



**PopMedNet**™

A Platform for  
Federated Data  
Sharing with Local  
Data Control

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# Outline of Talk

- ▶ PopMedNet overview
- ▶ PopMedNet strengths
- ▶ How CHORDS chose PopMedNet
- ▶ PopMedNet architecture
- ▶ Walk-through of processing a query
- ▶ CHORDS Status
- ▶ Steps Needed to Implement PMN for CCRN

# What is PopMedNet?



- ▶ Open source distributed (“Federated”) data sharing network for institutions that want to share information and analytics but not the underlying data
- ▶ Investigators submit queries through a web browser
- ▶ Developed by software development company, Lincoln Peak
- ▶ On behalf of the Department of Population Medicine at Harvard Pilgrim Health Care Institute
- ▶ For Mini-Sentinel project
- ▶ Now adopted by multiple national initiatives

# Example PMN Adopters

	Organization	Purpose	Year
	FDA	Post-marketing surveillance	2009
	AHRQ	Comparative effectiveness	2010
	AHRQ	Characterize practice patterns and outcomes	2011
	ONC	Mass. EHR-based health surveillance	2011
	HMORN	Cohort discovery	2012
	CRN	Outcomes research	2012
	PCORI	Comparative effectiveness	2013

# PopMedNet Principles\*

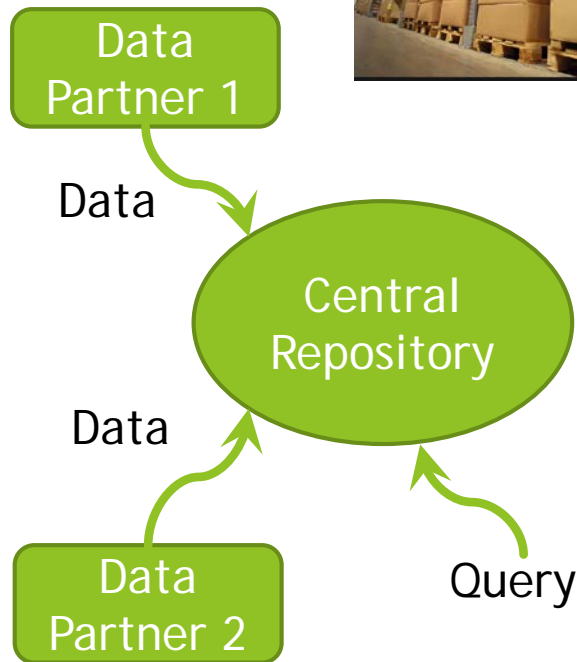
- ▶ Send the questions to the data
- ▶ Keep data in the hands of the original data holders
  - ▶ Decrease proprietary and liability issues
  - ▶ Decrease risk and severity of breaches
  - ▶ Data holders know their data; improve value and interpretation of findings
- ▶ Minimize data transfer
- ▶ Voluntary - data partner autonomy
- ▶ Reciprocity - value for participation
- ▶ Partnership
- ▶ Well-defined purpose

\* Jeff Brown, PopMedNet User Group Meeting 2012

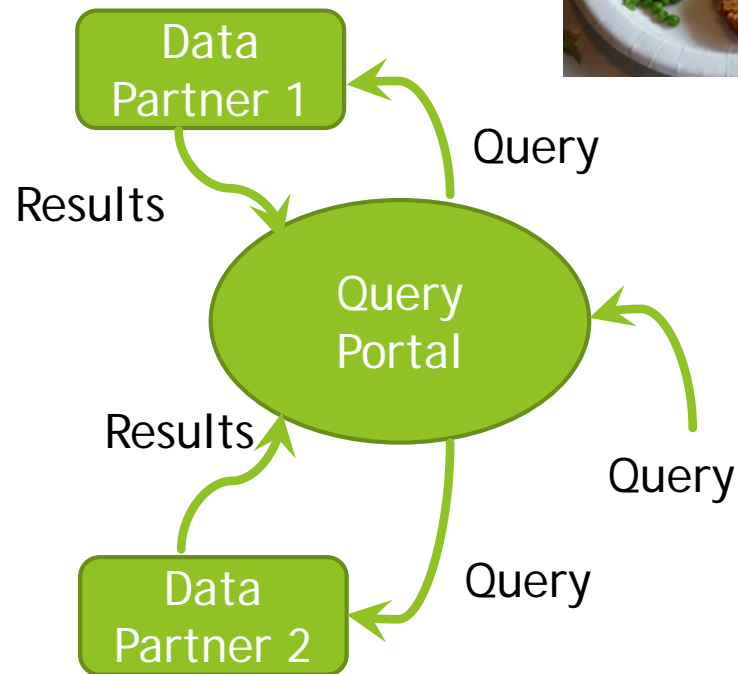
# PopMedNet's Distinguishing Strengths

- ▶ No co-mingling of data from different institutions
- ▶ Powerful rights management
- ▶ Human review included in workflow
- ▶ Data-source agnostic
- ▶ Uses “pull” architecture, so relatively easy to implement at data partners

