The UC Davis Sleep Lab's study of how sleep need changes across adolescence included a test of how prior time in bed (TIB) affects the waking electroencephalogram. In each year of the three year longitudinal study, participants kept 3 different TIB schedules (7, 8.5, and 10 h) for four consecutive nights. On the day following the fourth night, participants spent a day in the lab for performance and sleepiness testing. Each of 4 test batteries at 0900, 1100, 1300, and 1500 included a Karolinska drowsiness test / alpha attenuation test. EEG from C3/A2, C4/A1, O1/A2, and O2/A2 was recorded while participants seated comfortably at a desk stared at a dot on the wall at eye level for 3 minutes, with eyes closed for 2 minutes, staring at the dot again for 2 minutes, and with eyes closed for 2 additional minutes.

EEG was recorded with Grass Aura amplifiers and digitized at 400 Hz. EEG data in 5 second epochs was analyzed with fast Fourier transform with the following parameters: 2.56 second Welch tapered windows with 1.31 seconds of overlap, yielding 4 windows per 5 second epoch and a resolution of 0.391 Hz. Epochs that included the transition from eyes open to closed were excluded from analysis. Epochs containing artifacts were automatically detected with a computer program and were excluded from analysis. Power was averaged across all artifact free epochs separately for eyes open and eyes closed for each of the 4 recordings across the day. If a recording had fewer than 30 seconds of artifact free data, the data from that recording were omitted from the data pool. For example, for subject 301, year 3, 10h TIB, channel O2/A1, the eyes open recording at 1100 had 6 artifact free epochs and is included in the data pool, but the eyes closed recording had fewer than 6 artifact free epochs and has been omitted.

In the accompanying file, Feinberg_AdolescentSleepNeed_wakingEEG_Y123.csv, the codes that the lab uses to identify subjects have been replaced with random numbers unique to each subject; birth dates and recording dates have been removed. The only remaining indirect identifiers are sex and age. This CSV file contains processed data, i.e. FFT analysis results. The raw EEG recordings are large, ~300 GB total, contain subject names, and are not easily anonymized. In approximately 4 years when the second phase of the study is completed, all identifiers will be removed, and the daytime EEG files along with the sleep EEG files will be archived at the National Database for Autism Research.

The dimensions of the file Feinberg_AdolescentSleepNeed_wakingEEG_Y123.csv are 79 columns by 18734 rows. The following describes each column of data:

Subject: randomly generated unique subject number
Condition: code that identifies TIB duration and year of study.
S = 7h TIB, M = 8.5h TIB, L = 10h TIB
C = year 1, F = year 2, I = year 3.
Channel: EEG recording electrode location
Time: time of day, 0900, 1100, 1300, 1500
Eyes: O = open, C = closed
Nepochs: number of artifact free 5 second epochs
TIB: time in bed

Sex: F, M
TIBc: centered time in bed = TIB – 7
TIBcm: time in bed centered at mean = TIB – 8.5
Agec: centered age = age – 10
Age: participant's age at first recording of the year. Note that is the same for all 3 TIB conditions.
Year: year of study
Dump: 1 = exclude because participant failed to keep TIB schedule
Agecm: age centered at mean = age – 13.3
Boy: male = 1, female = 0
Minutes: duration of artifact free EEG, = nepochs/12
DeltaPWR: average power in the 0.98-4.10 Hz frequency band
ThetaPWR: average power in the 4.10-8.01 Hz frequency band
AlphaPWR: average power in the 8.01-11.91 Hz frequency band
LoBetaPWR: average power in the 11.91-16.99 Hz frequency band
HiBetaPWR: average power in the 16.99-29.88 Hz frequency band
PWR02 to PWR53: average power in narrow frequency bands. For band details, see the file 53band.csv.
logdelta: natural log of DeltaPWR
logtheta: natural log of ThetaPWR
logalpha: natural log of alphaPWR
logLoBeta: natural log of LoBetaPWR
LogHiBeta: natural log of HIBetaPWR