

An abstract graphic featuring several thin lines in green, orange, blue, and purple that converge towards a central point on the left side of the slide. These lines extend across the background, creating a sense of dynamic movement and convergence.

# Creative Convergence

Conducting a systematic review project through  
cross-institutional, distance collaboration

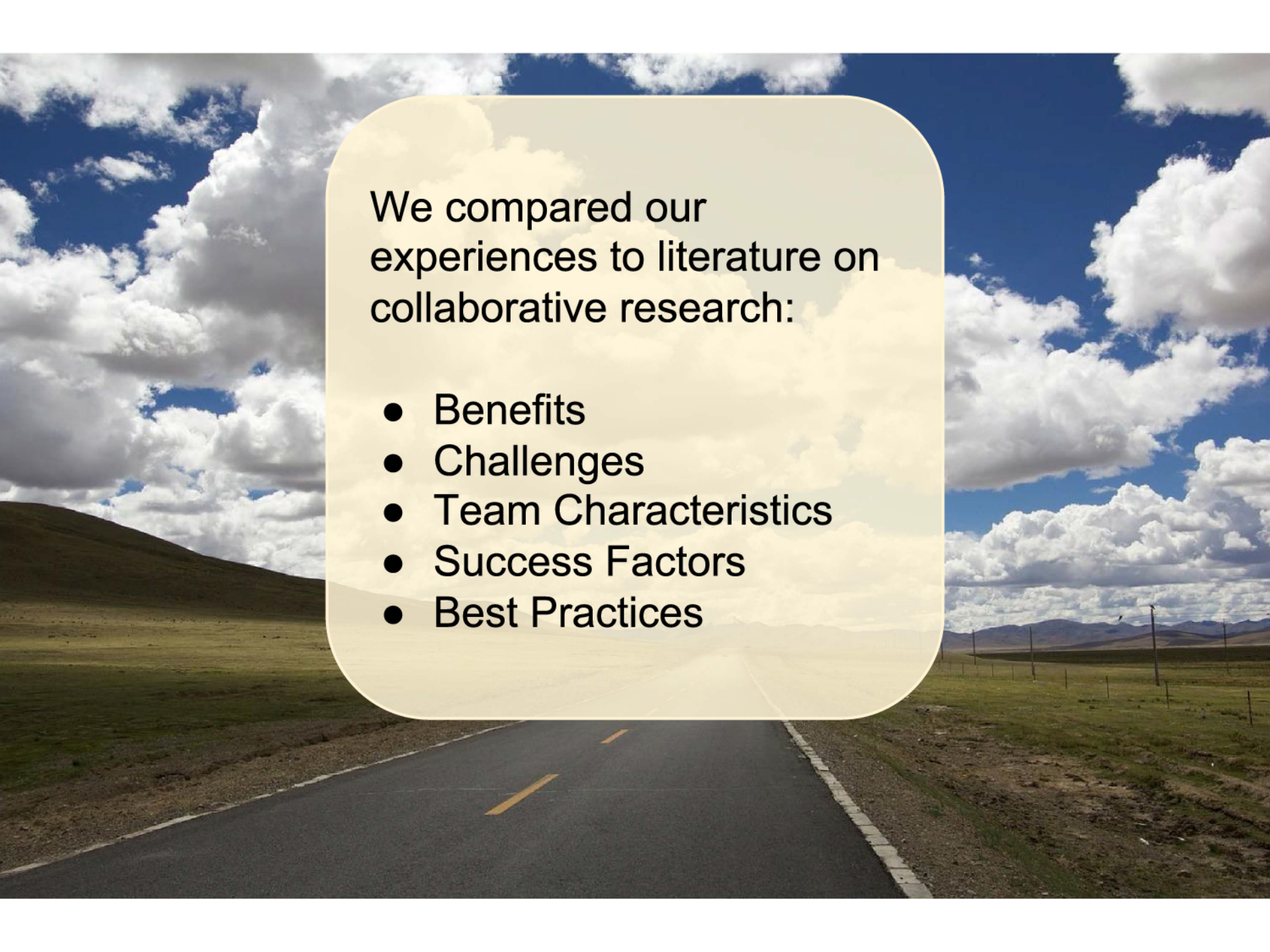


This presentation is  
licensed [CC-BY 4.0](https://creativecommons.org/licenses/by/4.0/)

# **Objective**

**To reflect on a cross-institutional  
systematic review project:**

What are effective collaboration  
methods for geographically  
dispersed research teams?



