EAGLE-I USER RESEARCH

Animal Models & Human Health Studies

SUMMER STREET DESIGN
JONATHAN ABBETT · EVAN PANKEY

THE PLAN

Review research process
Discuss human health results
Discuss animal model results

Followed by Part 2: Design Recommendations

RESEARCH FOCUS

Mouse models
Human health studies
[Cores]

KEY QUESTIONS

How do researchers currently find and use animal models?

How do human health researchers collaborate? Do they exchange data?

What are the incentives or requirements to share?

How do cores support their efforts?

SITE FOCUS

ALASKA	Human health studies
DARTMOUTH	Animal models
HARVARD	Animal models, human health studies
HAWAII	Animal models, human health studies
JACKSON STATE	Animal models, human health studies
MONTANA	Animal models, cores
MOREHOUSE	Animal models, human health studies, cores
OREGON	Animal models
PUERTO RICO	Animal models

SITE FOCUS

ALASKA	Hopkins, Bersamin
DARTMOUTH	Berwin, Fiering, Turk
HARVARD	Rosen, Cypess, Wall, Liu, Linder
HAWAII	Hoffman, Erdem, Pitts, Feger
JACKSON STATE	Patlolla, Hwang, Arslan, Sarpong, Taylor
MONTANA	Swain, Voyich-Kane, Wiley, Rynda, ARC
MOREHOUSE	Champion, Gibbons, Emmett, Rust
OREGON	Kohama, Winn
PUERTO RICO	Segarra, Pérez (2/26)

FINDINGS

HUMAN HEALTH STUDIES

"I do survey work and have small data sets. No one has ever asked me to share."

"We don't have restrictions but there are policies and proceedures like confidentiality and data sharing agreements. Once those steps are taken, they can get access."

"We have data sets from the federal government which are very restricted."

"Data sets should be documented or annoted well so someone unfamiliar can use the data."

“I think sharing data automatically increases scientific productivity.“

"The question is: if we put in, what do we get back?"

CATHLEEN / COMMUNITY HEALTH RESEARCHER

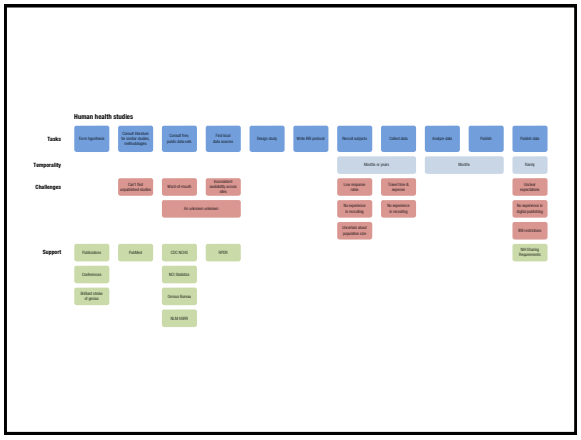
- Builds trust within target communities
- Weary of untoward collaborations
- Wants to learn from work of others
- Asks permission meticulously
- Very careful about data security
- Has never shared her data

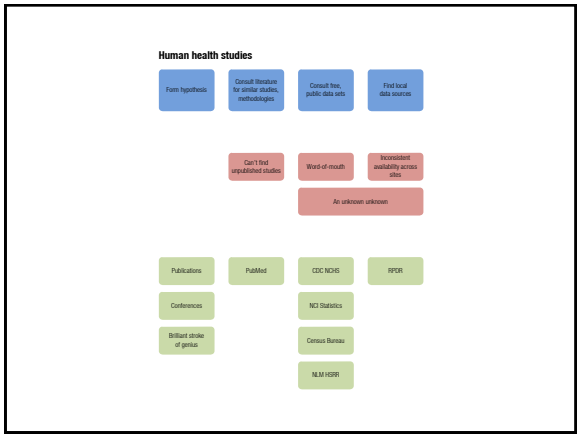
HOWARD / HEALTH SERVICES RESEARCHER

- Must balance desire for collaboration with restrictions on data usage
- Recommends public data sets to junior colleagues
- Would like better access to live data and appropriate analysis tools
- Wonders about emerging data sets

IVAN / INFORMATICIST

- Believes in a community approach to data curation and analysis
- Translational collaborations with clinical researchers helps grant prospects
- Openness to sharing not as common outside informatics circles
- Hard to find emerging data sets


