WHO Reference 2007
SPSS macro package

The package WHO2007_SPSS.zip contains the following items:

1. The syntax file **who2007.sps**

2. Three permanent (read-only) SPSS data sets containing the WHO 2007 reference: **bfawho2007.sav, hfawho2007.sav, wfawho2007.sav**

3. The file **readme_spss.pdf**

4. An example data set, **sample_who2007.sav**

5. The example syntax file, **sample_who2007.sps**

6. The example output file **sample_who2007.txt**

Contact for reporting bugs/ comments:
Should you encounter any problems with this macro, please send an e-mail with a clear description of the identified problem to "who_anthro@who.int , specifying in the subject line that it concerns the *WHO2007_SPSS* package - also indicate which version of SPSS you are using. Thank you.

Reference

de Onis, M, Onyango, A, Borghi, E, Siyam, A, Nishida, C, Siekmann, J. Development of a WHO growth reference for school-aged children and adolescents. Bulletin of the World Health Organization 2007; 85: 661-668.

Syntax file functions

1. The SPSS syntax file (who2007.sps) calculates z-scores for the three anthropometric indicators, weight-for-age, height-for-age body mass index (BMI)-for-age, based on the WHO reference 2007. It is designed to calculate statistics for children age 5-19 years (5-9 years for weight-for-age). This syntax file was written to handle any SPSS file that has values for at least age, weight, height, and sex.

2. The syntax file flags any extreme (i.e. biologically implausible) z-scores for each indicator. The extreme z-scores are defined as follows:

Weight-for-age z-score (ZWAZ)	ZWAZ<-6 or ZWAZ >5
Height-for-age z-score (ZHAZ)	ZHAZ<-6 or ZHAZ >6
BMI-for-age z-score (ZBMI)	ZBMI <-5 or ZBMI >5

3. The syntax file produces sex- and age-specific estimates for the prevalence of under/over nutrition and summary statistics (mean and SD) of the z-scores for each indicator, and if requested, stratified analysis by group such as urban/rural or regions.

The first part of the output is in cross tabulation form, which some people prefer. The second part of the output uses REPORT format for the prevalences. Both give similar results, but they may not match exactly. This is because SPSS crosstabs, particularly in the earlier versions, rounds to the nearest whole N on weighted crosstabs. The REPORT statistics at the end do not round to the nearest whole N on weighted samples.

Syntax file requirements
Users should have good and reasonable knowledge of SPSS programming to run the syntax file properly; in addition, the following requirements must be met:

1. The Syntax file has been written to run in SPSS Version 6.0 or higher.

2. The Syntax file requires three permanent SPSS data sets containing the WHO Reference 2007:

Standards SPSS names	
Weight-for-age	**wfawho2007.sav**
Height-for-age	**hfawho2007.sav**
BMI-for-age	**bfawho2007.sav**

These files must be stored in the working directory, which is currently set to **D:\who2007** by the program. This is also where the input dataset (*filename.sav*) is expected to be copied to. The location can easily be changed by the user, but if so, be sure to do multiple searches and replaces for **D:\who2007** so that all occurrences are captured.

3. The syntax file requires a SPSS data set containing at least the variables: sex, age, weight and height. Ideally the file could be stored in the same directory **D:\who2007** or alternatively a user-defined working directory (referred to in the syntax file as **D:\user**); the detailed requirements for its input variables are specified in the **Syntax File Parameters** section.

4. Avoid any variable names starting with underscore "_" or "$" in the input SPSS data set; they may conflict with SPSS system variables.

Syntax file outputs
The syntax file creates a new file based on the input file. It is recommended to save this file under a different name. This data set comprises the key variables needed and the computed variables. The main variables and their labels are listed below in case you need to do any debugging of the program.

