Building the National Evaluation System for Medical Devices: Using Real-World Evidence to Improve Device Safety and Effectiveness

PCORnet Perspective

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March 24, 2016

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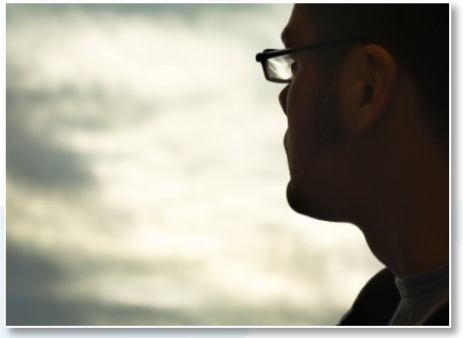
The National Patient-Centered Clinical Research Network

PCORnet: the National Patient-Centered Clinical Research Network

PCORnet's **goal** is to **improve the nation's capacity to conduct CER** efficiently, **by creating a large, highly representative, national patient-centered clinical research network** for conducting clinical outcomes research.

The **vision** is to support a learning US healthcare system, which would allow for **large-scale research** to be conducted with **enhanced accuracy and efficiency**.



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Overarching Objective of PCORnet: Develop a single functional research network

Create infrastructure, tools, and policies to support rapid, efficient comparative effectiveness research

Utilize multiple electronic health records, insurance claims data, data reported directly by patients, and other data sources

Engage patients, clinicians, and health system leaders throughout

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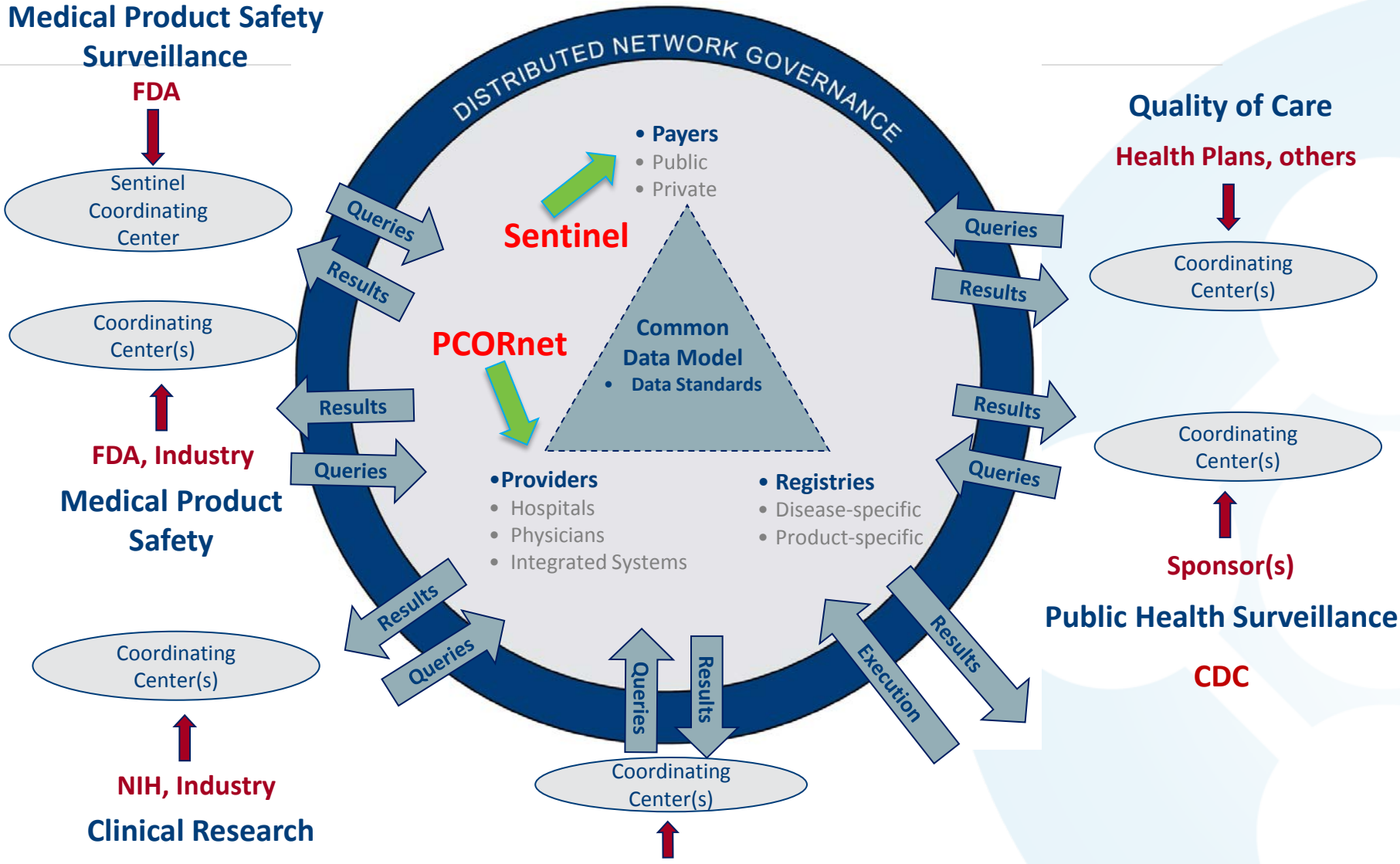
PCORnet as Part of a National Evidence Generation Infrastructure



