2023 AAMD Plan Study
Adaptive Planning

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Introductions

- Edward Singleton
- Director of Dosimetry
- Mary Bird Perkins Cancer, Baton Rouge, La
- Worked at Mary Bird Perkins for 22 Years

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Welcome

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Special Thank You!

- Joseph Brock
- Cornelia Gallow
- Janis Mayfield
- Trinh Nguyen
- Ben Nelms
- Rick Scherer

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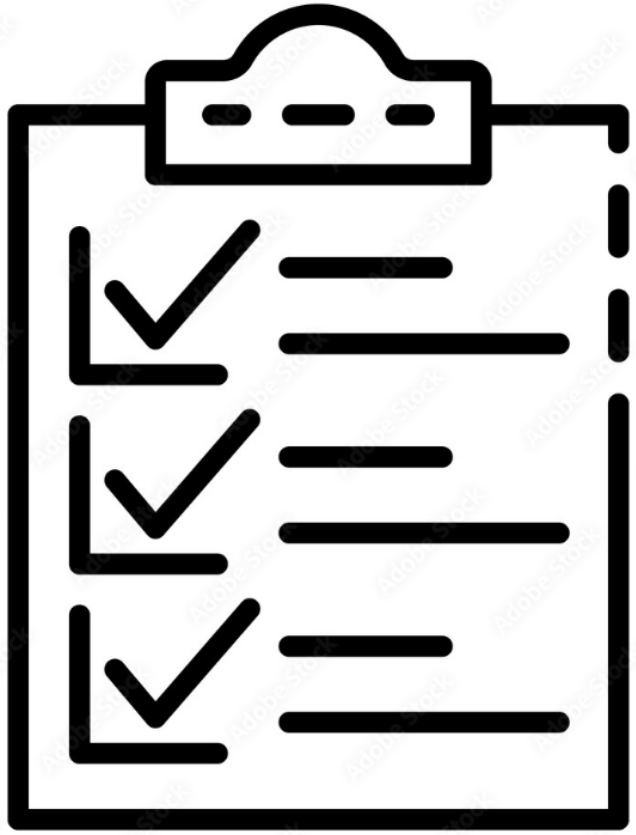
Plan Study Outline

- Overview
- Methods
- Results and Discussion
- Conclusions
- Questions



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Plan Study Overview

- Something New
- Test Planning Knowledge and Efficiency
- Simulate Real World Dosimetry Experience

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Plan Study Overview

- Patient treated at Mary Bird Perkins
- The contours used for the plan challenge were created by the Physicians at Mary Bird Perkins and the dosimetry staff
- H&N patient with weight loss
- Patient had a new CT and PTV's during treatment

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Plan Study Overview

- New revised planning PTV's were turned into dosimetry from the Physician
- Physician turns in and wants to start the new plan for the next fraction
- Meet all the scorecard plan requirements

- ***Main Metric = TIME it took to meet all objectives***

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Adaptative Planning

Why do a case study on adaptive planning?

- It is becoming common for certain treatment sites
- To test our planning knowledge under a time constraint
- To evaluate how different treatment planning systems handle adaptive planning
- To evaluate if planning with a time constraint reduces the quality of a plan
- Just to add some more chaos to our life

Patient History

- A H&N patient was selected for the planning study
- 34 Year Old Male
- pT4aN3bM0 Squamous Cell Carcinoma of the Left Retromolar Trigone
- Poorly Differentiated
- Smoked 1-2 packs weekly for 10 years prior to diagnosis
- Alcohol consumption of 1-2 drinks/week
- 189lbs at the time of diagnosis

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Retromolar Trigone Statistics

- Aggressive malignancies that mostly present at an advance stage
- Rare location for oral cavity tumors
- Squamous Cell Carcinoma of the Left Retromolar Trigone account for only 1.4% to 5.6% of all oral cavity cancers
- Mean age at diagnosis is 59.4
- 80% of patients diagnosed were either stage 3 or 4

