

**National Vaccination Coverage Estimates of Adolescents
Aged 13-17 years by Selected Demographic and Access to
Healthcare Characteristics Using National Immunization
Survey – Teen (NIS-Teen), 2021 Public User Files (PUF).**

SAS Programming and Data Analysis (STAT8678)

Final Project

By

Victor Agboli

002708759

1. Introduction

The National Immunization Survey - Teen (NIS-Teen) is a study sponsored and conducted by the National Center for Immunization and Respiratory Diseases (NCIRD). This study is a random digit dialing (RDD) telephone that identified household with adolescents 13-17 years of age and seeks to estimate the coverage rate of the vaccination of children between the ages of 19-35months old [1]. To carry out the survey, an adult who is most knowledgeable about the teen's vaccination was interviewed in each identified household.

For the 2021 NIS-Teen, household interviews began on January 7, 2021 and ended on February 3, 2022. Provider data collection extended from January 2021 through April 2022. A total sample, including the territory samples, of approximately 12.1 million telephone numbers yielded household interviews for 46,379 teens, 18,822 of whom had adequate provider data (provider-reported vaccination data adequate to determine whether the teen was up to date with respect to the recommended vaccination schedule). The 2021 NIS-Teen public-use data file (which includes data from Puerto Rico but does not include data for the U.S. Virgin Islands and Guam) contains data for 45,036 teens with completed household interviews, and more extensive data (e.g., provider-reported vaccination histories and facility data) for 18,352 teens with adequate provider data (including 104 unvaccinated teens). Data were collected in the U.S. Virgin Islands and Guam in 2021, although adolescents in these areas are not included on the public-use data file to protect their confidentiality [2]. Data on adolescent vaccination coverage are used to identify groups of adolescents at risk of vaccine-preventable diseases like human papillomavirus (HPV), meningococcal disease, and pertussis (whooping cough); to determine what additional efforts are needed to increase coverage; and to evaluate the effectiveness of programs designed to increase coverage to protect adolescents.

The data I would be working on to determine the coverage estimates is coded **P_UTDMENACWY** which is a type of Meningococcal serogroup ACWY-conjugate shot vaccine or Meningococcal serogroup ACWY-unknown type shot excluding any vaccinations after the random digit daily (RDD) interview date.

2. Method

This study is a cohort study that involves combination of analytical tools that includes descriptive statistics (frequency, weight percentages etc.) and the test statistics were carried out using chi-square test. This study has an inclusion criterion that participants must be all adolescents aged 13-17 years with adequate provider data (ADP) in the NIS-Teen 2021 PUF and the exclusion criteria is adolescents in the U.S. Territories (i.e., Guam, Puerto Rico, and U.S. Virgin Islands.).

My analyses include the followings:

- Create a sub-data set from the NIS-Teen 2021 survey year to include the following variables:
 1. **SEQNUMT** (UNIQUE TEEN IDENTIFIER)
 2. **PDAT2** (ADEQUATE PROVIDER DATA FLAG)

3. **PROVWT_C** (FINAL SINGLE-FRAME CELL-PHONE PROVIDER-PHASE WEIGHT (EXCLUDES TERRITORIES))
 4. **STRATUM** (STRATUM VARIABLE FOR VARIANCE ESTIMATION)
 5. **YEAR** (SAMPLING YEAR)
 6. **AGE** (AGE IN YEARS OF SELECTED TEEN)
 7. **SEX** (SEX OF TEEN)
 8. **RACEETHK** (RACE/ETHNICITY OF TEEN WITH MULTIRACE CATEGORY (RECODE)),
 9. **EDUC1** (EDUCATION LEVEL OF MOTHER WITH 4 CATEGORIES (RECODE)),
 10. **AGEGRP_M_I** (MOTHER'S AGE CATEGORIES (RECODE)),
 11. **MARITAL2** (MARITAL STATUS OF MOTHER (RECODE)),
 12. **INCPORAR_I** (INCOME TO POVERTY RATIO: IMPUTED (RECODE)),
 13. **INS_STAT2_I** (INSURANCE STATUS (PRIVATE ONLY/ANY MEDICAID/OTHER INSURANCE/UNINSURED): IMPUTED),
 14. **CKUP_11_12** (DID TEEN HAVE AN 11–12-YEAR-OLD WELL-CHILD EXAM OR CHECK-UP?)
 15. **CEN_REG** (CENSUS REGION BASED ON TRUE STATE OF RESIDENCE),
 16. **FACILITY** (FACILITY TYPES FOR TEEN'S PROVIDERS),
 17. **STATE** (TRUE STATE OF RESIDENCE (STATE FIPS CODE)),
 18. **P_UTDMENACWY** (UP-TO-DATE FLAG (PROV INFO): 1+ MENINGOCOCCAL SEROGROUP ACWY-CONJUGATE SHOT OR MENINGOCOCCAL SEROGROUP ACWY-UNKNOWN TYPE SHOT, EXCLUDING ANY VACCINATIONS AFTER THE RDD INTERVIEW DATE.)
- Report all weighted percentages to 1 decimal place.
 - Report all chi-square test statistics and their corresponding p-values to 2 decimal places in Table 2.
 - Indicate which variable or variables are associated with the type of vaccination for P_UTDMENACWY(UP-TO-DATE FLAG (PROV INFO): 1+ MENINGOCOCCAL SEROGROUP ACWY-CONJUGATE SHOT OR MENINGOCOCCAL SEROGROUP ACWY-UNKNOWN TYPE SHOT, EXCLUDING ANY VACCINATIONS AFTER THE RDD INTERVIEW DATE)
 - Report unweighted sample sizes and weighted percentage to 1 decimal place in Table 3.
 - Use PROC SURVEYFREQ to analyze and populate Table 4.
 - Use PROC SURVEYMEANS to estimate unadjusted weighted vaccination coverage estimates for all the selected variables in Table 5 (Model 1).
 - Use PROC SURVEYLOGISTIC to estimate unadjusted ODDS RATIOS to 2 decimal places for all the selected variables in Table 5 (Model 2).
 - Use PROC SURVEYLOGISTIC to estimate adjusted ODDS RATIOS to 2 decimal places for all the selected variables in Table 5 (Model 3).
 - Use PROC SURVEYLOGISTIC to estimate adjusted ODDS RATIOS to 2 decimal places for all the significant selected variables in Table 5 (Model 3) which is (Model 4).

- Report the Type III test of effect for models 3, 4, and 5 in Table 6. Report all Wald Chi-Square test statistics to 3 decimal places and their corresponding p-values to 2 decimal places.

3. Results and Interpretation

In this survey, there were a total of 18,002 participants amongst which there were weighted 51.0% (N = 9,579) were male and 49.0% (N = 8,423) were female. The age distribution of the participants was fairly across the study areas. 20.1% (N = 3,691) were 13years old, 20.1% (N = 3,789) were 14years old, 21.2% (N = 3,681) were 15years old, 19.9% (N = 3,548) were 16years and 18.7% (N = 3,293) were 17years.

The demographic sample sizes and weighted percent of this P_UTDMENACWY (Meningococcal serogroup ACWY-conjugate shot vaccine or Meningococcal serogroup ACWY-unknown type shot) vaccine is given in **table 1** below.

TABLE 1. Sample Characteristics of Adolescents Aged 13-17 Years in the United States, by Selected Demographic and Access-To-Care Variables--NIS-Teen 2021

Characteristic		Overall	
		Sample Size	Weighted %
Total		18,002	100.0
Age (years)			
	13	3,691	20.1
	14	3,789	20.1
	15	3,681	21.2
	16	3,548	19.9
	17*	3,293	18.7
Age Group (in years)			
	13-15*	11,161	61.4
	16-17	6,841	38.6
Sex of Adolescent			
	Male	9,579	51.0
	Female*	8,423	49.0
Race/Ethnicity			
	Non-Hispanic White*	11,054	48.7
	Non-Hispanic Black	1,750	13.3
	Hispanic	2,962	25.4
	Non-Hispanic Other	2,236	12.6
Mother's Educational Level			
	<High School*	1,069	12.2
	High School	2,591	20.7
	Some college or college graduate	4,607	22.8

TABLE 1. Sample Characteristics of Adolescents Aged 13-17 Years in the United States, by Selected Demographic and Access-To-Care Variables--NIS-Teen 2021

Characteristic		Overall	
		Sample Size	Weighted %
	>College graduate	9, 735	44.3
Mother's Marital Status			
	Married*	12, 660	62.5
	Never married/Widowed/divorced/separated	5, 342	37.5
Mother's Age			
	≤34 years*	1, 083	6.8
	35-44 years	7, 627	44.1
	≥45 years	9, 292	49.0
Income to Poverty Ratio			
	<133%*	3, 173	23.5
	133% - <322%	14, 829	76.5
Medical Insurance[§]			
	Private only*	11, 146	55.0
	Any Medicaid	5, 162	35.3
	Other	1, 290	6.7
	Uninsured	404	3.0
Well Child Visit at Age 11-12 Years**			
	Yes*	14, 993	81.5
	No	439	3.0
	Don't know/Refused/ Missing	2, 570	15.5
Census Region			
	Northeast*	3, 725	15.6
	Midwest	3, 850	21.0
	South	6, 519	39.3
	West	3, 908	24.2
Vaccination Facility Type			
	All private facilities*	7, 147	41.5
	All public facilities	1, 701	9.6
	All hospital facilities	2, 105	8.6
	All STD/school/teen clinics or other facilities	412	2.2
	Mixed ^{††}	3, 056	14.1
	Unknown/Don't Know ^{††}	3, 581	24.1

* Reference level.

[§]Insurance categories are mutually exclusive.

^{||} Includes IHS, military, CHIP, and some private.

** Status of health-care visit at age 11-12 years based on provider reported data.

†† Mixed indicates that the facility is identified to be in more than one of the facility categories such as private, public, hospital, STD/school/teen clinics.

†† Includes military, WIC clinics, pharmacies, unknown, and missing.

Chart/graph for the demographic's variables

Chart and graphs were constructed, including weights for the P_UTDMENACWY (Meningococcal serogroup ACWY-conjugate shot vaccine or Meningococcal serogroup ACWY-unknown type shot) vaccines as given below.

The Histogram of age groups tends to be symmetric across the ages, but the histogram of age (in years) tend to be skewed to the left. Also, the mother's age and the income to poverty ratio are right-skewed (**Figure 1 – Figure 4**).

For the vertical bar-graphs, in respect to the sex of adolescents, the male was slightly more than the female, for the Race/Ethnicity, the non-Hispanic white has the highest weighted percentage, followed by the Hispanic, non-Hispanic other multiple race and the non-Hispanic black has the lowest weighted percentage. In regards to the mother's educational level, college graduates have the highest weighted percentage, followed by those who have more than 12 years, non-college graduates, the 12years graduate and the lowest percentage was those with less than 12 years education. For the mother's marital status, most of them are married while the others are not (**Figure 5 – Figure 8**).

In respect to the pie-charts, for the medical insurance, most have private insurance, followed by any medic-aid, other insurance and uninsured are few. The well child visit at age 11-12years, almost all the children had checkups, few had no checkup and the rest chose don't know/refused/missing. For the census region, the highest was from the South, followed by the West, Midwest and the lowest was the Northeast. For the vaccination facility type, most went to all private facilities, followed distantly by unknown/DK, mixed, public facilities, all hospital facilities, and all STD/school/teen clinics or other facilities (**Figure 9 – Figure 12**).

