Using Accelerometers in Active Living Research:
Practical Issues in Collecting and Managing Data (Beginner Level)

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NIH Studies

Study	Aims	PI	Population	N	Mode of delivery	Actigraph model
NQLS 2001-2007	Walkability & PA	Jim Sallis	Adults, 20-65	2000	Mail	7164 and 71256
NQLS-S 2004-2009	Walkability & PA, Physical Functioning	Abby King	Seniors, 66+	900	Mail	7164 and 71256
NIK 2005-2010	Walkability/ Rec/Food Environment & BMI, PA, Diet	Brian Saelens	Children, 5-11	800	In-person & mail	GT1M
TEAN 2007-2011	Walkability, Rec/Food Env & PA, Diet	Jim Sallis	Teens, 12-16	850	Mail	7164, 71256, GT1M & GT3X
IPEN 2009-2013	Walkability & PA in numerous countries	Jim Sallis	Adults, 18-65	3000+	In-person & mail	7164, 71256, GT1M & GT3X

Format of workshop

- Presentation
  - A. Pre-data Collection
  - B. Boosting Compliance
  - C. Data Screening & MeterPlus
  - D. Decisions about Cleaning, Compliance & Cutpoints
- Breakout

  Goals:
  1. ask more in-depth questions
  2. learn from others experience & approaches
  3. try MeterPlus with your own files

Learning Objectives

A. Pre-data Collection

1. How to plan and budget for data collection
2. Benefits of having a good tracking database

B. Boosting Compliance

1. Tips for in-person & mail delivery & retrieval
2. Tips to increase compliance
3. Prompting protocols – how to get devices back

Learning Objectives

C. Data Screening & MeterPlus

1. Why it's important to screen data
2. What 'valid' vs 'invalid' data look like
3. MeterPlus demonstration

D. Decisions about Cleaning, Compliance & Cutpoints

1. What cleaning & compliance decisions need to be made
2. What cutpoints are out there and will this choice affect my outcomes

Pre-data Collection

Carrie Geremia

7164

GT1M / GT3X

Data Decisions

- 1. How long will you ask participants to wear the Actigraph?
- 2. When will you ask them to wear the Actigraph (e.g., waking time only, only when in town, all day and night)?
- 3. Will you ask participants to complete a log of when they put the unit on and take it off? Any other daily assignments?
- 4. Will you ask participants to re-wear the Actigraph if not enough good data are collected the first time?
- 5. What will be enough wearing time to be considered compliant and therefore not asked to do a re-wear?

Data Decisions, cont.

- 6. How will you define a valid hour?
- 7. How will you define a valid day?
- 8. Will you have different valid wear time criteria for weekday vs. weekend?
- 9. What software will you use to screen and score your Actigraph data?
- 10. Will you collect any additional data streams (e.g., step counts)? How will you process it/use it?

11. What epoch will you use?

- Activity in kids is intermittent so shorter epoch length will capture short bursts of activity and categorize them appropriately
- Longer epoch dilutes vigorous activity
- In use: 2, 5, 10, 15, 30, 60 seconds
- Enough memory in new models to use short epochs

How much memory?

15 second epoch	Days of data collection with Activity-only	Days of data collection with Activity+Steps (or 2 selections in GT3X)	Days of data collection with Activity+Dual+ Steps (or 3 selections in GT3X)	Days of data collection with 4 selections in GT3X
GT1M	85	42	28	NA
GT3X	358	179	119	89

- Battery runs out before memory.
- GT1M has about 14 days and GT3X has about 20 days (15 in tri-axial mode)

Budgeting for Data Collection

Staff	Part time equipment manager (at least 20 hours/week), for 30-50 meters/week; additional recruitment/participant management staff
Actigraphs	# days of data collection/ [return time + in-office time] = X X * [loss rate] = Y X-Y = the number of time the unit can go out in one year (Z) Number of participants to measure/Z = desired inventory to meet your measurement goals

Example: Assuming a 1 year data collection period, 30-day average return time, 5 day in-office time, 4% loss rate with a target of 100 participants to measure, it would be determined that 10 Actigraphs are needed.

Equipment

- Actigraphs
  - Label
  - Inventory

- Belts, clips
  - Where to purchase
  - Different sizes

- Calibrator

older models only

Delivery

- Online USPS
- Priority Mail http://www.usps.com/shipping/prioritymail.htm
- Tracking
- Cost
- Materials

Click-N-Ship(R) Notification - Windows Internet Explorer provided by Yahoo!

https://webmail.foundation.sdsu.edu/Projects/Erin.Merz/Inbox/TEAN%20Mailing/Click-N-Ship(R)%20Notification-242.EML?Cmd=open

Reply | Reply to all | Forward | Help

From: USPS_Shipping_Services@usps.com [USPS_Shipping_Services@usps.com]
Sent: Sat 2/7/2009 2:46 PM
To: Erin Merz
Cc:
Subject: Click-N-Ship(R) Notification
Attachments:

**** This is a post-only message. Please do not respond. ****

Dear TEAN STUDY,

This ship notification is being sent to you by the U.S. Postal Service at the request of PARTICIPANT X . If the "Shipped To" address information is not correct, please contact the Shipper.

A package with a Click-N-Ship label created on usps.com containing the following information is scheduled to be shipped on 02/10/2009.

From:	Shipped to:
PARTICIPANT X 555 MAIN STREET SAN DIEGO CA 92103-3138	TEAN STUDY ATTN: ERIN 3900 5TH AVE STE 300 SAN DIEGO CA 92103-3138

Type of Service: Delivery Confirmation™
Label Number: 0103 8555 7495 4018 2249

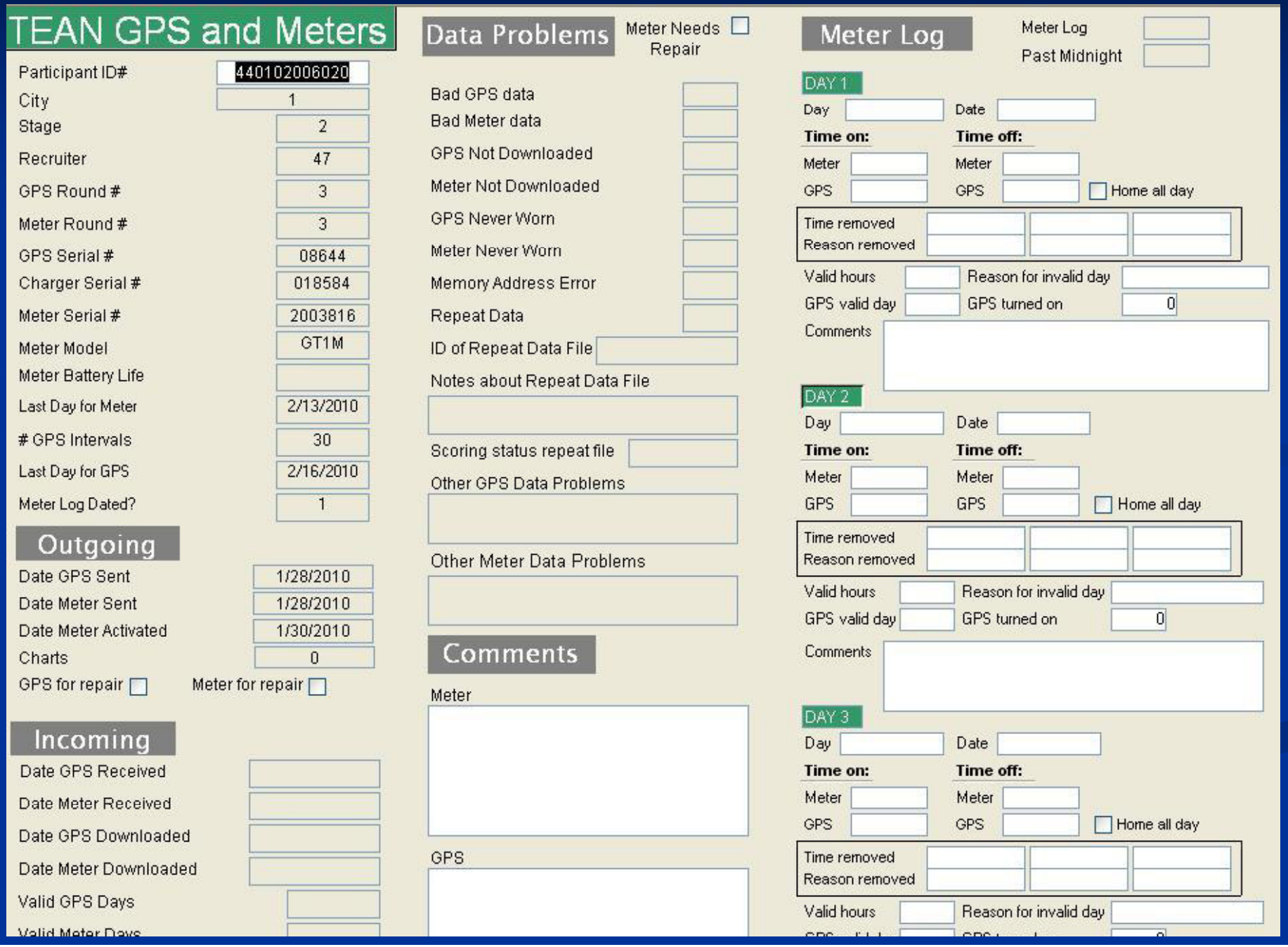
To check on the delivery status of your package, please go to Track and Confirm at www.usps.com.

Done | Unknown Zone (Mixed) | 100%

Tracking

- Access database
- Each wearing is a record
- Track by serial number and participant
- Queries
  - Length of time out
  - Problem units
  - Compliance
  - Outstanding units

Access Database



Questions?