# PopMedNet's Distinguishing Strengths: No Co-mingling of Data



Data Warehouse Model



Federated Network Model

# PopMedNet's Distinguishing Strengths: Powerful Rights Management and Human Review



Control what is shared according to:

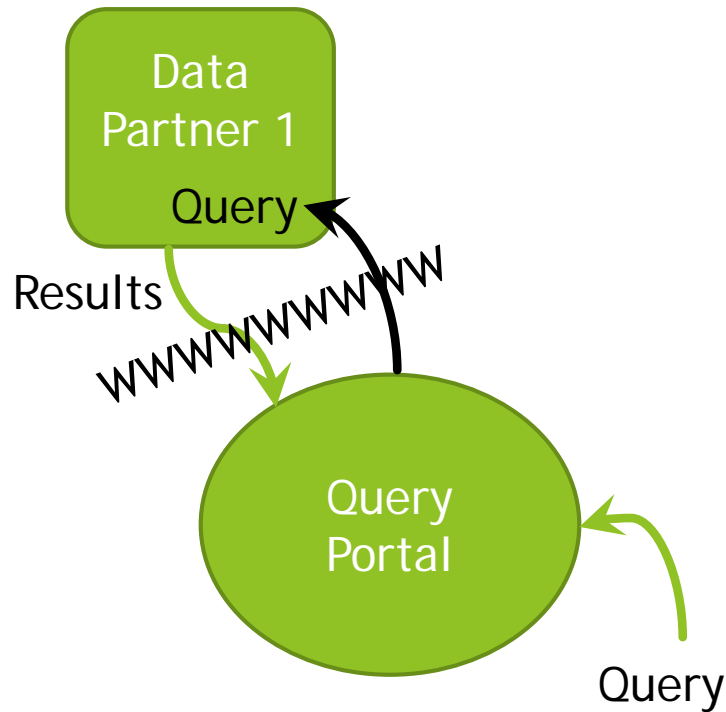
- Organization
- User
- Data source
- Query type



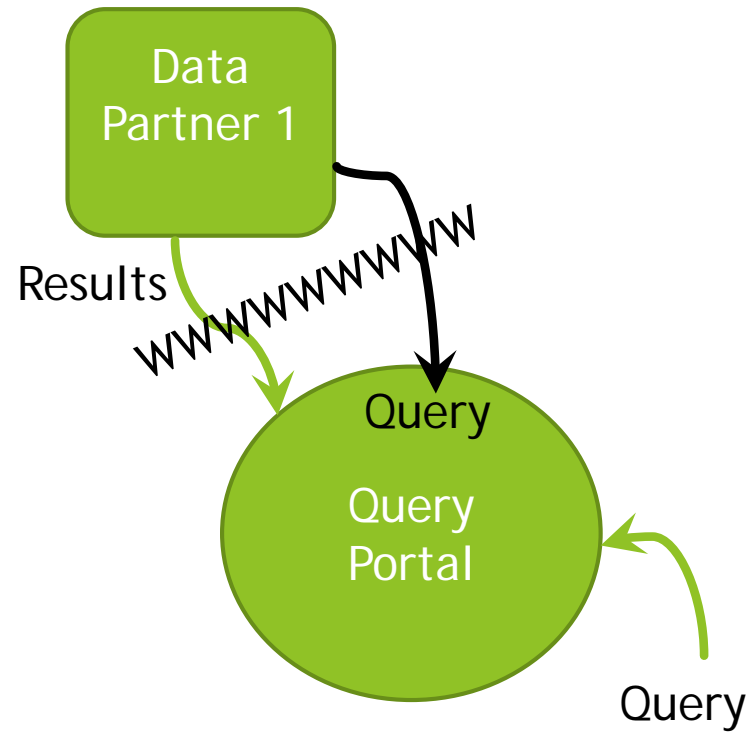
# PopMedNet's Distinguishing Strengths: Data-source Agnostic



# PopMedNet's Distinguishing Strengths: "Pull" Architecture



"Push" Architecture



"Pull" Architecture

# What is CHORDS?



- ▶ Colorado Health Observations Regional Data Service
- ▶ A collaboration between several Colorado research and health care organizations
- ▶ Technical and policy infrastructure to support regional data sharing for research, patient care, and surveillance
- ▶ Early projects have focused on public health
  - ▶ Tobacco use and exposure
  - ▶ Obesity
  - ▶ Cardiovascular risk

# How did CHORDS Choose PopMedNet?

- ▶ Developed project-specific use cases, which we then generalized into high-level use cases.

