

# Modelled Number and Cost of Biparametric Magnetic Resonance Imaging (bpMRI) Examinations in a Nationwide Prostate Cancer Screening Programme: Utilising the Results of the Czech ProstaPilot Study

Ondřej Májek<sup>a,b</sup>, Kateřina Hejčmanová<sup>a,b</sup>, Michal Staník<sup>c</sup>, Michal Standara<sup>d</sup>, Jan Křístek<sup>d</sup>, Roman Zachoval<sup>e</sup>, Renata Chloupková<sup>a,b</sup>, Ondřej Ngo<sup>a,b</sup>, Karel Hejduk<sup>a,b</sup>, Ladislav Dušek<sup>a,b</sup>

<sup>a</sup>Institute of Biostatistics and Analyses, Faculty of Medicine, Masaryk University, Brno, Czech Republic;  
<sup>b</sup>National Screening Centre, Institute of Health Information and Statistics of the Czech Republic, Prague 2, Czech Republic;  
<sup>c</sup>Department of Urologic Oncology, Department of Surgical Oncology, Masaryk Memorial Cancer Institute and Faculty of Medicine, Masaryk University, Brno, Czech Republic;  
<sup>d</sup>Department of Radiology, Masaryk Memorial Cancer Institute, Brno, Czech Republic;  
<sup>e</sup>Department of Urology, 3<sup>rd</sup> Faculty of Medicine of Charles University and Faculty Thomayer Hospital, Prague, Czech Republic

majek@iba.muni.cz

## Objectives

- Czechia initiated **nationwide prostate cancer screening programme in 2024**.
- The pilot phase of the programme is 5 years, during which experience and evidence are gathered to reach a final decision and strategy for the routine screening programme.
- Our objective was to investigate **alternative screening scenarios** following the **results of the Czech ProstaPilot (NCT05603351) study**.

## Materials and Methods

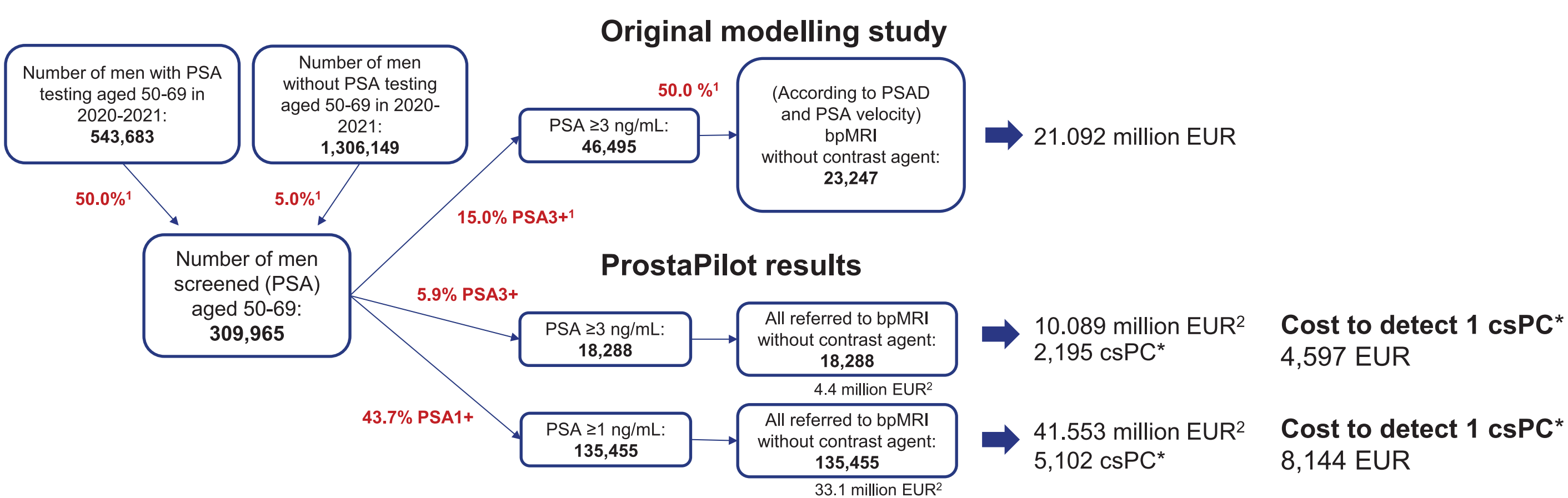
- We **previously designed a model of patient flow<sup>1</sup>** through the potential organised prostate cancer screening programme utilising literature and Czech national registry data.
- The aim of the **ProstaPilot study** was to assess the role of biparametric magnetic resonance imaging (bpMRI) in screening for clinically significant prostate cancer (csPC). We used **screening process characteristics associated with bpMRI use to estimate the number and cost of bpMRI examinations, as well as the cost to detect one csPC**.
- We used **data from the ongoing nationwide programme to assess the generalisability** of ProstaPilot results.

