

EXECUTIVE SUMMARY

VEEVA 2014 PAPERLESS TMF SURVEY: AN INDUSTRY BENCHMARK



The *Veeva 2014 Paperless TMF Survey* explores the life sciences industry's progress toward paperless clinical trials by gathering the experiences and opinions of 252 Trial Master File (TMF) owners. The goal of the research is to understand the impact of growing eTMF adoption as well as the drivers, benefits, and barriers to going paperless. The survey examines the success factors for fully electronic trials and gives an industry-wide view of where organizations fall on the spectrum of paper-based to paperless TMFs.

Key Findings

- The types of eTMFs used vary broadly across a range of technologies, from simple file systems to purpose-built eTMF applications.
- Email and paper remain the dominant mechanisms for exchanging documents with external parties.
- More-advanced eTMF systems (content management systems and eTMF applications) deliver a greater number of benefits and higher TMF quality.
- Organizations with more extensive use of metrics derive more benefits from using an eTMF.
- The top drivers motivating eTMF adoption are cost savings (56%), speeding study start-up (55%), improving monitoring (49%), and increasing inspection readiness (45%).
- The most frequently cited barriers to going paperless are cost of new technologies (38%), implementation time and services costs (33%), and regulatory requirements (28%).
- The eTMF capabilities most needed to go paperless are digital/e-signatures, electronic forms, and secure access for external parties.

Usage of Paper and Types of Electronic Trial Master Files

Respondents were asked to estimate the extent to which different departments manage TMF documents on paper at any time during a document's lifecycle. Document-focused areas including legal/contracts (53%), clinical operations (43%), clinical records (38%), and regulatory (38%) reportedly manage most/all of their TMF documents on paper at some point during the document's lifecycle. These paper-heavy departments would benefit most from process-efficiency initiatives.

Conversely, data-driven areas of the business appear to use the least paper. Only 19% of biostatistics, 22% of data management, and 25% of medical science departments are reported managing most/all TMF documents on paper.

Document exchange is another area in which the use of paper-based processes is prevalent. Results show that email (69%) and paper (57%) are the dominant means of exchanging trial documents between sponsors/ CROs. Usage is relatively consistent across external parties, with no one party significantly more or less likely to interact via paper or email.

Methods for Exchanging TMF Documents with External Parties

Base: Total respondents

	Between sponsor/CRO	With investigator sites	With IRBs/IECs	With regulatory authorities
Paper shipments	57%	63%	58%	65%
Email	69%	68%	62%	58%
Portal	43%	37%	32%	30%
Fax	25%	26%	23%	19%
Cloud file share	30%	24%	16%	12%
Content management system	30%	21%	18%	17%
eTMF application	15%	10%	6%	8%

What methods does your team use to exchange TMF documents with external parties? Select all that apply per row. (Q2)

Email offers very little efficiency over paper and introduces many of the same challenges as paper shipments. Emailing documents as attachments, like exchanging paper, puts information outside of controlled processes, making it harder to track and manage documents efficiently.

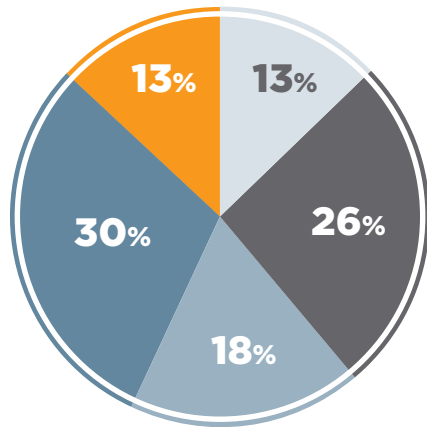
A significant fraction of paper TMF documents must be scanned, filed, and reconciled, as the majority of organizations (70%) mostly or always archive TMF documents electronically.