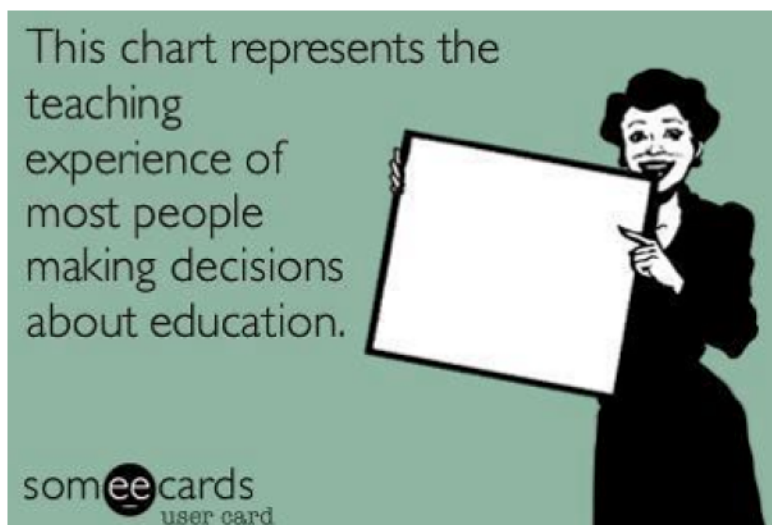
We compared our experiences to literature on collaborative research:

- Benefits
- Challenges
- Team Characteristics
- Success Factors
- Best Practices

# Benefits

## Our Project

Systematic Review on:  
Effective Library Instruction for  
EBP Health Sciences Education



## Our Team Experience

New Perspectives

International  
Networking

SR Experience

Build Technical  
Skills

Publication  
Opportunities

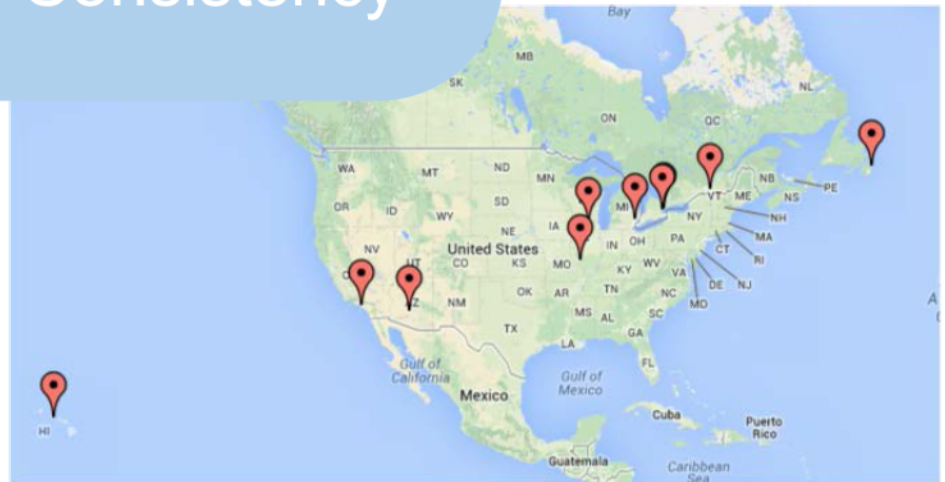


# SR Project Specific Challenges

- Ambiguity of concepts
- Duplicate citations
- Lack of abstracts
- Varied Educational Interventions
- Copyright questions

