Third RAND HRS Around-the-World Harmonization Meeting

A Meeting of the Network on the Harmonization of International Aging Studies
Supported by the National Institute on Aging

May 1, 2019

Westport, Ireland
Republic of Ireland

Meeting Summary

Covering May 1, 2019

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Meeting Summary

Overview

On May 1, 2019, the RAND Corporation convened a meeting of the Network on the Harmonization of International Aging Studies with support from the National Institute of Aging (NIA). The purpose of the meeting was to hear updates on each study and to further discuss the harmonization of aging data across studies.

The meeting began with a welcome from Rose Anne Kenny, who noted that this was the first time that a global scientific meeting was held in Westport, County Mayo. She gave a brief history of Ireland, noting that it has one of the richest archaeologies of any European country. She said this would be the first of many scientific meetings in County Mayo.

Status of Harmonization Around the World Projects and Meeting on Accelerometers

Then James Smith talked about the status of the harmonization around the world projects. This meeting specifically focused on accelerometers. The purpose of today's meeting was:

1. To organize meetings
2. Support small scale pilots of new content and innovation that is harmonized
3. Organize research conferences on cross-national studies
4. Foster development of new studies in network
5. Disseminate resources of the network.

At the last meeting, we agreed that the PIs would rate the topics. The results were as follows:

1. Pollution
2. Retrospective Modules
3. Accelerometers
4. Health Care Utilization
5. Smoking Around the World
6. Sexual Functioning

Besides exercise, other behavior that was focused on is sleep. Good sleep measures are one of the highest NIA priorities. What's the best objective way to measure sleep and exercise? Can we reduce cost by sharing them across studies?

Exercise and Sleep from the BSR/NIA Perspective

Then John Phillips (Chief of the Population and Social Processes Branch (PSP) of the NIA Division of Behavioral and Social Research (BSR) spoke on exercise and sleep from the BSR/NIA perspective. He thanked Jim for his leadership. John said that the London meeting was a big success, connecting all the studies around the world. Big picture was that he saw all these studies around the world and wanted to bring all the PIs together to innovate and contemplate. Physical activity and sleep are very important. There is a connection between sleep and health cognition. There is an opportunity for the HRS study to measure sleep and activity, to establish cross national measures to do so. John is looking at proposals and is interested in looking at how it is being done vs. the hypothetical. It is easier to use a standard device to do cross national comparisons. We need a standardization network device. Having data generated from this device that's open source is very important. We need to start considering the environment in which the data is being processed. We can't use a portable computer as there's too much data to process. How do we do comparisons between the data and surveys? How do we do this so that it's comparable across studies?

Lastly, tech is changing rapidly, things beyond activity on these devices, what types of other information can we collect from these devices?

Current Use of Accelerometers in some Current HRS Around the World Surveys-Highlights and Lessons Learned

The discussion continued with the current use of Accelerometers in some current HRS around the world surveys. Here are the highlights and lessons learned:

ELSA

Andrew Steptoe lead the discussion on accelerometer use in ELSA. The original device was worn on the wrist. We randomly selected 499 participants for an accelerometer substudy in wave 6 (2012). 400 agreed (80%) to 8 days wear time. We had technical problems in 28 people, insufficient wear time in 38 people, and loss of sleep logs in 4 people. 330 had data (.95% wear time) on at least 1 day, and 316 on at least 2 days. The mean wear time was 5.79 $\pm$ 1.31 days.

Consent to accelerometer Whitehall Study: Physical activity and social isolation were measured and averaged over all the days. 4880 participants were invited to wear Geneactiv for 9 days in 2012. 388 (8.3%) did not consent, and 210 had contraindications such as allergies or travel. Refusal was significantly more common among women, people who had less self-reported physical activity, people who had lower self-rated health, people who had slower walking speed, and people who had poorer cognitive function. People who were isolated were less physically active, as we expected. We also saw less physical activity in obese people.

Sleep duration analyses in the Whitehall Study: The sleep aspect is more problematic. We were estimating sleep parameters using an accelerometer without sleep analyses. It didn't adjust for older people being less active. It seemed like old people were sleeping all day and night, when they were just being inactive. The method was based on sustained periods of inactivity-an absence of change in arm angle greater than 5 degrees for 5 minutes or more during period defined as sleep in the sleep log. This was validated against PSG records (Van Hees et al, PLoSOne, 2015). The R package is located here: https://cran.r-project.org/web/packages/GGIR/GGIR.pdf Open source data is available.

Lessons learned: greater attention should be paid to interviewer/participant instructions, and specialist support is needed both during data collection and data cleaning/reduction phases. Axel asked the questions, "what is good sleep vs. bad sleep?" Andrew did not know the answer to that question.