Types of eTMFs

Respondents were also asked which type of eTMF they used most recently. The findings reveal that no one type of eTMF is dominant. The data show adoption of diverse solutions ranging from local file systems all the way to eTMF applications. File systems provide access to a shared folder structure and online storage. Cloud file shares provide additional capabilities, the most important of which is easy access for external parties. An eTMF application is typically built on a content management platform and provides purpose-built functionality and configurations specific to TMF documents, along with process-driven content management functionality such as search, versioning, and workflow.

eTMF System Most Recently Used

Base: Responses from sponsor companies only, N = 135



- N/A (paper-based TMF)
- Local file system (e.g. internal shared drive)
- Cloud file share (e.g. FTP site, dropbox.com)
- Content management system (e.g. Documentum, SharePoint)
- eTMF application (e.g. Veeva Vault, Wingspan)

Which type of eTMF solution did you use most recently? Select only one. (Q9)

Half of sponsor-company respondents with an eTMF report using a file share, whether a local file system (26%) or a cloud file share (18%). Nearly one-third (30%) report using a content management system such as EMC Documentum or Microsoft SharePoint. Finally, roughly one in ten respondents (13%) report using an eTMF application such as Veeva Vault eTMF or Wingspan eTMF.

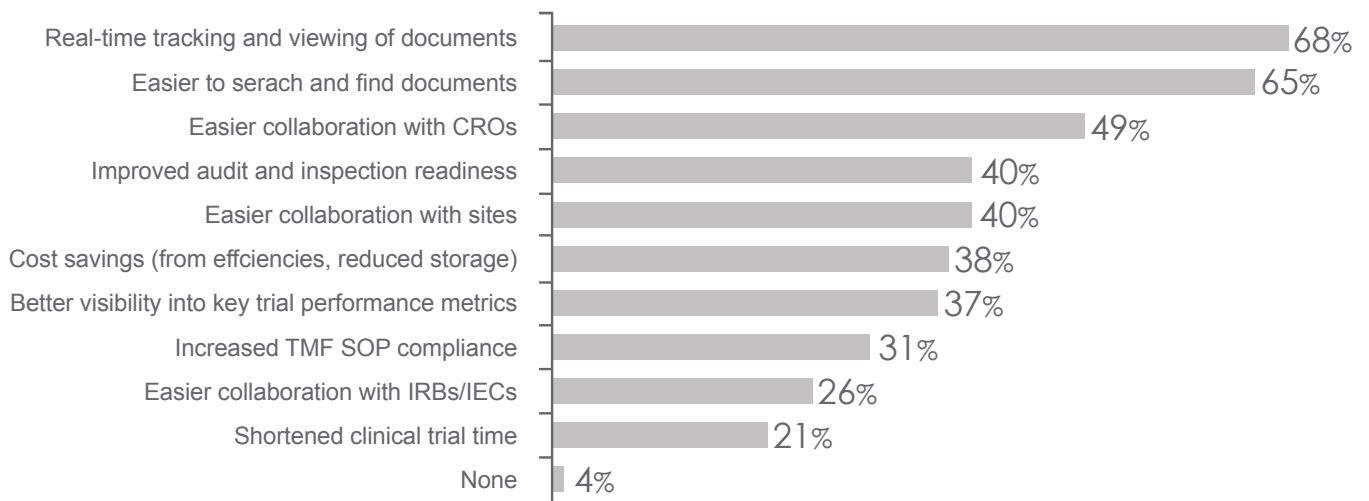
Reported Benefits of an eTMF

Respondents were asked to indicate which, if any, benefits they experience with the use of an eTMF. Real-time tracking and viewing (68%) and ease of locating documents (65%) are the two most frequently cited benefits across all types of eTMFs.

There is a connection between the type of eTMF used and the benefits reported.

