University of California Research eXchange (UC-ReX): A UC Shared Resource

UC-ReX

UC Davis, UC Irvine, UC Los Angeles
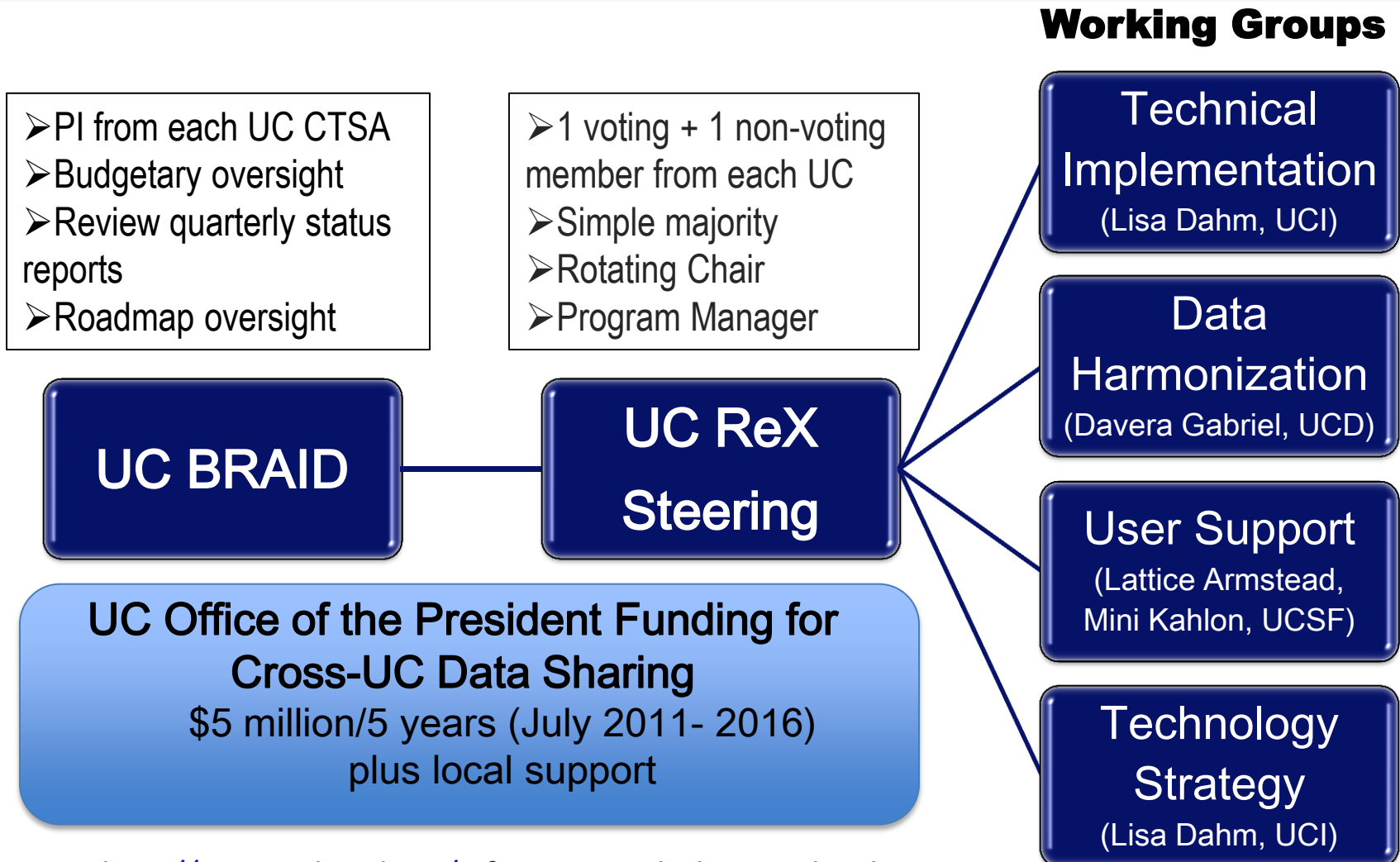
UC San Francisco, UC San Diego

The Vision: UC ReX

"Enable researchers and quality improvement specialists to query clinical data from all UC Health campuses for research or quality improvement purposes under a common cross-institutional IRB approval process"