Project-Specific Use Case	Generalized Use Case
Provider utilizes BMI summary report based on practice population	User generates patient-level count report per practice

- ▶ Created requirements based on the high-level use cases
- ▶ Identified four candidate platforms and assessed their ability to satisfy the requirements

# PopMedNet's Distinguishing Features per Requirements Survey

Requirement	Description	Supported			
		Physio-MIMI	i2b2/SHRINE	TRIAD	PopMedNet
Menu-driven Queries	Users must be able to select predefined queries from a menu interface, specify required parameters, and execute.	Yes	No	Yes	Yes
Arbitrary Queries	Users must be able to to specify arbitrary queries, returning aggregate or non-aggregate data.	Yes	No*	Yes	Yes
Hold for Review	Data owners must have the option to manually review queries before returning results.	No	No	No	Yes

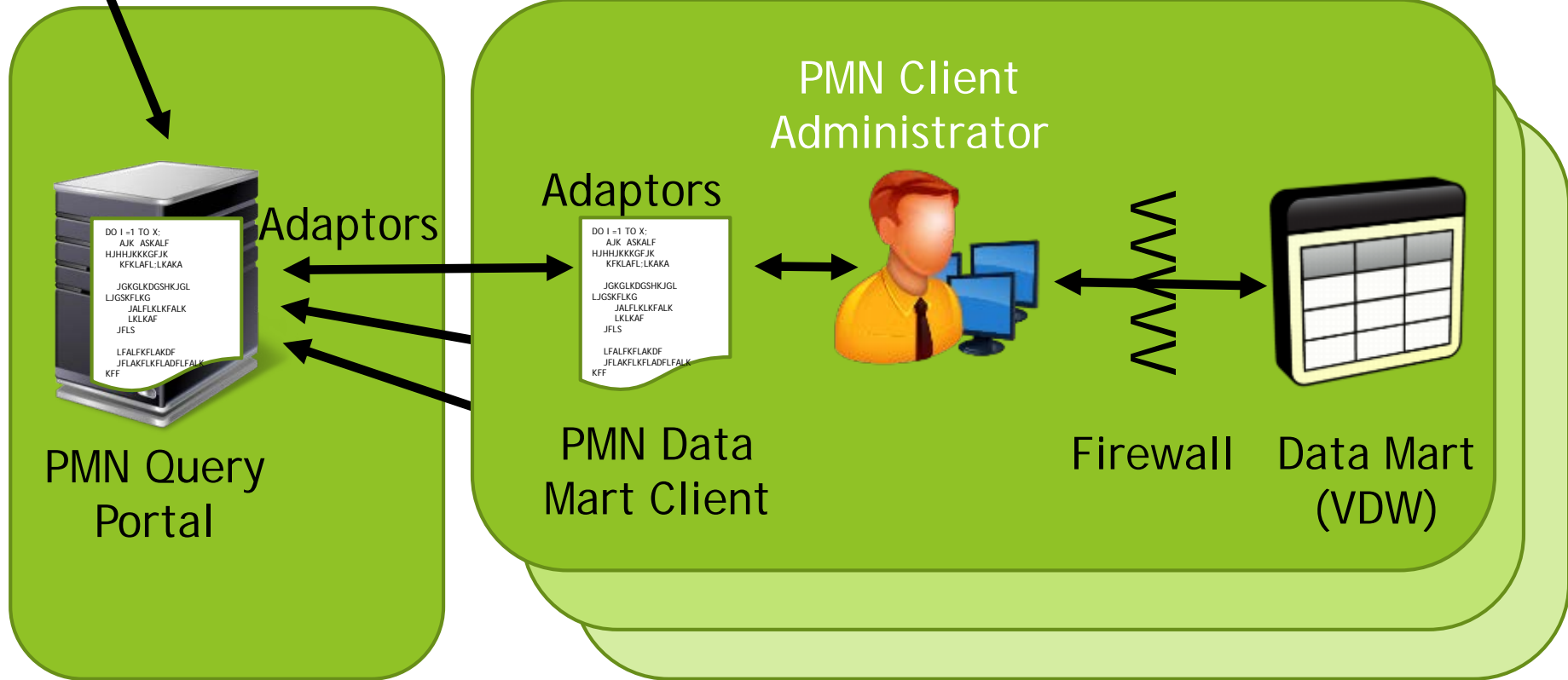
\* At the time of our analysis, i2b2/SHRINE supported aggregate count queries only, but additional work is underway which will add support for non-aggregate queries as well.

# PMN's High-Level Architecture



?