Human health studies
Tasks
Form hypothesis
Consult literature for similar studies, methodologies
Consult free, public data sets
Find local data sources
Design study
Write IRB protocol
Recruit subjects
Collect data
Analyze data
Publish
Publish data
Temporality
Months or years
Months
Rarely
Challenges
Can't find unpublished studies
Word-of-mouth
Inconsistent availability across sites
An unknown unknown
Low response rates
Travel time & expense
No experience in recruiting
No experience in recruiting
Uncertain about population size
Unclear expectations
No experience in digital publishing
IRB restrictions
NIH Sharing Requirements
Support
Publications
Conferences
Brilliant stroke of genius
PubMed
CDC NCHS
NCI Statistics
Census Bureau
NLM HSRR
RPDR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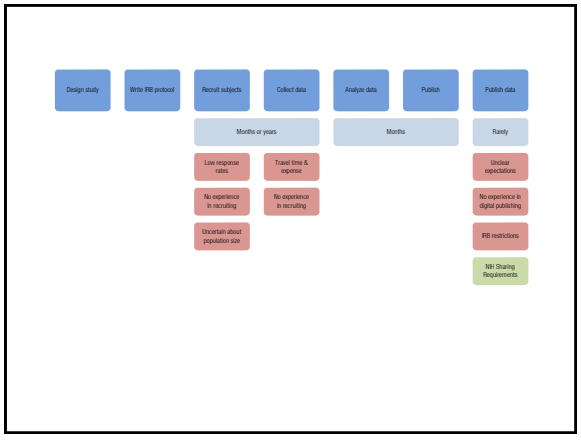
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No experience in recruiting
Uncertain about population size
Unclear expectations
No experience in digital publishing
IRB restrictions
NIH Sharing Requirements

FINDINGS

MOUSE MODELS

"Authorship is currency of scicence."

"Shared authorship is a big way to build collaborations."

"Eveyone knows the rules around sharing published materials, but they're not always followed."

"I know I can get things from my colleagues, collaborators and their collaborators."

"We found that a group we didn't know about had created a construct very similar to our own. Those kinds of things are hard to know from the literature."

"I have to ask investigators whether they have a particular strain [of mouse] that I'm looking for."

"We don't know what strains are here. There a lot of labs with a lot of transgenics."

"It's all through the grapevine."

"If I'm thinking about a new piece of equiment, I ask myself if anyone in my core research group has it. If they don't we might get together and buy it."

"My technician has built a nice little system to manage our mice across complex breeding cycles. I let other people know that I had this system, but they were not interested."

"I created two Excel sheets that have really help me manage my mice."

"We are reaching the limits of using Excel to manage our mice."

"I haven't used them, but I know there are lot of tools on the web."

CAROLINE / MOUSE CREATOR

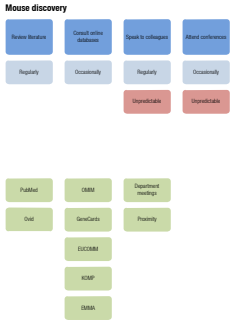
- Knows she needs to share
- Shares before publishing
- Careful about authorship
- Creates mouse "mirrors"
- Transfers mouse to private lab
- Managing requests and transfers is time consuming
- Gets requests even after hand-off

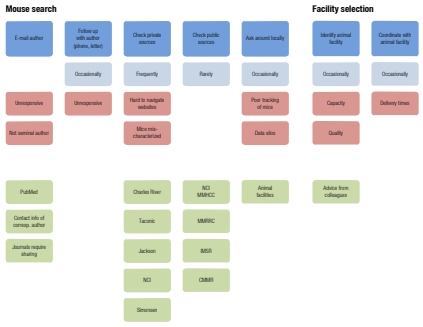
SANDRA / SMALL SCHOOL RESEARCHER

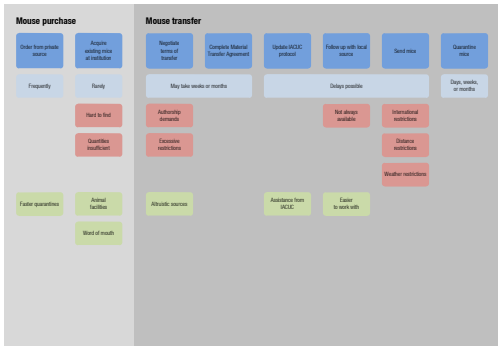
- Knows entire science faculty
- Attends conferences to expand professional network
- Shares her models to build clout
- Certain local resources lacking
- Wants cores to operate like businesses
- Has spent little time organizing