Variable name	Variable label
Casenum	case number
Wgting	weighting of sample, set to 1 if not needed
sex	1 is male, 2 is female
agemos	age in months
ageclass	age in years
weight2	child's weight in kg
height	height of the child in cm
oedema	Indicator variable ("n" or "y", default = "n")
region	country region
urbanr	urban or rural
bmi	Computed BMI
zhaz	Height-for-age z-score
zwaz	Weight-for-age z-score
zbmi	BMI-for-age z-score
wazflag	Flag for zwaz<-6 or zwaz>5
hazflag	Flag for zhaz<-6 or zhaz>6
bmiflag	Flag for zbmi<-5 or zbmi>5

Syntax file parameters:
The Syntax file requires **5 parameters** that should be specified:

sex: to specify the name of a variable containing sex information. If it is a numeric variable, its values must be 1 for males and 2 for females. If it is a character variable, e.g. "m" or "M" for males and "f" or "F" for females, an appropriate recode must be made to transform character variables into a numeric **1** and **2**. Users must code its missing value as no entry for either character or numeric variables, in which case no z-scores will be

calculated. If the missing value is something else, such as 0, then you must declare it as missing in the usual fashion: `missing values sex (0).`

weight2: to specify the name of a numeric variable containing body weight information. Body weight must be in kilograms. Users must code the missing value as **no entry,** in which case weight-related z-scores are not calculated.

height: to specify the name of a numeric variable containing height (standing) or length (recumbent) information. Height or length must be in centimeters. Users must code the missing value as **no entry**, in which case height-related z-scores are not calculated.

oedema: to specify the name of the character variable containing oedema information. The values of this variable must be character, i.e. "n" or "N" for non-oedema, and "y" or "Y" for oedema. The current program assumes there is no oedema present in the dataset, so oedema is set to "n". If oedema is present, you must set oedema to the variable that contains those values. Users must code its missing value as **no entry**, and the syntax file assumes missing to be non-oedema.

wgting: to specify the name of a numeric variable containing sampling weight. If "**wgting=1**" for all records, the un-weighted analysis is performed. If not otherwise specified, observations with missing or negative values in sampling weight are excluded from the analysis.

Syntax file setup and run
1. Create a directory, assumed by the syntax file to be **D:\who2007**, where you will place the 3 files containing the reference data, i.e., **bfawho2007.sav, hfawho2007.sav, wfawho2007.sav**.

2. Copy the file **who2007.sps** to this same directory. In older versions of SPSS you may want to set SPSS to open a syntax file at startup. This is done by checking the appropriate box under Edit/Preferences.

3. Copy the file containing the child data into this same directory. In the syntax file, change the name of "*filename.sav*" to the actual name.

4. If needed, edit the syntax file so that the key variables such as weight, sex, age, height, etc. are given the correct variable names as found in the child data file.

5. Open SPSS and run the entire syntax file. It will find the data file and create the proper statistics in the output file, which will appear onscreen as you run it. You must save this output file to whatever name you wish, *filename.lst* for older versions of SPSS and *filename.spo* for newer versions. It will also create new data file, *filename_z.sav*, which will have the key variables from the original file, plus the key computed variables. If you do not wish to have this new file saved, you can simply delete this line near the end:

XSAVE outfile="d:\who2007\filename_z.sav" /keep=casenum, wgting, region,urbanr,

weight2,sex,agemos,height,oedema,ageclass, zbmi,zwaz, zhaz, htagesd, oedzwaz, oedzbmi.

The **Untitled** data file that remains on screen at the end of the run contains all of the variables mentioned above, plus intermediate calculation variables which might be of use to those involved in understanding or debugging the syntax file.

6. The macro creates an SPSS output file that contains the prevalences and z-score summary statistics. In this summary analysis, only children aged between 61 and 228 completed months are included. The age groups in yearly and monthly intervals are shown below:

Age   **Indicator**

Years	Months	Weight	Height	BMI
5	61-71	X	X	X
6	72-83	X	X	X
7	84-95	X	X	X
8	96-107	X	X	X
9	108-119	X	X	X
10	120-131	X*	X	X
11	132-143		X	X
12	144-155		X	X
13	156-167		X	X
14	168-179		X	X
15	180-191		X	X
16	192-203		X	X
17	204-215		X	X
18	216-227		X	X
19	228		X	X

    * For Weight-for-age, age group 10 yrs covers up to age 120 completed months.

Note: To get started, the who2007_SPSS.zip package provides the user with an example data set (sample_who2007.sav), the respective syntax (sample_who2007.sps) and the expected output (sample_who2007.txt).