# Team Collaboration Challenges

Large, Dispersed Team  
Diverse knowledge & Experience  
Geography  
Methodology Development  
Ambitious Timeline  
Work/Life Conflicts  
Decisions - Maintaining Consistency



# **Lit Review**

**What is being written about effective methods for cross-institutional, distance research team collaboration, including:**

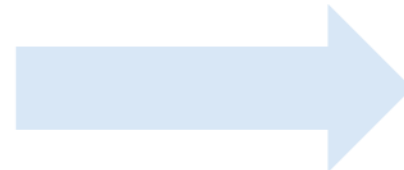
- **dispersed locations and time zones?**
- **different institutional resources and policies?**



# Searching the lit

After trying various options to get to literature  
\*about\* how research teams collaborate  
effectively, especially across institutions and  
space:

research collaboration  
cross institutional collaboration  
collaborative research  
online collaboration



# Team Science!





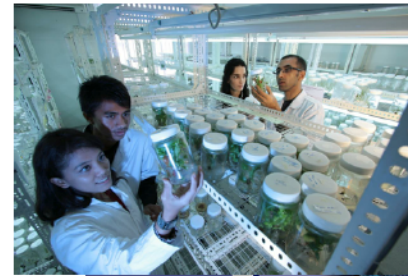
“The rapid proliferation of scholarly knowledge and the increasing complexity of social and scientific problems have prompted growing investments in team science initiatives.”

Team-based research with multiple disciplines may accelerate progress towards resolving complex societal and scientific problems

**Hall, et al., 2012**

Shift in how science is being conducted - teams increasingly dominate in production of high-impact, highly cited science; teams are growing in size, and are increasingly located across university boundaries rather than within them.

**Borner, et al., 2010**



**How might Med Libs  
participate in  
Team Science?**

# SciTS

**Why developed**

**Definition**

**Momentum**

# Characteristics of Team Science

## **Lit review**

Large teams - from a few to 50, to 200, to more!

Multiple projects

Multiple disciplines

Different departments, institutions, and geographic locations

Diverse goals - discovery, training, translational/public health, policy

## **Team**

Large team

Diverse knowledge and experience

Geography

Ambiguity of research focus

Methodology discussions



**Benefits**



A solid orange rounded rectangle with a light beige background.

**Challenges**

# Factors for success

**Intrapersonal** (internal motivations and individual attitudes)

**Interpersonal** (interactions among team members - communication, learning, work jointly to accomplish goals)

**Physical environment** (spatial distribution)

**Technological** (technical infrastructure and support)

**Organizational** (influence of team member's institution as well as make-up and org of team itself)

**Political/Societal**

Stokols, D., Misra, S., Moser, R. P., Hall, K. L., & Taylor, B. K. (2008) *Ecology of Team Science*

# **Recommended Best Practices: Attitudes**

Be open and adaptable

Be willing to learn and participate

Communicate

Address and resolve conflicts

Persevere through difficulties

## **Additional Team & Lit Review Insights**

# **Top 3 Recommendations for Team Research Sponsors**

Train team leaders

Facilitate initial f2f meeting

Provide teams with technological support

# Tools - What we used

## Communication

- Email
- Online meeting software - ...(often audio only)
- Recommendation: Use video options when possible, include asynchronous methods such as Google group, discussion board

## Record Keeping and Production

- Google Drive
  - Documents
  - Spreadsheets
- Wiki - some use at beginning, but set up and use had higher barrier than Google Drive options
- Consider: project management platform

## Citation Management

- EndNote and EndNote Web
- Recommendation: Consider platforms that allow for comment, annotation, and full text sharing within restricted group



# Project Planning

## Example timeline at project level

The screenshot shows a Google Sheets interface with a timeline chart. The chart is titled 'MLA #13 SR - TIMELINE' and is located in the first column (A) of the spreadsheet. The timeline spans from July to May. The tasks and their durations are as follows:

