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kg_nchs: A command for Korn–Graubard confidence intervals and National Center for Health Statistics' Data Presentation Standards for Proportions

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Abstract. In August 2017, the National Center for Health Statistics (NCHS), part of the U.S. Federal Statistical System, published new standards for determining the reliability of proportions estimated using their data. These standards require one to take the Korn–Graubard confidence interval (CI), CI widths, sample size, and degrees of freedom to assess reliability of a proportion and determine whether it can be presented. The assessment itself involves determining whether several conditions are met. In this article, I present `kg_nchs`, a postestimation command that is used following `svy: proportion`. It allows Stata users to a) calculate the Korn–Graubard CI and associated statistics used in applying the NCHS presentation standards for proportions and b) display a series of three dichotomous flags that show whether the standards are met. I provide empirical examples to show how `kg_nchs` can be used to easily apply the standards and prevent Stata users from needing to perform manual calculations. While developed for NCHS survey data, this command can also be used with data that stem from any survey with a complex sample design.

Keywords: st0564, kg_nchs, health survey data, complex sample design, effective sample size, Clopper–Pearson confidence interval, exact confidence interval, healthcare, Korn–Graubard confidence interval, National Ambulatory Medical Care Survey, survey design

1 Introduction

When calculating a confidence interval (CI) for proportions, Stata by default calculates the "exact" CI, known in the broader literature as the Clopper–Pearson binomial CI (Clopper and Pearson 1934). This CI is more optimal with proportions based on fewer events than other CIs such as the Wald (Newcombe 1998; Dean and Pagano 2015). However, to calculate this CI for proportions estimated for survey data that use a complex, multistage cluster design, one should apply an adjustment specified by Korn and Graubard (1998). This adjustment is applicable when analyzing data from many nationally representative health surveys, which often use samples with a complex design (Korn and Graubard 1999).

The Korn–Graubard adjustment to the Clopper–Pearson CI (or more simply the Korn–Graubard CI) is also a key component in presentation standards for proportions that are published by the National Center for Health Statistics (NCHS) (Parker et al. 2017). The NCHS is part of the U.S. Federal Statistical System and is the principal health statistics agency of the U.S. Department of Health and Human Services. The agency's mission is to provide statistical information that will guide actions and policies to improve the health of the American people. In August 2017, NCHS began using the Korn–Graubard CI, along with information on CI width, sample size, and degrees of freedom (DF), to assess the reliability of a proportion and determine whether it can be presented as an official estimate. Researchers using NCHS survey data who wish to follow these same presentation standards must now calculate the Korn–Graubard CI and use this CI to apply them.

In this article, I present the postestimation command `kg_nchs`, which serves two functions. First, it draws from the results stored by Stata's `svy: proportion` command and uses them to calculate the Korn–Graubard CI for each proportion, the effective sample size, and the absolute and relative CI widths. Second, `kg_nchs` automatically reviews these results and uses them to produce a series of dichotomous flags that determine whether a proportion meets the various components of the NCHS presentation standards for proportions. While this command was developed for NCHS survey data, its utility is much broader because it can also be used with data from any survey with a complex sample design.

2 Korn–Graubard CIs

2.1 Calculation

The Korn–Graubard CI involves a modification to the binomial CI frequently used in a nonsurvey setting (Korn and Graubard 1998) and was developed for use when estimating proportions using a sample with a complex design and when the proportion, sample size, or both are small (Gray, Haslett, and Kuzmicich 2004). To calculate the Korn–Graubard CI for proportion p (Korn and Graubard 1998) as used in the `kg_nchs` command, we need the effective sample size (n^*), which is the sample size divided by the design effect (Kish 1965). The approach used here for its calculation is

$$n^* = \frac{p(1-p)}{\text{var}(p)}$$

or the product of p and its complement $(1-p)$ divided by variance of p. Here p is the proportion, $(1-p)$ is the complementary proportion, and $\text{var}(p)$ is the variance of p. Limits are set such that when $p = 0$, then $n^* = n$ (where n is the sample size). The effective sample size is then adjusted by the DF, or the difference in number of primary sampling units (PSUs) and number of strata. This DF-adjusted effective sample size (n^*_{DF}) is defined as

$$n^*_{\text{DF}} = \frac{p(1-p)}{\text{var}(p)} \left\{ \frac{t_{n-1}(1- \propto /2)}{t_{\text{DF}}(1- \propto /2)} \right\}^2$$

Here the unadjusted effective sample size n^* is multiplied by the t distribution of $n-1$ divided by the t distribution of DF, squared (note $\propto$ represents the significance level). Limits are also placed here such that if $p = 0$, then $n^*_{\text{DF}} = n$.

