



Singapore Healthcare
Management 2015

Moving Towards Timely Delivery of Radiation Therapy Treatment Plans to Ensure Quality Check Prior to Treatment Delivery



National Cancer
Centre Singapore
SingHealth

Loyce Chua, National Cancer Center
Leow Manling, National Cancer Center

Background:

Current practice requires all Radiation therapy treatment plans from planning team, to be delivered to Quality Improvement team (QI) who are the radiation therapists, for checks at least one day before the start of patient's radiation therapy as per department benchmark.

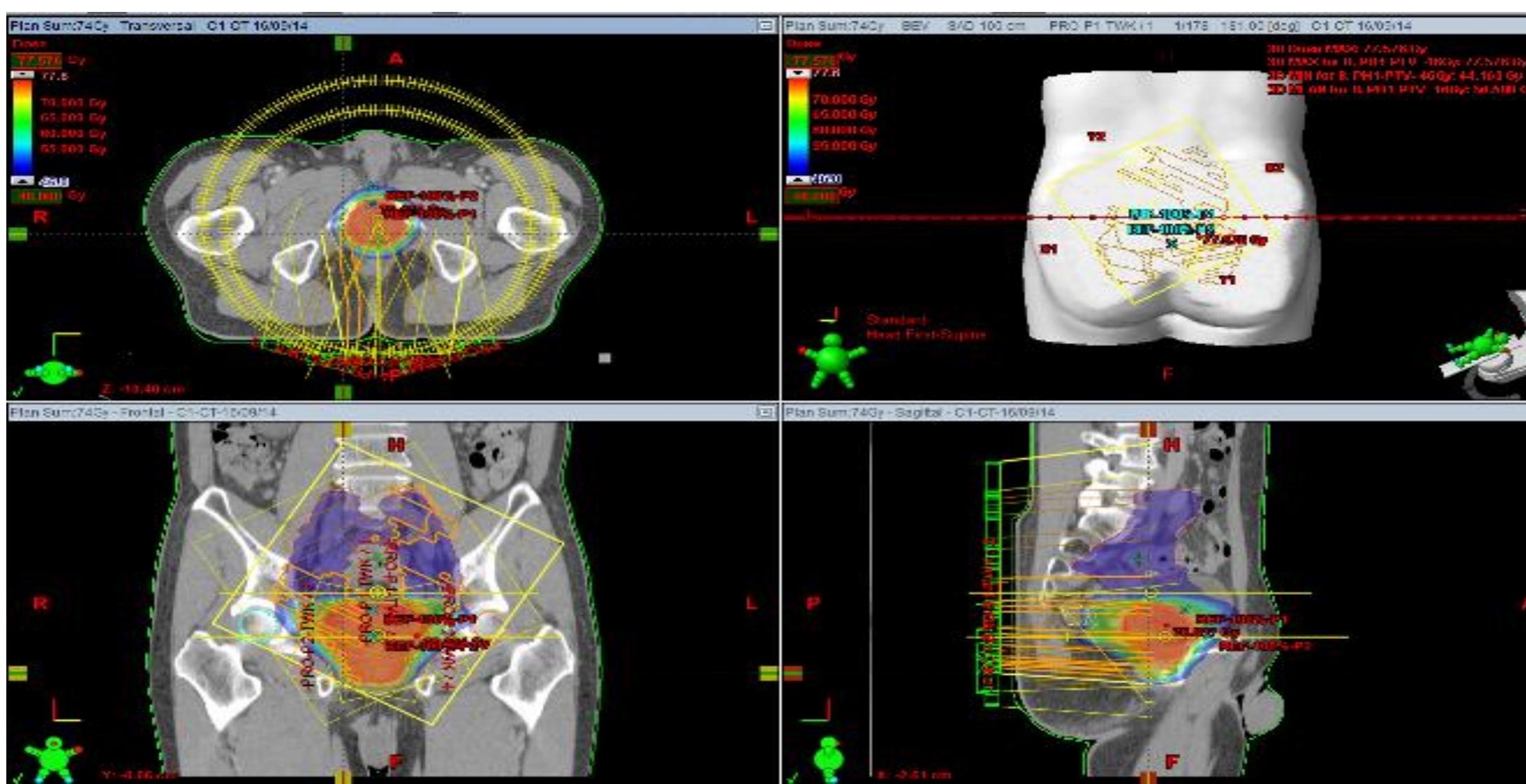


Figure 1:
Radiation Therapy plan

Mission Statement:

To reduce the percentage of delayed delivery of treatment plans by planning to Quality Improvement team for quality checks 24 hours (1 Day) before treatment starts from 30% to 20% in 6 months.