Task	Start Date	End Date
Prepare protocol	July 1	August 1
Finalize protocol	August 1	September 1
Searches for published and unpublished studies	August 1	December 1
Pilot test of eligibility criteria	August 1	September 1
Inclusion assessments	September 1	December 1
Pilot test of risk of bias assessment	September 1	October 1
Validity assessments	September 1	March 1
Pilot test of data collection	September 1	October 1
Data collection	October 1	May 1
Data entry	October 1	November 1
Follow-up of missing information	November 1	December 1
Analysis	December 1	January 1
Preparation of review report	January 1	May 1

Below the timeline chart, there is a table with the following data:

Task	Start Date	End Date
CHLA 2014	Till February 28:	Finish 1st phase of screening
	Till April 15:	Removal of off topic records
	Till May 15:	Finish second phase of screening
	Till June 2:	Removal of records that do not meet inclusion criteria
		Use data abstraction form (to be drafted and tested in March)
		Draft presentation

# Project Planning

## Example task-specific timeline

### Example:

1. Preparing a search strategy for 1 database (LISTA via EBSCOHost) based on the group's model strategy for PubMed/Medline
  - **3 hours** (mainly due to need to adjust MeSH to appropriate LISTA headings)
2. Conduct 1 database search and post the results for the group
  - **15 minutes**
3. Set up an EndNote Web account and become familiar with using it
  - **30 minutes**
4. Title/Abstract Review of 100 abstracts
  - **1.5 hours**
5. Full Text Review of 10 articles (for inclusion/exclusion)
  - **1.5 hours**
    - **Additional time** to pull full text / request via ILL: 30 minutes with possible wait time of 1-14 days to receive ILL response
6. Data extraction for 1 article
  - **30 minutes**
7. Critical appraisal for 1 article
  - **15 minutes**

Example expectation - title/abstract review time  
for 500 results: 7.5 hours

# Tools: Communication

Consider Online Education recommendations

- Asynchronous
  - Discussion forum
  - Email list - Google group
- Synchronous
  - Video, audio, chat meeting options

# Tools: Communication

Consider Online Education recommendations

- **Stable**
  - Group project website, wiki, or planning platform
  - Deadlines and goals on front page
- **Automated**
  - Shared calendar with reminders

# Tools: Project Planning

## Prepare Yourself for Team Science Template of questions to consider in preparation



### Collaboration and Team Science

Home  
[Home](#)

<a href="#">Home</a>
<a href="#">Agreement Template</a>
<a href="#">Tenure Track Offer Template</a>
<a href="#">Evaluating Contributions</a>
<a href="#">Resources</a>
<a href="#">Contact Us</a>
<a href="#">Field Guide in Action</a>
<a href="#">Field Guide Wins Award</a>
Download the: <a href="#">Team Science Field Guide</a> <a href="#">Welcome Letter</a>

#### Preparing Yourself for Team Science

Team science is rapidly becoming a primary mode of operation for complex questions involving human health. But making the most of it is fraught with the challenges of adapting from a solo-investigator

For example, individuals, collaborators, and highly integrated 'science' stuff is all about. Some people naturally function as team players to enable them to successfully contribute to team efforts. Effective team science requires team members to contribute positively to the overall functioning and success of the team and receive constructive feedback. In addition, they must also share credit, and decision making with other team members.

The strength of these skills is often dependent on an individual's own thoughts and feelings, and level of consciousness of the needs of the research team or leading a research team, mentally and emotionally.

Some tips include:

- 1. Recognize that others do not necessarily share your vision.
- 2. Consider many options and possibilities for how others will contribute.
- 3. Appreciate that different understandings and perceptions of team science exist.

