The COcoa Supplement and Multivitamin Outcomes Study (COSMOS)

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WHI Investigators Meeting
May 2, 2019
Median Treatment Period = 4.0 years

Primary Outcomes: Major cardiovascular events (MI, stroke, CVD death, and coronary revascularization) and total cancer (excluding non-melanoma skin cancer)

Baseline Blood/Urine Collection: >6800 participants; follow-up samples in a subgroup

Baseline Clinic Visit: Subcohort of 603 Boston-based participants with follow-up at 2 years
COSMOS Blood (Biospecimen Collection)

- **Timeline and sample size of blood and urine collections**

<table>
<thead>
<tr>
<th>Time</th>
<th>Actual to Date</th>
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</thead>
<tbody>
<tr>
<td>Baseline (April 2016-March 2018)</td>
<td>6,857</td>
</tr>
<tr>
<td>Year 1 (began August 2017)</td>
<td>2,135</td>
</tr>
<tr>
<td>Year 2</td>
<td>2,000, (began in mid-late 2018)</td>
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<tr>
<td>Year 3</td>
<td>2,000 (planned), mid-late 2019</td>
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</tbody>
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- **Home visit via Examination Management Services Inc (EMSI)**
  - Fasting blood and spot urine collection
  - Seated BP, height, weight, waist and hip circumference

- Participants can also collect blood and urine on their own or by visiting a Quest Diagnostics center around the U.S.
COSMOS Clinic Visits

- **Timeline and sample size of clinic visits at BWH, Boston:**
  - Baseline and 2-year follow-up in ~600 women and men
- **In-depth assessments at clinical visits:**
  - Fasting blood, spot urine, anthropometry
  - Cognitive (including ModBent) and physical function
  - Vascular studies, 24-hour ABP, fecal samples, and MRI

<table>
<thead>
<tr>
<th>Time</th>
<th>Completed to Date</th>
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<tbody>
<tr>
<td>Baseline (Sept 2016 - March 2018)</td>
<td>603 (297 women, 306 men)</td>
</tr>
<tr>
<td>Vascular: Pulse Wave Velocity</td>
<td>~550</td>
</tr>
<tr>
<td>24-hour Ambulatory BP</td>
<td>~500</td>
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<tr>
<td>Fecal samples</td>
<td>412</td>
</tr>
<tr>
<td>Brain MRI</td>
<td>120</td>
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<tr>
<td>Year 2 (same studies)</td>
<td>Began in mid-2018</td>
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**COSMOS Mind**

- Supported through an NIH (NIA) grant.
- Led by Wake Forest University (Laura Baker, PI).
- *Telephone-based cognitive assessments:*
  - No dementia at baseline
  - ~45 minutes long
  - Telephone interview for cognitive status-modified (TICSm) and other tests

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<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>Baseline (began July 2016)</td>
<td>2,262</td>
</tr>
<tr>
<td>Year 1 (began September 2017)</td>
<td>2,035</td>
</tr>
<tr>
<td>Year 2</td>
<td>Began in mid 2018</td>
</tr>
<tr>
<td>Year 3</td>
<td>To begin in mid 2019</td>
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</tbody>
</table>
COSMOS Web (ModBent)

- Supported through Mars Symbioscience.
- In collaboration with Columbia University.
- **Web-based cognitive assessments:**
  - ~30 minutes long
  - Conducted at baseline, 1, 2, and 3 years
  - ModBent (novel pattern recognition task)
  - Flanker and Spatial Memory Tests

<table>
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<th>Time</th>
<th>Completed to Date</th>
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<tr>
<td>Baseline (began July 2016)</td>
<td>3,958</td>
</tr>
<tr>
<td>Year 1</td>
<td>3,323</td>
</tr>
<tr>
<td>Year 2</td>
<td>Began in mid 2018</td>
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<tr>
<td>Year 3</td>
<td>To begin in mid 2019</td>
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</table>
COSMOS Eye

- Supported through an NIH (NEI) grant.
- Led by Dr. Bill Christen at Brigham and Women’s Hospital.
- Addition of cataract and age-related macular degeneration (AMD) as confirmed endpoints in COSMOS.
COSMOS Ancillary Study Participation

10,160 participants joined at least one

Mind
N=2262

Web
N=3953

Blood
N=6867

Clinic
N=603
An Emerging Data Matrix for the COSMOS Trial

Machine learning

Machine learning

Network science

Clinic measures

Web and app-based QQs

Medical records for outcomes

Other omics

Diet

Genetics

Cognition

Imaging

Biomarkers

Cocoa Extract

Multivitamin
Conclusions

- COSMOS provides exciting opportunities for biomarker, microbiome, ambulatory BP, vascular, cognitive, and vision studies.
- We encourage manuscript proposals and ancillary study applications leveraging this resource.

Thank you!