PCORnet Common Data Model v3.0

New to v3.0

DEMOGRAPHIC
- **PATID**
- BIRTH_DATE
- BIRTH_TIME
- SEX
- HISPANIC
- RACE
- BIOBANK_FLAG

Fundamental basis

ENROLLMENT
- **PATID**
- **ENR_START_DATE**
- ENR_END_DATE
- CHART
- **ENR_BASIS**

DISPENSING
- **DISPENSINGID**
- **PATID**
- PRESCRIBINGID (optional)
- **DISPENSE_DATE**
- **NDC**
- DISPENSE_SUP
- DISPENSE_AMT

DEATH
- **PATID**
- **DEATH_DATE**
- DEATH_DATE_IMPUTE
- **DEATH_SOURCE**
- DEATH_MATCH_CONFIDENCE

DEATH_CONDITION
- **PATID**
- **DEATH_CAUSE**
- **DEATH_CAUSE_CODE**
- **DEATH_CAUSE_TYPE**
- **DEATH_CAUSE_SOURCE**
- DEATH_CAUSE_CONFIDENCE

Data captured from processes associated with healthcare delivery

VITAL
- **VITALID**
- **PATID**
- ENCOUNTERID (optional)
- **MEASURE_DATE**
- MEASURE_TIME
- **VITAL_SOURCE**
- HT
- WT
- DIASTOLIC
- SYSTOLIC
- ORIGINAL_BMI
- BP_POSITION
- SMOKING
- TOBACCO
- TOBACCO_TYPE

CONDITION
- **CONDITIONID**
- **PATID**
- ENCOUNTERID (optional)
- REPORT_DATE
- RESOLVE_DATE
- ONSET_DATE
- CONDITION_STATUS
- **CONDITION**
- **CONDITION_TYPE**
- **CONDITION_SOURCE**

PRO_CM
- **PRO_CM_ID**
- **PATID**
- ENCOUNTERID (optional)
- **PRO_ITEM**
- PRO_LOINC
- **PRO_DATE**
- PRO_TIME
- **PRO_RESPONSE**
- PRO_METHOD
- PRO_MODE
- PRO_CAT

Data captured within multiple contexts: healthcare delivery, registry activity, or directly from patients

ENCOUNTER
- **ENCOUNTERID**
- **PATID**
- **ADMIT_DATE**
- ADMIT_TIME
- DISCHARGE_DATE
- DISCHARGE_TIME
- PROVIDERID
- FACILITY_LOCATION
- **ENC_TYPE**
- FACILITYID
- DISCHARGE_DISPOSITION
- DISCHARGE_STATUS
- DRG
- DRG_TYPE
- ADMITTING_SOURCE

DIAGNOSIS
- **DIAGNOSISID**
- **PATID**
- **ENCOUNTERID**
- *ENC_TYPE (replicated)*
- *ADMIT_DATE (replicated)*
- *PROVIDERID (replicated)*
- **DX**
- **DX_TYPE**
- **DX_SOURCE**
- PDX

PROCEDURES
- **PROCEDURESID**
- **PATID**
- **ENCOUNTERID**
- *ENC_TYPE (replicated)*
- *ADMIT_DATE (replicated)*
- *PROVIDERID (replicated)*
- PX_DATE
- **PX**
- **PX_TYPE**
- PX_SOURCE

LAB_RESULT_CM
- **LAB_RESULT_CM_ID**
- **PATID**
- ENCOUNTERID (optional)
- LAB_NAME
- SPECIMEN_SOURCE
- LAB_LOINC
- PRIORITY
- RESULT_LOC
- LAB_PX
- LAB_PX_TYPE
- LAB_ORDER_DATE
- SPECIMEN_DATE
- SPECIMEN_TIME
- **RESULT_DATE**
- RESULT_TIME
- RESULT_QUAL
- RESULT_NUM
- RESULT_MODIFIER
- RESULT_UNIT
- NORM_RANGE_LOW
- NORM_MODIFIER_LOW
- NORM_RANGE_HIGH
- NORM_MODIFIER_HIGH
- ABN_IND

PRESCRIBING
- **PRESCRIBINGID**
- **PATID**
- ENCOUNTERID (optional)
- RX_PROVIDERID
- RX_ORDER_DATE
- RX_ORDER_TIME
- RX_START_DATE
- RX_END_DATE
- RX_QUANTITY
- RX_REFILLS
- RX_DAYS_SUPPLY
- RX_FREQUENCY
- RX_BASIS
- RXNORM_CUI

