The Women’s Health Initiative
Long Life Study
Progress Report as of April 2019

NHLBI Contract No. HHSN26820110
Fred Hutchinson Cancer Research Center
Overview of Long Life Study
eligible population

Eligible Study Population:

– N=14,081 WHI Extension II MRC Participants
  • Non-institutionalized
  • Lowest age = 63 by 12/1/2011
  • GWAS intended on all as of 2015
  • Baseline biomarker data
    • Glucose, insulin, CRP, creatinine, triglycerides, total cholesterol, HDL-C and LDL-C
## Consent and participation status for LLS eligible

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number Eligible</td>
<td>14,081</td>
<td></td>
</tr>
<tr>
<td>Consented</td>
<td>9,246</td>
<td>(65.7%(^1))</td>
</tr>
<tr>
<td>Completed Visit</td>
<td>7,875</td>
<td>(85.2%(^2))</td>
</tr>
<tr>
<td>Successful Blood Draw(^3)</td>
<td>7,479</td>
<td>(95.0%(^4))</td>
</tr>
<tr>
<td>CBC Results Available</td>
<td>7,406</td>
<td>(94.0%(^4))</td>
</tr>
<tr>
<td>CVD biomarkers Available</td>
<td>7,325</td>
<td>(93.0%(^4))</td>
</tr>
</tbody>
</table>

---

1 Percentage of eligible.
2 Percentage of consented.
3 Successful blood draw = participant has both a F301 (LLS visit data form) and a F300 (LLS blood processing form).
4 Percentage of completed visit.
### Age and Race/Ethnicity of LLS participants

<table>
<thead>
<tr>
<th>Age at visit</th>
<th>(N=7,875)</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>63-69</td>
<td>724</td>
<td>9.2%</td>
</tr>
<tr>
<td>70-79</td>
<td>3,050</td>
<td>38.7%</td>
</tr>
<tr>
<td>80-89</td>
<td>3,689</td>
<td>46.8%</td>
</tr>
<tr>
<td>≥ 90</td>
<td>412</td>
<td>5.2%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>(N=7,875)</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>2,651</td>
<td>33.7%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,314</td>
<td>16.7%</td>
</tr>
<tr>
<td>White</td>
<td>3,910</td>
<td>49.7%</td>
</tr>
</tbody>
</table>
LLS Ancillary Studies Underway

**BA25** (Reiner): DNA – telomere in ~1,300 LLS participants

**AS534** (Conneely): DNA – methylation in ~43 LLS participants overlapping with AS315 (Whitsel)

**AS416** (Reis): Plasma PPT – protein microarrays in ~100 LLS participants

**AS518** (Assimes) – RNA sequencing pilot in ~100 LLS participants

**AS576** (Reiner/Kooperberg) – RNA sequencing ~1,350 LLS participants overlapping with TOPMed WGS
### LLS Ancillary Studies Pending

<table>
<thead>
<tr>
<th>Study (PI)</th>
<th># LLS Participants</th>
<th>Sample type</th>
<th>Assay</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS629 (Xiao)</td>
<td>250 cognitive decline + 500 controls (shared with AS624)</td>
<td>Serum-SST</td>
<td>Metabolomics, proteomics</td>
</tr>
<tr>
<td>AS624 (Stone)</td>
<td>375 CVD + 750 controls (shared with AS629)</td>
<td>Serum-SST</td>
<td>Metabolomics, proteomics</td>
</tr>
<tr>
<td>AS628 (Reiner)</td>
<td>7,800 (all LLS)</td>
<td>DNA (baseline and LLS)</td>
<td>CHIP</td>
</tr>
</tbody>
</table>
LLS Serum, Plasma, and RBCs available among the 7,875 Long Life Study participants

Source: WHI Query Builder
Serum, Plasma, and RBCs available at multiple time points among the 7,875 Long Life Study participants

Source: WHI Query Builder
LLS Publications

• 30 approved manuscripts excluding OPACH
  – telomere length,
  – DNA methylation
  – Genetics, gene expression
  – Physical performance, BP

• 15 OPACH papers published or in press
Objective Physical Activity and Cardiovascular Health (OPACH)

- Ancillary study of LLS: R01 HL105065 (PI: Andrea LaCroix)
- Aims to determine associations of PA and SB with cardiovascular events, total mortality, and incident falls
- Adding accelerometry, self-reported PA (PAQ and CHAMPS) and Falls calendar for a year
- N=7048 participated, 6489 completed 7-day accelerometer and sleep log (2012-2014)
OPACH Study Page

https://www.whi.org/researchers/data/WHIStudies/StudySites/AS286/Pages/home.aspx
OPACH Papers in Progress

- 15 papers published so far
- 30+ manuscript proposals approved

Outcomes being studied:

- Atrial fibrillation
- Congestive heart failure
- Diabetes
- Physical function/mobility
- Cognitive function
- Injurious falls (CMS)
- Fractures
- PA-related cancers
NIH Grants using OPACH Data

1. WHISH U01 (Kooperberg, LaCroix, Stefanick)
2. WHISH-2-Prevent Heart Failure (Eaton)
3. Novel methods for analyzing accelerometry data (Di)
4. Sedentary Time Interrupted P01 (LaCroix)
5. Novel Computational Techniques to detect the relationship between sitting patterns and metabolic syndrome in adults (Natarajan)
OPACH Submitted Grants

1. Unraveling Physical Activity and Sedentary Behavior Associations with Cancer Combining Two Cohorts (Evenson) – Pending 10\textsuperscript{th} percentile

2. Evidence to Inform Guidelines Regarding Physical Activity and Sedentary Behavior to Reduce Fracture Risk in Older Women (Crandall) – responding

3. Non-fracture fall-related injuries (Strotmeyer) – Resubmitted 3/2019

4. Physical activity across the Lifecourse Study (PAALS) (LaCroix, Godino, Jackson, LaMonte) submitted 3/2019
Junior Faculty and Doctoral Students

- Aladdin Shadyab, PhD (LaCroix)
- John Belletiere (LaCroix)
- Kelsie Full (Kerr, LaCroix)
- Andrew Hua (Buchner)
- Dori Rosenberg, PhD (LaCroix)
- Priya Palta (Evenson)
- Emily MacDonald (LaCroix)
- Nicole Glass (LaCroix, Bellettiere)
- Purva Jain (LaCroix, Bellettiere)
Focus areas

• Relative intensity of PA – in relation to incidence of disease events

• Changes in PA and SB patterns over 10 years (LLS1 – LLS2)

• In relation to changes in SPPB and biomarkers of healthy CVD aging

• Atrial fibrillation, CV reactivity, continuous heart rate monitoring (Zio patch)
Acknowledgements

WHI-CCC
Andrea LaCroix
Eileen Rillamas-Sun
Chongzhi Di
Julie Hunt
Lesley Tinker
Kyle Campbell
Todd Panek
Sheri Greaves
Yuzheng Zhang

University of Illinois
David Buchner

Stanford
Marcia Stefanick
William Haskell

Harvard
I-Min Lee

UNC
Kelly Evenson
Molly Wen
Amy Herring
Steve Marshall

University of Buffalo
Michael LaMonte

UAB
Beth Lewis

Johns Hopkins
Ciprian Crainiceanu
Jiawei Bai