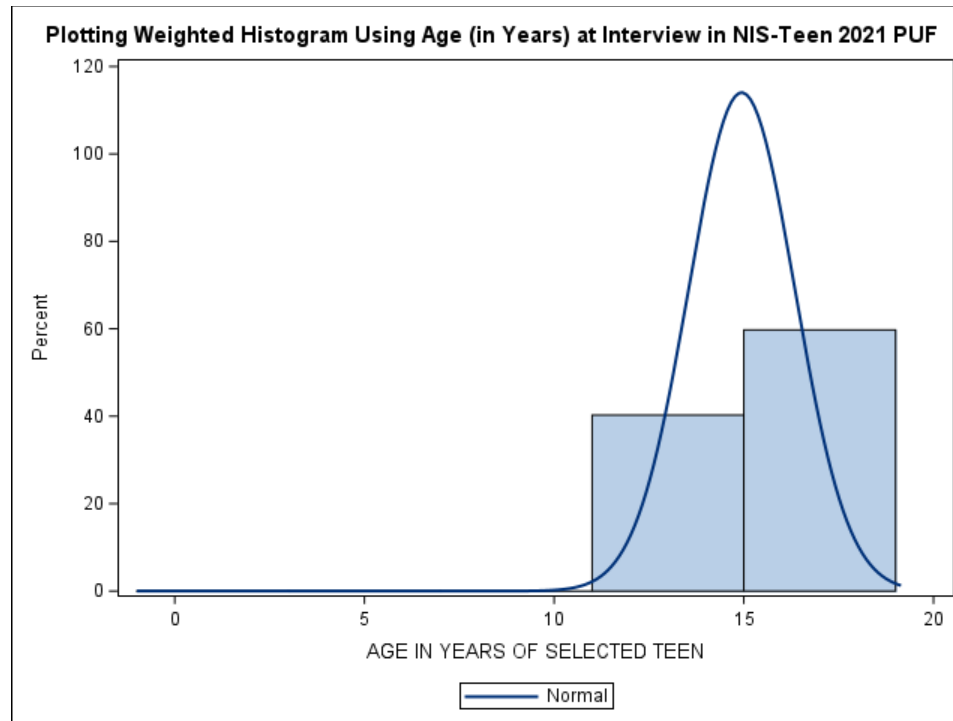


Figure 1: Weighted Histogram of Age (in years) of teens

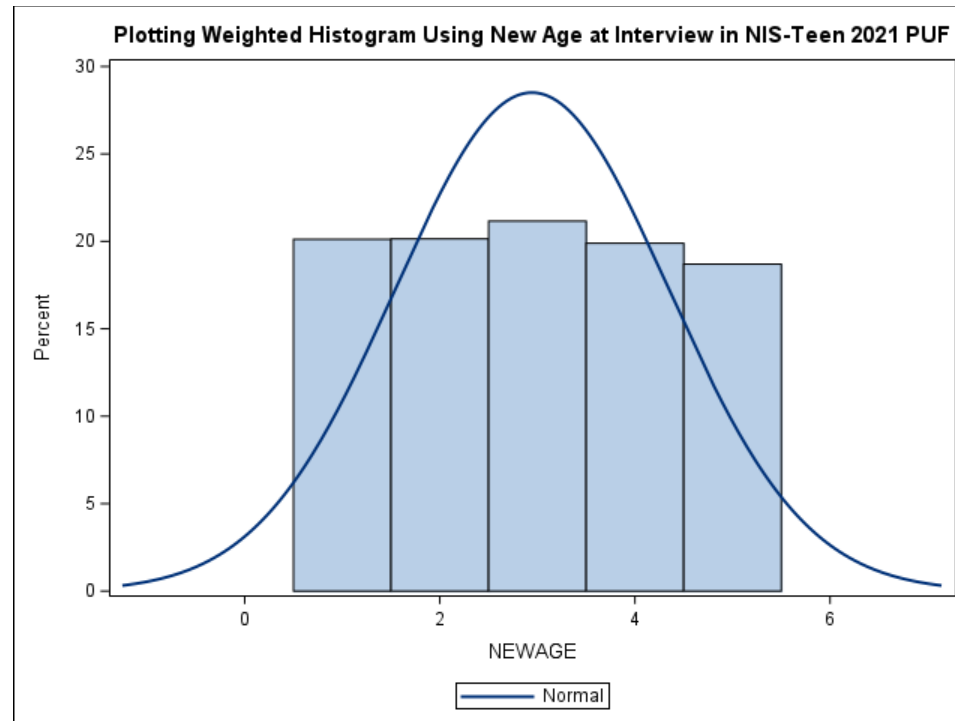


Figure 2: Weighted Histogram of New Age of teens

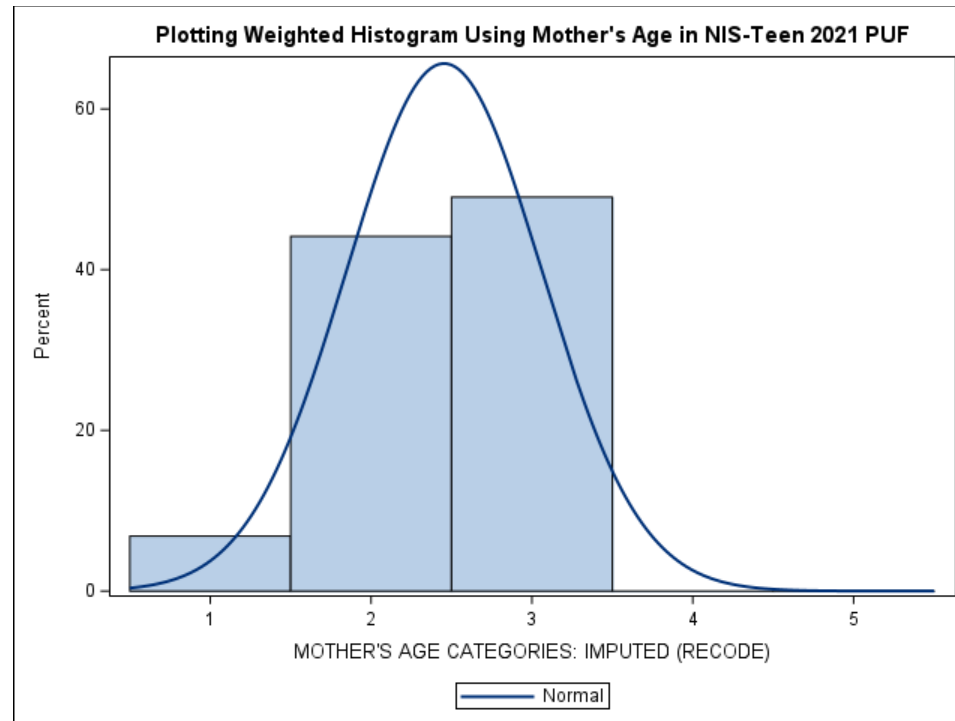


Figure 3: Weighted Histogram of Teens Mother's Age

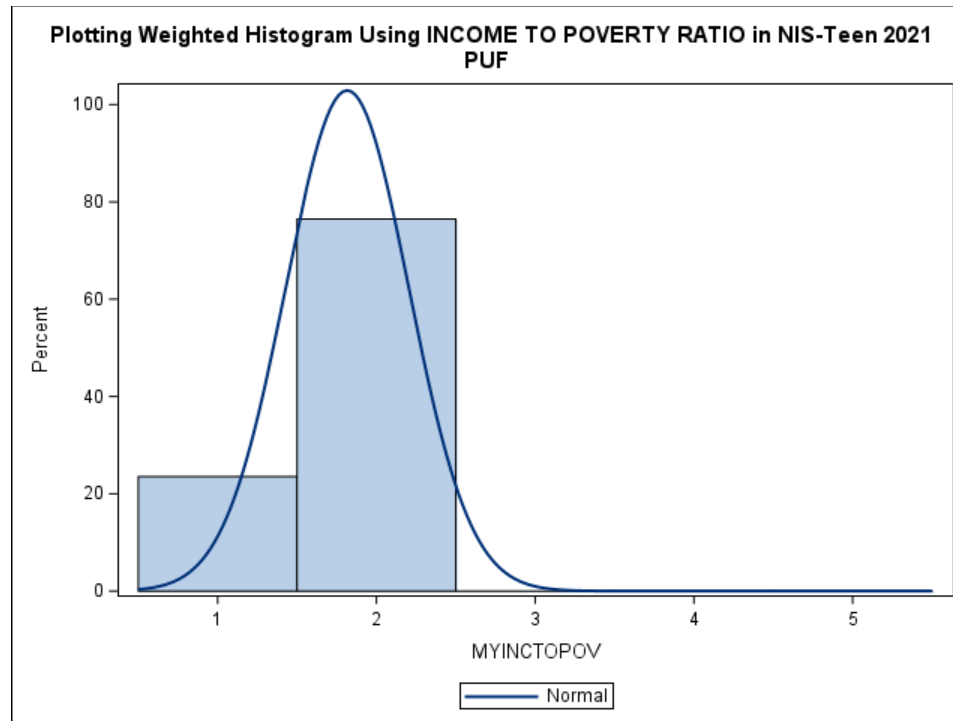


Figure 4: Weighted Histogram of Income to Poverty Ratio

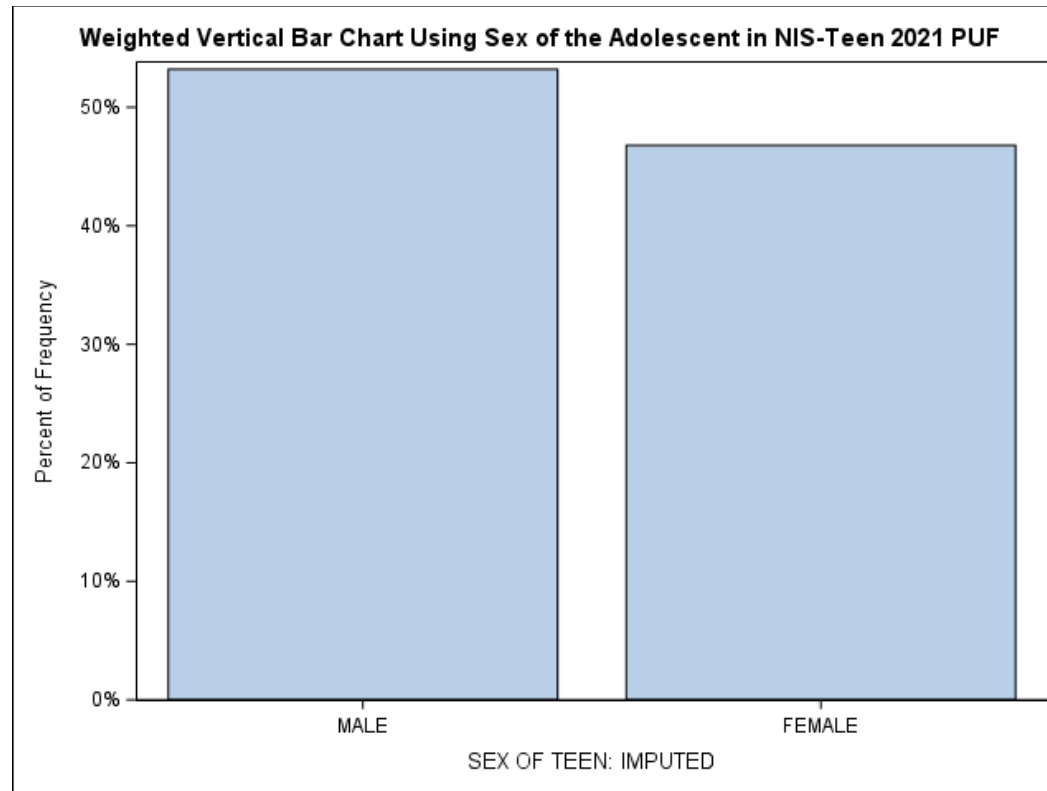


Figure 5: Weighted Bar chart of Sex of teens

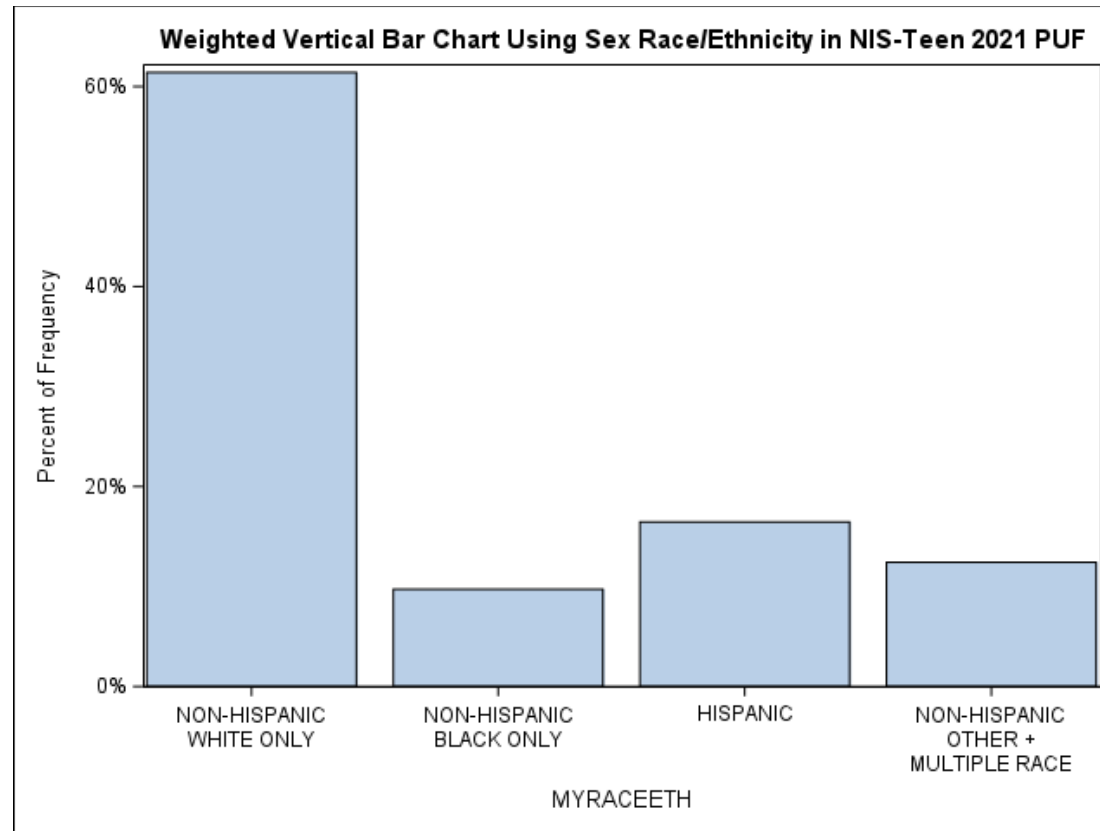


Figure 6: Weighted Bar chart of Race/Ethnicity

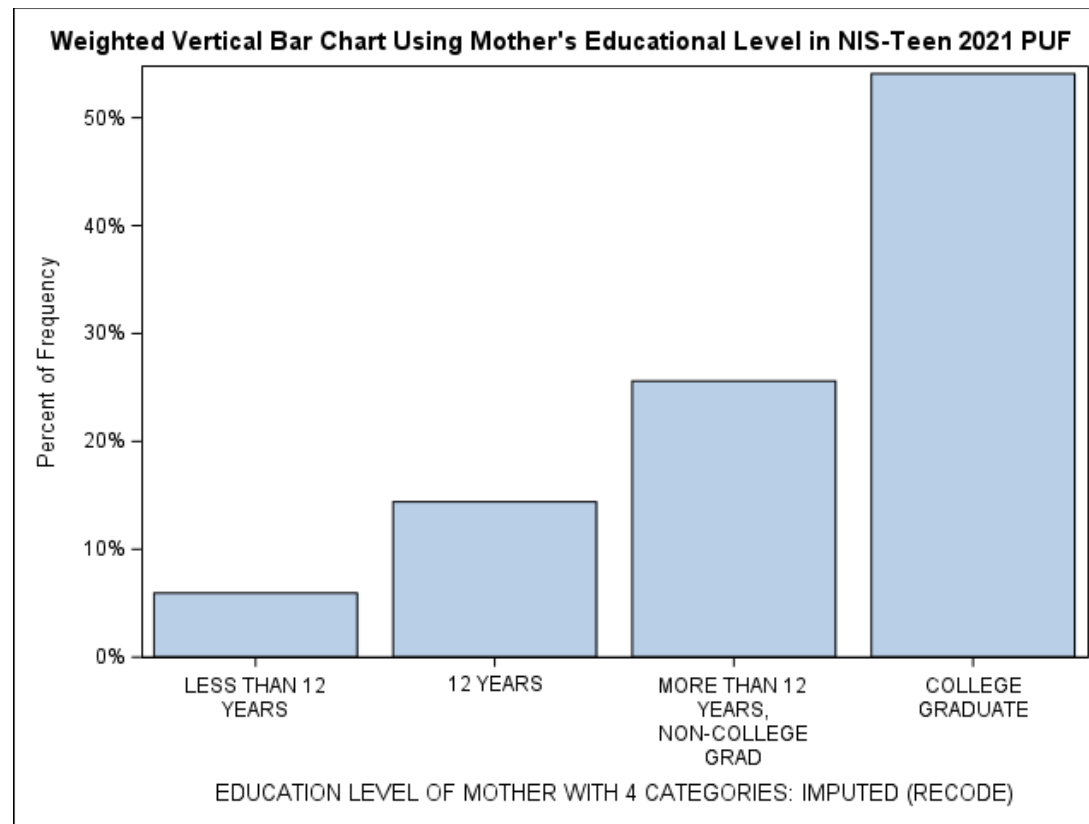


Figure 7: Weighted Bar chart of Mother's Educational Level

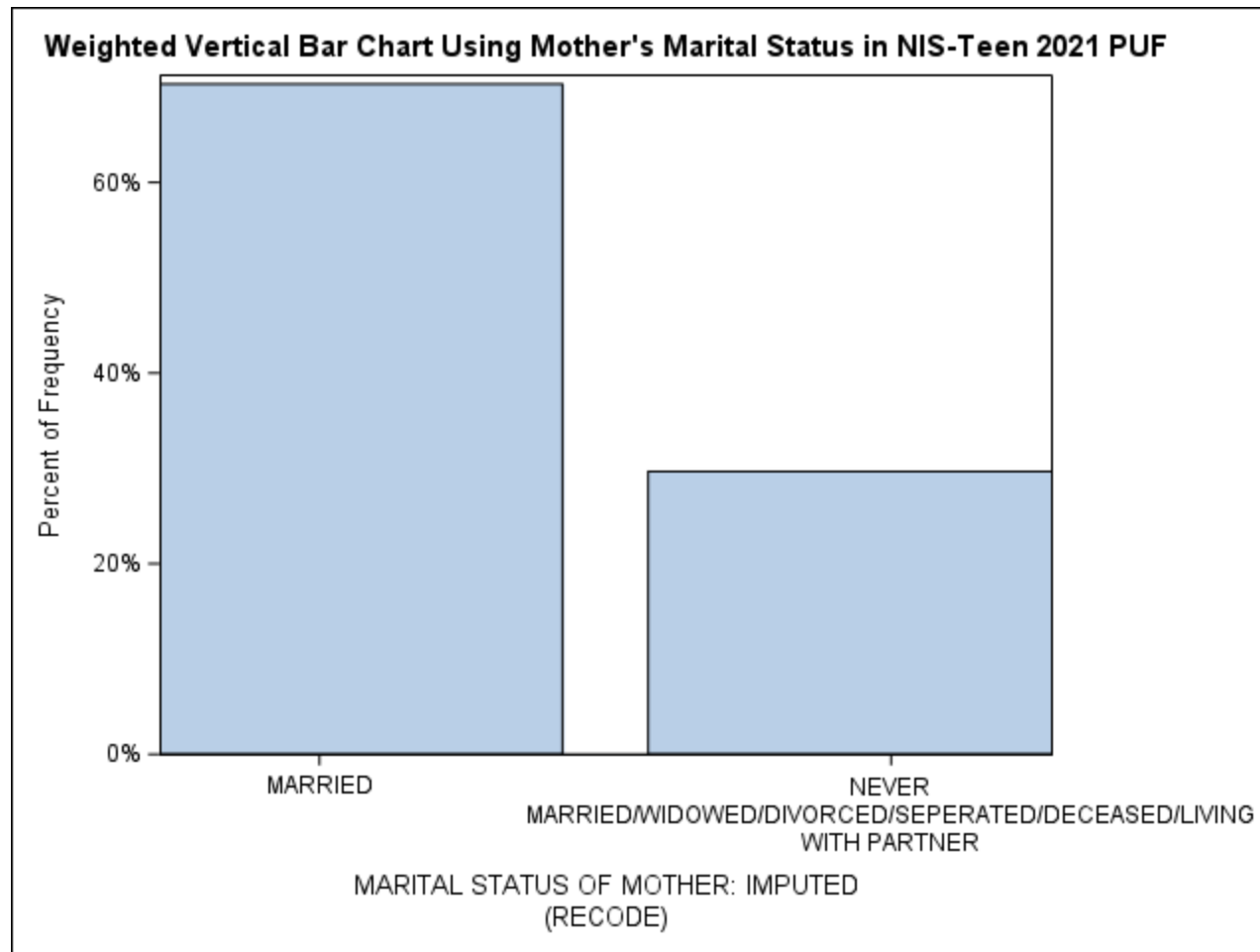


Figure 8: Weighted Bar chart of Mother's Marital Status

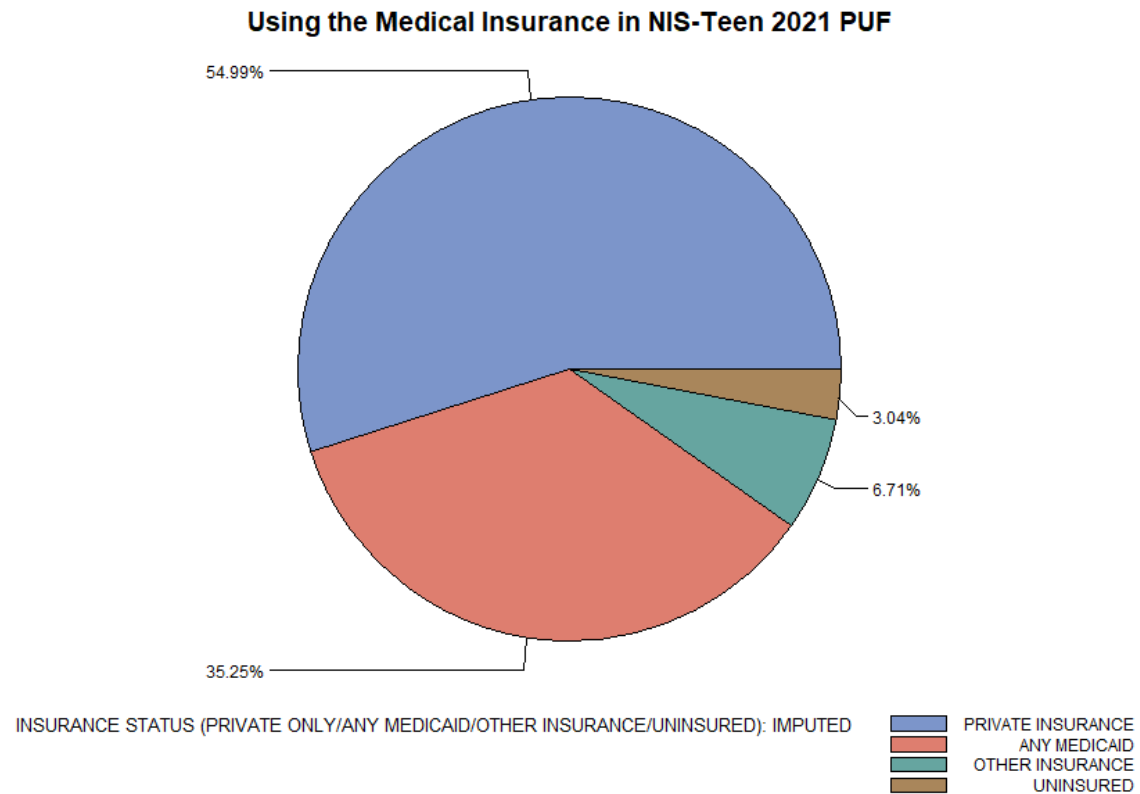


Figure 9: Pie Chart of Teens Medical Insurance

Using the Well Child Visits at Age 11-12 years in NIS-Teen 2021 PUF

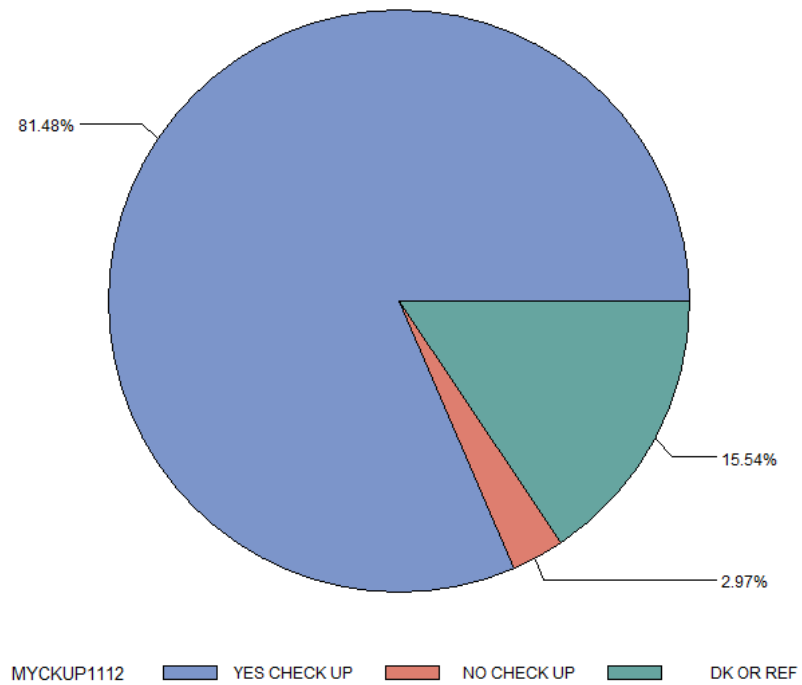


Figure 10: Pie Chart of Teens Well Child Visits

Using the Census Region of the Adolescent in NIS-Teen 2021 PUF

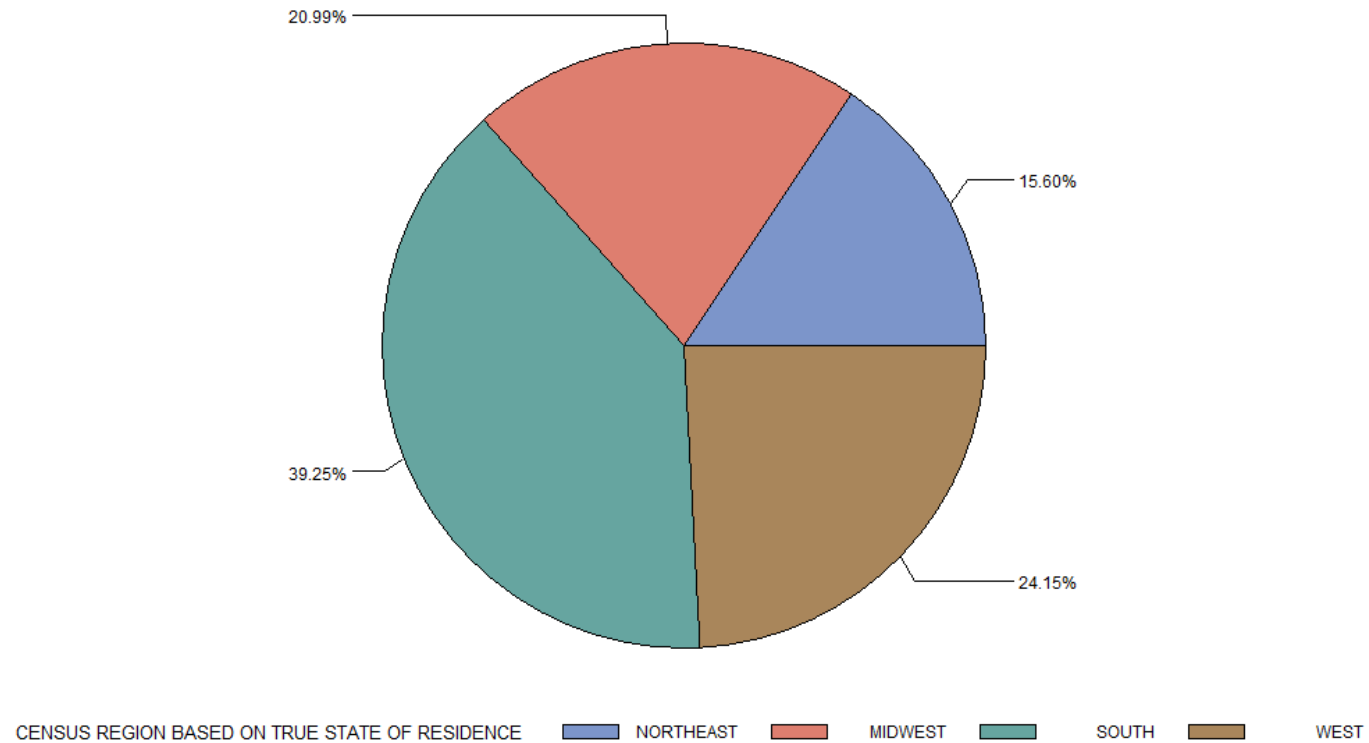


Figure 11: Pie Chart of Census Region

Using the Vaccination Facility Type of the Adolescent in NIS-Teen 2021 PUF

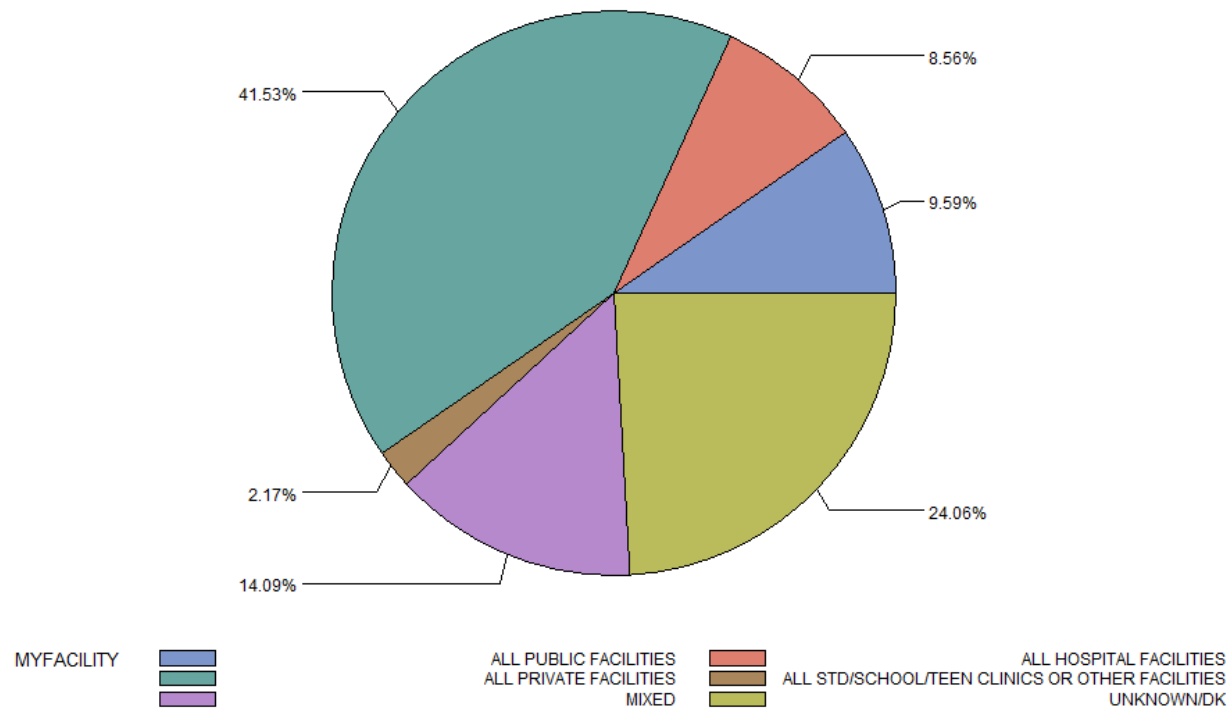


Figure 12: Pie Chart of Vaccination Facility Type of Teens

Chi-square tests

Null hypothesis: The individual demographic variables are not significantly associated with the P_UTDMENACWY (Meningococcal serogroup ACWY-conjugate shot vaccine or Meningococcal serogroup ACWY-unknown type shot) vaccine

Alternative hypothesis: The individual demographic variables are significantly associated with the P_UTDMENACWY (Meningococcal serogroup ACWY-conjugate shot vaccine or Meningococcal serogroup ACWY-unknown type shot) vaccine

Level of significance: 0.05

Table 2 shows the sample sizes of the demographics variables, the weighted 95% confidence interval (CI), the chi-square statistics and p-value. It can be seen that Ages ($\chi^2 = 81,001.10$, p – value < 0.01), the Age groups ($\chi^2 = 9,217.68$, p – value < 0.01), the Sex of the Adolescents ($\chi^2 = 4,149.63$, p – value < 0.01), Race/Ethnicity ($\chi^2 = 57,838.65$, p – value < 0.01), Mother's educational level ($\chi^2 = 80,740.78$, p – value < 0.01), Mother's marital status ($\chi^2 = 44.06$, p – value < 0.01), Mother's Age ($\chi^2 = 58,970.74$, p – value < 0.01), Income to poverty ratio ($\chi^2 = 3,759.20$, p – value < 0.01), Medical Insurance ($\chi^2 = 120,393.89$, p – value < 0.01), Well child visit at age 11-12 years ($\chi^2 = 212,132.41$, p – value < 0.01), Census Region ($\chi^2 = 118,817.99$, p – value < 0.01), and Vaccination facility type ($\chi^2 = 443,094.68$, p – value < 0.01), are all significant, which implies that each demographic variable is significantly associated in respect to the P_UTDMENACWY (Meningococcal serogroup ACWY-conjugate shot vaccine or Meningococcal serogroup ACWY-unknown type shot) vaccine.

TABLE 2. Vaccination Coverage Estimates Amongst Adolescents Aged 13-17 Years in the United States, by Selected Demographic and Access-To-Care Variables--NIS-Teen 2021

Characteristic		Meningococcal serogroup ACWY-conjugate shot vaccine or Meningococcal serogroup ACWY-unknown type shot			
		Sample Size	Weighted %(95% C.I.)	Chi-Square Statistic	P-value
Total		18, 002	89.0 (88.5 – 89.4)		
Age (years)				81, 001.10	0.00
	13	3, 691	85.6 (84.5 - 86.7)		
	14	3, 789	89.4 (88.7 - 90.1)		
	15	3, 681	90.3 (89.7 - 90.8)		
	16	3, 548	88.4 (87.9 - 89.0)		
	17*	3, 293	91.3 (90.9 - 91.7)		
Age Group (in years)				9, 217.68	0.00
	13-15*	11, 161	88.5 (87.9 - 89.1)		
	16-17	6, 841	89.8 (89.3 - 90.3)		
Sex of Adolescent				4, 149.63	0.00
	Male	9, 579	88.6 (87.9 - 89.2)		
	Female*	8, 423	89.4 (89.0 - 89.9)		
Race/Ethnicity				57, 838.65	0.00
	Non-Hispanic White*	11, 054	89.2 (88.7 - 89.8)		
	Non-Hispanic Black	1, 750	90.2 (89.2 - 91.1)		
	Hispanic	2, 962	86.5 (85.8 - 87.2)		
	Non-Hispanic Other	2, 236	91.8 (91.2 - 92.3)		
Mother's Educational Level				80, 740.78	0.00
	<High School*	1, 069	90.1 (88.3 - 91.9)		
	High School	2, 591	85.8 (84.9 - 86.8)		
	Some college or college graduate	4, 607	88.0 (87.4 - 88.5)		
	>College graduate	9, 735	90.7 (90.4 - 91.0)		
Mother's Marital Status				44.06	0.00

TABLE 2. Vaccination Coverage Estimates Amongst Adolescents Aged 13-17 Years in the United States, by Selected Demographic and Access-To-Care Variables--NIS-Teen 2021

Characteristic		Meningococcal serogroup ACWY-conjugate shot vaccine or Meningococcal serogroup ACWY-unknown type shot			
		Sample Size	Weighted %(95% C.I.)	Chi-Square Statistic	P-value