Benefits Attributed to eTMF Solution

Base: Respondents reporting having an eTMF, N = 191

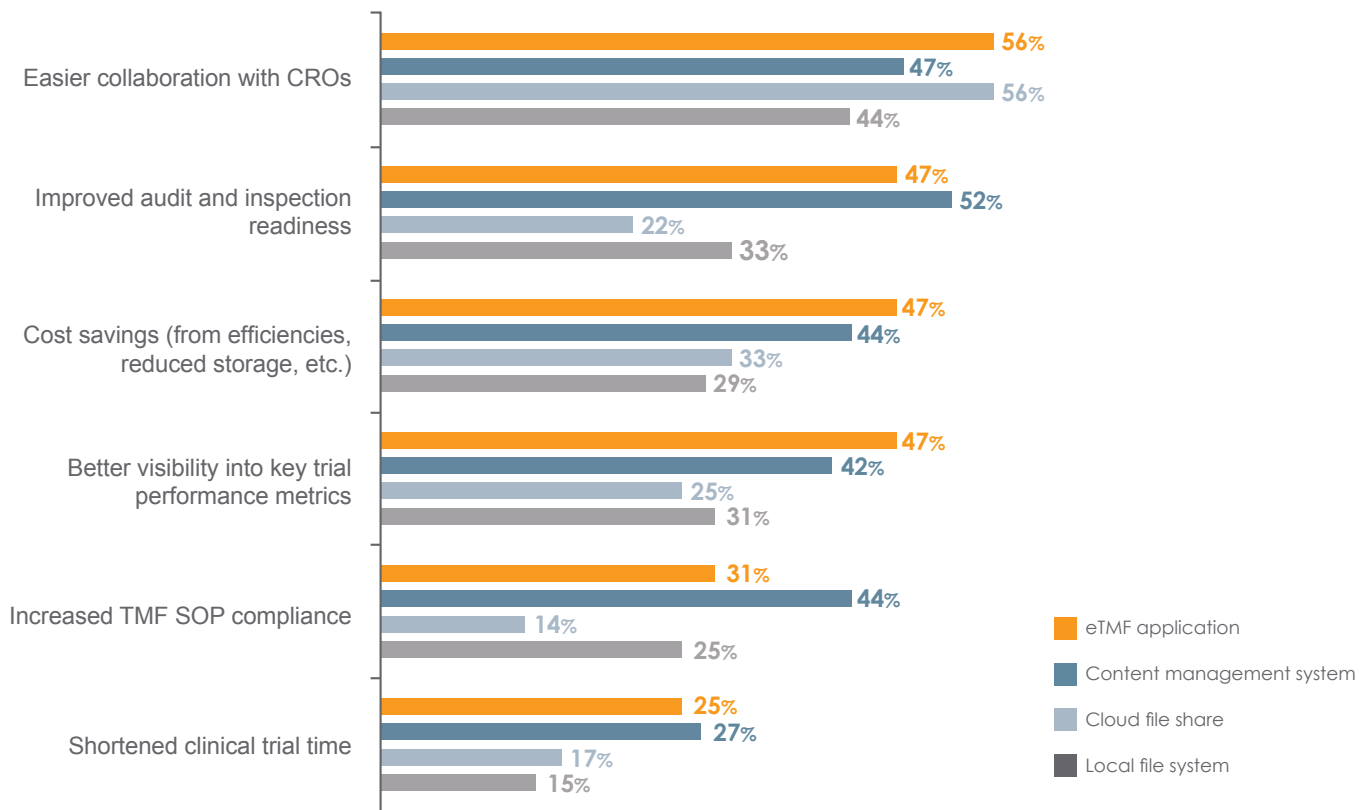


What benefits were achieved with your organization's implementation of the eTMF solution specified in Question 9? Select all that apply. (Q10)

Those using an eTMF application or a content management system achieve more benefits than those using a local or cloud file system ($p = 0.005$). This is also true across most benefit areas measured; specifically improved inspection readiness, cost savings, better visibility, and SOP compliance ($p < 0.05$).

