Impact on Radiation Therapy Recommendation and Treatment Modality for Patients With Ductal Carcinoma In Situ Using the 7-Gene Biosignature: Analysis of the PREDICT Study

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Background

- Breast-conserving surgery (BCS) followed by adjuvant radiotherapy (RT) has been a mainstay in the treatment of DCIS based on multiple randomized trials demonstrating a local recurrence benefit with RT.
- However, these studies have failed to identify subsets of patients who did or did not benefit from adjuvant RT after BCS, raising concerns regarding both over and undertreatment.
- Thus, better prognostic and predictive tools are needed to appropriately risk stratify patients and understand their benefit from RT.
- The 7-gene predictive DCIS biosignature provides a validated score (DS) for women undergoing BCS to assess their 10-year risk of in-breast and invasive recurrence with and without adjuvant RT.
- This trial was designed to evaluate the decision impact of the 7-gene predictive biosignature score on DCIS treatment recommendations.

Methods

- The PREDICT study is a prospective, multi-institutional trial for patients who received DCISionRT testing as part of their routine care.
- The registry includes females 26 and older who are diagnosed with DCIS, are candidates for BCS, and eligible for RT.
- Treating physicians completed treatment recommendation forms before and after receiving test reports to capture surgical, radiation and hormonal treatment (HT) recommendations and patient preferences.
- Analysis was performed in 2,012 patients treated at 63 clinical sites.

Results

- Median age was 62 years old with 32% grade 3 and 9% size 2.5 cm or greater.
- Post-test, RT recommendation changed for 40% of patients (p<0.001), with a net reduction of 20% in patients recommended to receive RT(p<0.001).
- The DCISionRT test results had the greatest impact (OR 26.2, 95%CI 19.1-36.4, when analyzed categorically using DS>3 cut-off; 2.3 per DS, 95%CI 2.1-2.6, when evaluated continuously) on post-test RT recommendation in multivariable analysis when compared to all other factors including patient preference, patient clinical and tumor pathological factors, patient race/ethnicity, treatment facility, physician specialty.
- The post-test RT recommendation rate increased with increasing DS (0-2, 2-4, 4-10) on a categorical basis, with odds ratios of 6.8 DS (2-4 vs 0-2), and 35.0 for DS (4-10 vs 0-2).
- After DCISionRT test result, patient preference was the second most important factor in post-testing RT recommendation.
- There was also a significant change in the modality of RT recommended to 34% of those patients recommended RT pre-test and post-test by radiation oncologists (n=937), with intensified RT modality for higher DS (p<0.001) and de-escalation for lower DS (p<0.001).

- DCISionRT changed RT recommendations in 38% of women overall (n=2012)
- **40%** of women initially recommended RT were **NOT** recommended RT after DCISionRT
- **34%** of women initially **NOT** recommended RT were recommended RT after DCISionRT

TABLE 1. Impact of the 7-gene predictive biosignature on adjuvant radiation recommended overall and by clinicopathologic factors

Clinical Factor	N	RT Recommended: Pre-test (%)	RT Recommended: Post-test (%)	RT Recommended: Net change (%)	Pre- to post-test change in RT recommended: Yes to no (%)	Pre- to post-test change in RT recommended: No to yes (%)	Total change in RT recommended: Overall change (%)	Total change in RT recommended: Overall change (95% CI)	p-Value
Overall	2012	71	51	-20	40	34	38	36, 40	<0.001
Age, years									
≤ 50	339	80	45	-35	45	15	39	35, 44	<0.001
> 50	1673	69	52	-17	38	37	38	36, 40	<0.001
Nuclear Grade									
1 or 2	1360	64	45	-18	45	34	41	39, 44	<0.001
3	652	87	62	-25	27	31	34	29, 35	<0.001
Tumor Size									
≤ 2.5 cm	1796	69	49	-20	43	31	39	37, 41	<0.001
> 2.5 cm	193	90	69	-21	26	38	27	22, 33	<0.001
RTOG 9804-like Criteria*									
'Good Risk'	1082	61	42	-19	49	33	43	40, 46	<0.001
Not 'Good Risk'	832	84	61	-23	33	37	34	31, 36	<0.001