	Married*	12, 660	89.0 (88.4 - 89.5)		
	Never married/Widowed/divorced/separated	5, 342	89.0 (88.5 - 89.6)		
Mother's Age				58, 970.74	0.00
	≤34 years*	1, 083	83.8 (81.6 - 86.0)		
	35-44 years	7, 627	88.4 (87.9 - 88.9)		
	≥45 years	9, 292	90.2 (89.9 - 90.6)		
Income to Poverty Ratio				3, 759.20	0.00
	<133%*	3, 173	88.2 (87.1 - 89.4)		
	133% - <322%	14, 829	89.2 (88.9 - 89.6)		
Medical Insurance[§]				120, 393.89	0.00
	Private only*	11, 146	90.2 (89.6 - 90.7)		
	Any Medicaid	5, 162	88.8 (88.2 - 89.4)		
	Other	1, 290	85.5 (84.4 - 86.6)		
	Uninsured	404	77.5 (75.5 - 79.5)		
Well Child Visit at Age 11-12 Years**				212, 132.41	0.00
	Yes*	14, 993	90.4 (89.9 - 90.9)		
	No	439	76.8 (74.0 - 79.6)		
	Don't know/Refused/ Missing	2, 570	84.0 (83.2 - 84.8)		
Census Region				118, 817.99	0.00
	Northeast*	3, 725	92.8 (91.9 - 93.6)		
	Midwest	3, 850	91.5 (90.9 - 92.1)		
	South	6, 519	87.5 (87.0 - 88.0)		
	West	3, 908	86.8 (86.3 - 87.3)		
Vaccination Facility Type				443, 094.68	0.00

TABLE 2. Vaccination Coverage Estimates Amongst Adolescents Aged 13-17 Years in the United States, by Selected Demographic and Access-To-Care Variables--NIS-Teen 2021

Characteristic		Meningococcal serogroup ACWY-conjugate shot vaccine or Meningococcal serogroup ACWY-unknown type shot			
		Sample Size	Weighted %(95% C.I.)	Chi-Square Statistic	P-value
	All private facilities*	7, 147	92.4 (92.0 - 92.7)		
	All public facilities	1, 701	85.4 (83.8 - 87.1)		
	All hospital facilities	2, 105	90.0 (89.0 - 90.9)		
	All STD/school/teen clinics or other facilities	412	69.8 (67.5 - 72.0)		
	Mixed††	3, 056	91.9 (91.5 - 92.4)		
	Unknown/Don't Know‡‡	3, 581	84.2 (83.7 - 84.7)		

* Reference level.

† $p < 0.05$ by chi-square test.

§Insurance categories are mutually exclusive.

|| Includes IHS, military, CHIP, and some private.

** Status of health-care visit at age 11-12 years based on provider reported data.

†† Mixed indicates that the facility is identified to be in more than one of the facility categories such as private, public, hospital, STD/school/teen clinics.

‡‡ Includes military, WIC clinics, pharmacies, unknown, and missing.

Unweighted sample size and weighted percentage

This table3. show unweighted sample size and weighted percentage for each State in the United State for the P_UTDMENACWY (Meningococcal)Vaccine

TABLE 3. Vaccination Coverage Estimates Amongst Adolescents Aged 13-17 Years in the United States and by States --NIS-Teen 2021		
U.S. National and States	Meningococcal serogroup ACWY-conjugate shot vaccine or Meningococcal serogroup ACWY unknown type shot	
	Sample Size	Weighted % (95% C.I.)
National	18, 002	89.0 (88.5 – 89.4)
Alabama	304	88.3 (84.6 - 91.9)
Alaska	268	75.2 (71.6 - 78.9)
Arizona	296	88.8 (87.0 - 90.6)
Arkansas	314	96.1 (95.2 - 97.1)
California	286	87.0 (85.5 - 88.6)
Colorado	298	84.8 (83.3 - 86.2)
Connecticut	340	94.9 (94.1 - 95.7)
Delaware	310	90.8 (89.8 - 91.8)
District of Columbia	409	90.2 (89.4 - 91.1)
Florida	312	76.9 (75.5 - 78.2)
Georgia	260	92.5 (91.6 - 93.4)
Hawaii	258	88.0 (87.0 - 89.0)
Idaho	334	89.1 (88.2 - 89.9)
Illinois	578	94.7 (94.2 - 95.1)
Indiana	268	91.3 (90.5 - 92.1)
Iowa	199	95.0 (94.3 - 95.7)
Kansas	300	86.0 (85.1 - 86.9)
Kentucky	240	87.7 (86.8 - 88.7)
Louisiana	303	93.7 (93.2 - 94.3)
Maine	293	88.2 (87.5 - 89.0)
Maryland	857	93.7 (93.3 - 94.0)
Massachusetts	266	91.8 (91.2 - 92.5)
Michigan	358	89.7 (89.1 - 90.3)
Minnesota	296	91.3 (90.6 - 91.9)
Mississippi	303	60.2 (59.2 - 61.3)
Missouri	340	90.4 (89.9 - 91.0)
Montana	290	77.1 (76.3 - 78.0)
Nebraska	315	89.7 (89.1 - 90.3)

Nevada	333	89.5 (88.9 - 90.1)
New Hampshire	282	88.1 (87.4 - 88.8)
New Jersey	292	91.8 (91.3 - 92.4)
New Mexico	337	84.6 (84.0 - 85.3)
New York	581	93.8 (93.5 - 94.2)
North Carolina	266	93.3 (92.8 - 93.8)
North Dakota	191	95.5 (95.0 - 96.0)
Ohio	254	90.3 (89.7 - 90.9)
Oklahoma	240	82.7 (82.0 - 83.5)
Oregon	294	82.4 (81.7 - 83.1)
Pennsylvania	929	92.8 (92.6 - 93.1)
Rhode Island	254	92.8 (92.3 - 93.3)
South Carolina	263	86.3 (85.7 - 86.9)
South Dakota	445	96.6 (96.4 - 96.9)
Tennessee	315	88.1 (87.6 - 88.6)
Texas	990	90.0 (89.7 - 90.2)
Utah	304	94.0 (93.6 - 94.4)
Vermont	488	88.8 (88.4 - 89.2)
Virginia	566	88.0 (87.7 - 88.4)
Washington	349	85.4 (84.8 - 85.9)
West Virginia	267	90.7 (90.2 - 91.1)
Wisconsin	306	91.7 (91.2 - 92.1)
Wyoming	261	75.9 (75.2 - 76.6)

Distribution of sample sizes, point and CI estimates

Table 4 shows the distribution of the sample sizes, point estimates and CIs for the demographic variables for the P_UTDMENACWY (Meningococcal serogroup ACWY-conjugate shot vaccine or Meningococcal serogroup ACWY-unknown type shot) vaccine.