Data captured from healthcare delivery, direct encounter basis

PCORNET_TRIAL
- **PATID**
- **TRIALID**
- **PARTICIPANTID**
- TRIAL_SITEID
- TRIAL_ENROLL_DATE
- TRIAL_END_DATE
- TRIAL_WITHDRAW_DATE
- TRIAL_INVITE_CODE

Associations with PCORnet clinical trials

HARVEST
- **NETWORKID**
- NETWORK_NAME
- **DATAMARTID**
- DATAMART_NAME
- DATAMART_PLATFORM
- CDM_VERSION
- DATAMART_CLAIMS
- DATAMART_EHR
- BIRTH_DATE_MGMT
- ENR_START_DATE_MGMT
- ENR_END_DATE_MGMT
- ADMIT_DATE_MGMT
- DISCHARGE_DATE_MGMT
- PX_DATE_MGMT
- RX_ORDER_DATE_MGMT
- RX_START_DATE_MGMT
- RX_END_DATE_MGMT
- DISPENSE_DATE_MGMT
- LAB_ORDER_DATE_MGMT
- SPECIMEN_DATE_MGMT
- RESULT_DATE_MGMT
- MEASURE_DATE_MGMT
- ONSET_DATE_MGMT
- REPORT_DATE_MGMT
- RESOLVE_DATE_MGMT
- PRO_DATE_MGMT
- REFRESH_DEMOGRAPHIC_DATE
- REFRESH_ENROLLMENT_DATE
- REFRESH_ENCOUNTER_DATE
- REFRESH_DIAGNOSIS_DATE
- REFRESH_PROCEDURES_DATE
- REFRESH_VITAL_DATE
- REFRESH_DISPENSING_DATE
- REFRESH_LAB_RESULT_CM_DATE
- REFRESH_CONDITION_DATE
- REFRESH_PRO_CM_DATE
- REFRESH_PRESCRIBING_DATE
- REFRESH_PCORNET_TRIAL_DATE
- REFRESH_DEATH_DATE
- REFRESH_DEATH_CAUSE_DATE

Process-related data

http://www.pcornet.org/resource-center/pcornet-common-data-model/

Bold font indicates fields that cannot be null due to primary key definitions or record-level constraints.

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The PCORnet CDM lives at
http://pcornet.org/pcornet-common-data-model/

PCORnet Research Readiness: Data Infrastructure

- **Clinical Data Research Networks**
  - 13 networks with ≥**1 million patients** into PCORnet Common Data Model (CDM)
- **Patient data available in PCORnet DataMarts to date:**

~75 Million

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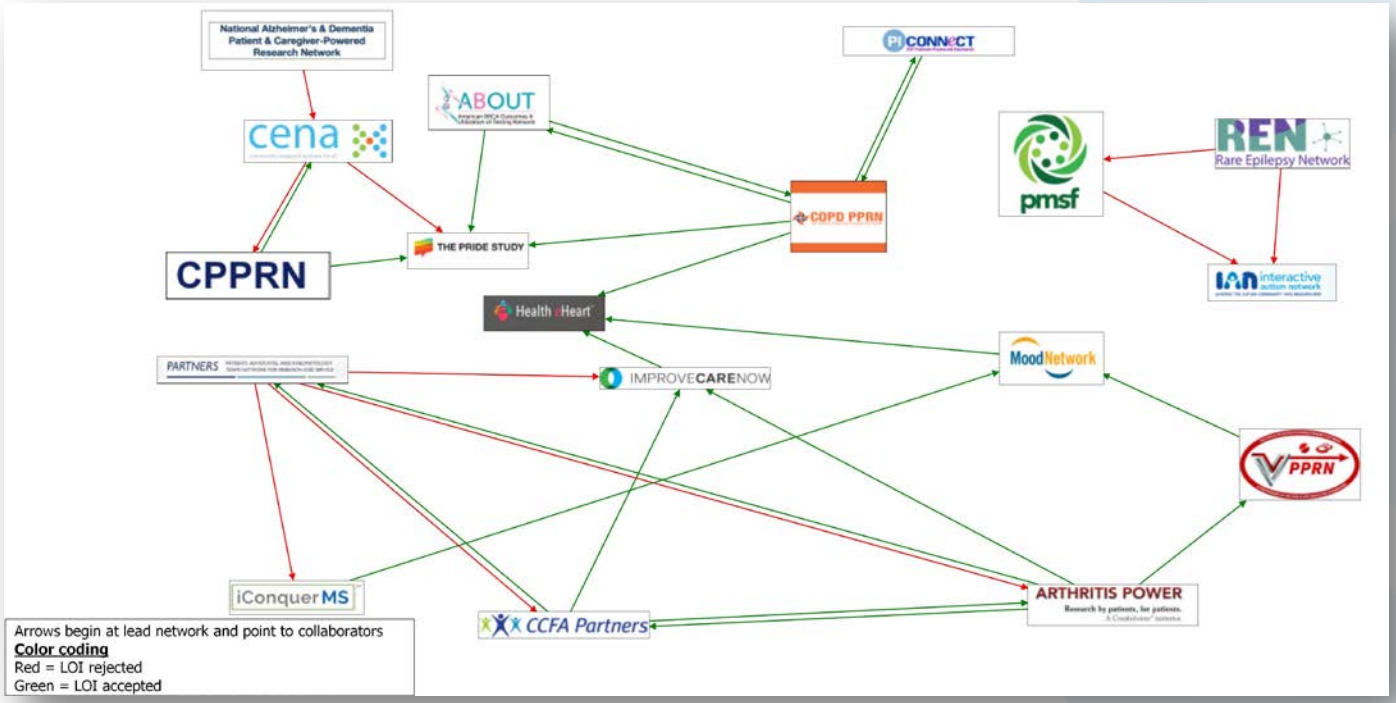
PCORnet People Power: transforming clinical research through the PPRNs