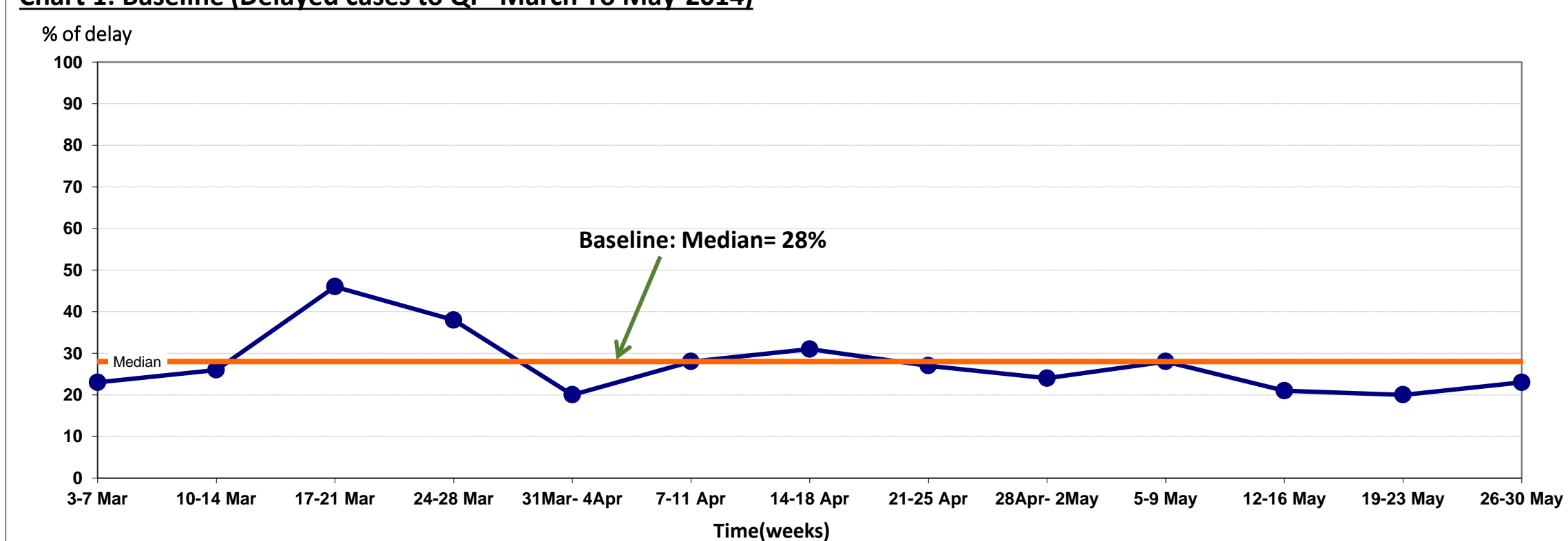
This project is of great importance because:

- It is in alignment with one of NCCS & SingHealth Quality Priorities - Safety First
- To increase efficiency and productivity of the planning department
- To enhance staff job satisfaction

Data collection

Generate baseline data from Mosaik (treatment record & verifying system-R&V) for total number of plans that were delivered below benchmark to QI from 1st March to 30th May 2014

Chart 1: Baseline (Delayed cases to QI - March To May 2014)



