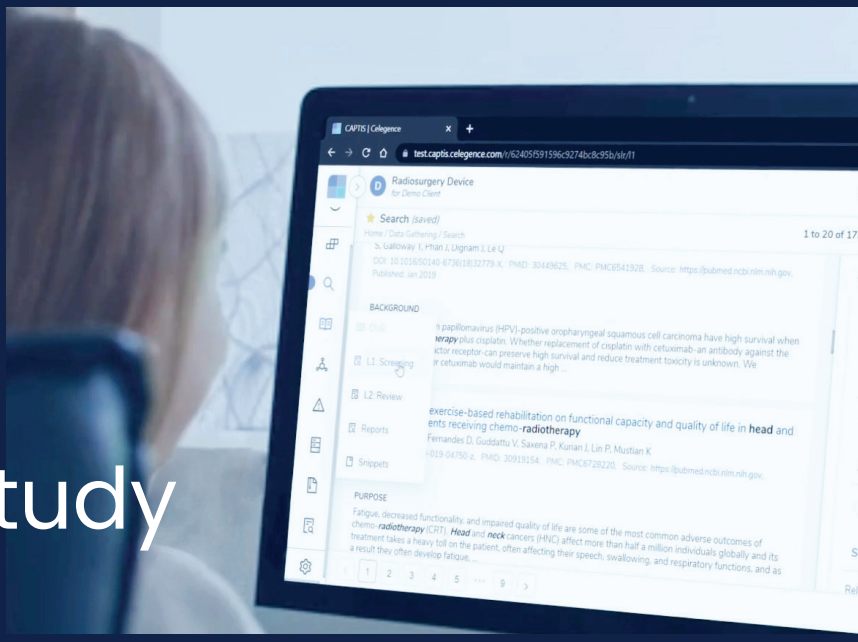
CAPTIS



CAPTIS™ Time Saving Study

Time comparison for literature search, article metadata compilation & review using manual method vs CAPTIS.

Celegence's medical writing teams have been utilizing and benefitting from CAPTIS™ since 2020 and have confirmed that this software solution has single-handedly made their literature reviews more efficient and enjoyable.

Key Features:

- Automatic metadata and full-text PDF retrieval
- Article tagging
- Ability to edit the search strategy at any point during the review
- Literature reports
- PRISMA diagrams and more

CAPTIS features enable medical writers and reviewers to focus their time on analyzing content, instead of manual mundane data gathering tasks.

The CAPTIS platform automates and manages the bulk of data gathering and record-keeping, eliminating multiple Excel sheets and other documents used to manually track literature reviews.

Time for literature review is dependent on parameters including the number of articles from search, type of device or therapeutic area, and general experience of reviewer. To determine which aspects of the entire systematic review process get the most benefit from CAPTIS, we put our technology to the test to quantify time savings compared to the traditional manual approach.

1. Aim

The aim of the study was to compare time taken needed for literature search, article metadata compilation and review of manual method versus using the CAPTIS platform.

2. Approach

5 Medical Devices

- 5 products chosen from different therapeutic areas
- Physical Medicine, Orthodontics, Orthopedics, Ophthalmology and Laryngology

2 Databases

- PubMed and Google Scholar considered for the analysis
- Approx. 200 articles assessed for each device

1 Approach

- Literature search, article metadata compilation and reviews performed for each device using manual approach versus CAPTIS
- Time tracked for: data gathering and compilation, deduplication, title and abstract screening, full-text search, download and full-text appraisal

10 Executions

- Workflows randomly distributed amongst 5 medical writers (20% mid-level writers, 80% senior writers)
- 10 total workflows executed, 2 for each product (manual and CAPTIS)

Table 1: Considerations

Therapeutic Areas		Inputs
Device	**Screen a minimum of 200 articles**	Safety and Performance Objectives
Device 1	Ophthalmology	Claims
Device 2	Laryngology	IFU
Device 3	Orthopedics	Old CEP/CER if any
Device 4	Physical Medicine	Product Description/specifications
Device 5	Orthodontics	Search strings used

