All of Us Research Program

21st Century Cures Act
10-Year Draft Plan for
Precision Medicine Funding

Eric Dishman
March 28, 2017
Precision Medicine Initiative Working Group of the ACD

- Formed March 2015; report presented and accepted September 2015
- Provides framework for creating and managing an unprecedented research cohort
- Recommendations include:
  - Two overarching enrollment methods (health care provider orgs and direct volunteers)
  - One million + volunteers of all health statuses and all ages
  - Reflect broad diversity of the United States
  - Longitudinal cohort with continuing interactions & data capture
  - Highly interactive and proactive participant model
  - Rich data: surveys, biospecimens, physical measurements, EHR, omics, mHealth
Overview: *All of Us* Research Program

- **Mission:** To accelerate scientific discovery & medical breakthroughs in precision medicine

- **How:** Deliver a national resource of deep clinical, environmental, lifestyle, & genetic data from one million participants who are consented & engaged to provide data on an ongoing, longitudinal basis (60+ years!)

- **Priority:** Reflect the broad diversity of the U.S.—all ages, races/ethnicities, gender, SES, geo, & health status—by over-recruiting those underrepresented in biomedical research

- **Priority:** Build the tools & capabilities that make it easy for researchers from citizen scientists to premier university labs to make discoveries using the data & biosamples and through ancillary studies w/ the cohort
Current Status of *All of Us*

- Built robust network of 50+ academic, provider, technology, & community partners
- Have plans/methods to recruit as underrepresented in biomed research as a major part of 1M participants
- Pilot test completed on language, concepts, interfaces
- Version 1 protocol submitted to IRB (consent, EHR authorization, 5 initial surveys, blood & urine collection, physical measures)
- Biobank capacity ready for alpha/beta launch, on schedule for national launch (35M+ vials)
- Enrollment website, 1-800#, smartphone apps, and data center developed with early testing & training begun
- Final end-to-end security testing, user testing, workflow testing, & training start in April

Pending testing results & IRB approval, aiming for **Alpha/Beta launch in May** & **National launch in Oct**
Estimated 10 year costs to fully fund program are $4.3B

- National Participant Engagement/Retention Platform – $1.6B
  - Includes Health Care Provider Organization network
  - Includes Direct Volunteer capacity across country
  - Include Community Engagement Partner network

- National Biobank & Specimen Sharing Platform – $1.3B
  - Includes genotyping and whole genome sequencing pilots

- Big Data Repository, Security, & Sharing Infrastructure – $500M
  - Includes Electronic Health Records and mHealth pilots

- Data Cleaning & Curation Infrastructure - $350M

- Researcher Tools & Ecosystem Development - $350M

- Operations, Communications, & Coordination – $200M

Must wait for cost curves—Whole genome seq & wearables today cost $1B each for 1M participants
Precision Medicine Funding in 21st Century Cures Act

Section 498E - “The Secretary… to establish and carry out… the ‘Precision Medicine Initiative’ includ[ing]…

- Developing a network of scientists…
- Developing new approaches for addressing scientific, medical, public health, and regulatory science issues…
- Applying genomic technologies…to provide data on the molecular basis of disease…
- Collecting information voluntarily by a diverse cohort of individuals that can be used to better understand health and disease”

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Cures Appropriation Assumptions

- Original proposed base budgets/plans aimed to ramp to $430M by 2019
- Current uncertainty about our base funding, so assuming base is flat with 2 scenarios:
  - Scenario 1 – base funding at FY 2017 requested level of $230M
  - Scenario 2 – base funding at FY 2016 Enacted level of $130M
- The Cures funds are no-year funds which provide flexibility for when the funds can be obligated. In some fiscal years, we will utilize this flexibility to appropriately manage the program while ensuring the proper stewardship of federal funds.
- Without increase in base, will need to slow the study, change its scope, and/or seek public/private partnerships to fill budget gaps
Timeline for Full Funding

Program starts

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Protocol release

Start mid-2017, hit 1M by end of 2020

Replacement Recruitment Ongoing

New biosample collection starts

Ramp to/Sustain 1M People

Clinical data: HPO

EHR Summary & Labs

Notes & Specialty EHRs

Imaging

Clinical data: DV

S4S & Vendor Pilots

EHR Summary & Labs

Notes & Specialty EHRs

Imaging

Genetics collection & counseling

Pilots

Genotyping

WGS

mHealth

Existing Participant Devices

Special Purpose Devices

Biobank capacity

V1

V2

V3

Special Populations

Kids

All Others

*based on current estimates, not final plans
Timeline for $230M Base Funding (Scenario 1)

*based on current estimates, not final plans

**Protocol release**
- 2017: V1.0
- 2018: V1.1
- 2019: V1.2
- 2020: V2.0
- 2021: V2.1
- 2022: V2.2
- 2023: V3.0
- 2024: V3.1
- 2025: V3.2

