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PSA and MRI – latest evidence on prostate cancer screening

Dr Sam Merriel
GP and NIHR Academic Clinical Lecturer
University of Manchester

Declarations

- PCUS have paid my travel costs for today's talk
- I deliver educational talks for Prostate Cancer UK
- Co-investigator for the 'Trial of Randomised Approaches for National Screening FOR Men (TRANSFORM)' funded by Prostate Cancer UK & National Institute for Health and Care Research (NIHR) Health Technology Assessment programme
- My research into prostate cancer diagnosis is funded by the NIHR, Prostate Cancer UK, and Cancer Research UK

Content

- State of play
- Current guidance
  - PCRMP
  - NICE
- Diagnostic pathway
- Current trials
- TRANSFORM
- Discussion

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State of play

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State of play

The Lancet Commissions

The *Lancet* Commission on prostate cancer: planning for the surge in cases

Nicholas D James, Ian Tannock, James N'Dow, Felix Feng, Silke Gillessen, Syed Adnan Ali, Blanca Trujillo, Bissan Al-Lazikani, Gerhardt Attard, Freddie Bray, Eva Compérat, Ros Eeles, Omolara Fatiregun, Emily Grist, Susan Halabi, Áine Haran, Daniel Herchenhorn, Michael Hofman, Mohamed Jalloh, Stacy Loeb, Archie MacNair, Brandon Mahal, Larissa Mendes, Masood Moghul, Caroline Moore, Alicia Morgans, Michael Morris, Declan Murphy, Vedang Murthy, Paul L Nguyen, Anwar Padhani, Charles Parker, Hannah Rush, Mark Sculpher, Howard Soule, Matthew R Sydes, Derya Tilki, Nina Tunariu, Paul Villanti, Li-Ping Xie

doi:10.1016/S0140-6736(24)00651-2

State of play

“We project that the number of new cases of prostate cancer annually will rise from 1·4 million in 2020 to 2·9 million by 2040.”

“The projected rise in prostate cancer cases cannot be prevented by lifestyle changes or public health interventions.”

doi:10.1016/S0140-6736(24)00651-2

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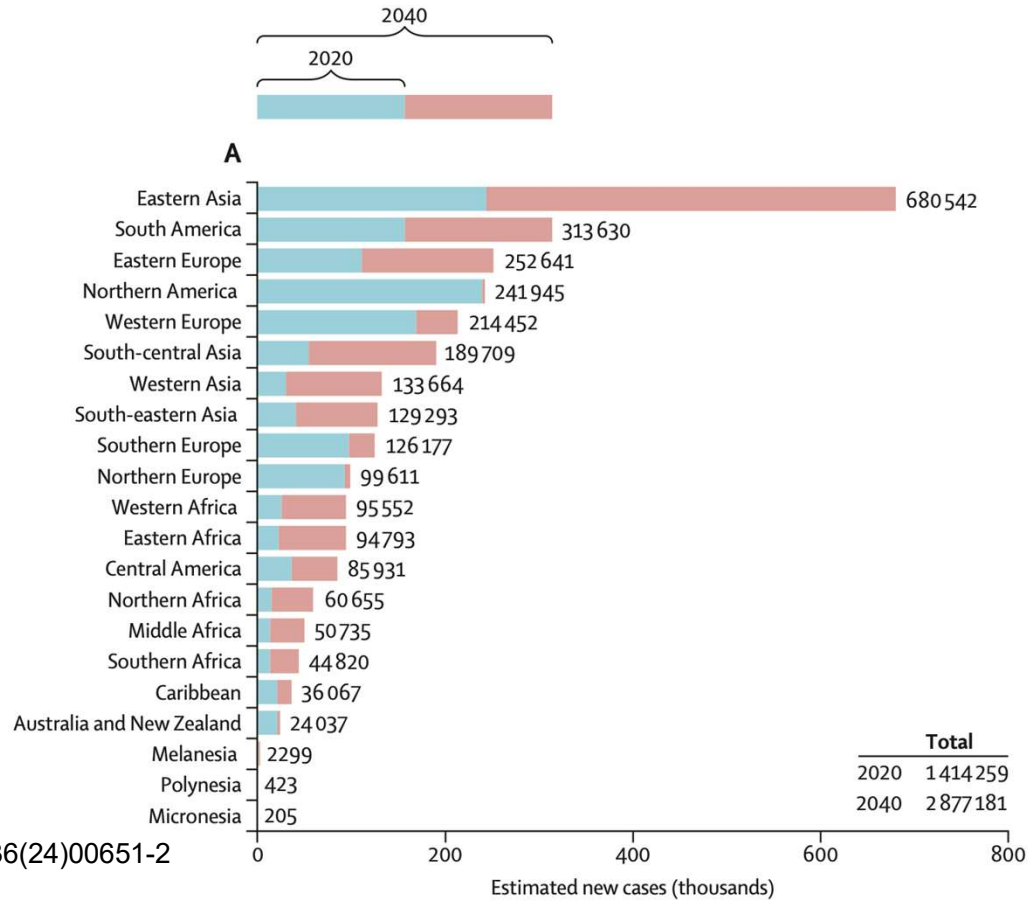
State of play



doi:10.1016/S0140-6736(24)00651-2

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State of play

Cases

52,254

New cases of prostate cancer each year, 2016-2018 average, UK

Deaths

12,039

Deaths from prostate cancer, 2017-2019, UK.

Survival

78%

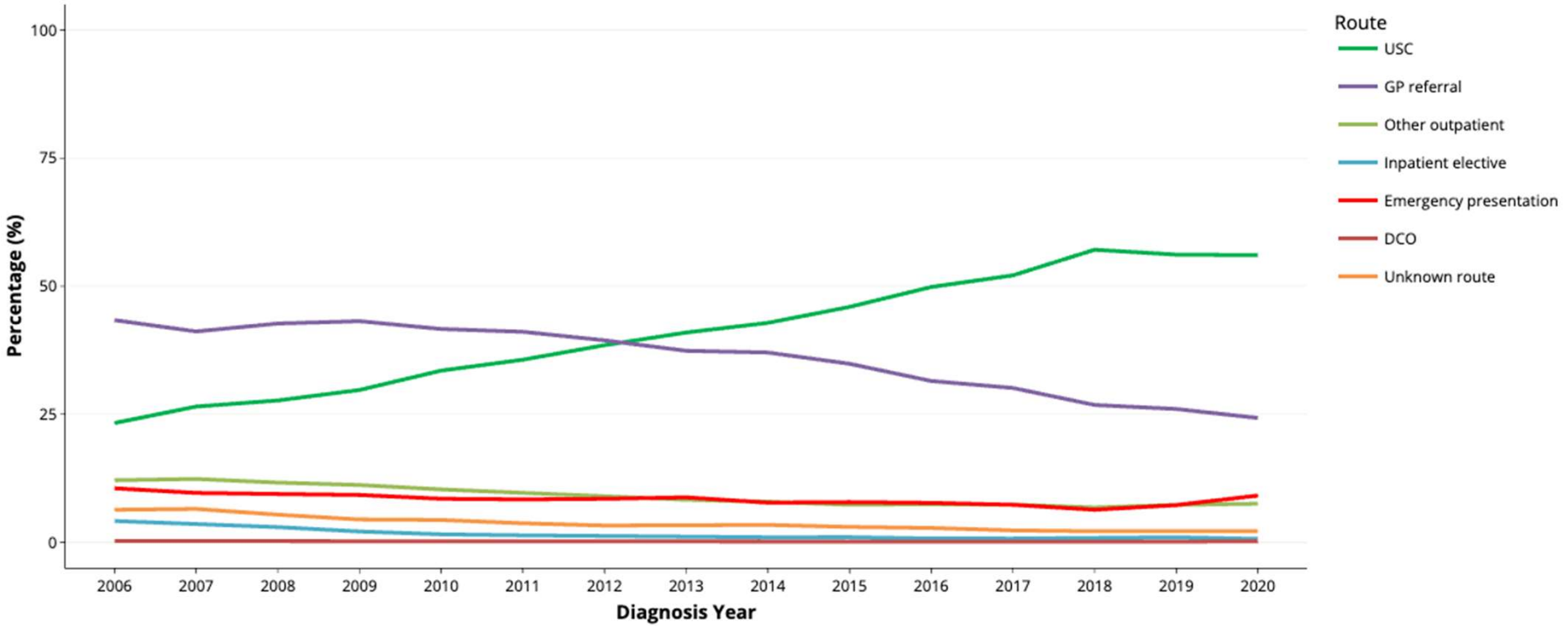
Survive prostate cancer for 10 or more years, 2013-2017, England

