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EARLY DIAGNOSIS AND EFFECTIVENESS OF SCREENING METHODS FOR PROSTATE CANCER

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Annotation
This thesis reviews prostate cancer screening methods, highlighting that systematic screening can reduce mortality by about 20%. Advanced tools like MRI-guided biopsy improve diagnosis and reduce unnecessary procedures. Combining personalized risk assessment with shared decision-making optimizes screening benefits while maintaining patient quality of life.

Keywords: prostate cancer, early diagnosis, prostate-specific antigen screening, digital rectal examination, magnetic resonance imaging, risk stratification, shared decision-making, overdiagnosis

Today, prostate cancer remains the most commonly diagnosed cancer among men worldwide, with notable geographic and demographic differences in incidence. It is the leading cancer diagnosis in 112 countries and the primary cause of cancer death in 48, highlighting its importance as a global health challenge. The disease’s heterogeneous nature—ranging from slow-growing tumors to aggressive forms—complicates screening and treatment decisions. Early enthusiasm for widespread PSA testing has given way to more balanced approaches due to concerns about overdiagnosis. Current guidelines now focus on personalized screening strategies that prioritize detecting clinically significant cancers while minimizing unnecessary procedures, informed by the latest evidence on biopsy techniques and risk assessment.

Prostate cancer screening primarily relies on measuring prostate-specific antigen, a protein produced by prostate cells. However, elevated prostate-specific antigen

levels are not specific to cancer and can also occur in benign conditions like benign prostatic hyperplasia and prostatitis, making comprehensive clinical evaluation essential Evidence from randomized controlled trials shows that prostate-specific antigen screening modestly reduces prostate cancer mortality over ten years but must be balanced against risks such as false positives, unnecessary biopsies, and overtreatment. Digital rectal examination, once a key screening tool, has limited sensitivity for early cancer detection but still adds value when combined with prostate-specific antigen testing. Advances in magnetic resonance imaging, especially multiparametric techniques combined with targeted biopsy, have significantly improved detection of clinically important tumors while reducing unnecessary biopsies. Modern risk stratification models use clinical, demographic, and biochemical data to better identify patients at risk and minimize unnecessary interventions. Epidemiological data indicate that reduced prostate-specific antigen screening since 2012 has been associated with increased metastatic prostate cancer cases, suggesting that screening discontinuation may delay diagnosis and worsen outcomes for some patients.

To sum up, current evidence supports an individualized, shared decision-making approach to prostate cancer screening rather than universal protocols. While prostate-specific antigen-based screening can reduce cancer-specific mortality, it carries risks of overdiagnosis and overtreatment. Advances such as multiparametric magnetic resonance imaging, targeted biopsies, and risk stratification tools have improved diagnostic accuracy and personalized screening. Future efforts should aim to refine biomarkers, optimize screening intervals, and explore the use of artificial intelligence to enhance early detection and reduce unnecessary interventions.

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