30 jaar onderzoek naar de effecten van vroege opsporing prostaatkanker

Prof. Dr. Monique J. Roobol

Erasmus University Medical Center, Cancer Institute

Rotterdam, The Netherlands

PubMed.gov

prostate cancer screening

Search

Advanced Create alert Create RSS User Guide

Save Email Send to Sorted by: Most recent Display options

MY NCBI FILTERS

63,320 results

The NEW ENGLAND JOURNAL of MEDICINE

Before we start…

The founders of ERSPC

Fritz Schröder

Louis Denis † 2021

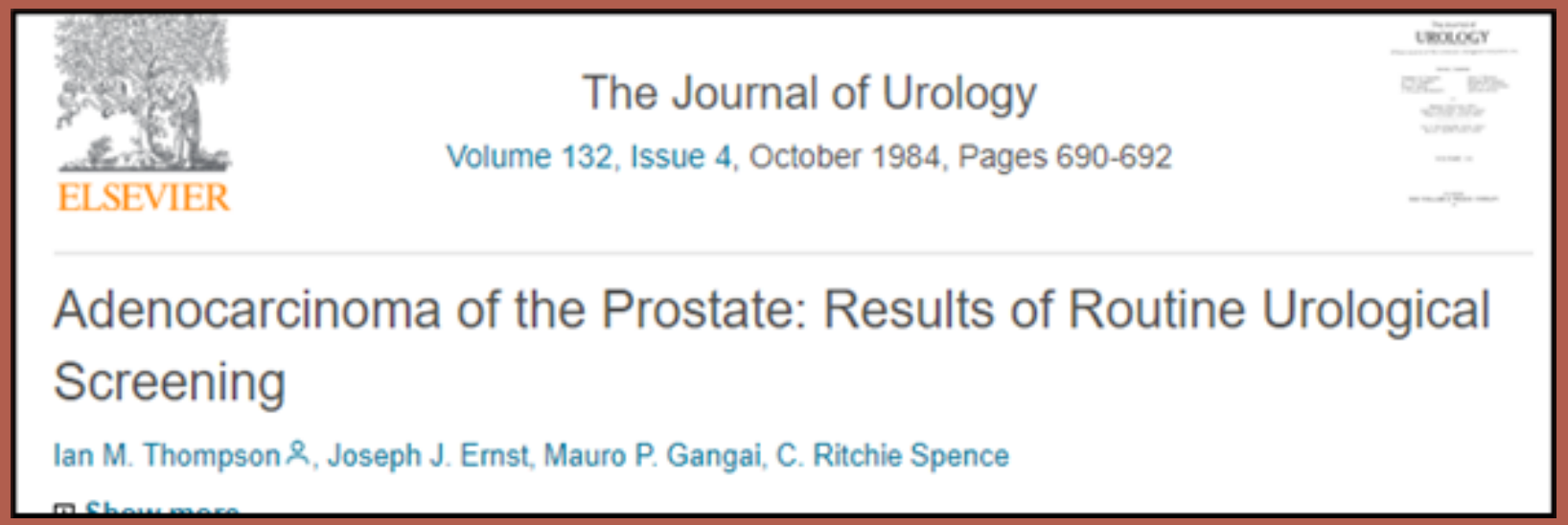
ERSPC
European Randomized Study of Screening for Prostate Cancer

Overview

- **What triggered us to consider screening for PCa?**
- The trials in the 90s
- The results: Benefit!!! Harm……
- How do we balance it?
- The future

Beyond cure…

- 1984: With the DRE as the only method of diagnosis, 30-35% of men had bone metastases, and 40-45% had nodal disease



The Journal of Urology
Volume 132, Issue 4, October 1984, Pages 690-692

Adenocarcinoma of the Prostate: Results of Routine Urological Screening

Ian M. Thompson, Joseph J. Ernst, Mauro P. Gangai, C. Ritchie Spence

Show more

The use of adjunctive screening tools for detection of adenocarcinoma of the prostate is suggested.

Then it started

October 8, 1987
N Engl J Med 1987; 317:909-916
DOI: 10.1056/NEJM198710083171501

ORIGINAL ARTICLE ARCHIVE

Prostate-Specific Antigen as a Serum Marker for Adenocarcinoma of the Prostate

Thomas A. Stamey, M.D., Norman Yang, Ph.D., Alan R. Hay, M.D., John E. McNeal, M.D., Fuad S. Freiha, M.D., and Elise Redwine, B.A.

We conclude that PSA is more sensitive than PAP in the detection of prostatic cancer and will probably be more useful in monitoring responses and recurrence after therapy. However, since both PSA and PAP may be elevated in benign prostatic hyperplasia, neither marker is specific. (N Engl J Med 1987; 317:909–16.)

1991, 30 years ago in the NEJM

MEASUREMENT OF PROSTATE-SPECIFIC ANTIGEN IN SERUM AS A SCREENING TEST FOR PROSTATE CANCER

WILLIAM J. CATALONA, M.D., DEBORAH S. SMITH, PH.D., TIMOTHY L. RATLIFF, PH.D., KATHY M. DODDS, R.N., DOUGLAS E. COPLEN, M.D., JERRY J.J. YUAN, M.D., JOHN A. PETROS, M.D., AND GERALD L. ANDRIOLE, M.D.

Table 4. Accuracy of Rectal Examination, Serum PSA Measurement, and Ultrasonography in Detecting Prostate Cancer on First Biopsy in 300 Men in the Comparison Group.

MEASURE*	RECTAL EXAMINATION	ULTRASONOGRAPHY	SERUM PSA†
		percent	
Sensitivity	86	92	79
Specificity	44	27	59
Positive predictive value	33	28	40
Negative predictive value	91	91	89
Overall accuracy	58	43	64

We conclude that serum PSA measurement is a useful addition to rectal examination and ultrasonography in the detection of prostate cancer and that it is the most accurate of the three tests for this purpose. Our results suggest that measurement of serum PSA and rectal examination combined, with the addition of ultrasonography in patients with abnormal findings, will provide a better method of detecting prostate cancer than rectal examination alone.

1990
Visiting Professor W. Catalona

Prof. Catalona visits Erasmus MC Urology headed by Prof. Schroder.

