

Assessment of Delivered Versus Planned D90 Ratios in LDR Prostate Brachytherapy



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Purpose :

This study assessed the LDR Brachytherapy service’s ability to deliver approved treatment plans by analysing the ratio of post-implant D90 values (actual) to planned implant D90 values (ideal).

Performance was compared across three oncologist-led teams over six years (2018-2023). As planners became confident with using the established rules based live planning technique.

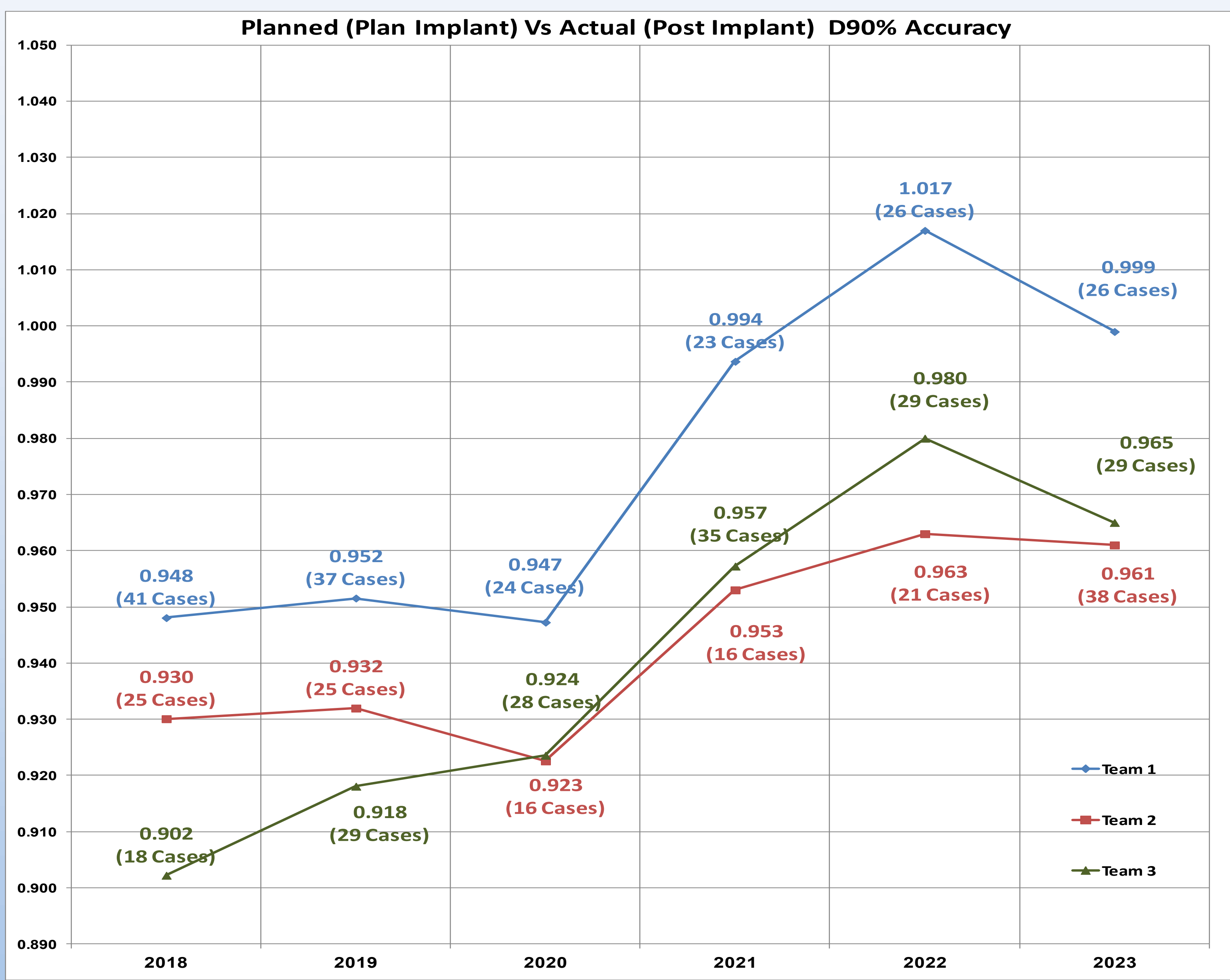
Methods :

Patients were treated between 2018 and 2023. The LDR Prostate Brachytherapy team consisted of 3 Oncologists, 3 Radiologists, 4 treatment planners, and 2 clinical technologists. Each implant team consisted of one Oncologist, one Radiologist, one Treatment Planner, and two Clinical Technologists. Radiologists and Treatment Planners rotated independently, ensuring all staff worked with each Oncologist when undertaking live rules based planning in theatre.