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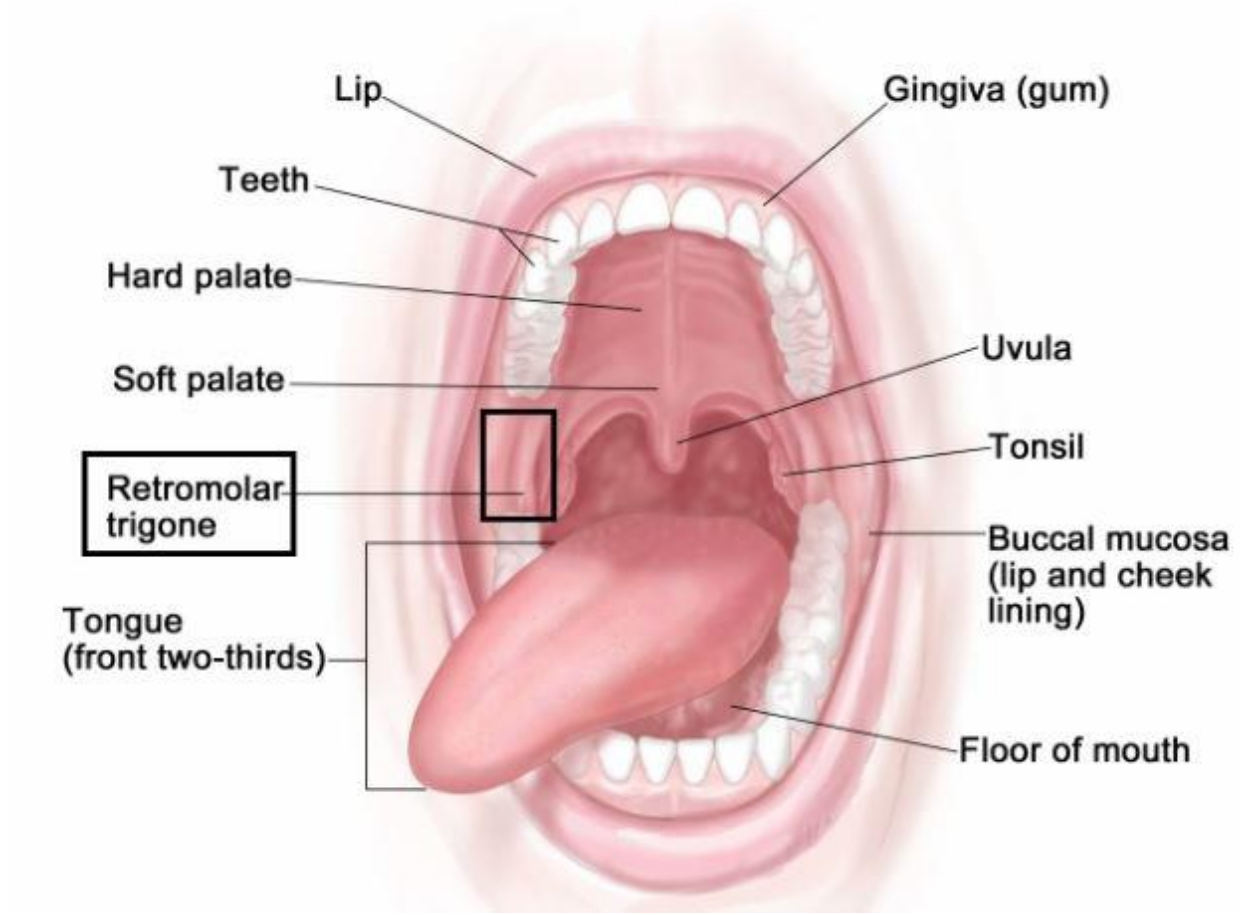
Retromolar Trigone