Dos	Dont's
Screen a minimum of 200 articles	Utilize varying search strings outside CAPTIS, to eliminate chance of getting different results
Use search strings created within the project deliverable	
Predefine the Level 1 screening and Level 2 appraisal criteria	Introduce new elements which are not defined in the deliverables
Use a third-party source to download full text articles	

Task for Each Workflow

Literature Search | Article metadata (reference and abstract) retrieval and consolidation | Pre-processing (deduplication) | Level 1 (L1) Review: Title and Abstract screening | Full-text PDF search & save | Level 2 (L2) Review: Full-text appraisal

Table 2: Workflow Assignments

Team Member	Device 1	Device 2	Device 3	Device 4	Device 5
Writer 1	CAPTIS - PM			CAPTIS - PM	
Writer 2	Manual - PM	CAPTIS - GS			
Writer 3		Manual - GS			Manual - GS
Writer 4			CAPTIS - GS		CAPTIS - GS
Writer 5			Manual - GS	Manual - PM	

PM: PubMed

GS: Google Scholar

3. Results

A total of 10 workflows (5 manual and 5 CAPTIS) were executed by 5 medical writers. The time taken for article metadata (reference and abstract) retrieval and consolidation, pre-processing (deduplication), L1 title and abstract review, full-text PDF search and saving and L2 full-text appraisal was noted, along with the number of articles included at each review stage.

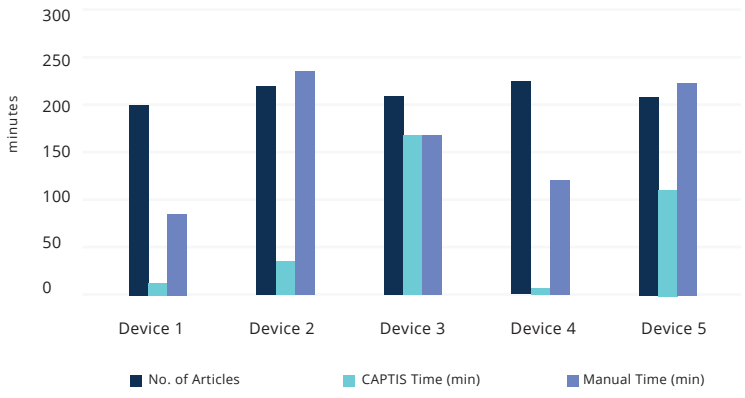
Table 3: Observations

Device	# of Hits		Duplicate Articles		Deduplications (min)		# of Missing Abstracts		Processing Times (min)		L1 Screening (min)		Moved to L2		# Full Text Articles		Time to Download FT		L2 Review	
	CAP	Man	CAP	Man	CAP	Man	CAP	Man	CAP	Man	CAP	Man	CAP	Man	CAP	Man	CAP	Man	CAP	Man
Device 1	201	201	15	15	0	9	2	0	12	66	292	236	66	73	40	73	63	84	325	348
Device 2	216	216	17	18	0	30	145	215	32	267	88	185	21	59	21	59	12	86	120	125
Device 3	206	206	39	29	0	7	155	199	156	156	84	71	22	6	8	6	8	6	24	22
Device 4	214	214	33	33	0	6	0	0	9	71	189	49	2	1	1	1	1	1	10	0
Device 5	207	207	29	26	0	30	114	207	104	214	138	157	49	35	25	35	23	25	56	107