TILDA

Then SIOBHAN SCARLETT did the presentation on Accelerometer Measurement in TILDA. They had 1,577 participants and used a GENEActiv wrist worn accelerometer, which had a $\pm$8g measurement range. The sampling frequency was 100hz, and the accelerometer was lightweight, water-resistant, and non-invasive. It also had a body temperature sensor. We offered it to Health Assessment participants (HC and Home). The accelerometer was worn for seven consecutive days following assessment.

The GENEActiv software package provides a company derived algorithm. It's not suitable for larger samples. It has a fully automated MEMs accelerometer classification algorithm for epidemiological studies derived—quick processing speed. We used spread-based approaches to estimate sleep onsets and offsets. The data was split into three second epochs at F_s = 100Hz, producing 216000 epochs for a 1-week period (180 hours). We further classified data into sleep and wake cycles using automated threshold detection.

Filtering:

- Range of movement values over a period of time determined, which allows for separation of sleep from wake
- IQR range filter used. Filtered epoch value log transformed to improve threshold detection.

Thresholding:

- Linear threshold determined to classify each epoch as a period of activity of inactivity. Histogram calculated—smoothed using 25-point centered moving average filter—eliminates possibility of phase shift—minimum value between two peaks chosen as threshold T.

Classification:

- Values converted to time-above-threshold representation. Threshold T applied at each point to determine sleep/non-sleep periods

Activity:

- Unfiltered Epoch variance vector magnitude used to compute activity scores.

Objective vs. Self-reported measurements: there is a small correlation between self-report and objective sleep (r=0.20). We assessed differences in reporting of sleep hours and objectively measured sleep hours. Sleep difference score was derived as [self-reported sleep time – objective sleep time]. Negative results = underreporting of sleep compared to accelerometer measurement.

Limitations:

- Company derived algorithms are not suitable for larger epidemiological studies
- Gold standard algorithm is not yet available
- Difficult to measure sleep onset latency without accompanying sleep diaries
- Overestimation of total sleep time
- Sleep/wakefulness can be misclassified where movement levels are low during sleep period
- Further measures to be derived-
    - Sleep: sleep efficiency, number of awakenings during the night, daytime napping
    - Activity: sedentary behavior, intensity of activity, steps

Despite limitations of accelerometers, the results show expected trends in sleep patterns. There is a feasible method of actigraph measurement of large survey samples. The algorithm can be applied to other samples. It provides measurement in natural home environment—no artificial sleep lab settings. An objective measure in the context of these larger studies enables powerful assessment of sleep/activity patterns, and uniquely answerable questions within each study.

SHARE

Annette Scherpenzeel did a presentation on measuring physical activity on accelerometers. Why measure physical activity? She said that physical activity and sitting time are strongly related to health outcomes during aging. We can measure mobility, falling risk and balance, and obesity. Differential item functioning and comparability. There are 28 countries in SHARE (27 European countries and Israel). We have done accelerometer data collection in 10 SHARE countries. We have a subsample of 200 participants per country and had panel members wear the accelerometers for 8 days. We had 50 accelerometers per country and recycled 4 cycles per accelerometers. In pretest, we had about 5 accelerometers per country. Which one to choose? We had 3 choices: 1) GENEActiv actigraph, which was used in ELSA, LISS, and ALP. It was unintrusive and would measuring cycling and sitting better than standing. It was heavy though and had skin irritations. 2) Axivity AX3 with adhesive patch on thigh was used in Denmark, but we had compliance issues, and thought that they might be too intrusive.
3) Modern commercial activity trackers were cool so that helped with compliance, raw data, validation, panel effect by feedback.

We ended up using axivity AX3 with adhesive patch on thigh. It's self-administered. Fieldwork design. Lessons learned from reasons for refusal: tailored refusal conversion screens in CAPI (to be read by interviewer), interviewer training, complex cycle, post, self-administration, most countries had no post or logistic problems, with the exception of Belgium, and Estonia. So we used a different delivery that we used in Italy. We made an instruction leaflet that was clear to all. There was very few demand for interviewer help. The lesson learned there was that the Italy model was also allowed in Estonia. Unexpected problems: reports of skin irritations (tape), devices that came back with no data registered on it (not correctly initialized by survey agency). Lesson learned from that: two different types of tape will be tested, initialization of devices in Train the Trainer sessions and instruction video.
We are now planning a field rehearsal (2nd pretest round), including test of two tapes, instruction video for correct initialization, and refusal conversion screens in CAPI. The main study is scheduled for October 2019-June 2020.