*RTOG 9804-like criteria (nuclear grade 1 or 2, non-palpable, screening detected, negative margins)

Figure 1. RT Recommendation Pre- and Post DCISionRT Test Results

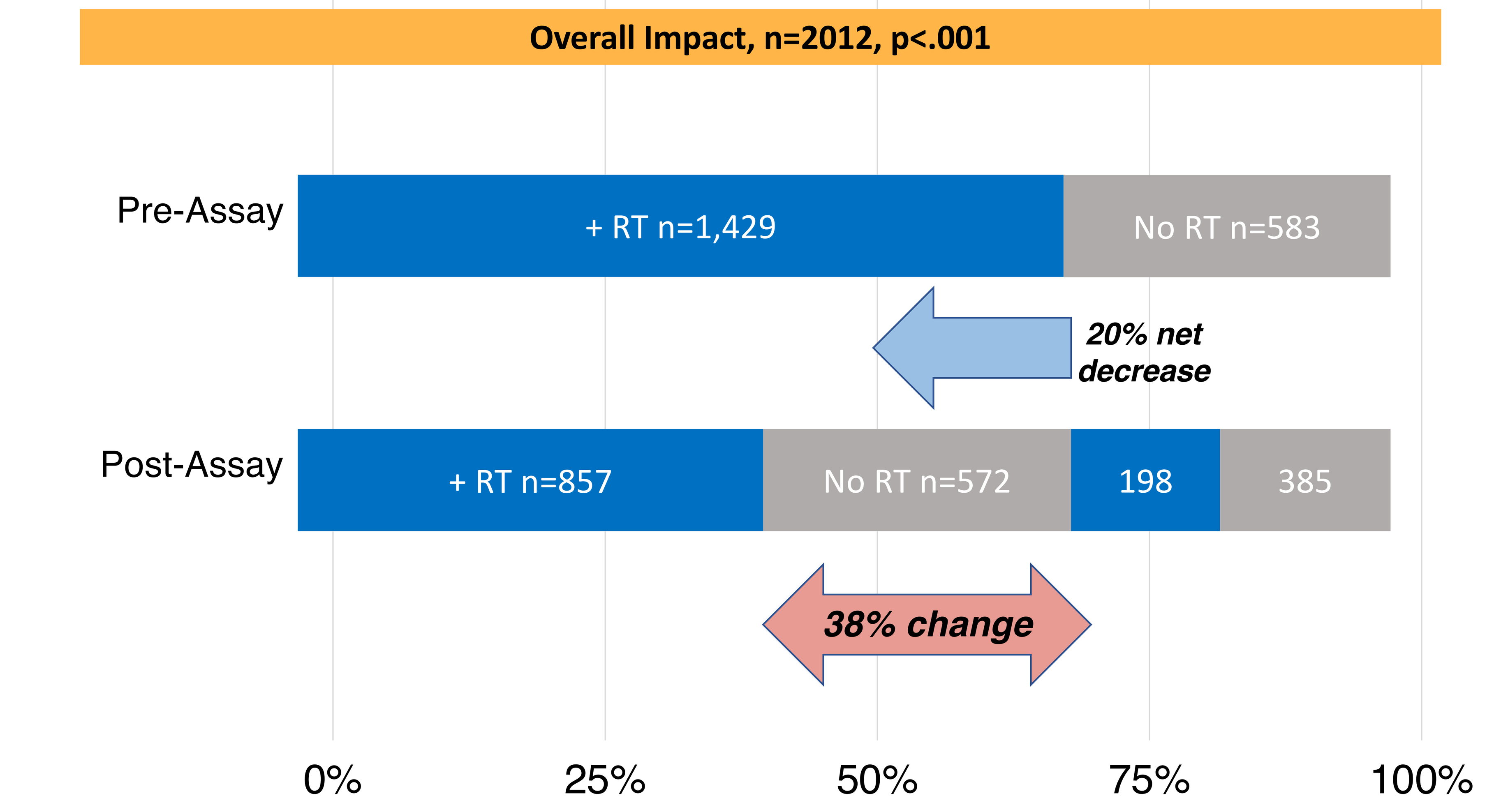
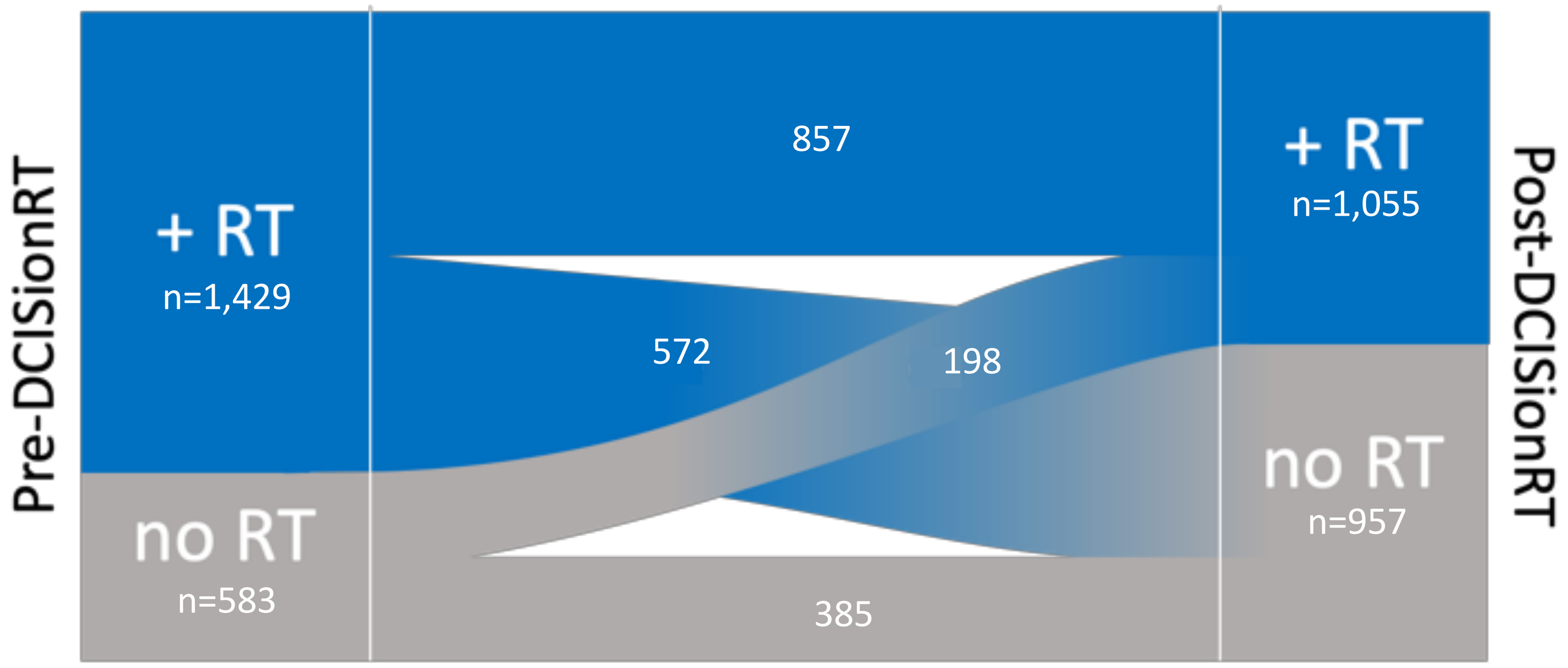


Figure 2. DCISionRT Decision Impact on RT Recommendation



Conclusions

- This analysis of over 2,000 patients demonstrates significant changes in recommendations to add or omit RT based on the 7-gene predictive. The integration of DCISionRT into clinical decision processes has substantial impact on recommendations aimed at optimal management to prevent over- or under-treatment.

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