Benefits Attributed to eTMF by eTMF Type

Base: Respondents reporting having an eTMF, N = 191



What benefits were achieved with your organization's implementation of the eTMF solution specified in Question 9? Select all that apply. (Q10)

Which type of eTMF solution did you use most recently? Select only one. (Q9)

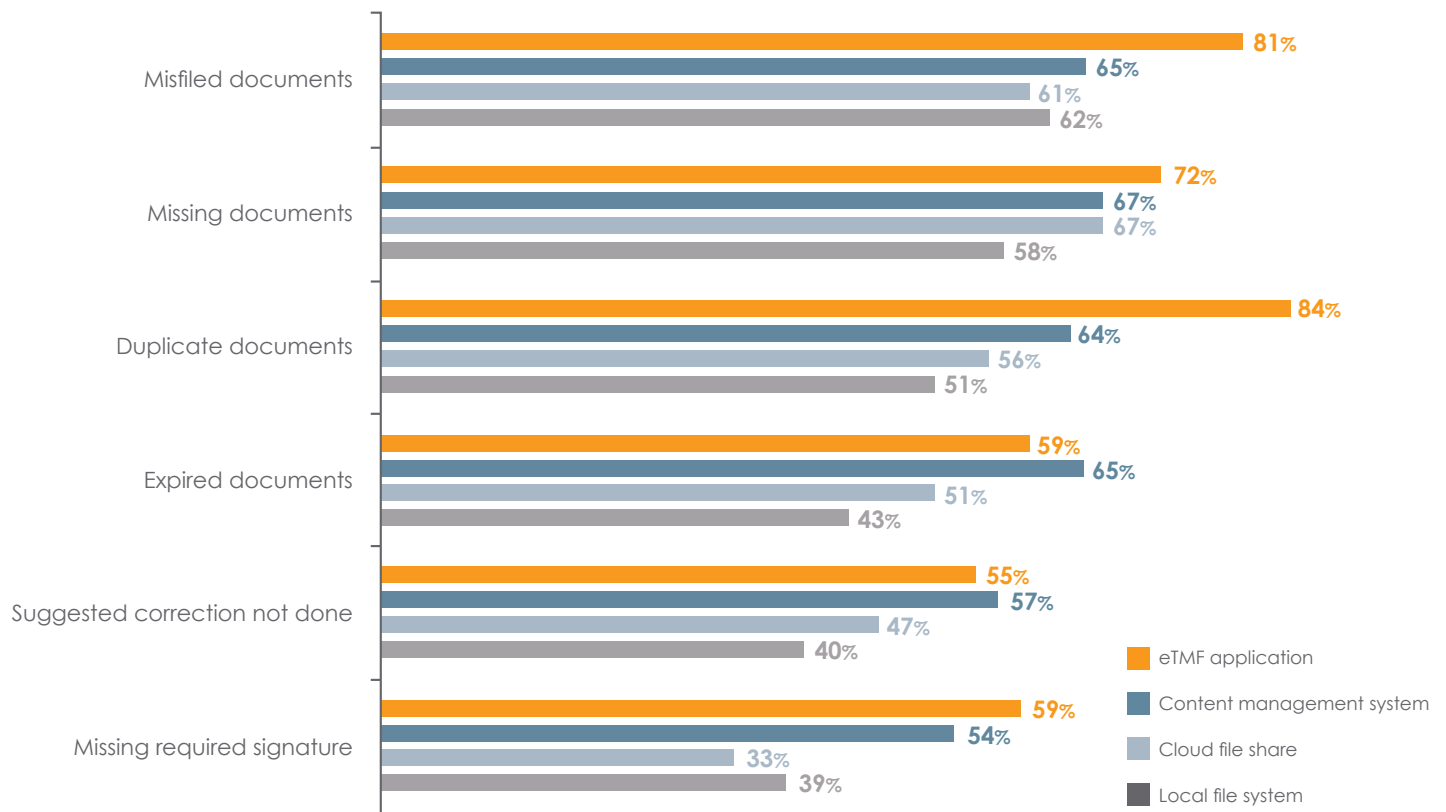
Improvements in Inspection Areas by Type of eTMF