Prevention

Not clearly linked to any preventable risk factors

Preventable cases of prostate cancer are not known as it is not clearly linked to any preventable risk factors

State of play



https://nhsd-ndrs.shinyapps.io/routes_to_diagnosis/

State of play

British Journal of General Practice
bringing research to clinical practice

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Article

Factors affecting prostate cancer detection through asymptomatic PSA testing in primary care in England: Evidence from the 2018 National Cancer Diagnosis Audit

Samuel Merriel, Nurunnahar Akter, Nadine Zakkak, Ruth Swann, Sean McPhail, Greg Rubin, Georgios Lyratzopoulos and Gary A. Abel

British Journal of General Practice 14 October 2024; BJGP.2024.0376. **DOI:** https://doi.org/10.3399/BJGP.2024.0376

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Current guidelines

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Current guidelines

GOV.UK — UK National Screening Committee

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Adult screening programme

Prostate Cancer

The prostate is a small gland found in men. It is located in the pelvis between the penis and the bladder. The main function of the prostate is to help in the production of semen. Prostate cancer is the most common cancer in men and usually affects men over the age of 65.

» Read more about prostate cancer on NHS UK

UK NSC screening recommendation

Based on the last UK NSC review of this condition that occurred in November 2020.

Screening is not currently recommended for this condition.

Current guidelines

https://www.gov.uk/guidance/prostate-cancer-risk-management-programme-overview

Current guidelines

PCRMP

- Reactive PSA testing upon request for men 50+ years
- Counselling and testing via GP
- PSA threshold of 3ng/mL

Current guidelines

PCRMP gaps

- Men aged below 50
- Men with a strong family history.
- Black men
- How often to test
- When to stop testing

Current guidelines

Research

Optimising the use of the prostate-specific antigen blood test in asymptomatic men for early prostate cancer detection in primary care:

report from a UK clinical consensus

Thomas A Harding, Richard M Martin, Samuel WD Merriel, Robert Jones, Joe M O'Sullivan, Mike Kirby, Oluwabunmi Olajide, Alexander Norman, Jaimin Bhatt, Oliver Hulson, Tanimola Martins, Vincent J Gnanapragasam, Jonathan Aning, Meg Burgess, Derek J Rosario, Nora Pashayan, Abel Tesfai, Natalia Norori, Amy Rylance and Andrew Seggie

doi: 10.3399/BJGP.2023.0586

Current guidelines

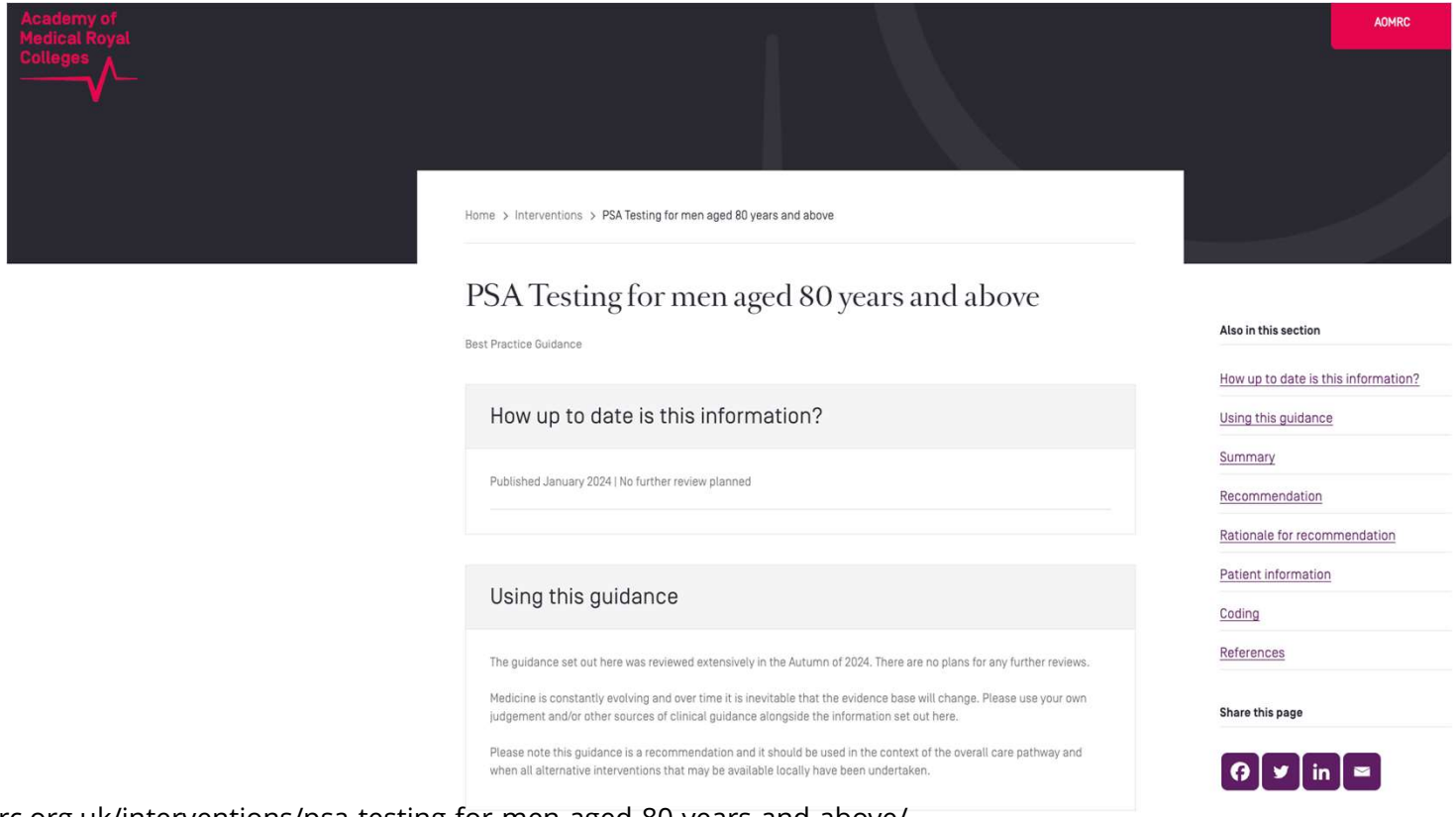
Areas of agreement:

- Awareness raising amongst higher risk men
- Proactive discussions with higher risk men
- Balanced information for men
- Risk-based testing intervals
- No DRE if PSA elevated
- Resource primary care properly to deliver current policy

Areas of uncertainty:

- Screening men without family history or black ethnicity
- Screening men with family history of BRCA-linked cancers
- Risk-adapted PSA thresholds
- Repeat PSA testing prior to referral
- Specific intervals for retesting
- Design of a national prostate cancer screening programme

Current guidelines



https://ebi.aomrc.org.uk/interventions/psa-testing-for-men-aged-80-years-and-above/

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Current guidelines

ANALYSIS

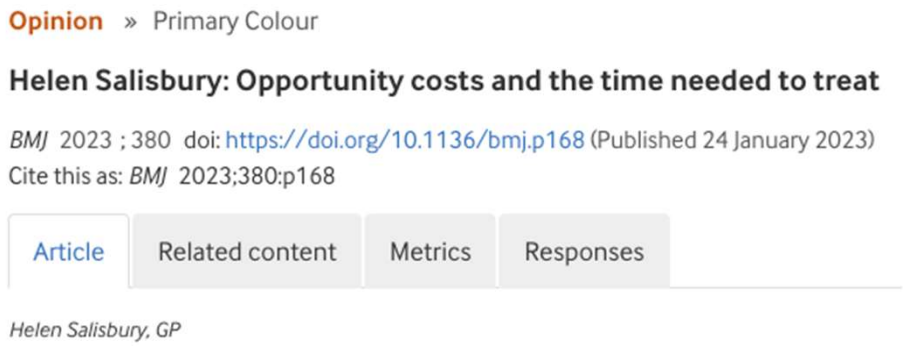
Current policies on early detection of prostate cancer create overdiagnosis and inequity with minimal benefit

Informed choice approaches lead to high rates of unsystematic PSA testing, especially among those least likely to benefit and most likely to be harmed, argue Andrew Vickers and colleagues

Andrew Vickers, [1] Frank O'Brien, [2] Francesco Montorsi, [3] David Galvin, [4] Ola Bratt, [5] Sigrid Carlsson, [1,5,6] James WF Catto, [7] Agne Krilaviciute, [8] Michael Philbin, [9] Peter Albers[8,10]

doi:10.1136/bmj-2022-071082

Current guidelines



Opinion » Primary Colour

Helen Salisbury: Opportunity costs and the time needed to treat

BMJ 2023 ; 380 doi: https://doi.org/10.1136/bmj.p168 (Published 24 January 2023)
Cite this as: *BMJ* 2023;380:p168

Article | Related content | Metrics | Responses

Helen Salisbury, GP

"Hashim Ahmed, chair in urology at Imperial College London, speaking on BBC Radio 4's Today programme, recently advised all men over 50 to ask their GP for a prostate specific antigen (PSA) test to look for cancer. Such consultations would ideally involve discussions about personal risk factors, why regular PSA testing isn't recommended by the UK National Screening Committee, recent advances in diagnostic techniques, and the tricky concept of overdiagnosis—explaining that some cancers wouldn't cause harm in the course of the patient's lifetime, but we don't know which ones, and that the treatment itself may have negative health effects. This is not a brief add-on task but a whole separate GP appointment."

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Symptomatic prostate cancer diagnosis

Symptomatic diagnosis

NICE National Institute for Health and Care Excellence

NICE guideline

Suspected cancer: recognition and referral

NICE guideline
Published: 23 June 2015
Last updated: 2 October 2023

www.nice.org.uk/guidance/ng12

Symptomatic diagnosis

1.6 Urological cancers

Prostate cancer

1.6.1 Refer people using a suspected cancer pathway referral for prostate cancer if their prostate feels malignant on digital rectal examination. **[2015]**

1.6.2 Consider a prostate-specific antigen (PSA) test and digital rectal examination to assess for prostate cancer in people with:

- any lower urinary tract symptoms, such as nocturia, urinary frequency, hesitancy, urgency or retention **or**
- erectile dysfunction **or**
- visible haematuria. **[2015]**

Symptomatic diagnosis

1.6.3 Consider referring people with possible symptoms of prostate cancer, as specified in recommendation 1.6.2, using a suspected cancer pathway referral for prostate cancer if their PSA levels are above the threshold for their age in table 1. Take into account the person's preferences and any comorbidities when making the decision. **[2021]**

Table 1 Age-specific PSA thresholds for people with possible symptoms of prostate cancer

Age (years)	Prostate-specific antigen threshold (micrograms/litre)
Below 40	Use clinical judgement
40 to 49	More than 2.5
50 to 59	More than 3.5
60 to 69	More than 4.5
70 to 79	More than 6.5
Above 79	Use clinical judgement

Current guidelines

Urgent suspicion of cancer referral

Prostate Cancer

- Evidence from digital rectal examination of a hard, irregular prostate
- Elevated or rising age-specific Prostate Specific Antigen (PSA). Rough guide to normal PSA levels (ng/ml):
  - Less than 60 years < 3
  - Aged 60–69 years < 4
  - Aged 70 years and over < 5

These figures are a pragmatic aid based on clinical consensus. The principles of Realistic Medicine should be applied when considering referral and, in older men, routine or no referral may be appropriate for PSA levels of:

- Aged 80-85 years > 10
- Aged 86 years and over > 20

https://www.cancerreferral.scot.nhs.uk/urological-cancers/

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Symptomatic diagnosis

Gnanapragasam *et al. BMC Medicine* (2022) 20:264
https://doi.org/10.1186/s12916-022-02453-7

BMC Medicine

OPINION Open Access

Urinary symptoms and prostate cancer—the misconception that may be preventing earlier presentation and better survival outcomes

Vincent J. Gnanapragasam[1,2,3*], David Greenberg[4] and Neil Burnet[5]

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Symptomatic diagnosis

BJGP

Clinical features of prostate cancer before diagnosis:
a population-based, case-control study

William Hamilton, Deborah J Sharp, Tim J Peters and Alison P Round

British Journal of General Practice 2006; 56 (531): 756-762.