Why measure exercise and sleep in population aging surveys- what types of hypotheses do we want to be able to examine with these data

Eileen Crimmins did a presentation, "Why measure exercise and sleep in population aging surveys?" Lack of activity and exercise is associated with multiple health conditions, such as mortality, heart disease, skeletal health, disability, diabetes, depression, dementia and AD. She said that we don't move like we used to do. We are hunter gathers and are built to move. For most of human history, man lived as a hunter gatherer which was a physically demanding life. Or exercise needs remain the same as our ancestors, but technology has eliminated physical work. Sedentary lifestyles are now considered "normal" but a sedentary lifestyle isn't good for us. There are epidemics that are inactivity-induced. It is a major risk factor for mortality. Life time activity matters. Nurses Health Study was a decades long study that showed that long term active people are more successful agers. Fitness training was found to have robust but selective benefits for cognition, with the largest fitness-induced benefits occurring for executive-control processes. Fitness contributes to good cognitive effects with training. Activity in old age can contribute positively to aging. Aerobic exercise has an effect on hippocampal volume in humans. Exercise enhances the neural stem cells proliferation and survival in middle-aged mice. Exercise counters age-related disease and disability. Exercise and activity matter. As for sedentary behavior—sitting is the new smoking. Poor sleep is associated with multiple health conditions. Sleep problems are also common, estimated at 20-50%. Insomnia, sleep disturbance from environment, night shift work, elective short sleep (socially and work related) are some of the issues.

1 in 4 adults over the age of 30 have a higher prevalence with obesity with obstructive sleep apnea. Sleep is a time to repair and restore. With short sleep the repair is not accomplished. Sleep quality and amount of time spent sleeping affects your body's ability to repair. Low quality sleep is linked to worse multisystem aging. Can you change multisystem aging index

with sleep interventions? Aging and Insomnia randomized control trial (RCT), cbt, tai chi, sleep seminar control, original trial reported in SLEEP (2014). The article asked the question, "what if we experimentally restrict sleep in aging humans?" They found that sleep deprivation leads to cells aging. After 1 night of no sleep, DNA changes and cell changes were associated with biological aging. (4 hours sleep) less sleep = more aging. Sleep is critical for the zebrafish brain to repair DNA damage. We pose the questions:

- Lifetime or point in time?
- Are people exercising the recommended amount?
- Are people too sedentary?
- How does movement affect health?
- How do health events, living circumstances, psychological state, family and work change affect movement?
- How does movement change over time?

Sedentary behavior is hugely important to study.

Reports from pilot work on measurement of sleep and activity: Issues that affect reliability and validity

Eileen Crimmins, Arie Kapteyn, and Jessica Faul did presentations on measuring physical activity and sleep.

Arie started by asking the basic question, how do self-reports of physical activity and sleep line up with what an accelerometer tells us? He then summarized their earlier work on cross-country comparisons of physical activity. He compared accelerometer measured sleep with self-reports. He had written an earlier paper, "what they say and what they do: comparing physical activity across the USA, England and the Netherlands." Physical activity and sleep are major inputs in achieving a healthy life. Increasingly, comparative studies across nations try to assess which policies are most effective. The study compared 3 countries: the Netherlands, USA, and England. We use two probability-based internet panels: LISS, and NL. For one weekday and one weekend day we ask about self-reported health. We asked common questions such as how often participants take part in sports/activities that are vigorous, moderate, mild, and how often.

Conclusions so far: objective and subjective measures of PA tell very different stories. Although at first sight accelerometry of sleep seems to be reasonably in line with self-reports, closer analysis shows a need for combining accelerometry with self-reports. Tentatively: to measure physical activity, accelerometry is superior. To measure sleep, one needs both self-

reports and accelerometry. In an ongoing pilot, we have extended the self-report sleep question.

Then Eileen Crimmins did a presentation on measuring sleep and activity with two devices. The outline was that we had two pilots. Each pilot compared 2 devices and self-reports. In each pilot, one device was commercially available (Fitbit) and the other was a research device (GENEActiv).

The first pilot measured mean sleep minutes. Sleep interruptions were very different. There were strange bed times on GENEActive in the first pilot. Do people go to bed in the middle of the afternoon?

With the second pilot design we wanted to measure what was happening with the bedtime? We needed fitabase data from Fitbit. The mean sleep minutes were more similar with the new fitbit in the second piilot. Fitbit changed their algorithm and "improved" it, which changed the comparison. GENEActiv, with odd bedtimes, can be attributed to naps and removing devices. We need to use minute by minute data to adjust for the algorithm of awakenings instead of macros.