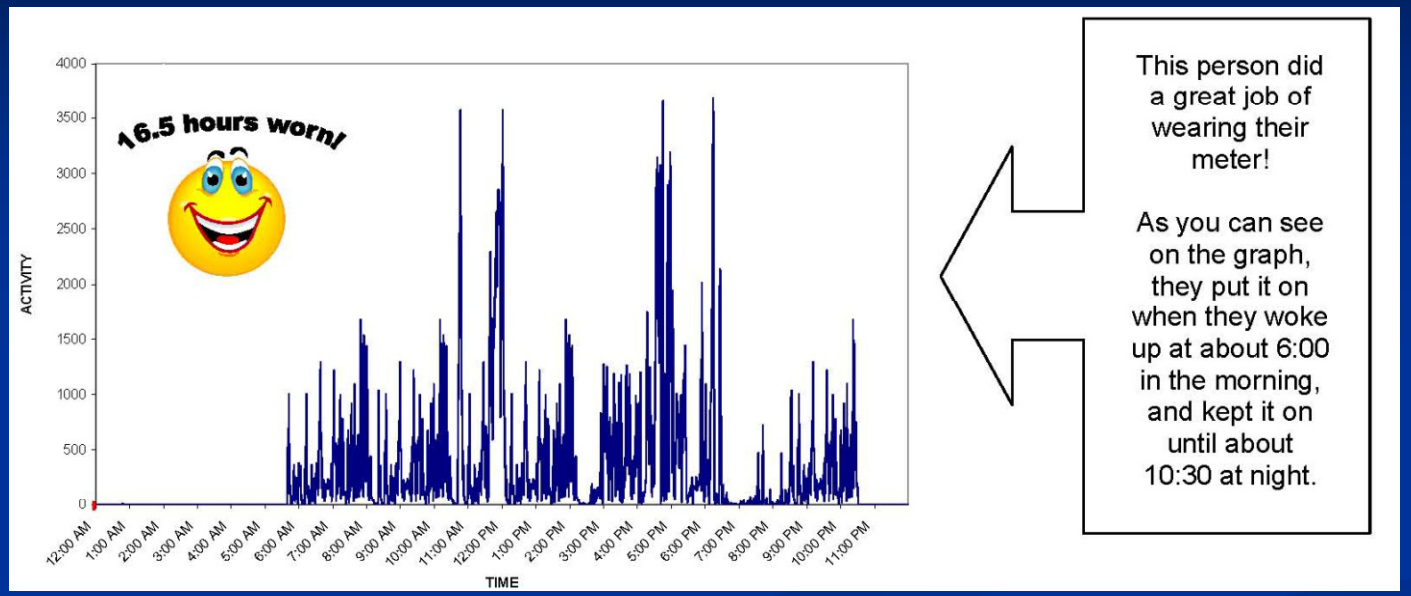
Boosting Compliance

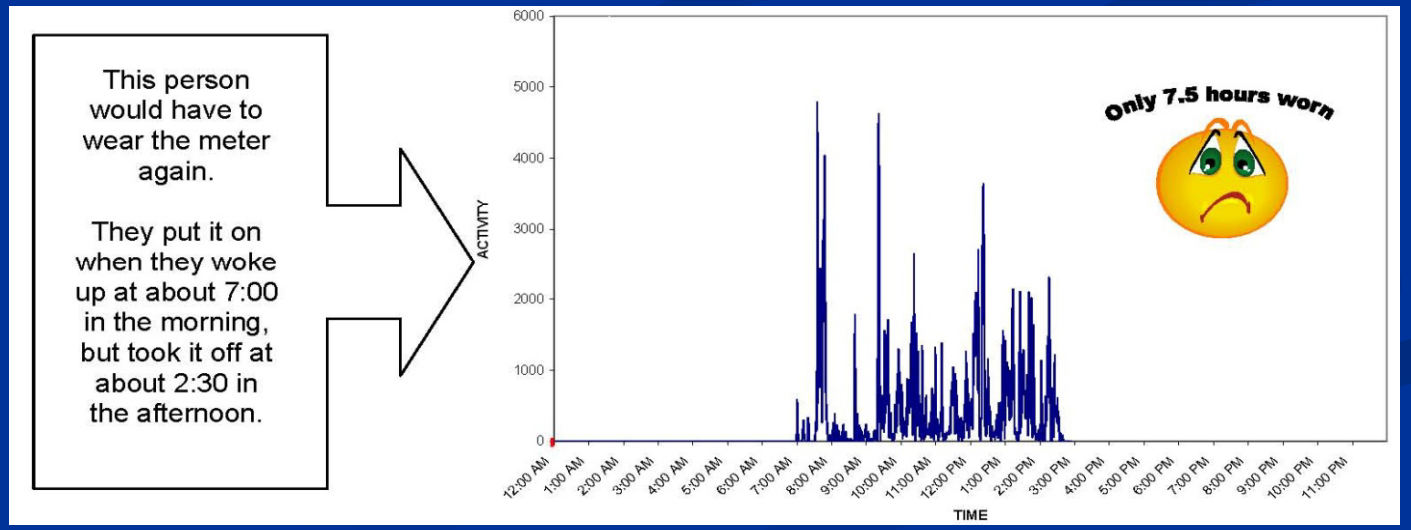
Rates

Study	Valid Wearing Time Guidelines	Compliance	Return Time (median)	Equipment Loss Rate
Seniors	5 valid days, <45 minutes of consecutive "0" counts per hour	90%	20 days	0.7%
Adults	5 valid days, <30 minutes	88%	20 days	2.6%
Teens	5 valid days (1 weekend), <30 minutes	71%	23 days	1.8%
Children	6 valid days (1 weekend), <20 minutes	74%	19 days	1.6%

Wearing Instructions

- Delivery one day early, preferably near the weekend
- Show how to wear
- Stress how long to wear (see charts)
- Will ask to re-wear





Meter Instructions

- How to wear meter
- Increase valid wearing time expectations
- Providing an end date

How to Wear the Activity Meter

This small activity meter records general movement and allows us to get a better idea of your overall activity level. We will **not** be able to tell what kind of specific activity is happening. At first, the belt may feel slightly awkward, but after a few hours, you will probably get used to it and not notice it as much. It is **extremely** important for our study that you wear the meter properly. If it is not worn properly, we may have to send it back for you to wear again. Please follow these instructions carefully:

- Wear the meter attached to the belt around your waist, just above your **right** hipbone. You can wear it either underneath or on top of your clothing.
- Wear the meter so that the star sticker is facing **up.**

- Wear the meter **snug** against your body. If you have to, you can adjust the belt by pulling the end of the strap to make it tighter. Or, to loosen the belt, push more of the strap through the loop. **Wear the belt tight enough so that the meter does not move when you are being active.**
- Please **put it on first thing in the morning --** either just after you get out of bed or just after you shower or take a bath in the morning.
- **Do not submerge the meter in water** (swimming, bathing, etc.)
- Keep the activity meter on all day (unless swimming or in the water).
- At night, **take it off right before you go to bed. You should be wearing the meter for *at least* 12 hours each day.**
- Do not let anyone else wear it.

- **The meter has a very short battery life.**
- **The last full day that it will work is _____. If you cannot begin wearing it by _____, please call 1-877-440-4832 as soon as possible!**

There is no "ON" or "OFF" switch that you need to worry about turning on or off every day. The activity meter runs on a battery and is programmed to run continuously without you needing to turn it on. Please do not try to open the activity meter.

Log/Journal

Meter and GPS Log

Wear the movement meter and GPS for seven (7) days in a row, including weekends. In the spaces below, write down the dates, days and times which you wear them. If you take the devices off for more than 30 minutes, such as for swimming, record when they were removed and for what reason. If you are unable to wear the meter for *at least* 12 hours one day, please wear it one extra day. Thank you!

Please start wearing your meter on or before _____.
The last full day that your meter will work is _____!

Day 1

(Circle Day) Mon Tues Wed Thurs Fri Sat Sun Date_____

Time Meter Put On:	am / pm	Time Left Home with GPS:	am / pm *or*
Time Meter Taken Off: :	am / pm		☐ Home All Day
Time removed during the day (e.g. 10:30-11am):	_____	_____	_____
Why removed (e.g. swimming):	_____	_____	_____

Day 2

(Circle Day) Mon Tues Wed Thurs Fri Sat Sun Date_____

Time Meter Put On:	am / pm	Time Left Home with GPS:	am / pm *or*
Time Meter Taken Off: :	am / pm		☐ Home All Day
Time removed during the day (e.g. 10:30-11am):	_____	_____	_____
Why removed (e.g. swimming):	_____	_____	_____

Day 3

(Circle Day) Mon Tues Wed Thurs Fri Sat Sun Date_____

Time Meter Put On:	am / pm	Time Left Home with GPS:	am / pm *or*
Time Meter Taken Off: :	am / pm		☐ Home All Day
Time removed during the day (e.g. 10:30-11am):	_____	_____	_____
Why removed (e.g. swimming):	_____	_____	_____

Day 4

(Circle Day) Mon Tues Wed Thurs Fri Sat Sun Date_____

Time Meter Put On:	am / pm	Time Left Home with GPS:	am / pm *or*

Prompting Material Return

Phone calls

- First calls at the beginning of wearing: to remind of criteria, proper wearing
- Prompt calls weekly

Emails/Text Messages

- Use in combination with phone calls, most effective with adults and teens

Mailings

- Last resort: if phone calls are not successful, begin mailing return materials, reward letter or home visit

DON'T GIVE UP!

Action (MC=meter check-in call; MR=meter reminder call; PC=prompt call)	Length of time before next contact
Make your MC call the day you expect your participant to receive the meter.	Schedule next call for **3 days later.**
Make your MR call to check in again and make sure the participant started wearing the meter.	Schedule next call for **5 days later.**
Make your PC1 call (first prompt call).	Schedule your next call for **1 week later.**
Make your PC2 call.	Schedule your next call for **1 week later.** If local, offer a home pickup.
Make your PC3 call and send an email if possible.	Schedule your next call for **1 week later.**
Make your PC4 call and mail a return envelope (#1).	Schedule your next call for **1 week later.**
Make your PC5 call.	Schedule your next call for **1 week later.**
Make your PC6 call and send an email if possible.	Schedule your next call for **1 week later.**
Make your PC7 call.	Schedule your next call for **1 week later.**
Make your PC8 call and mail another return envelope (#2).	Schedule your next call for **2 weeks later.**
Make your PC9 call.	Schedule your next call for **2 weeks later.**
Make your PC10 call and send an email if possible.	Schedule your next call for **2 weeks later.**
Make your PC11 call.	Schedule your next call for **2 weeks later.**
Make your PC12 call and mail another return envelope.	Schedule your next call for **2 weeks later and continue calling until at least 6 months have passed.**
At this point, the meter has been out for at least 6 months and 3 envelopes have been sent. Consult a supervisor about the next steps.	Continue calling if you have had contact with participant and think continued attempts will help. A reward letter is an option but only if nothing else helps. The reward is usually comparable to the incentive they would have received for completing the study.

Compliance Elements

- Charts/graphs
- Instruction sheets with dates
- Logs/Journals
- Calls/Emails/Texts/ Mailings
- Letter to schools and coaches
- Stickers

Questions?

MeterPlus & Data Screening

Kelli Cain

MeterPlus

- Anyone can use it, no programming skills required
- Windows-based, with user-friendly interface for data screening
- Will batch-process your files
- Works will all models of ActiGraph and all data streams
- C... step counts...
- ...act...
- ...ints
- Ma... parameters for selecting days to sc... points, bouts of activity, time filters, and more…

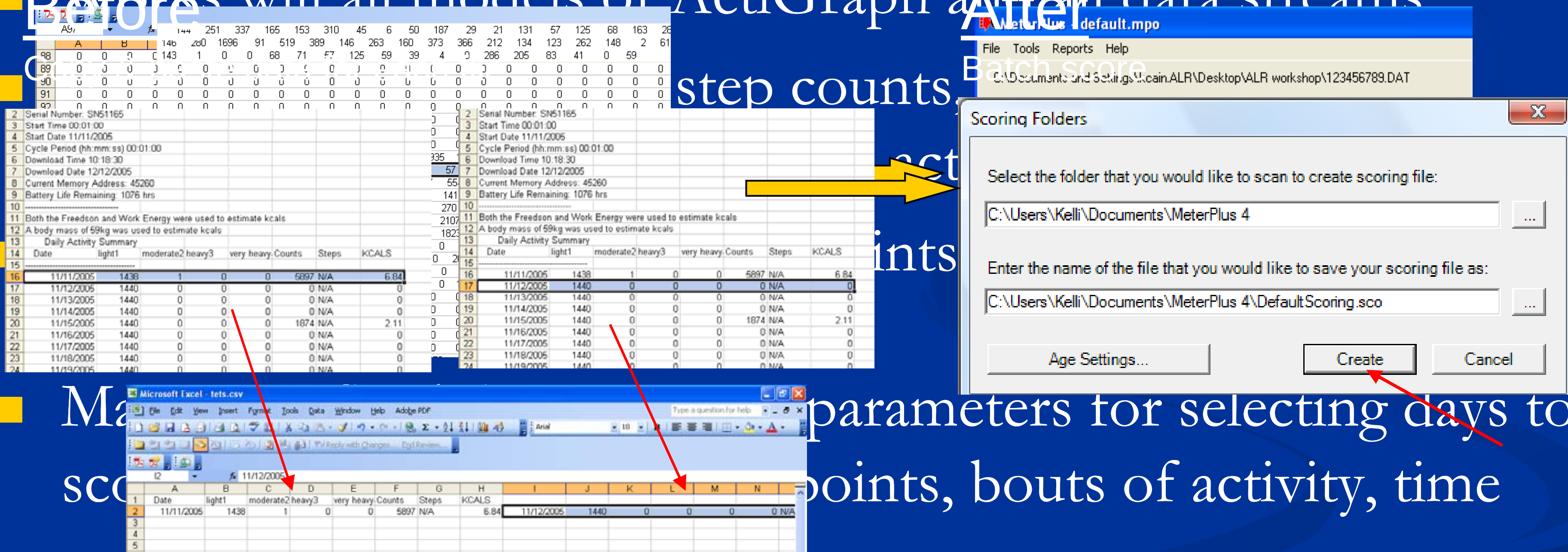
Before — Visual screen for consecutive zeros

