TASMC CASE STUDY

Accelerating Breakthroughs in Medical Research

Duality and Tel Aviv Sourasky Medical Center (TASMC)

Tel Aviv Sourasky Medical Center (TASMC) is a leading academic medical center in Israel with a long history of innovation in healthcare. The center is home to world-renowned research programs, including the Integrated Cancer Prevention Center (ICPC) and the Morris Kahn Personalized Medicine Research Center. TASMC is also a major clinical trial site for pharmaceutical and research organizations.

The partnership between Duality Technologies and TASMC marks a major acceleration toward discovering medical breakthroughs by unlocking critical collaborations among real-world evidence (RWE) research groups and custodians of real world data (RWD), such as medical centers. Using advanced cryptography and privacy-enhancing technologies, Duality's Secure Data Collaboration platform streamlines currently lengthy and prohibitive processes while complying with global data privacy, localization, and cross-border transfer regulations without compromising on accuracy and and timeliness of analysis of encrypted oncological data.

Collaboration is a crucial component of any modern data strategy. Generating actionable and innovative insights requires aggregating large volumes of diverse data from multiple sources. As stated by FDA Commissioner Rober M. Califf, collaboration among organizations with RWD is critical for truly impactful RWE studies. However, collaboration efforts with RWD custodians are hindered by lengthy processes to address security and privacy regulations, and the need for the stakeholders to remain in control of how their data is used. This greatly limits what can be shared, with whom, and where. There is a need for a better way. This new power to collaborate further elevates the already globally prominent TASMC for cancer research initiatives.

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"Ongoing precision medicine studies can immediately benefit from these capabilities by enabling secure collaboration across clinical institutions without requiring complex data sharing agreements or compromising individual-level privacy."

Dr. Ravit Geva
Head, GIT malignancies Center
Head, Research and Innovation Unit, Deputy Director Division of Oncology, Tel Aviv Sourasky Medical Center
ASCO Feasibility Report

Privacy and Security Regulations, Accuracy and Practicality

To accelerate and improve RWE studies and the resulting medical breakthroughs, TASMC is continuously looking for agile and compliant ways for collaborating on its high-quality data. The joint research with Duality proved that it is feasible and practical to use Duality's platform to enable such data collaborations yielding fast time-to-insights in collaborative RWE studies.

Privacy, Security, Governance, and Compliance

TASMC needs a solution that satisfies local and, ideally, global privacy and security regulations. The EU's GDPR definitions of anonymization and pseudonymization are among the most significant challenges to borderless data strategies. Commonly used methods to satisfy domestic policies, like de-identification processes accepted by US HIPAA laws, don't satisfy the GDPR requirement. By removing the need to and ability to access raw data by anyone but the data custodians themselves, Duality's platform satisfies the requirement without removing or obscuring valuable data context. Removing the need for data exposure to analyzers is unique to advanced privacy-enhancing technologies like federated analytics and multi-party fully-homomorphic encryption (FHE) that allow computations and queries to be run across encrypted datasets.

The uniqueness of the solution also meets the various security assurances each RWD custodian requires. Technical guardrails exist to know that data is only accessible to the data owner. Built-in governance controls allow data custodians to delegate permissions and report on data usage–by user, computation, and frequency. Rather than navigating complex privacy, security, and governance processes for each engagement, the platform is built to satisfy such needs without reliance on additional toolsets. By partnering with Duality, TASMC unlocks new opportunities for agile collaborations that are otherwise prohibitively complicated.

Key Security and Privacy Benefits

- No data exposure to analysts
- Limited or no movement of data
- Technical guardrails to guarantee access
- Governance controls to delegate and report on usage per user and per computation

High Accuracy Results, Practical and Agile Implementation

In technology adoption, the fundamental question "Does it do what we need?" is conjoined to the practical "Can we use it?" qualification. TASMC piloted the platform on colorectal cancer patient datasets while comparing the accuracy of results on raw versus encrypted data. In similar work, we find that typical anonymization processes can take 5-10hrs or longer for first results. With Duality, anonymization is achieved by default. The computations performed are typical in oncology studies:

			Seconds	
Computation		**Duality Result**	**Run Time**	**TASMC Results**
Median (Tx_onset_age)		66.005	7.32	66
Mean (Tx_onset_age)		63.52808	5.02	63.52808
Std (Tx_onset_age)		11.73949	5.85	11.73949
Frequencies (Sex)	1	294	3.05	294
	2	329		329
Chi2 (CannYN / Diagnosis)	chi2	17.9695	22.77	17.969
	p-value	0.021456		0.02146
Chi2 (CannYN/Sex)	chi2	0.1775	11.35	0.1775
	p-value	0.6735		0.6735
T-Test (CannYN/Tx_onset_age)	t-score	2.3869	9.44	2.387
	p-value	0.01729		0.01729
Logrank (CannYN)*	chi2	24.78	192.26	24.8
	p-value	42E-07 .6		6.42E-07