<sup>1</sup>Hejčmanová K, Koudelková M, Chloupková R, Babjuk M, Zachoval R, Ferda J, Ngo O, Hejduk K, Májek O. RWD56 Real World Data for Planning a New Organised Cancer Screening Programme in the Czech Republic: Example of Prostate Cancer Screening. Value in Health. 2023 Dec 1;26(12):S514-5.

## Results

- We **previously estimated that approximately 310,000 men are to be enrolled** in one year.
- Previously**, we expected that with **15% PSA positivity** and follow-up urological assessment and selection for bpMRI (50% of men), **23,247 men would undergo bpMRI**.
- According to **ProstaPilot results**
  - 5.9% were PSA3+**  
If those men were directly referred to bpMRI, 18,288 of them would undergo bpMRI and 2,195 csPCs were detected. Considering the cost of PSA, bpMRI, and biopsy/pathology, **cost to detect 1 csPC is 4,597 EUR**.
  - 43.7% were PSA1+**  
If those men were directly referred to bpMRI, **cost to detect 1 csPC increases to 8,144 EUR**.
- Data from **national programme are in line with ProstaPilot estimates** (8.8% PSA3+, 43.4% PSA1+).

**Key results of the modelling study using ProstaPilot results**  
PSA prostate-specific antigen, bpMRI biparametric magnetic resonance imaging, csPC clinically significant prostate cancer



<sup>1</sup>based on previous pilot studies, administrative data, and expert opinion  
<sup>2</sup>based on previously designed model and costing using national reimbursement decrees, 1 EUR=25 CZK  
<sup>3</sup>based on process characteristics from ProstaPilot, only screen-detected cancers in the first round were considered