Research

Julia Hippisley-Cox and Carol Coupland

Symptoms and risk factors to identify men with suspected cancer in primary care:
derivation and validation of an algorithm

doi:10.3399/bjgp13X660724

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Symptomatic diagnosis

Presenting symptoms of cancer and stage at diagnosis: evidence from a cross-sectional, population-based study

Minjaung Monica Koo, Ruth Swann, Sean McPhail, Gary A Abel, Lucy Elliss-Brookes, Greg P Rubin, Georgios Lyratzopoulos

Alternative parameterisation of advanced stage category as stage III–IV
Different parameterisation of stage at diagnosis was examined by defining late stage cases as those diagnosed at stages III or IV (stage IV in the main analysis) (n=7,997).
Reference group = patients with change in bowel habit. The non-shaded columns repeat data from the main analysis, presented here for ease of comparison.

	Main analysis			Sensitivity analysis		
Symptom (seen alone)	N (%) with stage IV	Unadjusted OR (95% CI)[1]	Adjusted OR (95% CI)[2]	N (%) with stage III–IV	Unadjusted OR (95% CI)[1]	Adjusted OR (95% CI)[2]
Abnormal mole	7 (1%)	0·04 (0·02–0·09)	0·17 (0·06–0·51)	38 (7%)	0·06 (0·04–0·09)	0·43 (0·20–0·93)
Breast lump	36 (3%)	0·11 (0·07–0·17)	0·20 (0·11–0·37)	163 (15%)	0·14 (0·10–0·19)	0·34 (0·21–0·55)
PMB	9 (4%)	0·12 (0·06–0·26)	0·40 (0·16–1·02)	33 (14%)	0·13 (0·08–0·21)	0·45 (0·24–0·85)
Rectal bleeding	28 (13%)	0·46 (0·27–0·77)	0·46 (0·27–0·78)	102 (47%)	0·70 (0·47–1·03)	0·66 (0·44–0·98)
LUTS	121 (15%)	0·54 (0·37–0·79)	0·56 (0·35–0·90)	325 (40%)	0·52 (0·38–0·72)	0·70 (0·47–1·05)
Haematuria	57 (18%)	0·65 (0·42–1·02)	0·79 (0·47–1·35)	98 (30%)	0·34 (0·23–0·49)	0·79 (0·50–1·24)
CIBH	46 (25%)	Ref	Ref	105 (56%)	Ref	Ref
Lower abdominal pain	18 (35%)	1·66 (0·85–3·22)	1·98 (1·00–3·94)	409 (47%)	0·68 (0·49–0·93)	0·91 (0·63–1·32)
Any other symptom	265 (30%)	1·32 (0·92–1·90)	1·27 (0·84–1·92)	36 (53%)	0·87 (0·50–1·52)	0·95 (0·41–2·23)
Abdominal pain	29 (33%)	1·47 (0·84–2·56)	1·45 (0·81–2·59)	31 (53%)	0·89 (0·49–1·60)	0·90 (0·49–1·67)
Hoarseness	21 (31%)	1·36 (0·74–2·51)	1·33 (0·57–3·10)	56 (63%)	1·31 (0·78–2·20)	1·52 (0·89–2·61)
Fatigue	18 (31%)	1·37 (0·72–2·62)	1·07 (0·54–2·10)	24 (47%)	0·69 (0·37–1·28)	0·90 (0·47–1·71)
Weight loss	27 (38%)	1·87 (1·04–3·35)	1·23 (0·66–2·28)	38 (54%)	0·89 (0·51–1·54)	0·78 (0·44–1·40)
Cough	72 (45%)	2·46 (1·56–3·88)	0·99 (0·59–1·65)	123 (76%)	2·50 (1·57–3·98)	1·42 (0·84–2·38)
Haemoptysis	33 (56%)	3·86 (2·09–7·13)	1·51 (0·78–2·92)	66 (61%)	1·21 (0·75–1·97)	0·75 (0·44–1·27)
Chest infection	34 (54%)	3·57 (1·96–6·48)	1·40 (0·73–2·66)	45 (71%)	1·93 (1·04–3·58)	1·07 (0·55–2·09)
Dyspnoea	52 (48%)	2·83 (1·71–4·68)	1·22 (0·70–2·12)	44 (75%)	2·26 (1·18–4·35)	1·25 (0·62–2·50)
Back pain	62 (58%)	4·19 (2·52–6·97)	3·19 (1·82–5·59)	76 (71%)	1·89 (1·14–3·14)	1·97 (1·13–3·43)
Chest pain	50 (60%)	4·61 (2·66–8·00)	2·12 (1·16–3·86)	66 (80%)	2·99 (1·63–5·49)	1·96 (1·03–3·75)
Neck lump	52 (80%)	12·17 (6·09–24·35)	5·62 (2·61–12·13)	63 (97%)	24·30 (5·77–102·28)	16·46 (3·76–72·10)
Joint Wald test	-	p<0·0010	p<0·0010	-	p<0·0010	p<0·0010

CIBH: change in bowel habit; LUTS: lower urinary tract symptoms; PMB: post-menopausal bleeding
[1] adjusted for symptoms
[2] adjusted for symptoms, sex, age group, ethnicity, IMD quintile, cancer diagnosis

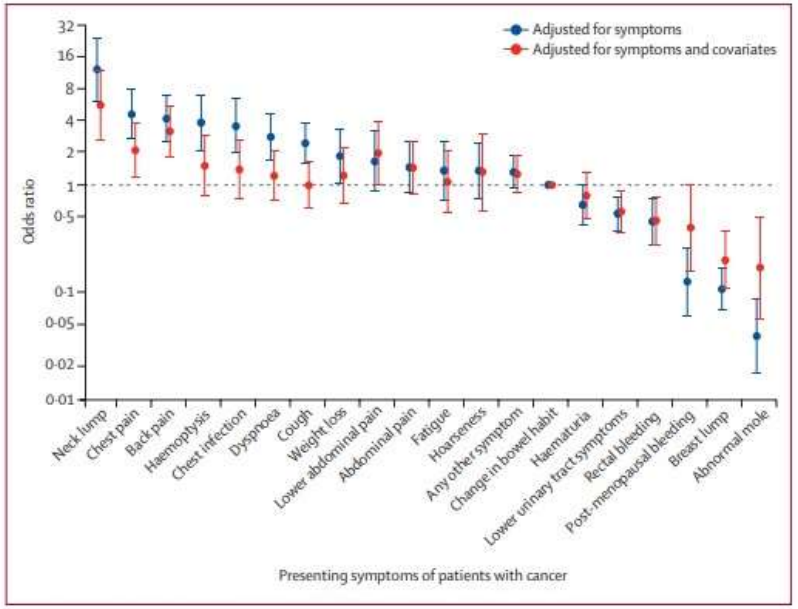

Figure 3: **Odds ratios of stage IV disease by presenting symptoms seen alone**
Odds ratios of stage IV disease by symptom without adjustment (blue); and with adjustment for sex, age group, ethnicity, IMD quintile, and cancer diagnosis (red). Data shown for 7997 patients with one of 12 cancers. Error bars represent 95% CIs; the dashed line represents the value of the reference group (patients with change in bowel habit). For odds ratios of symptoms when reported with other symptoms, see appendix p 9.

doi:10.1016/S1470-2045(19)30595-9

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Prostate cancer diagnostic pathway

