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The Impact of a Statewide Active Surveillance Initiative: A Roadmap for Increasing Active Surveillance Utilization Nationwide

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Abstract

Active surveillance (AS) is recommended as a management option for men with favorable-risk (low risk and favorable intermediate risk) prostate cancer; however, national rates remain low. The Michigan Urological Surgery Improvement Collaborative (MUSIC) established a quality improvement (QI) initiative in June 2014 to increase AS utilization. In this report, we analyze the rates of AS utilization over time in the state of Michigan (MUSIC) for men with favorable-risk prostate cancer and compare these to rates for other men diagnosed with favorable-risk prostate cancer in the USA outside the state of Michigan. While the variables that influence AS utilization were the same in both cohorts, we found that the AS utilization rates and the rate of increase were significantly higher in MUSIC. We conclude that the QI initiative started in MUSIC should serve as a roadmap to increasing AS use nationwide.

Patient summary: Active surveillance (AS), which involves close monitoring with blood tests and scans, is recommended for management of favorable-risk prostate cancer to avoid or delay unnecessary treatment. Our results show that a quality improvement program in Michigan increased AS use for prostate cancer patients in the state. This program should be used to increase AS uptake throughout the USA.

Of the 190 000 men diagnosed with prostate cancer (PCa) annually, most have localized disease. Furthermore, definitive treatment in men with favorable-risk PCa (low risk and favorable intermediate risk) does not improve PCa-specific mortality [1,2]. Active surveillance (AS) is recommended for men with low-risk PCa, and selectively in favorable intermediate-risk disease [3]. However, AS remains underutilized for men with favorable-risk disease [4,5].

While multiple predictors of AS use have been identified, there is limited information on methods to improve AS utilization. We used the Michigan Urological Surgery Improvement Collaborative (MUSIC) and Surveillance,

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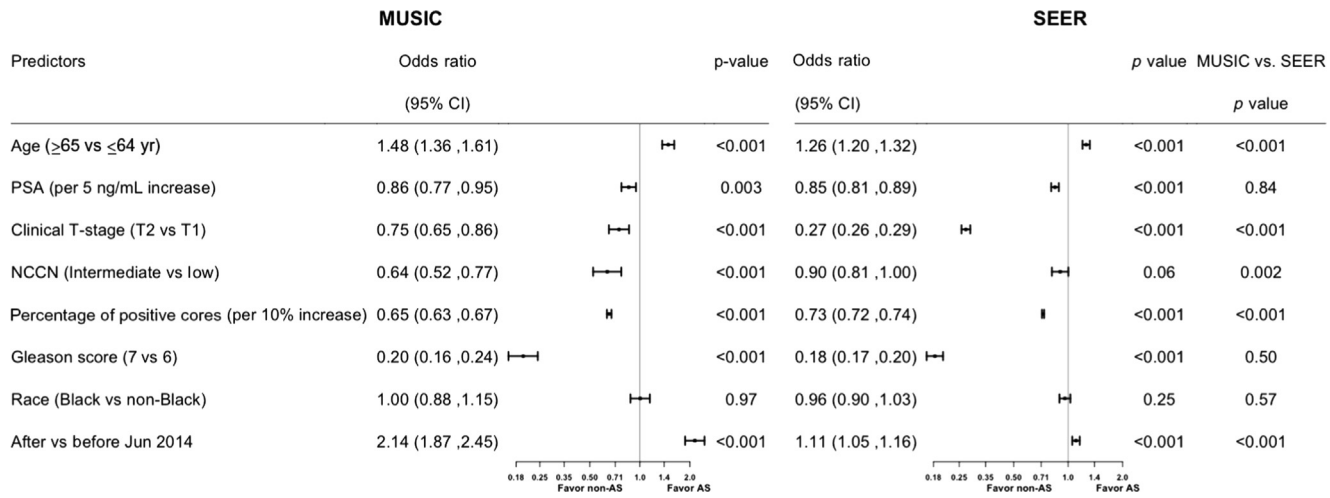

Fig. 1 – Predictors of active surveillance utilization. CI = confidence interval; MUSIC = Michigan Urological Surgery Improvement Collaborative; NCCN = National Comprehensive Cancer Network; PSA = prostate-specific antigen; SEER = Surveillance, Epidemiology and End Results.