The use of an eTMF application or content management system improves TMF quality in most inspection areas. Respondents using content management systems or eTMF applications report more “good” or “major” improvements in inspection areas than those using local or cloud file systems (mean of 4.7, compared to 3.7; $p = 0.014$). Specifically, those who used eTMF applications or content management systems are more likely to report improvements in the following inspection areas (not shown): duplicate documents (70% vs. 53%; $p = 0.046$), expired documents (63% vs. 46%; $p = 0.054$), suggested corrections not done (56% vs. 43%; $p = 0.070$) and missing required signatures (55% vs. 37%; $p = 0.028$). The data also suggest those using an eTMF application experience the greatest improvements.

Improvements in Inspection Area by eTMF Type

(Percent rating improvements as good or major)

Base: Respondents reporting having an eTMF, N varies



How much improvement, if any, did you observe in the following inspection areas after your organization implemented the eTMF solution specified in Question 9? (Q11)

Which type of eTMF solution did you use most recently? Select only one. (Q9)

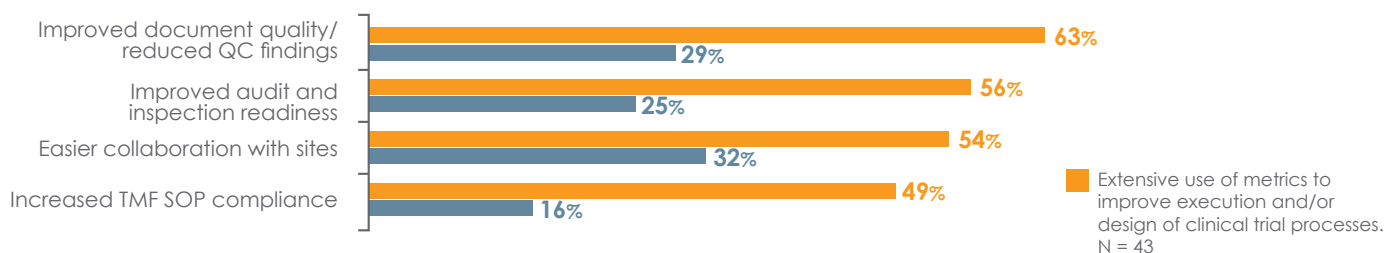
Use of Metrics and Impact on eTMF Benefits

Organizations that report extensively using metrics to improve execution and/or design of clinical trial processes realize a greater number of eTMF benefits than those that do not collect data or utilize metrics (mean number of benefits = 5.6 and 3.7, respectively; $p = 0.001$).

eTMF Benefits Achieved by Level of Metrics Usage

(Those reporting no use vs. extensive use of metrics)

Base: Respondents reporting having an eTMF, N varies



What benefits were achieved with your organization's implementation of the eTMF solution specified in Question 9? Select all that apply. (Q10)

To what extent is your organization leveraging metrics or data to inform clinical trial processes? Select one. (Q13)

Findings are similar when examining improvements in TMF inspection areas. Those organizations using metrics extensively rate improvements as “good” or “major” more often than those that do not collect or use data (mean number of improvements rated good/major = 5.6 and 3.6, respectively; p = 0.001).

eTMF Benefits and Inspection Area Improvements by Level of Metrics Usage

(Mean number of benefits and improvements rated good/major)

Base: Respondents reporting having an eTMF

	Mean number of eTMF benefits reported N=191	Inspection areas with good/major improvement N=187
Not collecting data	3.4	3.1
Collecting data but not using it to improve execution of trial	3.8	3.8
Using some metrics to improve execution of trial processes	4.7	4.2
Extensively using metrics to improve execution of trial processes	5.4	4.8
Extensively using metrics to improve execution and design of trial processes	5.9	6.2

What benefits were achieved with your organization’s implementation of the eTMF solution specified in Question 9? Select all that apply. (Q10)

How much improvement, if any, did you observe in the following inspection areas after your organization implemented the eTMF solution specified in Question 9?(Q11)

To what extent is your organization leveraging metrics or data to inform clinical trial processes? Select one. (Q13)

While the data show that using metrics to improve trial processes delivers benefits in TMF quality, the overall use of metrics is low. Twice the proportion of TMF owners report that their organization is not using metrics to improve trial processes (39%) compared to those organizations extensively leveraging metrics to improve execution and/or design of trial processes (20%).