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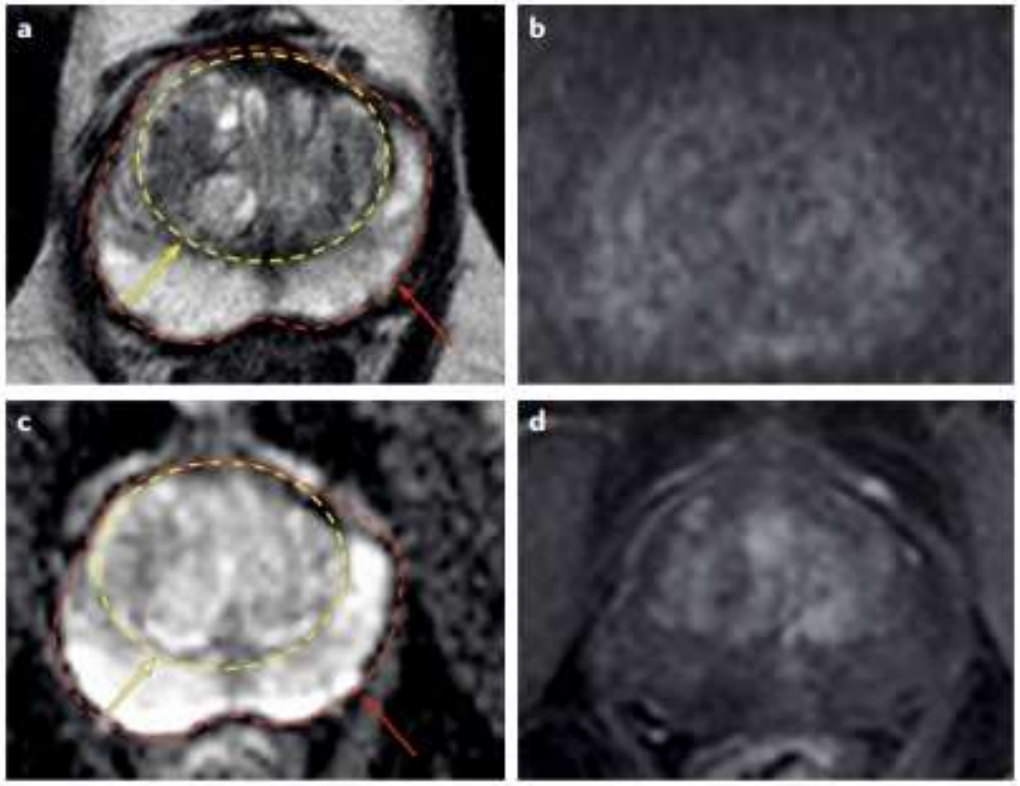
Diagnostic pathway



doi:10.1038/s41585-019-0212-4

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Diagnostic pathway

Diagnostic accuracy of multi-parametric MRI and TRUS biopsy in prostate cancer (PROMIS): a paired validating confirmatory study

Hashim U Ahmed, Ahmed El-Shater Bosaily*, Louise C Brown*, Rhian Gabe, Richard Kaplan, Mahesh K Parmar, Yolanda Collaco-Moraes, Katie Ward, Richard G Hindley, Alex Freeman, Alex P Kirkham, Robert Oldroyd, Chris Parker, Mark Emberton, and the PROMIS study group†*

doi:10.1016/S0140-6736(16)32401-1

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Diagnostic pathway

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 MAY 10, 2018 VOL. 378 NO. 19

MRI-Targeted or Standard Biopsy for Prostate-Cancer Diagnosis

V. Kasivisvanathan, A.S. Rannikko, M. Borghi, V. Panebianco, L.A. Mynderse, M.H. Vaarala, A. Briganti, L. Budäus, G. Hellawell, R.G. Hindley, M.J. Roobol, S. Eggener, M. Ghei, A. Villers, F. Bladou, G.M. Villeirs, J. Virdi, S. Boxler, G. Robert, P.B. Singh, W. Venderink, B.A. Hadaschik, A. Ruffion, J.C. Hu, D. Margolis, S. Crouzet, L. Klotz, S.S. Taneja, P. Pinto, I. Gill, C. Allen, F. Giganti, A. Freeman, S. Morris, S. Punwani, N.R. Williams, C. Brew-Graves, J. Deeks, Y. Takwoingi, M. Emberton, and C.M. Moore, for the PRECISION Study Group Collaborators*

doi: 10.1056/NEJMoa1801993

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Diagnostic pathway

Cochrane Library

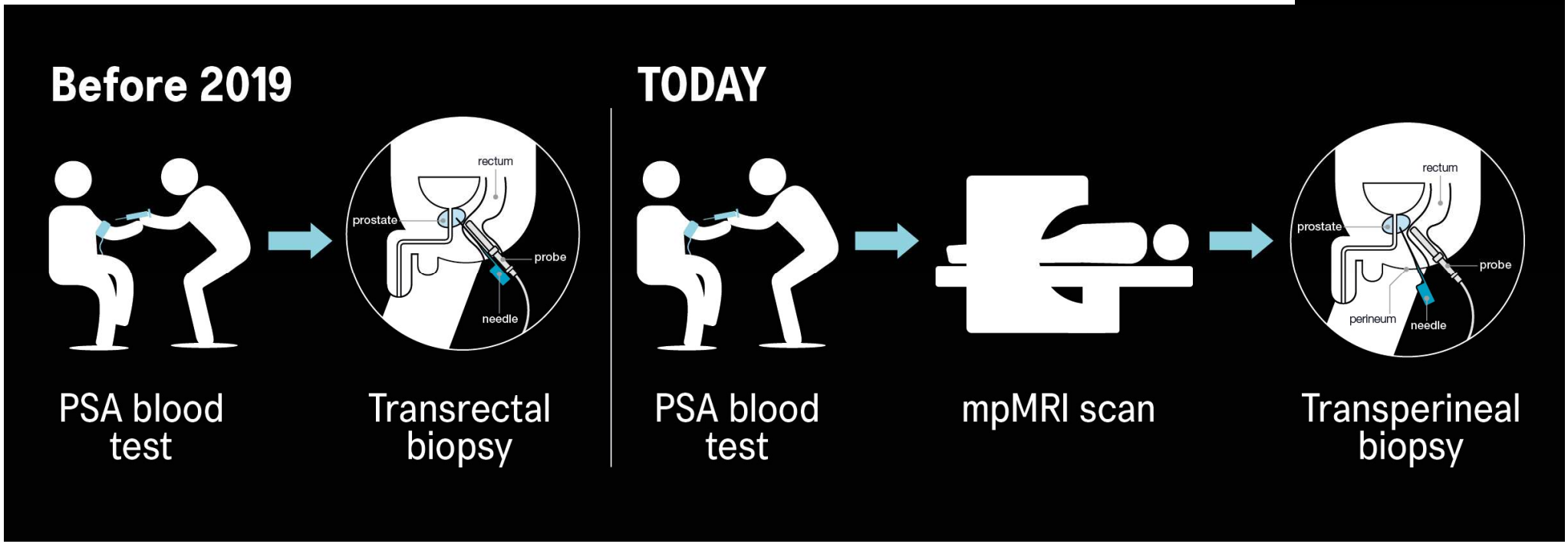
Cochrane Database of Systematic Reviews

Prostate MRI, with or without MRI-targeted biopsy, and systematic biopsy for detecting prostate cancer (Review)