The basis for an European screening trial

1991 in Rotterdam

TABLE 1 Characteristics of the screening protocols 1–10

Protocol number	Period	Recruitment rate (%)	Men (N)	Biopsy indication used
1	10/91–01/93	35.6	1 186	DRE and/or TRUS abnormal with lesion ≥8 mm. PSA in all men.
2	01/93–03/93	36.5	256	DRE and/or TRUS abnormal with lesion ≥8 mm or PSA ≥ 20.0 ng/mL.
3	03/93–05/93	42.4	297	DRE and/or TRUS abnormal with lesion ≥8 mm or PSA ≥ 20.0 ng/mL.
4	05/93–11/93	42.4	679	DRE and/or TRUS abnormal or PSA ≥ 4.0 ng/mL.
5	12/93–05/94	40.6	450	DRE and/or TRUS abnormal or PSA ≥ 4.0 ng/mL.
6	06/94–11/95	43.4	8 642	DRE and/or TRUS abnormal or PSA ≥ 4.0 ng/mL.
7	11/95–01/96 03/96–10/96	53.9	4 147	DRE and/or TRUS abnormal or PSA ≥ 4.0 ng/mL. No screening if PSA < 1.0 ng/mL.
8	01/96–03/96	52.8	1 404	DRE and/or TRUS abnormal or PSA ≥ 4.0 ng/mL. No screening if PSA < 1.0 ng/mL.
9	10/96–04/97	50.7	6 000	DRE and/or TRUS abnormal or PSA ≥ 4.0 ng/mL. No screening if PSA < 1.0 ng/mL
10	05/97–12/99	48.0	21 733	PSA ≥ 3.0 ng/mL. No screening if PSA < 3.0 ng/mL.
Total	Protocol 5–10		42 376	

BJUI 2003

Overview

- What triggered us to consider screening for PCa?
- **The trials in the 90s**
- The results: Benefit!!! Harm……
- How do we balance it?
- The future

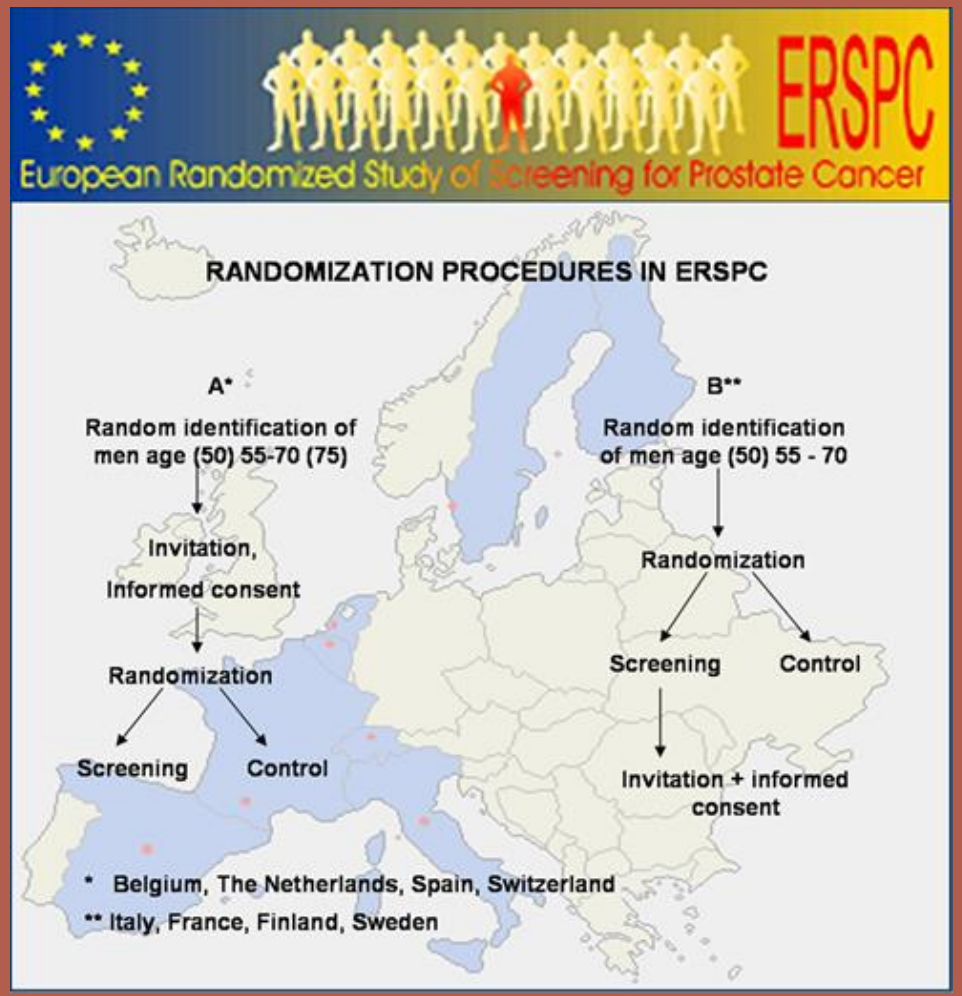
Screening trials initiated in the 90s

Study	Setting, country	Enrolment criteria	Study conducted	No of men randomised (intervention/control)	Screening method	Screening frequency	Primary outcomes	Secondary outcomes
ERSPC (core)[31]	RCT, multicentre, 9 European countries	Men aged 55-69 years	1993-2003, 13 year follow-up	72 891/89 352	PSA ± DRE. If PSA ≥3 ng/mL standardised prostate biopsy	Screening every 2-4 years	Prostate cancer-specific mortality	All-cause mortality, prostate cancer incidence, clinical stage, quality of life, harms
Labrie (Quebec)[33]	RCT, Quebec, Canada	Men aged 45-80 years	1988-1999, 11 year follow-up	31 133/15 353	PSA ± DRE. If PSA ≥3 ng/mL standardised prostate biopsy	Annual screening	Prostate cancer-specific mortality	Prostate cancer incidence, clinical stage
Lundgren (Stockholm)[23]	RCT, Stockholm, Sweden	Men aged 55-70 years	1988-2003, 20 year follow-up	2400/25 081	PSA, DRE, TRUS. Biopsy depended on DRE and TRUS findings, PSA >10 ng/mL	One-time screening	Prostate cancer-specific mortality	All-cause mortality, prostate cancer incidence
PLCO[32]	RCT, multicentre, US	Men aged 55-74 years	1993-2001, 15 year follow-up	38 340/38 343	PSA, DRE	Annual screening	Prostate cancer-specific mortality	All-cause mortality, prostate cancer incidence, clinical stage, Gleason grade, harms