#### Collaborative Agreement Template

[Home](#) > [Collaborative Agreement Template](#)

Search

<a href="#">Home</a>
<a href="#">Agreement Template</a>
<a href="#">Tenure Track Offer Template</a>
<a href="#">Evaluating Contributions</a>
<a href="#">Resources</a>
<a href="#">Contact Us</a>
<a href="#">Field Guide in Action</a>
<a href="#">Field Guide Wins Award</a>
Download the: <a href="#">Team Science Field Guide</a> <a href="#">Welcome Letter</a>

[Download Agreement Template PDF](#)

#### Questions for Scientific Collaborators

Although each research project has unique features, certain core issues are common to most of them and can be addressed by collaborators posing the following questions:

##### Overall Goals

1. What is the overall vision for the collaboration?
2. What are the scientific issues, goals, and anticipated outcomes or products of the collaboration?
3. When is the collaboration over?
4. When is the project over?

##### Who Will Do What?

1. What are the expected contributions of each participant?
2. Who will write any progress reports and final reports?
3. How, and by whom, will personnel decisions be made? How and by whom will personnel be supervised?
4. How and by whom will data be managed? How will access to data be managed? How will you handle long-term storage and access to data after the project is complete?

##### Authorship, Credit

1. What will be the criteria and the process for assigning authorship and credit?
2. How will credit be attributed to each collaborator's institution for public presentations, abstracts, and written articles?
3. How and by whom will public presentations be made?
4. How and by whom will media inquiries be handled?
5. When and how will you handle intellectual property and patent applications?

##### Contingencies & Communicating



# Tools

## Google

- Sites
  - Project templates
- Groups - discussion and email
- Drive - documents, spreadsheets, forms, presentations
- Calendar - reminders, list-calendar syncing

### Select a Site Template

Public

Featured

Business collaboration

Activities & events

Schools & education

Clubs & organizations

Personal & family

Government & non-profits

Policy

Language

English (US)

project management



Project Management Template with List to Google Calendar Syncing  
This is project management template that includes a script for syncing a list...



Project Management Template (v.211) with List to Google Calendar Syncing  
This is project management template that includes a script for syncing a list...



ITIL Project Management  
Effective, searchable, traceable project management through the google sites ...



Project Template  
Template for Project Management



GSMST PHYSENG  
Project Management Template

# Tools

## Team Science Toolkit

[www.teamsciencetoolkit.cancer.gov](http://www.teamsciencetoolkit.cancer.gov)

The screenshot displays the Team Science Toolkit website. At the top, the National Cancer Institute logo and name are visible, along with the text "at the National Institutes of Health | www.cancer.gov". The main header features the "Team Science Toolkit" title and a subtitle: "An interactive website to help you support, conduct and study team-based research." Below this is a navigation bar with links: Home, About Team Science, About the Toolkit, Discover, Contribute, Connect, News & Events, and About Us. The "Discover" link is highlighted.

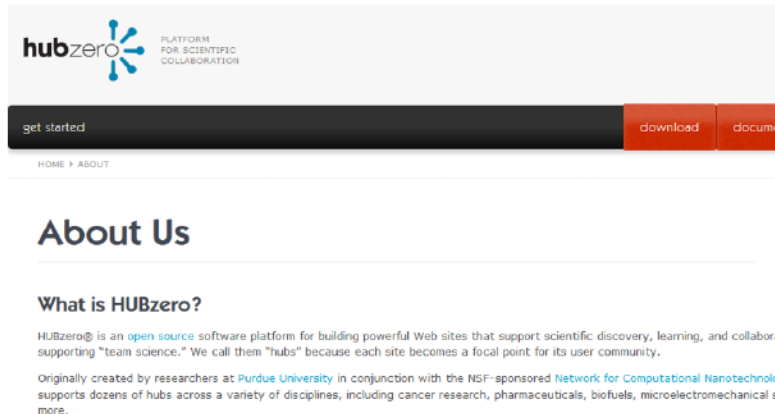
A large banner for the "2014 Science of Team Science Conference" is prominent. It includes the text: "The 2014 SciTS conference was held on August 6 - 8, 2014 in Austin, TX. A forum for sharing knowledge to maximize the effectiveness of team-based research, the conference is relevant to a wide range of stakeholders including individuals using, managing, facilitating, or supporting team-based research. Please save the date for SciTS 2015 - June 2-5 in the Washington DC metro area." A "Learn More" link is provided. To the right of the text is a graphic for "SciTS 2014" with the tagline "Building the knowledge base for effective team science". Below the graphic, it says "VIVO/SciTS 2014 Conference | August 6-8, 2014 Austin, TX".