After — Automated screen for consecutive zeros

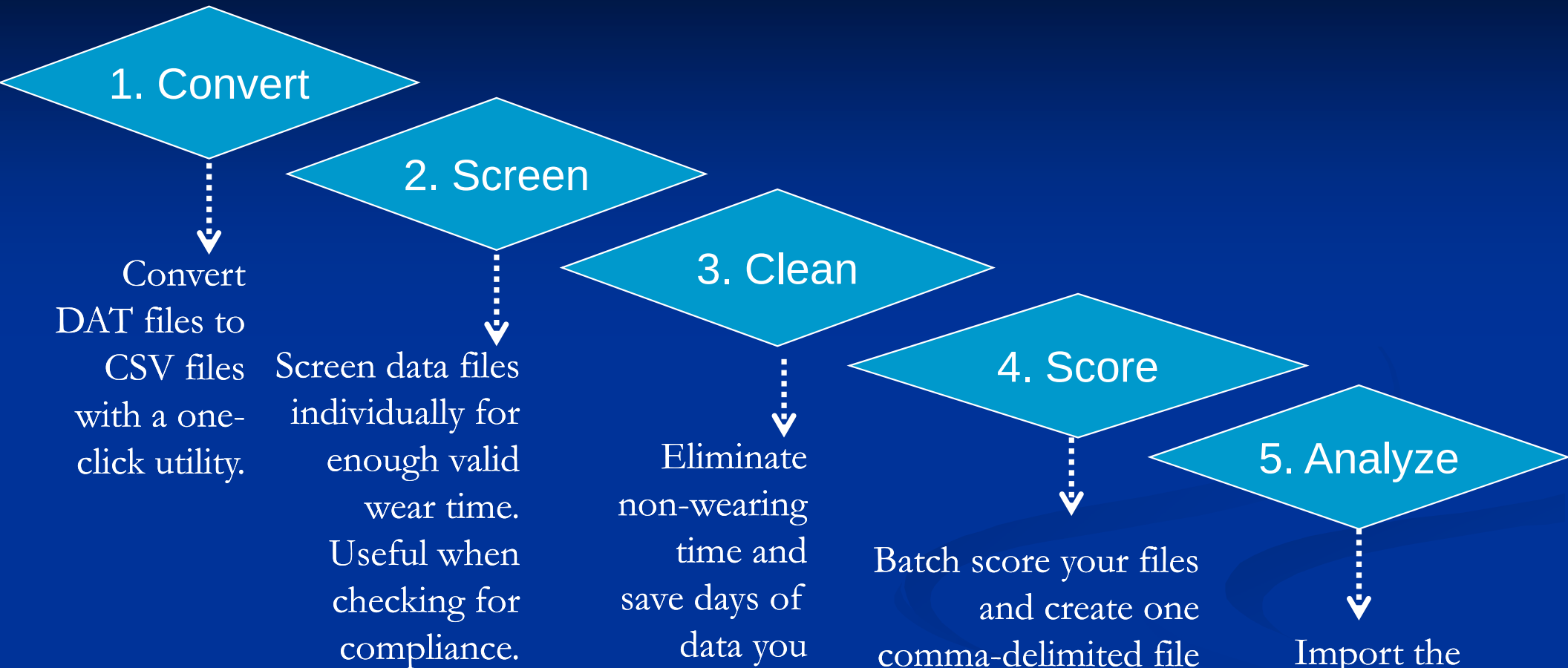
Before

After

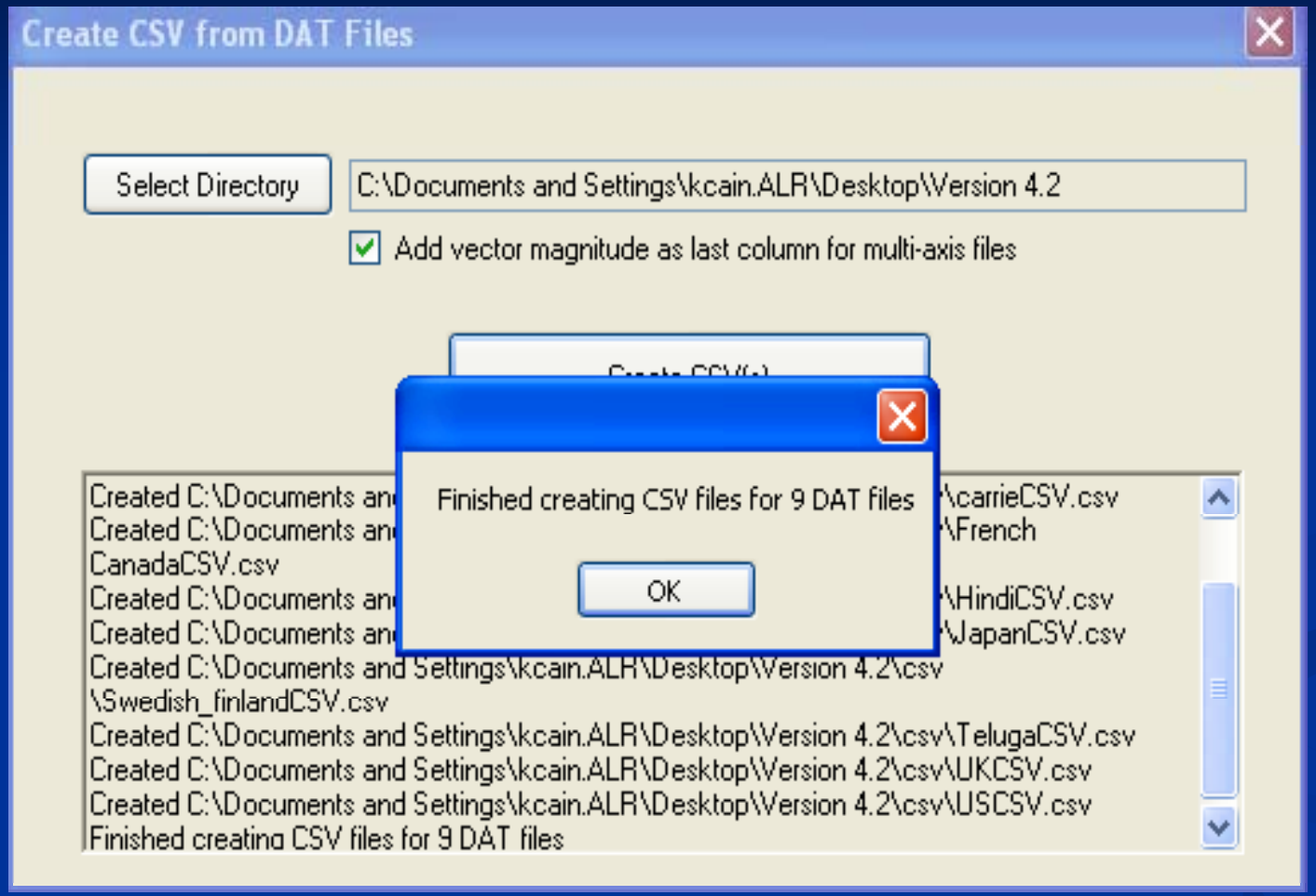
Batch score

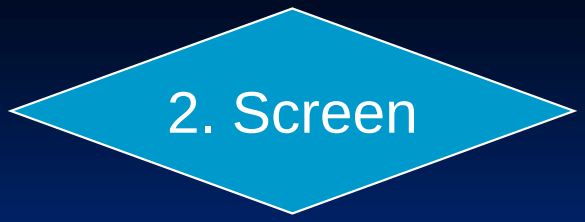


Steps


1. Convert
Convert DAT files to CSV files with a one-click utility.
2. Screen
Screen data files individually for enough valid wear time. Useful when checking for compliance.
3. Clean
Eliminate non-wearing time and save days of data you really want to keep as MPD files.
4. Score
Batch score your files and create one comma-delimited file containing variables for your entire sample.
5. Analyze
Import the comma-delimited file into statistical software and analyze.

Step 1. Convert DAT to CSV

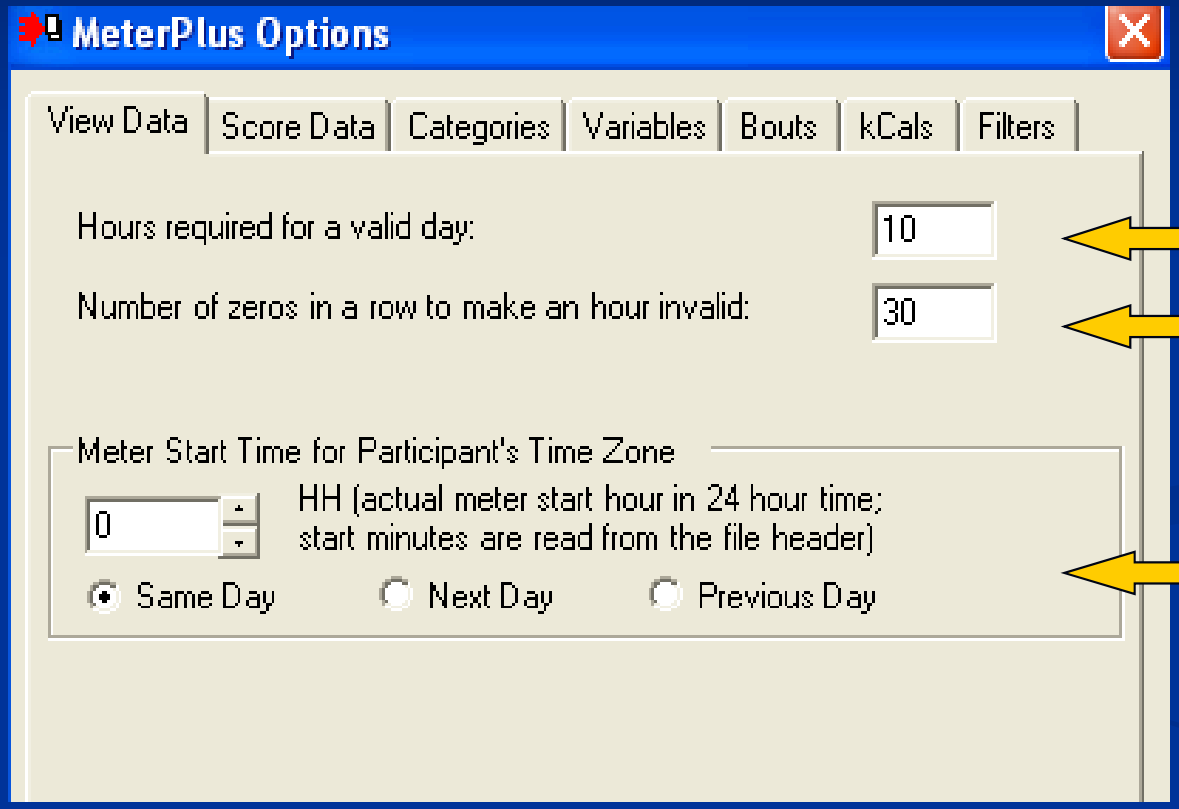




Data screening

- Screen data right away
  - Compliance with first wearing only 70-75% in children & teens. About 95% with additional wearing.
- Looking for valid wear time & malfunction
  - Decide if re-wear is needed
- MeterPlus makes this easy