Data Customer



Hub

Data Partners

# Inside the Query Portal

User interface

User and DataMart Provisioning/Administration

User account management

Job Scheduling

Request/Response Manager

```
DO I =1 TO X;  
  AIK ASKALF  
  HJHHJKKGFJK  
  KFKLAFLLKAKA  
  
  JGKGLKDGSHKJGL  
  LJGSKFLKG  
  JALFLKLFALK  
  LKLFKAF  
  JFLS  
  
  LFALFKFLAKDF  
  JFLAKFLKFLADFLFALK  
  KFF
```

Plug-ins



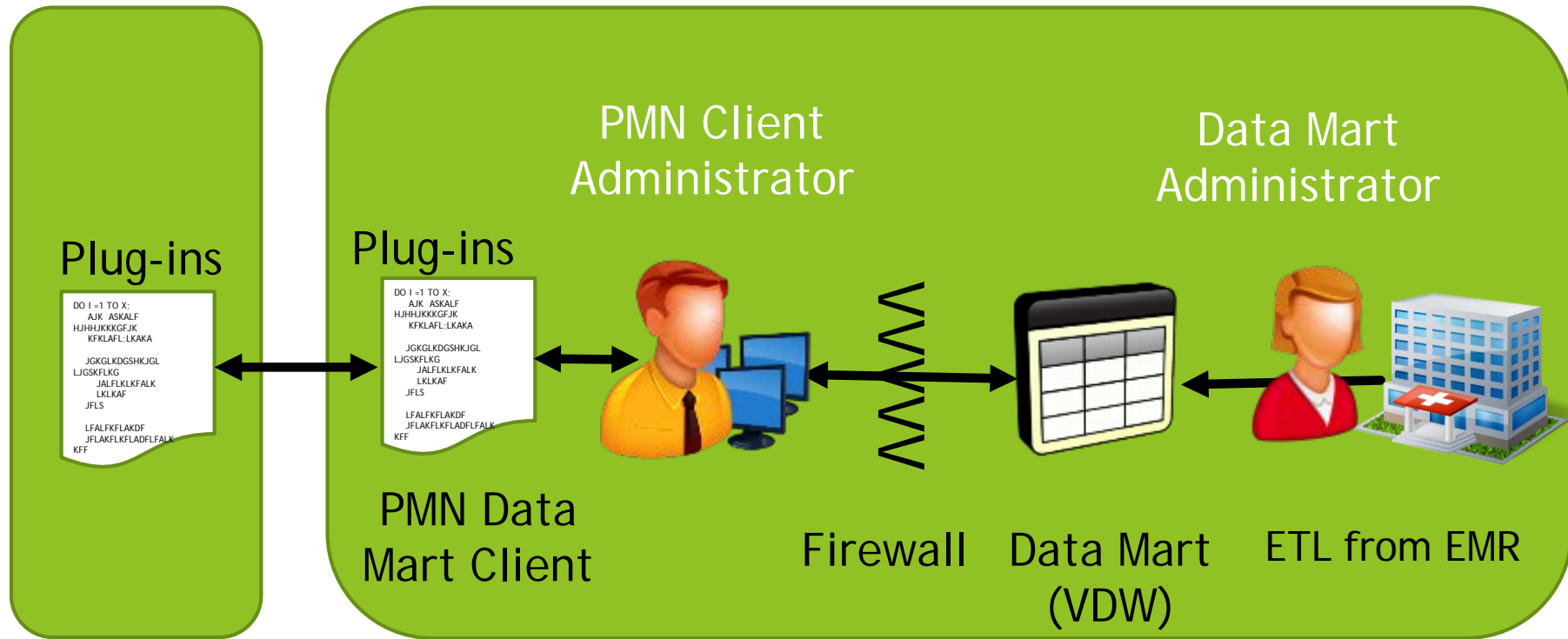
```
DO I =1 TO X;  
  AIK ASKALF  
  HJHHJKKGFJK  
  KFKLAFLLKAKA  
  
  JGKGLKDGSHKJGL  
  LJGSKFLKG  
  JALFLKLFALK  
  LKLFKAF  
  JFLS  
  
  LFALFKFLAKDF  
  JFLAKFLKFLADFLFALK  
  KFF
```

