



Stockholm<sup>3</sup>

**THE TEST  
THAT CHANGES  
EVERYTHING**

Reliable procedure  
for the early detection of  
**prostate cancer**

# Prostate cancer

... is the most common cancer in men. In the UK, around 12,000 patients die from prostate cancer every year.

Early detection plays a decisive role in the fight against prostate cancer. To this day, the PSA level and the digital rectal examination (DRE) form the basis of prostate cancer screening. However, both methods have their limitations and are the subject of controversial scientific debate. PSA is an organ marker rather than a tumour marker and the controversy surrounding screening using PSA is therefore justified.

**«... Stockholm3 blood test trial results are seminal»**

American Cancer Society<sup>A)</sup>

# Stockholm3 – the test that changes everything

- ✓ **Stockholm3** can recognise aggressive carcinomas at an early stage—even with a low PSA level—and therefore at a stage when it might still be curable<sup>B)</sup>.
- ✓ **Stockholm3** significantly reduces overdiagnosis, saving unnecessary biopsies and MRI examinations<sup>C)</sup>.
- ✓ **Stockholm3** saves a considerable amount of healthcare costs<sup>D)</sup>.
- ✓ **Stockholm3** strengthens primary care: management of the patient remains with the primary care provider for longer.
- ✓ **Stockholm3** provides a clear risk assessment and recommendations for action.
- ✓ **Stockholm3** is based on clinical studies, sound scientific evidence and validation studies with over 90,000 men<sup>B)</sup>.
- ✓ **Stockholm3** has been in clinical use in Sweden and Norway since 2017<sup>E)</sup>.
- ✓ **Stockholm3** has been named in the American Urological Association (AUA) guidelines as the primary test for the early detection of prostate cancer since 2023<sup>E)</sup>.
- ✓ **Stockholm3** has been validated in multiple ethnicities<sup>L)</sup>

## **The current situation and challenge**

- Until now, the prostate-specific antigen (PSA) was the only way to detect prostate cancer.
- The PSA level is not elevated in the early stages of 30-50% of all aggressive prostate cancer cases<sup>1)</sup>.
- Many highly aggressive prostate cancers do not increase the PSA level at all.
- Most men over 60 have one or more prostate cancer lesions, but never develop clinically relevant prostate cancer that spreads beyond the prostate and threatens the patient.
- PSA leads to a high level of overdiagnosis, as it cannot distinguish between aggressive and clinically insignificant tumours. The overtherapy that often results is associated with many distressing side effects for the patient.
- Diagnostic prostate biopsies are invasive, carry a risk of infection and should be reserved for those who are most at risk.

## ***EAU Prostate Cancer Research Award 2022***

European Association  
of Urology

# Why is Stockholm3 a better option than PSA?

Stockholm3 combines PSA with three other protein markers, a range of genetic markers and clinical information to provide a more accurate risk calculation than PSA alone. The results are personalised on the basis of age and family history, enabling an individual risk assessment. This approach ensures that people who are at high risk, but have a low PSA level, are identified at an early stage through further investigation. This prevents diagnoses from being made too late and expands the range of potential treatments.

The test includes a clear recommendation for action, which makes it easier to interpret the results and determine the next diagnostic steps. [This means that in most cases patients can be treated safely and in a resource-efficient manner by their GP without being referred to a urologist.]

## **The Stockholm3 test is a blood test for the early detection of prostate cancer.**

**The innovative test makes it possible to detect prostate carcinoma at a very early stage.**

Stockholm3 combines protein markers (free and total PSA, PSP94, GDF15 and KLK2) with a range of genetic markers and clinical data (age, family history of prostate cancer, previous biopsies, use of 5-alpha-reductase inhibitors) in an algorithm with the aim of detecting aggressive prostate cancer at an early stage.

## Protein risk markers

PSA measurement alone is not accurate for the purpose of risk assessment. The same PSA result may indicate different risk levels for different men. Stockholm3 measures PSA and three other protein markers to assess the risk of aggressive prostate cancer.