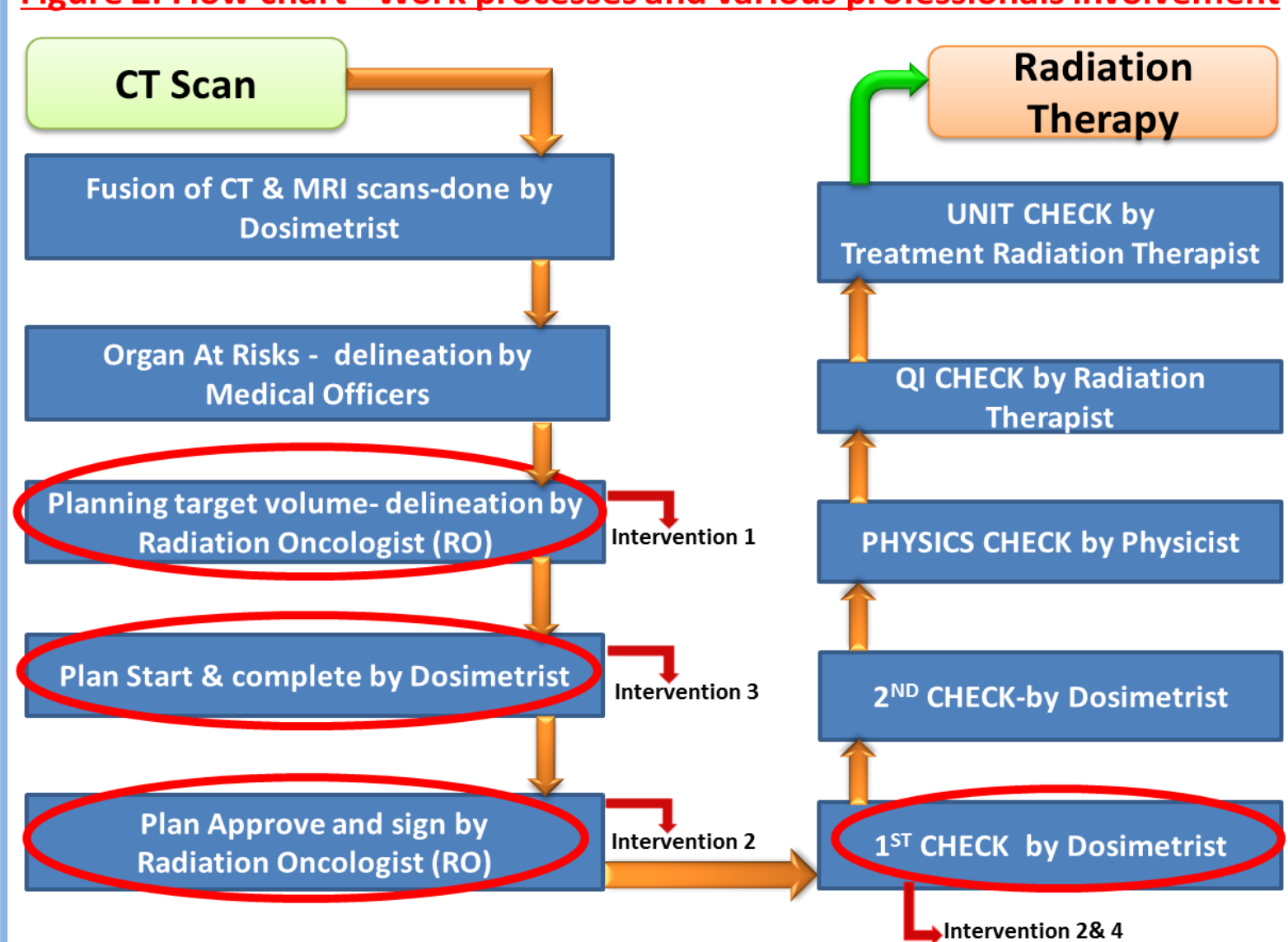
Analysis

Studied 2013 data to identify which activities caused the most delay during the planning process and resulted in treatment plans being sent out late to QI

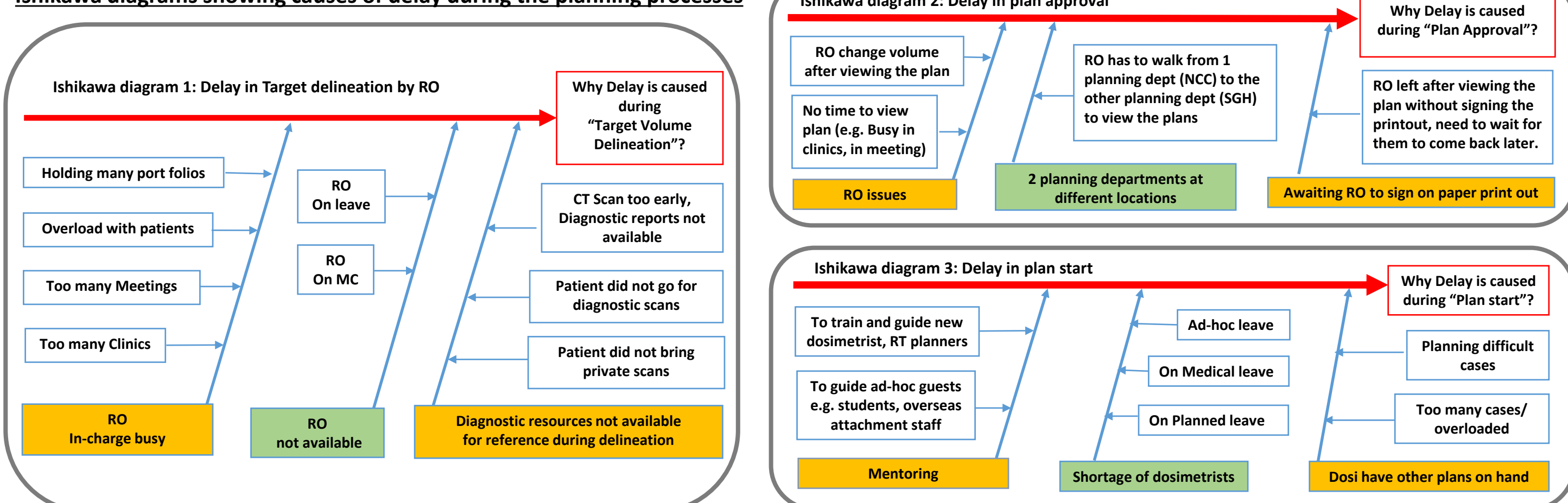
Table 1: 2013 Data for delay workflow process