Plug-ins

PMN Query Portal

PMN Data  
Mart Client

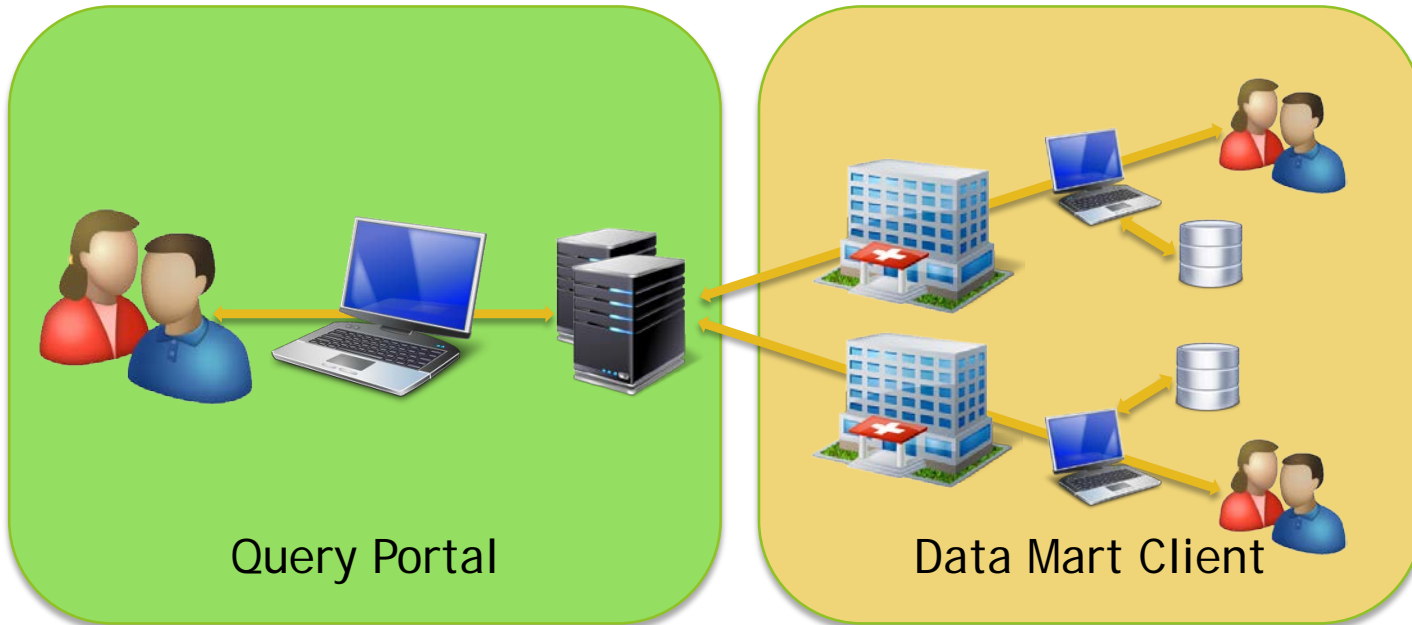
# Inside the Partner Site



PMN  
Query Portal



# Walk-Through of Processing a Query



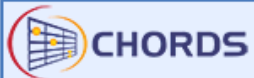
# Part 1: Investigator Submits Query



## Steps:

- ▶ Log into portal
- ▶ Initiate request
- ▶ Specify header information
- ▶ Specify parameters
- ▶ Submit request

# Logging Into the Portal



Colorado Health Observations Regional Data Service

Version: 3.2.9

**INSTRUCTIONS:** Please complete the form below and read the Terms and Conditions before using the Query Tool.

Username:

Password:

[Forgot Password?](#)

[Register for a New Account](#)

I agree to the [Terms and Conditions](#) of use.

Login

# Your Request History



CHORDS		Colorado Health Observations Regional Data Service					Welcome, EnhancedInvestigator		
		<a href="#">Home</a>	<a href="#">Requests</a>	<a href="#">Profile</a>	<a href="#">Resources</a>	<a href="#">Reports</a>	<a href="#">Network</a>	<a href="#">Contact Us</a>	<a href="#">Logoff</a>
<input type="checkbox"/> <b>What's New</b>									
<input type="checkbox"/> <b>Notifications</b> <span style="float: right;">▲</span>									
<input type="checkbox"/> <b>Requests</b> <span style="float: right;">▲</span>									
Name	Id	Date ▼	User	Status ▼	Type ▼	Project			
<a href="#">CHORDS Public Health - Bryant 1</a>	45	01/24/2014 11:31 AM	EnhancedInvesti	Completed	CHORDS Public Heal	PublicHealth			
<a href="#">Demo Query for Bryant and Jessica</a>	43	01/17/2014 02:51 PM	EnhancedInvesti	Completed	CHORDS Public Heal	PublicHealth			
<a href="#">CHORDS Public Health - 20</a>	42	01/17/2014 12:47 PM	EnhancedInvesti	Completed	CHORDS Public Heal	PublicHealth			
<a href="#">CHORDS Public Health - 8</a>	40	01/17/2014 12:02 PM	EnhancedInvesti	Completed	CHORDS Public Heal	PublicHealth			
<a href="#">CHORDS Public Health - 6</a>	38	01/17/2014 11:33 AM	EnhancedInvesti	Completed	CHORDS Public Heal	PublicHealth			
<a href="#">CHORDS Public Health - 3</a>	35	01/17/2014 10:44 AM	EnhancedInvesti	Draft	CHORDS Public Heal	PublicHealth			
<a href="#">CHORDS Public Health - 2</a>	34	01/17/2014 10:43 AM	EnhancedInvesti	Completed	CHORDS Public Heal	PublicHealth			
<a href="#">CHORDS Public Health - 1</a>	33	01/16/2014 02:22 PM	EnhancedInvesti	Completed	CHORDS Public Heal	PublicHealth			
<a href="#">CHORDS Public Health - 13</a>	31	01/15/2014 02:17 PM	EnhancedInvesti	Draft	(unknown)	PublicHealth			
<a href="#">CHORDS Public Health - 12</a>	30	01/15/2014 01:26 PM	EnhancedInvesti	Submitted	(unknown)	PublicHealth			
<a href="#">CHORDS Public Health - 11</a>	29	01/15/2014 01:25 PM	EnhancedInvesti	Draft	(unknown)	PublicHealth			
<a href="#">CHORDS Public Health - 10</a>	28	01/15/2014 01:21 PM	EnhancedInvesti	Draft	(unknown)	PublicHealth			

