Welcome to the Duke CTSI Virtual Town Hall

April 21, 2017
Hosted by Becky Moen, MBA
Chief Administrative Officer
Duke Clinical and Translational Science Institute

Please note that you have been muted upon entry to this WebEx. Click the microphone by your name in the participant list to unmute as needed.

This presentation is being recorded.
A Few Housekeeping Notes

• Q&A time will follow presentation

• During the presentation, use the chat box in WebEx to ask questions

• Please remain muted unless you need to speak. This minimizes background noise.

• When you speak, please identify yourself by name and work area to help others recognize you.

• This WebEx is being recorded and will be posted on the CTSI website
“How to Tap into a 12,000+ Person Study Cohort in Kannapolis”

Presenters

L. Kristin Newby, MD, MHS
Health Services Outcomes Research, DCRI

Jamie Todd, MD – Co-PI
MURDOCK COPD Study

Miriam Morey, PhD – Co-PI
Physical Performance Across the Lifespan Study
How to Tap into a 12000+ Person Study Cohort in Kannapolis

L. Kristin Newby, MD, MHS
April 21, 2017
Brief History of Duke in Kannapolis

- **2008**: Duke opens its first office on the NC Research Campus, establishing a presence in Kannapolis, NC.
- **2010**: MURDOCK Study enrolls its first participant.
- **2011**: MURDOCK MS cohort enrolls its first participant.
- **2011**: 5000th participant enrolled in MURDOCK Study.
- **2012**: New studies, cohorts, publications, collaborators, industry-sponsored studies, growing number of participants, expanded catchment region, growth in operations and capabilities, new clinical operations space.

PRESENT DAY
A Full-Service Hub for Translational Population Health Research
What is the MURDOCK Study?

Measurement to Understand the Reclassification of Disease Of Cabarrus / Kannapolis

• Overarching goal
  – Integrate population data (participant-reported, clinical, and molecular) as well as publicly available data sources in a geospatial framework to:
    • characterize health and disease, risk for clinical events, and response to treatment;
    • measure and predict population health outcomes;
    • provide a platform to conduct clinical and health services research.
Details of the MURDOCK Study

Distance from Durham to Kannapolis:
118 miles <2 hours, accessible by Amtrak

MURDOCK Leadership Team

Kristin Newby, MD, MHS
Erich Huang, MD, PhD
Geoff Ginsburg, MD, PhD
Julie Eckstrand, PharmD
Our Operations Team
Translational Population Health Research (TransPop)

Director of Operations
Julie Eckstrand, RPh

Project Leadership
Doug Wixted, MMCi, Strategic Services
Leah Bouk, CCRC, MBA, Clinical Operations
Perla Nunes, Community Engagement
Melissa Cornish, MSPH, Opportunity Development
Brooke Heidenfelder, PhD, Project Leadership
The MURDOCK Study Today

**HORIZON 1**
Used legacy samples and associated data to generate molecular biosignatures

Generated hypotheses to reclassify disease
- Cardiovascular disease
- Liver disease
- Obesity
- Osteoarthritis

**HORIZON 2**
Prospective cohort studies
- Multiple sclerosis
- Memory & cognitive health
- Physical performance
- Type 2 diabetes
- Medical records
- COPD

Analyses using samples/data
- Prostate cancer
- Vascular/Alzheimer’s

**HORIZON 3**
New molecular data from diverse patient populations
New cohort studies
New meta-analyses
International collaborations
Measurement of public health impact

**Horizon 1.5:** Community registry of adults in Kannapolis/Cabarrus County and surrounding region of North Carolina.
- More than 12,260 participants
- Over 450,000 annotated samples
Participants consented to:

- Health questionnaire (illness, PROs, activity, diet, lifestyle, meds and demographics)
- Brief exam (HR, BP, waist circumference)
- Blood and urine samples for unspecified future research
- Contact for annual follow-up
- Contact up to 4x/year for participation in other research studies
- Ongoing access to medical record
- Geospatial mapping
- Participation indefinite or until consent withdrawn

Inclusion criteria:

- Age 18 or older and reside in qualifying zip code
- Residential zip code requirement waived for:
  - Those who qualify for COPD cohort
  - All first responders who work in catchment area
  - Male healthcare workers who work in catchment area
  - People who work at the North Carolina Research Campus
## Snapshot of the MURDOCK Study Cohort

N=12,258 participants

<table>
<thead>
<tr>
<th>Category</th>
<th>% MURDOCK</th>
<th>% Region*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>66.0</td>
<td>51.3</td>
</tr>
<tr>
<td>African American</td>
<td>13.4</td>
<td>35.3**</td>
</tr>
<tr>
<td>Asian</td>
<td>0.7</td>
<td>3.5</td>
</tr>
<tr>
<td>Hispanic</td>
<td>12.5</td>
<td>10.9</td>
</tr>
<tr>
<td>Age (median)</td>
<td>52</td>
<td>—</td>
</tr>
</tbody>
</table>