The main content area is divided into three columns. The left column has a "Discover" section with the heading "what resources are available." and a search bar with a "Search" button and a link to "Advanced Search". Below this is a "Contribute" section with the heading "new resources to the toolkit." and a description: "Share your knowledge by uploading tools and information about the practice or study of team science." The right column has a "Connect" section with the heading "to colleagues across disciplines." and a description: "Join expert discussions on the blog, add your name to the directory, or stay up-to-date on News and Events." The middle column features a "Recently Added Resources" section with a list of items: "Dear Doc: advice for collaborators", "Supporting Interdisciplinary Collaboration: T...", and "The 'Welcome Letter': A Useful Tool for Labor...". Below this list, it states "The Toolkit currently includes 1310 resources." The right column has a "Resources" section with links to "Tools", "Measures", "Bibliography", and "Editors' Picks". Below this is a "Connections" section with links to "Recent Blog Posts", "Listserv", and "Communication Materials". At the bottom right, there are social media icons for LinkedIn, Facebook, and Twitter.

# Tools

## Team Science

## Toolkit



**hubzero** PLATFORM FOR SCIENTIFIC COLLABORATION

get started download documentation

HOME > ABOUT

### About Us

#### What is HUBzero?

HUBzero® is an [open source](#) software platform for building powerful Web sites that support scientific discovery, learning, and collaboration supporting "team science." We call them "hubs" because each site becomes a focal point for its user community.

Originally created by researchers at [Purdue University](#) in conjunction with the NSF-sponsored [Network for Computational Nanotechnology](#), HUBzero supports dozens of hubs across a variety of disciplines, including cancer research, pharmaceuticals, biofuels, microelectromechanical systems, and more.

### Just Another Web Site? Why Not Use a WordPress Blog?

HUBzero includes a powerful content management system built to support scientific activities. Sure, users on a hub can write blog entries and participate in discussion groups, but much more. They can work together in projects, publish datasets and computational tools with [Digital Object Identifiers \(DOIs\)](#), and make these publications available for others to download, but as live, interactive digital resources. Simulation/modeling tools published on a hub can be accessed with the click of a button. They run on cloud computing clusters, and other national high-performance computing (HPC) facilities and serve up compelling visualizations.



HUBzero overview  
2-page PDF document



HUBzero demo  
3-min video



Communities interaction  
3-min video



Example: nanoHUB.org  
Youtube video



Example: nees.org  
Youtube video

### ADVANCED SEARCH

### Show only the following types of resources:

- ☒ Tools
- ☐ Measures
- ☐ Bibliographic Works
- ☐ Funding Opportunities
- ☐ Job Announcements
- ☐ News & Events


### Show only resources related to the following goals:

- ☐ Learn about the field of team science: history, theory and concepts
- ☐ Establish or maintain effective team science endeavors
- ☒ Enhance team performance, interactions, and attitudes
- ☒ Provide institutional support for team science
- ☐ Provide training for team science to team members or students
- ☐ Conduct research on/evaluate team science
- ☐ Engage community partners in your scientific team

# Tools

## Systematic Review Toolbox

<http://systematicreviewtools.com>

[About](#)[Research](#)[Contact](#)

### Quick Search

Heard of a tool? Try searching for it...