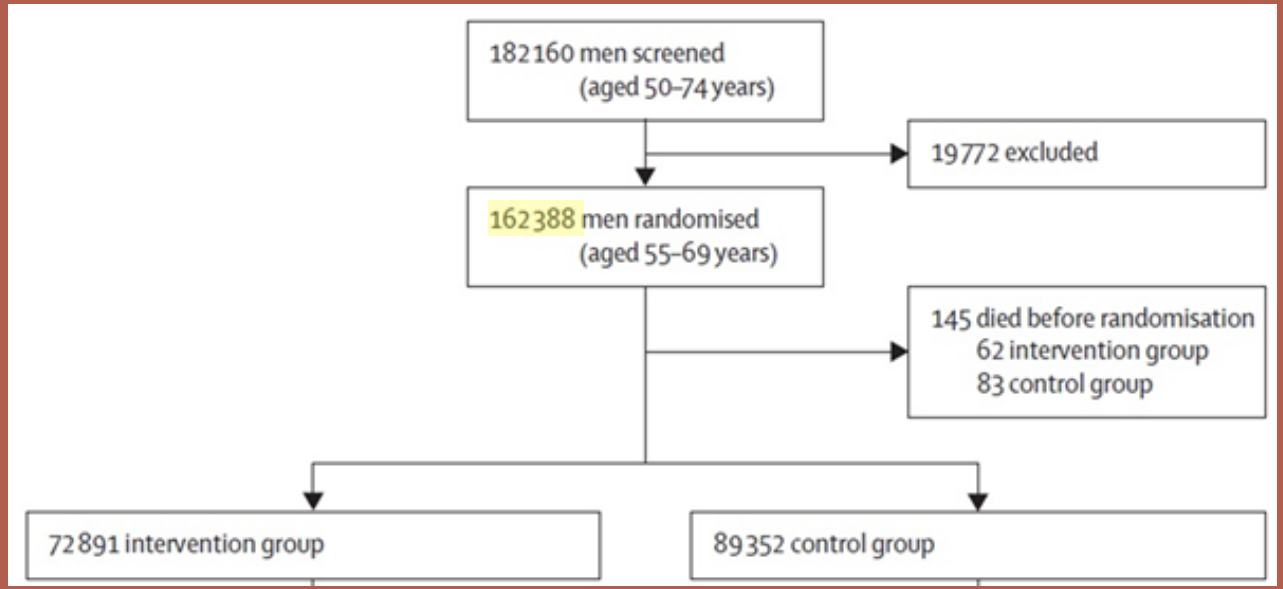
RCT=randomised controlled trial. PSA=prostate-specific antigen. DRE=digital rectal examination. TRUS=transrectal ultrasound.

To assess the effect of PSA based screening on prostate cancer-specific mortality more than 300,000 men were included in studies

ERSPC

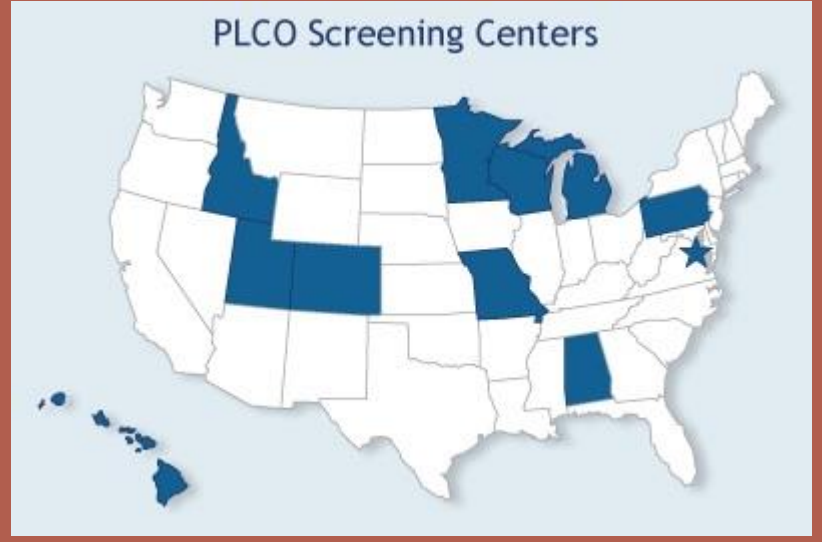


Started in 1993 In 8 European countries
www.erspc.org



- Screening interval: 4 years in 87%, 2 years in 13% (Sweden)
- Biopsy indication (sextant lateral): PSA >= 3.0 ng/ml
- Standardized causes of death evaluation
- Quality control by independent committees (e.g. pathology, PSA)

PLCO



- From 1993 through 2001, **76,693** men were randomly assigned at 10 U.S. study centers
- They received either annual screening (38,343 men) or usual care as the control group (38,350 men)
- Men in the screening group were offered annual PSA testing for 6 years and digital rectal examination for 4 years.
- Diagnostic evaluation was decided by the patients and their primary physicians.

Overview

- What triggered us to consider screening for PCa?
- The trials in the 90s
- **The results: Benefit!!! Harm……**
- How do we balance it?
- The future

Meeting archive

- Copenhagen 12 March, 2018
- Rotterdam 26-27 October 2017
- London 23 March, 2017
- Rotterdam 10 November, 2016
- Munich 10-11 March, 2016
- Schiphol Amsterdam 5 November, 2015
- Madrid 19-20 March, 2015
- Schiphol Amsterdam 23 October, 2014
- Antwerp March 27-28, 2014
- Lille 7-8 November, 2013
- Marstrand 11-12 April, 2013
- Ripley, Harrogate 7-9 November, 2012
- Ylläsjärvi 29-30 March, 2012
- Toulouse 3-4 November, 2010
- Zuoz 2-3 March, 2010
- Nyon 13-14 October, 2009
- Gothenburg 16-17 April, 2009
- Seili 22-24 October, 2008
- Toledo 15-16 March, 2007

25 JAAR

Prostaatkankerstichting

Results..... Debate, debate and debate....

