

Prostate Cancer (PC) at a national level: ESMO's 4-Stage Framework using an Algorithm based on the National Health Data System (NHDS)

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BACKGROUND

In 2020, the European Society for Medical Oncology (ESMO) introduced a 4-tier staging framework for prostate cancer (PC) combining metastatic status and androgen deprivation therapy (ADT) sensitivity:

- nonmetastatic castration-sensitive (nmCSPC),
- nonmetastatic castration-resistant (nmCRPC),
- metastatic castration-sensitive (mCSPC),
- metastatic castration-resistant (mCRPC).

Epidemiological data based on this classification are lacking.

→ **Objective: to classify prostate cancer cases using the ESMO framework**

METHODS

A retrospective observational study was conducted using the French Cancer Data Platform cohort, an extract from the National Health Data System (NHDS) covering over 8 million cancer patients or high-risk individuals.

Patients were included by the following criteria:

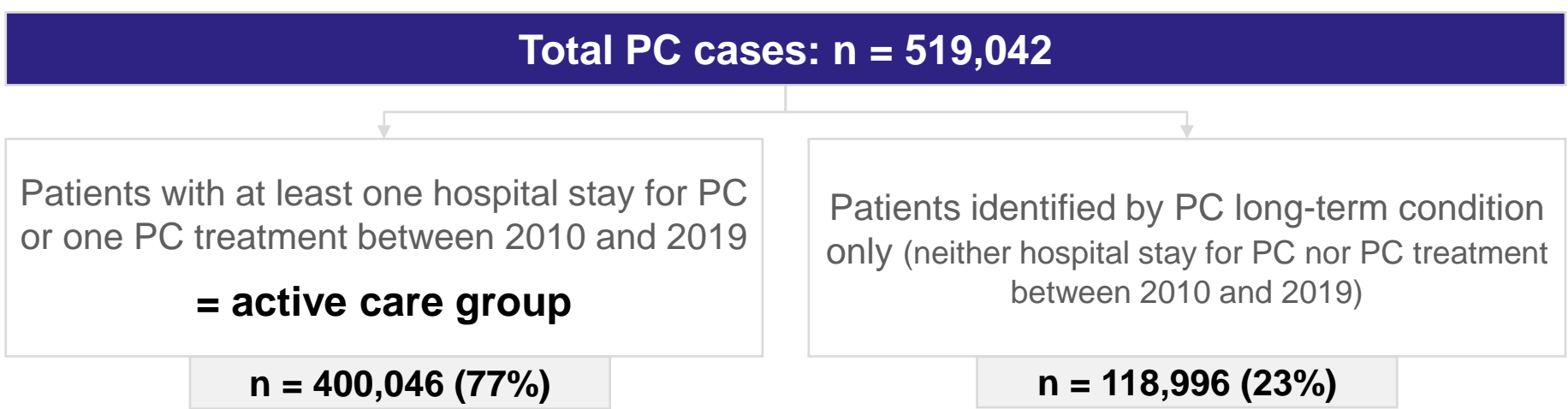
- **patients diagnosed with PC between 2014–2019** (long-term disease, hospitalization, specific drugs),
- without prior cancer,
- living in the country,
- **alive on 01/01/2019.**

Treatment lines from 2010–2019 health claims database were analysed. A rule-based algorithm developed with a multidisciplinary expert committee assigned cases to ESMO stages based on therapeutic trajectories. Stage was evaluated at the end of 2019.

RESULTS

POPULATION DESCRIPTION

- Analyses included 519,042 total PC cases (48,168 new cases diagnosed in 2019).
- Median age at diagnosis was 68.0 yo (Q1: 62.0 ; Q3:74.0).
- Among all cases, 23% were identified by PC long-term condition only.