Drivers and Barriers to Going Paperless

Costs and regulatory requirements are cited as the top barriers to going paperless. Thirty-eight percent (38%) of respondents cite the cost of new technology and 33% report cost of implementation as a major or insurmountable barrier.

While roughly a third of respondents (38%) report cost as a significant barrier, an equal number (38%) attribute cost savings to their eTMF. Cost savings varies by type of eTMF – 29% of those using a local file share report cost savings, as compared to 47% of organizations using an eTMF application. Over half of the respondents (56%) cite cost savings as a top reason for moving to an eTMF.

Fewer respondents cite regulatory requirements and uncertainty around regulatory changes (28% and 19% respectively) as major or insurmountable barriers.

Primary Barriers to Going Paperless

(Percent rating each as a major barrier or a barrier that cannot be overcome)

Base: Total respondents, N = 252

	Percent of respondents
Cost of new technology	38%
Cost of implementing new technology	33%
Regulatory requirements	28%
Lack of internal technical knowledge	26%
Limitation of in-house tools or technology	24%
Uncertainty regarding regulatory changes	19%
IRBs'/IECs' requirements	19%
Impact of organizational change	17%

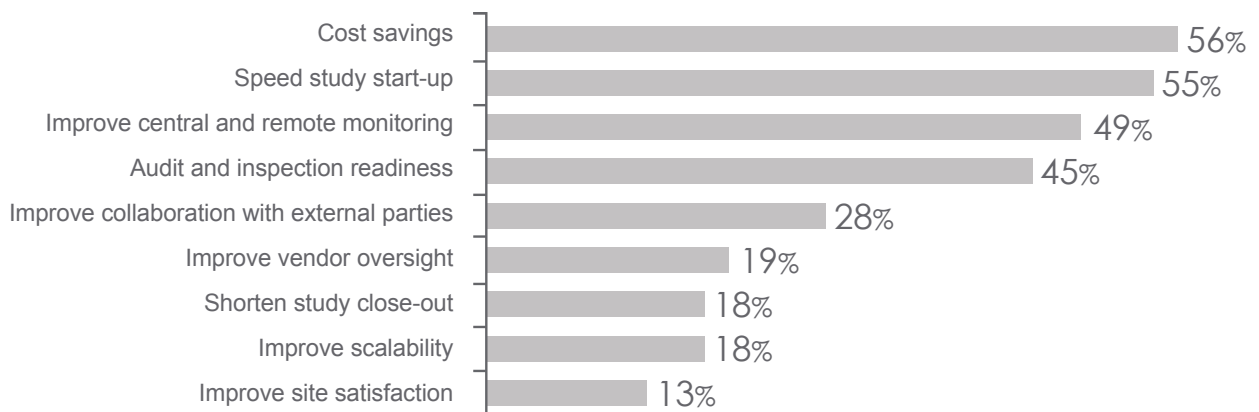
Rate the extent to which each of the following is a barrier to TMFs going paperless in your organization? (Q4)

Business Benefits Driving eTMF Adoption

In addition to cost savings (56%), other top reasons for moving to an eTMF include speeding study start-up (55%), improving monitoring (49%), and improving audit/inspection readiness (45%).

Top Drivers of eTMF Adoption

Base: Total respondents, N = 252



Which of the following business benefits are the most important in motivating your organization's adoption of electronic TMFs? Please select the top three benefits. (Q7)

A majority of sponsors also indicate that making start-up and monitoring processes paperless would significantly shorten clinical development times (64% and 56%, respectively).