We also collected activity and sleep data in population studies using actigraphy. There were challenges with this as well, such as more data. As battery and memory have increased, it is possible to collect and store high-throughput, three-axial, sub-second level acceleration data (between 10-200 obs per second). Supplementary sensors including gyroscopes, thermometers, inclinometers, pulsometers, light intensity and skin conductance sensors. Another challenge is data analytics. Activity counts are summaries of the raw data and depend on the device manufacturer, software version, and body location. Proprietary aggregated measures from companies-frequent updates to algorithm software (version control). Development of well-defined, open-source, reproducible data summary tools. Another challenge is harmonization.

Additional research is needed. Comparison of results from different actigraphy devices and the variety of algorithms used to evaluate actigraphy data in order to further establish standards of actigraphy technology. Research is needed to establish standards for setting start and stop times of the sleep and wake periods (might be device specific). More research is needed to assess the reliability of actigraphy under various circumstances, and to determine what parameters may be used to assess the quality of actigraphic data. There is a need for well-designed studies that include technical details related to the administration and scoring of actigraphy – whether visual inspection of data is performed, how missing data is handled, etc.

Actigraphy devices: we wanted to know what was easy for our participants to wear and was waterproof. HRS originally planned on using the Fitbit device—preferred by older respondents

(Mercer et al. 2016) and respondents could keep the device as an incentive. Initial pilot testing of the Fitbit device against the GENEActiv device used by Arie Kapteyn and ELSA within a volunteer sample (Crimmins) showed that results could not be harmonized easily. A second prepilot of GENEActiv, Actigraph and the iPhone (only examining activity not sleep) showed that with comparable settings data could be well-harmonized (higher Hz translates into higher measurement frequency).

We have an HRS Actigraphy Pilot this summer 2019.

- GENEActiv Original ($200) model will be used
- Preselected sample-goal is 250 people with actigraphy data and 250 controls
- Setting at 50Hz
- Consent by mail
- 2-part incentive-$25 prepay, +$25 when device is returned
- We will ask respondents to wear the devices for 10 days so that both weekdays and weekends are covered (trying to get 7 useable days)
- Short questionnaire on activity/sleep during study duration (using questions from the Consensus Sleep Diary (Carney, 2012) and Pittsburgh Sleep Quality Index (PSQI))
- Detailed information sheet
- Devices will be mailed back to HRS (prepaid mailer), data downloaded, and devices prepped for reuse
- We will mail a brief summary report of activity and sleep duration to respondents-summary of average mins of sleep and activity
- 2019 collection will inform us on consent, compliance, and logistics within the HRS

We also added questions to the 2018 core survey. We anticipate concerns about self-selection into completing the pilot and possible behavioral change due to participation in the pilot. As part of the overall pilot strategy, the selected respondents (eligible and controls) were asked additional questions in 2018 core interview about sleep and activity.

Sleep:

- What time do you usually go to bed and start trying to fall asleep on weekdays or work days?
- What time do you usually go to bed and start trying to fall asleep on weekends?
- What time do you usually wake up on weekdays or work days?
- What time do you usually wake up on weekends?

[Enter hour and minute and am/pm]

GENEActiv Original

- GENEActiv used by ELSA, TILDA, Whitehall, NSHAP (2020)
- Durable and waterproof
- Records light and uses a temperature sensor to determine whether it has been taken off the wrist
    - Light measurement is critical in helping to determine when the respondent is in bed and trying to go to sleep (i.e., the rest interval), which is necessary for scoring sleep parameters
- Produces usable report with minutes of activity and sleep
- GENEActiv raw data (m/s2 or gravitational acceleration for all 3 dimensions) can be processed with the GGIR package or other similar software packages
- R software in development to calculate steps

HRS Pre-Pilot-Testing GENEActiv Settings

- Volunteers (college students) each wore 2 devices for 7 days
- 3 Groups:
    - Control (n=8) – 2 identical devices
    - Treatment 1 (n=7) – with/without preloaded data entered during device set-up (height, weight, handedness)
    - Treatment 2 (n=8) – with/without light sensor covered
- Evaluated mins sleep, sedentary, light/moderate/vigorous activity averaged over 7 days
- Paired T Tests (difference between watches=0)
- Sleep-no significant differences (at $p < 0.05$) but both Tx watches (with preloaded data and with covered light sensor) in general recorded more sleep (~ .12 SD more) – approximately 7 more minutes per night
- Sedentary activity-no significant differences (at $p < 0.05$) but Tx1 Preload watch ~ .5 SD fewer minutes ($p=0.35$)
- Handedness most significantly impacts summary report data
- Need to evaluate further whether raw data is the same across Tx groups
- Need to evaluate the effect of the light sensor specifically on day time sleep
- HRS will not preload handedness in the 2019 pilot but will enter on which wrist the device is worn and handedness at data download and summarization

Conclusions:

- Increasingly possible and affordable to collect activity and sleep data in large-scale studies
- Many of the devices that are optimized to collect activity data are not ideal for sleep (supplement with self-reported sleep info)
- Significant resources needed to download and manage data collected on large scale
- Possible to compare and combine studies that collect raw accelerometry data at the same location on the body using open source summary algorithms that are increasingly available (further development needed)
- Pre-processing pipelines still need to take into account device selection and calibration, sampling frequency, missing data

Harmonization Summary

- Harmonize device and pre-processing decisions as much as possible
- Release raw data as well as summarized files harmonized across cohorts using identical algorithm software
- Consider data users
    - Parallel with genetic data in terms of considerations for use – most will not be experienced with processing raw files, high performance computing environments
- Harmonize survey content as well
- Potential confounding of sample characteristics and measurement context (e.g. season) not stable across field period

Visit their website: https://hrs.isr.umich.edu/?_ga=2.259755912.34852570.1573102710-788004625.1573102710

Presentation on Sleep and Exercise

Then Aiden Doherty did a presentation on Large Scale Analysis of Physical Activity and Sleep Wearable Sensor datasets. We are measuring physical activity. Accelerometers are more strongly associated with physical activity and energy expenditure, than self-report. Objective measures of physical activity/fitness more strongly associated with mortality than self-report.

Large numbers give clarity: ischemic heart diseases vs. systolic BP.

UK biobank accelerometer dataset has 100k participants and 7 days of data per participant. We sent out 236,000 email invitations and got a 44.2% response rate. Women 55-74 were more likely to consent. They had higher SES, better physical health status, less time since baseline assessment, lower phone usage, higher calorie consumption, and access to fewer cars.

Biobank didn't give a survey incentive. We measured activity by time of day. (Hour of day/ women vs. men).

(Jim Smith posited that older people may be more available than younger people since they are not working, i.e. retired.)

Some final thoughts on harmonization. Devices are pretty comparable. Wrist-worn devices that can measure raw acceleration data it would help to harmonize the studies around the world. Large scale collection of sensor data is possible to do cheaply and streamlined examples exist. Robust metrics are already good to use. We can always do retrospective analysis as better measures are developed in future; e.g. sleep, circadian rhythms, etc. It would be ideal to have random subsamples with validation measures; e.g. cameras, specific questionnaires.

Where do we go from here on sleep and exercise?

Then Jim Smith ran a group discussion by the HRS PIs. Technology on how to do this on a population-based survey is changing very rapidly. Information that is avail is also changing very rapidly, in a very rapid learning period. We will know more 6 months from now due to all the information learning.

Has HRS ever considered wearing accelerometers on the thigh instead of the wrist? David Weir said that none of the measures is perfect. The key is to get as raw of the data as possible. Data gets messed up with the processing. The first order of business is to cross calibrate the data.

Andrew Steptoe said that the consensus is that the accelerometer should be worn on the wrist. Most big studies are on the wrist. Rose Anne Kenny said that the wrist is embedded in the society, as opposed to the thigh, which requires more instruction and might be harder for older people to use. David Weir and Jim Smith said we should do a substudy using both thigh and wrist to get a subsample to create an algorithm. John Phillips said that investigator-driven studies drive innovation.

Arie Kapteyn said that there is an obvious way of harmonization: if everyone is using the same algorithm and software, that would be a good way to keep things harmonized. John Phillips then asked if that takes away the supplemental questions we are able to answer? Arie Kapteyn asked, if you feel like you have good data, can you train the algorithm to adjust for self-

reported health? Axel Borsch Supan said don't scale or validate on SRH. It's the little things that make the difference. A camera may help--just getting up and walking to fridge and back, the little things, the triviality of life that you want to capture for activity—for old people. There is a good cause to measure young people's activity as that would cause obesity later on. The behavior you have when you are young will affect your life later on in life. So, what do we want? One algorithm for young people, one for old people?

Andrew Steptoe brought up sleep fragmentation and said we needed self-reported health to get that information. Jim Smith said that no matter the device that's chosen, implementation is where there's been a lot of change. So, we can build on what we've learned? Andrew Steptoe said access to data is a big issue. If we want to make this data accessible, what are we going to use for that—this is an enormous challenge.

Aiden Doherty said that Biobank's policy is anyone can apply for access to the data (25-30 terabytes of data). It's not storage but computational space can be an issue. There is no GPS info embedded in the information. Is there an information sharing issue?

Eileen Crimmins said to think about questions being harmonized and gather all that's there now and get recommendations on what changes need to be made so we can all incorporate them at the same time. David Weir said we've all talked about sending a questionnaire with a devicethat needs to be harmonized across studies.