CLASSIFICATION USING THE ESMO FRAMEWORK

The distribution of ESMO-defined stages assigned by the rule-based expert system at the end of 2019 was:

	Total cases (n=519,042)	2019 cases (n=48,168)	Age at diagnosis Median (Q1 ; Q3)
nmCSPC	78.7 %	80.0 %	67.0 (62.0 ; 73.0)
nmCRPC	0.3 %	-	68.0 (62.0 ; 74.0)
mCSPC	12.8 %	18.7 %	74.0 (66.0 ; 81.0)
mCRPC	3.3 %	-	68.0 (62.0 ; 75.0)
Unclassified	4.8 %	1.3 %	69.0 (63.0 ; 75.0)

TREATMENT TRAJECTORIES

- Treatment lines analysed between 2010 and 2019 included androgen deprivation therapy (44.5% of active care group), prostate surgery (38.1%), radiotherapy (33.7%), androgen receptor pathway inhibitor (4.7%), chemotherapy (3.1%), brachytherapy (2.5%), focal therapy (1.4%).
- Treatment trajectories from 2010 to 2019 varied by stage in 2019:

Fig. 1 – Number of PC treatment lines received between 2010 and 2019, by stage in 2019, in active care group (n = 400,046)

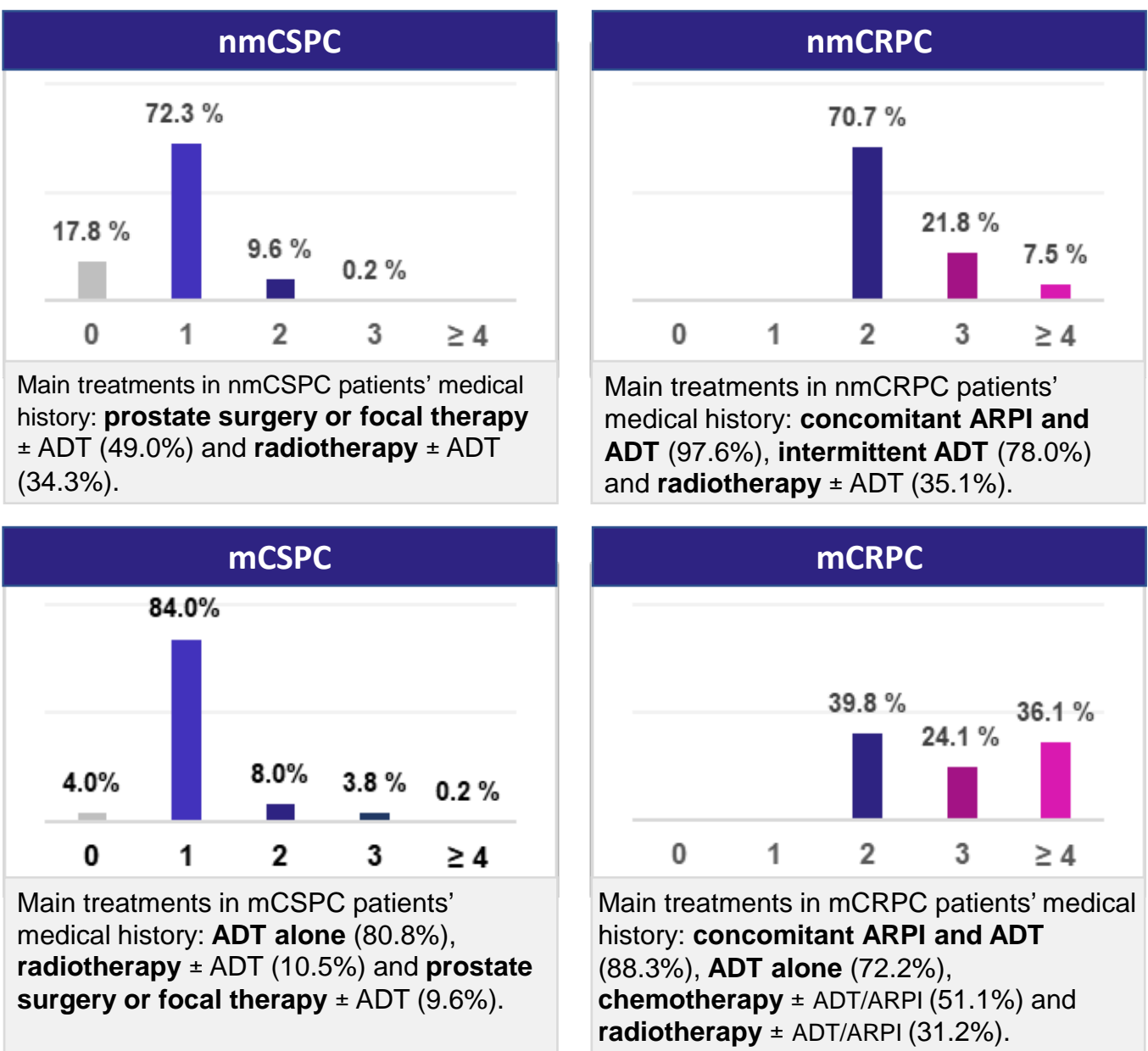
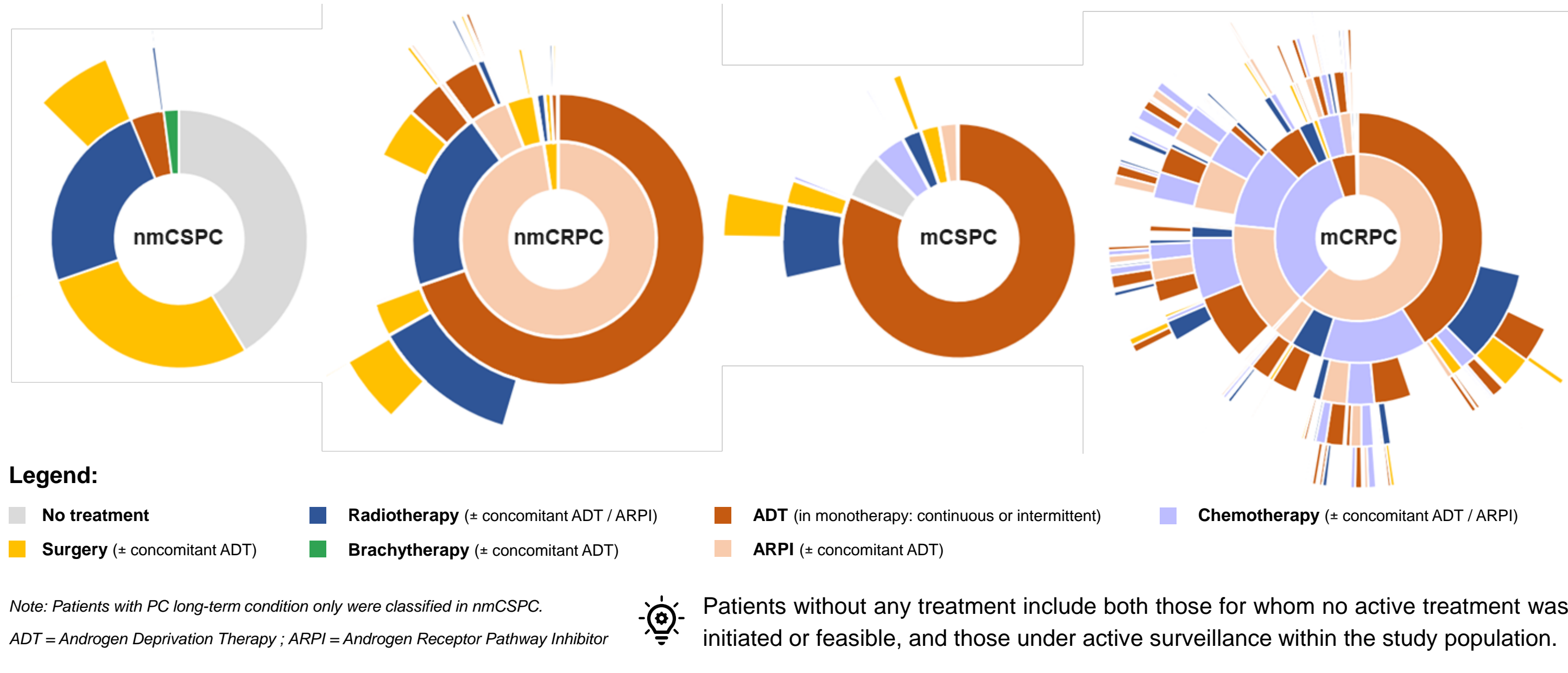


Fig. 2 – PC treatment lines received between 2010 and 2019, by stage in 2019, in total PC cases (n = 519,042)
Read from outer rings toward the center: earlier treatment lines on the edge, recent treatment lines at the center.



CONCLUSION

- **The algorithm successfully classified 95.2% of PC cases alive on 01/01/2019** (98.7% of 2019 PC cases) **according to the ESMO framework.**
- Exclusion of deceased cases before 01/01/2019 **limits generalizability to patients with severe outcomes.**
- However, this methodology provides **robust national epidemiological metrics** and a foundation for future integration with clinical and molecular data.