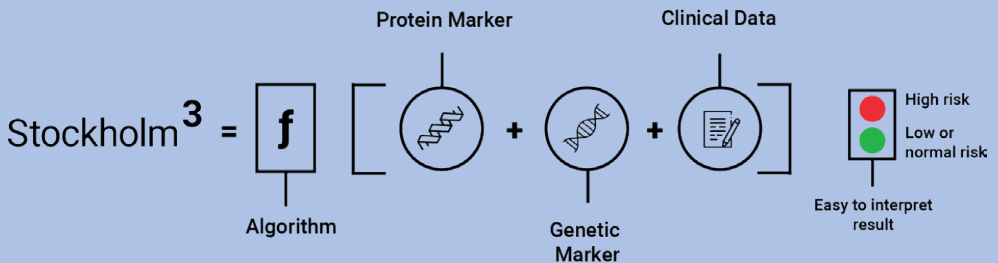
## Genetic risk markers

The Stockholm3 test also measures a range of genetic markers, known as single nucleotide polymorphisms. These are small variations in the code of the same gene that indicate a risk. The presence of specific genes is not measured.

## Clinical factors

Clinical information is also taken into account when analysing the Stockholm3 risk score. This includes

- Age
- Father, brother or son with prostate cancer
- Whether or not a previous biopsy has taken place
- Taking 5-alpha-reductase inhibitors



# Results

**Stockholm3 provides a prostate cancer risk score and a clear recommendation on how to proceed.**

Stockholm3 leads to a better understanding of the individual probability of prostate cancer and thus reduces the patient's uncertainty.

## Risk score

The Stockholm3 test indicates the probability of having aggressive prostate cancer as a risk score. The result includes a percentage for the presence of clinically significant prostate cancer (Gleason's score  $\geq 3+4=7$  / ISUP  $\geq 2$ ).

## Recommendation for further action

Stockholm3 provides clear recommendations on how to proceed.

**High risk:** referral to a urologist for further investigation

**Low or normal risk:** repeat the test in two to six years

**«An important step  
towards smarter screening  
for prostate cancer»**

The Lancet Oncology<sup>1)</sup>

## Indication of the Stockholm3 test

Stockholm3 is approved for men aged 45 to 74 years who have not yet been diagnosed with prostate cancer.

### The general recommendations for prostate cancer testing still apply:

- Men aged 50 and over. If there is a family history of prostate cancer, age 45 and over.
- The upper age limit is generally 75 years. The procedure may also be useful for older patients, provided they are biologically younger.
- Life expectancy of at least ten years.
- No prior diagnosis of prostate cancer.

### The following also applies:

PSA < 1.5 ng/ml:	do not use Stockholm3
PSA 1.5 to 20 ng/ml:	use the Stockholm3 test
PSA > 20 ng/ml:	refer directly to the urologist for investigation

The risk of prostate cancer below a PSA value of 1.5 ng/ml is very low.

A PSA value of more than 20 ng/ml usually requires further investigation.

# Clinical utility proven in routine care



## Capho S:t Görans Hospital, Sweden

One of Stockholm's major care providers covering 35% of all prostate cancer diagnostics and care in Region Stockholm

Replaced PSA by Stockholm3 in 2017

Distribution of risk group at primary diagnostics (N=21,135)<sup>(7)</sup>

55 %

REDUCED OVER-DIAGNOSTICS

49 %

INCREASED DETECTION OF TREATABLE CANCERS

29 %

REDUCTION OF CANCERS DETECTED AT LATE STAGES

17-28 %

COST REDUCTION<sup>(8)</sup>



## Helse Stavanger University Hospital, Norway

Covering all prostate cancer diagnostics and care in Region Rogaland, Norway, with ~350,000 inhabitants.