**New biosample collection starts**

**Ramp to/Sustain 1M People**
- Start mid-2017, hit 1M by end of 2021

**Clinical data: HPO**
- EHR Summary & Labs
- Notes & Specialty EHRs
- Imaging

**Clinical data: DV**
- S4S & Vendor Pilots
- EHR Summary & Labs
- Notes & Specialty EHRs
- Imaging

**Genetics collection & counseling**
- Pilots
- Genotyping
- WGS

**mHealth**
- Existing Participant Devices
- Special Purpose Devices

**Biobank capacity**
- V1
- V2
- V3

**Special Populations**
- Kids
- All Others
Timeline for $130M Base Funding (Scenario 2)

*based on current estimates, not final plans

Program starts

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- **Protocol release**: V1.0 - V2.4
- **New biosample collection starts**
- **Ramp to/Sustain 1M People**: Start mid-2017, hit 1M by end of 2022
- **Clinical data: HPO**
- **Clinical data: DV**
- **Genetics collection & counseling**
- **mHealth**
- **Biobank capacity**: V1, V2
- **Special Populations**: Kids, All Others

Notes:
- Kids
- All Others

*Replacement Recruitment Ongoing*
Summary

- Good news: close to launching Version 1 protocol & platforms with participants
- Final 10-year work plans and budgets still in flux
  - Need to learn from alpha, beta, and first year of national launch
  - Congressional budgets still under consideration
  - Still soliciting public/expert input on key items like genomics plan, special populations
- Neither Scenario 1 nor 2 get us to full budget, so forces tradeoff discussions
- Three particular tradeoff dimensions for discussion:
  - Balance of Value to Participants and Value to Researchers
  - Breadth of Participants and Depth of Data Collection
  - Across the Board Cuts versus Stopping One of the Major Pillars of the Program
Back-Up Slides
Main Awardees So Far

Federal Partners: White House, HHS, NIH, ONC, HRSA, VA, USDS
Washington, D.C. area

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Washington, D.C. area

Main Awardees So Far

Building Block Partners

RMCs regional med centers

FQHCs

Participant Technologies Center (PTC) Scripps, La Jolla, CA

San Ysidro Health San Ysidro, CA

Calif PM Consortium San Diego, CA

Northwestern Evanston, IL

Biobank Mayo Clinic Rochester, MN

Trans-Amer PM Consort for HCSRNs Detroit, MI

Geisinger Danville, PA

Pitt Pittsburgh, PA

New Eng PM Consortia Boston, MA

Columbia New York, NY

Hudson River Peekskill, NY

Community Health Middletown, CT

Building
Block
Partners

RMCs
regional med centers

FQHCs

Eau Claire Columbia, SC

Cherokee Health Knoxville, TN

Jackson-Hinds Jackson, MS

Data & Research Center (DC) Vanderbilt, Nashville, TN

Jackson
-Hinds
Knoxville, TN

Trans-Amer PM Consort for HCSRNs Detroit, MI

Geisinger Danville, PA

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New Eng PM Consortia Boston, MA

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San Ysidro Health San Ysidro, CA

Northwestern Evanston, IL

Biobank Mayo Clinic Rochester, MN

Federal Partners:
White House, HHS, NIH, ONC, HRSA, VA, USDS
Washington, D.C. area

Anticipate new “community partner” awards begin mid ‘17
Current Consortium Members & Their Roles

Direct Volunteers

Health Care Provider Organizations

Branding & Content

Education & Awareness

Outreach & Recruitment

Enrollment: Informed Consent, PPI, EHR

Baseline Evaluation & Biospecimen Collection

Sustained Engagement

Health Care Provider Organizations
Estimated Cures Obligations and Carryover Per Fiscal Year

Scenario 1: $230M Base

Scenario 2: $130M Base

![Graph showing estimated cures obligations and carryover per fiscal year for two scenarios. The x-axis represents fiscal years from FY 2017 to FY 2026, and the y-axis represents obligations and carryover amounts up to $450,000,000.00. The two scenarios are differentiated by their base amounts, with Scenario 1 starting at $230M and Scenario 2 at $130M. The graphs include lines for annual cures appropriation, estimated obligations, and estimated carryover.]
A base of $230M would cover most of the basic people, specimen, and data platforms although some Cures funding would need to be utilized to support our current HPO network.

Some activities delayed past original planned date (e.g. mHealth data capture would start later than originally planned)

### Areas of Focus for Cures Funding
- Genetics Collection and Counseling
- Digital Clinical Data/EHR
- mHealth/Consumer Devices
- Researcher Tools Development

### Additional Potential Areas for Cures Funding
- Deeper engagement with and enrollment of diverse populations
- Other Omics Sequencing
- Imaging
- Environmental Sensors
- ELSI and Policy Research
- Grants to Researchers
## Scenario 1: Cures Funding Obligations by FY

<table>
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<tr>
<th>FY</th>
<th>Annual Cures Appropriation</th>
<th>Projected Obligations</th>
<th>Projected Carry-Over</th>
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With a base of $130M, the Cures funding would need to be utilized to support the basic participant, specimen, and data platforms of the program:

- Health Care Provider Organization network (No additional large RMCs; get to 1M in 2023)
- Participant Technology Systems Center and Participant Center
- Engagement Partner Awards (No growth)
- Biobank (limited growth in sample collection)
- Data and Research Center and basic data analytics (e.g. genotyping, some small pilots)

In FY 2023, when the Cures funding is $419M, we would have flexibility to perform additional activities outside of funding for the basic infrastructure (e.g. we could start whole genome sequencing of participants).

If our base is $130M, do we continue to enroll 1M participants with more limited data (e.g. limited EHR data) and specimen collection, or do we enroll less participants and strive for a greater depth of data?
## Scenario 2: Cures Funding Obligations by FY

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