# Make a New Request



Choose Request Type ✕

**Please choose a model, then click a request type to create a request**

CHORDS Public Health ▾

CHORDS Public Health

Cancel

//

# Request Header



**Request** [?] [▲]

**CHORDS Public Health**  
CHORDS Public Health Query

**Name**  
CHORDS Public Health - 14

**Priority**  
Normal

**Due Date**

**Purpose of use**  
<not specified>

**Level of PHI Disclosure**  
<not specified>

**Project**  
PublicHealth [x]

**Description**

**Activity**  
<None>

**Activity Description**

**Run Mode**

- Run Immediately After I Click "Submit"
- Schedule to Run Later

# Query Parameters



## Query Parameters

Optional: Enter a start and end date range for this query. Otherwise, 5 years of data will be returned.

Start date

End date

# Specify Data Sources



**DataMart Routing**

Please select DataMarts to which this query will be sent

<input checked="" type="checkbox"/> ▲ DataMart	Organization
<input checked="" type="checkbox"/> CU Test VDW	CU - CHORDS Administration
<input checked="" type="checkbox"/> DH Test VDW	CU - CHORDS Administration
<input checked="" type="checkbox"/> KP Test VDW	CU - CHORDS Administration
<input checked="" type="checkbox"/> NJH Test VDW	CU - CHORDS Administration

Submit

Save

Copy



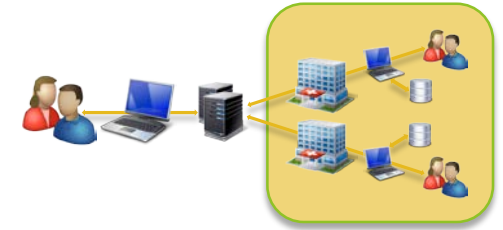
## Part 2: Data Partner Responds to Query



### Steps:

- ▶ Log into datamart client
- ▶ View request details
- ▶ Reject / hold / run query
- ▶ Preview results
- ▶ Submit results

# Datamart Client



**DataMart Client**

local

DataMarts: All Status: Submitted Dates:

Project	Request Type	Request Name	Priority	Due Date	Status	Requestor	Request Time	DataMart Name	Responder	Response Time	Request Id
PublicHealth	CHORDS Public Health	CHORDS Public Health - 14	Medium		Submitted	Enhancedl...	1/28/2014...	CU Test V...			46
PublicHealth		CHORDS Public Health - 12	Medium		Submitted	Enhancedl...	1/15/2014...	CU Test V...			30

Page size: 25 Start with Windows Automatic Refresh Refresh Details Settings Close Exit 1 / 1

Ready Connected

# View Request Details



**DataMart Client - Request Detail**

Network:	local	Project:	PublicHealth	DataMart:	CU Test VDW
Request Name:	CHORDS Public Health - 14	Request Type:	CHORDS Public Health - 14	Request Id:	46
Priority:	Medium	Due Date:		Status:	Submitted
Requestor:	EnhancedInvestigator	Request Time:	01/28/2014 08:09 AM	Email:	EnhancedInvestigator@root.org
Submitted To:	CU Test VDW				
Description:					
Note:					

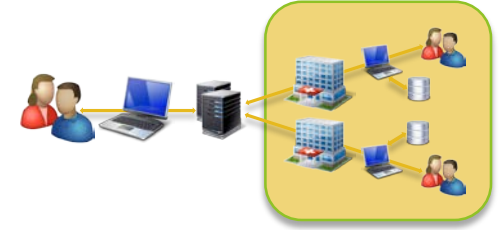
# Run The Query



Response:  File View

Run	Hold	Reject	Add File	Delete File	Post Process	Export Results..	Upload Results	Close
-----	------	--------	----------	-------------	--------------	------------------	----------------	-------

# Preview Result Documents



Response:

File View

File	DocumentId	MimeType	Size	IsViewable
<a href="#">Response.xml</a>	0	x-application/lpp-dns-table	321400	<input checked="" type="checkbox"/>
<a href="#">Response.csv</a>	1	test/csv	20570	<input checked="" type="checkbox"/>



# Submit Results



**DataMart Client - Upload Comments**

Enter comments below if additional information should be provided about your results. The comments below will be returned to the originator of the query along with the results.