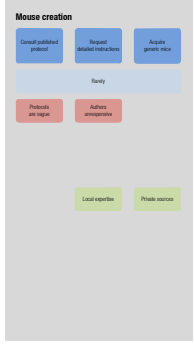
CALVIN / MOUSE CONSUMER

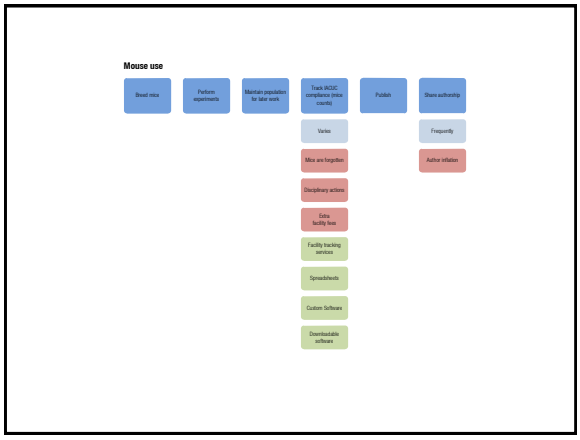
Follows literature, attends conferences
Cultivates professional network
Efficient with lab resources
Authors can be non-responsive
Hard to find true source of mice
Buys private mice if available
Cutting-edge models are more challenging, but can be worth it

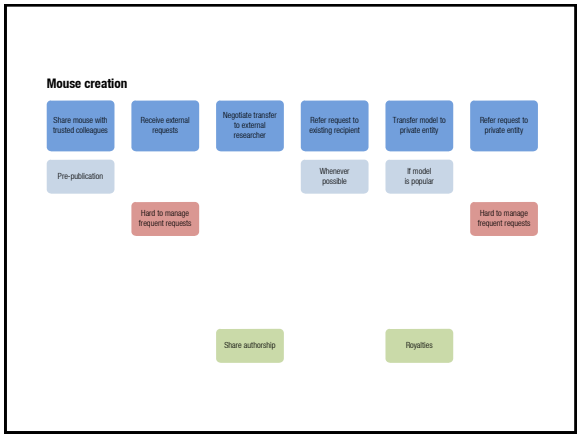



Mouse search
E-mail author
Follow-up with author (phone, letter)
Check private sources
Check public sources
Ask around locally
Occasionally
Frequently
Rarely
Occasionally
Unresponsive
Unresponsive
Hard to navigate websites
Poor tracking of mice
Not seminal author
Mice mis-characterized
Data silos
PubMed
Contact info of corresp. author
Journals require sharing
Charles River
Taconic
Jackson
NCI
Simonsen
NCI MMHCC
MMRRC
IMSR
CMMR
Animal facilities
Facility selection
Identify animal facility
Coordinate with animal facility
Occasionally
Occasionally
Occasionally
Capacity
Delivery times
Quality
Advice from colleagues


Mouse purchase
Order from private source
Acquire existing mice at institution
Frequently
Rarely
Hard to find
Quantities insufficient
Faster quarantines
Animal facilities
Word of mouth
Mouse transfer
Negotiate terms of transfer
Complete Material Transfer Agreement
Update IACUC protocol
Follow-up with local source
Send mice
Quarantine mice
May take weeks or months
Delays possible
Days, weeks, or months
Authorship demands
Excessive restrictions
Not always available
International restrictions
Distance restrictions
Weather restrictions
Altruistic sources
Assistance from IACUC
Easier to work with


Mouse creation
Consult published protocol
Request detailed instructions
Acquire generic mice
Rarely
Protocols are vague
Authors unresponsive
Local expertise
Private sources