Jim then asked John Phillips, "based on what you heard all day long, John, would NIA welcome proposals on this at some point? To which John replied, "this is an example of where it's always worth contacting me and talking about what you want to do. Contact us and talk to us about your plans. These meetings serve an important opportunity to have people hear what's going on, and hear what's right for their study. If you want to apply for supplementation, computing, etc., I'm going to ask questions." Jim Smith said that "the impression is that on this particular subject, that the studies that spoke today, they're in the lead on the development of science in this area, and the rest of the studies are content to learn from this development as it will be easier for them to see that the consensus is from what the current studies are learning. We'll take the best of that science and incorporate it into our new studies." Jessica Faul suggested to take all raw data from all the studies and run it through Aiden's algorithm/presentation. Lisa Berkman said that large studies like this has a coordinating center that coordinates calibration. We should consider this. Yaohui Zhao added that a training session on training people how to use the raw data and then show examples on how to use the raw data would also be good.

Future HRS's around the world meetings -place, agenda, and issues

Sexual Behaviors was not ranked high by PIs. We will ask ELSA (David Lee) to provide to all PI's:

- Their full sexual model
- Their best half model
- Their best 10-12 question model

It's a sensitive topic in the countries where the studies are being held. The consensus is that it would be very useful. The full ELSA module in effect. The issue with other studies is that it is going to raise the sensitivity of their studies. If you can cut the sex module questions in half, the entry point is to give us your best 10-12 questions. We will distribute this to the PIs around the world.

Pollution was ranked high by PIs. There were 2 kinds of pollution--external and internal.

For external, Sarah Adar (UM), Gavin Shaddik, and Jinkook Lee can, for a modest fee, tell projects how to connect to external sources with good pollution measures over time and space in each country. We've already started in LASI, ELSA, KloSA, and HRS (about $50,000 a study). You can join the teams already in place. PM 2.5 data is already quite good, we just need to link it with posted data.

For internal, we should have a meeting on this like the accelerometer meeting to discuss best methods of measuring internal pollution. We should discuss how we can measure indoor pollution with the new equipment that is cost-effective. Things like using a bad stove, etc. contribute to indoor pollution or how the outside air gets inside. Right now, it's expensive to measure this.

Eileen Crimmins said that for external pollution we are thinking of measuring heavy metals.

Retrospective module were ranked highly by PIs. We need to have a future meeting on this.

Small scale projects-retro data. Good life histories already in SHARE, CHARLS, HRS (being done in KLoSA and ½ LASI). Many other countries with rich histories would benefit; the two Irelands, India, S Africa, and Brazil to name just a few.

Lessons learned-content, off year wave, should we this do after few waves are completed, what should the mode of interview be? We also want to know how to obtain funding, how do we convince funders that this would be a bargain since data infrastructure already exists and it would be a onetime only fee, but funders must be convinced. Should we(invite funders to meetings? Rose Anne Kenny said that we need to build a good strong business case on this because it is hard to convince funders. Axel Borsch Supan said that the EU commission has already paid twice for this data. Rose Anne Kenny said that from a policy perspective, it's hard to sell to governments.

Axel Borsch Supan asked how much social status is determined by your parents and early education. Half of your life is predetermined after 10 years. Lisa Berkman said there is an importance in midlife. People get their first jobs, family formation, what's happening in the environment during that time, and how that affects health. Jim Smith said that for Ireland, there is a long history in the struggles and how that affects contemporary life. Axel Borsch Supan asked when is unemployment insurance important? It's easier to sell to governments that like intervention. It's much harder to sell in the US/UK, vs. free markets.

Possible new country additions:

Australia and New Zealand (Smith)

Malaysia and Thailand (Weir) Pakistan (Bloom)

Wales-Andrew Steptoe said that he had a meeting last week with the government and researchers and that the commissioner of Wales is keen on doing it. The Welsh government is putting out a tender later this year for a project.

Cuba is working slowly with Rebeca Wong.

Latin America-Equator (Fernanda and Cesar)-they've been contacted by Uruguay who is keen to become part of the HRS studies (initial meeting was end of March).

Egypt- (TILDA-Mohamed Salama) we introduced the idea to Minister of social solidarity who is interested. They offered support and have good infrastructure. We are following TILDA's example since Mohamed is based at Trinity (Richard Sussman tried 15 years ago to bring Egypt into the fold but was unsuccessful).

New countries are not BSR's emphasis especially as a payer.

David Weir went to Thailand and said no one was using CAPI system. They used paper and pencil for wave 2 but we are trying to get them to do wave 3 using CAPI. Malaysia met Norma

Mansour (Dept of Soc Sec at Malaysia Govt.) halfway through a baseline collection. We would like to see them brought into this collective. Engagement with them might be beneficial.

Axel Borsch Supan said that SHARE has a survey intended for West Bank and Jordan that are in Arabic which you might be able to use Egypt. David Weir asked if LASI has an Arabic version.