Epidemiology and End Results (SEER) prostate AS databases to investigate methods to improve systematic AS utilization. The publicly available SEER AS database identifies men diagnosed with PCa nationwide from 2010 to 2016. Medical records are reviewed to ensure that patients were initially managed conservatively and did not undergo definitive therapy within 1 yr. MUSIC is a statewide collaborative that encompasses more than 90% of practicing urologists in Michigan. Each practice has trained data abstractors who collect standardized patient information. Confirmation of AS is determined according to two criteria: (1) the patient's chart explicitly states AS as the primary management strategy; and (2) the patient did not undergo definitive therapy within 1 yr of diagnosis.

In June 2014, MUSIC began an AS initiative for patients with favorable-risk PCa, including value-based reimbursement and publication of the *Roadmap for management of men with favorable-risk prostate cancer* (MUSIC roadmap) [6]. In this process, value-based reimbursement measurements included metrics such as the rate of patients with low-risk PCa evaluated for or placed on AS and rates of confirmatory testing for patients with low-risk PCa. In addition, the MUSIC roadmap provided high- and low-intensity surveillance plans that allow clinicians to tailor AS regimens on the basis of an individual patient's clinical variables. Here we compare AS rates over time in MUSIC and SEER to assess the impact of this initiative.

We included men diagnosed with favorable-risk PCa between 2010 and 2016 for SEER (the most recent SEER data available are from 2016), and between 2012 and 2019 for MUSIC. We excluded patients with missing clinical data and SEER patients diagnosed in Michigan.

Using a multivariable logistic regression model, we determined variables influencing AS use. For both cohorts, practice site and zip code were included as random effects to account for spatial correlations. In addition, a generalized linear regression model with an interaction term between the AS rate and the cohort was used to compare rates of increase in AS before and after June 2014. Covariate balancing was performed using inverse probability weighting (IPW). AS trends were created using an IPW-generalized additive model (Supplementary material).

We identified 6300 patients in MUSIC who met the inclusion criteria, including 3608 with low-risk PCa and 2692 with favorable intermediate-risk PCa. The SEER cohort included 81 216 men, of whom 36 101 had low-risk PCa and 45 115 had favorable intermediate-risk PCa (Supplementary Table 1). Predictors of AS management in both cohorts on multivariable analysis are shown in Fig. 1.

We used an odds ratio (OR) scale to compare AS utilization before and after the June 2014 MUSIC initiative. After the initiative, MUSIC patients were more than twice as likely to be managed with AS (OR 2.14, 95% confidence interval [CI] 1.87–2.45; $p < 0.001$; Fig. 1). Among patients in SEER, those diagnosed after June 2014 were 11% more likely to be managed on AS (OR 1.11, 95% CI 1.05–1.16; $p < 0.001$). OR comparison for the two cohorts shows that the increase in AS use was significantly higher in MUSIC than in SEER (interaction OR 1.95, 95% CI 1.70–2.23; $p < 0.001$).

Notably, comparison of the increase in AS for all men with favorable-risk PCa revealed that despite a lower AS utilization rate in 2014, MUSIC had higher AS utilization rates in 2015 and 2016 after implementation of the QI initiative. In addition, after using SEER data from 2010–2016 to perform projections of AS rates for 2017–2019, we observed a significantly higher increase in AS use in MUSIC compared to SEER ($p < 0.001$; Fig. 2). These findings were seen in subgroup analyses for men with low-risk PCa (Supplementary Fig. 1) and men with favorable intermediate-risk PCa (Supplementary Fig. 2).