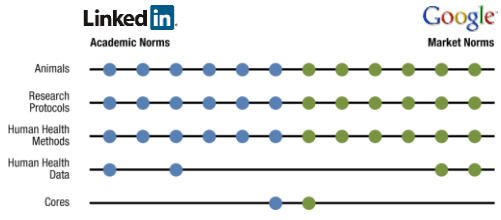


Part 2

DESIGN RECOMMENDATIONS

KEY CHALLENGES

Sustainability
Data half-life
Academic vs. market culture
Discordant sharing expectations
Scant lab organization



APPROACH

Hook into institutional workflows
Pain points in research workflows

RECOMMENDATIONS

HUMAN HEALTH STUDIES

UNCLEAR SHARING EXPECTATIONS

"Muddy Boots" data collectors (primary)

Few incentives, privacy concerns

Populations researchers (secondary)

Willing, but institutional restrictions

Informaticists (tertiary)

Sharing, eager to share more

NIH DATA SHARING POLICY

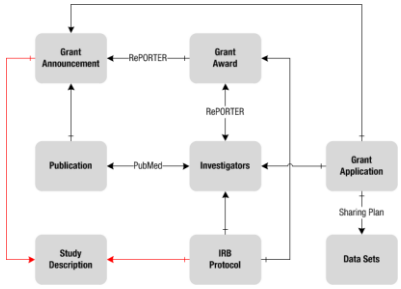
"NIH believes that **data sharing is essential** for expedited translation of research results into knowledge, products, and procedures to improve human health. NIH **endorses the sharing of final research data** to serve these and other important scientific goals and expects and supports the timely release and sharing of final research data from NIH-supported studies for use by other researchers."

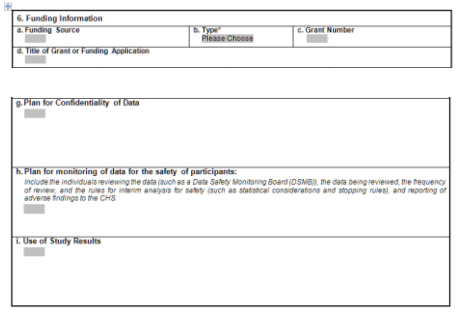
"Investigators submitting an NIH application seeking $500,000 or more in direct costs in any single budget period are **expected to include a plan for data sharing** or state why data sharing is not possible."

NIH DATA SHARING POLICY

"NIH recognizes **that data sharing may be complicated or limited**, in some cases, by organizational policies, local IRB rules, and local, State and Federal laws and regulations."

"The rights and privacy of individuals who participate in NIH-sponsored research must be **protected at all times**. Thus, data intended for broader use should be free of identifiers that would permit linkages to individual research participants and variables that could lead to deductive disclosure of the identity of individual subjects."




6. Funding Information

a. Funding Source | b. Type* Please Choose | c. Grant Number

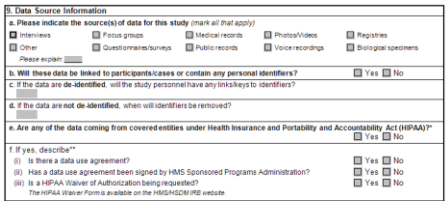
d. Title of Grant or Funding Application

g. Plan for Confidentiality of Data

h. Plan for monitoring data for the safety of participants:

Include the individuals reviewing the data (such as a Data Safety Monitoring Board (DSMB)), the data being reviewed, the frequency of review, and the rules for interim analyses for safety (such as statistical considerations and stopping rules), and reporting of adverse findings to the CHS.

i. Use of Study Results



9. Data Source Information

a. Please indicate the source(s) of data for this study *(mark all that apply)*

☒ Interviews ☐ Focus groups ☐ Medical records ☐ Photos/Videos ☐ Registries
☐ Other ☐ Questionnaires/surveys ☐ Public records ☐ Voice recordings ☐ Biological specimens
Please explain:

b. Will these data be linked to participants/cases or contain any personal identifiers? ☐ Yes ☐ No

c. If the data are **de-identified**, will the study personnel have any links/keys to identifiers?

d. If the data are **not de-identified**, when will identifiers be removed?

e. Are any of the data coming from covered entities under Health Insurance and Portability and Accountability Act (HIPAA)?* ☐ Yes ☐ No

f. If yes, describe"*
(i) Is there a data use agreement? ☐ Yes ☐ No
(ii) Has a data use agreement been signed by HMS Sponsored Programs Administration? ☐ Yes ☐ No
(iii) Is a HIPAA Waiver of Authorization being requested? ☐ Yes ☐ No
The HIPAA Waiver Form is available on the HMS/HSDM IRB website