Replaced PSA by Stockholm3 in 2019

Increased sensitivity and specificity (N=4,784)<sup>(4)</sup>

26 %

REDUCED OVER-DIAGNOSTICS

89 %

INCREASED EARLY DETECTION

23-28 %

COST REDUCTION<sup>(4)</sup>

## References

- <sup>A)</sup> Hay. Stockholm3 test improve prostate cancer screening. *Cancer*. 2021
- <sup>B)</sup> Grönberg et al. Prostate cancer screening in men aged 50–69 years (STHLM3): a prospective population-based diagnostic study. *The Lancet Oncology*. 2015. Bergman et al. Strukturerat omhändertagande för män som önskar prostatacancerstestning erfarenheter från Prostatacancercentrum. *Läkartidningen*. 2018. Viste et al. Effects of replacing PSA with Stockholm3 for diagnosis of clinically significant prostate cancer in a healthcare system - the Stavanger experience. *SJPHC*. 2020. Nordström et al. Prostate cancer screening using a combination of risk-prediction, MRI, and targeted prostate biopsies (STHLM3-MRI): a prospective, population-based, randomised, open-label, non-inferiority trial. *The Lancet Oncology*. 2021. Söderbäck et al. Strukturerad kedja vid test för prostatacancer kortar ledtider - uppdaterade erfarenheter från Capio S:t Görans sjukhus visar på träffsäker diagnostik och god hälsoekonomi. *Läkartidningen*. 2023
- <sup>C)</sup> Grönberg et al. Prostate cancer screening in men aged 50–69 years (STHLM3): a prospective population-based diagnostic study. *The Lancet Oncology*. 2015. Eklund et al. The Stockholm-3 (STHLM3) Model can Improve Prostate Cancer Diagnostics in Men Aged 50–69 yr Compared with Current Prostate Cancer Testing. *European Urology Focus*. 2016. Bergman et al. Strukturerat omhändertagande för män som önskar prostatacancerstestning erfarenheter från Prostatacancercentrum. *Läkartidningen*. 2018. Viste et al. Effects of replacing PSA with Stockholm3 for diagnosis of clinically significant prostate cancer in a healthcare system - the Stavanger experience. *SJPHC*. 2020. Nordström et al. Prostate cancer screening using a combination of risk-prediction, MRI, and targeted prostate biopsies (STHLM3-MRI): a prospective, population-based, randomised, open-label, non-inferiority trial. *The Lancet Oncology*. 2021. Söderbäck et al. Strukturerad kedja vid test för prostatacancer kortar ledtider - uppdaterade erfarenheter från Capio S:t Görans sjukhus visar på träffsäker diagnostik och god hälsoekonomi. *Läkartidningen*. 2023
- <sup>D)</sup> Bergman et al. Strukturerat omhändertagande för män som önskar prostatacancerstestning erfarenheter från Prostatacancercentrum. *Läkartidningen*. 2018. Viste et al. Effects of replacing PSA with Stockholm3 for diagnosis of clinically significant prostate cancer in a healthcare system - the Stavanger experience. *SJPHC*. 2020. Söderbäck et al. Strukturerad kedja vid test för prostatacancer kortar ledtider - uppdaterade erfarenheter från Capio S:t Görans sjukhus visar på träffsäker diagnostik och god hälsoekonomi. *Läkartidningen*. 2023. Hao et al. Cost-Effectiveness of the Stockholm3 Test and Magnetic Resonance Imaging in Prostate Cancer Screening: A Microsimulation Study. *European Urology*. 2021
- <sup>E)</sup> Wei et al., Early Detection of Prostate Cancer: AUA/SUO Guideline Part I: Prostate Cancer Screening. *Journal of Urology*. 2023
- <sup>F)</sup> Swedish National Prostate Cancer Register (NPCR). 2018-2019. Figures in relation to Sweden overall.
- <sup>G)</sup> Söderbäck et al. Strukturerad kedja vid test för prostatacancer kortar ledtider - uppdaterade erfarenheter från Capio S:t Görans sjukhus visar på träffsäker diagnostik och god hälsoekonomi. *Läkartidningen*. 2023
- <sup>H)</sup> Viste et al. Effects of replacing PSA with Stockholm3 for diagnosis of clinically significant prostate cancer in a healthcare system - the Stavanger experience. *SJPHC*. 2020.
- <sup>I)</sup> More. An important step towards smarter screening for prostate cancer. *The Lancet Oncology*. 2021
- <sup>J)</sup> Thompson et al. Effect of Finasteride on the Sensitivity of PSA for Detecting Prostate Cancer. *Journal of the National Cancer Institute*. 2016
- <sup>K)</sup> Bergman et al. Strukturerat omhändertagande för män som önskar prostatacancerstestning erfarenheter från Prostatacancercentrum. *Läkartidningen*. 2018. Viste et al. Effects of replacing PSA with Stockholm3 for diagnosis of clinically significant prostate cancer in a healthcare system - the Stavanger experience. *SJPHC*. 2020.
- <sup>L)</sup> Vigneswaran et al. Stockholm3 in a multi-ethnic cohort for prostate cancer detection (SEPTA): A prospective multicentered trial. *Journal of Clinical Oncology*. 2024



# Stockholm<sup>3</sup>

## Radically improves early detection of prostate cancer

- ✓ **Stockholm3 finds twice as many** men with aggressive cancers compared to current clinical practice with PSA<sup>K</sup>.
- ✓ **Stockholm3 decreases the number of unnecessary biopsies by 50%** compared to current clinical practice with PSA<sup>G</sup>.
- ✓ **Stockholm3 finds aggressive cancer also in men with low PSA values.** <sup>B</sup>.
- ✓ **Stockholm3** is based on scientific clinical studies including **more than 90,000 men** <sup>B</sup>.
- ✓ **Stockholm3** has been used in clinical practice **in Sweden and Norway since 2017.**