3.1. Article metadata (reference and abstract) retrieval and consolidation

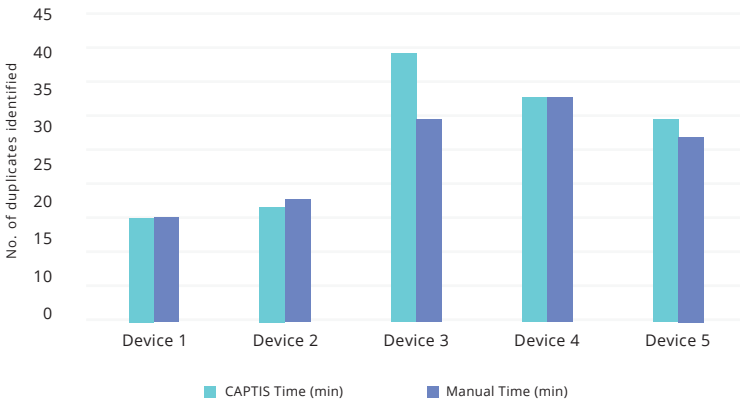
Article metadata retrieval and consolidation was faster via CAPTIS in 4 out of 5 Devices, with an average time reduction of 62% seen overall.

▼ 62%



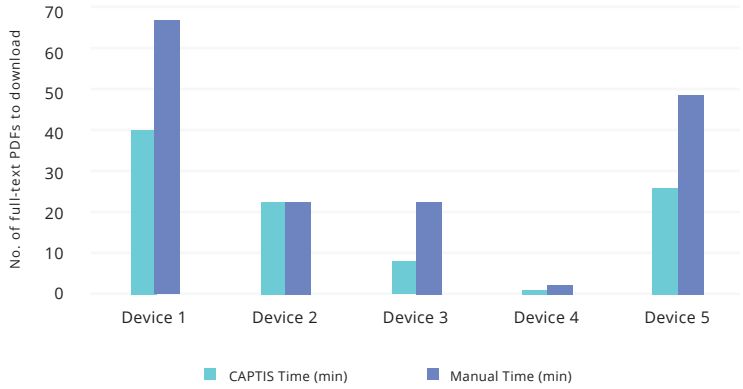
3.2. Pre-processing (Deduplication)

CAPTIS identified a higher number of duplicates in 2 out of 5 devices when compared to the manual deduplication method. Medical writers spent 0 minutes on CAPTIS vs 6-30 minutes when manually identifying duplicates depending upon the number of hits.



3.3. Full-text Search and Save

CAPTIS automatically searches and consolidates full-text PDFs of open access articles, leaving users a much shorter list of articles for which full-texts are needed. In comparison, doing this activity manually entails searching for the full-text PDF of every single article included in L1, renaming, and saving available PDFs which were available, and marking those which need to be purchased.



Time Taken for Full-Text PDF Search & Save

CAPTIS users consistently spent lesser time finding full texts or categorizing articles for purchase since the platform automatically downloads all available/free full-texts. Users saved an average of 45% of time for this activity when using CAPTIS.

▼ 45%

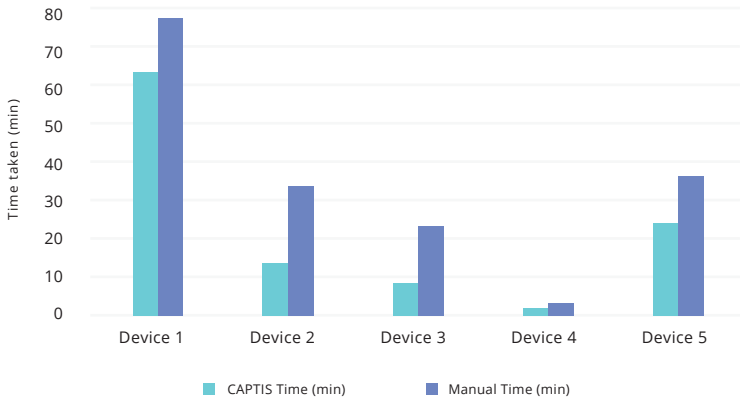


Table 4: Percentage time savings for full-text search and save

Device	Manual Time (min)	CAPTIS Time (min)	% Savings with CAPTIS
Device 1	76	63	17%
Device 2	31	12	61%
Device 3	22	8	64%
Device 4	2	1	50%
Device 5	35	23	34%