TABLE 4. Sample Characteristics of Adolescents Aged 13-17 Years in the United States, by Selected Demographic and Access-To-Care Variables--NIS-Teen 2021

Characteristic		Overall	
		Sample Size (n)	Weighted % (95% C.I.)
Total		18, 002	89.0 (87.9-90.0)
Age (years)			
	13	3,691	20.1 (18.9-21.4)
	14	3,789	20.1 (18.9-21.5)
	15	3,681	21.2 (19.9-22.5)
	16	3,548	19.9 (18.6-21.2)
	17*	3,293	18.7 (17.5-19.9)
Sex of Adolescent			
	Male	9,579	51.0 (49.5-52.6)
	Female*	8,423	49.0 (47.4-50.5)
Race/Ethnicity			
	Non-Hispanic White*	11,054	48.7 (47.2-50.2)
	Non-Hispanic Black	1,750	13.3 (12.3-14.3)
	Hispanic	2,962	25.4 (23.8-27.0)
	Non-Hispanic Other	2,236	12.6 (11.5-13.8)
Mother's Educational Level			
	<High School*	1,069	12.2 (10.9-13.6)
	High School	2,591	20.7 (19.4-22.2)
	Some college or college graduate	4,607	22.8 (21.6-24.0)
	>College graduate	9,735	44.3 (42.7-45.8)
Mother's Marital Status			
	Married*	12,660	62.5 (60.8-64.0)
	Never married/Widowed/divorced/separated	5,342	37.5 (36.0-39.2)
Mother's Age			
	≤34 years*	1,083	6.8 (5.9-7.9)
	35-44 years	7,627	44.1 (42.6-45.7)
	≥45 years	9,292	49.0 (47.4-50.6)
Income to Poverty Ratio			
	<133%*	3,173	23.5 (22.1-25.0)
	133% - <322%	14,829	76.5 (75.0-77.9)
Medical Insurance[§]			
	Private only*	11,146	55.0 (53.4-56.6)
	Any Medicaid	5,162	35.3 (33.7-36.9)

	Other	1,290	6.7 (6.0-7.5)
	Uninsured	404	3.0 (2.5-3.7)
Well Child Visit at Age 11-12 Years**			
	Yes*	14,993	81.5 (80.1-82.8)
	No	439	3.0 (2.3-3.7)
	Don't know/Refused/ Missing	2,570	15.5 (14.3-16.8)
Census Region			
	Northeast*	3,725	15.6 (15.0-16.2)
	Midwest	3,850	21.0 (20.3-21.7)
	South	6,519	39.3 (38.2-40.3)
	West	3,908	24.2 (22.9-25.5)
Vaccination Facility Type			
	All private facilities*	7,147	41.5 (40.0-43.1)
	All public facilities	1,701	9.6 (8.6-10.6)
	All hospital facilities	2,105	8.6 (7.9-9.3)
	All STD/school/teen clinics or other facilities	412	2.2 (1.8-2.6)
	Mixed ^{††}	3,056	14.1 (13.1-15.1)
	Unknown/Don't Know ^{††}	3,581	24.1 (22.7-25.5)

* Reference level.

[§]Insurance categories are mutually exclusive.

^{||} Includes IHS, military, CHIP, and some private.

** Status of health-care visit at age 11-12 years based on provider reported data.

^{††} Mixed indicates that the facility is identified to be in more than one of the facility categories such as private, public, hospital, STD/school/teen clinics.

^{††} Includes military, WIC clinics, pharmacies, unknown, and missing.

Table 5 shows the confidence intervals for weighted estimates-Model 1, the unadjusted odds ratio-Model 2, the adjusted odds ratio-Model 3, and the Adjusted odds ratio for the variable that were significant in model 3-Model 4 for the Meningococcal serogroup ACWY conjugate shot vaccine or Meningococcal serogroup ACWY unknown type shot vaccine. The odds ratio is all calculated in respect to the reference levels.

TABLE 5. Vaccination Coverage Estimates Amongst Adolescents Aged 13-17 Years in the United States, by Selected Demographic and Access-To-Care Variables--NIS-Teen 2021

Characteristic	Overall Vaccinated Against Meningococcal serogroup ACWY conjugate shot vaccine or Meningococcal serogroup ACWY unknown type shot			
	Weighted Estimates % (95% C.I.) MODEL 1	Unadjusted Odds Ratio Estimate (95% C.I.) MODEL 2	Adjusted Odds Ratio Estimate (95% C.I.) MODEL 3	Significant Variables Adjusted Odds Ratio Estimate (95% C.I.) MODEL 4
Total				
Age (years)				
13	85.6 (83.0-88.2)	0.57 (0.41-0.78)	0.71 (0.49-1.04)	
14	89.4 (86.8-92.1)	0.81 (0.56-1.17)	0.91 (0.64-1.29)	
15	90.3 (88.5-92.1)	0.89 (0.65-1.21)	0.96 (0.69-1.32)	
16	88.4 (85.8-91.0)	0.73 (0.51-1.03)	0.81 (0.58-1.13)	
17*	91.3 (89.4-93.2)	Ref	Ref	Ref
Sex of Adolescent				
Male	88.6 (87.1-90.0)	0.91 (0.74-1.14)	0.86 (0.70-1.06)	
Female*	89.4 (87.9-90.9)	Ref	Ref	Ref
Race/Ethnicity				
Non-Hispanic White*	89.2 (88.2-90.3)	Ref	Ref	Ref
Non-Hispanic Black	90.2 (87.7-92.6)	1.11 (0.82-1.49)	1.24 (0.89-1.71)	1.25 (0.91-1.72)
Hispanic	86.5 (83.3-89.8)	0.78 (0.58-1.05)	0.95 (0.70-1.28)	0.96 (0.72-1.29)
Non-Hispanic Other	91.8 (89.9-93.6)	1.34 (1.02-1.76)	1.54 (1.15-2.06)	1.57 (1.17-2.11)
Mother's Educational Level				
<High School*	90.1 (86.1-94.1)	Ref	Ref	Ref

	High School	85.8 (82.5-89.1)	0.67 (0.40-1.12)	0.54 (0.32-0.91)	0.58 (0.36-0.95)
	Some college or college graduate	88.0 (86.2-89.7)	0.81 (0.50-1.29)	0.64 (0.39-1.03)	0.70 (0.45-1.07)
	>College graduate	90.7 (89.6-91.8)	1.08 (0.68-1.70)	0.72 (0.44-1.20)	0.83 (0.54-1.27)
Mother's Marital Status					
	Married*	89.0 (87.6-90.3)	Ref	Ref	Ref
	Never married/Widowed/divorced/separated	89.0 (87.4-90.7)	1.01 (0.81-1.25)	1.11 (0.86-1.43)	
Mother's Age					
	≤34 years*	83.8 (77.3-90.3)	Ref	Ref	Ref
	35-44 years	88.4 (86.7-90.1)	1.48 (0.90-2.43)	1.36 (0.78-2.37)	
	≥45 years	90.2 (89.0-91.4)	1.79 (1.10-2.92)	1.45 (0.82-2.55)	
Income to Poverty Ratio					
	<133%*	88.2 (85.9-90.5)	Ref	Ref	Ref
	133% - <322%	89.2 (88.0-90.4)	1.10 (0.86-1.42)	0.96 (0.70-1.33)	
Medical Insurance[§]					
	Private only*	90.2 (88.9-91.5)	Ref	Ref	Ref
	Any Medicaid	88.8 (87.0-90.5)	0.86 (0.69-1.08)	0.99 (0.74-1.34)	
	Other	85.5 (79.7-91.4)	0.64 (0.39-1.05)	0.81 (0.48-1.38)	
	Uninsured	77.5 (69.0-86.0)	0.38 (0.22-0.63)	0.57 (0.31-1.04)	
Well Child Visit at Age 11-12 Years**					
	Yes*	90.4 (89.3-91.4)	Ref	Ref	Ref
	No	76.8 (64.9-88.7)	0.35 (0.18-0.70)	0.46 (0.23-0.90)	0.44 (0.23-0.83)
	Don't know/Refused/Missing	84.0 (80.9-87.1)	0.56 (0.43-0.72)	0.69 (0.50-0.95)	0.60 (0.46-0.78)
Census Region					
	Northeast*	92.8 (91.4-94.2)	Ref	Ref	Ref
	Midwest	91.5 (90.0-92.9)	0.84 (0.63-1.11)	0.95 (0.70-1.29)	0.95 (0.71-1.27)
	South	87.5 (85.9-89.1)	0.55 (0.42-0.70)	0.59 (0.45-0.76)	0.57 (0.44-0.74)
	West	86.8 (83.6-90.0)	0.51 (0.36-0.73)	0.59 (0.42-0.83)	0.60 (0.43-0.84)
Vaccination Facility Type					
	All private facilities*	92.4 (90.8-94.0)	Ref	Ref	Ref
	All public facilities	85.4 (81.5-89.4)	1.53 (1.00-2.33)	1.23 (0.78-1.92)	1.27 (0.82-1.94)

	All hospital facilities	90.0 (87.3-92.6)	2.06 (1.40-3.02)	1.85 (1.21- 2.81)	1.90 (1.28-2.83)
	All STD/school/teen clinics or other facilities	69.8 (60.7-78.8)	0.39 (0.23-0.67)	0.39 (0.22- 0.67)	0.38 (0.23-0.64)
	Mixed††	91.9 (90.0-93.8)	1.94 (1.30-2.90)	1.84 (1.23- 2.77)	1.81 (1.21-2.71)
	Unknown/Don't Know**	84.2 (81.7-86.8)	0.91 (0.63-1.31)	0.84 (0.57-1.23)	0.85 (0.59-1.22)

* Reference level.

† $p < 0.05$ by chi-square test.

§ Insurance categories are mutually exclusive.

|| Includes IHS, military, CHIP, and some private.

** Status of health-care visit at age 11-12 years based on provider reported data.

†† Mixed indicates that the facility is identified to be in more than one of the facility categories such as private, public, hospital, STD/school/teen clinics.

** Includes military, WIC clinics, pharmacies, unknown, and missing.

Logistic regression results

In **table 6**, for model 2, it is shown that the unadjusted odds ratio for the age of the adolescent in years is significant ($\chi^2 = 14.583$, p -value = 0.01), the unadjusted odds ratio for the sex of the adolescent is not significant ($\chi^2 = 0.661$, p -value = 0.42), the unadjusted odds ratio for the race/ethnicity is significant ($\chi^2 = 8.783$, p -value = 0.03), the unadjusted odds ratio for the mother's educational level is significant ($\chi^2 = 13.346$, p -value = 0.00), the unadjusted odds ratio for the mother's marital status is not significant ($\chi^2 = 0.007$, p -value = 0.93), the unadjusted odds ratio for the mother's age is significant ($\chi^2 = 7.238$, p -value = 0.03), the unadjusted odds ratio for the income to poverty ratio is not significant ($\chi^2 = 0.586$, p -value = 0.44), the unadjusted odds ratio for the medical insurance is significant ($\chi^2 = 16.185$, p -value = 0.00), the unadjusted odds ratio for the well child visit at age 11-12 years is significant ($\chi^2 = 25.942$, p -value = 0.00), the unadjusted odds ratio for the census region is significant ($\chi^2 = 30.974$, p -value = 0.00), and the unadjusted odds ratio for the vaccination facility type is significant ($\chi^2 = 72.858$, p -value = 0.00).

For model 3, it is shown that the adjusted odds ratio for the age of the adolescent in years is not significant ($\chi^2 = 4.430$, p -value = 0.35), the adjusted odds ratio for the sex of the adolescent is not significant ($\chi^2 = 1.903$, p -value = 0.17), the adjusted odds ratio for the race/ethnicity is significant ($\chi^2 = 10.081$, p -value = 0.02), the adjusted odds ratio for the mother's educational level is not significant ($\chi^2 = 7.432$, p -value = 0.06), the adjusted odds ratio for the mother's marital status is not significant ($\chi^2 = 0.595$, p -value = 0.44), the adjusted odds ratio for the mother's age is not significant ($\chi^2 = 1.695$, p -value = 0.43), the adjusted odds ratio for the income to poverty ratio is not significant ($\chi^2 = 0.055$, p -value = 0.81), the adjusted odds ratio for the medical insurance is not significant ($\chi^2 = 4.587$, p -value = 0.20), the adjusted odds ratio for the well child visit at age 11-12 years is significant ($\chi^2 = 9.758$, p -value = 0.01), the adjusted odds ratio for the census region

is significant ($\chi^2 = 28.996$, p-value = 0.00), and the adjusted odds ratio for the vaccination facility type is significant ($\chi^2 = 64.528$, p-value = 0.00).

For model 4, the adjusted odds ratio for the variables that were significant in model 3 were calculated which was race/ethnicity, well child visit at age 11-12years, census region, vaccination facility type. The adjusted odds ratio for the race/ethnicity is significant ($\chi^2 = 10.570$, p-value = 0.01) the adjusted odds ratio for the well child visit at age 11-12years is significant ($\chi^2 = 19.721$, p-value = 0.00), the adjusted odds ratio for the census region is significant ($\chi^2 = 30.851$, p-value = 0.00), and the adjusted odds ratio for the vaccination facility type is significant ($\chi^2 = 67.897$, p-value = 0.00).

TABLE 6. Type III Test of Effect for Models Using NIS-Teen 2021.						
Characteristic	Wald Chi-Squares					
	Model 2		Model 3		Model 4	
	Statistic	P-Value	Statistic	P-Value	Statistic	P-Value
Age (years)	14.583	0.01	4.430	0.35		
Sex of Adolescent	0.661	0.42	1.903	0.17		
Race/Ethnicity	8.783	0.03	10.081	0.02	10.570	0.01
Mother's Educational Level	13.346	0.00	7.432	0.06		
Mother's Marital Status	0.007	0.93	0.595	0.44		
Mother's Age	7.238	0.03	1.695	0.43		
Income to Poverty Ratio	0.586	0.44	0.055	0.81		
Medical Insurance	16.185	0.00	4.587	0.20		
Well Child Visit at Age 11-12 Years	25.942	0.00	9.758	0.01	19.721	0.00
Census Region	30.974	0.00	28.996	0.00	30.851	0.00
Vaccination Facility Type	72.858	0.00	64.528	0.00	67.897	0.00

4 - Conclusion

This project has to do with the analysis of (NIS-Teen) 2021 data and the focus vaccine was the P_UTDMENACWY(Meningococcal serogroup ACWY-conjugate shot vaccine or Meningococcal serogroup ACWY-unknown type shot), there were a total of 18, 002 participants, graphs and charts were assessed, descriptive analysis were conducted for all the variables under study for both weighted and unweighted estimates, point estimates and confidence intervals were also constructed. Four models were also fitted for the data which included weighted estimates, adjusted and unadjusted odds ratios.

In conclusion, for the logistic regression, the wald chi-square was used to determine if the variables were significant. In model 2 which is an unadjusted odds ratio, teenagers ages, mother's educational level, mother's age, medical insurance, Well Child Visit at Age 11-12 Years,

race/ethnicity, Census Region, Vaccination Facility Type were all significant while the sex of the adolescent, mother's marital status, and income to poverty ratio were not significant.

In respect to model 3 which is an adjusted odds ratio, in all the variables, only race/ethnicity, Well Child Visit at Age 11-12 Years, Census Region, Vaccination Facility Type were significant and others were not significant.

The model 4 is also an adjusted odds ratio using only the variables significant in model 3, it was confirmed that all the variables that were significant in model 3 were also significant in model 4.

References

- 1, NIS-Teen Data and Documentation for 2015 to Present | CDC
(<https://www.cdc.gov/vaccines/imz-managers/nis/datasets-teen.html>)
- 2, About the National Immunization Surveys | CDC
(<https://www.cdc.gov/vaccines/imz-managers/nis/about.html>)
- 3, PROC FREQ: PROC FREQ Statement
(https://documentation.sas.com/doc/en/pgmsascdc/9.4_3.5/procstat/procstat_freq_syntax01.htm)
- 4, PROC MEANS: PROC MEANS Statement
(https://documentation.sas.com/doc/en/pgmsascdc/9.4_3.5/proc/n1qnc9bddfvhzqn105kqitnf29cp.htm)
- 5, PROC SGPLOT: Overview
(https://documentation.sas.com/doc/en/pgmsascdc/9.4_3.5/grstatproc/p1t32i8511t1gfn17sw07yxtazad.htm)

APPENDIX

```

/***** Final Semester Milestone Project SAS Code
*****/

/***** Vaccine Variable Name: P_UTDMENACWY(1+
MENINGOCOCCAL SEROGROUP
ACWY-CONJUGATE SHOT OR MENINGOCOCCAL SEROGROUP ACWY-UNKNOWN TYPE
SHOT) *****/

/*****/

/* Step 1:  ASSIGN SAS LIBRARIES AND FILE NAMES */
/*****/

LIBNAME PUF "C:\Users\victo\Documents\NISTEEN2021";
OPTIONS FMTSEARCH = (PUF WORK LIBRARY);

%LET MYPATH = C:\Users\victo\Documents\NISTEEN2021\RESULTS;

/*****/

/* Step 2:  CREATE THE DATA SET FOR YOUR PROJECT */
/*          USING THE VARIABLE LIST GIVING FROM THE MAIN DATA SET */
/*****/

DATA MYPROJECT;

    SET PUF.NISTEENPUF21(KEEP = SEQNUMT PDAT2 PROVWT_C STRATUM YEAR AGE SEX
RACEETHK EDUC1 AGEGRP_M_I
                                MARITAL2 INCPORAR_I INS_STAT2_I
CKUP_11_12 CEN_REG FACILITY STATE P_UTDHPV
                                P_UTDHPV2 P_UTDHPV_15INT P_UTDMEN
P_UTDMENACWY P_UTDTD P_UTDTDAP P_UTDTDAP7
                                P_UTDHEPA1 P_UTDVRC);

/*** ASSIGNING NEW AGE OF TEEN VARIABLE:  1 = 13 YEARS, 2 = 14 YEARS, 3 = 15
YEARS,
                                4 = 16 YEARS, AND 5 = 17 YEARS ***

```



```

NEWAGE = .;

IF AGE IN (13) THEN NEWAGE = 1;

ELSE IF AGE IN (14) THEN NEWAGE = 2;

ELSE IF AGE IN (15) THEN NEWAGE = 3;

ELSE IF AGE IN (16) THEN NEWAGE = 4;

ELSE IF AGE IN (17) THEN NEWAGE = 5;

/*      NEWAGE2 = AGE - 12;*/

    /*** ASSIGNING AGE GROUP OF TEEN VARIABLE:  1 = (13 - 15)YEARS; 2 =
(16-17) YEARS. ***/

TEENAGEGP = .;

IF AGE IN (13, 14, 15) THEN TEENAGEGP = 1;

ELSE IF AGE IN (16, 17) THEN TEENAGEGP = 2;

    /*** REGROUPING 11-12 YEAR OLD WELL-CHILD EXAM OR CHECK-UP OF TEEN: BY
COMBINING DON'T KNOW /REFUSED

/ MISSING AS 3 ***/

MYCKUP1112 = CKUP_11_12;

IF CKUP_11_12 IN (., 77, 99) THEN MYCKUP1112 = 3;

    /*** ASSIGNING MISSING FACILITY AS UNKNOW = 6 ***/

MYFACILITY = FACILITY;

IF FACILITY IN (.) THEN MYFACILITY = 6;

    /*** INCOME TO POVERTY RATIO VARIABLE 1= <133%; 2=133% TO 322% ***/

IF 0 <= INCPORAR_I < 1.33162 THEN MYINCTOPOV = 1;

ELSE IF 1.33162 <= INCPORAR_I < 3.22046 THEN MYINCTOPOV = 2;

    /*** REASSIGNING RACE/ETHNICITY VARIABLES: 1 = NH-WHITES; 2 = NH-
BLACKS; 3 = HISPANICS;

4 = NH-OTHERS ***/

MYRACEETH = .;