- Patient Powered Research Networks represent 20 different models of partnerships and infrastructure, representing over 100 diseases overall



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Many parts of PCORnet are still under construction

Short- and Long-Term Outcomes related to Bariatric Surgery

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The National Patient-Centered Clinical Research Network

Short- and Long-Term Effects of Antibiotics on Childhood Growth

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The National Patient-Centered Clinical Research Network

Aspirin Dosing: A Patient-Centric Trial Assessing Benefits and Long-term Effectiveness (ADAPTABLE) Trial

PCORnet's First Pragmatic Clinical Trial

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The National Patient-Centered Clinical Research Network

Open science

- Protocol and survey questions posted for public review and comment in July 2015
- Public and CDRN feedback contributed to key protocol changes
  - Exclusion of ticagrelor-treated patients
  - Exclusion of patients with potential indications for an oral anticoagulant, even if not treated with one
  - Inclusion of patients regardless of prior use of aspirin before randomization
- All ADAPTABLE materials and information are posted publicly (http://theaspirinstudy.org)
- Open dissemination plan for trial results

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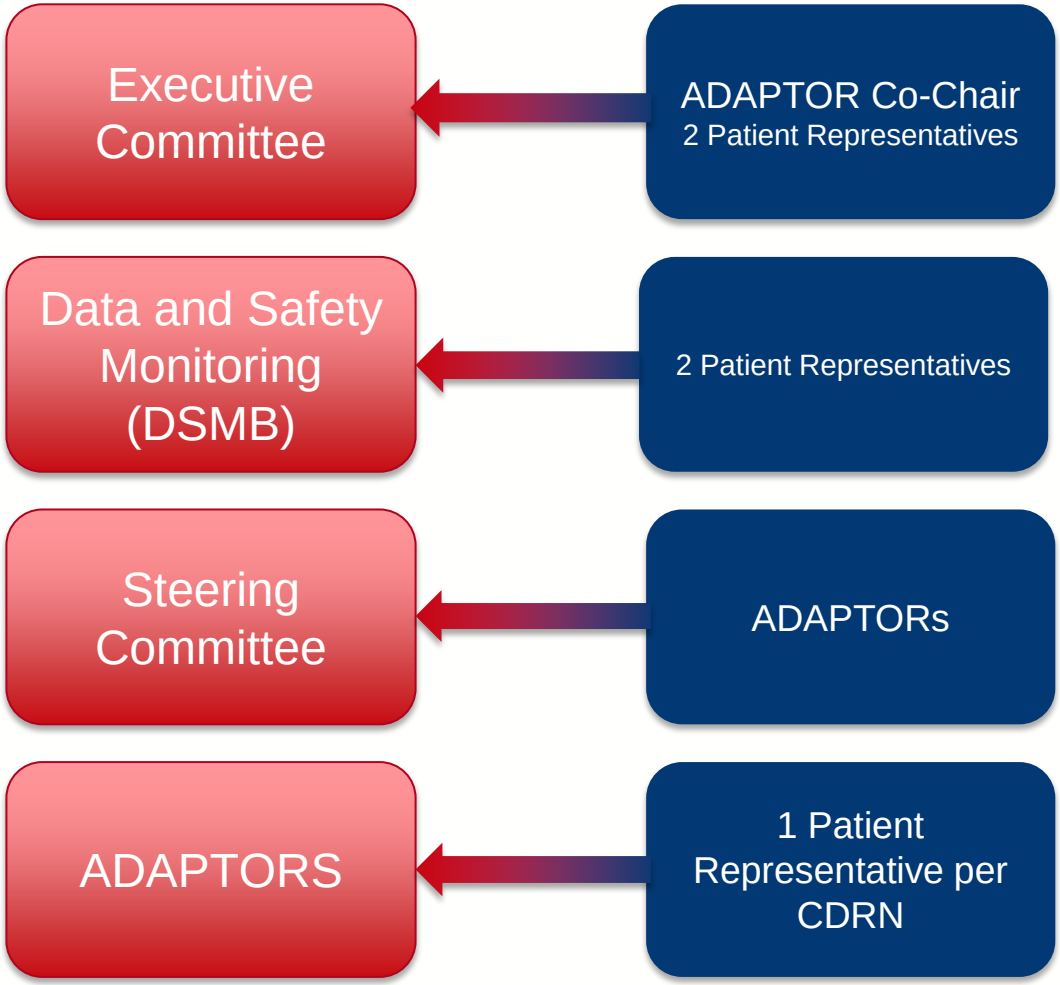
Patient Engagement in All Trial Aspects