IRB INTEGRATION

Extract contact information, grant number

Scrape grant description, keywords, NIH project ID from grant number

Combine with contact information to create "study description"

IRB INTEGRATION

Data does not reveal proprietary info

Facilitates search for similar research by grant topic, PI, and study type

INTEGRATION SCENARIO

Paul needs IRB approval to study human subjects in an upcoming project. As negotiated between the IRB and the local Eagle-i team, the IRB extracts study type and grant information from the protocol, along with Paul's contact information, and includes it in a regular report sent automatically to the Eagle-i database.

Eagle-i combines that information with the keywords of the project's grant announcement to create a "Study Description" that can be indexed and retrieved through search.

FIND HUMAN RESEARCHER LIKE ME

Given the sensitive nature of Cathleen's research area, and the geographic obstacles to rural research, it's hard to recruit reliable subjects. She'd love to consult with other investigators in similar situations to find novel approaches to these challenges. She opens the Eagle-i website and searches for prospective cohort studies of rural populations. Eagle-i returns several hits.

Each hit provides a Primary Investigator's contact information and an excerpt of the grant funding his research. Cathleen uses this information to decide which PIs to e-mail.

FIND CONNECTION TO RESTRICTED DATA

Put off by the tedium of traditional chart reviews, Paul brings up the Eagle-i website to find data resources that might help.

He's not sure exactly what to search for, so he uses the browsable directory of resources to find a list of data sets and tools. The directory clues him into RPDR, a clinical data repository accessible only to researchers affiliated with Partners Healthcare in Massachusetts. Though he can't access the system himself, he recalls a colleague with whom he trained that's affiliated with Massachusetts General Hospital. Paul e-mails his old colleague to propose a collaboration using the RPDR data.

INCLUDE EAGLE-I IN DATA SHARING PLAN

Jeff submits a draft of his grant application to his university's Office of Sponsored Programs. They respond with several recommendations for improvement, including a suggestion to use Eagle-i to fulfill the grant's data sharing requirements. Jeff learns that Eagle-i will provide a free repository for his project's research data, including a unique URL that can be related to any PubMed IDs of journal articles he publishes. Since he's never published his data online before, and lacks the technical skills to do it himself, he includes the Eagle-i repository in his grant application's Data Sharing Plan.

PUT DATA ONLINE

Upon completing his research, Jeff prepares his data for archiving.

Jeff loads the eagle-i website and follows a simple, multi-step wizard to load his data set into the repository. Along the way, he indicates the source and agency identifier of his research's funding, as well as the PMIDs of a paper he published about the research.

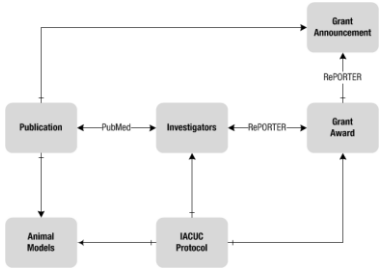
When the process is complete, Jeff is given a unique URL for his data set that he can include in future publications, in his CV, or share with colleagues.

FIND A DATASET

David's mentor recommends that he use the NHANES data set. Unfamiliar with the resource, he searches for "NHANES" in Google... He sees an NHANES hit from the eagle-i website. Clicking through, he reads some summary information about NHANES, plus a list of several data sets uploaded by other investigators that contain similar information. He's able to find two promising sets that pertain to obesity – using them will eliminate some of the patient recruitment and data collection he'd normally have to manage himself.