The NEW ENGLAND JOURNAL of MEDICINE 2009

ORIGINAL ARTICLE

Screening and Prostate-Cancer Mortality in a Randomized European Study

Fritz H. Schröder, M.D., Jonas Hugosson, M.D., Monique J. Roobol, Ph.D., Teuvo L.J. Tammela, M.D., Stefano Ciatto, M.D., Vera Nelen, M.D., Maciej Kwiatkowski, M.D., Marcos Lujan, M.D., Hans Lilja, M.D., Marco Zappa, Ph.D., Louis J. Denis, M.D., Franz Recker, M.D., Antonio Berenguer, M.D., Liisa Määttänen, Ph.D., Chris H. Bangma, M.D., Gunnar Aus, M.D., Arnauld Villers, M.D., Xavier Rebillard, M.D., Theodorus van der Kwast, M.D., Bert G. Blijenberg, Ph.D., Sue M. Moss, Ph.D., Harry J. de Koning, M.D., and Anssi Auvinen, M.D., for the ERSPC Investigators*

ERSPC:

- Rate ratio for death from prostate cancer in the screening group, as compared with the control group, was 0.80 (95% CI: 0.65 to 0.98)
- Reduction in M+ advanced disease 30-40% (Eur Urol 2012)

And clarity

Reevaluating PSA Testing Rates in the PLCO Trial

TO THE EDITOR: In March, the Centers for Medicare and Medicaid Services temporarily suspended the development of a proposed "Non-Recommended Prostate-Specific Antigen (PSA)–Based and why the test was performed. Categorical responses for when the most recent test was performed were within the past year, 1 to 2 years ago, 2 to 3 years ago, more than 3 years ago, and

Annals of Internal Medicine ORIGINAL RESEARCH

Reconciling the Effects of Screening on Prostate Cancer Mortality in the ERSPC and PLCO Trials

Tsodikov et al. 2017

Conclusion: After differences in implementation and settings are accounted for, the ERSPC and PLCO provide compatible evidence that screening reduces prostate cancer mortality.

Confirmation of results: harm <> benefit


2012

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 MARCH 15, 2012 VOL. 366 NO. 11

Prostate-Cancer Mortality at 11 Years of Follow-up

Fritz H. Schröder, M.D., Jonas Hugosson, M.D., Monique J. Roobol, Ph.D., Teuvo L.J. Tammela, M.D., Stefano Ciatto, M.D., Vera Nelen, M.D., Maciej Kwiatkowski, M.D., Marcos Lujan, M.D., Hans Lilja, M.D., Marco Zappa, Ph.D., Louis J. Denis, M.D., Franz Recker, M.D., Alvaro Páez, M.D., Liisa Määttänen, Ph.D., Chris H. Bangma, M.D., Gunnar Aus, M.D., Sigrid Carlsson, M.D., Arnauld Villers, M.D., Xavier Rebillard, M.D., Theodorus van der Kwast, M.D., Paula M. Kujala, M.D., Bert G. Blijenberg, Ph.D., Ulf-Hakan Stenman, M.D., Andreas Huber, M.D., Kimmo Taari, M.D., Matti Hakama, Ph.D., Sue M. Moss, Ph.D., Harry J. de Koning, M.D., and Anssi Auvinen, M.D., for the ERSPC Investigators*

ERSPC:

- Rate ratio for death from prostate cancer in the screening group, as compared with the control group, was 0.79 (95% CI: 0.68 to 0.91)


2012

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 AUGUST 16, 2012 VOL. 367 NO. 7

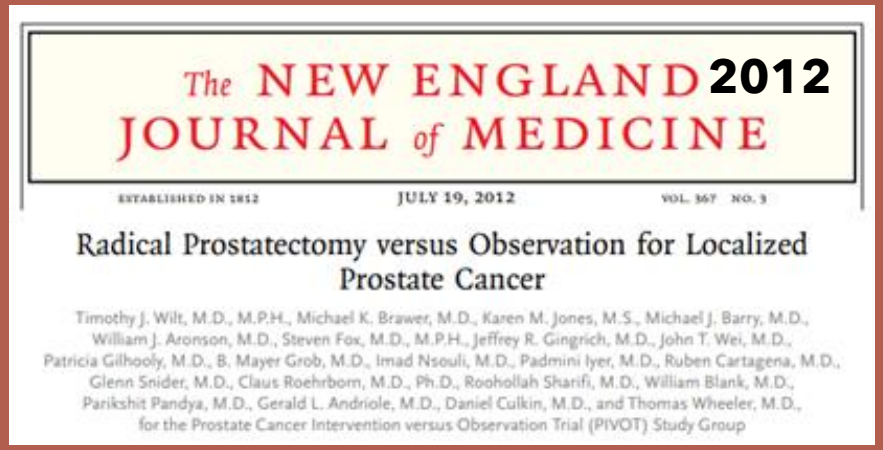
Quality-of-Life Effects of Prostate-Specific Antigen Screening

Eveline A.M. Heijnsdijk, Ph.D., Elisabeth M. Wever, M.Sc., Anssi Auvinen, M.D., Jonas Hugosson, M.D., Stefano Ciatto, M.D.,* Vera Nelen, M.D., Maciej Kwiatkowski, M.D., Arnauld Villers, M.D., Alvaro Páez, M.D., Sue M. Moss, Ph.D., Marco Zappa, M.D., Teuvo L.J. Tammela, M.D., Tuukka Mäkinen, M.D., Sigrid Carlsson, M.D., Ida J. Korfage, Ph.D., Marie-Louise Essink-Bot, Ph.D., Suzie J. Otto, Ph.D., Gerrit Draisma, Ph.D., Chris H. Bangma, M.D., Monique J. Roobol, Ph.D., Fritz H. Schröder, M.D., and Harry J. de Koning, M.D.

Adjusting for harm:

- The benefit of screening was diminished by loss of QALYs owing to postdiagnosis long-term effects **(overdiagnosis and subsequent overtreatment)**

Should we treat all screen-detected PCa?