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Retromolar Trigone

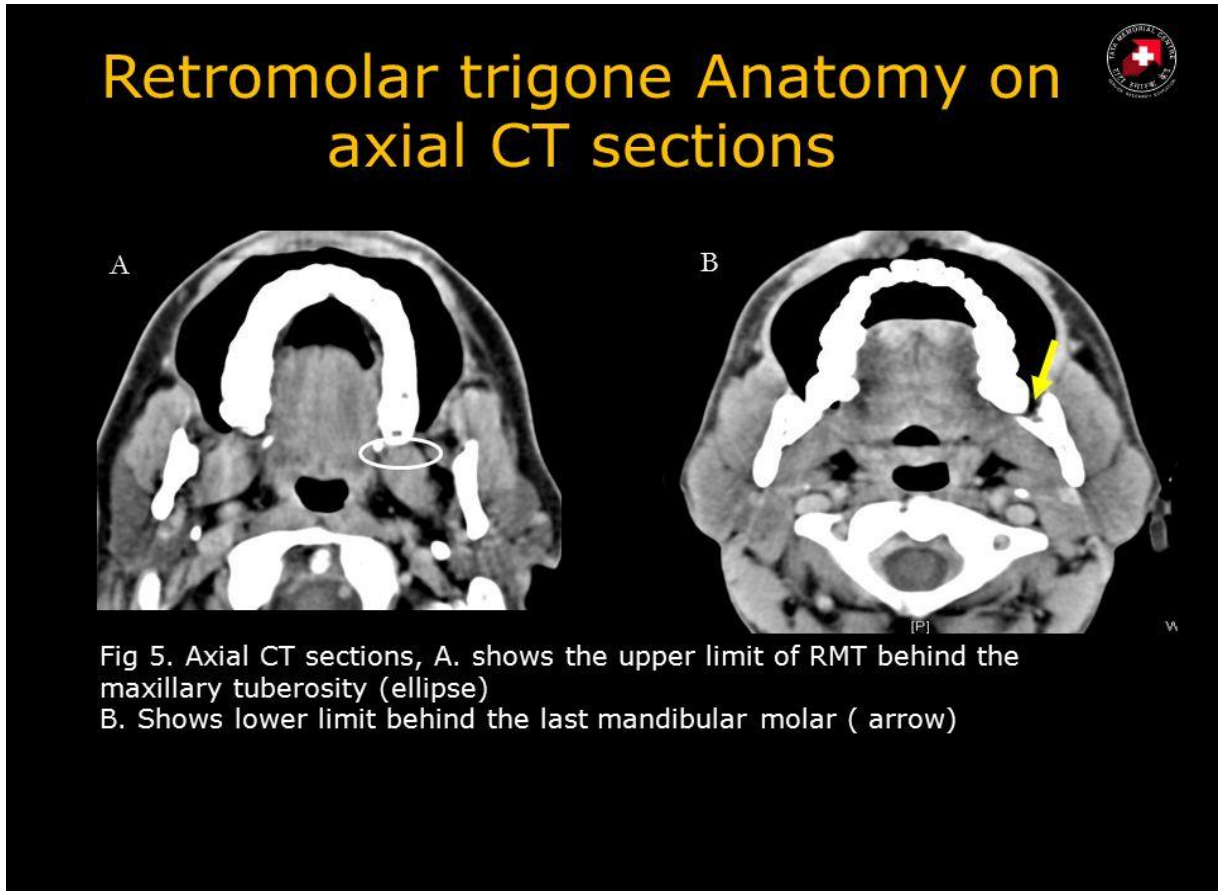

Fig 5. Axial CT sections, A. shows the upper limit of RMT behind the maxillary tuberosity (ellipse)
B. Shows lower limit behind the last mandibular molar (arrow)

https://www.google.com/url?sa=i&url=https%3A%2F%2Fslideplayer.com%2Fslide%2F5869342%2F&psig=AOvVaw24H4jmUuQdFg8R69mIfEQB&ust=1682094853161000&source=images&cd=vfe&ved=0CBIQjhxqFwoTCPDxgfHxuP4CFQAAAAAdAAAAABAE

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Course Of Treatment

- Surgery(Multiple positive lymph nodes found in surgery)
- Dental Evaluation
- Postop Concurrent Chemo/Radiation