Improving audit and inspection readiness is the fourth major driver of eTMF adoption. Shortly after the survey was conducted, the MHRA updated the definition of critical GCP inspection findings to include TMFs that are inaccessible or sufficiently incomplete that inspectors cannot fulfill their duties. These changes may increase the importance of inspection readiness and TMF accessibility in future survey results.

Capabilities Needed to Go Paperless

The three capabilities most commonly cited as necessary for adoption of a paperless eTMF are digital/e-signatures (66%), electronic forms (65%), and secure access by external parties (62%). These results reflect the relatively low levels of adoption for these technologies in respondent organizations.

Capabilities Your Organization Needs for a Paperless TMF

Base: Total respondents, N = 252

	Percent of respondents
Digital or e-signatures	66%
Electronic forms	65%
Secure access by external parties	62%
System compliance with 21 CFR Part 11, EU Annex 11, etc.	59%
Tracking and reporting	56%
Archival and export capabilities	47%
Integration with CTMS	47%
Integration with EDC	47%

Which of these capabilities do you think your organization needs in order to move to paperless TMFs? Select all that apply. (Q5)

The relative ranking for required functionality varies by the type of eTMF currently in place within each organization. Companies using local or cloud file systems most frequently cite needing electronic forms (71% and 65% respectively) and digital/e-signatures capabilities (68% and 65% respectively). By contrast, organizations using an eTMF application most frequently cite integrating a Clinical Trial Management System (CTMS) (76%) and Electronic Data Capture (EDC) (61%) with the eTMF as necessary for going paperless.

Secure access for external parties is among the top three most required capabilities for all respondents, except those currently maintaining a cloud TMF. These data highlight the importance of external access and the role of cloud in fulfilling partner access requirements.

Conclusion

While paper is still extensively used when managing trial master file documents, eTMF adoption is on the rise. The *Veeva 2014 Paperless TMF Survey* reveals multiple stages of maturation for technology, processes, and metrics usage in the industry's move toward a paperless TMF. Those using more mature TMF technologies are seeing the greatest operational and business benefits from their eTMF.

Technology – The survey indicates that the type of eTMF utilized matters and significantly influences the level of benefits achieved. Not all eTMFs are created equal. The additional functionality and control that come with content management systems and eTMF applications appear to make a material difference in improving operating performance when compared to local or cloud-shared storage.

Process – Over half the respondents (56%) report electronic collaboration and document processing between sponsor and CRO partners (exchange, QC, review, and approval), but further probing into the definition of “electronic” suggests that the vast majority of these processes were carried out through email. When examining methods of TMF document exchange between sponsors and CROs, the survey found that 69% of respondents report using email, while 43% use a portal, and only 15% use an eTMF application.

Metrics – The more organizations use metrics to optimize trial processes, the more benefit they derive from their eTMF. Using metrics to improve trial processes impacts TMF quality. As the adoption of metrics expands, the industry will be better equipped to determine which metrics truly influence or predict outcomes.

The results also show that barriers to becoming paperless are relatively low. None of the listed barriers were rated as “major” or “insurmountable” by a majority of respondents. The two leading barriers, cost and regulatory requirements, are rapidly diminishing due to changes in technology and regulations. According to Forrester Research, the implementation of cloud applications costs significantly less than implementing on-premises systems.² On the regulatory front, the FDA and MHRA have reduced signatory requirements to a handful of documents and instituted broad acceptance of electronic signatures.³

Moving Forward

The data suggest three major changes are necessary to deliver on the full potential of a paperless TMF:

1. Deploying eTMFs that are more than electronic archives.
2. Replacing established but inefficient email and paper workflows with structured eTMF processes.
3. Expanding the use of metrics in trial operations.

With these changes in place, organizations can create a paperless operating model that achieves the goals of cost savings, faster study start-up, improved monitoring, and TMF inspection readiness.

