Real-World Insights on Pan-Cancer Immune Checkpoint Inhibitor Treatment: Initial Findings of a Belgian Multicenter Study

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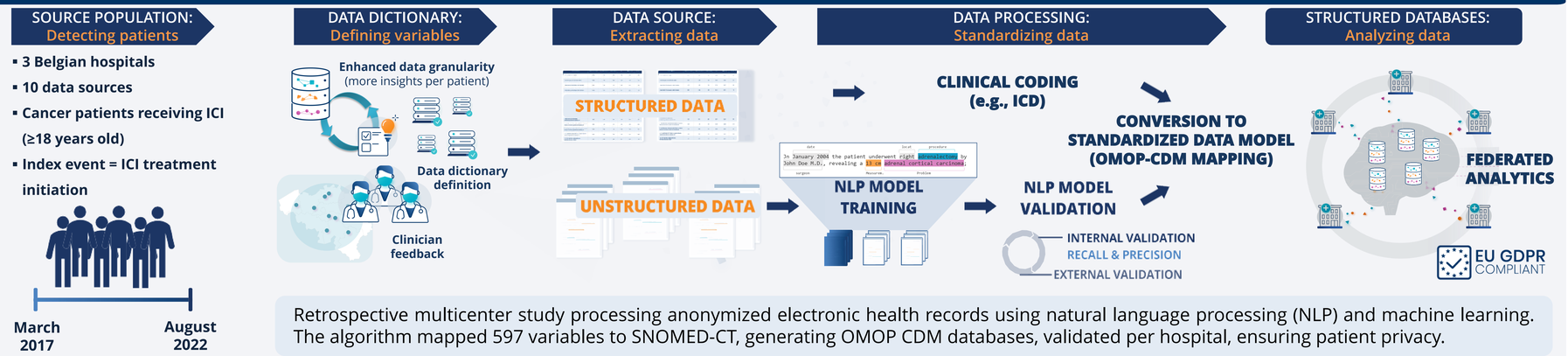
BACKGROUND AND AIMS

- To bridge the gap between clinical trial patients and real-world populations, we conducted a comprehensive study in Belgium to characterize cancer patients treated with immune checkpoint inhibitors (ICIs), which have demonstrated survival advantages in various cancer types.
- We present here the initial findings of the ICI-treated patient cohort regarding demographic and clinical characteristics, cancer type, ICI treatments, and overall survival (OS).

METHODS



Retrospective multicenter study processing anonymized electronic health records using natural language processing (NLP) and machine learning. The algorithm mapped 597 variables to SNOMED-CT, generating OMOP CDM databases, validated per hospital, ensuring patient privacy.

RESULTS AND CONCLUSIONS

Figure 1. Patient demographics. The graphs below represent the age distribution, sex, smoking status, mean weight, height, and BMI of the study population. Height and weight detection was performed on structured data (approx. 50% coverage)- NLP extraction is ongoing. Error bars: SD.

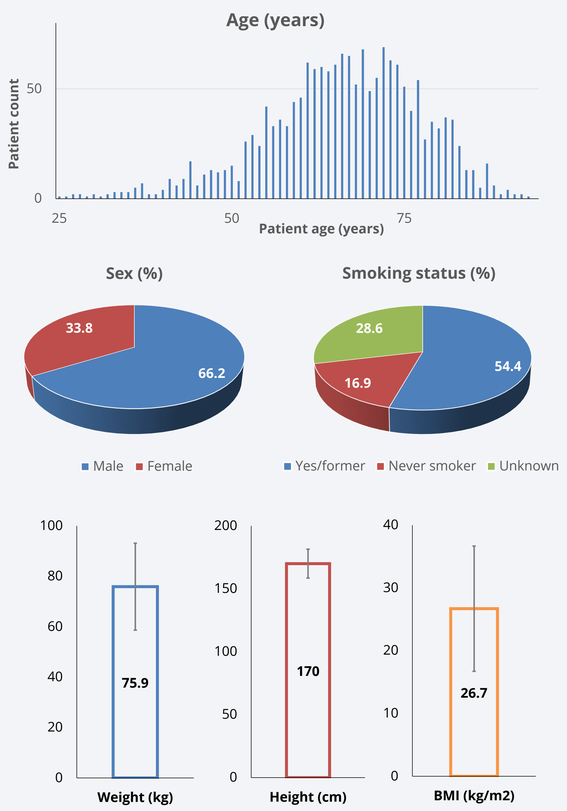


Table 1. Cancer types by ICI treatment. Cancer types among patients with detected cancers are shown, categorized by ICI treatment. Percentages are calculated based on the total number of patients with identified cancer types (number of patients with unknown cancer types are shown at the top). Dashes indicate no patients in that category and cells containing fewer than 5 patients are explicitly marked, in compliance with data privacy.

