Rounding Methods in Different Software

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R rounds numbers slightly differently to the traditional method used in SPSS. Rounding is an important and widely used method of disclosure control and it is important that there is a clear understanding of R's rounding method.

SPSS rounds numbers using the traditional method of “rounding half away from zero”, where values of .5 are rounded up to the nearest integer. However, R uses a “round half to even” method for rounding. For example, 1.5 and 2.5 would both be rounded to 2 when using R. While this is less common than the method used in SPSS, this is still a valid rounding technique and is accepted amongst the mathematical community. The idea behind this method is that it eliminates bias away from zero, as numbers are evenly split for rounding up or down, rather than .5 always being rounded up. Python also uses a “round half to even” method.

R's inbuilt round function is illustrated below.

```r
round(1.5, 0)
## [1] 2
round(2.5, 0)
## [1] 2
round(3.5, 0)
## [1] 4
```

Analysts in ISD often have to round numbers to a smaller number of decimal places. For example, if you had a percentage of people seen within 4 hours in Emergency Departments at 90.25%, this would be rounded down to 90.2% using R, when this would normally be expected to round up to 90.3%. As a result, the output would be slightly lower than what would be expected.

```r
round(90.25, 1)
## [1] 90.2
```

The R package “janitor” contains a round_half_up() function which replicates the “round half away from zero” method. This function allows you to enter a value and a specified number of decimal places to round to using “round half away from zero”.

```r
library(janitor)
round_half_up(1.5, 0)
## [1] 2
round_half_up(2.5, 0)
## [1] 3
```
As you can see, the `round_half_up` function works in the traditional method that most of us are used to.

It is strongly advised that the `round_half_up` function should be used in all analysis.