--UC Research eXchange (UC-ReX) proposal, 2010

Governance Structure

> PI from each UC CTSA
> Budgetary oversight
> Review quarterly status reports
> Roadmap oversight

> 1 voting + 1 non-voting member from each UC
> Simple majority
> Rotating Chair
> Program Manager

Technical Implementation
(Lisa Dahm, UCI)

Data Harmonization
(Davera Gabriel, UCD)

UC BRAID

UC ReX Steering

User Support
(Lattice Armstead, Mini Kahlon, UCSF)

UC Office of the President Funding for Cross-UC Data Sharing
$5 million/5 years (July 2011- 2016)
plus local support

Technology Strategy
(Lisa Dahm, UCI)

http://www.ucbraid.org/informaticsmdashuc-rex.html

Accomplishments and Lessons

Accomplishments

- Established representative governance structure and initiated working groups

- Demonstrated collaborative decision making

- Partnered with Recombinant to install i2b2 infrastructure

- Piloted UC ReX Data Explorer virtual clinical data Launched ucrex.org

- Loaded top 150+ labs, vital status, (4) medications

- ★ **Full Enterprise Go Live, October 2013**

  - **Data Explorer** Tool Demo

Lessons Learned

- Real time development requires flexibility

- Results of analysis and variation in campus readiness impacted scope

- Federated model supported expedient delivery and has known limitations

- i2b2 SHRINE function and its role as the initial UC ReX program deliverable requires targeted communication

- Sustainability is required to support ongoing work and plan/develop new capabilities

UC ReX: UC's Data Broker

UC ReX will develop core capabilities to serve as UC's Clinical Data Broker by developing strategic partnerships to support:

- Data Explorer Cohort Identification

- Automated Honest Broker

- Cross UC Predictive Analytics

Strategy: Cohort Identification

1. **Expand ReX Infrastructure for Data Explorer Cohort Identification**

   Enables investigators and quality analyst to validate study and quality hypotheses

   a. Partner with Recombinant to:

      i. Implement development network

      ii. Upgrade to i2b2 version 1.6

   b. Extend searchable data elements: Lab Values (top 150+ labs); Medications; BMI; Microbiology Labs; CA Death Registry Pilot

2. Develop & implement cross-UC Honest Broker Process

Provision data under a collaborative process that delivers data to a common storage location

   a. Develop automated provisioning capability

   b. Technology alignment with UC Share & CG Hub to provide clinical correlates for genomics

3. Provide Predictive Analytics Platform

    a. Partner to provide aggregate data for cross UC business intelligence platform to support analytics needed for quality improvement & cost management initiatives for UCOP

    b. Pilot Cross UC Predictive Analytics Platform (UCI, UCD, UCSF) to provide 30-day Readmit Risk Assessment

4. Expand Data Explorer content
   a. Map UC Biobanking data to Data Explorer
      i. Adds value to UC ReX as a shared UC Resource
      ii. Strengthens industry proposition – UC can accelerate clinical trials by providing quick access to high quality, targeted patient data.
   b. Add lab values, medications and BMI data
   c. Implement CA Death Registry proof of concept

5. Develop new program capabilities to support future strategy

   a. Develop processes/capability:

      i. Data Quality – informed by user feedback

      ii. Proposal Assessment – ability to assess effort and cost

      iii. Expansion of ReX Network – to add new nodes

Challenge: Sustainability

- Partnership with CIOs at each University
- Strong Governance Structure
- Dedicated Program Manager
- Vendor supported systems
- Enterprise supported infrastructure

UC HEALTH

- 5 Academic Medical Centers
- 10 Hospitals
- 144,000 admissions / year
- 3.9 million out-patient visits / year
- 290,000 emergency room visits /year
- 50% of all transplants in California
- 25% of extensive burn care in California
- ~20% of all care delivered in California
- $490 million in charity care (2011)
- 18 health professional schools

State-of-the-Art
Ronald Reagan
UCLA Medical Center

APPENDIX 2
UCReX Data (Source / Years)