RECOMMENDATIONS

ANIMAL MODELS



Principal Investigator:

Protocol Number:

Protocol Title:

Protocol Contact Person, E-Mail Address and Phone Number (if not PI)

Research Team
(please provide the name(s), title(s), qualifications/years of experience for each person working with animals on this protocol)

Funding Information (check all that apply)
☒ Current Grant (specify granting agency and agency number):
☐ Pending Grant (specify grant agency):
☐ Other (specify):

Joslin Cost Center Number (if applicable, list all cost-centers that apply)

Species to be Used (check **one**, only one per application)
☒ Mouse
☐ Rat

Animal Housing (check all that apply)
☐ Fifth Floor – Barrier
☒ Fifth Floor – Conventional
☐ Basement
☐ Other (specify):

Number of Animals Used in the Past Year: 20
Estimated Number of Animals to be Used in the Up-Coming Year: 120
Estimated Length of Stay for Animals: 60

IACUC INTEGRATION

Use IACUC protocols to know who is using what mice

Extend protocol form to request specific models, sources

IACUC INTEGRATION

Protocols updated regularly

Layer on visibility restrictions

- Inside/outside
- Published/unpublished

LAB ORGANIZATION

Ad-hoc, home-grown

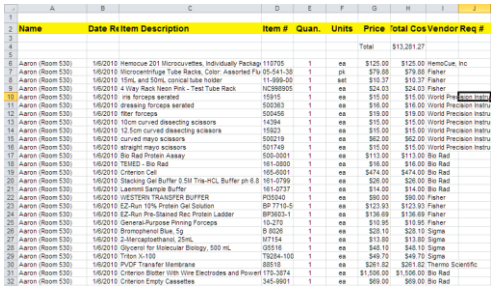
Excel-based

Infrequently updated

Software geared to large labs

Data varies, is highly particular

Good ideas are out there



	A	B	C	D	E	F	G	H	I	J
1										
2	Name	Date Re	Item Description	Item #	Quan.	Units	Price	Total Cos	Vendor	Req #
3										
4							Total	$13,281.27		
5										
6	Aaron (Room 530)	1/6/2010	Hemocue 201 Microcuvettes, Individually Packag	110705	1	ea	$125.00	$125.00	HemoCue, Inc	
7	Aaron (Room 530)	1/6/2010	Microcentrifuge Tube Racks, Color: Assorted Flu	05-541-36	1	pk	$79.88	$79.88	Fisher	
8	Aaron (Room 530)	1/6/2010	15mL and 50mL conical tube holder	11-999-00	1	set	$10.37	$10.37	Fisher	
9	Aaron (Room 530)	1/6/2010	4 Way Rack Neon Pink - Test Tube Rack	NC998905	1	ea	$24.03	$24.03	Fisher	
10	Aaron (Room 530)	1/6/2010	iris forceps serated	15915	1	ea	$15.00	$15.00	World Pre	Scan Instru
11	Aaron (Room 530)	1/6/2010	dressing forceps serated	500363	1	ea	$16.00	$16.00	World Precision Instru	
12	Aaron (Room 530)	1/6/2010	filter forceps	500456	1	ea	$19.00	$19.00	World Precision Instru	
13	Aaron (Room 530)	1/6/2010	10cm curved dissecting scissors	14394	1	ea	$15.00	$15.00	World Precision Instru	
14	Aaron (Room 530)	1/6/2010	12.5cm curved dissecting scissors	15923	1	ea	$15.00	$15.00	World Precision Instru	
15	Aaron (Room 530)	1/6/2010	curved mayo scissors	500219	1	ea	$62.00	$62.00	World Precision Instru	
16	Aaron (Room 530)	1/6/2010	straight mayo scissors	501749	1	ea	$15.00	$15.00	World Precision Instru	
17	Aaron (Room 530)	1/6/2010	Bio Rad Protein Assay	500-0001	1	ea	$113.00	$113.00	Bio Rad	
18	Aaron (Room 530)	1/6/2010	TEMED - Bio Rad	161-0800	1	ea	$16.00	$16.00	Bio Rad	
19	Aaron (Room 530)	1/6/2010	Criterion Cell	165-6001	1	ea	$474.00	$474.00	Bio Rad	
20	Aaron (Room 530)	1/6/2010	Stacking Gel Buffer 0.5M Tris-HCL Buffer ph 6.8	161-0799	1	ea	$26.00	$26.00	Bio Rad	
21	Aaron (Room 530)	1/6/2010	Laemmli Sample Buffer	161-0737	1	ea	$14.00	$14.00	Bio Rad	
22	Aaron (Room 530)	1/6/2010	WESTERN TRANSFER BUFFER	P05040	1	ea	$90.00	$90.00	Fisher	
23	Aaron (Room 530)	1/6/2010	EZ-Run 10% Protein Gel Solution	BP 7710-5	1	ea	$123.93	$123.93	Fisher	
24	Aaron (Room 530)	1/6/2010	EZ-Run Pre-Stained Rec Protein Ladder	BP3603-1	1	ea	$136.69	$136.69	Fisher	
25	Aaron (Room 530)	1/6/2010	General-Purpose Pinning Forceps	10-270	1	ea	$10.95	$10.95	Fisher	
26	Aaron (Room 530)	1/6/2010	Bromophenol Blue, 5g	B 8026	1	ea	$28.10	$28.10	Sigma	
27	Aaron (Room 530)	1/6/2010	2-Mercaptoethanol, 25mL	M7154	1	ea	$13.80	$13.80	Sigma	
28	Aaron (Room 530)	1/6/2010	Glycerol for Molecular Biology, 500 mL	G5516	1	ea	$48.10	$48.10	Sigma	
29	Aaron (Room 530)	1/6/2010	Triton X-100	T9284-100	1	ea	$49.70	$49.70	Sigma	
30	Aaron (Room 530)	1/6/2010	PVDF Transfer Membrane	88518	1	ea	$261.82	$261.82	Thermo Scientific	
31	Aaron (Room 530)	1/6/2010	Criterion Blotter With Wire Electrodes and Power	170-3874	1	ea	$1,506.00	$1,506.00	Bio Rad	
32	Aaron (Room 530)	1/6/2010	Criterion Empty Cassettes	345-9901	1	ea	$69.00	$69.00	Bio Rad	