Post Implants scans where undertaken on average 6 weeks after the initial LDR implant and for consistency outlined and analysed by 1 clinical technologist with results monitored and assessed by each oncologist.

D90 ratios were then reviewed for all implants.

A total of 483 patients were analysed, with a median follow-up of 5 years and an overall recurrence rate of 2.3%.



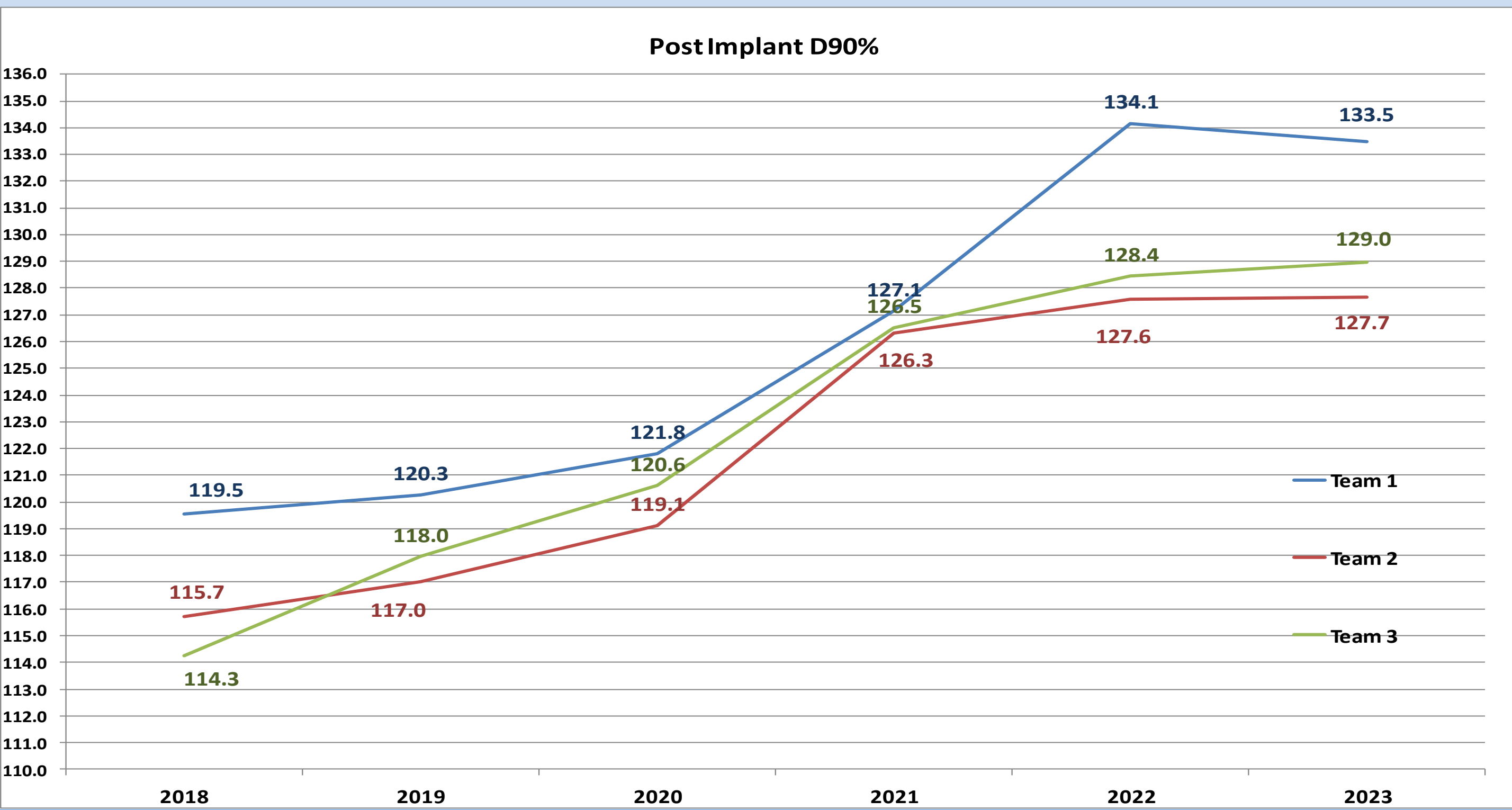
Results :