3.4. Level 1 and Level 2 Reviews

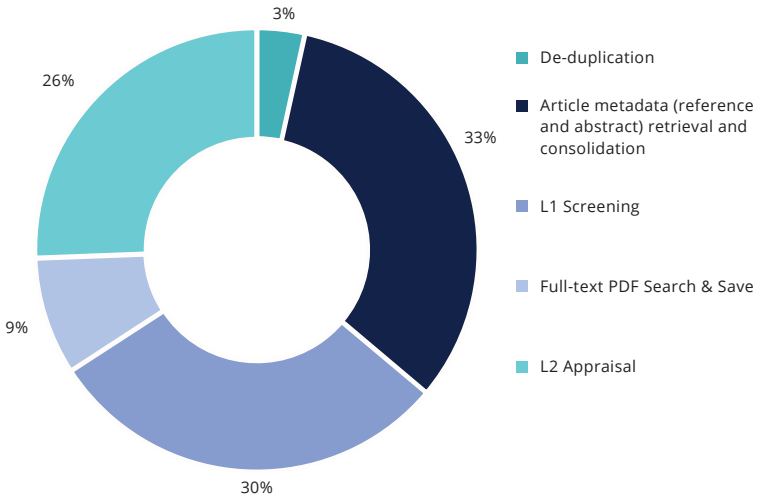
Comparison between Level 1 Review (title and abstract Screening) and Level 2 full-text appraisal duration for CAPTIS vs. Manual processes were not calculated since these two steps constitute the "analysis" portion of the entire literature review process. Time variations in these two steps were noted, as expected since 2 different reviewers reviewed the same dataset. This can be attributed to that fact that these tasks are subjective in nature, i.e., time taken to screen and appraise articles will very amongst different reviewers depending on their level of experience and knowledge in the respective therapeutic area.

4. Extrapolations

Let's look at the average percentage of time each task took using the manual review process.

Time reductions of were 62%, 100% and 45% of time (as calculated in the sections above) applied to Article metadata (reference and abstract) retrieval and consolidation, deduplication and full-text PDF search and save activities (non-analysis components of the literature review), respectively, we saw an overall reduction of 62% of time for non-analysis tasks leading to an overall reduction of 28% of time on the overall literature review.

Overall Manual Review Time Split



5. Conclusion

CAPTIS utilization resulted in an overall time reduction of **62%** for non-analysis tasks (Article metadata (reference and abstract) retrieval and consolidation, deduplication, and full-text PDF search) leading to an overall reduction of **28%** on the overall literature review.

With time savings of **62%, 100% and 45%** applied for article metadata (reference and abstract) retrieval and consolidation, deduplication and full-text PDF search and save activities, respectively, we can expect savings of 13.28 hours on the non-analysis components of the literature review.

62% Overall Time Reduction

1. Non-Analysis Tasks
2. Deduplication
3. Full-text PDF search

28% Overall Time Reduction Literature Review

Table 5: Additional Possible Conclusions

Task	Manual Benchmark per Article (min)	No. of Articles Assumed	Total Manual Time (min) (Assumed articles x Manual Benchmark)	Time Savings with CAPTIS	Time Savings (min) (Total Manual Time x Time Savings)	Time Savings (hrs)
Article metadata retrieval	1.5	400	600	62%	372	6.20
Deduplication	0.5	400	200	100%	200	3.33
Full-text search and save	5	100	500	45%	225	3.75
Total Savings on Non-analysis Tasks (hrs)						**13.28**

7. Discussion

How does CAPTIS help writers save so much time?

1. **Article Metadata Retrieval:** While exporting out of databases like PubMed is fairly easy, CAPTIS makes Google Scholar extraction easy, too. Google Scholar is notorious for not having an abstract export option, so writers have to manually copy and paste each abstract.

2. **Deduplication:** Users save 100% of the time they would have spent on deduplicating articles since CAPTIS automatically deduplicates the entire article list. CAPTIS also allows users to manually mark duplicates, if required.

3. **Full-text search and save:** CAPTIS manages the available full-text article list. Time spent on searching, downloading, renaming, and saving the available PDFs along with marking those articles needing to be purchased is significantly reduced, since users only need to look for missing full-text articles.