Survey Methods

The survey consisted of fourteen questions, many of which included subquestions with response matrices. Survey questions were designed for individuals with knowledge of TMF document processes and with partial or full responsibility for a TMF within their organization. An external expert in survey design reviewed the survey for objectivity and lack of bias. The survey was piloted with a small group of respondents for feedback on question clarity before it was introduced. The survey was commissioned by Veeva Systems and conducted by Fierce Markets. Completion of the survey was voluntary, and the first fifty responders were offered a \$5 Starbucks gift card. All respondents were offered a summary of the survey results. No other compensation was offered or provided.

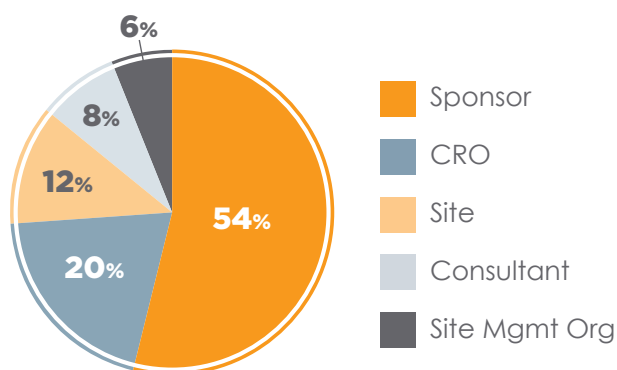
Survey Respondents

Of the 170,000 individuals invited to take the survey, a total of 2,103 surveys were initiated, the majority of which were terminated based on a qualification question gauging the level of responsibility for a TMF in their organization. Over 150 unverified responses were eliminated, yielding 252 qualified survey responses. As a result, we believe this represents the largest and most rigorously qualified survey sample of TMF stakeholders.

Over half of the respondents were from the United States. The majority of respondents were from small or medium-sized organizations – 64% indicated that their organization had 15 or fewer active trials.

Survey Respondents by Type of Organization

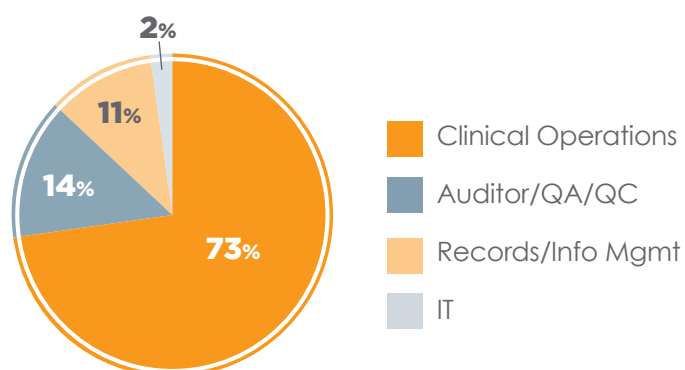
Base: Total respondents, N = 252



Select the best description for your organization.
Select one. (Q15)

Survey Respondents by Functional Area

Base: Total respondents, N = 252



Which of the following best describes your functional area within your organization? Select one. (Q16)

Contact

For more information about the study, please visit <http://www.veeva.com/tmfsurvey-2014> or contact us at eTMFSurvey@veeva.com.

¹ MHRA, 25 April 2014, Accessed from the MHRA website: <http://www.mhra.gov.uk/Howweregulate/Medicines/Inspectionandstandards/GoodClinicalPractice/News/CON408249>

² Forrester, The ROI Of Software-As-A-Service, Liz Herbert and Jon Erickson.

³ Lisa Mulcahy presentation, "Designing Efficient Processes for TMF Content when Outsourcing Clinical Trials," March 2014.

⁴ Survey questions and answer options were reviewed for clarity and lack-of-bias by Geoff Feinberg, Research Director, Yale University, Yale Project on Climate Change Communication. Former Vice President, GfK Roper, GfK Custom Research North America.