The next series of steps in calculating a Korn–Graubard CI begins with adjusting the number of x positive responses for n^*_{DF} such that

$$x = n^*_{\text{DF}} p$$

The number of positive responses (x) is then used to calculate v_1 through v_4 DF, which are needed to calculate the F distribution and ultimately to produce the Korn–Graubard CI:

$$\begin{aligned} v_1 &= 2x \\ v_2 &= 2(n^*_{\text{DF}} - x + 1) \\ v_3 &= 2(x+1) \\ v_4 &= 2(n^*_{\text{DF}} - x) \end{aligned}$$

Finally, the CI (Korn and Graubard 1998) can be calculated for x number of positive responses with the DF-adjusted effective sample size of n^*_{DF}, where the lower limit of the interval (p_L) is

$$p_L(x, n^*_{\text{DF}}) = \frac{v_1 F_{v_1,v_2}(\propto /2)}{v_2 + v_1 F_{v_1,v_2}(\propto /2)}$$

and the upper limit of the interval (p_U) is

$$p_U(x, n^*_{\text{DF}}) = \frac{v_3 F_{v_3,v_4}(1- \propto /2)}{v_4 + v_3 F_{v_3,v_4}(1- \propto /2)}$$

2.2 NCHS presentation standards for proportions

The NCHS Data Presentation Standards for Proportions (Parker et al. 2017) were developed to assess the reliability of a proportion and determine whether it should be presented. Note that these standards do not address issues surrounding confidentiality, which may also be separately assessed to determine whether a proportion should not be presented. In addition, while these standards primarily focus on estimates calculated from survey data, they also discuss estimates resulting from population data (specifically, NCHS vital statistics). However, the Korn–Graubard CI does not apply to estimates from population data and therefore does not apply to the `kg_nchs` command discussed below. While this section provides a brief description of the NCHS standards and how to use the Korn–Graubard CI to apply them, Stata users are encouraged to read the full report to gain a complete understanding. The report can be found at https://www.cdc.gov/nchs/data/series/sr_02/sr02_175.pdf.

Prior to assessing the reliability of a proportion using the NCHS standards, some final calculations are needed using the Korn–Graubard CI, specifically, the absolute and relative widths of the CI. Here the absolute width of the Korn–Graubard CI is defined by $p_U(x, n^*_{\text{DF}}) - p_L(x, n^*_{\text{DF}})$. The relative widths are calculated for both the proportion p and its complement $(1 - p)$. Here the relative width for p is defined as $\{p_U(x, n^*_{\text{DF}}) - p_L(x, n^*_{\text{DF}})\}/p$ and for $1 - p$ as $\{p_U(x, n^*_{\text{DF}}) - p_L(x, n^*_{\text{DF}})\}/(1 - p)$.

According to the NCHS standards (Parker et al. 2017), proportion p is considered unreliable and would not be presented if any of the following are true: a) $n < 30$ or $n^* < 30$, b) the absolute width of its Korn–Graubard CI is ≥ 0.30, or c) its absolute CI width is > 0.05 and < 0.30, and its relative CI width is $> 130\%$ of the proportion. These thresholds were decided upon for the standards while keeping in mind that the Korn–Graubard CI is known to be conservative (Brown, Cai, and DasGupta 2001; Gray, Haslett, and Kuzmicich 2004).

If any of the aforementioned conditions are met, proportion p is suppressed. However, the NCHS standards also have additional considerations: a) the absolute CI width is ≤ 0.05 and either $p = 0$ or $1 - p = 0$, or b) the absolute CI width is ≤ 0.05 and DF < 8. In these instances, a statistical review of the estimate should be given to determine whether it could be presented or should be suppressed. While within NCHS, this review would be performed by a clearance official, for general Stata users, this review might entail a manual assessment by either the user or a knowledgeable statistician.

The final consideration when applying the NCHS standards is to assess the reliability of the complement of proportion p. During instances where p is presented, its complement $(1 - p)$ should also have the NCHS standards applied to it to assess the complement's reliability. If $1 - p$ is found to be unreliable, per standards p can still be presented; however, a footnote should be added that states its complement does not meet the standards. Note that this assessment of $1 - p$ should be given regardless if $1 - p$ is intended to be presented.