Screening data



Valid hours

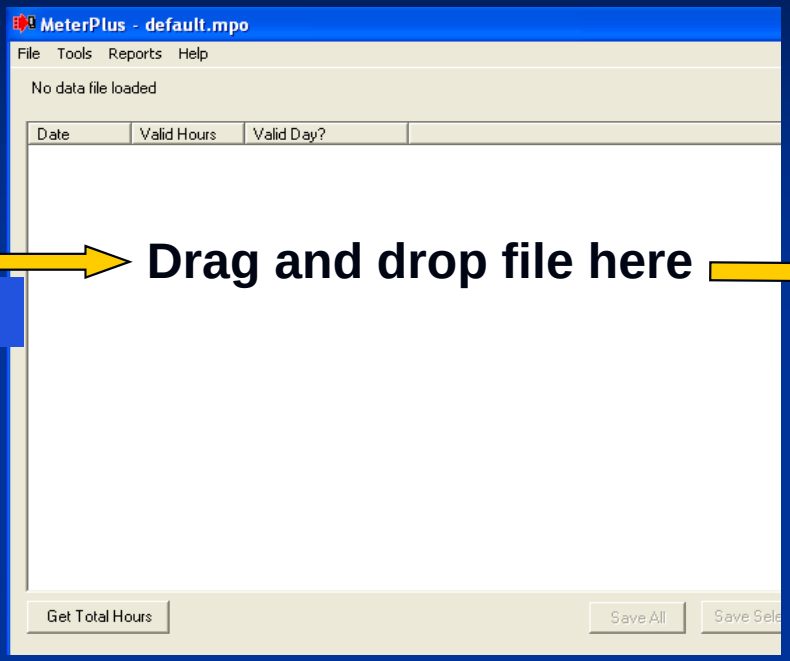
Non-wearing time

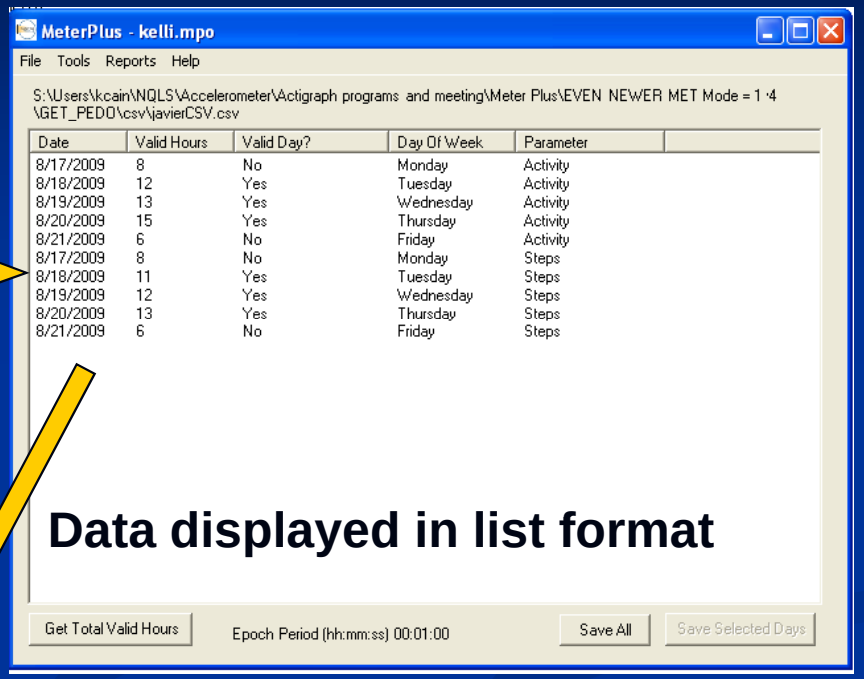
Time zone or start time adjustments

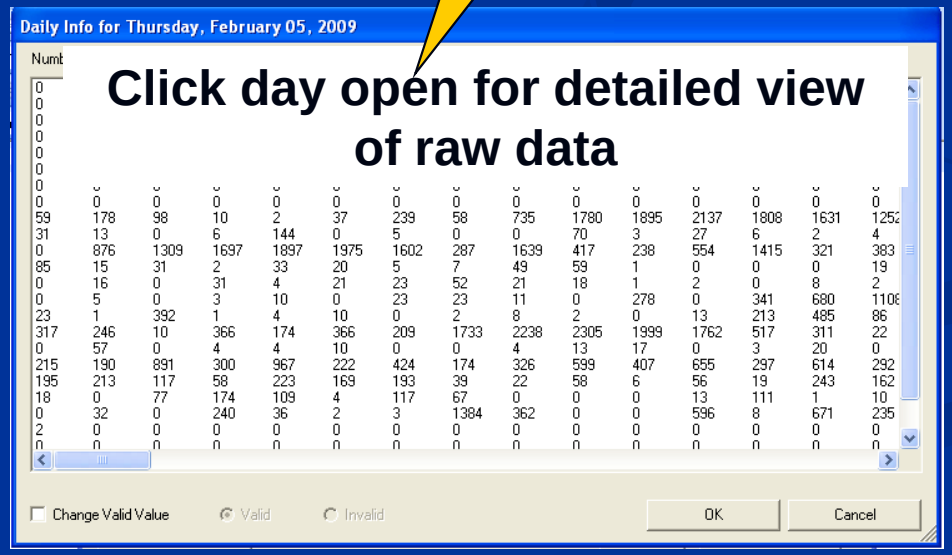
Screening Actigraph files

Raw data file

SN50163.CSV







Examples of data

- Wear time
- Mail days that may look like wear time
- Malfunction/Invalid data
- Repeat data (older models)

Wear time – typical pattern

Daily Info for Thursday, August 22, 2002

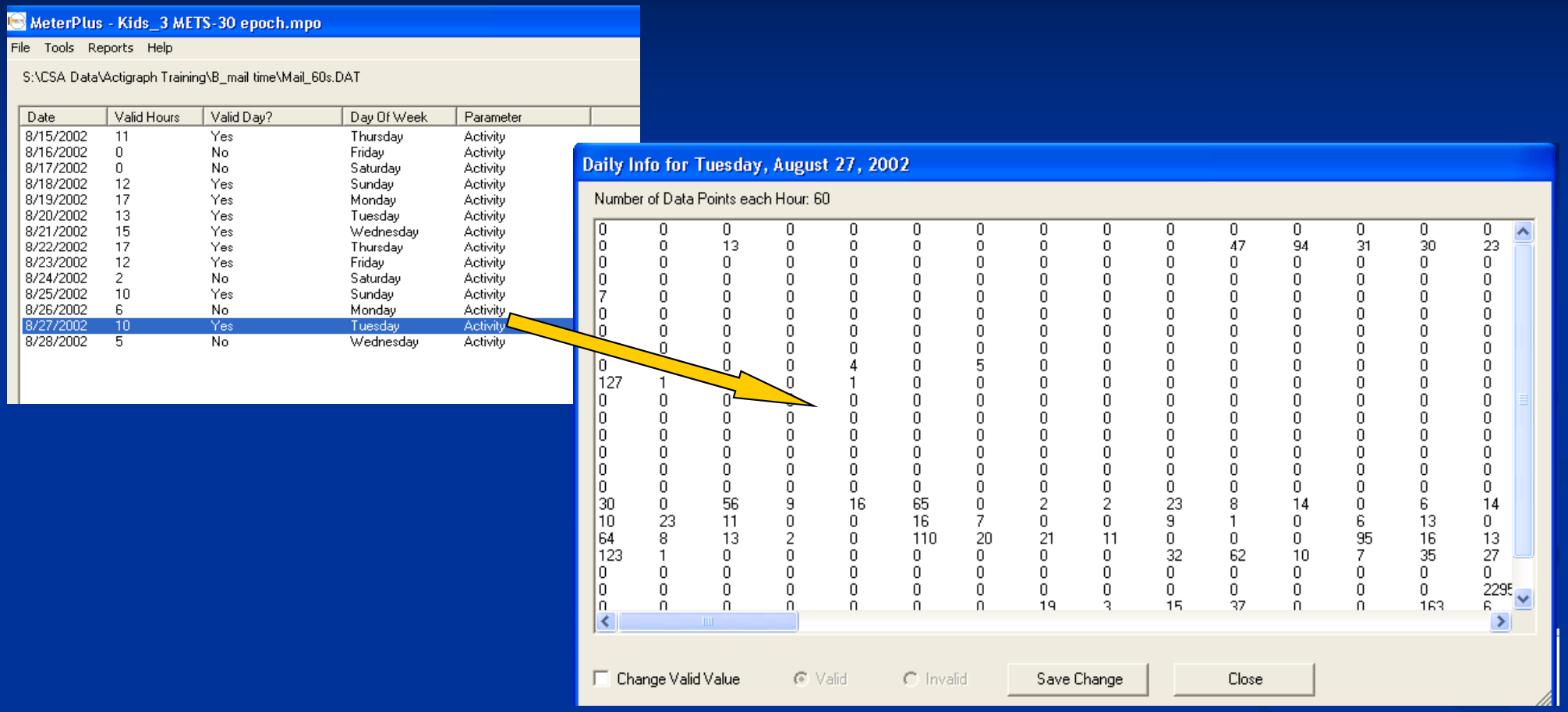
Number of Data Points each Hour: 60

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
198	164	344	148	311	108	207	76	14	86	25	68	127	260	95
20	37	77	211	12	24	0	10	0	4	11	0	0	0	0
6	4	0	5	0	0	8	8	2	0	0	0	0	0	0
87	2	0	195	315	0	11	15	20	19	13	71	49	4	6
5	0	253	1131	951	182	251	6	1480	831	90	11	0	162	269
83	0	280	76	86	194	138	28	150	426	12	513	173	246	39
202	15	195	132	223	382	196	45	101	782	1239	757	1213	3832	704
0	0	0	0	0	0	0	12	423	469	1133	488	392	197	816
894	1063	900	386	760	208	537	90	160	265	1079	558	1332	1090	862
469	873	1338	1963	2133	1079	684	1093	1347	2070	662	334	531	846	1231
768	159	385	1634	1898	2009	539	2076	2167	2225	310	321	3136	2675	616
525	772	639	132	149	125	33	49	99	98	490	638	261	126	34
544	1022	319	239	310	0	15	0	1	26	83	38	0	43	7
0	0	1	4	0	0	0	0	0	0	127	0	0	0	9
0	0	28	2	0	0	1	104	0	0	0	0	0	6	0
0	0	0	0	0	0	236	314	894	584	342	35	419	291	159

☐ Change Valid Value ◉ Valid ○ Invalid

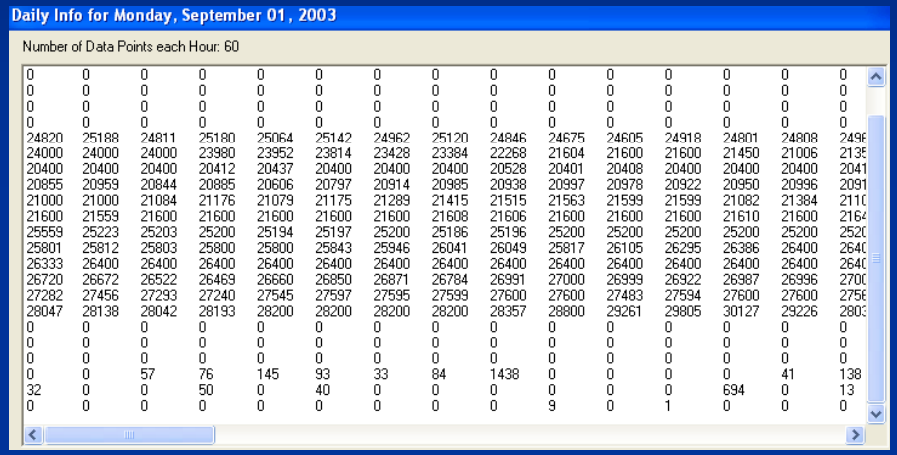
OK Cancel

Mail days

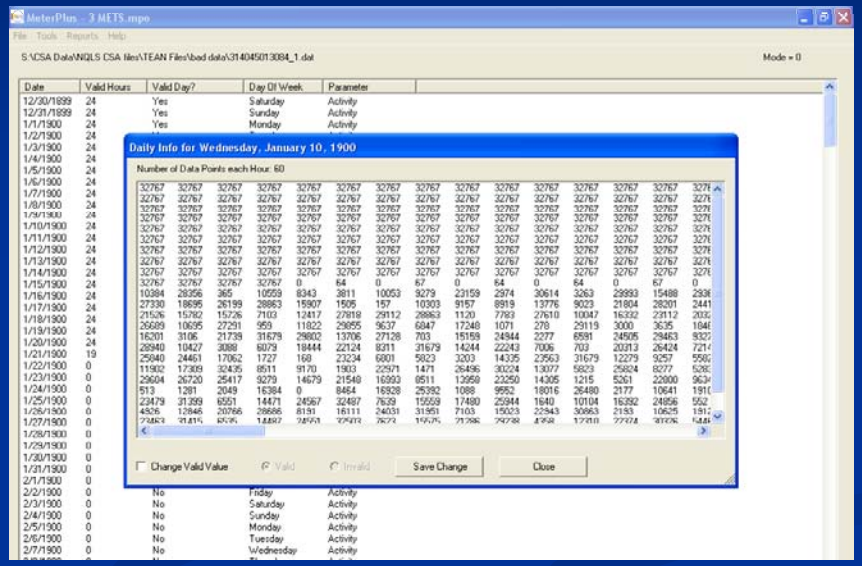

MeterPlus - Kids_3 METS-30 epoch.mpo
File Tools Reports Help
S:\CSA Data\Actigraph Training\B_mail time\Mail_60s.DAT
Date | Valid Hours | Valid Day? | Day Of Week | Parameter
8/15/2002 | 11 | Yes | Thursday | Activity
8/16/2002 | 0 | No | Friday | Activity
8/17/2002 | 0 | No | Saturday | Activity
8/18/2002 | 12 | Yes | Sunday | Activity
8/19/2002 | 17 | Yes | Monday | Activity
8/20/2002 | 13 | Yes | Tuesday | Activity
8/21/2002 | 15 | Yes | Wednesday | Activity
8/22/2002 | 17 | Yes | Thursday | Activity
8/23/2002 | 12 | Yes | Friday | Activity
8/24/2002 | 2 | No | Saturday | Activity
8/25/2002 | 10 | Yes | Sunday | Activity
8/26/2002 | 6 | No | Monday | Activity
8/27/2002 | 10 | Yes | Tuesday | Activity
8/28/2002 | 5 | No | Wednesday | Activity
Daily Info for Tuesday, August 27, 2002
Number of Data Points each Hour: 60
Change Valid Value
Valid
Invalid
Save Change
Close