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Planning CT Setup

- Supine
- S Frame with mold care
- Bite block/stent to deviate the tongue to the patients right
- Arms across abdomen holding ring
- Knee sponge
- Wire over incision
- 3mm bolus over incision
- .25cm slice thickness

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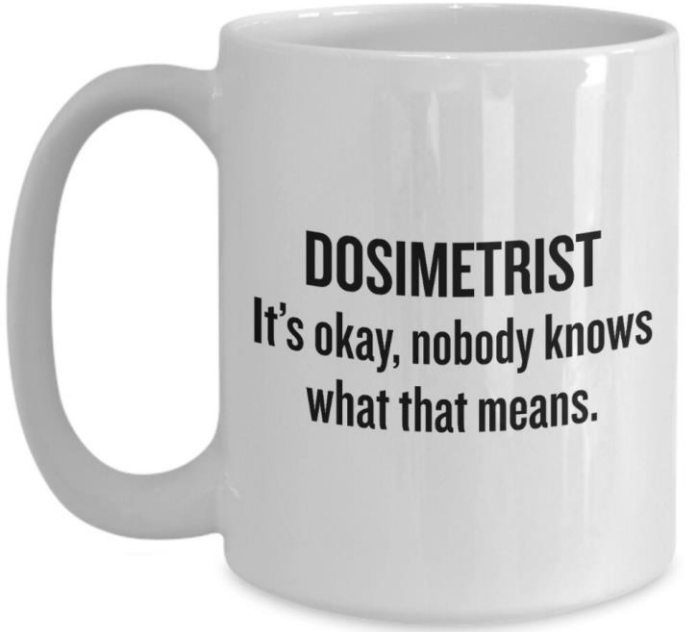
Clinical Planning Directive

- 210cGy/fraction
- 30 fractions
- 6MV
- 2 arc VMAT
- Four PTV Levels (63Gy, 60Gy, 57Gy, 54Gy)
- 3mm bolus over incision
- 95% coverage of PTV 63Gy and PTV 60Gy
- 90% coverage of PTV 57Gy and PTV 54Gy



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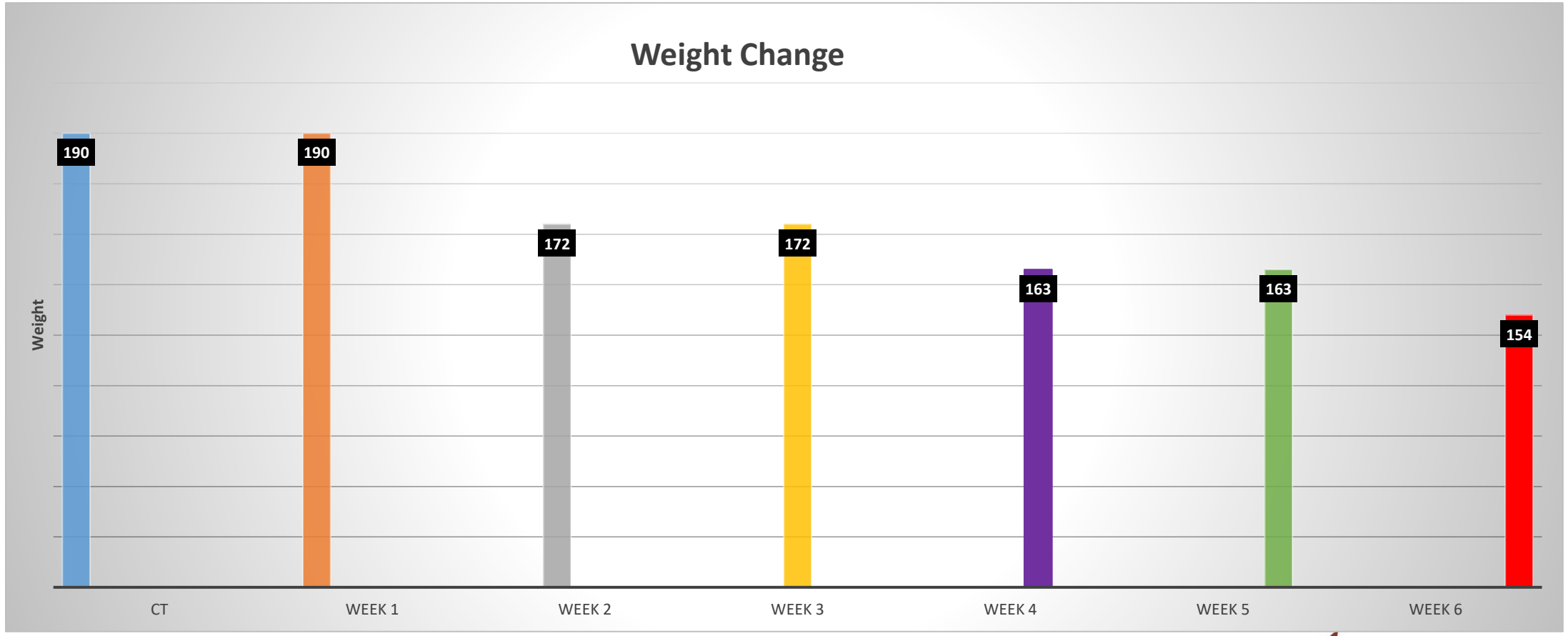
Weight Change



