Large-Scale Network Study on the Impact of Immune Checkpoint Therapy in Metastatic Non-Small Cell Lung Cancer: The iCAN mNSCLC Study-a-Thon

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Background

Metastatic non-small cell lung cancer (mNSCLC) represents a significant global health burden (2.2M new diagnoses annually), characterized by poor prognoses and high mortality rates (1.8M annually) [1,3]. The introduction of immune checkpoint inhibitors (ICIs) has advanced the treatment for mNSCLC, offering improved survival outcomes in clinical trials for select patient groups[2]. However, evidence of the uptake, treatment and effectiveness patterns of ICIs in real-world settings, particularly across diverse healthcare systems and populations, remains scarce.

Real-world data (RWD) is vital to complement clinical trial findings, yet barriers such as data standardization, lack of networks, especially across borders, as well as privacy concerns hinder comprehensive global assessments. Data harmonization to the OMOP common data model (CDM) and federated data analysis frameworks address these challenges by enabling standardized, large-scale analyses, while maintaining patient privacy.

Here we present lessons learned from the iCAN mNSCLC study-a-thon held in Helsinki, Finland in March 2025. The study-a-thon event brought together a multidisciplinary team from 21 sites and nine countries, from both academia and industry data partners with the objective to characterize patients with mNSCLC, evaluate shifts in treatment patterns and clinical outcomes following the introduction of ICIs.

Methods

This study-a-thon introduced an iterative, standardized data-readiness and quality workflow for oncology studies (Figure 1). Each participating Data Partner executed an oncology-specific Oncology Data Quality Assessment described in a complementary abstract titled *"Coordinating center-based, rather than self-deployed, data readiness assessment and improvement for oncology RWE"*.

The study cohorts included adult patients with mNSCLC diagnosed from January 1, 2015, to the most recent available data. Specific cohorts included patients with NSCLC, mNSCLC, and the subset who initiated standard-of-care systemic antineoplastic therapies for metastatic disease. mNSCLC regimens in each database were inferred using the ARTEMIS package. Key outcomes were treatment-free interval, time to next treatment, time to treatment discontinuation, and overall survival.

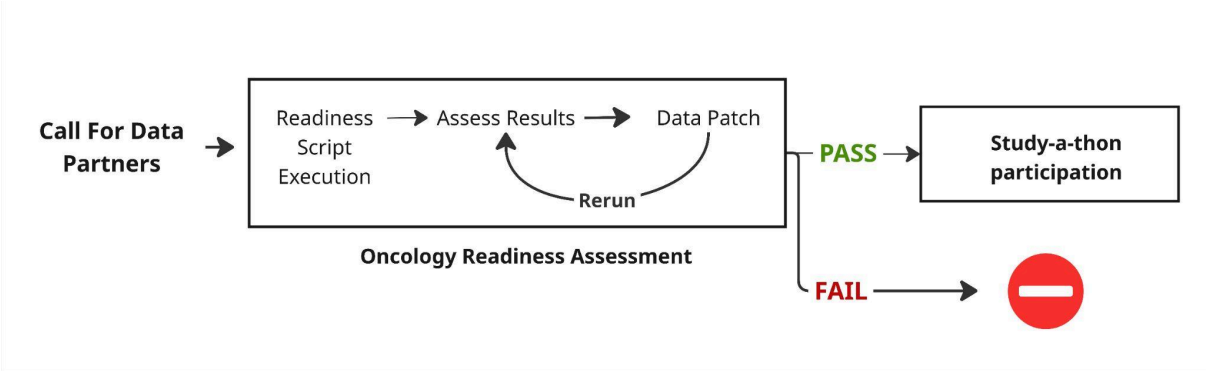

Figure 1. Depiction of onboarding to the study-a-thon and the readiness assessment. Only data partners that passed the assessment after running the patch were permitted to join.

Results

A total of 17 data partners successfully passed the oncology data-readiness assessment and generated results in time to contribute to three abstracts—one accepted for presentation at IASLC WCLC 2025 titled *A large-scale network study on the impact of immune checkpoint therapy in metastatic non-small cell lung cancer: the iCAN mNSCLC study-a-thon*, and two currently under review for the ESMO 2025 congress, including *FALCON-Lung: evolving global ICI treatment patterns and outcomes in the era of personalized mNSCLC*, which presents key outcomes and analyses of treatment-initiated cohorts.

These abstracts represent results on 30,153 patients with NSCLC from Australia, Belgium, Finland, Germany, Spain, UK, and the US. Median age at diagnosis ranged from 65 years in the Roche WAYFIND-R (Basel) database to 72 years in Tampere University Hospital (Finland). The proportion of men ranged from 42% in Dana Farber Cancer Institute (Boston) to 75% in IIS La Fe (Valencia). The median follow up time in the NSCLC cohort was between 306 days in Wayfind-R to 642 days in Emory University (Atlanta).

The work started in the iCAN mNSCLC study-a-thon is continued in FALCON—the Federated Alliance for Large-scale Cancer Observational Network. Since the event and first round of results, additional partners have joined, and a dedicated subnetwork, FALCON-Lung, has been formed. As of writing, FALCON-Lung comprises 23 data partners. The development and structure of the FALCON Network

are detailed in the ESMO abstract titled *FALCON – a novel high-quality cancer network for real-world evidence (RWE)*.

Conclusion

Our experience underscores the feasibility and importance of large-scale, federated network studies to generate reliable real-world evidence (RWE) in oncology. Given the complexity, specificity and granularity required in oncology data — such as detailed histology and treatment episode abstraction — individual data sources alone rarely suffice to achieve robust sample sizes for meaningful inference. Standardized methods, tools like ARTEMIS[4], and systematic quality assurance practices such as the Oncology Readiness Assessment are critical to managing this complexity. Furthermore, intensive and structured collaborations, exemplified by the study-a-thon model, enables rapid iterative improvements and sustained engagement across multiple data partners. Our experience from the iCAN mNSCLC study-a-thon, the largest federated OMOP Oncology study to date, demonstrates that high-quality, secure, reproducible, and scalable oncology RWE research is both achievable and essential, setting the stage for future international collaborative efforts.

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