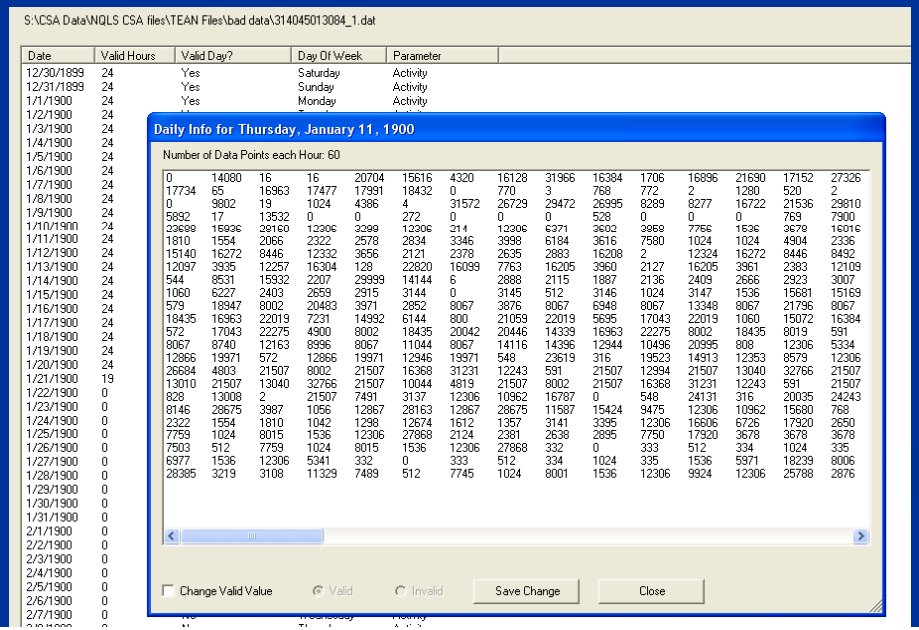
Malfunction – invalid data

Counts >16,000, don't have to fill the entire day.

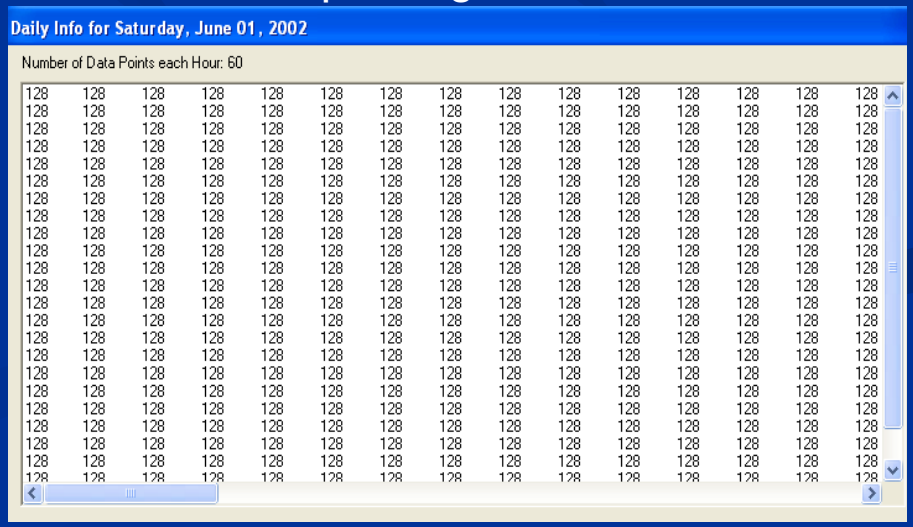


Constant, repeating, often "32767"



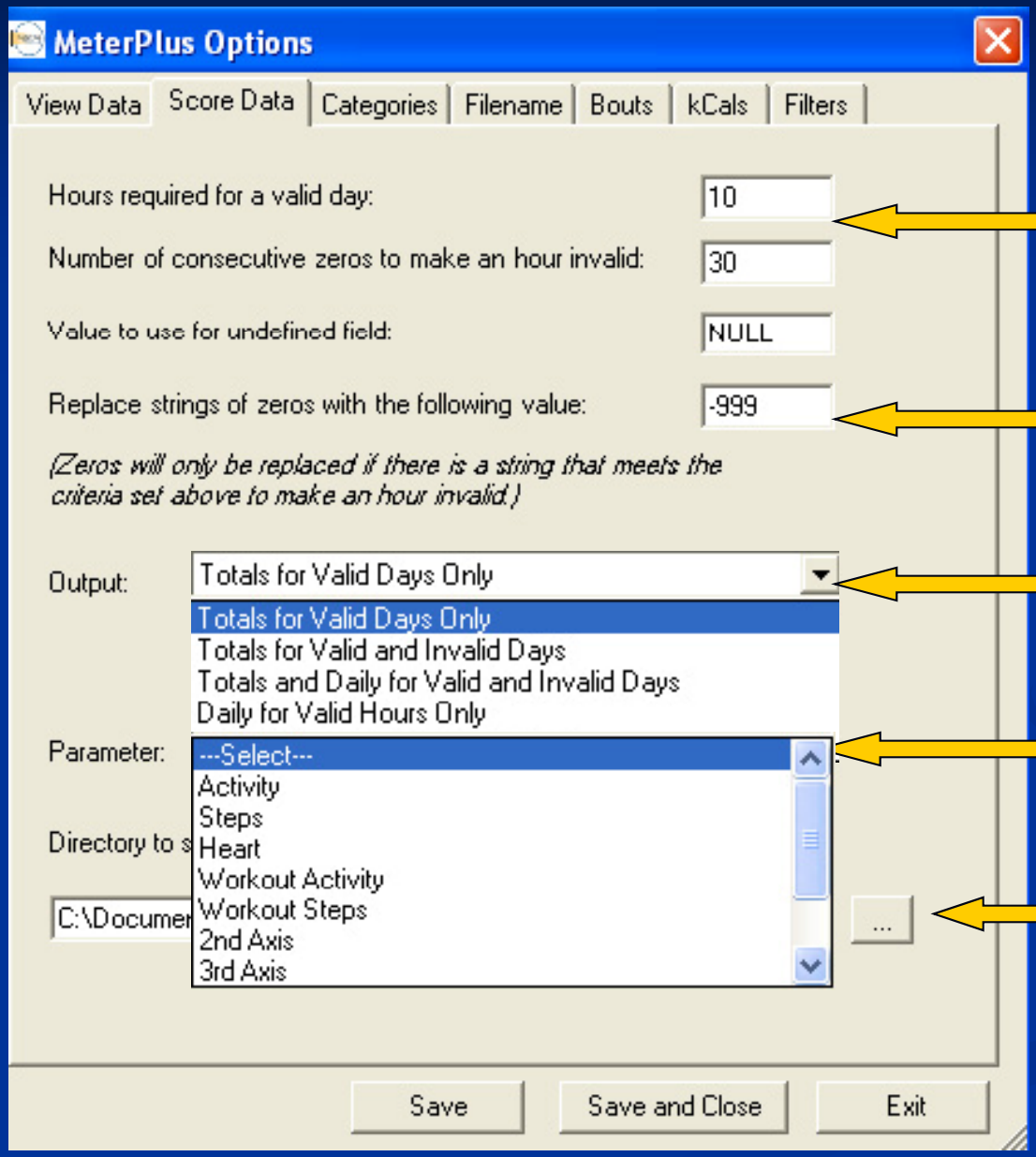


Constant, repeating



3. Clean

Cleaning data



Define wearing time

Code non-wearing time

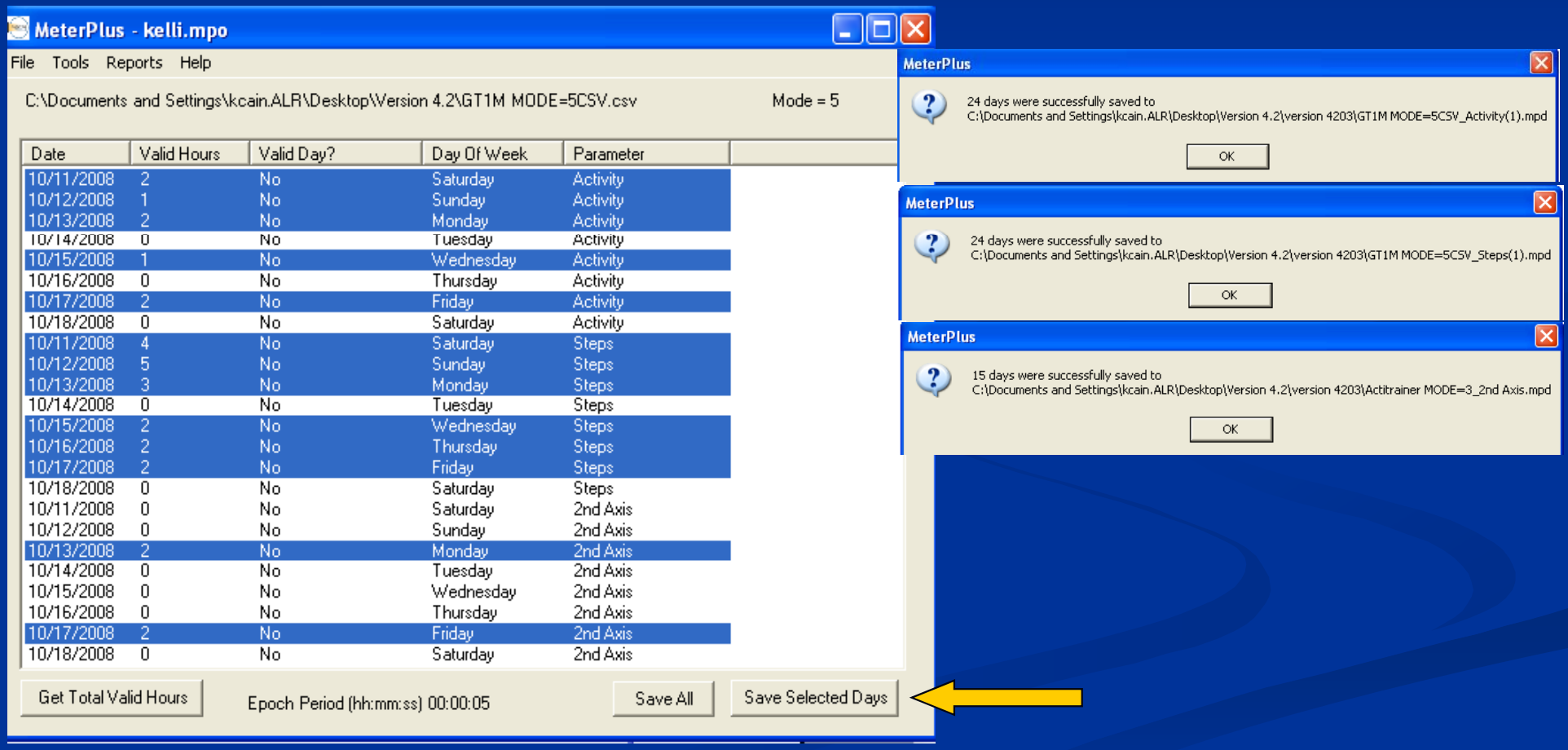
Select level of output

Select the type of data that is batch scored

Browse for location to save cleaned files *(MPD)*

Saving wear time

Select the days to be scored. Days without enough valid wearing time can be excluded from this process so they are not included in the final data set.