-	Overall	Pembrolizumab	Nivolumab	Atezolizumab	Durvalumab	Avelumab	Cemiplimab	Ipilimumab-Nivolumab
Patients with unknown cancer type, n	256	79	104	27	n < 5	n < 5	-	38
Patients with detected cancer type, n (%)	1468 (100)	677 (46.1)	405 (27.6)	157 (10.7)	76 (5.2)	32 (2.2)	13 (0.9)	106 (7.2)
CANCER TYPES, n (%)								
Lung cancer	731 (49.8)	456 (67.4)	113 (27.9)	91 (58)	69 (90.8)	-	-	n < 5
Melanoma	134 (9.1)	21 (3.1)	73 (18)	-	-	-	-	39 (36.8)
Renal cell carcinoma	126 (8.6)	23 (3.4)	69 (17)	-	-	n < 5	-	31 (29.2)
Bladder cancer	124 (8.4)	72 (10.6)	15 (3.7)	16 (10.2)	-	20 (62.5)	-	n < 5
Head and neck carcinoma	107 (7.3)	43 (6.4)	59 (14.6)	-	n < 5	-	n < 5	-
Mesothelioma	50 (3.4)	n < 5	19 (4.7)	n < 5	-	-	-	29 (27.4)
Breast cancer	33 (2.2)	9 (1.3)	n < 5	21 (13.4)	-	n < 5	-	-
Liver cancer	28 (1.9)	n < 5	7 (1.7)	20 (12.7)	-	-	-	-
Esophageal cancer	27 (1.8)	5 (0.7)	19 (4.7)	n < 5	-	-	-	-
Cervical cancer	11 (0.7)	n < 5	n < 5	n < 5	-	-	n < 5	-
Colorectal cancer	11 (0.7)	7 (1)	n < 5	-	n < 5	-	-	-
Ureter cancer	9 (0.6)	7 (1)	-	n < 5	-	n < 5	-	-
Thymic epithelial tumors	7 (0.5)	-	5 (1.2)	-	-	-	-	n < 5
Stomach cancer	6 (0.4)	n < 5	n < 5	-	-	-	-	-
Ovarian cancer	n < 5	n < 5	-	-	n < 5	-	n < 5	-
Pancreatic cancer	n < 5	-	n < 5	-	-	n < 5	-	-
Cholangiocarcinoma	n < 5	n < 5	n < 5	-	-	-	-	-

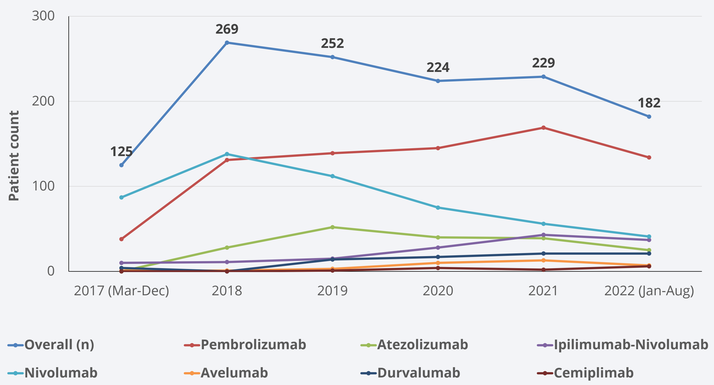
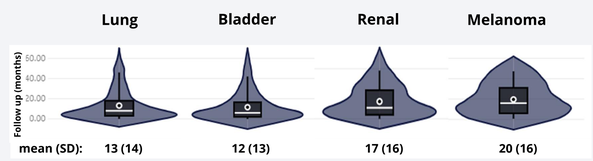


Figure 2. Patient count per year and ICI. Line graph depicting the patient count per year and per ICI regarding date of ICI treatment initiation, i.e., the index date for patient inclusion in the study. Colored lines show the overall population (including total patient number per year) and subgroups based on different ICI treatments reimbursed in Belgium, representing all indications together (monotherapy, combination therapy, all treatment lines and settings). The corresponding months of 2017 and 2022 are shown, as data was not collected for the full year.

Figure 3. Mean follow-up time (months). Violin plots display the distribution of mean follow-up time in months for patients with the most detected cancer types. The width of the violin plot represents the data density, with a horizontal line indicating the median and a box representing the interquartile range (IQR). The circle within the box denotes the mean follow-up time (error bars: SD). Follow up spans from ICI treatment initiation to last hospital visit or death.



CONCLUSIONS: These initial findings highlight the feasibility of automatically extracting and locally validating federated hospital databases- an invaluable tool for real-world data on ICI-treated patients. Comparable datasets would require linking government databases, which cannot be done in a federated manner nor enriched with hospital-level data. Ongoing and future analyses will explore:

- Comorbidities
- Tumor staging (TNM)
- Treatment lines
- Adverse events
- Anatomical pathology
- Genetic alterations
- Overall survival
- Time on treatment
- Time to next treatment (rwPFS)

DISCLOSURES: A.V. declares speaker fees (Novartis, Ipsen) and advisory board and congress fees (Ipsen), all paid directly to UZA. Since 06/2023, spouse works freelance at LynxCare Health Informatics (IT development, no customer contact).