Here is your data!

# Part 3: Investigator Views Results

## Steps:


- ▶ Log into portal
- ▶ View response details
- ▶ Download results






# Select Completed Request




**Colorado Health Observations Regional Data Service**
Welcome, EnhancedInvestigator

[Home](#)
[Requests](#)
[Profile](#)
[Resources](#)
[Reports](#)
[Network](#)
[Contact Us](#) [Log off](#)

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[Network](#)  [Requests](#)

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[All Projects](#)
[PublicHealth](#)

Name	Id	Date	User	Status	Type	Project
<a href="#">CHORDS Public Health - 14</a>	46	01/28/2014 08:09 AM	EnhancedInvesti	Completed	CHORDS Public Heal	PublicHealth
<a href="#">CHORDS Public Health - Bryant 1</a>	45	01/24/2014 11:31 AM	EnhancedInvesti	Completed	CHORDS Public Heal	PublicHealth
<a href="#">Demo Query for Bryant and Jessica</a>	43	01/17/2014 02:51 PM	EnhancedInvesti	Completed	CHORDS Public Heal	PublicHealth
<a href="#">CHORDS Public Health - 20</a>	42	01/17/2014 12:47 PM	EnhancedInvesti	Completed	CHORDS Public Heal	PublicHealth
<a href="#">CHORDS Public Health - 8</a>	40	01/17/2014 12:02 PM	EnhancedInvesti	Completed	CHORDS Public Heal	PublicHealth
<a href="#">CHORDS Public Health - 6</a>	38	01/17/2014 11:33 AM	EnhancedInvesti	Completed	CHORDS Public Heal	PublicHealth
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<a href="#">CHORDS Public Health - 2</a>	34	01/17/2014 10:43 AM	EnhancedInvesti	Completed	CHORDS Public Heal	PublicHealth
<a href="#">CHORDS Public Health - 1</a>	33	01/16/2014 02:22 PM	EnhancedInvesti	Completed	CHORDS Public Heal	PublicHealth
<a href="#">CHORDS Public Health - 13</a>	31	01/15/2014 02:17 PM	EnhancedInvesti	Draft	(unknown)	PublicHealth
<a href="#">CHORDS Public Health - 12</a>	30	01/15/2014 01:26 PM	EnhancedInvesti	Submitted	(unknown)	PublicHealth
<a href="#">CHORDS Public Health - 11</a>	29	01/15/2014 01:25 PM	EnhancedInvesti	Draft	(unknown)	PublicHealth

# View Results



**Received Responses**

<input checked="" type="checkbox"/> DataMart	▼ Last Response	Status	Message
<input checked="" type="checkbox"/> CU Test VDW	1/28/2014 8:15:34 AM	Completed	<a href="#">Here is your data!</a>

# Preview Results Online



[Show Documents List](#)

MeasureDate	Gender	Race	Hispanic	Age	Underweight	Overweight	Obese	Tobacco_Current	Tobacco_Never	Tobacco_Quit	Tobacco_Passive
2009-Q1	F	UN	U	55	1	0	0	0	0	0	0
2009-Q1	F	UN	Y	25	2	0	0	0	2	0	0
2009-Q1	F	UN	Y	45	1	0	0	0	0	1	0
2009-Q1	F	UN	Y	85	1	0	0	0	0	0	0
2009-Q1	F	WH	N	45	3	0	0	0	3	0	0
2009-Q1	M	BA	N	20	0	1	0	0	1	0	0
2009-Q1	M	BA	N	55	2	0	0	0	0	2	0
2009-Q1	M	UN	U	30	1	0	0	0	0	0	0
2009-Q1	M	UN	U	35	2	0	0	0	2	0	0
2009-Q1	M	UN	U	55	0	1	0	1	0	0	0
2009-Q1	M	UN	U	60	2	0	0	2	0	0	0
2009-Q1	M	UN	U	65	1	0	0	0	0	0	0
2009-Q1	M	WH	N	30	1	0	0	0	0	0	0
2009-Q1	M	WH	N	55	1	0	0	0	1	0	0
2009-Q2	F	HP	N	55	1	0	0	0	1	0	0
2009-Q2	F	UN	N	65	1	0	0	0	0	0	0
2009-Q2	F	WH	N	35	1	0	0	0	0	0	0
2009-Q2	F	WH	N	55	2	2	0	1	1	1	0