NO	Activity	No of patients delay	Main contribution
1	Fusion (MRI/CT /PET)	44 patients	44
2	Target Volume delineation	345 patients	301
3	Plan start	400 patients	55
4	Plan complete	870 plans (some patient has 2 to 3 plans) Average : 435 patients	35
5	Plan approval	480 patients	45
6	Plan 1 st check	520patients	40
7	Plan 2 nd check	564 patients	44
8	Physics check	581 patients	17

Figure 2: Flow chart - Work processes and various professionals involvement



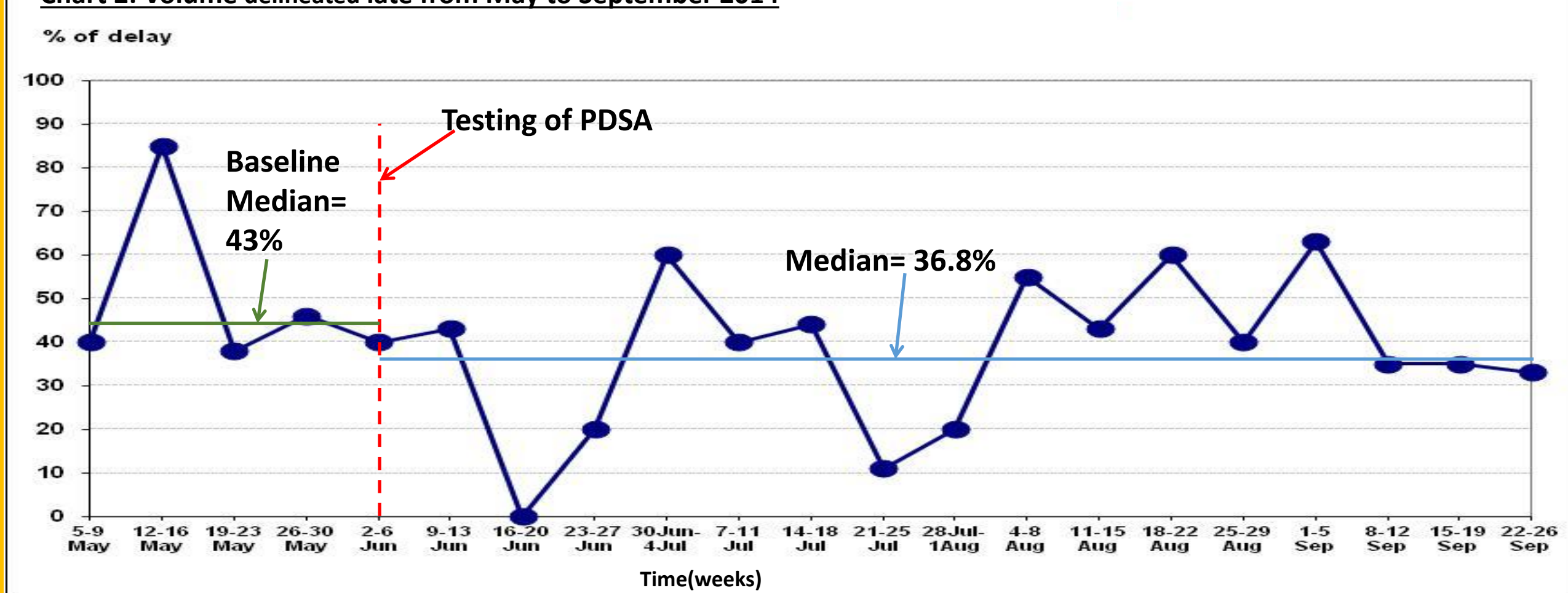
Ishikawa diagrams showing causes of delay during the planning processes