IACUC INTEGRATION

Calvin needs IACUC approval to perform experiments on mice in his next study... In addition to the usual protocol summary, Calvin must list the particular strains of mice he intends to use and the source of those mice.

The mice strain information is exported in electronic format and sent to eagle-i for processing.

FIND A MOUSE NEARBY

Before budgeting for relatively common mice, Calvin logs onto eagle-i to check if investigators at his institution are already using them. He finds three potential leads.

To protect the identities of investigators who use animals, eagle-i does not display contact information; instead the mouse resource page displays a simple contact form that will confidentially forward Calvin's sharing request to the resource's owner.

In the end, one investigator responds directly to Calvin to share his mice, saving Calvin time and money.

FIND SEMINAL SOURCE OF A MOUSE

Calvin reads about an innovative study in a leading neuroscience journal that uses a mouse model about which he's unfamiliar. He checks PubMed for details, but it is unclear from the article if the authors created the model themselves. Calvin continues his search on the eagle-i website. He enters the PMID of the article he read and retrieves a list of related mouse models with links to the originating investigators.

PUBLICIZE YOUR MOUSE

Caroline created a new mouse model last year that's proving to be quite popular. She has just transferred the model to a private lab which will fulfill requests for it from the general research community. She'd like to eliminate many of the direct requests she receives by e-mail and phone, so she logs onto Eagle-I and searches for her mouse model. Finding it, she updates the model's meta-data with contact information for the private lab.

"YELP" FOR CORES

Sandra goes to the eagle-i site and searches for "FACS cores." She gets a list of cores in order of proximity to her institution. She clicks the link of one core's page. It displays a description of the core, a list of its services, internal and external costs, and average turnaround time. Beneath, the page lists brief reviews by other scientists who have used the core. She returns to the results list and resorts it by cost, then by turnaround time. She also bookmarks her results page and the pages of the facilities that appeal to her most.

"MATCH.COM" FOR MANAGEMENT TOOLS

Sandra finally has some extra time to look into lab organization tools, but she balks at doing a whole lot of Googling. She instead goes to the eagle-i "Get Organized" section and enters a little information about her lab. Sandra gets back a list of tools submitted by other researchers that match her criteria. Luckily most tools are free, and some include comments from researchers that have used them. She can easily click through to downlaod a template or software package. She bookmarks her favorite results to show to this lab members at their Friday meeting.

WRAPPING UP

IDEA "GRAB BAG"

Promote sharing policies

Categorizing the general types of sharing policies, and publishing the sharing policy linked to the IRB information would increase the transparency of data sharing in human health research and allow researchers to determine where data sharing is more welcome.

IDEA "GRAB BAG"

Knowledge exchange about animal core best practices.

Small and remote institutions have similar animal resource core management problems. Within this category some have solutions that could be shared with others.

THANKS!