Jim Smith said that the network of countries is growing. The main funding for the studies have to come from their own countries as NIA is already funding studies around the world.

David Weir suggested that we do an HCAP study meeting for the PIs right after the HRS monitoring meetings. Let's start either the afternoon of 29th or the morning of the 30th.

Cross-national research conference:

- Should emphasize value of cross-national comparable studies explaining cross country health difference
- Budget is available for 2 of these conferences
- We must organize one of them during this meeting
- Proposal mentioned putting out a call to the PIs and outside researchers
- 10 papers with 30 participants-conference to be held either at RAND or NIA DC.

Lisa Berkman said that the South Africa project will have a committee and launch. Our hope is that by having emerging economy countries like China, India, Brazil, with a set of aging issues will serve as an example to inspire the South African government to move forward. These studies are covering 75% of the world's population.

Possible Future Meetings:

Oct 13-17 HALSI meeting in South Africa

Oct 28-29 DMC meeting in DC

Dec. 9-10 CHARLS in Beijing

Full Studies meeting in DC—Date TBD

Appendix 1:

Acronym Definitions

Acronym	Definition
ADAMS	Aging, Demographics, and Memory Study
BSR	Division of Behavioral and Social Research
CHARLS	China Health and Retirement Longitudinal Study
DBS	dried blood spots
DNA	deoxyribonucleic acid
DRM	Day Reconstruction Method
ELSA	English Longitudinal Study of Aging
ELSI	Brazilian Longitudinal Study of Health, Aging, and Well Being
HAALSI	Health and Aging in Africa: Longitudinal Studies of INDEPTH communities
HAGIS	Healthy Aging in Scotland
HbA1c	glycosylated hemoglobin
HCAP	Harmonized Cognitive Assessment Protocol
HRS	Health and Retirement Study
IFLS	Indonesian Family Life Survey
INDEPTH	International Network for the continuous Demographic Evaluation of Populations and Their Health
JSTAR	Japanese Study of Aging and Retirement
KLoSA	Korean Longitudinal Study of Aging
LASI	Longitudinal Aging Study in India
MHAS	Mexican Health and Aging Study
MMSE	Mini Mental State Examination
MRI	magnetic resonance imaging
NHANES	National Health and Nutrition Examination Survey
NIA	National Institute on Aging
NICOLA	Northern Ireland Cohort for the Longitudinal Study of Aging
PERFAR	Population Europe Resource Finder and Archive
RNA	ribonucleic acid
SAGE	Study on Global Aging and Adult Health
SHARE	Survey of Health, Aging, and Retirement in Europe
TILDA	The Irish Longitudinal Study on Aging

Appendix 2:
Meeting Agenda

LOCATION:
Westport House
Quay Rd.
Cloonmonad
Westport, Co. Mayo, Ireland

ARRIVAL DAY- Tuesday, April 30

Tuesday afternoon – HRS attendees arrive in Westport and check into Wyatt hotel or Castlecourt hotel.

6pm – Meet in Castlecourt Hotel Bar for predinner drinks
6:30pm – Dinner in local restaurant at Black Truffle Bistro (http://www.blacktruffle.ie/)- 3 Market Lane,
9:00pm – Visit Wyatt Hotel for Traditional Irish Music Session.

Addresses-

Castlecourt Hotel
Castlebar Street, Westport, Co. Mayo, Ireland.

Wyatt Hotel
The Wyatt Hotel, The Octagon, Westport, Co. Mayo, Ireland
Tel: +353 98 25027 | Email: info@wyatthotel.com

Wednesday, May 1: Westport HRS Harmonization Meeting Agenda

LOCATION OF MEETING- WESTPORT HOUSE- Quay Rd, Cloonmonad, Westport, Co. Mayo, Ireland

8:30am	Registration at Westport House
8:45am	Welcome to the West of Ireland- Professor Rose Anne Kenny of Trinity
9:00am	Introduction- Status of harmonization around the world project and this meeting on accelerometers- Jim Smith- RAND
9:15am	Exercise and Sleep from BSR/NIA perspective- John Phillips of BSR/NIA