Drost FJH, Osses DF, Nieboer D, Steyerberg EW, Bangma CH, Roobol MJ, Schoots IG

doi:10.1002/14651858.CD012663.pub2

Diagnostic pathway



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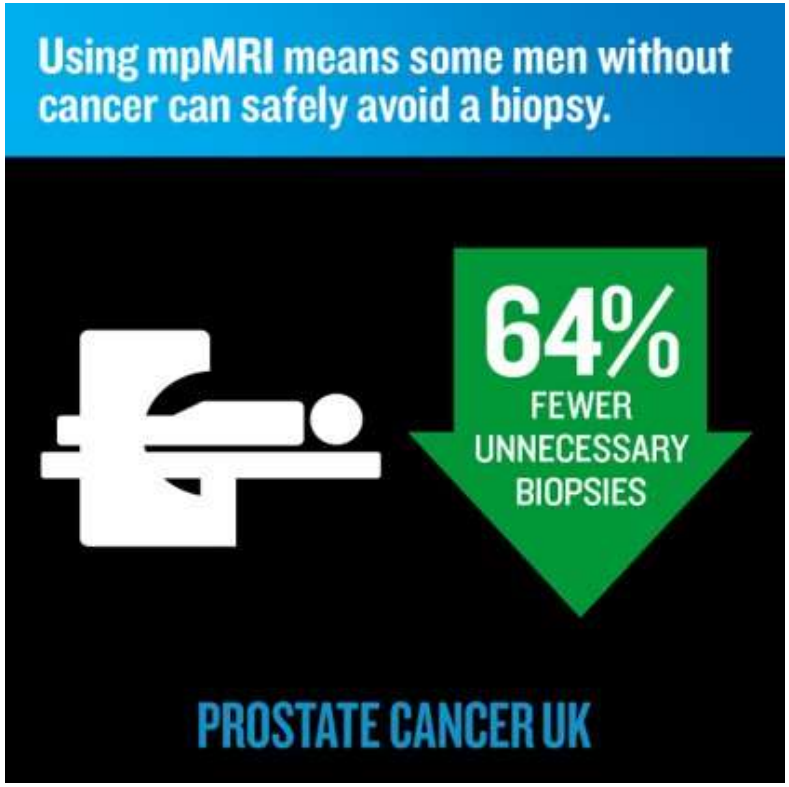
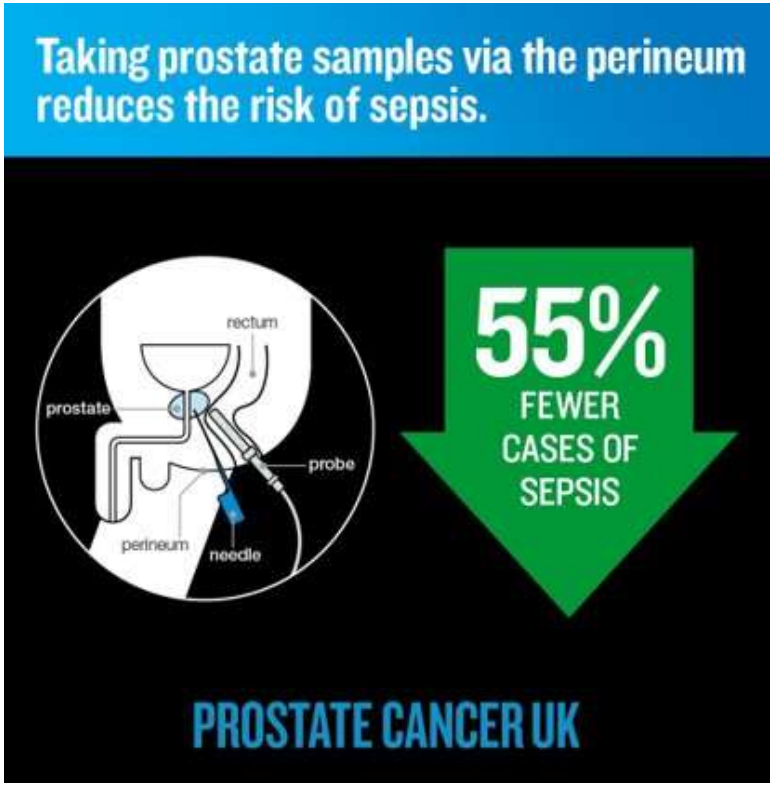
Diagnostic pathway





doi:10.1200/JCO.2023.41.6_suppl.43

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Prostate cancer screening trials

Screening trials

Research

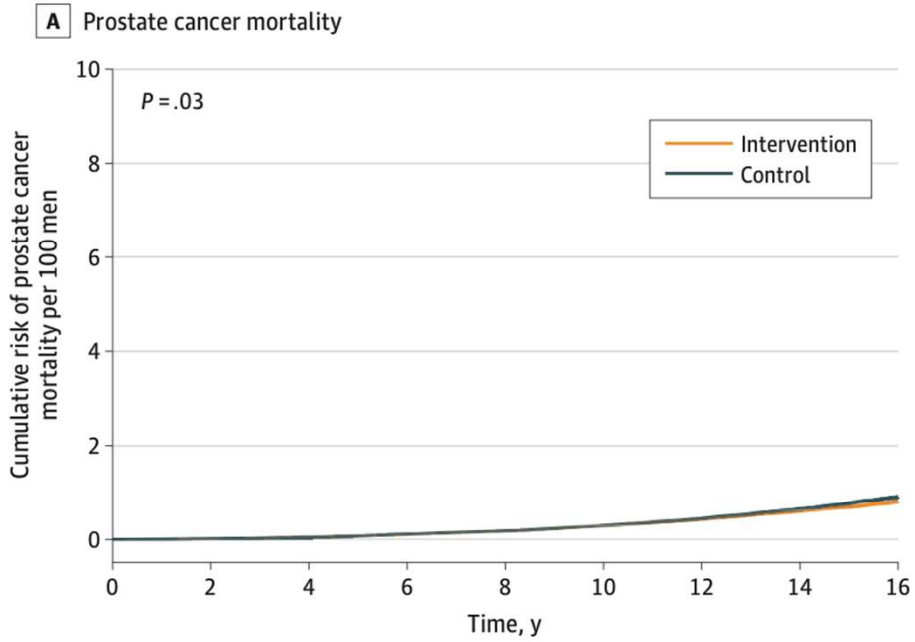
JAMA | Original Investigation

Prostate-Specific Antigen Screening and 15-Year Prostate Cancer Mortality
A Secondary Analysis of the CAP Randomized Clinical Trial