Adaptable

ClinicalTrials.gov: NCT02697916

ADAPTABLE Study Design

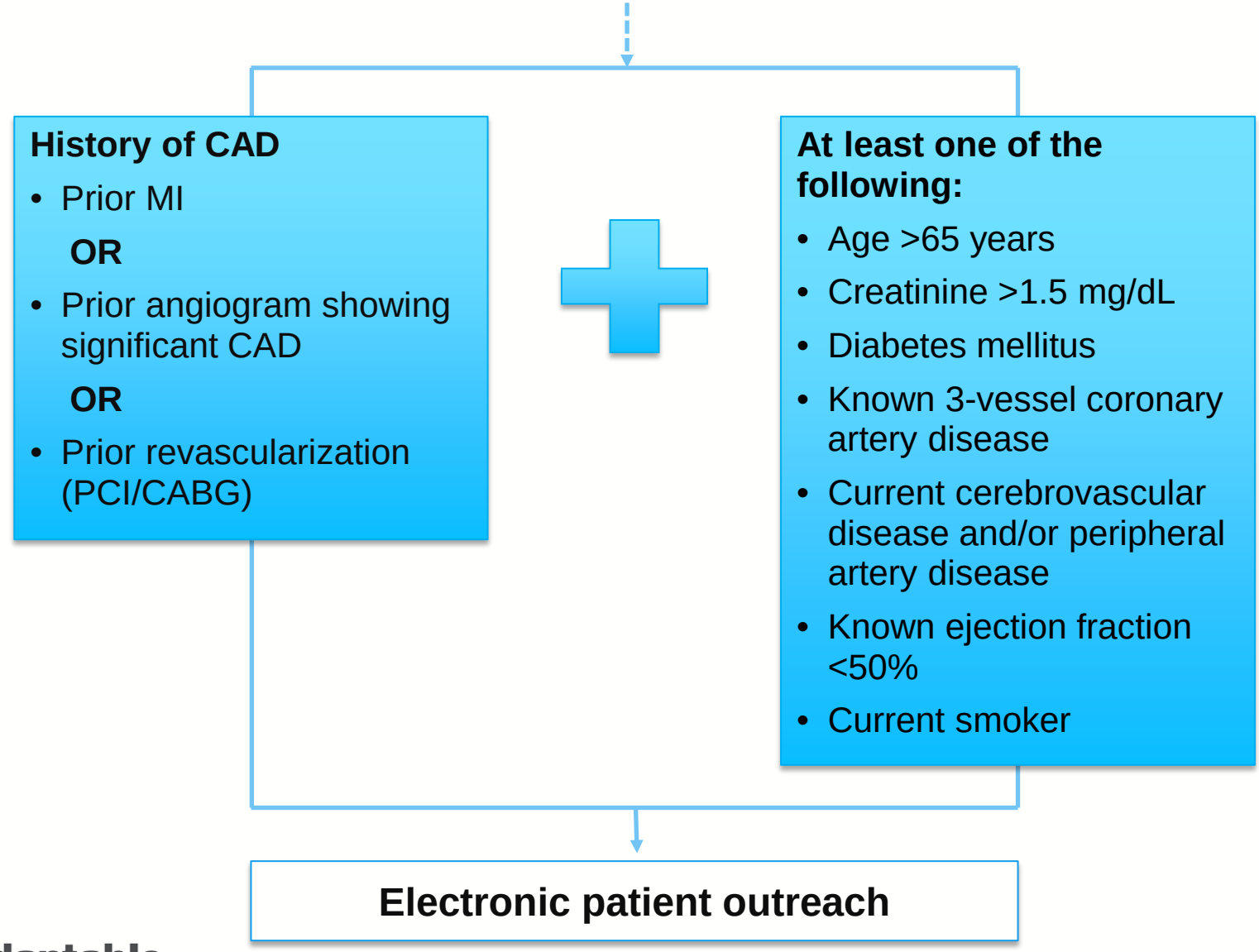
Patients with known ASCVD + ≥ 1 "enrichment factor"*

Identified through EHR (computable phenotype) by CDRNs
(PPRN patients that are already a part of a CDRN are eligible to participate.)

† Participants without internet access may be consented and followed via a parallel system.