```

```
IF RACEETHK = 1 THEN MYRACEETH = 3;
ELSE IF RACEETHK = 2 THEN MYRACEETH = 1;
ELSE IF RACEETHK = 3 THEN MYRACEETH = 2;
ELSE IF RACEETHK = 4 THEN MYRACEETH = 4;

RUN;

/*****
*** THIS PROGRAM PRODUCES ALL YOUR VARIABLE CREATED IN THE SUBSET DATA ***
*****/

PROC CONTENTS DATA = MYPROJECT VARNUM;

RUN;

/*****
*****/

/**** THIS PROGRAM REMOVES ALL THE FORMATS FROM THE VARIABLES CREATED IN THE
SUBSET DATA ****/

/*****
*****/

DATA PROJECT;

SET MYPROJECT;

FORMAT _ALL_; /**** DELETE ALL THE FORMATS FROM THE ORIGINAL DATA SET
*** /

RUN;

PROC CONTENTS DATA = PROJECT VARNUM;

RUN;

/*****
*****/

/**** THIS PROGRAM PRODUCES NEW FORMATS TO BE USED FOR MY VARIABLES CREATED IN
THE SUBSET DATA ****/

/*****
*****/
```

```
PROC FORMAT;
```

```
    VALUE MYAGE 1 = "13"
```

```
                2 = "14"
```

```
                3 = "15"
```

```
                4 = "16"
```

```
                5 = "17"
```

```
                ;
```

```
    VALUE FMTAGRP 1 = "13 - 15"
```

```
                2 = "16 - 17"
```

```
                ;
```

```
    VALUE FMTSEX 1 = "MALE "
```

```
                2 = "FEMALE"
```

```
                ;
```

```
    VALUE FMTRACE 1 = "NON-HISPANIC WHITE ONLY "
```

```
                2 = "NON-HISPANIC BLACK ONLY "
```

```
                3 = "HISPANIC "
```

```
                4 = "NON-HISPANIC OTHER + MULTIPLE RACE"
```

```
                ;
```

```
    VALUE FMTCKUP 1 = "YES CHECK UP"
```

```
                2 = "NO CHECK UP "
```

```
                3 = "DK OR REF "
```

```
                ;
```

```
    VALUE FMTINS 1 = "PRIVATE INSURANCE"
```

```
                2 = "ANY MEDICAID "
```

```
                3 = "OTHER INSURANCE "
```

```
                4 = "UNINSURED "
```

```
                ;
```

```
    VALUE FMTMAGRP 1 = "<= 34 YEARS "
```

```
                2 = "35 TO 44 YEARS"
```

```
                3 = ">= 45 YEARS "
```

```
                ;
```

```

VALUE FMTMARRY 1 = "MARRIED"
                2 = "NEVER
MARRIED/WIDOWED/DIVORCED/SEPERATED/DECEASED/LIVING WITH PARTNER"
                ;

VALUE FMTMEDU 1 = "LESS THAN 12 YEARS"
                2 = "12 YEARS"
                3 = "MORE THAN 12 YEARS, NON-COLLEGE GRAD"
                4 = "COLLEGE GRADUATE"
                ;

VALUE FMTINCPR 1 = " 0% TO <133% "
                2 = " 133% TO 322%"
                ;

VALUE FMTFACTY 1 = "ALL PUBLIC FACILITIES"
                2 = "ALL HOSPITAL FACILITIES"
                3 = "ALL PRIVATE FACILITIES"
                4 = "ALL STD/SCHOOL/TEEN CLINICS OR OTHER
FACILITIES"
                5 = "MIXED"
                6 = "UNKNOWN/DK"
                ;

VALUE FMTCENREG 1 = "NORTHEAST"
                2 = "MIDWEST"
                3 = "SOUTH"
                4 = "WEST"
                ;

VALUE FMTTDAP 0 = "NOT 1+ MENINGOCOCCAL SEROGROUP ACWY-CONJUGATE SHOT
OR UNKNOWN TYPE SHOT"
                1 = "1+ MENINGOCOCCAL SEROGROUP ACWY-CONJUGATE
SHOT OR UNKNOWN TYPE SHOT"
                ;

```

```

VALUE FMSTATE      . = "MISSING"
1 = "ALABAMA"      "
2 = "ALASKA"       "
3 = "              "
4 = "ARIZONA"      "
5 = "ARKANSAS"     "
6 = "CALIFORNIA"   "
7 = "              "
8 = "COLORADO"     "
9 = "CONNECTICUT"  "
10 = "DELAWARE"    "
11 = "DISTRICT OF COLUMBIA"
12 = "FLORIDA"     "
13 = "GEORGIA"     "
14 = "              "
15 = "HAWAII"      "
16 = "IDAHO"       "
17 = "ILLINOIS"    "
18 = "INDIANA"     "
19 = "IOWA"        "
20 = "KANSAS"      "
21 = "KENTUCKY"    "
22 = "LOUISIANA"   "
23 = "MAINE"       "
24 = "MARYLAND"    "
25 = "MASSACHUSETTS"
26 = "MICHIGAN"    "
27 = "MINNESOTA"   "
28 = "MISSISSIPPI"
29 = "MISSOURI"    "
30 = "MONTANA"     "

```

```
31 = "NEBRASKA"
32 = "NEVADA"
33 = "NEW HAMPSHIRE"
34 = "NEW JERSEY"
35 = "NEW MEXICO"
36 = "NEW YORK"
37 = "NORTH CAROLINA"
38 = "NORTH DAKOTA"
39 = "OHIO"
40 = "OKLAHOMA"
41 = "OREGON"
42 = "PENNSYLVANIA"
43 = "
44 = "RHODE ISLAND"
45 = "SOUTH CAROLINA"
46 = "SOUTH DAKOTA"
47 = "TENNESSEE"
48 = "TEXAS"
49 = "UTAH"
50 = "VERMONT"
51 = "VIRGINIA"
52 = "
53 = "WASHINGTON"
54 = "WEST VIRGINIA"
55 = "WISCONSIN"
56 = "WYOMING"

;

RUN;

PROC CONTENTS DATA = PROJECT;

RUN;
```

```

/*****
*****/

/*** THIS PROGRAM PRODUCES THE DISTRIBUTION OF SAMPLE SIZES FOR EACH VARIABLE
OF INTEREST ***/

/*****
*****/

ODS OUTPUT ONEWAYFREQS = RESPONSETABLE; /*** THIS CREATES YOUR SAS DATA SET
RESULTS FROM THE

PROC FREQ RESULTS ***/

PROC FREQ DATA = PROJECT;

    WHERE PDAT2 = 1 AND PROVWT_C NE .; /*** USING ONLY ADEQUATE PROVIDER
DATA ***/

    TABLES NEWAGE TEENAGEGP SEX MYRACEETH EDUC1 MARITAL2 AGEGRP_M_I
MYINCTOPOV INS_STAT2_I

        MYCKUP1112 CEN_REG MYFACILITY STATE/ NOCUM NOPERCENT;

    TITLE1 '2021 NIS-TEEN PUBLIC-USE FILE';

    TITLE2 'UNWEIGHTED FREQUENCIES OF SELECTED CHARACTERISTICS OF
ADOLESCENTS AGED 13-17 YEARS';

    FORMAT NEWAGE MYAGE.;

    FORMAT TEENAGEGP FMTAGRP.;

    FORMAT SEX FMTSEX.;

    FORMAT MYRACEETH FMTRACE.;

    FORMAT EDUC1 FMTMEDU.;

    FORMAT MARITAL2 FMTMARRY.;

    FORMAT AGEGRP_M_I FMTMAGRP.;

    FORMAT MYINCTOPOV FMTINCPR.;

    FORMAT INS_STAT2_I FMTINS.;

    FORMAT MYCKUP1112 FMTCKUP.;

    FORMAT CEN_REG FMTCENREG.;

    FORMAT MYFACILITY FMTFACTY.;

    FORMAT STATE FMSTATE.;

RUN;
```

```
/** THIS PROCEDURE DISPLAYS ALL THE VARIABLE NAMES IN THE DATA SET IN
ALPHABETICAL ORDER ***/

PROC CONTENTS DATA = RESPONSETABLE SHORT;

RUN;

/** THIS CREATES YOUR SAS DATA SET RESULTS FOR YOUR SAMPLE SIZES ***/

DATA RESPONSETABLEV1;

    RETAIN TABLE MYVARIABLE MYVARCOUNT MYVARNUM FREQUENCY;

    LENGTH MYVARIABLE $40.; /** CREATING THE LENGTH FOR THE CHARACTER
VALUES TO BE PLACED IN

                                THE VARIABLE MYVARIABLE ***/

    SET RESPONSETABLE(KEEP = AGEGRP_M_I CEN_REG EDUC1 FREQUENCY INS_STAT2_I
MARITAL2 MYCKUP1112

                                MYFACILITY MYINCTOPOV MYRACEETH NEWAGE SEX
STATE TEENAGEGP TABLE);

    /** MYVARIABLE = THE LABEL FOR EACH VALUE OF VARIABLE; MYVARCOUNT =
THE VARIABLE NUMBER IN

                                THE TABLE; MYVARNUM = THE VALUE OF EACH
VARIABLE ***/

    IF NEWAGE NE . THEN DO;

        MYVARIABLE = PUT(NEWAGE, MYAGE.);

        MYVARCOUNT = 1;

        MYVARNUM = NEWAGE;

    END;

    ELSE IF TEENAGEGP NE . THEN DO;

        MYVARIABLE = PUT(TEENAGEGP, FMTAGRP.);

        MYVARCOUNT = 2;

        MYVARNUM = TEENAGEGP;

    END;

    ELSE IF SEX NE . THEN DO;

        MYVARIABLE = PUT(SEX, FMTSEX.);
```



```
MYVARCOUNT = 3;
MYVARNUM = SEX;
END;
ELSE IF MYRACEETH NE . THEN DO;
    MYVARIABLE = PUT(MYRACEETH, FMTRACE.);
    MYVARCOUNT = 4;
    MYVARNUM = MYRACEETH;
END;
ELSE IF EDUC1 NE . THEN DO;
    MYVARIABLE = PUT(EDUC1, FMTMEDU.);
    MYVARCOUNT = 5;
    MYVARNUM = EDUC1;
END;
ELSE IF MARITAL2 NE . THEN DO;
    MYVARIABLE = PUT(MARITAL2, FMTMARRY.);
    MYVARCOUNT = 6;
    MYVARNUM = MARITAL2;
END;
ELSE IF AGEGRP_M_I NE . THEN DO;
    MYVARIABLE = PUT(AGEGRP_M_I, FMTMAGRP.);
    MYVARCOUNT = 7;
    MYVARNUM = AGEGRP_M_I;
END;
ELSE IF MYINCTOPOV NE . THEN DO;
    MYVARIABLE = PUT(MYINCTOPOV, FMTINCPR.);
    MYVARCOUNT = 8;
    MYVARNUM = MYINCTOPOV;
END;
ELSE IF INS_STAT2_I NE . THEN DO;
    MYVARIABLE = PUT(INS_STAT2_I, FMTINS.);
    MYVARCOUNT = 9;
    MYVARNUM = INS_STAT2_I;
```

```
END;

ELSE IF MYCKUP1112 NE . THEN DO;

    MYVARIABLE = PUT(MYCKUP1112, FMTCKUP.);

    MYVARCOUNT = 10;

    MYVARNUM = MYCKUP1112;

END;

ELSE IF CEN_REG NE . THEN DO;

    MYVARIABLE = PUT(CEN_REG, FMTCENREG.);

    MYVARCOUNT = 11;

    MYVARNUM = CEN_REG;

END;

ELSE IF MYFACILITY NE . THEN DO;

    MYVARIABLE = PUT(MYFACILITY, FMTFACITY.);

    MYVARCOUNT = 12;

    MYVARNUM = MYFACILITY;

END;

ELSE IF STATE NE . THEN DO;

    MYVARIABLE = PUT(STATE, FMSTATE.);

    MYVARCOUNT = 13;

    MYVARNUM = STATE;

END;

KEEP TABLE MYVARIABLE MYVARCOUNT MYVARNUM FREQUENCY;

RUN;

/*** THIS PROCEDURE EXPORTS YOUR SAMPLE SIZES IN A MS EXCEL FILE ***/

PROC EXPORT DATA = RESPONSETABLEV1 OUTFILE
="C:\Users\icto\Documents\NISTEEN2021\TABLE1\TABLE1SAMPLESIZESNEW.xlsx"
DBMS=XLSX REPLACE;

RUN;
```

```

/*****
*****/

/*** THIS PROGRAM PRODUCES THE DISTRIBUTION OF WEIGHTED FREQUENCIES AND
PERCENTAGES FOR EACH VARIABLE OF INTEREST ***/

/*****
*****/

ODS OUTPUT ONEWAYFREQS = WTRESPONSETABLE;

PROC FREQ DATA = PROJECT;

    WHERE PDAT2 = 1; /*** USING ONLY ADEQUATE PROVIDER DATA ***/

    WEIGHT PROVWT_C; /*** TO INCLUDE WEIGHTS FOR WEIGHTED RESULTS ***/

    TABLES NEWAGE TEENAGEGP SEX MYRACEETH EDUC1 MARITAL2 AGEGRP_M_I
MYINCTOPOV INS_STAT2_I MYCKUP1112 CEN_REG MYFACILITY STATE/ NOCUM;

    TITLE1 '2021 NIS-TEEN PUBLIC-USE FILE';

    TITLE2 'CHI-SQUARE TEST RESULTS FOR WEIGHTED VACCINATION COVERAGES BY
SELECTED VARIABLES';

    FORMAT NEWAGE MYAGE.;

    FORMAT TEENAGEGP FMTAGRP.;

    FORMAT SEX FMTSEX.;

    FORMAT MYRACEETH FMTRACE.;

    FORMAT EDUC1 FMTMEDU.;

    FORMAT MARITAL2 FMTMARRY.;

    FORMAT AGEGRP_M_I FMTMAGRP.;

    FORMAT MYINCTOPOV FMTINCPR.;

    FORMAT INS_STAT2_I FMTINS.;

    FORMAT MYCKUP1112 FMTCKUP.;

    FORMAT CEN_REG FMTCENREG.;

    FORMAT MYFACILITY FMTFACTY.;

    FORMAT STATE FMSTATE.;

RUN;

/*** THIS PROCEDURE DISPLAYS ALL THE VARIABLE NAMES IN THE DATA SET IN
ALPHABETICAL ORDER ***/
```

```
PROC CONTENTS DATA = WTRESPONSETABLE SHORT;

RUN;

/*** THIS CREATES YOUR SAS DATA SET RESULTS FOR YOUR SAMPLE SIZES ***/

DATA WTRESPONSETABLEV1;

    RETAIN TABLE MYVARIABLE MYVARCOUNT MYVARNUM PERCENT MYPERCENT;

    LENGTH MYVARIABLE $40.; /*** CREATING THE LENGTH FOR THE CHARACTER
VALUES TO BE PLACED IN THE VARIABLE MYVARIABLE ***/

    SET WTRESPONSETABLE (KEEP = TABLE PERCENT NEWAGE TEENAGEGP SEX
MYRACEETH EDUC1 MARITAL2 AGEGRP_M_I MYINCTOPOV INS_STAT2_I MYCKUP1112 CEN_REG
MYFACILITY STATE);

    MYPERCENT = PUT(PERCENT, 8.1); /*** FORMATING PERCENTAGES TO 1 DECIMAL
PLACE ***/

    /*** MYVARIABLE = THE LABEL FOR EACH VALUE OF VARIABLE; MYVARCOUNT =
THE VARIABLE NUMBER IN THE TABLE; MYVARNUM = THE VALUE OF EACH VARIABLE ***/

    IF NEWAGE NE . THEN DO;

        MYVARIABLE = PUT(NEWAGE, MYAGE.);

        MYVARCOUNT = 1;

        MYVARNUM = NEWAGE;

    END;

    ELSE IF TEENAGEGP NE . THEN DO;

        MYVARIABLE = PUT(TEENAGEGP, FMTAGRP.);

        MYVARCOUNT = 2;

        MYVARNUM = TEENAGEGP;

    END;

    ELSE IF SEX NE . THEN DO;

        MYVARIABLE = PUT(SEX, FMTSEX.);

        MYVARCOUNT = 3;

        MYVARNUM = SEX;

    END;

    ELSE IF MYRACEETH NE . THEN DO;
```

```
MYVARIABLE = PUT(MYRACEETH, FMTRACE.);
MYVARCOUNT = 4;
MYVARNUM = MYRACEETH;
END;
ELSE IF EDUC1 NE . THEN DO;
    MYVARIABLE = PUT(EDUC1, FMTMEDU.);
    MYVARCOUNT = 5;
    MYVARNUM = EDUC1;
END;
ELSE IF MARITAL2 NE . THEN DO;
    MYVARIABLE = PUT(MARITAL2, FMTMARRY.);
    MYVARCOUNT = 6;
    MYVARNUM = MARITAL2;
END;
ELSE IF AGEGRP_M_I NE . THEN DO;
    MYVARIABLE = PUT(AGEGRP_M_I, FMTMAGRP.);
    MYVARCOUNT = 7;
    MYVARNUM = AGEGRP_M_I;
END;
ELSE IF MYINCTOPOV NE . THEN DO;
    MYVARIABLE = PUT(MYINCTOPOV, FMTINCPR.);
    MYVARCOUNT = 8;
    MYVARNUM = MYINCTOPOV;
END;
ELSE IF INS_STAT2_I NE . THEN DO;
    MYVARIABLE = PUT(INS_STAT2_I, FMTINS.);
    MYVARCOUNT = 9;
    MYVARNUM = INS_STAT2_I;
END;
ELSE IF MYCKUP1112 NE . THEN DO;
    MYVARIABLE = PUT(MYCKUP1112, FMTCKUP.);
    MYVARCOUNT = 10;
```

```
        MYVARNUM = MYCKUP1112;

    END;

    ELSE IF CEN_REG NE . THEN DO;

        MYVARIABLE = PUT(CEN_REG, FMTCENREG.);

        MYVARCOUNT = 11;

        MYVARNUM = CEN_REG;

    END;

    ELSE IF MYFACILITY NE . THEN DO;

        MYVARIABLE = PUT(MYFACILITY, FMTFACITY.);

        MYVARCOUNT = 12;

        MYVARNUM = MYFACILITY;

    END;

    ELSE IF STATE NE . THEN DO;

        MYVARIABLE = PUT(STATE, FMSTATE.);

        MYVARCOUNT = 13;

        MYVARNUM = STATE;

    END;

    KEEP TABLE MYVARIABLE MYVARCOUNT MYVARNUM PERCENT MYPERCENT;

RUN;

/**** THIS PROCEDURE EXPORTS YOUR SAMPLE SIZES IN A MS EXCEL FILE ****/

PROC EXPORT DATA = WTRESPONSETABLEV1 OUTFILE
="C:\Users\victo\Documents\NISTEEN2021\TABLE1\TABLE1WEIGHTEDPERCENT.xlsx"
DBMS=XLSX REPLACE;

RUN;

/*****
*****

/**** THIS PROGRAM PRODUCES THE DISTRIBUTION OF WEIGHTED FREQUENCIES FOR EACH
VARIABLE OF INTEREST ****/

/****      AND THE CHI-SQUARE STATISTICS AND P-VALUE FOR EACH VARIABLE OF
INTEREST.      ****/
```

```
/******  
******/
```

```
ODS OUTPUT CHISQ = MYCHISQTEST;
```

```
PROC FREQ DATA = PROJECT;
```

```
    WHERE PDAT2 = 1; /** USING ONLY ADEQUATE PROVIDER DATA ***/
```

```
    WEIGHT PROVWT_C; /** TO INCLUDE WEIGHTS FOR WEIGHTED RESULTS ***/
```

```
    TABLES (NEWAGE TEENAGEGP SEX MYRACEETH EDUC1 MARITAL2 AGEGRP_M_I  
MYINCTOPOV INS_STAT2_I MYCKUP1112 CEN_REG MYFACILITY)*P_UTDMENACWY / CHISQ;
```

```
    TITLE1 '2021 NIS-TEEN PUBLIC-USE FILE';
```

```
    TITLE2 'CHI-SQUARE TEST RESULTS FOR WEIGHTED VACCINATION COVERAGES BY  
SELECTED VARIABLES';
```

```
    FORMAT NEWAGE MYAGE.;
```

```
    FORMAT TEENAGEGP FMTAGRP.;
```

```
    FORMAT SEX FMTSEX.;
```

```
    FORMAT MYRACEETH FMTRACE.;
```

```
    FORMAT EDUC1 FMTMEDU.;
```

```
    FORMAT MARITAL2 FMTMARRY.;
```

```
    FORMAT AGEGRP_M_I FMTMAGRP.;
```

```
    FORMAT MYINCTOPOV FMTINCPR.;
```

```
    FORMAT INS_STAT2_I FMTINS.;
```

```
    FORMAT MYCKUP1112 FMTCKUP.;
```

```
    FORMAT CEN_REG FMTCENREG.;
```

```
    FORMAT MYFACILITY FMTFACTY.;
```

```
    FORMAT P_UTDMENACWY FMTTDAP.;
```

```
RUN;
```

```
/** THIS PROCEDURE DISPLAYS ALL THE VARIABLE NAMES IN THE DATA SET IN  
ALPHABETICAL ORDER ***/
```

```
PROC CONTENTS DATA = MYCHISQTEST SHORT;
```

```
RUN;
```

```
DATA MYCHISQTESTV1;

    RETAIN TABLE STATISTIC MYVALUE MYPROB DF VALUE PROB;

    LENGTH MYVALUE MYPROB $15.;

    SET MYCHISQTEST;

    WHERE STATISTIC IN ("Chi-Square"); /*** SELECTING ONLY CHI-SQUARE
RESULTS ***/

    MYVALUE = PUT(VALUE, 10.2); /*** FORMATTING THE CHI-SQUARE STATISTIC TO
2 DECIMAL PLACES. ***/

    MYPROB = PUT(PROB, 8.2); /*** FORMATTING THE CHI-SQUARE P-VALUES TO 2
DECIMAL PLACES. ***/

RUN;

/*** THIS PROCEDURE EXPORTS YOUR VACCINATION COVERAGE ESTIMATES RESULTS IN A
MS EXCEL FILE ***/

PROC EXPORT DATA = MYCHISQTESTV1 OUTFILE
="C:\Users\ victo\Documents\NIS-TEEN2021\TABLE2\TABLE2CHISQUARE.xlsx" DBMS=XLSX
REPLACE;

RUN;

/*****
*****/

/*** THIS PROGRAM PRODUCES A HISTOGRAM FOR AGE IN YEARS AT INTERVIEW OF THE
ADOLESCENT ***/

/*****
*****/

/*** NOTE: YOUR CREATE HTML SHOULD BE CHECKED IN THE RESULTS WINDOW BEFORE
YOU CAN SEE YOUR PLOTS ***/

PROC SGPLOT DATA=PROJECT;

    WHERE PDAT2 = 1; /*** USING ONLY ADEQUATE PROVIDER DATA ***/

    TITLE "Plotting Weighted Histogram Using Age (in Years) at Interview in
NIS-Teen 2021 PUF";
```



```
HISTOGRAM AGE / BINSTART = 1 BINWIDTH = 1 NBINS = 5 WEIGHT = PROVWT_C;
DENSITY AGE;
RUN;

/*****
*****/

/*** THIS PROGRAM PRODUCES A HISTOGRAM FOR NEW AGE AT INTERVIEW OF THE
ADOLESCENT ***/

/*****
*****/

/*** NOTE: YOUR CREATE HTML SHOULD BE CHECKED IN THE RESULTS WINDOW BEFORE
YOU CAN SEE YOUR PLOTS ***/

PROC SGPLOT DATA=PROJECT;

    WHERE PDAT2 = 1; /*** USING ONLY ADEQUATE PROVIDER DATA ***/

    TITLE "Plotting Weighted Histogram Using New Age at Interview in NIS-Teen
2021 PUF";

    HISTOGRAM NEWAGE / BINSTART = 1 BINWIDTH = 1 NBINS = 5 WEIGHT = PROVWT_C;
    DENSITY NEWAGE;
RUN;

/*****
*****/

/*** THIS PROGRAM PRODUCES A HISTOGRAM FOR MOTHER'S AGE GROUP ***/

/*****
*****/

/*** NOTE: YOUR CREATE HTML SHOULD BE CHECKED IN THE RESULTS WINDOW BEFORE
YOU CAN SEE YOUR PLOTS ***/

PROC SGPLOT DATA=PROJECT;
```

```

        WHERE PDAT2 = 1; /*** USING ONLY ADEQUATE PROVIDER DATA ***/

        TITLE "Plotting Weighted Histogram Using Mother's Age in NIS-Teen 2021
PUF";

        HISTOGRAM AGEGRP_M_I / BINSTART = 1 BINWIDTH = 1 NBINS = 5 WEIGHT =
PROVWT_C;

        DENSITY AGEGRP_M_I;

RUN;

/*****
*****/

/*** THIS PROGRAM PRODUCES A HISTOGRAM FOR INCOME TO POVERTY RATIO ***/

/*****
*****/

PROC SGPLOT DATA=PROJECT;

        WHERE PDAT2 = 1; /*** USING ONLY ADEQUATE PROVIDER DATA ***/

        TITLE "Plotting Weighted Histogram Using INCOME TO POVERTY RATIO in NIS-
Teen 2021 PUF";

        HISTOGRAM MYINCTOPOV / BINSTART = 1 BINWIDTH = 1 NBINS = 5 WEIGHT =
PROVWT_C;

        DENSITY MYINCTOPOV;

RUN;

/*****
*****/

/*** THIS PROGRAM PRODUCES A VERTICAL BAR GRAPH FOR THE SEX OF THE ADOLESCENT
*****/

/*****
*****/

PROC SGPLOT DATA=PROJECT;

        WHERE PDAT2 = 1; /*** USING ONLY ADEQUATE PROVIDER DATA ***/

        TITLE "Weighted Vertical Bar Chart Using Sex of the Adolescent in NIS-
Teen 2021 PUF";

