresponse bias is present in the data.

In addition to unit nonresponse, item nonresponse will be reviewed. We plan to compute missing item rates and report these. Because the web survey will prompt respondents to answer skipped questions, we expect the item missing rate will be small. If item missing rates are low (less than 5% to 10%), we will examine whether the data are missing at random and whether it is appropriate to use listwise deletion (calculate percentages and averages over all cases with non-missing data). If item nonresponse is higher than 10%, we will consider using imputation such as hot deck, maximum likelihood, or multiple imputation (which replaces the missing values with a set of plausible values that represent uncertainty in the imputation process). The report will provide details on item nonresponse and discuss any caveats readers should be aware of when interpreting the analysis.

RDS. Understanding nonresponse in RDS is a complex task. Nonresponse and nonresponse bias are particularly challenging to measure in RDS studies because non-responders are contacted by other participants rather than by researchers and because nonresponse is a multiple stage process.[61] Nonresponse is the result of three decisions in the current study: (1) the decision by the seed (or recruiter) to request e-coupons (i.e., answering yes to the question in the survey that asks them if they would like to recruit others); (2) the decision by the recruiter to send the e-coupons to potential recruits; and (3) the decision by the potential recruit to go online and take the screener. Nonresponse in the last stage involves not just the recruiters' nonresponse but also the recruits' nonresponse. RDS generally assumes complete response at all stages. However, nonresponse at any stage can result in recruits having characteristics different from the pool of potential recruits in systematic ways.

The approach of beginning with a large ABS sample as seeds is innovative, and the traditional literature on nonresponse bias analysis for RDS is very limited. The few attempts to study nonresponse bias in RDS has focused on the assumptions, whether they hold, and the implications for estimation.[62] One of the key diagnostics for RDS is the effect of the seeds, but in our application, we use ABS random seeds to avoid this issue altogether. Another key RDS issue is homophily and having enough waves to reduce its effects. However, in our application, the ABS sample and a small number of waves are essential to avoid the potential bias from homophily.

Several methods have been recommended to detect potential nonresponse bias in RDS.[63] We propose the following analyses:

- We will examine e-coupon distribution data to document the extent of nonresponse. We will calculate the percentage of respondents who took e-coupons and the e-coupon redemption rate as a proxy for response rates. Low e-coupon redemption rates may be an indicator of nonresponse bias.
- We will examine the relationship between a potential FLSA violation on the part of the recruiters and the number of recruits. One potential concern is that recruiters who have experienced an FLSA violation may be more likely to recruit others who have also experienced an FLSA violation. This might happen if, for example, respondents viewed the study as an opportunity to "report" that they had experienced violations. This would upwardly bias the prevalence estimate of FLSA violations. However, we view this as a relatively remote possibility given that the informational materials are very careful in characterizing the study as a general labor market survey and not as about FLSA violations.
- We will conduct a follow-up study with recruiters whose coupons were not used. The follow-up study will ask recruiters, for each e-coupon they requested, whether they sent the e-coupon and, if not, why not. The survey will be sent by email or text message within one week of the e-coupon expiration date. This will provide information on whether the nonresponse is due to recruiters not sending e-coupons or recruits refusing to

[61] Gile, K.J., Johnston, L.G., and Salganik, M.J. (2015). Diagnostics for Respondent-Driven Sampling, *Journal of the Royal Statistical Society Series A: Statistics in Society*, Volume 178(1): 241–269, https://doi.org/10.1111/rssa.12059; Lee et. al (2017).

[62] Gile et. al (2015); Lee et. al (2017)

[63] Gile et. al (2015); Lee et. al (2017)

complete the survey. It should be noted that this type of follow-up study is subject to its own nonresponse bias because not all recruiters will respond to the survey.

- To determine whether nonresponse is indicative of nonresponse bias, we will examine if potential recruits who did and did not respond differ systematically in terms of demographic characteristics using information on sex and race for each recruit collected from the recruiter. This information will be collected in the section of the survey that asks them to recruit. Recruiters are likely to know the sex and race of those whom they recruit.

B.4. Test of Procedures or Methods to be Undertaken

We are conducting the following activities to test procedures for the National Worker Survey.

Formative Research. To our knowledge, no previous surveys have used web-based RDS to recruit low-wage workers on the topic of FLSA violations. To inform the recruitment and administration of the National Worker Survey, the research team conducted a small, qualitative study using one-on-one interviews with workers (OMB Control No. 1290-0043). The formative research guide was designed to provide data to inform the design and ascertain overall feedback from workers to increase the chances of success of the study. This formative research was designed to accomplish three objectives: 1) assess the appropriateness and acceptability of using web-based RDS to recruit workers in low-wage industries for a study of FLSA violations; 2) identify potential challenges in the use of a web-based RDS, and 3) inform mitigation strategies to address these challenges. A total of 26 workers participated in the 60-minute, video-based interviews. All interviews took place over Zoom. Participants received a $50 incentive for their participation. The data collection protocol in this package reflects the findings from the formative research.

Cognitive Interviews. The National Worker Survey was pretested before submission to the Office of Management and Budget (OMB). The cognitive interviews were conducted in three rounds (OMB Control No. 1290-0043). The purpose of the first round was to assess understanding of survey questions and response options using probing approaches, and it included 17 participants. The first round used concurrent probing. The second round included 10 cognitive interviews to test the instrument's revisions based on the first round of testing and collect timing data. The second round used retrospective probing in which respondents completed the full survey and were then probed about the clarity of the questions and any potential problems with the instrument. The benefit of retrospective probing is that it allowed us to estimate the burden. The third round included 13 participants and tested the translated instrument in Spanish, Chinese, and Vietnamese.[64] The version of the instrument submitted to OMB incorporates the pretest results, and no further changes are anticipated. In terms of burden, the average time to complete the survey, including the screener, was 30 minutes, although the time varied across respondents.