Richard M. Martin, BM, BS, PhD; Emma L. Turner, PhD; Grace J. Young, MSc; Chris Metcalfe, PhD; Eleanor I. Walsh, MSc; J. Athene Lane, PhD; Jonathan A. C. Sterne, PhD; Sian Noble, PhD; Peter Holding, MSc; Yoav Ben-Shlomo, MBBS, PhD; Naomi J. Williams, PhD; Nora Pashayan, MD, PhD; Mai Ngoc Bui, PhD; Peter C. Albertsen, MD; Tyler M. Seibert, MD, PhD; Anthony L. Zietman, MD; Jon Oxley, MD; Jan Adolfsson, MD; Malcolm D. Mason, MD; George Davey Smith, DSc; David E. Neal, MD; Freddie C. Hamdy, MD; Jenny L. Donovan, PhD; for the CAP Trial Group

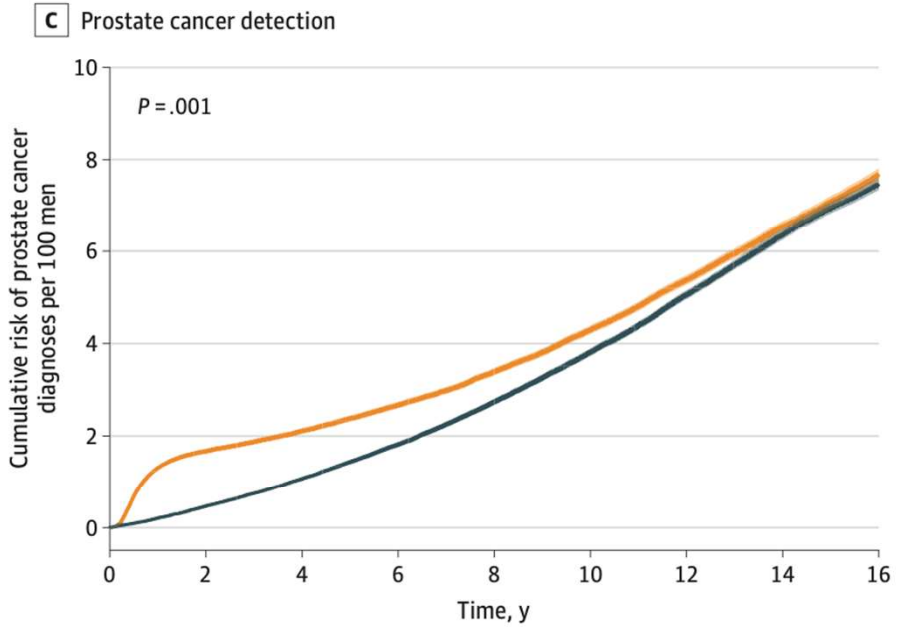
doi:10.1001/jama.2024.4011

Screening trials



No. at risk

Intervention	189 326	177 962	164 154	146 469	51 975
Control	219 395	206 205	189 599	166 375	40 988



No. at risk

Intervention	189 326	174 289	158 876	139 138	48 427
Control	219 395	204 203	184 887	158 863	38 396

doi:10.1001/jama.2024.4011

Screening trials

EUROPEAN UROLOGY 84 (2023) 426–434

available at www.sciencedirect.com
journal homepage: www.europeanurology.com

European Association of Urology

Prostate Cancer – Editor's Choice

A Detailed Evaluation of the Effect of Prostate-specific Antigen–based Screening on Morbidity and Mortality of Prostate Cancer: 21-year Follow-up Results of the Rotterdam Section of the European Randomised Study of Screening for Prostate Cancer

Ivo I. de Vos [†,*], *Annick Meertens* [†], *Renée Hogenhout, Sebastiaan Remmers, Monique J. Roobol, on behalf of the ERSPC Rotterdam Study Group*

Erasmus MC Cancer Institute, University Medical Center Rotterdam, Rotterdam, The Netherlands

doi:10.1016/j.eururo.2023.03.016

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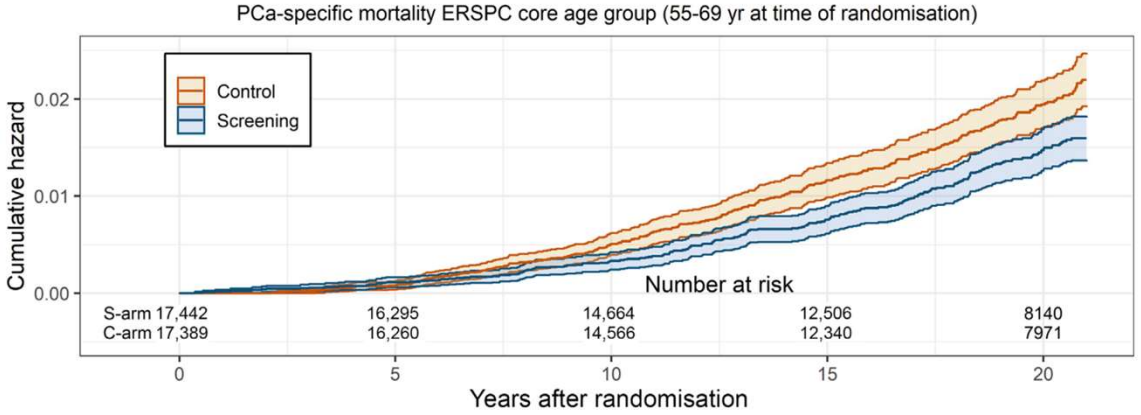
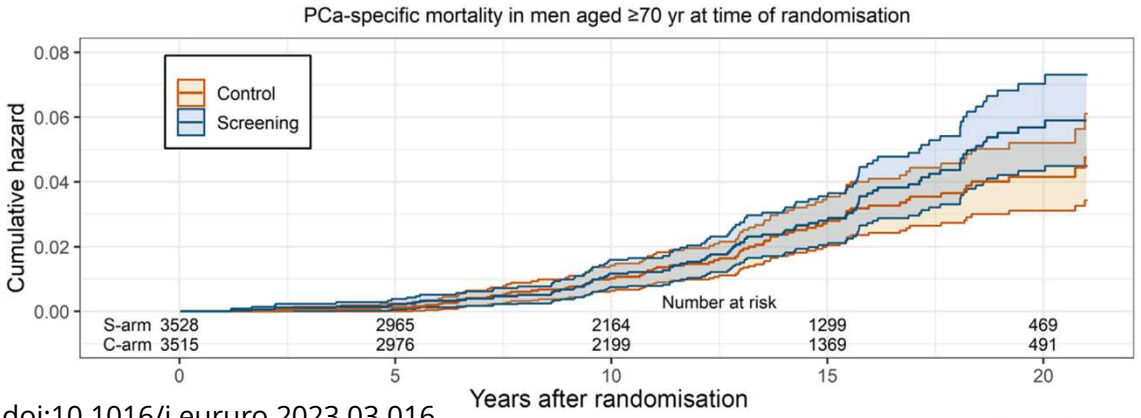
Screening trials