```

```
        VBAR SEX / WEIGHT = PROVWT_C STAT = PERCENT;

        FORMAT SEX FMTSEX.;

RUN;

/*****
***/

/**** THIS PROGRAM PRODUCES A VERTICAL BAR GRAPH FOR THE RACE/ETHNICITY ****/

/*****
***/

PROC SGPLOT DATA=PROJECT;

    WHERE PDAT2 = 1; /**** USING ONLY ADEQUATE PROVIDER DATA ****/

    TITLE "Weighted Vertical Bar Chart Using Sex Race/Ethnicity in NIS-Teen
2021 PUF";

    VBAR MYRACEETH / WEIGHT = PROVWT_C STAT = PERCENT;

    FORMAT MYRACEETH FMTRACE.;

RUN;

/*****
***/

/**** THIS PROGRAM PRODUCES A VERTICAL BAR GRAPH FOR THE MOTHER'S EDUCATIONAL
LEVEL ****/

/*****
***/

PROC SGPLOT DATA=PROJECT;

    WHERE PDAT2 = 1; /**** USING ONLY ADEQUATE PROVIDER DATA ****/

    TITLE "Weighted Vertical Bar Chart Using Mother's Educational Level in
NIS-Teen 2021 PUF";

    VBAR EDUC1 / WEIGHT = PROVWT_C STAT = PERCENT;

    FORMAT EDUC1 FMTMEDU.;

RUN;
```

```

/*****
*** /

/**** THIS PROGRAM PRODUCES A VERTICAL BAR GRAPH FOR THE MOTHER'S MARITAL
STATUS ****/

/*****
*** /

PROC SGPLOT DATA=PROJECT;

    WHERE PDAT2 = 1; /**** USING ONLY ADEQUATE PROVIDER DATA ****/

    TITLE "Weighted Vertical Bar Chart Using Mother's Marital Status in NIS-
Teen 2021 PUF";

    VBAR MARITAL2 / WEIGHT = PROVWT_C STAT = PERCENT;

    FORMAT MARITAL2 FMTMARRY.;

    XAXIS FITPOLICY = SPLIT;

RUN;

/*****
**** /

/**** THIS PROGRAM PRODUCES A PIE CHART OF THE MEDICAL INSURANCE ****/

/*****
**** /

PROC GCHART DATA=PROJECT;

    TITLE "Using the Medical Insurance in NIS-Teen 2021 PUF";

    WHERE PDAT2 = 1 AND PROVWT_C NE .; /**** USING ONLY ADEQUATE PROVIDER DATA
****/

    PIE INS_STAT2_I / SUMVAR = PROVWT_C TYPE=SUM PERCENT = ARROW NOHEADING
LEGEND DISCRETE;

    FORMAT INS_STAT2_I FMTINS.;

RUN;

QUIT;

/*****
**** /
```

```
/** THIS PROGRAM PRODUCES A PIE CHART OF THE WELL CHILD VISIT AT AGE 11-12
YEARS***/
```

```
/*
****/
```

```
PROC GCHART DATA=PROJECT;
```

```
    TITLE "Using the Well Child Visits at Age 11-12 years in NIS-Teen 2021
PUF";
```

```
    WHERE PDAT2 = 1 AND PROVWT_C NE .; /** USING ONLY ADEQUATE PROVIDER DATA
***/
```

```
    PIE MYCKUP1112 / SUMVAR = PROVWT_C TYPE=SUM PERCENT = ARROW NOHEADING
LEGEND DISCRETE;
```

```
    FORMAT MYCKUP1112 FMTCKUP.;
```

```
RUN;
```

```
QUIT;
```

```
/*
****/
```

```
/** THIS PROGRAM PRODUCES A PIE CHART OF THE CENSUS REGION OF THE ADOLESCENT
***/
```

```
/*
****/
```

```
PROC GCHART DATA=PROJECT;
```

```
    TITLE "Using the Census Region of the Adolescent in NIS-Teen 2021 PUF";
```

```
    WHERE PDAT2 = 1 AND PROVWT_C NE .; /** USING ONLY ADEQUATE PROVIDER DATA
***/
```

```
    PIE CEN_REG / SUMVAR = PROVWT_C TYPE=SUM PERCENT = ARROW NOHEADING LEGEND
DISCRETE;
```

```
    FORMAT CEN_REG FMTCENREG.;
```

```
RUN;
```

```
QUIT;
```

```
/*
****/
```

```

/*** THIS PROGRAM PRODUCES A PIE CHART OF THE VACCINATION FACILITY TYPE OF
THE ADOLESCENT ***/

/*****
****/

PROC GCHART DATA=PROJECT;

    TITLE "Using the Vaccination Facility Type of the Adolescent in NIS-Teen
2021 PUF";

    WHERE PDAT2 = 1 AND PROVWT_C NE .; /*** USING ONLY ADEQUATE PROVIDER DATA
****/

    PIE MYFACILITY / SUMVAR = PROVWT_C TYPE=SUM PERCENT = ARROW NOHEADING
LEGEND DISCRETE;

    FORMAT MYFACILITY FMTFACTY.;

RUN;

QUIT;

/*****
****/

/***** THIS PROGRAM PRODUCES THE DISTRIBUTION OF SAMPLE SIZES AND
VACCINATION COVERAGE *****/

/***** ESTIMATES WITH THEIR CORRESPONDING CONFIDENCE INTERVALS FOR EACH
VARIABLE OF INTEREST *****/

/*****
****/

%MACRO MYESTIMATE(VAR1, VAR2, VAR3, VAR4, DESCRIPTION);

/*** &VAR1. VARIABLE ***/

ODS OUTPUT SUMMARY = MYMEANS&VAR1.; /*** GIVE A NAME TO THE SAS DATA SET TO
BE CREATED ***/

PROC MEANS DATA=PROJECT MEAN CLM MAXDEC = 3;

    TITLE "20121 NIS-TEEN PUBLIC-USE FILE VACCINATION COVERAGE ESTIMATES BY
DESCRIPTION";

    WHERE PDAT2 = 1 AND PROVWT_C NE .;

    CLASS &VAR1.; /*** INSERT YOUR SELECTED CHARACTERISTICS VARIABLE ***/

```

```
WEIGHT PROVWT_C; /*** INSERT YOUR WEIGHT VARIABLE ***/

FREQ &VAR1.; /*** INSERT YOUR SELECTED CHARACTERISTICS VARIABLE ***/

VAR &VAR2.; /*** INSERT YOUR VACCINE VARIABLE ***/

FORMAT &VAR1. &VAR3.;

FORMAT &VAR2. FMTTDAP.;

RUN;

/*** THIS PROCEDURE DISPLAYS ALL THE VARIABLE NAMES IN THE DATA SET IN
ALPHABETICAL ORDER ***/

PROC CONTENTS DATA = MYMEANS&VAR1. SHORT;

RUN;

DATA MYMEANS&VAR1.V1;

    RETAIN MYCHARACT MYVARIABLE MYVARNUM MYRESULTS FINALESTIMATE
&VAR2._MEAN &VAR2._LCLM &VAR2._UCLM;

    LENGTH MYRESULTS FINALESTIMATE $20. MYVARIABLE $40.;

    SET MYMEANS&VAR1.;

    MYESTMATE = PUT(ROUND(&VAR2._MEAN*100,0.1), 4.1); /*** ROUNDING THE
POINT ESTIMATE AS A PERCENTAGE TO 1 DECIMAL PLACE ***/

    CONINTEL = '('||PUT(ROUND(&VAR2._LCLM*100,0.1), 4.1)||' -
'|PUT(ROUND(&VAR2._UCLM*100,0.1), 4.1)||')'; /*** COMBINING THE LOWER AND
UPPER CONFIDENCE LIMITS ***/

    FINALESTIMATE = CATX(" ",MYESTMATE," ",CONINTEL); /*** COMBINING THE
POINT ESTIMATE AND CONFIDENCE LIMITS TO SHOW ONE RESULT ***/

    MYCIDIFF = (&VAR2._UCLM*100) - (&VAR2._LCLM*100); /*** FINDING THE
DIFFERENCE IN CONFIDENCE WIDTH ***/

    IF (MYCIDIFF > 20) THEN MYRESULTS = FINALESTIMATE||"***"; /*** TESTING
TO SEE IF THE DIFFERENCE IN CONFIDENCE WIDTH IS GREATER THAN 20 PERCENTAGE
POINTS ***/

    ELSE MYRESULTS = FINALESTIMATE;

/*** ASSIGNING MYVARIABLE = THE LABEL FOR EACH VALUE OF VARIABLE AND
MYVARNUM = THE VALUE OF EACH VARIABLE ***/

MYVARIABLE = PUT(&VAR1.,&VAR3.);

MYVARNUM = &VAR1.;
```

```
MYCHARACT = &VAR4.;

KEEP MYCHARACT MYVARIABLE MYVARNUM MYRESULTS FINALESTIMATE &VAR2._MEAN
&VAR2._LCLM &VAR2._UCLM;

RUN;

/**** THIS PROCEDURE EXPORTS YOUR VACCINATION COVERAGE ESTIMATES RESULTS IN A
MS EXCEL FILE ****/

/**** MAKE SURE YOU CHANGE FILE NAMES FOR EACH DIFFERENT VARIABLE
(CCHARACTERISTICS) ****/

PROC EXPORT DATA = MYMEANS&VAR1.V1/****MYMEANS&VAR1.V1****/ OUTFILE
="C:\Users\victo\Documents\NISTEEN2021\TABLE2\TABLE2VAX&VAR1..xlsx" DBMS=XLX
REPLACE;

RUN;

PROC APPEND BASE = ALLESTIMATES DATA = MYMEANS&VAR1.V1 FORCE;

RUN;

%MEND MYESTIMATE;

%MYESTIMATE(NEWAGE, P_UTDMENACWY, MYAGE., 1, "Age (years) at Interview");
%MYESTIMATE(TEENAGEGP, P_UTDMENACWY, FMTAGRP., 2, "Age Group at Interview");
%MYESTIMATE(SEX, P_UTDMENACWY, FMTSEX., 3, "Sex of Adolescent at Interview");
%MYESTIMATE(MYRACEETH, P_UTDMENACWY, FMTRACE., 4, "Race/Ethnicity at
Interview");
%MYESTIMATE(EDUC1, P_UTDMENACWY, FMTMEDU., 5, "Mother's Education Level at
Interview");
%MYESTIMATE(MARITAL2, P_UTDMENACWY, FMTMARRY., 6, "Mother's Marital Status at
Interview");
%MYESTIMATE(AGEGRP_M_I, P_UTDMENACWY, FMTMAGRP., 7, "Mother's Age at
Interview");
%MYESTIMATE(MYINCTOPOV, P_UTDMENACWY, FMTINCPR., 8, "Income to Poverty at
Interview");
%MYESTIMATE(INS_STAT2_I, P_UTDMENACWY, FMTINS., 9, "Medical Insurance at
Interview");
```



```
%MYESTIMATE(MYCKUP1112, P_UTDMENACWY, FMTCKUP., 10, "Well Child Visit at
Interview");

%MYESTIMATE(CEN_REG, P_UTDMENACWY, FMTCENREG., 11, "Census Region at
Interview");

%MYESTIMATE(MYFACILITY, P_UTDMENACWY, FMTFACTY., 12, "Vaccination Facility at
Interview");

%MYESTIMATE(STATE, P_UTDMENACWY, FMSTATE., 13, "State at Interview");
```

```
DATA PUF.ALLESTIMATES;

    SET ALLESTIMATES;
```

```
RUN;
```

```
PROC EXPORT DATA = ALLESTIMATES OUTFILE
="C:\Users\victo\Documents\NISTEEN2021\TABLE2\TABLE2.xlsx" DBMS=XLX REPLACE;

RUN;
```

```
/******
*****/

/*** THIS PROGRAM PRODUCES THE DISTRIBUTION OF SAMPLE SIZES FOR EACH VARIABLE
OF INTEREST ***/

/***                                USING SAS SURVEY PROCEDURES
***/

/******
*****/

/* DEMONSTRATE THE SURVEYFREQ PROCEDURE */

TITLE1 "FREQUENCY ANALYSIS - PUF FOR NIS-TEEN 2021";

TITLE2 'UNIVARIATE FREQUENCIES ON VARIOUS VARIABLES';

ODS OUTPUT CROSSTABS = FINALSTABLE1; /*** THIS CREATES YOUR SAS DATA SET
RESULTS FROM THE PROC SURVEYFREQ RESULTS ***/

PROC SURVEYFREQ DATA = PROJECT;

    STRATA STRATUM; /*** STRATUM VARIABLE FOR VARIANCE ESTIMATION ***/
```

```

    CLUSTER SEQNUMT;  /*** UNIQUE TEEN IDENTIFIER ***/

    WEIGHT PROVWT_C; /*** FINAL DUAL-FRAME PROVIDER-PHASE WEIGHT (EXCLUDES
TERRITORIES) ***/

    TABLES PDAT2*(P_UTDMENACWY NEWAGE SEX MYRACEETH EDUC1 MARITAL2
AGEGRP_M_I MYINCTOPOV INS_STAT2_I MYCKUP1112 CEN_REG MYFACILITY STATE
TEENAGEGP) / CL (TYPE=CP) NOWT NOSTD;

RUN;

/*** THIS PROCEDURE DISPLAYS ALL THE VARIABLE NAMES IN THE DATA SET IN
ALPHABETICAL ORDER ***/

PROC CONTENTS DATA = FINALTABLE1 SHORT;

RUN;

DATA FINALTABLE1V1;

    LENGTH FNLESTIMATE MYRESULTS $20.;

    SET FINALTABLE1(KEEP = AGEGRP_M_I CEN_REG EDUC1 FREQUENCY INS_STAT2_I
LOWERCL MARITAL2 MYCKUP1112 MYFACILITY STATE TEENAGEGP MYINCTOPOV
MYRACEETH NEWAGE PDAT2 P_UTDMENACWY PERCENT
SEX TABLE UPPERCL _SKIPLINE);

    IF _SKIPLINE IN (1) THEN DELETE;

    MYESTMATE = PUT(ROUND(PERCENT,0.1), 5.1);

    CONINTEL = '(' || PUT(ROUND(LOWERCL,0.1), 5.1) || ' -
' || PUT(ROUND(UPPERCL,0.1), 5.1) || ')';

    CONINTEFL = COMPRESS(CONINTEL);

    FNLESTIMATE = CATX(" ",MYESTMATE," ",CONINTEFL);

    MYCIDIFF = UPPERCL - LOWERCL;

    IF (MYCIDIFF > 20) THEN MYRESULTS = FNLESTIMATE || "***";

    ELSE MYRESULTS = FNLESTIMATE;

RUN;

/*** THIS CREATES YOUR SAS DATA SET RESULTS I WILL NEED ***/

DATA FINALTABLE1V2;