*Data based on U.S. Census tracts

**African Americans in Cabarrus County represent 17.1% of the County population (2014).
# Self-Reported Illnesses of MURDOCK Cohort

<table>
<thead>
<tr>
<th>Number</th>
<th>% of Total Cohort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>3475</td>
</tr>
<tr>
<td>Diabetes</td>
<td>2260</td>
</tr>
<tr>
<td>Heart</td>
<td></td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>764</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>432</td>
</tr>
<tr>
<td>Coronary artery disease</td>
<td>901</td>
</tr>
<tr>
<td>Heart attack</td>
<td>814</td>
</tr>
<tr>
<td>Pacemaker</td>
<td>218</td>
</tr>
<tr>
<td>High Cholesterol</td>
<td>5468</td>
</tr>
<tr>
<td>Hypertension</td>
<td>4206</td>
</tr>
<tr>
<td>Obesity (BMI 28 [24-32] kg/m²)</td>
<td>2979</td>
</tr>
<tr>
<td>Osteoarthritis</td>
<td>2928</td>
</tr>
<tr>
<td>Other Mental Illness</td>
<td>636</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cancer</th>
<th>Number</th>
<th>% of Total Cohort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>430</td>
<td>3.5</td>
</tr>
<tr>
<td>Colon</td>
<td>125</td>
<td>1.0</td>
</tr>
<tr>
<td>Lung</td>
<td>78</td>
<td>0.6</td>
</tr>
<tr>
<td>Prostate</td>
<td>259</td>
<td>2.1</td>
</tr>
<tr>
<td>Cervical</td>
<td>168</td>
<td>1.4</td>
</tr>
<tr>
<td>Melanoma</td>
<td>451</td>
<td>3.7</td>
</tr>
<tr>
<td>Skin cancer, not melanoma</td>
<td>1741</td>
<td>14.2</td>
</tr>
<tr>
<td>Oral</td>
<td>29</td>
<td>0.2</td>
</tr>
<tr>
<td>Other type of cancer</td>
<td>512</td>
<td>4.2</td>
</tr>
</tbody>
</table>

N=12,258 MURDOCK Study participants, as of 3/27/2017
Counts may include deceased individuals who are deceased or have approved use of their data/biospecimens but cannot be re-contacted for future studies.
Banked Sample Inventory

- Average number of aliquots stored per participant: ~35
  - Collection initiated in early 2009
  - Collected for all participants at enrollment under MURDOCK Registry
  - Follow-up sample collection dependent on protocol

- >450,000 samples stored

<table>
<thead>
<tr>
<th>Stored as:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Plasma</td>
<td>0.5 mL</td>
</tr>
<tr>
<td>Serum</td>
<td>0.5 mL</td>
</tr>
<tr>
<td>Whole blood</td>
<td>3 mL</td>
</tr>
<tr>
<td>PAXGene RNA</td>
<td>2.5 mL</td>
</tr>
<tr>
<td>Buffy coat</td>
<td>not applicable</td>
</tr>
<tr>
<td>Urine</td>
<td>10 mL</td>
</tr>
</tbody>
</table>
Collaborating is Easy

1. Investigator has new idea and consults with CTSI TransPop leadership

2. Complete online submission via MURDOCK Study website Proposal Concept Form: murdock-study.com

3. Proposal concept form to MURDOCK Leadership with budget

4. MURDOCK Leadership reviews form
   Interested investigator can present concepts

5a. Proposal approved to proceed

5b. Proposal changes are requested for re-review

6. Proposal concept evolves into proposal submission to funding agency/sponsor

Contact:
Melissa Cornish, CTSI
(919) 622-2254
melissa.cornish@duke.edu
Ease and Value of Collaboration with TransPop
Collaborators share their experiences in their own words

Simply put, interaction with the MURDOCK Study team has driven the success of my MURDOCK-MS sub-study. They have been responsive and proactive during the 5+ years of recruitment, and have set us up for future success with the study.

—Simon Gregory, PI, MURDOCK Horizon 2 MS Study

Your team’s careful maintenance of sample provenance and control of the chain of custody meet the highest standards in the profession. Analysis of certain metabolites clearly shows that MURDOCK plasmas were processed promptly and with care. [We] look forward to further collaborations with MURDOCK-CTSI.

—James Bain, Faculty Co-Director, Metabolomics Laboratory, Duke Molecular Physiology Institute

MURDOCK leadership and staff worked closely with me on multiple aspects of a large 5-year NIH proposal on smoking cessation and provided substantial value to the proposal by offering recruitment through existing relationships with the MURDOCK study population, access to comprehensive environmental data on participants through geospatial mapping datasets, and correlational analysis with genomic and longitudinal health outcomes data.