Intervention 1- PDSA

Arrange 4 RO's patients CT schedule according to their non-clinic days so that they can delineate the planning volumes on their non-clinic days

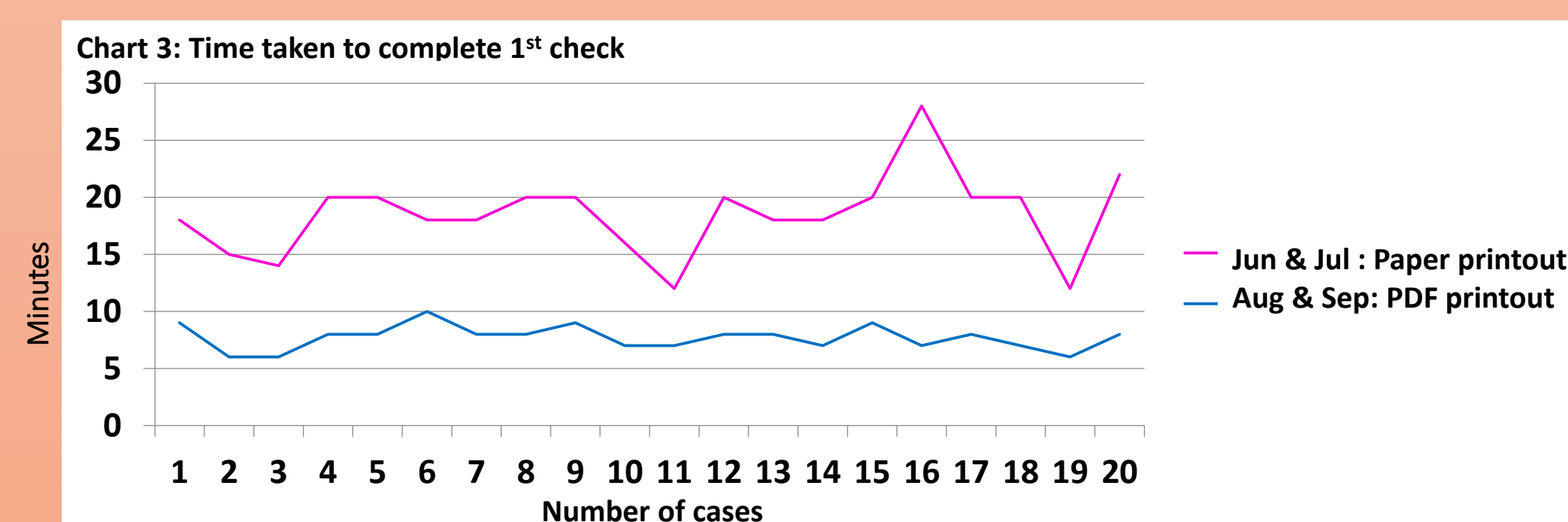
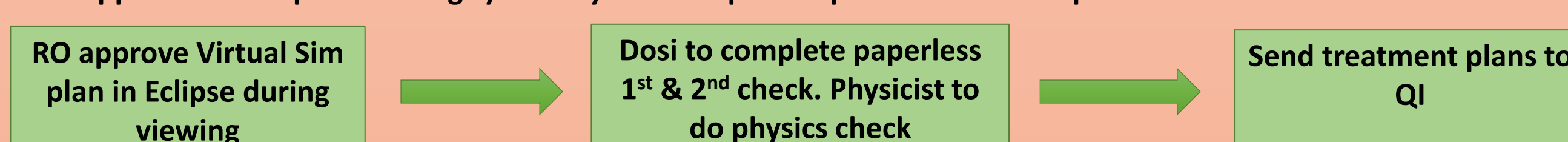
Chart 2: Volume delineated late from May to September 2014



- After the intervention, the median % is still quite similar
- The delay in delineation were due to the ROs having ad-hoc meetings or CT scan procedure was booked when they were on leave or overseas conference
- This intervention will be on hold for the time being, while we work with Mosaik staff to come up with an automated scheduling system to include RO's leave schedule

Intervention 2- PDSA

Plan approval on Eclipse Planning system by RO & Paperless printout in Mosaik for Planners