The NEW ENGLAND JOURNAL of MEDICINE

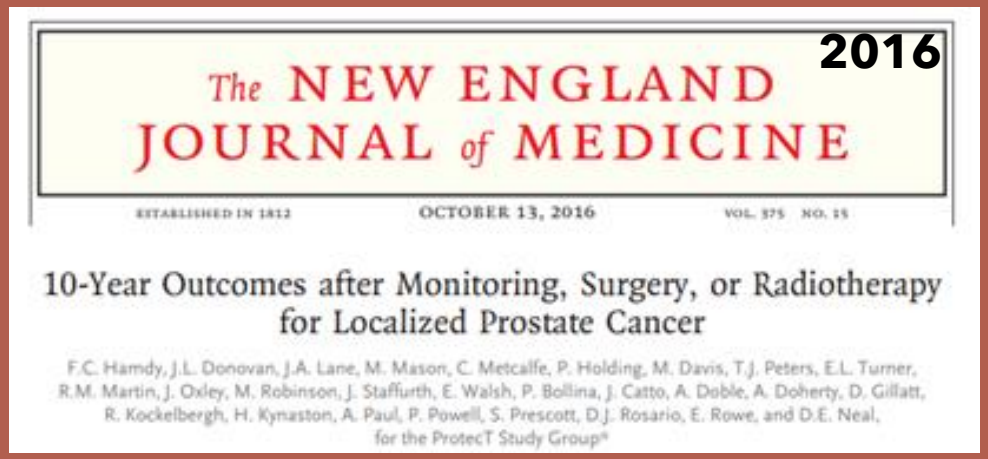
2012

ESTABLISHED IN 1812 JULY 19, 2012 VOL. 367 NO. 3

Radical Prostatectomy versus Observation for Localized Prostate Cancer

Timothy J. Wilt, M.D., M.P.H., Michael K. Brawer, M.D., Karen M. Jones, M.S., Michael J. Barry, M.D., William J. Aronson, M.D., Steven Fox, M.D., M.P.H., Jeffrey R. Gingrich, M.D., John T. Wei, M.D., Patricia Gilhooly, M.D., B. Mayer Grob, M.D., Imad Nsouli, M.D., Padmini Iyer, M.D., Ruben Cartagena, M.D., Glenn Snider, M.D., Claus Roehrborn, M.D., Ph.D., Roohollah Sharifi, M.D., William Blank, M.D., Parikshit Pandya, M.D., Gerald L. Andriole, M.D., Daniel Culkin, M.D., and Thomas Wheeler, M.D., for the Prostate Cancer Intervention versus Observation Trial (PIVOT) Study Group

Among screen detected localized PCa, radical prostatectomy did not significantly reduce all-cause or prostate-cancer mortality, as compared with observation, through at least 12 years of follow-up.


The NEW ENGLAND JOURNAL of MEDICINE

2016

ESTABLISHED IN 1812 OCTOBER 13, 2016 VOL. 375 NO. 15

10-Year Outcomes after Monitoring, Surgery, or Radiotherapy for Localized Prostate Cancer

F.C. Hamdy, J.L. Donovan, J.A. Lane, M. Mason, C. Metcalfe, P. Holding, M. Davis, T.J. Peters, E.L. Turner, R.M. Martin, J. Oxley, M. Robinson, J. Staffurth, E. Walsh, P. Bollina, J. Catto, A. Doble, A. Doherty, D. Gillatt, R. Kockelbergh, H. Kynaston, A. Paul, P. Powell, S. Prescott, D.J. Rosario, E. Rowe, and D.E. Neal, for the ProtecT Study Group*

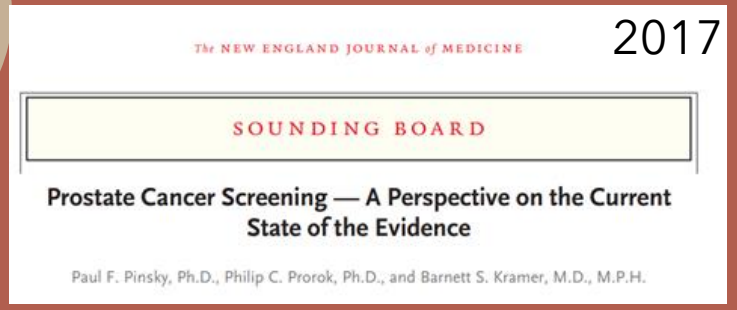
At a median of 10 years, prostate-cancer–specific mortality was low irrespective of the treatment assigned, with no significant difference among treatments.

No, certainly not , **Active Surveillance** is the way to go

Even better:

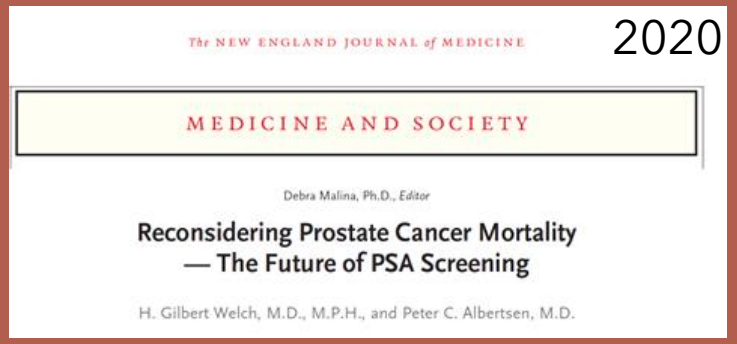
AVOID the diagnosis and stop making men cancer patients

Reflection on what we had learned..



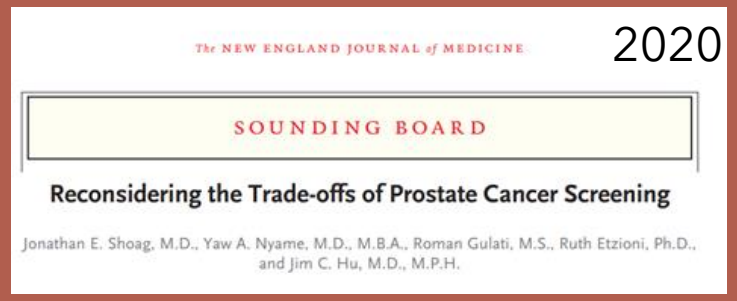
2017

There is a critical need for strategies to reduce the burdens associated with the diagnosis of **indolent disease**, through a combination of **not diagnosing** it in the first place and accurately classifying it as **not needing any further follow-up or treatment**, while still maintaining any mortality benefits for men with aggressive disease. Perhaps that is the **most pressing research challenge** going forward.



2020

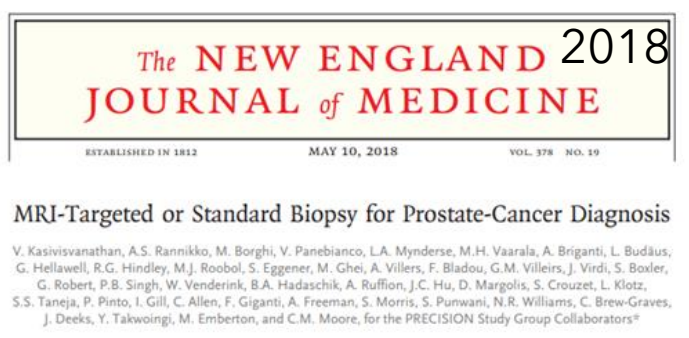
We have learned that the conventional goal of screening – to maximize cancer detection – is wrong. The appropriate goal is more complex: **identify the few cancers that matter**, while not disturbing the rest of the population.