	UCSF			UCSD			UCLA			UCI			UCD		
	Timeperiod	Source of Data	coding system(s)	Timeperiod	Source of Data	coding system(s)	Timeperiod	Source of Data	coding system(s)	Timeperiod	Source of Data	coding system(s)	Timeperiod	Source of Data	coding system(s)
Demographics															
Gender	2012-2013	Epic EMR	in-house	2005-2013	Epic EMR	in-house	2006 - 2013	Epic EMR	in-house	1993-2013	Clinical Data Warehouse	in-house	2003-2013	Epic EMR	in-house
Language	2012-2013	Epic EMR	in-house	2005-2013	Epic EMR	in-house	2006 - 2013	Epic EMR	in-house	1993-2013	Clinical Data Warehouse	in-house	2003-2013	Epic EMR	in-house
Marital Status	2012-2013	Epic EMR	in-house	2005-2013	Epic EMR	in-house	2006 - 2013	Epic EMR	in-house	1993-2013	Clinical Data Warehouse	in-house	2003-2013	Epic EMR	in-house
Race / Ethnicity	2012-2013	Epic EMR	OMB	2005-2013	Epic EMR	OMB	2006 - 2013	Epic EMR	OMB 1 & 2 question (mixed)	1993-2013	Clinical Data Warehouse	OMB	2003-2013	Epic EMR	OMB 2-question
Religion	2012-2013	Epic EMR	in-house	2005-2013	Epic EMR	in-house	2006 - 2013	Epic EMR	in-house	1993-2013	Clinical Data Warehouse	in-house	2003-2013	Epic EMR	in-house
Diagnosis	2012-2013	Epic EMR	ICD-9-CM	2005-2013	Epic EMR	ICD-9-CM	2006 - 2013	Epic EMR & Billing System	ICD-9-CM	1993-2013	Clinical Data Warehouse	ICD-9-CM	2003-2013	Epic EMR	ICD-9-CM
Procedures	2012-2013	Epic EMR	ICD-9-CM	2005-2013	Epic EMR	ICD-9-CM	2006 - 2013	Epic EMR	ICD-9-CM, CPT4	1993-2013	Clinical Data Warehouse	ICD-9-CM	2003-2013	Epic EMR	ICD-9-CM
Laboratory Results	2012-2013	Epic EMR	LOINC	2005-2013	Epic EMR	LOINC	2006 - 2013	Epic EMR	LOINC	1993-2013	Clinical Data Warehouse	LOINC	2003-2013	Epic EMR	LOINC
Medications	2012-2013	Epic EMR	NDC	2005-2013	Epic EMR	NDC	2013	Epic EMR	NDC	1993-2013	Clinical Data Warehouse		1993-2013	Epic EMR	NDC
Vital Status	2012-2013	Epic EMR	none	2005-2013	Epic EMR	none	2006 - 2013	Epic EMR	none	1993-2013	Clinical Data Warehouse	none	2003-2013	Tethered Metaregistry	none
Data Not Yet Included	biospecimen data			imaging data			biospecimen data			imaging data			imaging data		
	clinical notes			patient-reported outcomes						biospecimen data			biospecimen data		
				biophysiologic data - EKG						patient-reported outcomes			patient-reported outcomes		
				clinical notes						biophysiologic data - EKG, EEG			biophysiologic data - EKG, EEG		
										clinical notes			clinical notes		
										clinical trials data			clinical trials data		

APPENDIX 3
UC ReX Data Metrics

UC ReX Data Elements								
		Year 1- 2 Data			Year 3 Data			
UC CAMPUS	TOTAL PATIENT DATA ELEMENTS	DEMOGRAPHICS	DIAGNOSIS	PROCEDURES	LABS	VITAL STATUS	MEDS (4)	PATIENT DATA ELEMENTS COMMENTS
UCSD	82,610,531	6,891,004	10,614,282	N/A	65,033,266	4,396	67,583	Procedures and Children's Hospital data excluded.
UCI	52,651,819	10,332,268	21,240,149	858,073	18,733,969	1,478,806	8,554	Demographics & ICD9 Dx and Px from 1992. Lab and Meds from 2009. Children's data limited to a few clinics.
UCSF	254,976,654	178,988,224	3,731,125	156,064	70,649,908	1,437,870	13,463	Procedures data included for 2012 only.
UCD	109,871,655	10,921,320	18,958,851	680,524	79,120,530	35,780	154,650	
UCLA	165,220,515	29,030,764	37,358,066	1,076,403	97,699,918	41,617	13,747	
TOTAL	665,331,174	236,163,580	91,902,473	2,771,064	331,237,591	2,998,469	257,997	