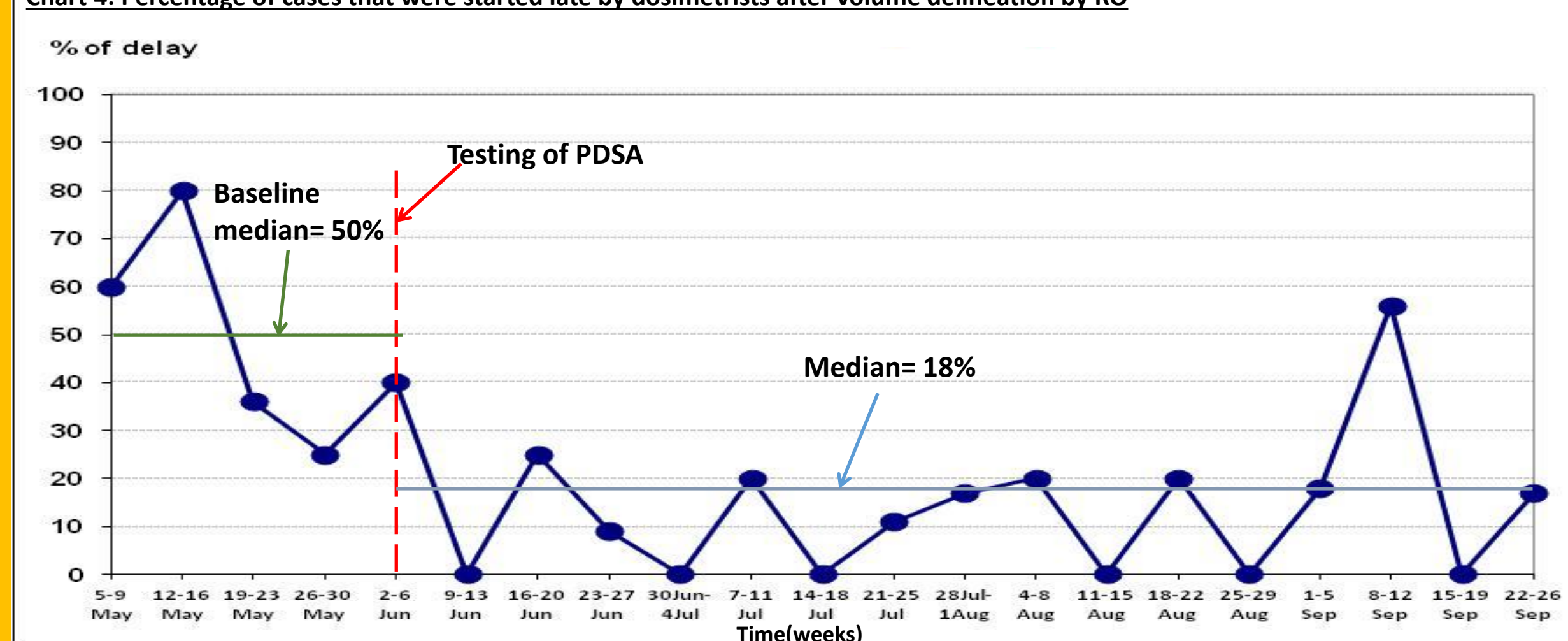


- By getting the ROs to approve the plan on the planning system for virtual simulated plans has significantly reduced the time for dosimetrist 1st check by 50%
- We are looking into spreading this paperless approval method to IMRT (Intensity Modulated Radiotherapy) planning treatment technique

Intervention 3- PDSA

Introduction of RT planners to increase manpower in planning department

Chart 4: Percentage of cases that were started late by dosimetrists after volume delineation by RO