Compliance by Default

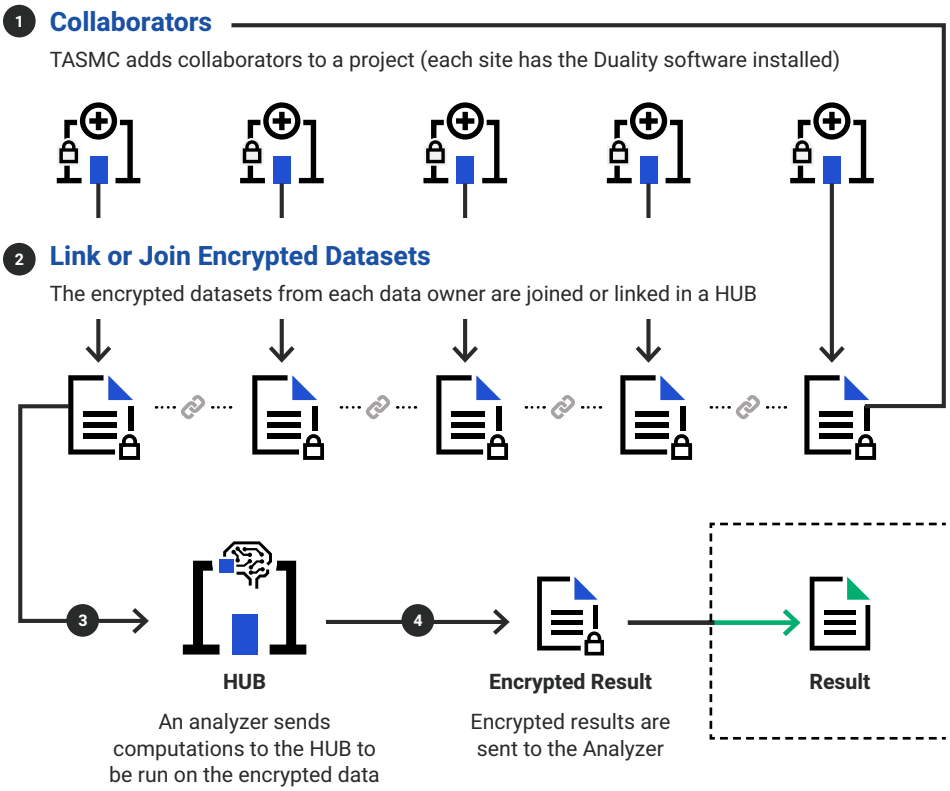
- No data exposure to analysts
- Limited or no movement of data
- Technical guardrails to guarantee data security and privacy
- Governance controls to delegate and report on usage per user and computation

Faster Time to Results

- Eliminate anonymization processes
- Increase volume and variety of data to be used in analyses
- Easy to use Collaboration Management
- Built-in Governance Controls and reporting
- Robust API and SDK for agile implementation

Unlocking (Borderless) Collaboration for RWE

Satisfying security, privacy, and governance still leaves questions about functional requirements to maximize this newfound freedom to collaborate. Some healthcare research projects require the ability to link and join datasets for analyses in aggregate, which adds time and complexity that can impede results. Additionally, researchers must be able to use the data effectively: to run queries and descriptive analytics, as well as run or train (proprietary) models. Again, Duality came out on top with the robust combination of a specialized computation engine with key collaboration management functions. Teams can coordinate schema management and entity matching functions without reliance upon 3rd party tools and services, adding even more efficiency to an already streamlined operation.



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"In healthcare research, it is imperative to collaborate on data to derive robust conclusions about the effectiveness of treatments. Duality's solution facilitates privacy-preserving data sharing for the benefit of patients and the entire healthcare community."

Dr. Ravit Geva
Head, GIT malignancies Center
Head, Research and Innovation Unit, Deputy Director Division of Oncology, Tel Aviv Sourasky Medical Center

Unlock Innovation

dualitytech.com

- Collaborate with anyone, anywhere, in any environment
- Built-in Schema Management
- Satisfy data partner security and privacy needs

Conclusion

Through their pioneering efforts, Duality and the Tel Aviv Medical Center have set a new standard for secure and privacy-preserving collaborative analysis of Real World Data, driving breakthroughs in cancer research and ultimately improving patient outcomes. The partnership represents a transformative step for all healthcare RWE studies. As the study proves, researchers finally have a solution that will accelerate their efforts, enabling better insights, in less time, and while satisfying global data privacy and security regulations.

TASMC Requirements		Duality's Secure Data Collaboration platform
Assurance of data security for data custodian	EXCEEDED	Technical guardrails guarantee that only data custodians have access to raw data. No trust in 3rd parties required
Meet GDPR anonymization requirement for involved PHI/PII	EXCEEDED	Technical guardrails satisfy the anonymization requirement as defined in GDPR by default
Governance to know how data is being used	EXCEEDED	Pre-and ad-hoc approval controls for computations with reporting to show all computations run on the encrypted data set(s)
Ability to join and link data sets	EXCEEDED	Core functionality of the platform. Also, allows for private join wherein data custodians do not learn which records match
Computational accuracy of two decimal places	EXCEEDED	Accuracy of more than 5 decimal placed achieved for all computations
Efficiency - total process computation time	EXCEEDED	Anonymization is achieved by default, no process time. Computation runtime varies from 3 to 30 seconds for descriptive analytics and <90 seconds for survival analyses.

ABOUT DUALITY

Duality Technologies Inc. is a pioneer and leader in developing advanced cryptographic solutions including fully homomorphic encryption, federated analytics, federated learning, and secure computing. Duality's Secure Data Collaboration platform applies these technologies to empower healthcare organizations to collaborate with their business and research ecosystems.

Contact us for more information, to schedule a demo, or try it yourself.

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