### Advanced Search

Select an underlying **approach**:

Select a **discipline**:

Check 'Any' if not concerned about any specific **features**:

☒ Any

OR

Select **features** you want a tool to support:


☐ Protocol Development

☐ Automated Search

☐ Study Selection

☐ Quality Assessment

☐ Data Extraction

[Search](#)[About](#)

### Advanced Search Results:


Search criteria:

- Discipline: "any"
- Underlying Approach: "Reference Management"
- Features: "any"

26 tools have been found...

# Tools - Data

## Translate what you learn to support your users

**LabKey Software Foundation**  
Open Source Software for Scientists

Home Solutions Docs & Support Download Developers

Home

The Open Source Platform for Translational Research

**Integrate**

Files  
Word Excel PDF

Clinical Study Data

Specimens

Gene Sequences

Flow Cytometry Files

Proteomics Data

Any Assay Data

**Analyze**

LabKey Server

Data Repository

Data Integration

Security

Auditing

**Collaborate**

Visualizations

Reports / Data

API  
R Javascript  
SQL SAS  
Perl Java

Scientists

Collaborators

Statisticians, Programmers

From thousands of spreadsheets scattered across computers to huge files generated in genomics and proteomics experiments, research teams face daunting data management challenges. LabKey is a secure, web-based data integration platform that can be customized to meet the evolving needs of translational research organizations.

**REDCap**

Logged in as site\_admin

My Projects

Project Home

Project Setup

Project status: **Production**

Data Collection

Manage Survey Participants

Scheduling

Record Status Dashboard

Add / Edit Records

Data Collection Instruments:

Demographics

Baseline Data

Month 1 Data

Month 2 Data

Month 3 Data

Completion Data

Applications

Calendar

Data Export Tool

Data Import Tool

Data Comparison Tool

Logging

Field Comment Log

File Repository

Graphical Data View & Stats

Report Builder

Reports

**REDCap Demo Database**

Project Home

Project Setup

**Quick Tasks**

Codebook

Manage Survey Participants

Export data

Create a report

The Codebook is a human-readable, read-only version of the project's Data Dictionary and serves as a quick reference for viewing field attributes.

Invite participants to complete your survey by emailing a public survey link or building a participant list for batch notification.

Export your data from REDCap to open or view in Excel or various stats packages.

Build custom reports for quick views of your data, and export reports to Excel/CSV.

**Project Dashboard**

The tables below provide general dashboard information, such as a list of all users with access to this project, general project statistics, and upcoming calendar events (if any).

**Current Users**

User	Expires
site_admin (Jee User)	never

**Project Statistics**

Records in project	292
Most recent activity	10/09/2014 10:22am
Space usage for docs	320.27 MB
Project status	<b>Production</b>

**Upcoming Calendar Events (next 7 days)**

Time	Date	Description
		No upcoming events

# Further questions

Possible roles for librarians in support of team science

- Data management
- Collaboration methods
- Researcher networks
- Knowledge sharing and transfer
- Open access support
- SciTS research

# Image Sources

- Map image created by Alison Ferrell and Genevieve Gore
- Project timeline example created by Genevieve Gore
- All screenshots taken by Ginny Pannabecker using the Mac Grab utility application or Windows Snippy application.
- Additional photo and image sources\*
  - <http://pixabay.com/en/road-landscape-clouds-sky-348544/> - public domain image
  - <https://flic.kr/p/dUwB97> - CC-BY photo, Education Experts, AJ Cann
  - <http://pixabay.com/en/swiss-corner-kirchlispitzen-r%C3%A4tikon-57259/> - public domain image
  - <https://flic.kr/p/dxvmRd> - CC-BY photo, SAM team celebrates landing, NASA Goddard Space Center
  - <http://pixabay.com/en/wave-circle-monitor-send-globe-376967/> - public domain image
  - <http://pixabay.com/en/biology-research-laboratory-220005/> - public domain image
  - <http://pixabay.com/en/laboratory-scientists-research-385349/> - public domain image

# References

## Lit Review

Breen, H. (2013, October). Virtual Collaboration in the Online Educational Setting: A Concept Analysis. In *Nursing forum* (Vol. 48, No. 4, pp. 262-270).