Our results show that for men with favorable-risk PCa, initial AS rates increased rapidly after the statewide initiative in Michigan. The rate of increase was greater in MUSIC than that observed nationally. The limitations of our study include the lack of SEER data after 2016, precluding a direct comparison for 2017–2019, and the potential for confounding variables not captured in either SEER or MUSIC. Nonetheless, our findings highlight the impact of

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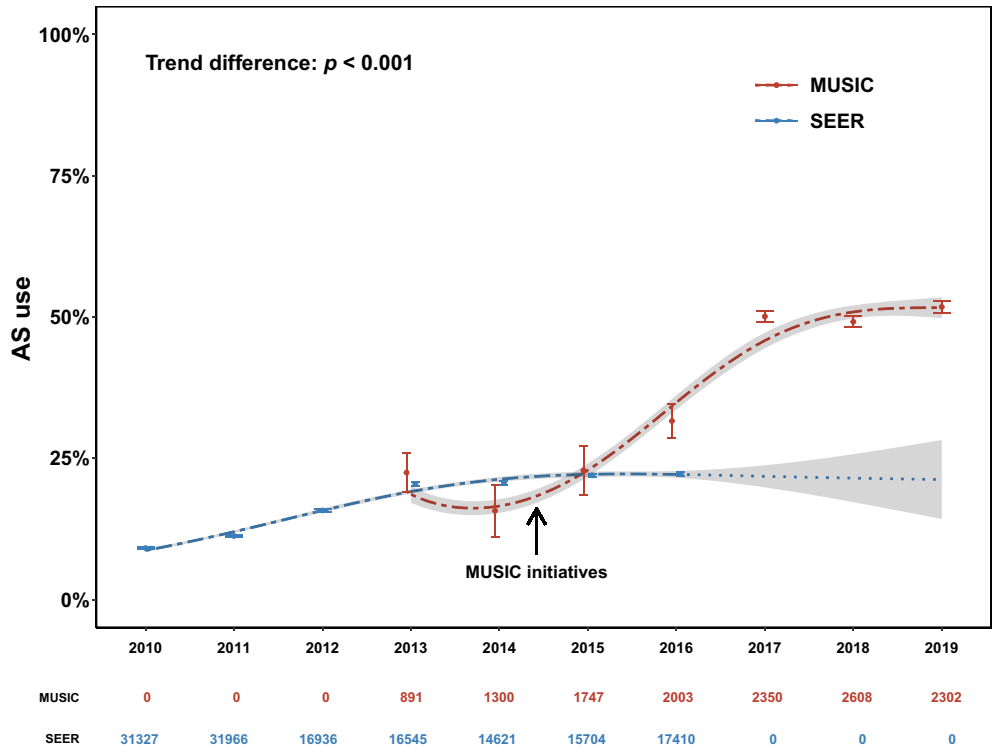

Fig. 2 – Trends in AS utilization. The blue dotted line denotes the projected active surveillance rate on the basis of SEER data from 2010–2016. AS = active surveillance; MUSIC = Michigan Urological Surgery Improvement Collaborative; SEER = Surveillance, Epidemiology and End Results.

quality improvement initiatives on AS utilization. Collectively, these data show that quality improvement efforts have dramatically increased AS rates to a greater degree than factors causing more gradual uptake nationally.

Author contributions: Randy A. Vince Jr. had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: Vince, Sun, Spratt, Mahal.
Acquisition of data: Mahal, Sun.
Analysis and interpretation of data: Vince, Sun, Spratt, Sarle, Morgan.
Drafting of the manuscript: Vince, Sun, Spratt, Morgan, George, Cher, Lane.
Critical revision of the manuscript for important intellectual content: Vince, Spratt, Morgan, Ginsburg, George, Lane.
Statistical analysis: Vince, Spratt, Sun.
Obtaining funding: Spratt.
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Supervision: Spratt, Morgan, Sarle.
Other: None.

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Peer Review Summary and Supplementary data

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