—James Davis, Director, Duke Smoking Cessation Center
Comments and questions are welcome

- Sign up for our TransPop distribution list by emailing murdock-study@duke.edu
- Call us at (704) 250-5861
- Visit our website: www.murdock-study.org
The MURDOCK COPD Study

Evaluating the impact, progression, and management of chronic obstructive pulmonary disease (COPD) in a real-world setting.

Scott Palmer, MD, MHS – Co PI
Jamie Todd, MD – Co PI
Chronic Obstructive Pulmonary Disease (COPD)
A leading cause of death and disability

<table>
<thead>
<tr>
<th>Condition</th>
<th>Total Deaths</th>
<th>Share of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart disease</td>
<td>614,348</td>
<td>23.4%</td>
</tr>
<tr>
<td>Cancer</td>
<td>591,699</td>
<td>22.5%</td>
</tr>
<tr>
<td>Chronic lower respiratory diseases</td>
<td>147,101</td>
<td>5.6%</td>
</tr>
<tr>
<td>Accidents</td>
<td>136,053</td>
<td>5.2%</td>
</tr>
<tr>
<td>Stroke</td>
<td>133,103</td>
<td>5.1%</td>
</tr>
<tr>
<td>Alzheimer's disease</td>
<td>93,541</td>
<td>3.6%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>76,488</td>
<td>2.9%</td>
</tr>
<tr>
<td>Flu, pneumonia</td>
<td>55,227</td>
<td>2.1%</td>
</tr>
<tr>
<td>Kidney disease</td>
<td>48,146</td>
<td>1.8%</td>
</tr>
<tr>
<td>Suicide</td>
<td>42,773</td>
<td>1.6%</td>
</tr>
</tbody>
</table>

Source: Centers for Disease Control and Prevention

BREATHTAKING NUMBERS

Smoking is the primary cause of COPD

$49.9 BILLION
Annual economic cost of COPD (ER visits, hospitalizations and lost productivity)

13.1 MILLION
U.S. adults have diagnosed COPD

12.0 MILLION
U.S. adults have undiagnosed COPD

AMONG THOSE LIVING WITH COPD
51% say it limits their ability to work
53% say it limits their social activities
COPD: Evolving Risk Stratification Approaches

The Global Initiative on Chronic Obstructive Lung Disease (GOLD)

<table>
<thead>
<tr>
<th>GOLD Stage</th>
<th>FEV1 (% pred)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOLD 1</td>
<td>≥ 80</td>
</tr>
<tr>
<td>GOLD 2</td>
<td>50-79</td>
</tr>
<tr>
<td>GOLD 3</td>
<td>30-49</td>
</tr>
<tr>
<td>GOLD 4</td>
<td>&lt; 30</td>
</tr>
</tbody>
</table>

2011 Revision

2017 Revision

Historical

Determine degree of airflow limitation and assign numeric GOLD stage

Assign A-D GOLD group.

Determine exacerbation history and symptoms.

CAT < 10

CAT ≥ 10

0-1 (not leading to hospital admission)

≥ 2 or ≥ 1 leading to hospital admission

C

D

A

B

Symptoms

mMRC 0-1

mMRC ≥ 2

Exacerbation History

0

1

2

3

4
Why the MURDOCK COPD Study?

- No study has prospectively examined the clinical value of these new algorithms in assessing risk of important events (e.g. death, exacerbation, hospitalization).

- Majority of current knowledge in COPD is derived from populations enrolled at academic medical centers, unclear how reflective these populations are of the broader community.

- The primary results of this study will be used to determine if 2017 GOLD risk group correlates with the clinical COPD events in a “real world” setting.

- Secondary results may help 1) determine how COPD therapies are applied in the community and 2) describe the impact and clinical progression of COPD in a community cohort of patients.
Study Overview

• Longitudinal observational cohort study
• Target enrollment, n=850
• 2yr enrollment, 5yr f/u
• First participant enrolled October 6, 2016
• 103 currently enrolled

• Key inclusion criteria
  • ≥40 years of age
  • ≥ 10 pack-year history of tobacco exposure
  • COPD confirmed by spirometry at screening (FEV1/FVC < 0.70)

• Key exclusion criteria
  • Participation in an investigational drug trial at the time of screening
  • Subjects listed for or previously received lung transplantation at the time of screening.
<table>
<thead>
<tr>
<th>Visit Number</th>
<th>Pre/Screening Visit</th>
<th>Enrollment Visit</th>
<th>Follow-Up Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>V 0</td>
<td>V 1</td>
<td>V 2</td>
</tr>
<tr>
<td>Study Month</td>
<td>0</td>
<td>0</td>
<td>6*</td>
</tr>
<tr>
<td>Informed Consent</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical record release and HIPAA form</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demographic data</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Medical history</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Exacerbation history</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Concomitant medication</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Self-reported hospitalizations</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Hospital bill/medical record collection</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>COPD assessment test</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPAQ-Short Form</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Six-minute walk test</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spirometry</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assign GOLD risk group</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Telephone visits (scheduled at 6-month intervals between annual in-person visit).
Demographics
COPD Measures