Adaptable

Computable phenotype for CDRNs



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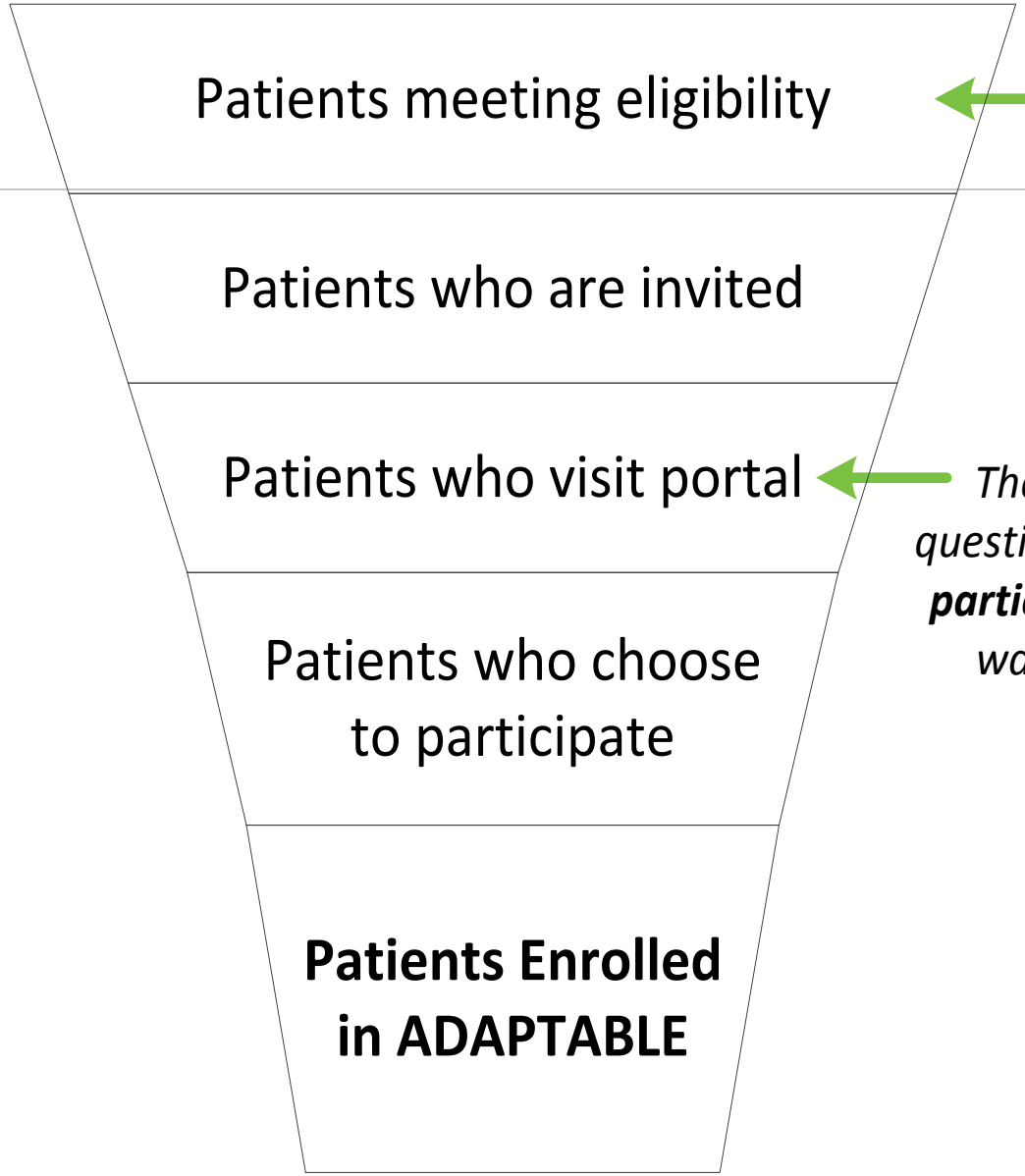
↓

Patients contacted with trial information and link to e-consent;†
Treatment assignment will be provided directly to patient

↓

† *Participants without internet access may be consented and followed via a parallel system.*