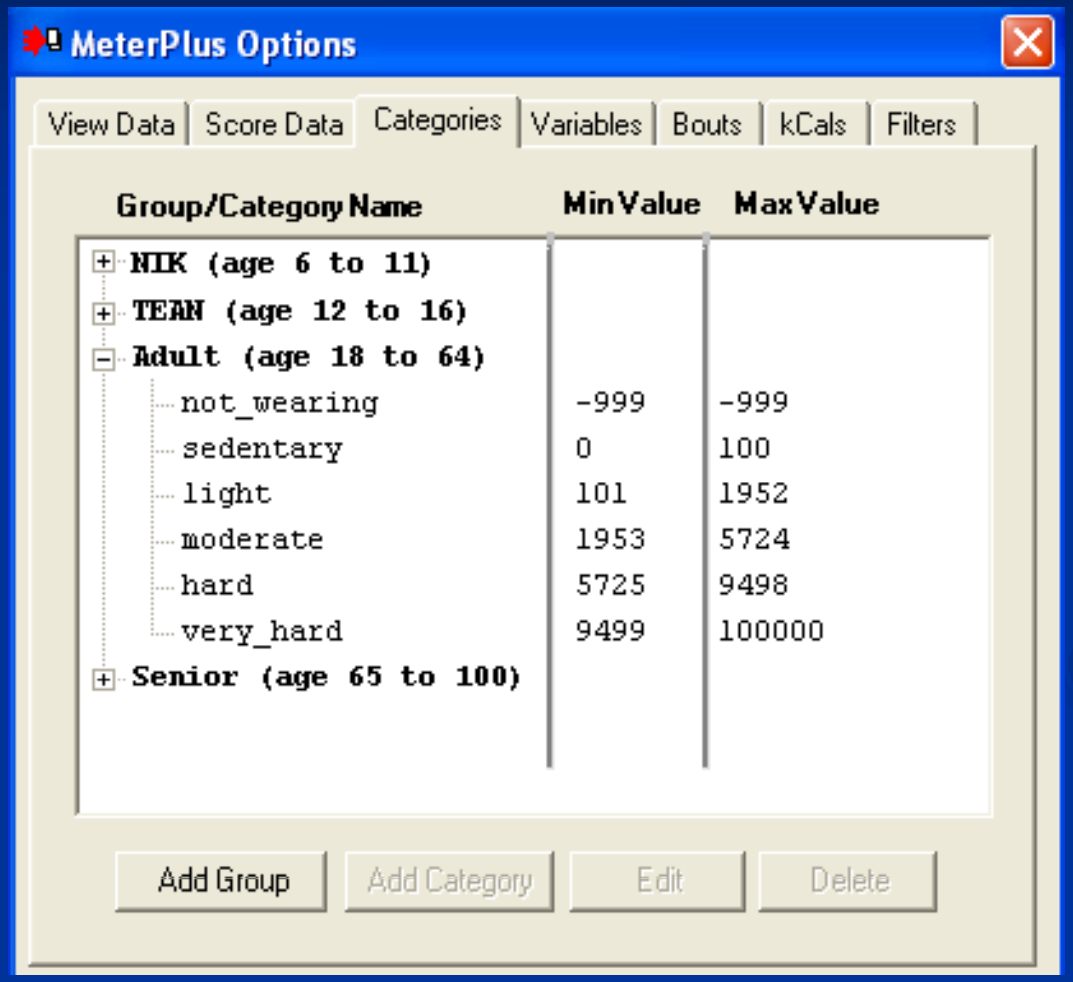
Variables: Date, Valid Hours, Valid Day, Day of Week & Parameter

4. Score

Scoring Data

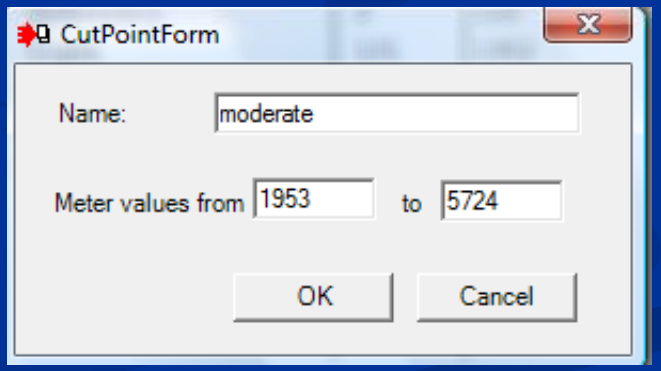
- There are a few things to configure in MeterPlus before batch-scoring your files
  - Cut-points
  - Filename variables
  - Energy Expenditure
  - Bouts
  - Time Filters

Programming cut-points



Create Groups

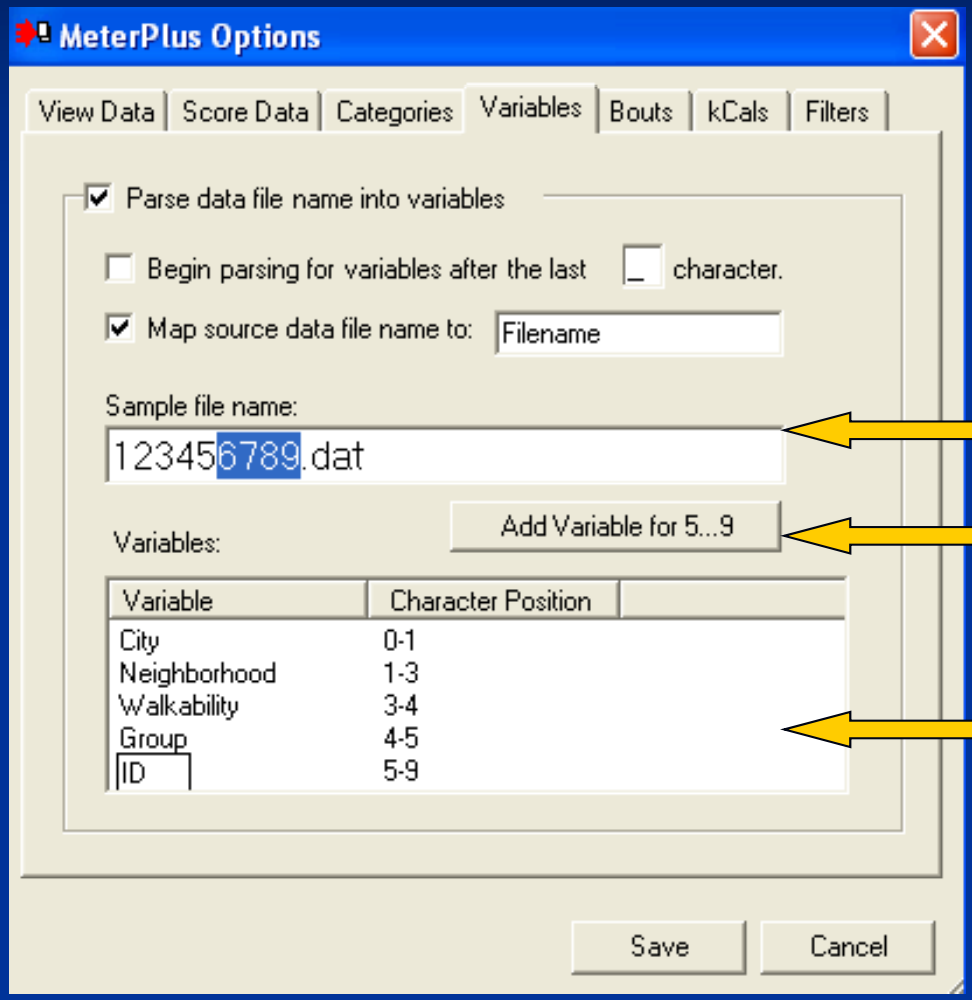
Add/Edit Cut-points



Variables Created

•Total, Daily and Hourly: time spent in each activity category (not wearing, sedentary, light, moderate, vigorous). All days and/or Valid Days Only

Filename variables

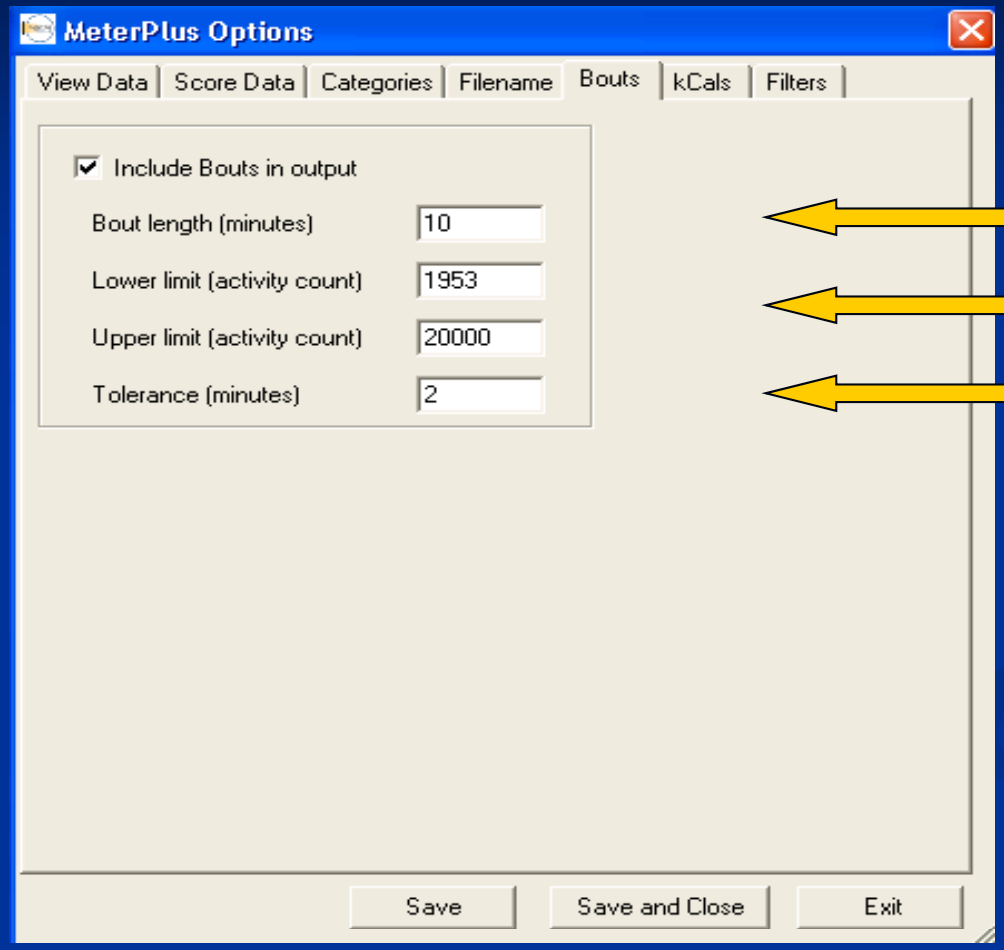


Enter sample file name

Designate character positions

Name your variables

Settings for bouts (sustained levels of activity)



