

# Spreading the Word on Going Digital in the Lab

## The Data Management Working Group

The Harvard Medical School (HMS) Data Management Working Group (DMWG) was established in response to identified unmet needs in biomedical research in the HMS community. One subgroup was created to study and support researchers’ interest in and use of Electronic Lab Notebooks (ELN). This subgroup seeks to determine use cases for ELNs in HMS research labs by evaluating the needs of researchers and investigating functionalities available with current technologies. This subgroup has produced a web-based guide on ELNs, and will enable the DMWG to act as a consultant for labs seeking to start or improve their ELN practices.

## The Electronic Lab Notebook Matrix

The matrix table compares Electronic Lab Notebook (ELN) options, helping researchers identify appropriate solutions. We sent a survey to 26 vendors, and created a matrix based on the responses. This matrix does not recommend any particular solution(s), but serves as an educational tool and decision map for librarians and researchers alike to navigate the growing ELN market. The group continuously processes requests for updates to current matrix information, as well as inquiries to add additional ELNs. Mentions of this matrix on Twitter, in Nature, and Wikipedia show that the wider community welcomes resources that make research data management solutions more findable, accessible, interoperable, and reusable (FAIR).

### DATAMANAGEMENT.HMS.HARVARD.EDU/ELECTRONIC-LAB-NOTEBOOKS

Features & Specifications	Benchling	Bio-Tech	BIOVIA	Chemotion	Confluence	Doccollab	eLabNote	eLabFTW	ELOG	Evernote	Exemplar	Findings	Hivisbench	IDBS	LabArchives	LabCollector	LabGuru	LabVantage	LabWare	Labfolder	MBook	OneNote	OpenWestWare	QSE	PerkinElmer Signals	RSpace	Rift
Interactivity																											
Auto Metadata Harvest	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Search functions can search across file formats and beyond typos	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Ability to manipulate files and images	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Support for multiple open windows	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Ability to link out	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Support for Researcher Documentation																											
Hyperlink support	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Metadata Creation Prompts	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Rights Management (Licensing)	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Protocol Integration	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Adaptability to Lab workflows																											
Accounts/Permissions Levels	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Internal Data Sharing	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Adaptable to a Variety of Workflows	+	No response received	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Compatibility with authoring tools	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Windows Compatible	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Macintosh Compatible	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Linux Compatible	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Android Compatible	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
iOS Compatible	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Storage																											
Cloud Storage	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Local Storage	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Hybrid (cloud/local) Storage	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Versioning	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
File Redundancy	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Creates stable URLs or persistent identifiers for entries	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Can unregistered users access the data found at persistent links?	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Storage Capacity - Users	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Storage Capacity - Max File Size	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Hosting																											
Cloud	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Local	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Hybrid	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Support																											
Training	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Documentation	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Data Migration from Other Systems (incoming migration)	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Compatibility with data repositories	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Exit Strategies (outgoing migration)	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Recovery Options	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Single Sign-on (institutional ID)	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Number of Institutions per institution	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Multiple user logins	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Number of registered (nonresearch) users	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Other higher-education users	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Security																											
Security levels	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Backend accessibility	+	No response received	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Other																											
Open Science/Open Data Efforts	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Academically Oriented	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Cost (per seat)	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Desktop/mobile input	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Good Entry	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Term of Service	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+
Platform Integrations	+	+	No response received	+	+	No response received	+	+	No response received	+	+	+	+	+	+	+	+	+	+	+	+	+	No response received	+	+	+	+



Benchling

Feature	Specifications
Vendor	
Vendor representative verified this information	✔
Interactivity	
Auto Metadata Harvest	No information provided
Search functions can search across file formats and beyond typos	Able to search for documents within the platform 3/3, able to search beyond file formats 3/3, able to search beyond typographical errors 3/3, transparency of file structure 3/3
Ability to manipulate files and images	Can manipulate all, including other attachments dragged into the notebook
Support for multiple open windows	✔
Ability to link out	✔
Support for Researcher Documentation	
Hyperlink support	✔
Metadata Creation Prompts	✔
Rights Management (Licensing)	✖ Benchling follows industry best practices around encryption and security. You have strict access control over your data, and everything is regularly backed up. You own all of your data, period.
Protocol Integration	✔
Adaptability to Lab Workflows	
Accounts/Permissions Levels	✔
Internal Data Sharing	✔
Adaptable to a Variety of Workflows	No information provided
Compatibility with	✔

## References

Kwok, Roberta. 2018. "How to pick an electronic laboratory notebook." Nature 560(7717): 269-270. doi: 10.1038/d41586-018-05895-3