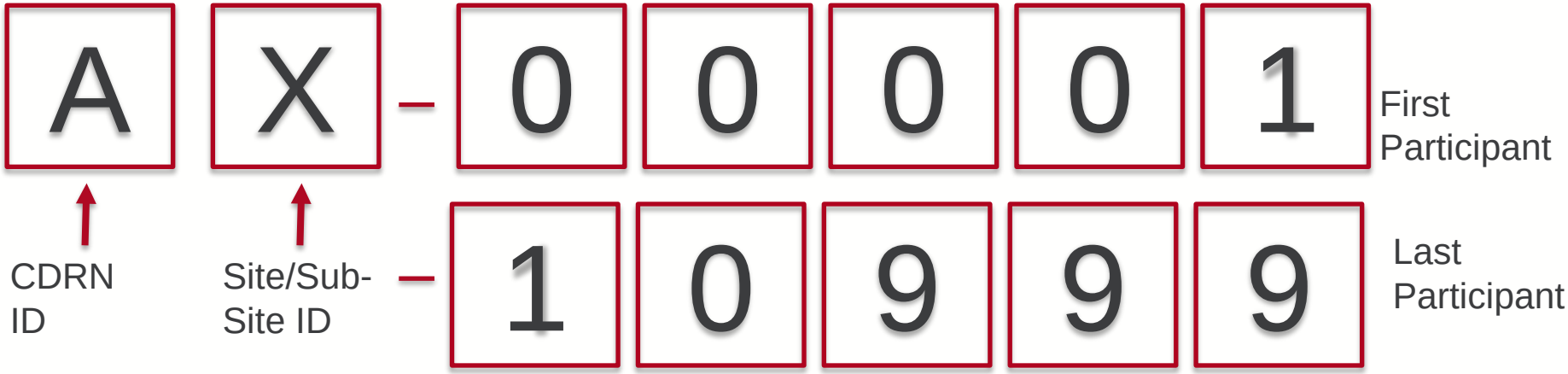
Managed at site and/or network level

This is where the phenotype is situated

*The patient answers a few basic questions to **check for those unsafe to participate**, but full eligibility criteria was determined at the site level*

Golden Ticket (Invite)

ADAPTABLE Subject ID



Adaptable

Adaptable
The Aspirin Study

Presented in English
En Espanol

TEXT SIZE A

Let's get started!

Thank you for taking the time to find out more details about the ADAPTABLE aspirin study.
With your help, we hope to find out what is the right dose of aspirin for people with heart disease.

Got a code?

Please enter in the special code that was included in your invitation:

AX3BN

ENTER

No code? No problem!

You can still learn more about this study even if you have not been asked to participate.

CONTINUE

Already have a profile? Login

pcornet POWERED BY mytrus.

Contact Us Help

Adaptable
The Aspirin Study

TEXT SIZE A

There are 5 steps to join the study!

The time on each card is an estimate of
how long it will take you to complete each section.
There are no time limits, so please go at your own pace.