```

```
RETAIN TABLE MYVARIABLE MYVARCOUNT MYVARNUM FREQUENCY FNLESTIMATE
MYRESULTS;

SET FINALSTABLE1V1;

/** MYVARIABLE = THE LABEL FOR EACH VALUE OF VARIABLE; MYVARCOUNT =
THE VARIABLE NUMBER IN THE TABLE; MYVARNUM = THE VALUE OF EACH VARIABLE ***/

IF P_UTDMENACWY NE . THEN DO;
    MYVARIABLE = PUT(P_UTDMENACWY, FMTTDAP.);
    MYVARCOUNT = 0;
    MYVARNUM = P_UTDMENACWY;
END;

IF NEWAGE NE . THEN DO;
    MYVARIABLE = PUT(NEWAGE, MYAGE.);
    MYVARCOUNT = 1;
    MYVARNUM = NEWAGE;
END;

ELSE IF TEENAGEGP NE . THEN DO;
    MYVARIABLE = PUT(TEENAGEGP, FMTAGRP.);
    MYVARCOUNT = 2;
    MYVARNUM = TEENAGEGP;
END;

ELSE IF SEX NE . THEN DO;
    MYVARIABLE = PUT(SEX, FMTSEX.);
    MYVARCOUNT = 3;
    MYVARNUM = SEX;
END;

ELSE IF MYRACEETH NE . THEN DO;
    MYVARIABLE = PUT(MYRACEETH, FMTRACE.);
    MYVARCOUNT = 4;
    MYVARNUM = MYRACEETH;
END;

ELSE IF EDUC1 NE . THEN DO;
    MYVARIABLE = PUT(EDUC1, FMTEDEU.);
```

```
MYVARCOUNT = 5;
MYVARNUM = EDUC1;
END;
ELSE IF MARITAL2 NE . THEN DO;
    MYVARIABLE = PUT(MARITAL2, FMTMARRY.);
    MYVARCOUNT = 6;
    MYVARNUM = MARITAL2;
END;
ELSE IF AGEGRP_M_I NE . THEN DO;
    MYVARIABLE = PUT(AGEGRP_M_I, FMTMAGRP.);
    MYVARCOUNT = 7;
    MYVARNUM = AGEGRP_M_I;
END;
ELSE IF MYINCTOPOV NE . THEN DO;
    MYVARIABLE = PUT(MYINCTOPOV, FMTINCPR.);
    MYVARCOUNT = 8;
    MYVARNUM = MYINCTOPOV;
END;
ELSE IF INS_STAT2_I NE . THEN DO;
    MYVARIABLE = PUT(INS_STAT2_I, FMTINS.);
    MYVARCOUNT = 9;
    MYVARNUM = INS_STAT2_I;
END;
ELSE IF MYCKUP1112 NE . THEN DO;
    MYVARIABLE = PUT(MYCKUP1112, FMTCKUP.);
    MYVARCOUNT = 10;
    MYVARNUM = MYCKUP1112;
END;
ELSE IF CEN_REG NE . THEN DO;
    MYVARIABLE = PUT(CEN_REG, FMTCENREG.);
    MYVARCOUNT = 11;
    MYVARNUM = CEN_REG;
```

```
END;

ELSE IF MYFACILITY NE . THEN DO;

    MYVARIABLE = PUT(MYFACILITY, FMTFACTY.);

    MYVARCOUNT = 12;

    MYVARNUM = MYFACILITY;

END;

ELSE IF STATE NE . THEN DO;

    MYVARIABLE = PUT(STATE, FMSTATE.);

    MYVARCOUNT = 11;

    MYVARNUM = STATE;

END;

KEEP TABLE MYVARIABLE MYVARCOUNT MYVARNUM FREQUENCY FNLESTIMATE
MYRESULTS;

RUN;

PROC EXPORT DATA = FINALSTABLE1V2 OUTFILE
="C:\Users\ victo\Documents\NISTEEN2021\TABLE2\SURVEYTABLE1.xlsx" DBMS=XL SX
REPLACE;

RUN;

/***** NATIONAL ESTIMATE *****/

PROC MEANS DATA=PROJECT MEAN CLM MAXDEC = 3;

    TITLE "2021 NIS-TEEN PUBLIC-USE FILE VACCINATION COVERAGE ESTIMATES BY
DESCRIPTION";

    WHERE PDAT2 = 1 AND PROVWT_C NE .;

    WEIGHT PROVWT_C; /*** INSERT YOUR WEIGHT VARIABLE ***/

    VAR P_UTDMENACWY; /*** INSERT YOUR VACCINE VARIABLE ***/

    FORMAT P_UTDMENACWY FMTTDAP.;
```

RUN;

/** END OF SAS MIDTERM CODE **/

/*

UNADJUSTED MODEL 1 *****

%MACRO MYESTIMATES (VAR1, VAR2, VAR3, VAR4, DESCRIPTION);

/** CREATE A DATA SET FOR VARIABLE YOU WANT TO ESTIMATE VACCINATION COVERAGE
***/

DATA FLPRJTDATA&VAR2.;

 SET PROJECT (KEEP = SEQNUMT STRATUM PROVWT_C &VAR1. &VAR2.);

RUN;

/** SORT DATA BY VARIABLES IN THE BY STATEMENT YOU INTEND TO ESTIMATE **/

PROC SORT DATA = FLPRJTDATA&VAR2.;

 BY &VAR2.;

RUN;

/** ODS OUTPUT TO CREATE A SAS DATA SET FOR ESTIMATES NEEDED **/

ODS OUTPUT STATISTICS=SAS_EST&VAR2.;

/** USING SAS SURVEYMEANS TO ESTIMATE VACCINATION COVERAGE **/

PROC SURVEYMEANS DATA = FLPRJTDATA&VAR2. NOBS SUM MEAN STDERR CLM;

```

    STRATUM STRATUM; /*** STRATUM VARIABLE FOR VARIANCE ESTIMATION ***/
    CLUSTER SEQNUMT; /*** UNIQUE TEEN IDENTIFIER ***/

    WEIGHT PROVWT_C; /*** FINAL DUAL-FRAME PROVIDER-PHASE WEIGHT (EXCLUDES
TERRITORIES) ***/

    CLASS &VAR1.;

    VAR &VAR1.;

    BY &VAR2.;

RUN;

/*** THIS PROCEDURE DISPLAYS ALL THE VARIABLE NAMES IN THE DATA SET IN
ALPHABETICAL ORDER ***/

PROC CONTENTS DATA = SAS_EST&VAR2. SHORT;

RUN;

DATA SAS_ESTV1&VAR2.;
    SET SAS_EST&VAR2.;

    MEAN = MEAN*100; *CONVERT TO PERCENT ESTIMATES;

    STDERR = STDERR*100; *CONVERT TO PERCENT ESTIMATES;

    LOWERCLMEAN = LOWERCLMEAN*100;*CONVERT TO PERCENT ESTIMATES;

    UPPERCLMEAN = UPPERCLMEAN*100;*CONVERT TO PERCENT ESTIMATES;

    MYESTMATE = PUT(ROUND(MEAN,0.1), 5.1);

    CONINTEL = '('||PUT(ROUND(LOWERCLMEAN,0.1), 5.1)||' -
'|PUT(ROUND(UPPERCLMEAN,0.1), 5.1)||')';

    CONINTEFL = COMPRESS(CONINTEL);

    FNLESTIMATE = COMPRESS(CATX(" ",MYESTMATE," ",CONINTEFL));

    MYCIDIFF = UPPERCL - LOWERCL;

    IF (MYCIDIFF > 20) THEN MYRESULTS = COMPRESS(FNLESTIMATE||"***");

    ELSE MYRESULTS = COMPRESS(FNLESTIMATE);

RUN;

DATA SAS_ESTV2&VAR2.;

    RETAIN VARNAME VARLEVEL MYVARCOUNT MYVARNUM MYVARIABLE MEAN STDERR
    LOWERCLMEAN UPPERCLMEAN MYRESULTS;