Börner, K., Contractor, N., Falk-Krzesinski, H. J., Fiore, S. M., Hall, K. L., Keyton, J., ... & Uzzi, B. (2010). A multi-level systems perspective for the science of team science. *Science Translational Medicine*, 2(49), 49cm24-49cm24.

Hall, K. L., Stokols, D., Stipelman, B. A., Vogel, A. L., Feng, A., Masimore, B., ... & Berrigan, D. (2012). Assessing the value of team science: a study comparing center-and investigator-initiated grants. *American journal of preventive medicine*, 42(2), 157-163.

García-Milian, R., Norton, H. F., Auten, B., Davis, V. I., Holmes, K. L., Johnson, M., & Tennant, M. R. (2013). Librarians as Part of Cross-Disciplinary, Multi-institutional Team Projects: Experiences from the VIVO Collaboration. *Science & technology libraries*, 32(2), 160-175.

Stokols, D., Hall, K. L., Taylor, B. K., & Moser, R. P. (2008). The science of team science: overview of the field and introduction to the supplement. *American journal of preventive medicine*, 35(2), S77-S89.

Stokols, D., Misra, S., Moser, R. P., Hall, K. L., & Taylor, B. K. (2008). The ecology of team science: understanding contextual influences on transdisciplinary collaboration. *American journal of preventive medicine*, 35(2), S96-S115.

Vogel, A. L., Hall, K. L., Fiore, S. M., Klein, J. T., Michelle, B. L., Gadlin, H., ... & Falk-Krzesinski, H. J. (2013). The team science toolkit: enhancing research collaboration through online knowledge sharing. *American journal of preventive medicine*, 45(6), 787.



# Tools

Google Sites

<http://www.google.com/sites/overview.html>

NIH - Prepare Yourself for Team Science - Collaborative Agreement Template

<https://ccrod.cancer.gov/confluence/display/NIHOMBUD/Collaborative+Agreement+Template>

Team Science Toolkit

<https://www.teamsciencetoolkit.cancer.gov/Public/Home.aspx>

HUBzero

<https://hubzero.org/>

Systematic Review Toolbox

<http://systematicreviewtools.com/>

LabKey

<http://www.labkey.com/>

REDCap

<http://www.project-redcap.org/>

# Recommended Best Practices

## For institutions / funders / supporting groups

- Plan ahead using templates
- Clear vision of what constitutes success
- Assessment to track project, adjust
- Gauge team member readiness toward teams science: openness and adaptability, previous experience with collaborative projects
- Consider combining strangers and known colleagues
- Provide training for leaders and team members
- Provide platform/tools for project management, communication, and discussion

# Recommended Best Practices

## For team leaders

- Communicate with open, enthusiastic, inclusive approach
- Set regular meeting times
- Provide opportunities for f2f meetings to build community
- Utilize centralized planning and production platform
- Plan ahead with team using templates
- Designate roles and responsibilities - when changes, communicate to all along with changed expectations
- Encourage open, frequent, explicit communication
  - Decisions - reinforce group decisions for consistency
- Address conflicts and work through to resolution

# **Recommended Best Practices**

## **For individual team members**

- Attitudes: openness, adaptability, willingness to devote substantial time to learning and participating, egalitarian values
- Commit time needed
- Active participation in meetings, planning, and tasks
- Keep up with progress and activities
- Communicate openly, with empathy, explicitly, and often
- Willingness to address conflicts and work to resolution



**Presentation Contact for questions:**  
Virginia Pannabecker, [GinnyP@vt.edu](mailto:GinnyP@vt.edu)

**Authors:**

Virginia Pannabecker, Carolyn Dennison, Alison Farrell, Genevieve Gore, Assako Holyoke (SR Team Leader), Viola Machel, Christine Marton, Kelly O'Brien, Stephanie Swanberg, Mindy Thuna