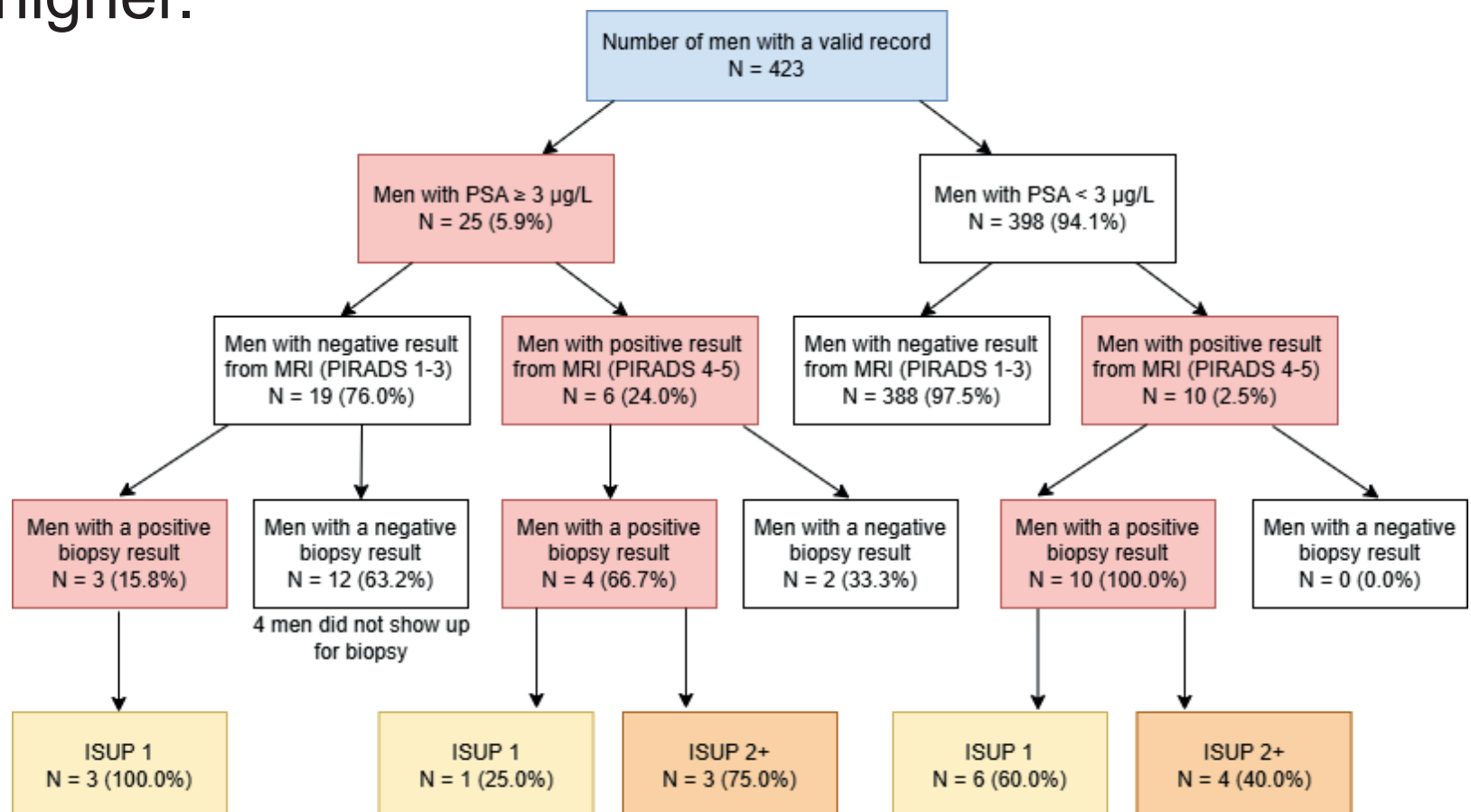
## Conclusions

- Real-world data lead to **lower estimates of prostate-specific antigen (PSA) test positivity than previously expected**, likely because of the high prevalence of opportunistic screening.
- Extended biparametric magnetic resonance imaging use is therefore potentially feasible.
- Whereas the **lower PSA threshold** could alleviate **limitations of PSA sensitivity**, it is associated with a substantial **resource consumption**.

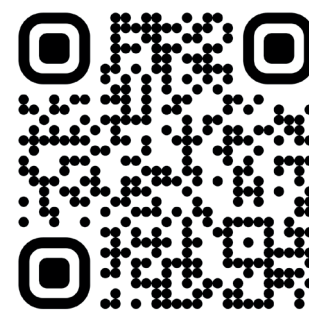
### Czech ProstaPilot (NCT05603351) study



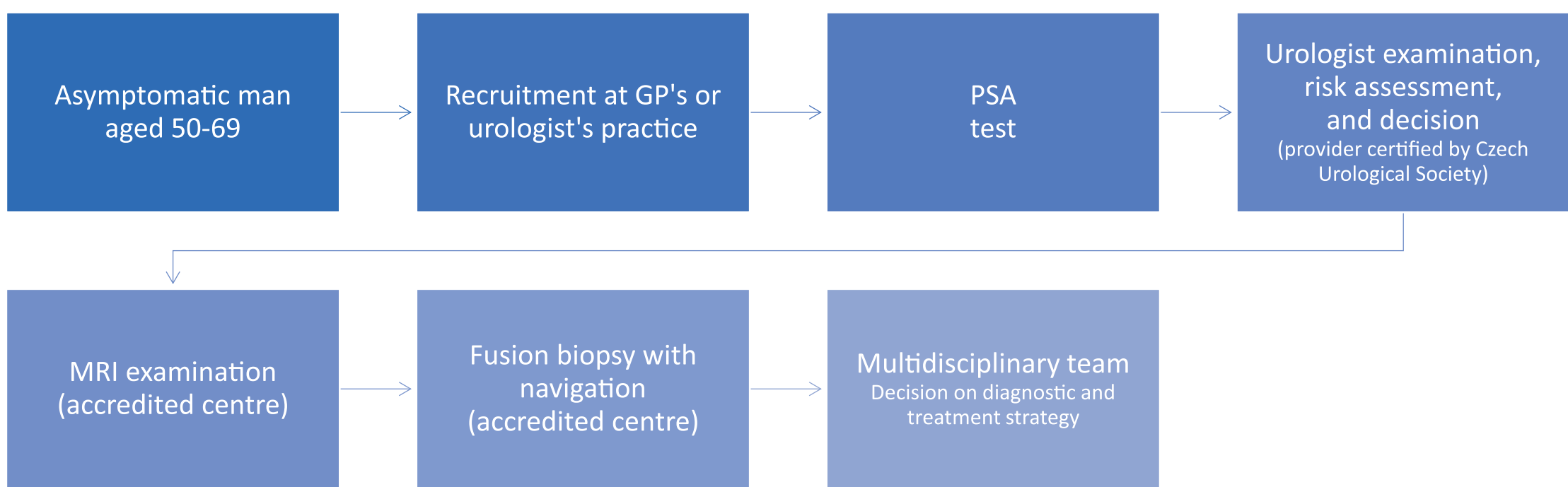
- Between May 2022 and May 2023, 423 **men aged 50–69 years** who were enrolled via volunteer-based recruitment, underwent **both PSA testing and bpMRI** of the prostate.
- Positive results** were defined as **PSA 3 µg/L or a Prostate Imaging-Reporting and Data System score of 4-5**. Those with positive tests were referred for further evaluation, including an MRI-targeted biopsy and a systematic 12-core biopsy.
- csPC** was defined as any cancer of International Society of Urological Pathology grade group 2 or higher.



### Czech Nationwide Prostate Cancer Screening Pilot Programme



- Launch of the programme: **January 2024**
- Target population
  - men aged 50-69 years** (+364 days) with no history of prostate cancer and no suspicion of prostate cancer
  - older men with good performance status and life expectancy at least 10-15 years can/should follow the same screening scheme
- Screening test: **PSA test**



[www.prostascreeing.cz/en](http://www.prostascreeing.cz/en)

Acknowledgement and funding: This work was supported by the Czech Ministry of Health under grant NU22-09-00539.