doi:10.1016/j.eururo.2023.03.016

Screening trials

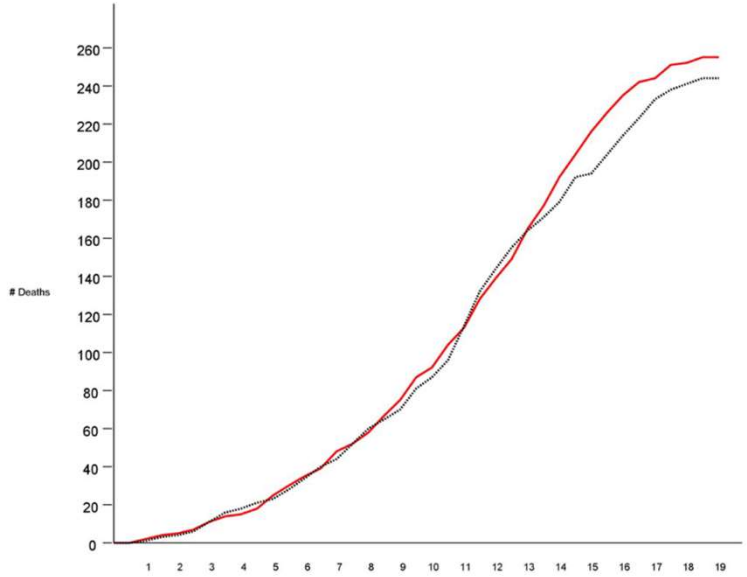
Original Article

Extended Mortality Results for Prostate Cancer Screening in the PLCO Trial With Median Follow-Up of 15 Years

Paul F. Pinsky, PhD[1]; Philip C. Prorok, PhD[1]; Kelly Yu, PhD[2]; Barnett S. Kramer, MD, MPH[1]; Amanda Black, PhD[2]; John K. Gohagan, PhD[3]; E. David Crawford, MD[4]; Robert L. Grubb, MD[5]; and Gerald L. Andriole, MD[5]

https://doi.org/10.1002/cncr.30474

Screening trials



Intervention Arm										
# at Risk	38340	37715	36877	35868	34664	33220	30800	22865	12805	2631
Control Arm										
# at Risk	38343	37710	36833	35765	34549	33092	30493	22496	12453	2468

https://doi.org/10.1002/cncr.30474

Screening trials

Research

JAMA Oncology | Original Investigation

Magnetic Resonance Imaging in Prostate Cancer Screening
A Systematic Review and Meta-Analysis

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Screening trials

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European Association of Urology

Platinum Priority – Prostate Cancer
Editorial by Ian M. Thompson Jr. on pp. 101–102 of this issue

Prostate Cancers in the Prostate-specific Antigen Interval of 1.8–3 ng/ml: Results from the Göteborg-2 Prostate Cancer Screening Trial

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Screening trials

Table 2 – Results for MRI scans and prostate biopsies

Variables	PSA 1.8–<3.0	PSA 3–<10
Men, *n*	670	377
PI-RADS, *n* (%)		
≤2	479 (72)	245 (65)
3	52 (7.8)	26 (6.9)
4	101 (15)	64 (17)
5	7 (1.0)	20 (5.3)
No MRI	31 (4.6)	22 (5.8)
PI-RADS ≥3, *n* (%)	160 (24)	110 (29)
Biopsy procedures, *n* (%)	156 (23)	109 (29)
Referred to biopsy but not performed, *n* (%)	4 (0.60)	1 (0.27)
Biopsy outcome, *n* (%)		
Benign	92 (14)	48 (13)
Gleason 3 + 3	33 (4.9)	26 (6.9)
Gleason 3 + 4	24 (3.6)	25 (6.6)
Gleason 3 + 5	0	2 (0.53)
Gleason 4 + 3	4 (0.60)	2 (0.53)
Gleason 4 + 4	0	2 (0.53)
Gleason 4 + 5	3 (0.44)	2 (0.53)
Gleason 5 + 4	0	2 (0.53)
Insignificant cancer = Gleason 6, *n* (%)	33 (4.9)	26 (6.9)
Significant cancer = Gleason ≥7, *n* (%)	31 (4.6)	35 (9.3)

MRI = magnetic resonance imaging; PI-RADS = Prostate Imaging Reporting and Data System; PSA = prostate-specific antigen.

doi:10.1016/j.eururo.2024.01.017

Screening trials

Open access Original research

BMJ Oncology

Prevalence of MRI lesions in men responding to a GP-led invitation for a prostate health check: a prospective cohort study

Caroline M Moore ,[1,2] Elena Frangou,[3] Neil McCartan,[1,4] Aida Santaolalla,[5] Douglas Kopcke,[6,7] Giorgio Brembilla,[6] Joanna Hadley,[2,6] Francesco Giganti,[1,7] Teresa Marsden,[1,2] Mieke Van Hemelrijck,[5] Fiona Gong,[6] Alex Freeman,[8] Aiman Haider,[8] Steve Tuck,[9] Nora Pashayan,[10] Thomas Callender,[11] Saran Green,[5] Louise C Brown,[3] Shonit Punwani,[6,7] Mark Emberton,[2,12] on behalf of the Re-Imagine Study group

doi:10.1136/bmjonc-2023-000057

Screening trials

ReIMAGINE – Clinically significant PCa (Gleason≥3+4=7)

	MRI +ve	MRI -ve	
PSA<3ng/mL	14 (56%)	0 (0%)	14
PSA≥3ng/mL	11 (44%)	4 (100%)	15
	25	4	29

Screening trials

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European Association of Urology

An Evaluation of Screening Pathways Using a Combination of Magnetic Resonance Imaging and Prostate-specific Antigen: Results from the IP1-PROSTAGRAM Study

David Eldred-Evans[a,b], *Henry Tam*[c], *Heminder Sokhi*[d,e], *Anwar R. Padhani*[e], *Martin Connor*[a,b], *Derek Price*[f], *Martin Gammon*[g], *Natalia Klimowska-Nassar*[h,i], *Paula Burak*[h,i], *Emily Day*[h,i], *Mathias Winkler*[a,b], *Francesca Fiorentino*[h,i], *Hashim U. Ahmed*[a,b,*]

doi:10.1016/j.euo.2023.03.009

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PROSTATE CANCER UK

TRANSFORM

TRANSFORM

1

Stage 1 (3 years)

- Pilot 4 screening interventions
- Evaluate how to deliver pivotal trial assessing key processes and assumptions
- Short-term outcomes
- Develop bio-digital twin protocols

2

Stage 2 (6 years)

- Main trial of optimal intervention
- Medium-term clinical outcomes
- PROMS: quality of life.
- Costs and resources
- Create bio-digital twin

3

Stage 3 (10 years)

- Evaluate long-term primary outcomes through linkage to national databases

TRANSFORM

- Men aged 50 to 75 years
- Men aged 45 to 50 with Black ethnicity
- No previous prostate cancer
- No recent PSA test, prostate MRI, prostate biomarker test or prostate biopsy

TRANSFORM

Primary test	Group	Referral criteria
PSA	PHC 1	PSA ≥ 3ng/ml → MRI
	PHC 2	PSA ≥ 1ng/ml → MRI
MRI	PHC 3	MRI in all. Blood samples for PSA density
PRS	PHC 4	PRS 10-year AR ≥ 3.5 → MRI. Saliva for PRS. Bloods for PSA density.

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Thank you