Annual D90 ratios for Team 1 ranged from 94.8% to 101.7%, for Team 2 from 92.3% to 96.3%, and for Team 3 from 90.2% to 98.0%

Comparisons of D90 ratios between 2018–2020 and 2021–2023 demonstrated statistically significant improvements for all teams:

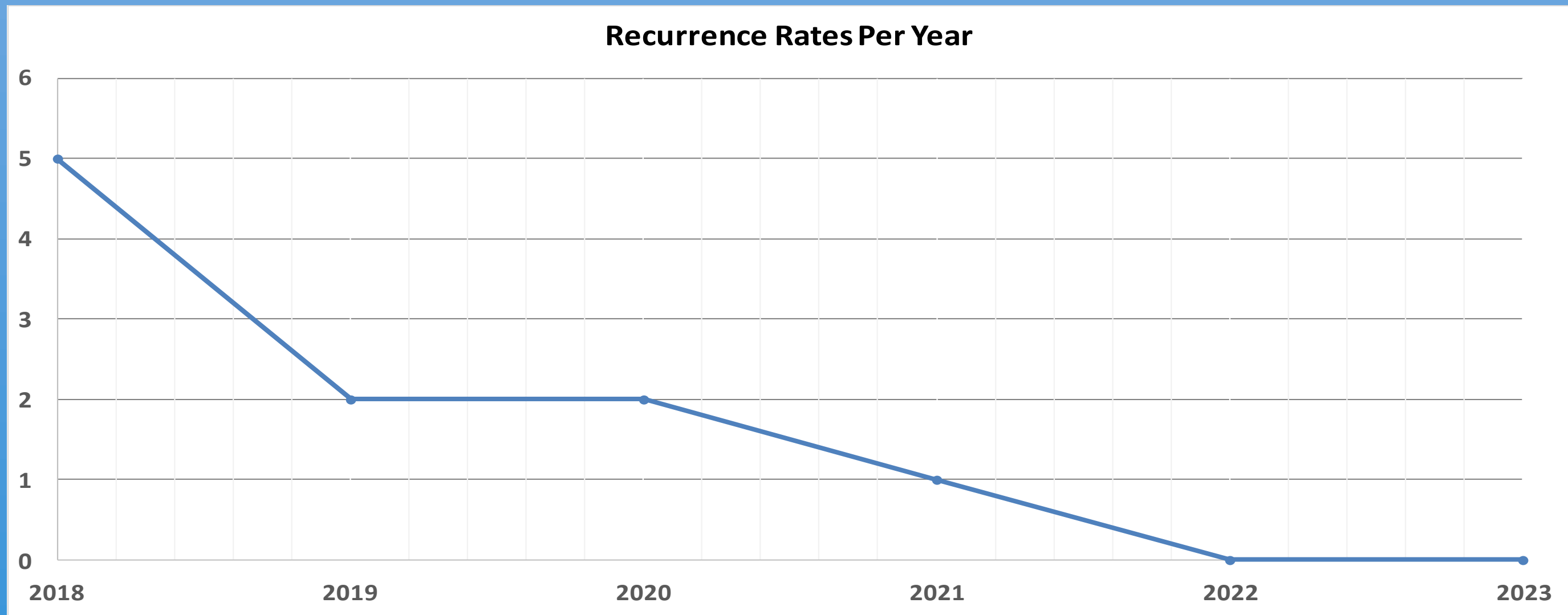
Team 1 p=0.011, Team 2 p=0.019, Team 3 p=0.014, with recurrence rates of 3.9% between 2018-2020, n=254, and a recurrence rate of 0.4% between 2021-2023, n=229.

Team 1 demonstrated a recurrence rate of 3.42%, with the highest mean D90 ratio (97.6%) and mean D90 value (125.1, SD 16.0). Team 2 showed a recurrence rate of 2.23%, with a mean D90 ratio of 94.4% and mean D90 value of 122.2 (SD 11.9). Team 3 achieved the lowest recurrence rate (0.57%), with a mean D90 ratio of 94.1% and mean D90 value of 122.9 (SD 10.5).



Conclusion :

All teams showed a significant improvement in D90 ratios from 2021 onwards. Despite variation in recurrence rates and mean D90 values, the overall trend indicates a consistent improvement in implant delivery.



References & Acknowledgments:

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