Purpose
The advent of kV cone beam based IGRT has facilitated isocenter and positioning accuracy to sub-millimeter levels and has opened the door to the possibility of adaptive targeting of planned fields. The adaptive radiation therapy process, however, should include real-time implementation of modified plans. This is not being practiced because of the systematic time constraints of structure definition and complex/IMRT case re-planning. This study tests the feasibility of applying template Atlas based IMRT prostate plans to multiple patients for possible IMRT planning within minutes.

Results
Nine test patients are matched with the three different techniques defined above. For a particular patient, the best matched of the three techniques is used for comparison analysis. For most of the cases, the small FOV match is the one chosen. For template plans scaled to cover PTV adequately, dose to 20% of the rectum volume averages 75 Gy (standard deviation (STD) 8 Gy) and percent rectum volume receiving 65 Gy averages 31% (STD 11%). 30% bladder volumes receive doses that average 57 Gy (STD 18 Gy). Percent bladder volume receiving 65 Gy or more averages 26% (STD 14%). With template plans scaled to cover CTV, the above numbers for rectum are 68 Gy (STD 7 Gy) and 26% (STD 11%), for bladders are 52 Gy (STD 18 Gy) and 22% (STD 15%).

Discussion/Conclusion
• In 7 of the 9 cases, the best re-plan was generated with the SFOV match criteria.
• The template plans scaled to deliver adequate dose to CTV have better sparing of critical structures as expected. With IGRT readily available, it is conceivable to reduce margins of PTVs to within millimeters of the CTV. With reduced PTV margins, there could be a higher percentage of template IMRT prostate plans based on Atlas contour matching deemed clinically acceptable.
• With more cases added to the Atlas, it is reasonable to expect to find better matches. More rigid patient preparation may also improve Atlas contour/patient correlation. Patient specific Atlas generation may expedite IMRT template plan applications.
• With only minutes to arrive at a usable IMRT plan, this could be considered as a possible solution to the conundrum of wanting adaptive real-time re-planning and the reality of time and workflow issues.