9:25am	Current Use of Accelerometers in Some Current HRS Around the World Surveys- Highlights and Lessons learned- 15 MINUTES EACH ELSA-ANDREW STEPTOE TILDA- SIOBHAN SCARLETT SHARE- ANNETTE SCHERPENZEEL
10:10am	Coffee Break
10:25am	Why measure exercise and sleep in population aging surveys- what types of hypotheses do we want to be able to examine with these data? - EILEEN CRIMMINS-USC
11:05am	Reports from pilot work on measurement of sleep and activity: Issues that affect reliability and validity EILEEN CRIMMINS, ARIE KAPTEYN, JESSICA FAUL
12:00pm	Lunch- Lunch in Westport house
1:00pm	Tour of Westport House- historic Irish building
1:30pm	PRESENTATION ON SLEEP and EXERCISE - AIDEN DOHERTY,
3:30pm	WHERE DO WE GO FROM HERE ON SLEEP AND EXERCISE- group discussion by HRS PIs- Jim Smith
4:30pm	Future HRS's around the world meetings -place, agenda, and issues- Jim Smith
5:00pm	WHAT ARE THE SOCIAL ACTIVITIES IN THE EVENING AND THE TILDA MEETING – NIALL Turner
6:15pm	Bus leaves for Murrisk (15 min drive)
6:30pm	stop off at Croagh Patrick
7:00pm	Arrive at Murrisk Tavern for dinner http://www.tavernmurrisk.com/
9:00pm	Bus back to Westport venue for Trad Music (Matt Molloys) and -other Conference attendees- Bridge Street - Westport

Appendix 3:
List of Participants

Organizers

James Smith (Chair), RAND
Rose Anne Kenny, Trinity College Dublin & TILDA

Presenters

Eileen Crimmins, University of Southern California
Aiden Doherty, University of Oxford
Jessica Faul, Health and Retirement Study, University of Michigan
Arie Kapteyn, University of Southern California
Siobhan Scarlett, Trinity College Dublin, TILDA
Annette Scherpenzeel, Max Planck Institute for Social Law and Social Policy & SHARE
Andrew Steptoe, University College London & ELSA

Other Participants

James Banks, Institute for Fiscal Studies & ELSA
Lisa Berkman, Harvard University & HAALSI
Axel Borsch Supan, Max Planck Institute for Social Law and Social Policy & SHARE
Brian Caulfield, Trinity College Dublin
Cesar de Oliveira, University College London & ELSI Brasil
Orna Donoghue, Trinity College Dublin & TILDA
Elaine Douglas, University of Stirling & HAGIS
Ann Hever, Trinity College Dublin & TILDA
Maria Fernanda Lima-Costa, Oswaldo Cruz Foundation (Fiocruz) & ELSI Brasil
Yuanyuan Ma, Trinity College Dublin & TILDA
Taulant Muka, Institute of Social and Preventive Medicine (ISPM)
Deidre O'Connor, Trinity College Dublin & TILDA
Mohamed Salama, Trinity College Dublin
Niladri Sett, Trinity College Dublin
David Weir, University of Michigan & HRS
Yaohui Zhao, Beijing University & CHARLS

Federal Participants

National Institute on Aging

John Phillips, Chief, Population and Social Processes Branch; HRS Project Scientist, BSR

Appendix 4

Researchers Present at International Health and Retirement Study Meeting in Ireland

5/24/2019

A researcher presenting at the third meeting of the grant on improving harmonization of the international Health and Retirement Study (photo by Kate Lee).

Kate Lee and Jim Smith at Westport House (photo by Niall Turner).

The entrance to Westport House (photo by Kate Lee).

On May 1, the third meeting of the grant on improving harmonization of the international Health and Retirement Study (HRS) was held at Westport House in Westport, Ireland. **Jim Smith** is the principal investigator of this grant and attended the meeting, along with **Kate Lee**, who organized the conference and documented the events of the meeting.

The meeting aimed to improve the scientific and policy content of the HRS around the world studies. These studies now exist in more than 40 countries, covering more than 70 percent of global population ages 60 and older in the United States, Brazil, China, continental Europe, India, Indonesia, Japan, Mexico, the United Kingdom (England, Northern Ireland, and Scotland), the Republic of Ireland, South Africa, and South Korea. Principal investigators of these studies and John Phillips, who represents senior leadership of the National Institute on Aging's Division of Behavioral and Social Research, attended the event.

Presenters—including Andrew Steptoe of the English Longitudinal Study of Ageing, Siobhan Scarlett of the Irish Longitudinal Study on Ageing, Annette Scherpenzeel of the Survey of Health, Ageing and Retirement in Europe, Jessica Faul of the Health and Retirement Study, Arie Kapteyn and Eileen Crimmins of the University of Southern California, and Aidan Doherty of University of Oxford—shared their expertise on topics ranging from accelerometers to objectively measuring exercise and sleep. A number of speakers noted how lack of activity and exercise are associated with multiple health conditions. Subjective answers by respondents to sleep and vigorous exercise questions are known to be biased, since people in different countries and of different ages have different standards about what constitutes good exercise and sleep means.

The presentations suggested ways to incorporate or improve the way in which these topics are addressed in forthcoming surveys. In the next few years, meetings are being planned for researchers who are part of this network and who are working these subjects.