Watch
the ADAPTABLE short video

5 min

Read
more details about participating in ADAPTABLE

15 min

Answer
a few questions about the study

5 min

Join
the ADAPTABLE study

3 min

Inform
us about your current health

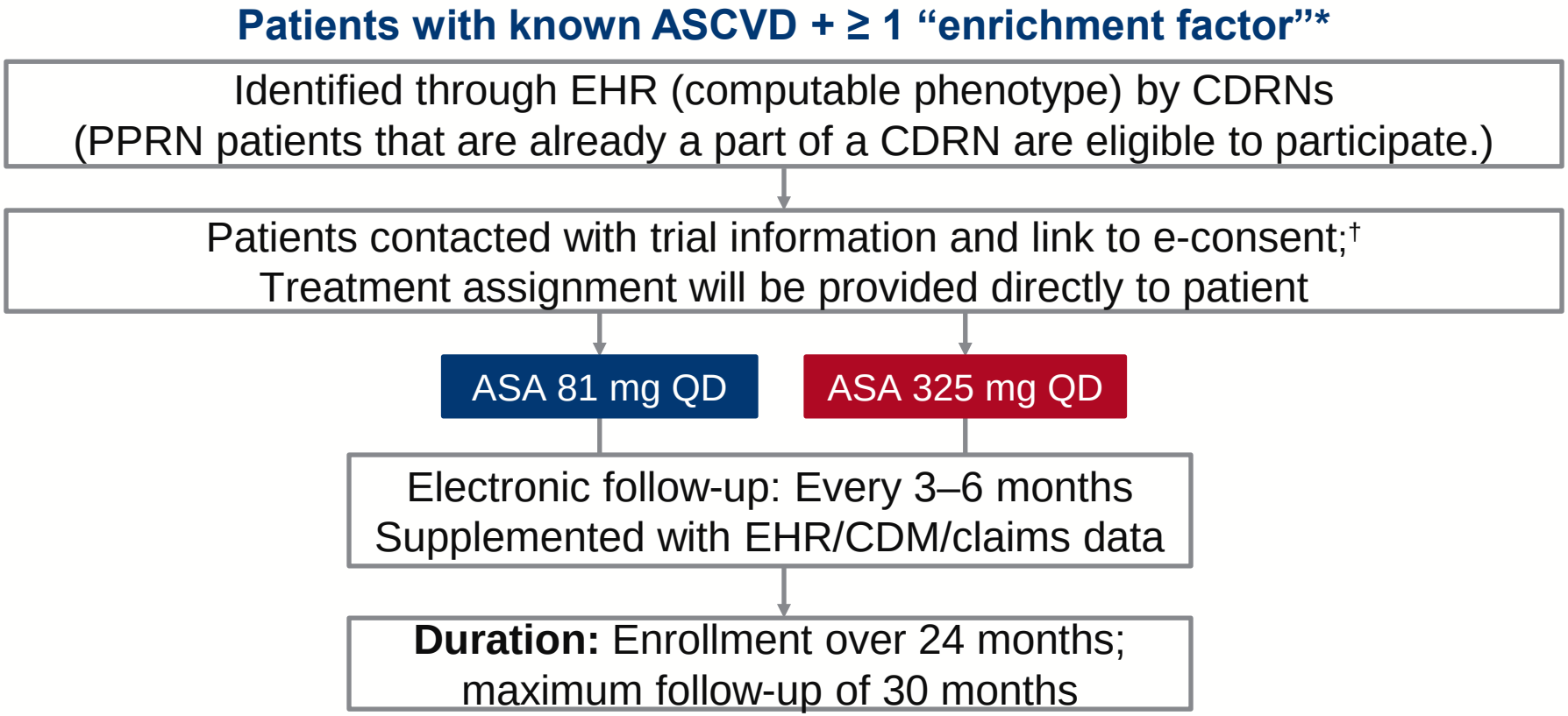
5 min

LET'S GET STARTED

pcornet POWERED BY mytrus.

Contact Us Help

ADAPTABLE Study Design



† *Participants without internet access may be consented and followed via a parallel system.*

Adaptable

ADAPTABLE Study Design

Patients with known ASCVD + ≥ 1 "enrichment factor"*

Identified through EHR (computable phenotype) by CDRNs
(PPRN patients that are already a part of a CDRN are eligible to participate.)

Patients contacted with trial information and link to e-consent;†
Treatment assignment will be provided directly to patient

Exclusion criteria

- Age <18 years
- ASA allergy or contraindication (including pregnancy or nursing)
- Significant GI bleed within past 12 months
- Significant bleeding disorder
- Requires warfarin, direct oral anticoagulant, or ticagrelor

ASA 81 mg QD | ASA 325 mg QD

Electronic follow-up: Every 3–6 months
Supplemented with EHR/CDM/claims data

Duration: Enrollment over 24 months; maximum follow-up of 30 months

***Enrichment factors**

- Age >65 years
- Creatinine >1.5 mg/dL
- Diabetes mellitus (type 1 or 2)
- Known 3-vessel CAD
- Current CVD or PAD
- Known EF <50% by echo, cath, nuclear study
- Current smoker

Primary endpoint:
Composite of all-cause mortality, hospitalization for MI, or hospitalization for stroke

Primary safety endpoint:
Hospitalization for major bleeding

† *A subset of participants who do not have internet access may be consented and followed via a parallel system.*

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ClinicalTrials.gov: NCT02697916

Enabling and testing pragmatic research: e-data collection and e-follow-up

N=20,000

ADAPTABLE enrollee

Baseline data

Web portal follow-up
- *Randomized to 3 vs 6 mos contact*
- *Patient-reported hospitalizations*
- *Medication use*
- *Health outcomes*

DCRI call center
- *Contacts patients who miss 2 e-visits*
- *Collect identical data by phone*

6 | 12 | 18 | 24 | 30

PCORnet Coordinating Center follow-up
- *Via Common Data Model*
- *Validated coding algorithms for endpoints*

CMS and private health plans follow-up
- *Longitudinal health outcomes*
- *Validated coding algorithms for endpoints*

Death ascertainment

National Death Index (NDI) & Social Security Database

Adaptable

ClinicalTrials.gov: NCT02697916

Adaptable
The Aspirin Study

Allison Smith AS

TEXT SIZE A

Hi, Allison! Welcome back.

Please complete each form. The time on each card is an estimate of how long it will take you to complete each section.
There are no time limits, so please go at your own pace.

Info
Contact & insurance information
5 min

History
Past history
5 min

Medications
Have your current medications handy
5 min

Hospitalization
Let us know about any hospitalizations
3 min

LET'S GET STARTED

Your assigned aspirin dosage

You have been assigned the daily dosage of **325 mg** of aspirin each day for participation in the ADAPTABLE study.

Re-watch video | Re-read documents

Cost

- ADAPTABLE: **$850** per participant
  - 20,000 participants
  - $17M total cost
- PROMISE* (pragmatic trial): **$3,100** per participant
  - 10,003 participants
  - $27M total cost
- BRIDGE**: **$13,000** per participant
  - 1,884 participants
  - $23M total cost

*Outcomes of Anatomical versus Functional Testing for Coronary Artery Disease
http://www.nejm.org/doi/full/10.1056/NEJMoa1415516

**Perioperative Bridging Anticoagulation in Patients with Atrial Fibrillation
http://www.nejm.org/doi/full/10.1056/NEJMoa1501035

Learn more about ADAPTABLE

http://theaspirinstudy.org

PCORnet's Top 5 Needs:

- ✔ Engaged clinical organizations and patients
- ✔ Collaboration framework
- ✔ Analysis-ready standardized data with strong privacy protections
- ☐ Ability to embed research in care settings (clinicians *required*)
- ☐ Regulatory oversight that protects patients without unnecessary burdens

Thanks!