

## Add Health Wave I Length of Day

Filename: w1lday

### Description

This Add Health dataset contains the number of hours of daylight at each Wave I respondent location on that respondent's survey date. Length of day is derived from the solar declination on a given date and the terrestrial latitude of a given location. All the points at the same latitude on the same calendar date are generally considered to have the same day length.

For reasons of privacy protection and potential deductive disclosure of respondent locations, only geographic latitudes between 28° north and 47° north were allowed. Any respondent locations south of 28° were assigned 28° and any respondent locations north of 47° were assigned 47°. These limits were applied to 991 respondents and ensure that the finest degree to which a respondent location may be reverse calculated is no less than three states. For these 991 respondents, the maximum difference between true length of day and the length of day resulting from obfuscated latitude is +/-30 minutes.

Solar declination is the angle between the rays of the Sun and the plane of Earth's equator—a measure of where the sun's rays are perpendicular to Earth's surface—in degrees north or south of the equator. This varies from approximately 23.45° north in June to 23.45° south in December.

The algorithms used to formulate the full equation used to calculate solar declination for this dataset were obtained from the National Oceanic and Atmospheric Administration at the following Web address: <http://www.srrb.noaa.gov/highlights/sunrise/program.txt>. These formulae were originally published in *Astronomical Algorithms* by Jean Meeus (Willmann-Bell, Inc., Richmond, VA, 1999). The full equation for deriving day length from geographic latitude and solar declination, which was used for the creation of the length of day dataset, may be expressed as:

$$\text{Length of day} = \arccos([\sin(a) - \sin(\phi) \times \sin(\delta)] \div [\cos(\phi) \times \cos(\delta)]) \div 15 \times 2$$

### Variable Listing

Variable Name	Variable Label and Description
W1LD1	DAYLIGHT HOURS ON SURVEY DATE <ul style="list-style-type: none"><li>• Range: 9.0 to 15.8 hours</li><li>• Tenths of an hour</li></ul>

### Wave I - Length of Day Data

Number of observations: 20,745

AID		Char	Respondent identifier NOTE: Smallest 5 and largest 5 values are displayed.
Frequency	Percent	Value	Label
1	0%	10316654	
1	0%	10316952	
1	0%	10506342	
1	0%	10570810	
1	0%	10606128	
20735	100%	Values omitted	Values omitted
1	0%	99886995	
1	0%	99886996	
1	0%	99886997	
1	0%	99886998	
1	0%	99886999	

W1LD1		Num	Daylight hours on survey date NOTE: Smallest 5 and largest 5 values are displayed.
Frequency	Percent	Value	Label
2	0%	9.00	
3	0%	9.20	
16	0%	9.30	
13	0%	9.40	
16	0%	9.50	
20328	98%	9.6-15.3	NOTE: Range of values omitted from display

121	1%	15.40	
115	1%	15.50	
89	0%	15.60	
18	0%	15.70	
24	0%	15.80	