# Download Result Documents



[Show View](#)

Name	Type	Size		
Response.xml	x-application/lpp-dns-table	313.87 Kb	<a href="#">[view]</a>	<a href="#">[download]</a>
Response.csv	test/csv	20.00 Kb		<a href="#">[download]</a>

# Examine Results



Response.csv [Read-Only] - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW TEAM Ames, Michael

A1 : MeasureDate

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	MeasureDate	Gender	Race	Hispanic	Age	Underweight	Overweight	Obese	Tobacco_Current	Tobacco_Never	Tobacco_Quit	Tobacco_Passive	Tobacco_Environ
2	2009-Q1	F	UN	U	55	1	0	0	0	0	0	0	0
3	2009-Q1	F	UN	Y	25	2	0	0	0	2	0	0	0
4	2009-Q1	F	UN	Y	45	1	0	0	0	0	1	0	0
5	2009-Q1	F	UN	Y	85	1	0	0	0	0	0	0	0
6	2009-Q1	F	WH	N	45	3	0	0	0	3	0	0	0
7	2009-Q1	M	BA	N	20	0	1	0	0	1	0	0	0
8	2009-Q1	M	BA	N	55	2	0	0	0	0	2	0	0
9	2009-Q1	M	UN	U	30	1	0	0	0	0	0	0	0
10	2009-Q1	M	UN	U	35	2	0	0	0	2	0	0	0
11	2009-Q1	M	UN	U	55	0	1	0	1	0	0	0	0
12	2009-Q1	M	UN	U	60	2	0	0	2	0	0	0	0
13	2009-Q1	M	UN	U	65	1	0	0	0	0	0	0	0
14	2009-Q1	M	WH	N	30	1	0	0	0	0	0	0	0
15	2009-Q1	M	WH	N	55	1	0	0	0	1	0	0	0
16	2009-Q2	F	HP	N	55	1	0	0	0	1	0	0	0
17	2009-Q2	F	UN	N	65	1	0	0	0	0	0	0	0
18	2009-Q2	F	WH	N	35	1	0	0	0	0	0	0	0
19	2009-Q2	F	WH	N	55	2	2	0	1	1	1	0	0
20	2009-Q2	F	WH	N	75	1	0	0	0	0	1	0	0
21	2009-Q2	F	WH	Y	25	1	0	0	0	1	0	0	0
22	2009-Q2	M	UN	N	40	1	0	0	1	0	0	0	0
23	2009-Q2	M	UN	N	45	1	0	0	0	0	1	0	0
24	2009-Q2	M	UN	U	25	1	0	0	0	1	0	0	0
25	2009-Q2	M	UN	U	35	1	0	0	0	1	0	0	0
26	2009-Q2	M	UN	U	50	1	0	0	0	1	0	0	0
27	2009-Q2	M	UN	U	55	1	2	0	0	1	0	0	0
28	2009-Q2	M	UN	U	60	2	0	0	2	0	0	0	0
29	2009-Q2	M	UN	Y	35	1	0	0	0	0	0	0	0
30	2009-Q2	M	UN	Y	50	1	0	0	0	0	0	0	0

Response

READY 100%

# CHORDS Status: Governance

- ▶ Governance is a critical component of any data sharing network.
- ▶ CHORDS has a draft governance document, based on work by national groups.
- ▶ Such documents should address organizational structure, data management, security / privacy / confidentiality, and resource allocation

# CHORDS Status: Technical

- ▶ Twelve partner sites
- ▶ All have installed the data mart client and run tests.
- ▶ Two adaptors delivered. Three more under way.
- ▶ DataMart deployment is simple and quick.
- ▶ Manuals written for administrators, developers, and investigators.
- ▶ Using version 5.

# Changes in Version 5

- ▶ Can update plug-ins without installing a new version of the DataMart Client
- ▶ Security is simplified, improving performance
- ▶ Documents are stored encrypted on the file system (vs. within the database)
- ▶ REST API instead of MVC design pattern provides future development flexibility



# Steps Needed to Implement PMN for CCRN

- ▶ Set up a CCRN instance of PopMedNet Query Portal
  - ▶ Separate instance provides independence on when CCRN moves to a new version of PMN
  - ▶ Would be built off of our modified code base
- ▶ Build plug-ins for CCRN data needs
  - ▶ Cost depends on complexity of plug-in
  - ▶ We will participate in discussions re plug-in requirements
- ▶ Configure Query Portal for CCRN
  - ▶ Data partner organizations and users
  - ▶ Logos, website, etc.
- ▶ Deploy PMN DataMart Client at Data Partners

Questions?