2020

Based on long-term FU and **new developments**: As clinicians who screen, diagnose, and treat patients with prostate cancer and as statisticians who are devoted to understanding the effects of cancer screening, we suggest that the **balance of benefits and harms of screening may be more favorable than is generally appreciated.**

mpMRI in clinical and screening setting


The NEW ENGLAND JOURNAL of MEDICINE

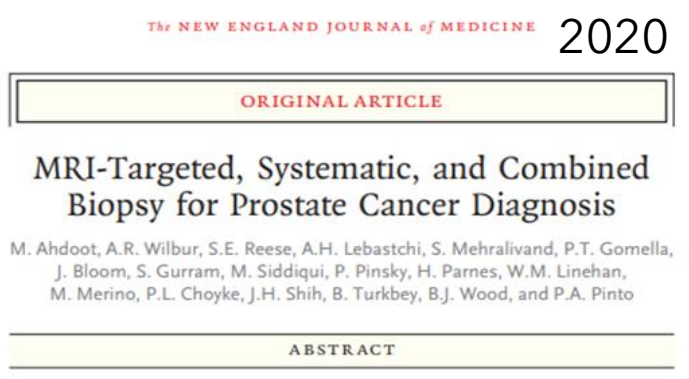
ESTABLISHED IN 1812 MAY 10, 2018 VOL. 378 NO. 19

2018

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*

PRECISION trial: MRI, with or without targeted biopsy, led to **fewer men undergoing biopsy**, more clinically significant cancers being identified, **less overdetection of clinically insignificant cance**r, and fewer biopsy cores being obtained than did standard transrectal ultrasonography–guided biopsy.


The NEW ENGLAND JOURNAL of MEDICINE

2020

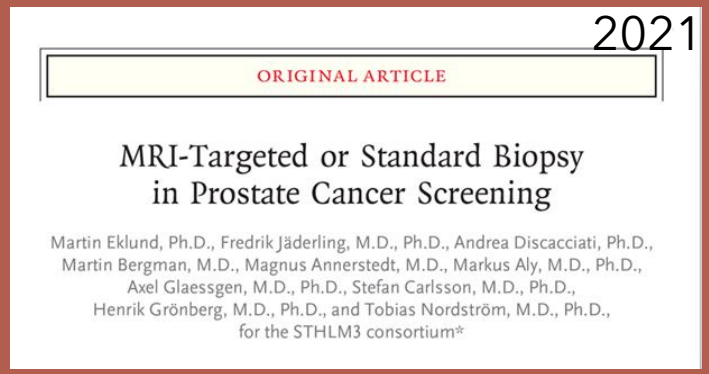
ORIGINAL ARTICLE

MRI-Targeted, Systematic, and Combined Biopsy for Prostate Cancer Diagnosis

M. Ahdoot, A.R. Wilbur, S.E. Reese, A.H. Lebastchi, S. Mehralivand, P.T. Gomella, J. Bloom, S. Gurram, M. Siddiqui, P. Pinsky, H. Parnes, W.M. Linehan, M. Merino, P.L. Choyke, J.H. Shih, B. Turkbey, B.J. Wood, and P.A. Pinto

ABSTRACT

Among patients with MRI-visible lesions, **combined biopsy** led to more detection **of all** prostate cancers. However, MRI-targeted biopsy alone **underestimated** the histologic grade of some tumors.


2021

ORIGINAL ARTICLE

MRI-Targeted or Standard Biopsy in Prostate Cancer Screening

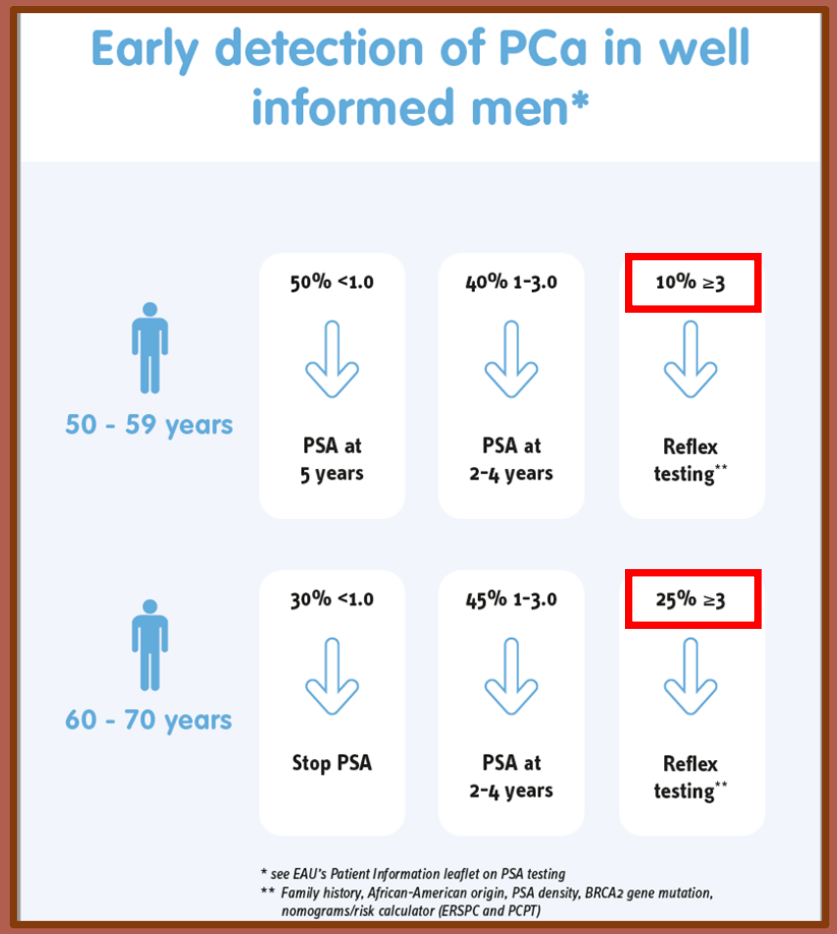
Martin Eklund, Ph.D., Fredrik Jäderling, M.D., Ph.D., Andrea Discacciati, Ph.D., Martin Bergman, M.D., Magnus Annerstedt, M.D., Markus Aly, M.D., Ph.D., Axel Glaessgen, M.D., Ph.D., Stefan Carlsson, M.D., Ph.D., Henrik Grönberg, M.D., Ph.D., and Tobias Nordström, M.D., Ph.D., for the STHLM3 consortium*

STHLM3MRI trial: MRI with **targeted and standard biopsy** in men with MRI results suggestive of prostate cancer was noninferior to standard biopsy for detecting clinically significant prostate cancer in a population-based screening-by-invitation trial and resulted in **less detection of clinically insignificant cancer.**

Overview

- What triggered us to consider screening for PCa?
- The trials in the 90s
- The results: Benefit!!! Harm……
- **How do we balance it?**
- The future

Population based screening



12,750 men enrolled → 1,532 randomized with PSA ≥ 3 ng/ml

STHLM3MRI trial : 12% directly referred for mpMRI

Proportion MRI-negative correlates to disease risk distribution

	STHLM3MRI Main Study n=1,532	Göteborg-2 n=551	Precision n=500	MRI-First n=251	STHLM3MRI Phase 1 n=532
Cohort	Screening	Screening	Clinical	Clinical	Clinical
Age, yrs (median)	66	57	64	64	64
PSA, ng/ml (median)	4.3	3.3	6.7	6.5	6.3
MRI not suggestive of significant cancer	56%	77%	28%	21%	19%

In Europe: 55 Million men aged 55-75 yr, with a PSA cut-off as only risk stratification step:
6.6 Million men eligible for MRI , 60% unnecessary?