3 The kg_nchs command

3.1 Syntax

The syntax is simply

```
kg_nchs
```

Because this is a postestimation command for proportions using survey data, it can be executed only immediately following a `svy: proportion` command. An error message will result if used following any other command, including `proportion` without the `svy` prefix.

3.2 Description

The `kg_nchs` postestimation command uses the output from a `svy: proportion` command to generate two sets of results, all contained in one table. In the first set of results, each proportion and its standard error are used to calculate some statistics. These include the complementary proportion, Korn–Graubard 95% CI, effective sample size (adjusted for DF), the absolute Korn–Graubard CI width, and the relative Korn–Graubard CI widths (multiplied by 100) for both the proportion and its complement.

The second set of results pertains directly to the NCHS standards and presents three separate dichotomous flags (0 = no; 1 = yes) for each proportion. The first flag signals whether a proportion meets all presentation standards and is considered reliable. The second flag signals whether a proportion is flagged for statistical review. The third and final flag pertains to the complementary proportion and signals whether the complement meets all presentation standards and is considered reliable. Used together, these flags provide Stata users with a quick method of assessing whether a proportion meets these comprehensive standards without the need for performing manual calculations.

3.3 Understanding DF and restriction following the over() option

For complex sample surveys, one general rule is to calculate DF as the number of PSUs minus the number of strata. Note that this is not the only way. For example, when calculating national estimates using the NCHS National Health Interview Survey, DF are assumed to be large enough for a normal approximation, and DF may be calculated as $n - 1$ (National Center for Health Statistics 2006; Parker et al. 2017). However, the number of PSUs minus the number of strata is the approach used with most NCHS surveys (Parker et al. 2017) and in Stata software. Therefore, this approach is used in the `kg_nchs` postestimation command.

Because DF play a critical role in both the adjustment of the effective sample size and determining whether a proportion should be flagged for statistical review, Stata users should clearly understand how DF are calculated for use in `kg_nchs`. The PSU and strata counts used in this calculation by Stata are for all observations included in the preceding `svy: proportion` command (not those associated with each specific proportion listed in Stata's Results window). When one calculates the Korn–Graubard 95% CI for a specific subgroup, it may be improper to use the counts for all observations because this could lead to inflated PSU and strata counts, especially for instances with smaller subgroups. More explicitly, this leads to a problem if `kg_nchs` would be used following a `svy: proportion` command with the `over()` option. In such an instance, Stata would use the PSU and strata counts for all observations and would not capture those counts specific to each subpopulation of the variable or variables specified in the `over()` option.

Therefore, to prevent the incorrect PSU and strata counts from being used, the `kg_nchs` postestimation command is designed so it cannot be used following the command `svy: proportion` when it is accompanied with the `over()` option. If the com-

mand is given with the `over()` option, an error message will result. Instead, Stata users may use the `subpop()` option with the `svy` prefix. The result will be a more accurate calculation that is guaranteed to correctly estimate the DF and accurately calculate the DF-adjusted effective sample size.

4 Empirical examples

The proceeding examples use public-use data from the 2014 National Ambulatory Medical Care Survey (NAMCS), which consists of 45,710 patient visits. NAMCS is an annual survey conducted by NCHS that is representative of ambulatory visits made to nonfederal, office-based physicians in the United States. Details on the design, methods, and content of NAMCS can be found elsewhere (National Center for Health Statistics 2017).