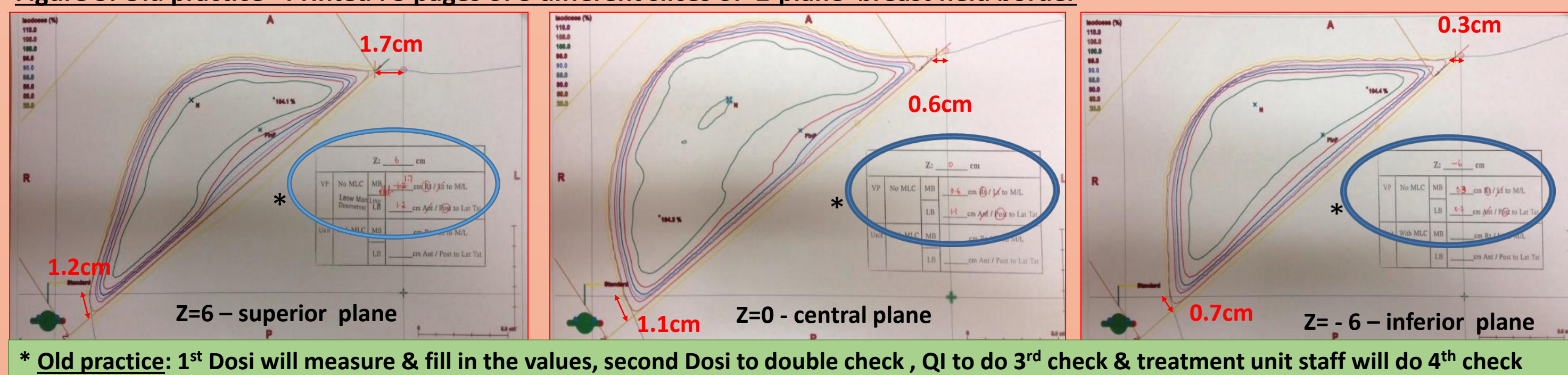


- Radiation therapists are rotated into planning to be trained as RT planners. They helped out in virtual simulated and 3D plans
- There is a drop in the median percentage (50% to 18%) of cases that were started late weekly after the intervention
- By rotating more Radiation therapists into planning, the total numbers of planners increase and thus more plans can be started promptly and delivered to QI on time

Intervention 4- PDSA

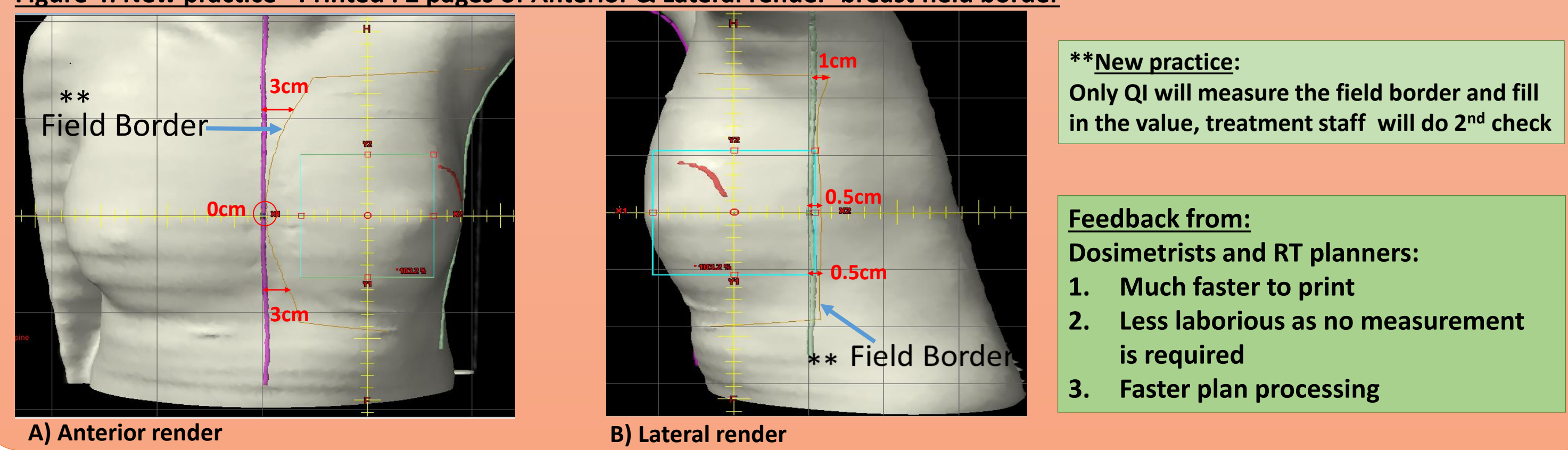
To reduce the number of pages for printing breast field border measurement and write up for breast cases during 1st check

Figure 3: Old practice - Printed : 3 pages of 3 different slices of 'Z-plane' breast field border



* Old practice: 1st Dosi will measure & fill in the values, second Dosi to double check, QI to do 3rd check & treatment unit staff will do 4th check

Figure 4: New practice - Printed : 2 pages of Anterior & Lateral render breast field border