Minimum length

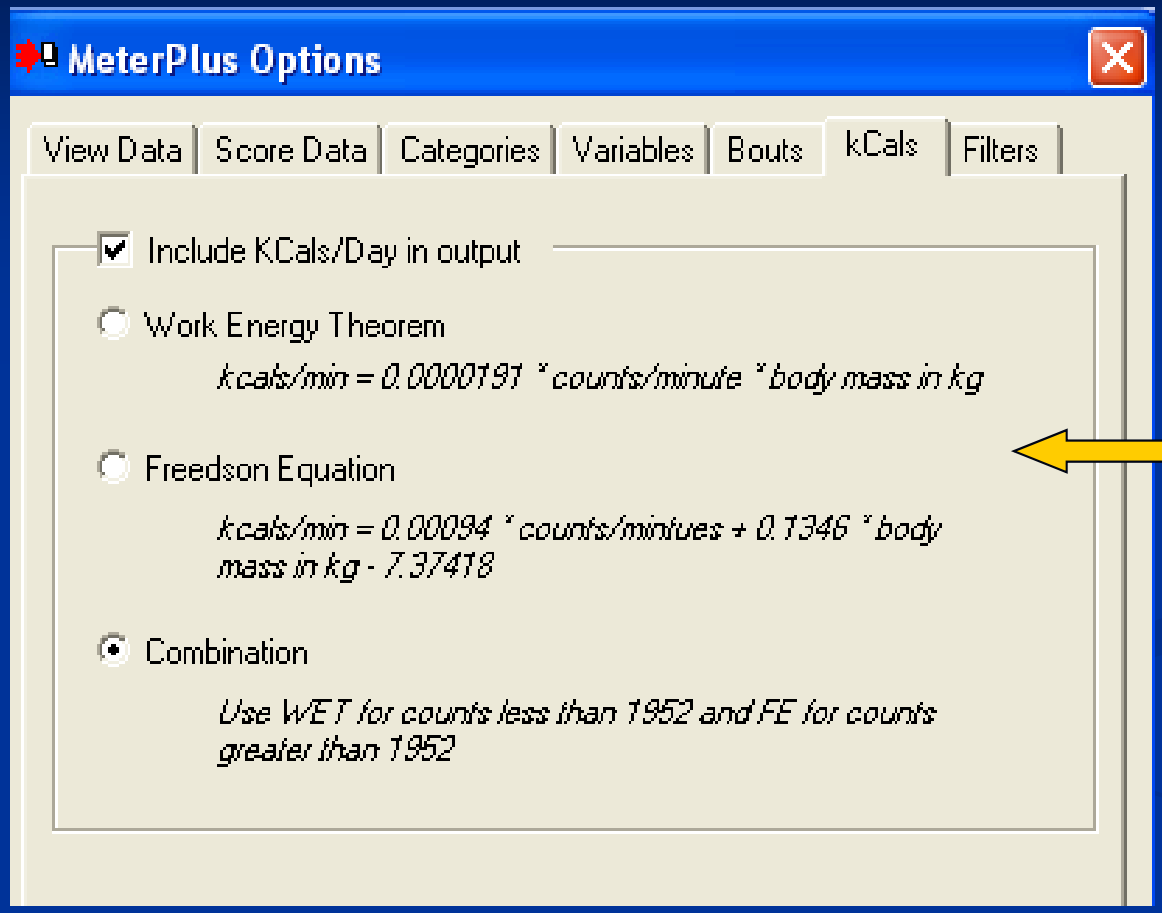
Intensity

Allowable interruption

Variables Created

- Number, total length and average length of bouts
- Start and end times of each bout
- Total, Daily and Hourly

Energy expenditure

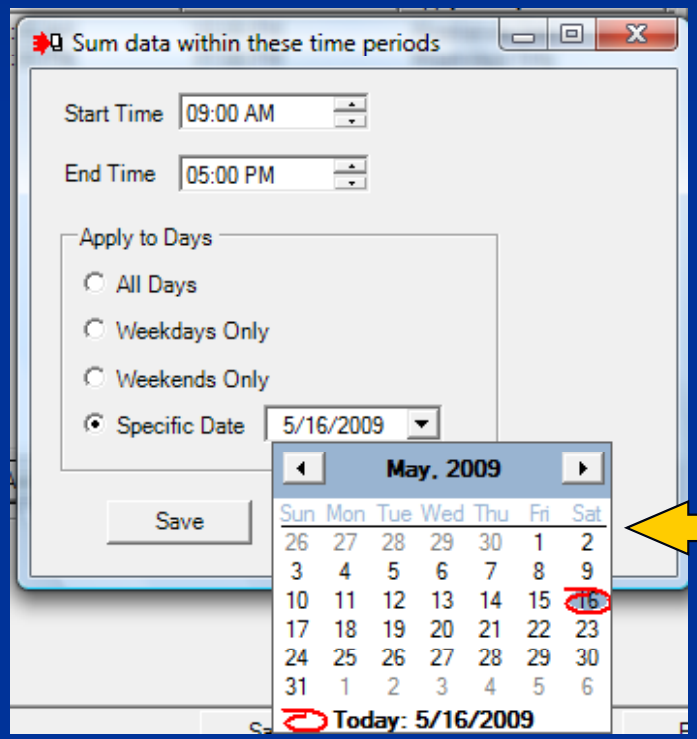


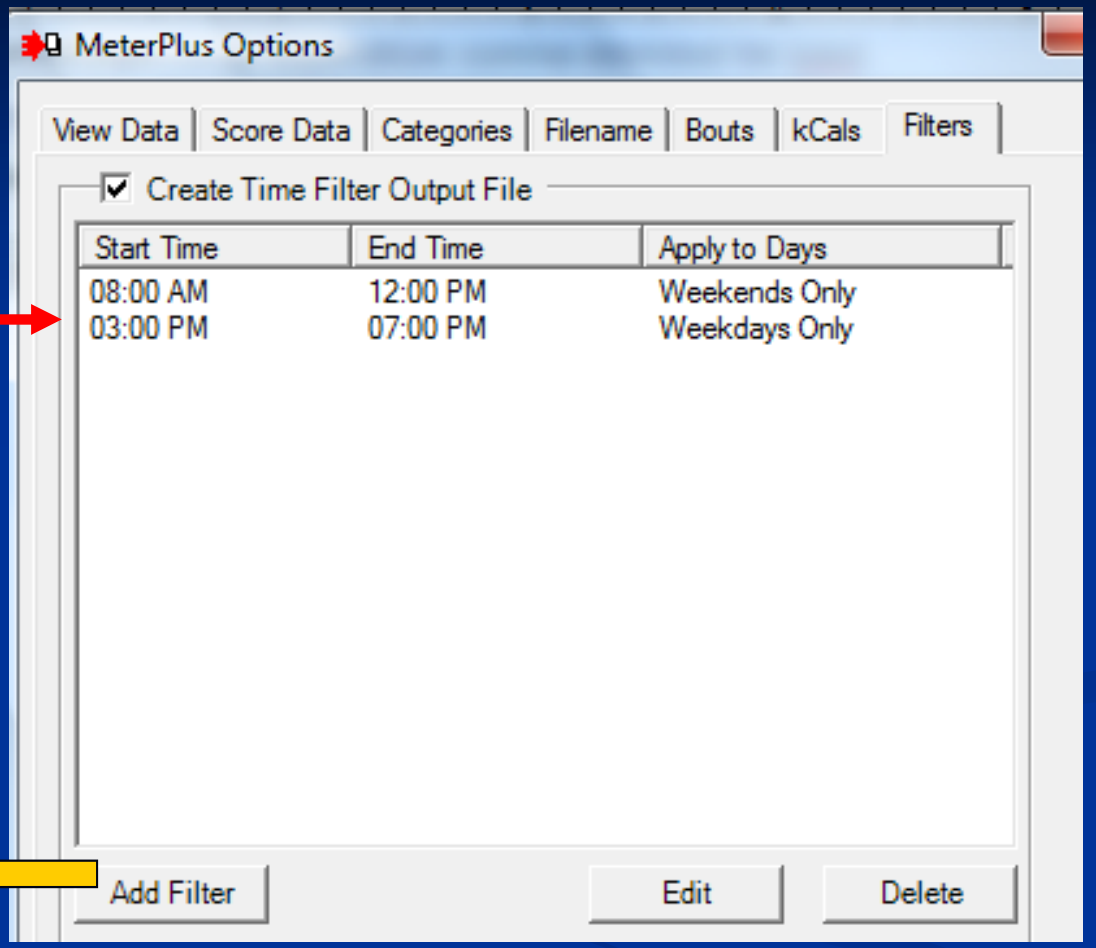
Choice of 3 algorithms

Variables Created

- Total, mean and peak energy expenditure
- Energy expenditure in each activity category
- Total, Daily and Hourly

Time filters

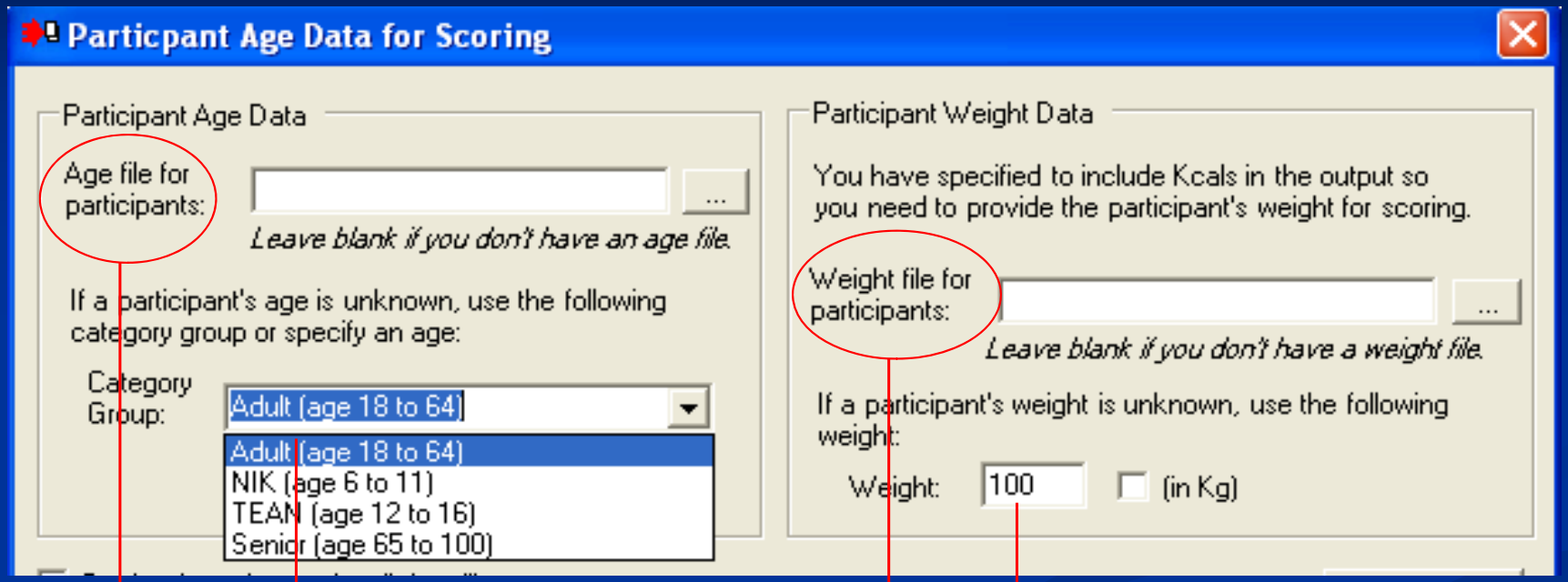




Variables Created

- Date and day of week
- Start and end times of each filter
- Time spent in each activity category during each defined time period.