The following example uses 2014 NAMCS data and the `svy: proportion` command to estimate the proportion of visits to office-based physicians made by patients with congestive heart failure and the `kg_nchs` postestimation command to calculate the Korn–Graubard CIs and assess whether the resulting proportions meet NCHS standards.

```
. use kg_nchs_examples
. label define agegrp 1 "18-44" 2 "45-64" 3 "65+", add
. label values agegrp agegrp
. label define race 1 "NH White" 2 "NH Black" 3 "Hispanic" 4 "NH Other", add
. label values race race
. label define sex 1 "Female" 2 "Male", add
. label values sex sex
. label define dichot 1 "Yes" 2 "No", add
. label values cads dichot
. label values chfs dichot
. label values hyplipids dichot
. label values htns dichot
. svyset [pweight=patwt], psu(cpsum) strata(cstratm) singleunit(centered)
> vce(robust)
  (output omitted)
```

```
. svy: proportion chfs
(running proportion on estimation sample)

Survey: Proportion estimation

Number of strata =      50      Number of obs   =       45,710
Number of PSUs   =   2,179      Population size =  884,707,170
                                Design df       =        2,129

--------------------------------------------------------------
                 |             Linearized           Logit
                 |  Proportion   Std. Err.     [95% Conf. Interval]
-----------------+--------------------------------------------
chfs              |
             Yes |   .0157735   .0013157      .0133905    .0185725
              No |   .9842265   .0013157      .9814275    .9866095
--------------------------------------------------------------

. kg_nchs

Korn-Graubard 95% Confidence Intervals (modified for complex surveys from
 Clopper-Pearson method), as used with National Center for Health Statistics´
 Data Presentation Standards for Proportions

------------------------------------------------------------------------------
  Proportion      95% CI(p)                      CI Width              NCHS Std
                                                                        Flags
      p   (1-p)   Lower  Upper          n*        Abs     Rel(p)   Rel(1-p)   A B C
------------------------------------------------------------------------------
 0.0158 0.9842  0.0133 0.0186   8,958.54     0.0053    33.4535     0.5361   1 0 1
 0.9842 0.0158  0.9814 0.9867   8,958.54     0.0053     0.5361    33.4535   1 0 1
------------------------------------------------------------------------------

Degrees of freedom=   2,129

(Abbreviations: CI, confidence interval; NCHS Std, National Center for Health
                Statistics Standards; p, proportion; (1-p), complementary
                proportion; n*, effective sample size adjusted for degrees of
                freedom; Abs, absolute width; Rel, relative width)

NCHS Std Flags Key (0=No, 1=Yes)
   A: Proportion (p) meets all presentation standards, and is considered
      reliable
   B: Proportion (p) flagged for statistical review
   C: Complementary proportion (1-p) meets all presentation standards, and is
      considered reliable
```

Here 1.6% of visits were made by patients with congestive heart failure, while 98.4% were made by patients without congestive heart failure. The `kg_nchs` command shows that both of these proportions are reliable (that is, flag A = 1) because each meets the conditions for reliability detailed by the NCHS standards: $n^* > 30$, an absolute Korn–Graubard CI width < 0.30, and a relative CI width of $\leq 130\%$. Neither proportion requires statistical review (that is, flag B = 0) because although the absolute CI width is ≤ 0.05, neither proportion is equal to 0 or 1, and the DF > 8. In addition, for each proportion, its complement is also reliable (that is, flag C = 1).

The next example again examines office-based physician visits by patients with congestive heart failure but specifically among the subgroup of Hispanic women aged ≥ 65 years. With a smaller subgroup of 440 observations, reliability issues exist.

```
. svy, subpop(if race==3 & agegrp==3 & sex==1): proportion chfs
(running proportion on estimation sample)
Survey: Proportion estimation
Number of strata =      45      Number of obs   =       42,151
Number of PSUs   =   2,003      Population size =  822,603,966
                                Subpop. no. obs =          440
                                Subpop. size    = 15,994,190.9
                                Design df       =        1,958
```

	Proportion	Linearized Std. Err.	Logit [95% Conf.	Interval]
chfs				
Yes	.0388459	.0177429	.0156655	.0930831
No	.9611541	.0177429	.9069169	.9843345

```
Note: 5 strata omitted because they contain no subpopulation
      members.
. kg_nchs

Korn-Graubard 95% Confidence Intervals (modified for complex surveys from
 Clopper-Pearson method), as used with National Center for Health Statistics´
 Data Presentation Standards for Proportions
```

Proportion p	(1-p)	95% CI(p) Lower	Upper	n*	CI Width Abs	Rel(p)	Rel(1-p)	NCHS Std Flags A	B	C
0.0388	0.9612	0.0120	0.0910	119.11	0.0790	203.3131	8.2171	0	.	.
0.9612	0.0388	0.9090	0.9880	119.11	0.0790	8.2171	203.3131	1	0	0

```
Degrees of freedom=   1,958

(Abbreviations: CI, confidence interval; NCHS Std, National Center for Health
                Statistics Standards; p, proportion; (1-p), complementary
                proportion; n*, effective sample size adjusted for degrees of
                freedom; Abs, absolute width; Rel, relative width)

NCHS Std Flags Key (0=No, 1=Yes)
   A: Proportion (p) meets all presentation standards, and is considered
      reliable
   B: Proportion (p) flagged for statistical review
   C: Complementary proportion (1-p) meets all presentation standards, and is
      considered reliable
```