Overview

- What triggered us to consider screening for PCa?
- The trials in the 90s
- The results: Benefit!!! Harm……
- How do we balance it?
- **The future**

Trials, trials, trials.

- Prostate cancer screening is a dynamic field of research
- What are we waiting for?

Table 1 - Overview of the ongoing or recently completed trials related to risk-stratified early detection of prostate cancer

Trial Name Trial number *Country* *Principal Investigator*	Design	Study period	N	Age at inclusion (yrs.)	Methods for risk adaption per arm	Biopsy indication	Primary endpoint
PROBASE [1, 2] ISRCTN37591328 *Germany* *Peter Albers*	RCT, Multicenter	2013-2028	46.000 *(target)*	a. 45 b. 50	a. PSA at 45 yrs.* b. PSA at 50 yrs.* *mpMRI if PSA ≥3	a/b. PSA ≥3* *SBx and TBx if mpMRI is positive	Incidence of metastatic PCa after 15 yrs.
Göteborg prostate cancer screening 2 (G2) trial [1, 3] ISRCTN94604465 *Sweden* *Jonas Hugosson*	RCT, Single center	2015-2040	40.000 *(target)*	50-60	a. PSA + mpMRI if PSA ≥3 b. PSA + mpMRI if PSA ≥3 c. PSA + mpMRI if PSA ≥1.8	a. PSA ≥3 (SBx + TBx*) b. PSA ≥3 (TBx only*) c. PSA ≥ 1,8 (TBx*) *If mpMRI is positive (PI-RADSv2 3-5)	PCa detection rate and overdiagnosis (small insignificant PCa).
STHLM3-MR 2 [4-6] NCT03377881 *Sweden* *Tobias Nordström*	RCT, Multicenter	2018-2020 *(completed)*	12.750 *(actual)*	50-74	a. PSA + STHLM3 test + bpMRI if PSA ≥3 b. PSA + STHLM3 test + bpMRI if PSA ≥1.5 and S3M >11%	a. PSA ≥3 b. STHLM3 test ≥11% and PSA ≥1.5 *SBx and/or TBx according to positive bpMRI (PI-RADSv2 3-5) and STHLM3	Detection rate of csPCa (GS ≥7).
PROSCREEN [4, 7] NCT03423303 *Finland* *Aessi Auvinen*	RCT	2018-2028	67.000 *(target)*	50-63	a. PSA + 4Kscore when PSA ≥3 + mpMRI when increased risk b. No screening	a. PSA ≥3 and abnormal 4Kscore and positive mpMRI	PCSM after 10 yrs.
PROSTAGRAM [1, 8] ISRCTN43502108 *United Kingdom* *David Eldred-Evans*	Observational, prospective, multicenter	2018-2019 *(completed)*	408 *(actual)*	50-69	a. PSA + TRUS + bpMRI	a. Any positive test result* *PSA ≥3, bpMRI/TRUS ≥PI-RADS 3-5 or 4-5	Proportion positive MRI and TRUS.
Nanjing [4, 9] NCT04322045 *China* *Jingyan Shi*	Interventional (Clinical Trial), single group	2020-2022	10.000 *(target)*	≥50	a. PSA + mpMRI if PSA ≥ 4	a. Positive mpMRI (PI-RADSv2 3-5)	Incidence of PCa.
MVP (MRI vs PSA) [4] NCT02799303 *Canada (Toronto)* *Robert Nam*	RCT	2016-2020	1010 *(target)*	≥50	a. mpMRI b. PSA	a. positive mpMRI b. PSA ≥4	csPCa (GS ≥ 7 on TRUS biopsy).
ReIMAGINE [4, 10] NCT04063566 *United Kingdom* *Caroline Moore*	Interventional (Clinical Trial), single group	2019-2022	300 *(target)*	50-75	a. PSA + mpMRI	a. positive mpMRI or PSA-density ≥0.12	1. Acceptance rate of invitation for screening. 2. Prevalence of positive MRI. 3. Prevalence of PCa.
VISIONING1 [4] NCT03749993 Switzerland Cyrill Rentsch	Interventional (Clinical Trial), single group	2019-2023	500 *(target)*	46-75	a. bpMRI + PSA	a. positive bpMRI (PI-RADS 3-5) (TBx ± SBx*) *SBx if PSA >10 or suspicious DRE	Total costs of MRI based PCa screening.
PROFILE study [4, 11] NCT02543905 *United Kingdom* *Rosalind A Eeles*	Observational, prospective	2015-2025	700 *(target)*	40-69 (at higher genetic risk)	a. PSA + mpMRI	a. all participants	Association of genetic profiles and biomarkers to predict PCa.
BARCODE – 1 Study [4] NCT03857477 *United Kingdom* *Rosalind A Eeles*	Observational, prospective, Multicenter	2019-2027	5000 *(target)*	55-69	a. SNP profile + mpMRI to men within the top 10% genetic risk score profile	a. the top 10% genetic risk score profile (follow-up benign biopsy result by PSA)	Association of SNP profile and PCa.
ProCaRis Study [4, 12, 13] NCT01739062 *Denmark* *Jacob Fredsøe*	RCT, Multicenter	2013-2019 *(completed)*	7800 *(actual)*	18-80	a. PSA + SNP test b. PSA	–	Number of low-risk patients who get a PSA test.
PCa Screening in Men With Germline BRCA2 [4] NCT02154672 *United States of America* *Preston Sprenkle*	Observational, prospective	2014-2018 *(completed)*	100 *(actual)*	30-90 (BRCA2 mutation carriers)	a. PSA + DRE + mpMRI if either is abnormal	a. positive PSA and/or DRE and/or mpMRI	Incidence of PCa among male BRCA2 mutation carriers.
IMPACT study [4, 14, 15] NCT00261456 *United Kingdom* *Rosalind A Eeles*	Observational, prospective	2005-2030	1700 *(target)*	40-69 (BRCA1/2 mutation carriers)	a. BRCA1/2 carriers* b. BRCA1/2 non-carriers* *PSA + 4Kscore when PSA >3	a. PSA >3 b. PSA >3	Incidence of PCa among BRCA 1/2 mutations carriers and non-carriers
PCa Screening Among Men With High Risk Genetic Predisposition [4, 16, 17] NCT02053805 *Israel* *David Margel*	Interventional (Clinical Trial), single group	2014-2019 *(completed)*	188 *(actual)*	40-70 (BRCA1/2 mutation carriers)	a. PSA + mpMRI	a. Abnormal PSA* mpMRI and/or positive mpMRI** *age-specified PSA criteria ** PI-RADSv2 3-5	Prevalence of PCa among male BRCA 1/2 mutation carriers.