Age and weight scoring



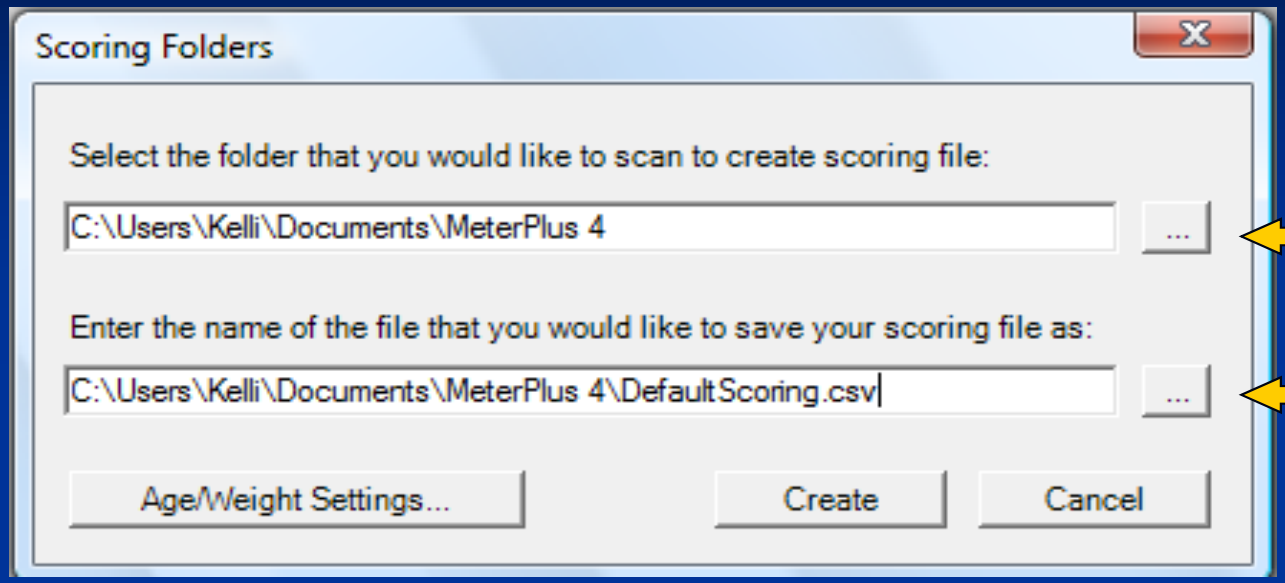
Use subject age to apply different cutpoints within the same batch

Select a group of cutpoints to use for your entire sample

Use subject body weight for energy expenditure calculations

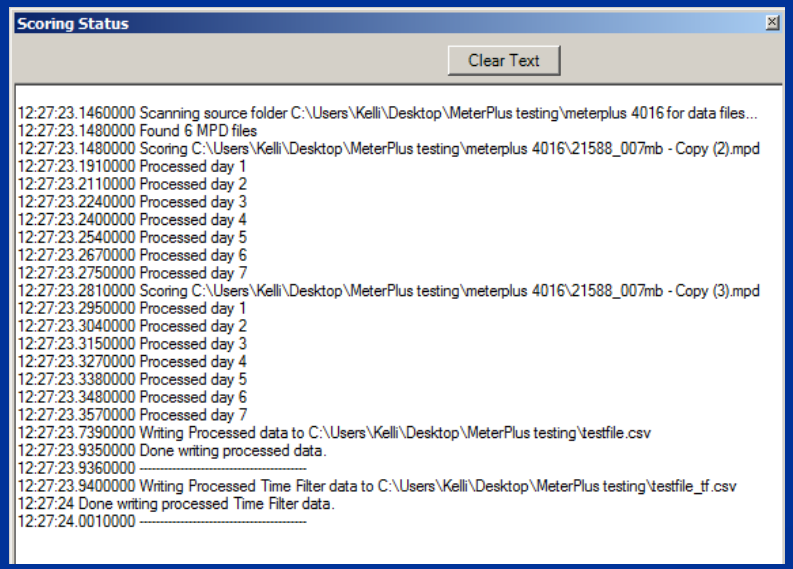
Select a weight to be used for your entire sample

Batch scoring



Where to find individual files to process

Where to save processed CSV file for entire sample



One step → Create

5. Analyze

Output

File type	Description
CSV	Comma-delimited file containing the results of the batch scoring including activity counts, step counts, bouts and energy expenditure.
TF.CSV	Comma-delimited file containing the time-filtered activity variables only
SPS	SPSS syntax file that will import data into SPSS

MeterPlus

- Where to get more information

  www.meterplussoftware.com
- Demonstration at breakout session
- ALR grantee discount

Questions?

Data Decisions

- No consensus, big differences across studies
- Cut-points and METs
  - Differences in outcomes depending on cutpoints and MET value used to define MVPA threshold
  - "Brisk walk"=3 METs for adults and 4+ METs for children
- Data cleaning and compliance
  - What are some of the decisions to make?
  - What are people using?

Calibration Studies

	MVPA cutpoint (60s equiv)	METs	Age	Validation/Criterion measure	Activity
Freedson, 1997	*10 yr:* 1017 *10 yr:* 1910	3 4	6-18	VO2 consumption	Treadmill [60s]
Pate, 2006	1680	20 mL/kg/min (equiv to brisk walk)	3-5	Cosmed	Walk, run, lifestyle [15s]
Ekelund , 2004	2000	3	9-10	Used previous research to establish	Treadmill
Evenson, 2008	2296	ROC curve analysis	5-8	Cosmed	Lifestyle and treadmill [15s]
Treuth, 2004	3000	4.6	13-14 girls	Cosmed & heart rate	Lifestyle [30s]
Puyau, 2002	3200	AEE: .05 kcal/kg/mn (hrt rate 130)	6-16	room respiration, microwave detector & heart rate	Lifestyle and treadmill [60s]
Sirard, 2005	*3 yr old:* 2460 *5 yr old:* 3564	ROC curve analysis	3-5	Observation	Walk, run, sit, play [15s]
Mattocks, 2007	3582	4	12	Cosmed	Lifestyle

Differences in sedentary and MVPA in same sample *(n=72; 4-7 yr olds; p<.01)*

	MVPA cutpoint	Mean minutes MVPA/day	Sedentary cutpoint	Mean minutes sedentary/day
Puyau	3200	28	800	488
Treuth	3000	41	650	180
Freedson	630	266	*NA*	*NA*
Reilly	*NA*	*NA*	1100	501

Reilly, Penpraze, Hislop, Davies, Grant & Paton (2008). Objective measurement of physical activity and sedentary behaviour: review with new data. Arch. Dis. Child, 93, 614-619.

Cleaning and compliance decisions

- Reliable data processing staff
- Number of valid days & valid hours
- How many minutes of consecutive zero counts to define non-wearing

Reliability between data cleaners

- Ideally, same person would clean data for entire sample
- Detailed protocols with thorough training
- Inter-rater reliability

Same data, different cleaning parameters

7 wearing days

10 minutes of zeros

MeterPlus - ALR(1).mpo

File Tools Reports Help

C:\Documents and Settings\kcain.ALR\Desktop\Test data\Wearing Time test\Mail_60s.DAT

Date	Valid Hours	Valid Day?	Day Of Week	Parameter
8/15/2002	2	No	Thursday	Activity
8/16/2002	0	No	Friday	Activity
8/17/2002	0	No	Saturday	Activity
8/18/2002	8	No	Sunday	Activity
8/19/2002	11	Yes	Monday	Activity
8/20/2002	12	Yes	Tuesday	Activity
8/21/2002	13	Yes	Wednesday	Activity
8/22/2002	14	Yes	Thursday	Activity
8/23/2002	11	Yes	Friday	Activity
8/24/2002	0	No	Saturday	Activity
8/25/2002	7	No	Sunday	Activity
8/26/2002	1	No	Monday	Activity
8/27/2002	4	No	Tuesday	Activity
8/28/2002	0	No	Wednesday	Activity

5 valid days

20 minutes of zeros

MeterPlus - default.mpo

File Tools Reports Help

S:\CSA Data\Actigraph Training\B_mail time\Mail_60s.DAT

Date	Valid Hours	Valid Day?	Day Of Week	Parameter
8/15/2002	5	No	Thursday	Activity
8/16/2002	0	No	Friday	Activity
8/17/2002	0	No	Saturday	Activity
8/18/2002	11	Yes	Sunday	Activity
8/19/2002	13	Yes	Monday	Activity
8/20/2002	13	Yes	Tuesday	Activity
8/21/2002	15	Yes	Wednesday	Activity
8/22/2002	16	Yes	Thursday	Activity
8/23/2002	11	Yes	Friday	Activity
8/24/2002	2	No	Saturday	Activity
8/25/2002	8	No	Sunday	Activity
8/26/2002	5	No	Monday	Activity
8/27/2002	5	No	Tuesday	Activity
8/28/2002	1	No	Wednesday	Activity

6 valid days

30 minutes of zeros

MeterPlus - default.mpo

File Tools Reports Help

S:\CSA Data\Actigraph Training\B_mail time\Mail_60s.DAT

Date	Valid Hours	Valid Day?	Day Of Week	Parameter
8/15/2002	11	Yes	Thursday	Activity
8/16/2002	0	No	Friday	Activity
8/17/2002	0	No	Saturday	Activity
8/18/2002	12	Yes	Sunday	Activity
8/19/2002	17	Yes	Monday	Activity
8/20/2002	13	Yes	Tuesday	Activity
8/21/2002	15	Yes	Wednesday	Activity
8/22/2002	17	Yes	Thursday	Activity
8/23/2002	12	Yes	Friday	Activity
8/24/2002	2	No	Saturday	Activity
8/25/2002	10	Yes	Sunday	Activity
8/26/2002	6	No	Monday	Activity
8/27/2002	10	Yes	Tuesday	Activity
8/28/2002	5	No	Wednesday	Activity

9 valid days

60 minutes of zeros

MeterPlus - default.mpo

File Tools Reports Help

S:\CSA Data\Actigraph Training\B_mail time\Mail_60s.DAT

Date	Valid Hours	Valid Day?	Day Of Week	Parameter
8/15/2002	16	Yes	Thursday	Activity
8/16/2002	0	No	Friday	Activity
8/17/2002	0	No	Saturday	Activity
8/18/2002	13	Yes	Sunday	Activity
8/19/2002	20	Yes	Monday	Activity
8/20/2002	14	Yes	Tuesday	Activity
8/21/2002	17	Yes	Wednesday	Activity
8/22/2002	17	Yes	Thursday	Activity
8/23/2002	14	Yes	Friday	Activity
8/24/2002	4	No	Saturday	Activity
8/25/2002	12	Yes	Sunday	Activity
8/26/2002	9	No	Monday	Activity
8/27/2002	17	Yes	Tuesday	Activity
8/28/2002	15	Yes	Wednesday	Activity

10 valid days

Differences in sedentary & non-wear time

Zeros	Valid Days	Minutes of "Not wearing" time in same 7 wearing days	Minutes of "Sedentary" time in same 7 wearing day
10	5	4680	2861
20	6	4505	3036
30	9	4396	3145
60	10	4278	3263

- No differences in MVPA
- Difference between 2861 (10 zeros) & 3263 (60 zeros) = 402 min
- Almost one hour per day difference on average

Protocols – select studies

	Minimum wearing days	Minimum valid hours	# consecutive minutes of zero counts for non-wear time	Cutpoints	METs
NHANES, US	4	10	60+ (with allowance of a few low counts)	Freedson	4
TAAG, US	1	80% standard day is non-missing	20+	Treuth	4.6
EYHS, 4 European	3	10	10+	Freedson	3
ALSPAC, UK	3	10	10+	Mattocks	4
Kolle 2009, Norway	2	8	10+	Ekelund	3

What about activities that are missed by accelerometer?

- Under-estimates certain activities (biking, swimming, etc.)
- Use diary or log to identify time, duration and type of activity
- Get MET value for activity from Compendium of Physical Activities
- Using a regression equation, get corresponding count value
- Insert or replace values with new count value
- Labor intensive and didn't make a difference in one of our studies

Esliger, D.W., Copeland, J.L., Barnes, J.D. & Tremblay, M.S. (2005). Standardizing and optimizing the use of accelerometer date for free-living physical activity monitoring. Journal of Physical Activity and Health, 3, 366-383.

Summary

- MeterPlus can help manage and score your data but each investigator has many decisions to make
- Need more research to reach consensus…any takers?

The end…

- Questions, Comments?
- Come try out MeterPlus and discuss other topics
- References and other materials to take
- Roundtable in the morning