Incentive Experiment. Most web-based RDS studies use electronic incentives due to the belief the immediate delivery of an incentive gives legitimacy to the study and encourages peer recruitment.[65] At the same time, because electronic incentives are anonymous, they may encourage cheating by duplicate completion or pretending to be eligible to get the incentives. Incentives sent by direct mail have been recommended as a way to prevent cheating because researchers can check for requests to send multiple incentives to the same address.[66] However, it is uncertain whether delayed delivery of an incentive would influence the willingness to recruit others.

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[64] The additional languages in which to translate the survey were selected based on analyses of CPS data. Specifically, the languages spoken.

[65] Helms et al. (2021)

[66] One of our external consultants, Dr. Sunghee Lee, indicated that a recent RDS switched from e-mailed to mailed gift cards due to the possibility of fraud. Mailing incentives has also been discussed as method to reduce cheating in web-based RDS. See Teitcher J.E., Bockting W.O., Bauermeister J.A., Hoefer C.J., Miner M.H., and Klitzman R.L. (2015). Detecting, preventing, and responding to "fraudsters" in internet research: Ethics and tradeoffs. *J Law Med Ethics*, 43(1):116-33, https://doi.org/10.1111/jlme.12200.

The National Worker Survey will include an experiment that compares Mastercard e-gift card and mailed Mastercard gift card incentives. Households in the soft launch will be randomly assigned to two groups. The experimental group will receive completion and recruitment incentives in the form of a Mastercard E-gift card that will be emailed within 24 hours of completing the survey by the respondent or recruit. The second group will receive mailed Mastercard gift cards as incentives. We expect the experiment to yield 800 completed surveys in each group, with 400 ABS completes and 400 RDS completes. This sample size should be enough to detect a 7-percentage point difference between the two groups.[67] The analysis will compare the percentage of respondents who were sent e-coupons and the percentage of redeemed coupons between the two groups. A lower recruitment rate in the mailed Mastercard gift card group could indicate that the delay in receipt of the incentive deterred respondents from recruiting or that it prevented cheating. The analysis will compare the percentage of surveys flagged as fraud based on the criteria in Section B.2.4 to adjudicate between these two explanations. The results of the experiment will inform the approach to incentive delivery in the rest of the study.

Weighting Simulation. A simulation was conducted examine the robustness of to the SS estimator for weighting data from RDS when multiple populations (industries) are sampled. The simulation included several steps. First, a population of workers was generated, with each worker being assigned an industry and a violation status (based on a probability distribution). The generated population also assigned each worker a number of connections to workers in each industry. Second, a simulation of the RDS methodology was run on the data using an e-coupon redemption rate of 30%. Third, the resulting sample was used to calculate violation rates using both an unweighted average and the SS estimator. Finally, the potential bias of the estimated violation proportion was assessed by comparing them to the violation rate used to generate the sample (the "true" violation rate).

The simulation found that the SS estimator had 90% or higher coverage even when homophily was high. (Coverage is how often the 95% confidence interval for the violation rate contained the true violation rate.) In contrast, an unweighted estimator had high coverage when homophily was low but 50% or lower coverage when homophily was moderate or high. Therefore, we conclude that the SS estimator is appropriate for weighting estimates for the Worker Survey.

[67] This assumes a recruitment rate of 30% in the Mastercard gift card group.

B.5. Individuals Consulted on Statistical Methods and Individuals Responsible for Collecting and/or Analyzing the Data

Individuals Consulted on Statistical Methods

The following individuals were consulted on statistical aspects of the design:

Exhibit 9. Individuals Consulted on Statistical Design

Name	Title	Telephone Number
J. Michael Brick	Senior Vice President, Westat	(301) 294-2004
Nik Theodore	Professor, Department of Urban Planning and Policy, University of Illinois Chicago	(312) 996-8378
Kelly Daley	Associate Vice President, Westat	(312) 403-0455
Joseph Gasper	Associate Vice President, Westat	(240) 314-2470
Sunghee Lee	Associate Research Professor at the Survey Methodology Program, University of Michigan	(734) 764-8354
Mark Handcock	Professor Statistics, University of California Los Angeles	(424) 259-5106

In addition, the Project Officer for DOL is Kacie Chang, (202) xxx-xxxx

Individuals Responsible for Collecting/Analyzing the Data

The following individuals will be responsible for collecting and analyzing the data:

Exhibit 10. Individuals Responsible for Data Collection and Analysis

Name	Title	Telephone Number
Michael Hornbostel	Principal Research Associate, Westat	(240) 314-2578
Laura Gamble	Senior Statistician, Westat	(240) 453-5611
J. Michael Brick	Senior Vice President, Westat	(301) 294-2004
Nik Theodore	Professor, Department of Urban Planning and Policy, University of Illinois Chicago	(312) 996-8378
Joseph Gasper	Associate Vice President, Westat	(240) 314-2470
Kenneth Dau-Schmidt	Willard and Margaret Carr Professor of Labor and Employment Law, University of Indiana Bloomington	(812) 855-0697