- High symptom burden
- Moderate Airflow Limitation
Working with MURDOCK

• Broad network of existing research infrastructure
• Multifaceted research expertise
• Willing to learn and apply new skills (e.g., spirometry)
• Engaged in the local community
• Creativity in troubleshooting and problem-solving
• Focused on driving a scientific mission meaningful to patients
Physical Performance Across the Lifespan

Miriam C. Morey, Ph.D., Co-PI
Harvey Jay Cohen, MD, Co-PI
Study Overview

- Nested cohort study
- Age and gender stratified enrollment (n=1000)
- Enriched functional and physical activity assessments including direct measures of physical performance
- Biomarker and health measures
- Repeat assessment at 2-year follow-up

Visit 2 Status N=1000

- Completed V2 (520)
- Not yet eligible (157)
- Declined V2 (157)
- Eligible but not yet scheduled (61)
- Lost to Follow-Up (43)
- Deceased (14)
- Scheduled (27)
- Screen Failure (6)
Interface with Kannapolis Staff

- Expert management of regulatory study components
- Train-the-trainer approach for physical performance testing and accelerometry
- Translation of materials into Spanish
- Very positive team to work with!!!!
Significant change in slope from one age group cohort to the next for:
• 6 minute walk and usual gait between 6th and 7th decade
• single legged stands and chair stands between 4th and 5th decade
Physical Performance Study

Participant Feedback Letter Data

**WALKING SPEED**

The chart below shows your usual walking speed for each time you were tested.
- Normal or "usual" walking speeds range between 1.3 and 1.6 yards/second among people ages 30 to 60.
- For individuals over age 60, the normal range is between 1.0 to 1.4 yards/seconds.
- Some medical conditions, such as a stroke or severe arthritis, might slow your walking speed.

![Walking Speed Chart](chart1.png)

Walking speed below this level (0.76 yds/sec) shows early problems with walking and ability to get around.

Walking speed below this level (0.44 yds/sec) usually means you need, or will need in the near future, more help getting around, doing common daily activities, or needing an assisted living residence.

Your "usual" or normal walking speed tells us a lot about how easy it will be for you to move about in later life. Although normal walking speed slows down as we get older, most people’s walking speed remains steady over a two-year period. In general, men tend to walk faster than women. A walking speed faster than 1.3 yds/sec is needed to comfortably cross a street with a traffic light.

**CARDIO-RESPIRATORY FITNESS**

The chart below shows how many yards you walked in six minutes at each testing occasion. The tables on the right provide a range of average scores for this test for men and women at different ages.

![Six Minute Walk Chart](chart2.png)

<table>
<thead>
<tr>
<th>Age</th>
<th>Yards you need to walk in 6 minutes to score in “average” range</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-39</td>
<td>639-781</td>
</tr>
<tr>
<td>40-49</td>
<td>640-796</td>
</tr>
<tr>
<td>50-59</td>
<td>574-736</td>
</tr>
<tr>
<td>60-69</td>
<td>562-726</td>
</tr>
<tr>
<td>70-79</td>
<td>471-680</td>
</tr>
<tr>
<td>80-89</td>
<td>383-604</td>
</tr>
<tr>
<td>90+</td>
<td>304-502</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>Yards needed to walk in 6 minutes to score in “average” range</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-39</td>
<td>620-774</td>
</tr>
<tr>
<td>40-49</td>
<td>596-763</td>
</tr>
<tr>
<td>50-59</td>
<td>560-723</td>
</tr>
<tr>
<td>60-69</td>
<td>500-659</td>
</tr>
<tr>
<td>70-79</td>
<td>435-614</td>
</tr>
<tr>
<td>80-89</td>
<td>340-540</td>
</tr>
<tr>
<td>90+</td>
<td>273-441</td>
</tr>
</tbody>
</table>
Works in Progress

- Baseline analyses of biomarkers
- Planned analyses constructing “robustness” and “impairment” biomarker indices
- Development of “robustness” phenotype
- Association between physical performance self report and actual
- Biomarker profile of sedentary
- Others

Thank you very much!!!

The Duke Pepper Center welcomes collaborations with other investigators

Our particular interest is in themes around “physical reserve and resilience”
Questions?

Don’t forget to unmute yourself!
Thank you for participating!

A recording of this presentation will be posted on
www.ctsi.duke.edu

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