Here approximately 3.9% of visits were by Hispanic females aged ≥ 65 years with congestive heart failure. The Stata results from the `kg_nchs` command show that the relative Korn–Graubard CI width is > 130. Therefore, the proportion does not meet the standards, is not considered reliable, and would not be presented (that is, flag A $= 0$). Note that because this proportion is considered unreliable, both flags B and C are not applicable and will display a "." in the results table for this proportion.

For the complement, 96.1% of visits were by Hispanic females aged ≥ 65 years without congestive heart failure. This proportion meets NCHS standards (that is, flag A = 1) and does not require statistical review (that is, flag B = 0). However, its complement is considered unreliable (that is, flag C = 0). Therefore, Stata users applying these standards should add a footnote stating such.

The example below examines office-based physician visits by Hispanic male patients aged 18–44 years. Among this subpopulation, not a single visit was by a patient who had congestive heart failure. Rather, 100.0% of visits by Hispanic males aged 18–44 were by persons who had never been diagnosed with congestive heart failure.

```
. svy, subpop(if race==3 & agegrp==1 & sex==2): proportion chfs
(running proportion on estimation sample)

Survey: Proportion estimation

Number of strata =      47      Number of obs   =       42,982
Number of PSUs   =   2,073      Population size =  836,367,850
                                Subpop. no. obs =          376
                                Subpop. size    = 9,960,219.31
                                Design df       =        2,026

------------------------------------------------------------------------------
             |                Linearized                     Logit
             |  Proportion   Std. Err.      [95% Conf. Interval]
-------------+----------------------------------------------------------------
chfs          |
         Yes |           0  (no observations)
          No |           1           .               .           .
------------------------------------------------------------------------------

Note: 3 strata omitted because they contain no subpopulation
      members.

. kg_nchs

Korn-Graubard 95% Confidence Intervals (modified for complex surveys from
 Clopper-Pearson method), as used with National Center for Health Statistics´
 Data Presentation Standards for Proportions

------------------------------------------------------------------------------
  Proportion     95% CI(p)                        CI Width              NCHS Std
                                                                        Flags
      p   (1-p)   Lower   Upper          n*        Abs     Rel(p)  Rel(1-p)   A B C
------------------------------------------------------------------------------
 0.0000 1.0000  0.0000  0.0098      376.00     0.0098          .         .   1 1 1
 1.0000 0.0000  0.9902  1.0000      376.00     0.0098          .         .   1 1 1
------------------------------------------------------------------------------

Degrees of freedom=   2,026

(Abbreviations: CI, confidence interval; NCHS Std, National Center for Health
                Statistics Standards; p, proportion; (1-p), complementary
                proportion; n*, effective sample size adjusted for degrees of
                freedom; Abs, absolute width; Rel, relative width)

NCHS Std Flags Key (0=No, 1=Yes)
   A: Proportion (p) meets all presentation standards, and is considered
      reliable
   B: Proportion (p) flagged for statistical review
   C: Complementary proportion (1-p) meets all presentation standards, and is
      considered reliable
```

Recall that the limits specified above state that when a proportion is 0, the effective sample size is set to the nominal sample size (in this instance, 376). Thus, as the `kg_nchs` results show, according to NCHS standards, both of these proportions are reliable (that is, flag A = 1). However, both of these estimates would be flagged for statistical review (that is, flag B = 1) because the absolute Korn–Graubard CI width is ≤ 0.05 and the proportion (or its complement) is equal to 0. In addition, for these instances `kg_nchs` will not show the relative CI widths in the Stata Results window.