N = number of participants; RCT = randomized controlled trial; PSA = prostate-specific antigen in ng/mL; mpMRI = multiparametric Magnetic Resonance Imaging; PCa = prostate cancer; SBx = systematic prostate biopsy; TBx = targeted biopsy; PI-RADSv2 = Prostate Imaging Reporting and Diagnostic System version 2; STHLM3 test = Stockholm3 test; csPCa = clinically significant PCa; 4K score = Prostate-Specific Kallikrein; PCSM = prostate cancer-specific mortality; TRUS = Transrectal ultrasound; bpMRI = biparametric Magnetic Resonance Imaging; DRE = digital rectal examination; SNP = single-nucleotide polymorphism; BRCA = BReast CAncer gene

Hogenhout et al. Eur Urol Oncol 2021

30 years of knowledge brought together

EUROPEAN UROLOGY 79 (2021) 327–329

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

European Association of Urology

Platinum Opinion

Early Detection of Prostate Cancer in 2020 and Beyond: Facts and Recommendations for the European Union and the European Commission

Hendrik Van Poppel [a,†,], Renée Hogenhout [b,†], Peter Albers [c,d], Roderick C.N. van den Bergh [e], Jelle O. Barentsz [f,‡], Monique J. Roobol [b,‡]*

EUROPEAN UROLOGY ONCOLOGY XXX (2021) XXX–XXX

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

European Association of Urology

A European Model for an Organised Risk-stratified Early Detection Programme for Prostate Cancer

Hendrik Van Poppel [a,†,], Renée Hogenhout [b,†], Peter Albers [c,d], Roderick C.N. van den Bergh [e], Jelle O. Barentsz [f,‡], Monique J. Roobol [b,‡]*

EURURO-9477; No. of Pages 9
ARTICLE IN PRESS
EUROPEAN UROLOGY XXX (2019) XXX–XXX

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

European Association of Urology

Review – Prostate Cancer

Prostate-specific Antigen Testing as Part of a Risk-Adapted Early Detection Strategy for Prostate Cancer: European Association of Urology Position and Recommendations for 2021

Hendrik Van Poppel [a,], Monique J. Roobol [b], Christopher R. Chapple [c], James W.F. Catto [d,e], James N'Dow [f,g], Jens Sønksen [h,i], Arnulf Stenzl [j], Manfred Wirth [k]*

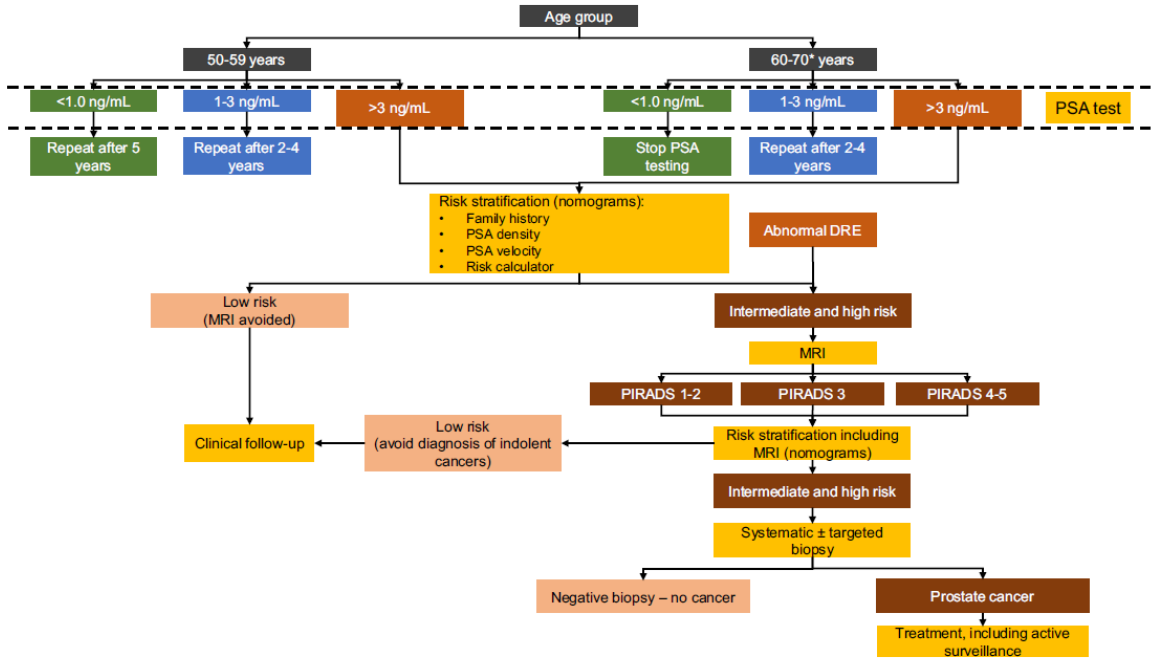


Fig. 4 – Risk-adapted algorithm for the early detection of prostate cancer, adapted based on prostate cancer guidelines published by the EAU [21]. The patient's values and preferences should always be taken into account as part of a shared decision-making process [21].
DRE = digital rectal examination; EAU = European Association of Urology; MRI = magnetic resonance imaging; PIRADS = Prostate Imaging Reporting and Data System; PSA = prostate-specific antigen.
*Healthy men >70 yr without important comorbidities and a life expectancy of >10-15 yr may continue PSA testing.

- 30 years have passed
- We have learned so much
- Isn't it time we implement our knowledge in an organized way accessible for all men in Europe?

Why Urology ? why Prostate Cancer?

- The text from my inaugural address:

- **Why urology?**
- Not the most appealing subject to talk about at a birthday party, unless it is a joke….
- Just because urological problems are not or rarely discussed it is a fascinating part of medicine.
- In particular, **prostate cancer** often has **a long-lasting considerable impact on daily life**.
- Patients often **suffer in silence** and feel they are **alone**

- To help these men is a privilege

- *Working at the department of Urology since September 1991.*

Thank you for listening