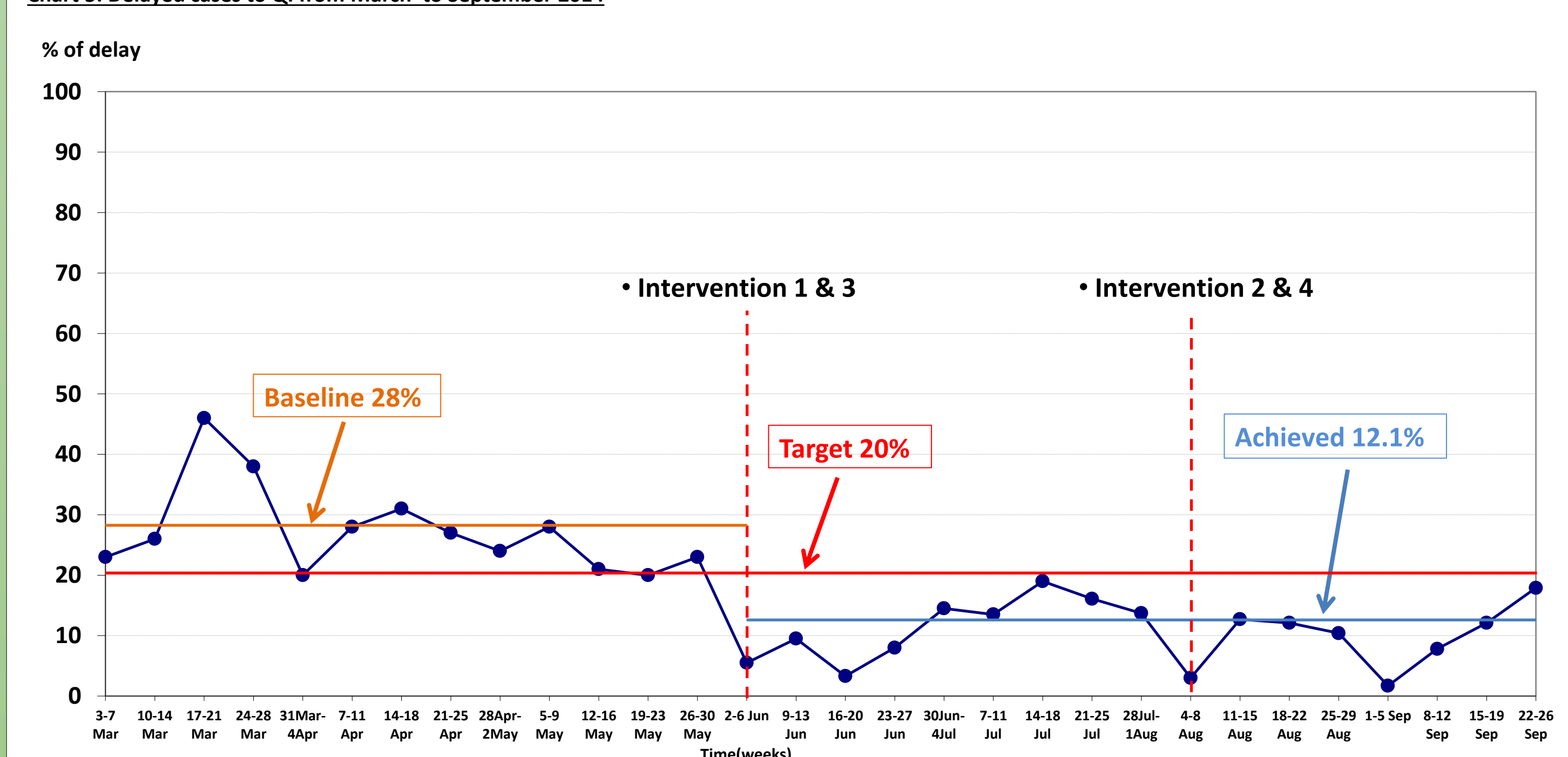


**New practice:
Only QI will measure the field border and fill in the value, treatment staff will do 2nd check

Feedback from:
Dosimetrists and RT planners:
1. Much faster to print
2. Less laborious as no measurement is required
3. Faster plan processing

Results of number of late cases to QI: From June to September after different interventions

Chart 5: Delayed cases to QI from March to September 2014



- There are significant improvement in the number of cases sent to QI on time after the interventions
- Dosimetrists commented that they are able to start and complete the plans more promptly and QI staff also observed that they are receiving the plans on time
- This could be largely due to the increase of manpower (training of RT planners) in the planning department
- We will continue to work on sustaining the interventions and to maintain the rate of treatment plans deliver to QI on time

Acknowledgement:

We would also like to thank P.G. Chew (Sponsor), S. Wong, Planning team, Radiation Oncologists, Radiation Therapists and Schedulers for their contribution in this project.