The final example details why the `kg_nchs` postestimation command cannot be used following an `svy: proportion` command that uses the `over()` option. Here the proportion of office-based physician visits by non-Hispanic black patients aged 18–44 years, 45–64 years, and ≥ 65 years with congestive heart failure is estimated. As noted above, in such instances, an error message would be generated by the postestimation command.

```
. svy, subpop(if race==2): proportion chfs, over(agegrp)
(running proportion on estimation sample)
Survey: Proportion estimation
Number of strata =      50      Number of obs    =       45,025
Number of PSUs   =   2,178      Population size =  873,123,271
                                Subpop. no. obs =        3,321
                                Subpop. size    = 66,048,510.2
                                Design df       =        2,128

          Yes: chfs = Yes
           No: chfs = No
    _subpop_1: agegrp = 18-44
    _subpop_2: agegrp = 45-64
    _subpop_3: agegrp = 65+
```

Over	Proportion	Linearized Std. Err.	Logit [95% Conf.	Interval]
Yes				
_subpop_1	.0041198	.0028281	.0010694	.0157346
_subpop_2	.0219264	.0051355	.0138229	.0346136
_subpop_3	.0447492	.0102216	.0284752	.0696571
No				
_subpop_1	.9958802	.0028281	.9842654	.9989306
_subpop_2	.9780736	.0051355	.9653864	.9861771
_subpop_3	.9552508	.0102216	.9303429	.9715248

```
. kg_nchs
option over() not allowed: see help kg_nchs for more information
r(198);
```

This restriction prevents the use of an inaccurate number of DF (in the Results window immediately above, 2,128) when adjusting the effective sample size for each subgroup. As an alternative, Stata users would generate separate `svy: proportion` commands for each subgroup using the `subpop()` option, as shown below for the subgroup of visits by non-Hispanic black patients aged ≥ 65 years:

```
. svy, subpop(if race==2 & agegrp==3): proportion chfs
(running proportion on estimation sample)
Survey: Proportion estimation
Number of strata =      48      Number of obs    =       44,187
Number of PSUs   =   2,110      Population size =  865,760,060
                                Subpop. no. obs =           905
                                Subpop. size    =   19,157,851
                                Design df       =        2,062
```

	Proportion	Linearized Std. Err.	Logit [95% Conf.	Interval]
chfs				
Yes	.0447492	.0102216	.028475	.0696576
No	.9552508	.0102216	.9303424	.971525

```
Note: 2 strata omitted because they contain no subpopulation
      members.
. kg_nchs

Korn-Graubard 95% Confidence Intervals (modified for complex surveys from
 Clopper-Pearson method), as used with National Center for Health Statistics´
 Data Presentation Standards for Proportions
```

Proportion p	(1-p)	95% CI(p) Lower	Upper	n*	CI Width Abs	Rel(p)	Rel(1-p)	NCHS Std Flags A	B	C
0.0447	0.9553	0.0269	0.0695	409.75	0.0426	95.3023	4.4645	1	0	1
0.9553	0.0447	0.9305	0.9731	409.75	0.0426	4.4645	95.3023	1	0	1

```
Degrees of freedom=   2,062

(Abbreviations: CI, confidence interval; NCHS Std, National Center for Health
                Statistics Standards; p, proportion; (1-p), complementary
                proportion; n*, effective sample size adjusted for degrees of
                freedom; Abs, absolute width; Rel, relative width)

NCHS Std Flags Key (0=No, 1=Yes)
   A: Proportion (p) meets all presentation standards, and is considered
      reliable
   B: Proportion (p) flagged for statistical review
   C: Complementary proportion (1-p) meets all presentation standards, and is
      considered reliable
```

For visits by non-Hispanic black patients with congestive heart failure, the age group $\geq$ 65 years has a different number for DF (that is, 2,062) than the original example if `kg_nchs` was allowed to follow an `svy: proportion` command with the `over()` option (that is, 2,128). This restriction prevents the miscalculation of the DF-adjusted effective sample size and allows for an accurate assessment of the NCHS standards.

5 Conclusion

The kg_nchs postestimation command produces the Korn–Graubard CI and a series of related statistics that are needed to determine if a proportion is considered reliable per NCHS presentation standards (Parker et al. 2017). It also displays three dichotomous flags that prevent the need for manual comparison of these results to the conditions that compose these standards. Thus, using kg_nchs with svy: proportion is an easy and efficient method that allows Stata users to accurately determine if a proportion meets the NCHS Data Presentation Standards for Proportions. While this command was developed for use with NCHS data, it can also be used with any dataset that stems from a survey with a complex sample design.

6 Acknowledgments

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7 Programs and supplemental materials

To install a snapshot of the corresponding software files as they existed at the time of publication of this article, type

```
. net sj 19-3
. net install st0564     (to install program files, if available)
. net get st0564         (to install ancillary files, if available)
```

8 References

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