```

```
LENGTH MYVARIABLE $30.0 ;

SET SAS_ESTV1&VAR2.;

WHERE VARLEVEL IN ("1");


MYVARCOUNT = &VAR4.;

MYVARNUM = &VAR2.;

MYVARIABLE = PUT(&VAR2., &VAR3.);


KEEP VARNAME VARLEVEL MYVARCOUNT MYVARNUM MYVARIABLE MEAN STDERR
LOWERCLMEAN UPPERCLMEAN MYRESULTS;

RUN;


PROC PRINT DATA=SAS_ESTV2&VAR2. NOOBS LABEL;

FORMAT MYVARNUM &VAR3.;

FORMAT MEAN STDERR 5.2;

VAR MYVARNUM MEAN STDERR MYRESULTS;

LABEL

MEAN='PERCENT UP-TO-DATE'

STDERR='STANDARD ERROR'

MYRESULTS = "WEIGHTED PERCENT AND 95% C.L.";

TITLE "&VAR1. ESTIMATES BY ESTIMATION DEMOGRAPHIC VARIABLE";

RUN;


PROC APPEND BASE = FINALTABLE2 DATA=SAS_ESTV2&VAR2. FORCE;

RUN;


%MEND MYESTIMATES;


%MYESTIMATES(P_UTDMENACWY, NEWAGE, MYAGE., 1, "AGE IN YEARS OF SELECTED
TEEN");

%MYESTIMATES(P_UTDMENACWY, SEX, FMTSEX., 2, "SEX OF TEEN");
```



```
%MYESTIMATES(P_UTDMENACWY, MYRACEETH, FMTRACE., 3, "RACE/ETHNICITY OF TEEN
WITH MULTIRACE CATEGORY (RECODE)");

%MYESTIMATES(P_UTDMENACWY, EDUC1, FMTMEDU., 4, "EDUCATION LEVEL OF MOTHER
WITH 4 CATEGORIES (RECODE)");

%MYESTIMATES(P_UTDMENACWY, MARITAL2, FMTMARRY., 5, "MARITAL STATUS OF MOTHER
(RECODE)");

%MYESTIMATES(P_UTDMENACWY, AGEGRP_M_I, FMTMAGRP., 6, "MOTHER'S AGE CATEGORIES
(RECODE)");

%MYESTIMATES(P_UTDMENACWY, MYINCTOPOV, FMTINCPR., 7, "(INCOME TO POVERTY
RATIO: IMPUTED (RECODE)");

%MYESTIMATES(P_UTDMENACWY, INS_STAT2_I, FMTINS., 8, "INSURANCE STATUS
(PRIVATE ONLY/ANY MEDICAID/OTHER INSURANCE/UNINSURED): IMPUTED");

%MYESTIMATES(P_UTDMENACWY, MYCKUP1112, FMTCKUP., 9, "DID TEEN HAVE AN 11-12
YEAR OLD WELL-CHILD EXAM OR CHECK-UP?");

%MYESTIMATES(P_UTDMENACWY, CEN_REG, FMTCENREG., 10, "CENSUS REGION BASED ON
TRUE STATE OF RESIDENCE");

%MYESTIMATES(P_UTDMENACWY, MYFACILITY, FMTFACTY., 11, "FACILITY TYPES FOR
TEEN'S PROVIDERS");
```

```
DATA PUF.FINALTABLE2;
```

```
    SET FINALTABLE2;
```

```
RUN;
```

```
PROC EXPORT DATA = FINALTABLE2 OUTFILE=
```

```
"C:\Users\victo\Documents\NISTEEN2021\FINALTABLE2.xlsx" DBMS=XLSX REPLACE;
```

```
RUN;
```

```
/*****
UNADJUSTED    MODEL 2    ODDS RATIOS
*****/
```

```
***** MODEL 2 ODDS RATIO PROGRAM *****/
```

```
%MACRO MYODDSRATIO(VAR1, VAR2, VAR3, VAR4, DESCRIPTION);
```

```
PROC SURVEYLOGISTIC DATA = PROJECT;
```

```
STRATA STRATUM; /*** STRATUM VARIABLE FOR VARIANCE ESTIMATION ***/
CLUSTER SEQNUMT; /*** UNIQUE TEEN IDENTIFIER ***/
WEIGHT PROVWT_C; /*** FINAL DUAL-FRAME PROVIDER-PHASE WEIGHT (EXCLUDES
TERRITORIES) ***/
DOMAIN PDAT2; /*** ADEQUATE PROVIDER DATA FLAG ***/

CLASS &VAR3.;

MODEL P_UTDMENACWY(EVENT = "1") = &VAR1.;

ODS OUTPUT PARAMETERESTIMATES=MYUNADJPARAEST&VAR1.;
ODS OUTPUT ODDSRATIOS=MYOREST&VAR1.;
ODS OUTPUT MODELANOVA=MYTYPE3TEST&VAR1.;

RUN;

/*** CREATING RESULTS FOR ODDS RATIOS ***/

DATA MYORESTV1&VAR1.;
    RETAIN NEWEFFECT MYRESULTS MYESTMATE CONINTELFL;
    LENGTH MYRESULTS NEWEFFECT $20.;
    SET MYOREST&VAR1.;
    WHERE PDAT2 = 1;

    NEWEFFECT = EFFECT;

    MYESTMATE = PUT(ROUND(ODDSRATIOEST,0.01), 5.2);
    CONINTEL = '('||PUT(ROUND(LOWERCL,0.01), 5.2)||' -
'|PUT(ROUND(UPPERCL,0.01), 5.2)||')';
    CONINTELFL = COMPRESS(CONINTEL);
    MYRESULTS = CATX(" ",MYESTMATE," ",CONINTELFL);

RUN;
```

```
DATA MYORESTV2&VAR1.;

    RETAIN MYVARCOUNT NEWEFFECT MYRESULTS MYESTMATE CONINTEFL;

    LENGTH MYVARIABLE NEWEFFECT $20.;

    SET MYORESTV1&VAR1.;

    MYVARCOUNT = &VAR4.;

    KEEP MYVARCOUNT NEWEFFECT MYRESULTS MYESTMATE CONINTEFL;

RUN;

PROC APPEND BASE = ODDSRATIOSTABLE3 DATA=MYORESTV2&VAR1. FORCE;

RUN;

/*** CREATING RESULTS FOR SIGNIFICANCE T-TESTS AND P-VALUES WITHIN MODEL
VARIABLES   ***/

PROC CONTENTS DATA = MYUNADJPARAEST&VAR1. SHORT;

RUN;

DATA MYUNADJPARAESTV1&VAR1.;

    RETAIN MYVARNUM VARIABLE EFFECT MYVARIABLE MYTVALUE MYPROBT;

    LENGTH MYVARIABLE $40.;

    SET MYUNADJPARAEST&VAR1. (KEEP = PDAT2 VARIABLE CLASSVAL0 TVALUE PROBT);

    WHERE PDAT2 = 1;

    IF VARIABLE IN ("Intercept") THEN DELETE;

    EFFECT = INPUT(CLASSVAL0, 8.);

    IF VARIABLE IN ("&VAR1.") THEN DO;

        MYVARIABLE = PUT(EFFECT, &VAR2.);

        MYVARNUM = &VAR4.;
```

```
END;

MYTVALUE = PUT(ROUND(TVALUE, 0.001), 8.3);
MYPROBT = PUT(ROUND(PROBT, 0.01), 8.2);

KEEP MYVARNUM VARIABLE EFFECT MYVARIABLE MYTVALUE MYPROBT;

RUN;

PROC APPEND BASE = MYUNADJPARATTEST DATA=MYUNADJPARAESTV1&VAR1. FORCE;
RUN;

/*** CREATING RESULTS FOR TYPE III TEST OF EFFECT FOR MODELS ***/

DATA MYTYPE3TESTV1&VAR1.;
    RETAIN MYVARCOUNT NEWEFFECT MYVARIABLE MYWALDCHISQ MYPROBCHISQ;
    LENGTH MYVARIABLE NEWEFFECT $20.;
    SET MYTYPE3TEST&VAR1.;
    WHERE PDAT2 = 1;

    MYVARCOUNT = &VAR4.;

    NEWEFFECT = EFFECT;

    MYWALDCHISQ = PUT(ROUND(WALDCHISQ, 0.001), 8.3);
    MYPROBCHISQ = PUT(ROUND(PROBCHISQ, 0.01), 8.2);

    KEEP MYVARCOUNT NEWEFFECT MYWALDCHISQ MYPROBCHISQ;

RUN;

PROC APPEND BASE = MYTYPE3TEST DATA=MYTYPE3TESTV1&VAR1. FORCE;
RUN;
```

```
%MEND MYODDSRATIO;
```

```
%MYODDSRATIO(NEWAGE, MYAGE., NEWAGE(PARAM=REF REF="5"), 1, "AGE IN YEARS OF  
SELECTED TEEN");
```

```
%MYODDSRATIO(SEX, FMTSEX., SEX(PARAM=REF REF="2"), 2, "SEX OF TEEN");
```

```
%MYODDSRATIO(MYRACEETH, FMTRACE., MYRACEETH(PARAM=REF REF="1"), 3,  
"RACE/ETHNICITY OF TEEN WITH MULTIRACE CATEGORY (RECODE)");
```

```
%MYODDSRATIO(EDUC1, FMTMEDU., EDUC1(PARAM=REF REF="1"), 4, "EDUCATION LEVEL  
OF MOTHER WITH 4 CATEGORIES (RECODE)");
```

```
%MYODDSRATIO(MARITAL2, FMTMARRY., MARITAL2(PARAM=REF REF="1"), 5, "MARITAL  
STATUS OF MOTHER (RECODE)");
```

```
%MYODDSRATIO(AGEGRP_M_I, FMTMAGRP., AGEGRP_M_I(PARAM=REF REF="1"), 6,  
"MOTHER'S AGE CATEGORIES (RECODE)");
```

```
%MYODDSRATIO(MYINCTOPOV, FMTINCPR., MYINCTOPOV(PARAM=REF REF="1"), 7,  
"(INCOME TO POVERTY RATIO: IMPUTED (RECODE)");
```

```
%MYODDSRATIO(INS_STAT2_I, FMTINS., INS_STAT2_I(PARAM=REF REF="1"), 8,  
"INSURANCE STATUS (PRIVATE ONLY/ANY MEDICAID/OTHER INSURANCE/UNINSURED):  
IMPUTED");
```

```
%MYODDSRATIO(MYCKUP1112, FMTCKUP., MYCKUP1112(PARAM=REF REF="1"), 9, "DID  
TEEN HAVE AN 11-12 YEAR OLD WELL-CHILD EXAM OR CHECK-UP?");
```

```
%MYODDSRATIO(CEN_REG, FMTCENREG., CEN_REG(PARAM=REF REF="1"), 10, "CENSUS  
REGION BASED ON TRUE STATE OF RESIDENCE");
```

```
%MYODDSRATIO(MYFACILITY, FMTFACTY., MYFACILITY(PARAM=REF REF="1"), 11,  
"FACILITY TYPES FOR TEEN'S PROVIDERS");
```

```
DATA PUF.ODDSRATIOSTABLE3;
```

```
    SET ODDSRATIOSTABLE3;
```

```
RUN;
```

```
PROC EXPORT DATA = ODDSRATIOSTABLE3 OUTFILE  
="C:\Users\ victo\Documents\NISTEEN2021\ODDSRATIOSTABLE3.xlsx" DBMS=XLSX  
REPLACE;
```

```
RUN;
```

```
DATA PUF.MYUNADJPARATTEST;
```

```
        SET MYUNADJPARATTEST;

RUN;

PROC EXPORT DATA = MYUNADJPARATTEST OUTFILE
="C:\Users\victo\Documents\NISTEEN2021\MYUNADJPARATTESTTABLE3.xlsx" DBMS=XLSX
REPLACE;

RUN;

DATA PUF.MYTYPE3TEST;

        SET MYTYPE3TEST;

RUN;

PROC EXPORT DATA = MYTYPE3TEST OUTFILE
="C:\Users\victo\Documents\NISTEEN2021\MYTYPE3TESTTABLE3.xlsx" DBMS=XLSX
REPLACE;

RUN;

/***Na here I stop o ***/

/*****
*****/

/*** THIS PROGRAM PRODUCES THE DISTRIBUTION OF WEIGHTED FREQUENCIES FOR EACH
VARIABLE OF INTEREST ***/

/***      AND THE CHI-SQUARE STATISTICS AND P-VALUE FOR EACH VARIABLE OF
INTEREST.      ***/

/*****
*****/

/*****
*****/

/*****
***** ADJUSTED MODEL 3  ODDS RATIOS      *****/
/*****
*****/

TITLE1 "FITTING A LOGISTIC REGRESSION MODEL ACCOUNTING FOR COMPLEX SURVEY
DESIGN FEATURES";
```

```
TITLE2 'USING NIS-TEEN PUBLIC USER FILES 2021 AND UNGROUPED AGES (13 TO 17
YEARS) AT INTERVIEW';
```

```
PROC SURVEYLOGISTIC DATA = PROJECT;
```

```
    STRATA STRATUM; /** STRATUM VARIABLE FOR VARIANCE ESTIMATION ***/
```

```
    CLUSTER SEQNUMT; /** UNIQUE TEEN IDENTIFIER ***/
```

```
    WEIGHT PROVWT_C; /** FINAL DUAL-FRAME PROVIDER-PHASE WEIGHT (EXCLUDES
TERRITORIES) ***/
```

```
    DOMAIN PDAT2; /** ADEQUATE PROVIDER DATA FLAG ***/
```

```
    CLASS NEWAGE(PARAM=REF REF="5") SEX(PARAM=REF REF="2")
MYRACEETH(PARAM=REF REF="1") EDUC1(PARAM=REF REF="1") MARITAL2(PARAM=REF
REF="1") AGEGRP_M_I(PARAM=REF REF="1")
        MYINCTOPOV(PARAM=REF REF="1") INS_STAT2_I(PARAM=REF REF="1")
MYCKUP1112(PARAM=REF REF="1") CEN_REG(PARAM=REF REF="1") MYFACILITY(PARAM=REF
REF="1");
```

```
    MODEL P_UTDMENACWY(EVENT = "1") = NEWAGE SEX MYRACEETH EDUC1 MARITAL2
AGEGRP_M_I MYINCTOPOV INS_STAT2_I MYCKUP1112 CEN_REG MYFACILITY;
```

```
    ODS OUTPUT PARAMETERESTIMATES=MYADJPARAEST;
```

```
    ODS OUTPUT ODDSRATIOS=MYADJOREST;
```

```
    ODS OUTPUT MODELANOVA=MYADJTYPE3TEST;
```

```
RUN;
```

```
/** CREATING RESULTS FOR ODDS RATIOS ***/
```

```
DATA MYADJORESTV1;
```

```
    RETAIN NEWEFFECT MYRESULTS MYESTMATE CONINTELFL;
```

```
    LENGTH MYRESULTS NEWEFFECT $20.;
```

```
    SET MYADJOREST;
```

```
    WHERE PDAT2 = 1;
```

```
    NEWEFFECT = EFFECT;
```

```
MYESTMATE = PUT(ROUND(ODDSRATIOEST,0.01), 5.2);

CONINTEL = '(' || PUT(ROUND(LOWERCL,0.01), 5.2) || ' - ' || PUT(ROUND(UPPERCL,0.01), 5.2) || ')';

CONINTELFL = COMPRESS(CONINTEL);

MYRESULTS = CATX(" ",MYESTMATE," ",CONINTELFL);

RUN;

DATA MYADJORESTV2;

    RETAIN NEWEFFECT MYRESULTS MYESTMATE CONINTELFL;

    SET MYADJORESTV1;

    KEEP NEWEFFECT MYRESULTS MYESTMATE CONINTELFL;

RUN;

PROC EXPORT DATA = MYADJORESTV2 OUTFILE
="C:\Users\victo\Documents\NISTEEN2021\MULTILOGODDSRATIOTABLE3.xlsx"
DBMS=XLSX REPLACE;

RUN;

/*** CREATING RESULTS FOR SIGNIFICANCE T-TESTS AND P-VALUES WITHIN MODEL
VARIABLES ***/

PROC CONTENTS DATA = MYADJPARAEST SHORT;

RUN;

DATA MYADJPARAESTV1;

    RETAIN MYVARNUM VARIABLE EFFECT MYVARIABLE MYTVALUE MYPROBT;

    LENGTH MYVARIABLE $40.;

    SET MYADJPARAEST(KEEP = PDAT2 VARIABLE CLASSVAL0 TVALUE PROBT);

    WHERE PDAT2 = 1;

    IF VARIABLE IN ("Intercept") THEN DELETE;
```



```
EFFECT = INPUT(CLASSVAL0, 8.);

IF VARIABLE IN ("NEWAGE") THEN DO;
    MYVARIABLE = PUT(EFFECT, MYAGE.);
    MYVARNUM = 1;
END;

ELSE IF VARIABLE IN ("SEX") THEN DO;
    MYVARIABLE = PUT(EFFECT, FMTSEX.);
    MYVARNUM = 2;
END;

ELSE IF VARIABLE IN ("MYRACEETH") THEN DO;
    MYVARIABLE = PUT(EFFECT, FMTRACE.);
    MYVARNUM = 3;
END;

ELSE IF VARIABLE IN ("EDUC1") THEN DO;
    MYVARIABLE = PUT(EFFECT, FMTMEDU.);
    MYVARNUM = 4;
END;

ELSE IF VARIABLE IN ("MARITAL2") THEN DO;
    MYVARIABLE = PUT(EFFECT, FMTMARRY.);
    MYVARNUM = 5;
END;

ELSE IF VARIABLE IN ("AGEGRP_M_I") THEN DO;
    MYVARIABLE = PUT(EFFECT, FMTMAGRP.);
    MYVARNUM = 6;
END;

ELSE IF VARIABLE IN ("MYINCTOPOV") THEN DO;
    MYVARIABLE = PUT(EFFECT, FMTINCPR.);
    MYVARNUM = 7;
END;

ELSE IF VARIABLE IN ("INS_STAT2_I") THEN DO;
    MYVARIABLE = PUT(EFFECT, FMTINS.);
```

```
        MYVARNUM = 8;

    END;

    ELSE IF VARIABLE IN ("MYCKUP1112") THEN DO;

        MYVARIABLE = PUT(EFFECT, FMTCKUP.);

        MYVARNUM = 9;

    END;

    ELSE IF VARIABLE IN ("CEN_REG") THEN DO;

        MYVARIABLE = PUT(EFFECT, FMTCENREG.);

        MYVARNUM = 10;

    END;

    ELSE IF VARIABLE IN ("MYFACILITY") THEN DO;

        MYVARIABLE = PUT(EFFECT, FMTFACITY.);

        MYVARNUM = 11;

    END;


    MYTVALUE = PUT(ROUND(TVALUE, 0.001), 8.3);

    MYPROBT = PUT(ROUND(PROBT, 0.01), 8.2);


    KEEP MYVARNUM VARIABLE EFFECT MYVARIABLE MYTVALUE MYPROBT;

RUN;


PROC EXPORT DATA = MYADJPARAESTV1 OUTFILE
="C:\Users\victo\Documents\NISTEEN2021\MULTILOGTTESTTABLE3.xlsx" DBMS=XLSX
REPLACE;

RUN;


/*** CREATING RESULTS FOR TYPE III TEST OF EFFECT FOR MODELS ***/


DATA MYADJTYPE3TESTV1;

    RETAIN NEWEFFECT MYWALDCHISQ MYPROBCHISQ;

    LENGTH NEWEFFECT $20.;

    SET MYADJTYPE3TEST;

    WHERE PDAT2 = 1;
```

```

NEWEEFFECT = EFFECT;

MYWALDCHISQ = PUT(ROUND(WALDCHISQ, 0.001), 8.3);
MYPROBCHISQ = PUT(ROUND(PROBCHISQ, 0.01), 8.2);

KEEP NEWEEFFECT MYWALDCHISQ MYPROBCHISQ;

RUN;

PROC EXPORT DATA = MYADJTYPE3TESTV1 OUTFILE
="C:\Users\victo\Documents\NISTEEN2021\MULTILOGTYPE3TESTTABLE3.xlsx"
DBMS=XLSX REPLACE;

RUN;

/*****
          ADJUSTED MODEL 4  ODDS RATIOS          *****/

TITLE1 "FITTING A LOGISTIC REGRESSION MODEL ACCOUNTING FOR COMPLEX SURVEY
DESIGN FEATURES";

TITLE2 'USING NIS-TEEN PUBLIC USER FILES 2021 AND UNGROUPED AGES (13 TO 17
YEARS) AT INTERVIEW';

PROC SURVEYLOGISTIC DATA = PROJECT;

    STRATA  STRATUM; /*** STRATUM VARIABLE FOR VARIANCE ESTIMATION ***/

    CLUSTER SEQNUMT; /*** UNIQUE TEEN IDENTIFIER ***/

    WEIGHT PROVWT_C; /*** FINAL DUAL-FRAME PROVIDER-PHASE WEIGHT (EXCLUDES
TERRITORIES) ***/

    DOMAIN PDAT2;      /*** ADEQUATE PROVIDER DATA FLAG ***/

    CLASS MYRACEETH(PARAM=REF REF="1") MYCKUP1112(PARAM=REF REF="1")
CEN_REG(PARAM=REF REF="1") MYFACILITY(PARAM=REF REF="1");

```

```
MODEL P_UTDMENACWY(EVENT = "1") = MYRACEETH MYCKUP1112 CEN_REG  
MYFACILITY;
```

```
ODS OUTPUT PARAMETERESTIMATES=MYPARAESTML4;
```

```
ODS OUTPUT ODDSRATIOS=MYORESTML4;
```

```
ODS OUTPUT MODELANOVA=MYTYPE3TESTML4;
```

```
RUN;
```

```
/** CREATING RESULTS FOR ODDS RATIOS */
```

```
DATA MYORESTML4V1;
```

```
RETAIN NEWEFFECT MYRESULTS MYESTMATE CONINTELFL;
```

```
LENGTH MYRESULTS NEWEFFECT $20.;
```

```
SET MYORESTML4;
```

```
WHERE PDAT2 = 1;
```

```
NEWEFFECT = EFFECT;
```

```
MYESTMATE = PUT(ROUND(ODDSRATIOEST,0.01), 5.2);
```

```
CONINTEL = '(' || PUT(ROUND(LOWERCL,0.01), 5.2) || ' -  
' || PUT(ROUND(UPPERCL,0.01), 5.2) || ')';
```

```
CONINTELFL = COMPRESS(CONINTEL);
```

```
MYRESULTS = CATX(" ",MYESTMATE," ",CONINTELFL);
```

```
RUN;
```

```
DATA MYORESTML4V2;
```

```
RETAIN NEWEFFECT MYRESULTS MYESTMATE CONINTELFL;
```

```
SET MYORESTML4V1;
```

```
KEEP NEWEFFECT MYRESULTS MYESTMATE CONINTELFL;
```

```
RUN;
```

```
PROC EXPORT DATA = MYORESTML4V2 OUTFILE
="C:\Users\victo\Documents\NISTEEN2021\MULTILOGODDSRATIOTABLE3ML4.xlsx"
DBMS=XLSX REPLACE;

RUN;

/*** CREATING RESULTS FOR SIGNIFICANCE T-TESTS AND P-VALUES WITHIN MODEL
VARIABLES ***/

PROC CONTENTS DATA = MYADJPARAEST SHORT;

RUN;

DATA MYADJPARAESTML4V1;

    RETAIN MYVARNUM VARIABLE EFFECT MYVARIABLE MYTVALUE MYPROBT;

    LENGTH MYVARIABLE $40.;

    SET MYADJPARAESTML4(KEEP = PDAT2 VARIABLE CLASSVAL0 TVALUE PROBT);

    WHERE PDAT2 = 1;

    IF VARIABLE IN ("Intercept") THEN DELETE;

    EFFECT = INPUT(CLASSVAL0, 8.);

    IF VARIABLE IN ("MYRACEETH") THEN DO;

        MYVARIABLE = PUT(EFFECT, FMTRACE.);

        MYVARNUM = 1;

    END;

    ELSE IF VARIABLE IN ("MYCKUP1112") THEN DO;

        MYVARIABLE = PUT(EFFECT, FMTCKUP.);

        MYVARNUM = 3;

    END;

    ELSE IF VARIABLE IN ("CEN_REG") THEN DO;

        MYVARIABLE = PUT(EFFECT, FMTCENREG.);

        MYVARNUM = 4;

    END;
```

```
ELSE IF VARIABLE IN ("MYFACILITY") THEN DO;
    MYVARIABLE = PUT(EFFECT, FMTFACTY.);
    MYVARNUM = 5;
END;

MYTVALUE = PUT(ROUND(TVALUE, 0.001), 8.3);
MYPROBT = PUT(ROUND(PROBT, 0.01), 8.2);

KEEP MYVARNUM VARIABLE EFFECT MYVARIABLE MYTVALUE MYPROBT;

RUN;

PROC EXPORT DATA = MYADJPARAESTML4V1 OUTFILE
="C:\Users\victo\Documents\NISTEEN2021\MULTILOGTTESTTABLE3ML4.xlsx" DBMS=XLSX
REPLACE;

RUN;

/*** CREATING RESULTS FOR TYPE III TEST OF EFFECT FOR MODELS ***/

DATA MYTYPE3TESTML4V1;

    RETAIN NEWEFFECT MYWALDCHISQ MYPROBCHISQ;

    LENGTH NEWEFFECT $20.;

    SET MYTYPE3TESTML4;

    WHERE PDAT2 = 1;

    NEWEFFECT = EFFECT;

    MYWALDCHISQ = PUT(ROUND(WALDCHISQ, 0.001), 8.3);
    MYPROBCHISQ = PUT(ROUND(PROBCHISQ, 0.01), 8.2);

    KEEP NEWEFFECT MYWALDCHISQ MYPROBCHISQ;

RUN;
```

```
PROC EXPORT DATA = MYTYPE3TESTML4V1 OUTFILE  
="C:\Users\victo\Documents\NISTEEN2021\MULTILOGTYPE3TESTTABLE3ML4.xlsx"  
DBMS=XLSX REPLACE;  
  
RUN;
```