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Weight Change

- 10% Weight Loss at Week 2
- 16.5% Weight Loss at Week 4
- 23.3% Weight Loss at Week 6

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Weight Change

- ***At week 4, the Decision was made to rescan and re-plan the patient***
- The patient has a 16.5% weight loss
- Decrease of 2cm in the SSD on the patients left
- Decrease of .8-1cm in the SSD on the patients right

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Weight Change

2.2 cm decrease on the left side

.8cm decrease on the right side

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Timeline

Wednesday 3:00PM

- The Patient had a new planning CT

Thursday 2:00PM

- New revised planning PTV's were turned into dosimetry from the Physician

Thursday 2:05PM

- The physician informs dosimetry that the plan must start the next day

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Timeline

Thursday 3:00PM

- The therapists alert dosimetry that the patients time for Friday has been moved from 2:30pm to 8:00AM

Thursday 3:30PM

- Physics informs dosimetry that they need the plan by 7:00PM at the latest so they can perform QA

Thursday 6:00PM

- Dosimetry has an approved plan by the Physician

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Timeline

Friday 8:00AM

- Dosimetry staff start looking for new jobs

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Plan Study

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Methods

- We wanted something different and we wanted to hear from you!
- Decision was made to send out a survey.

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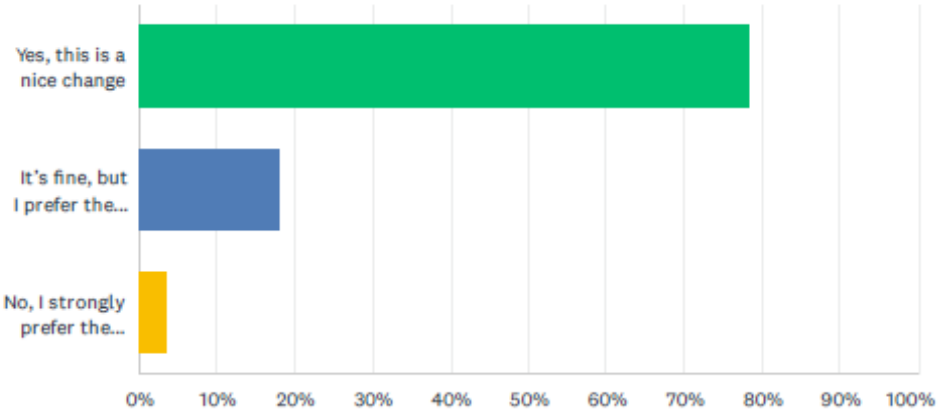
Survey

Q1 In general, do you like this idea for the 2023 AAMD Plan Study?

Answered: 84 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes, this is a nice change	78.57%	66
It's fine, but I prefer the conventional plan study methods	17.86%	15
No, I strongly prefer the conventional plan study method	3.57%	3
TOTAL		84

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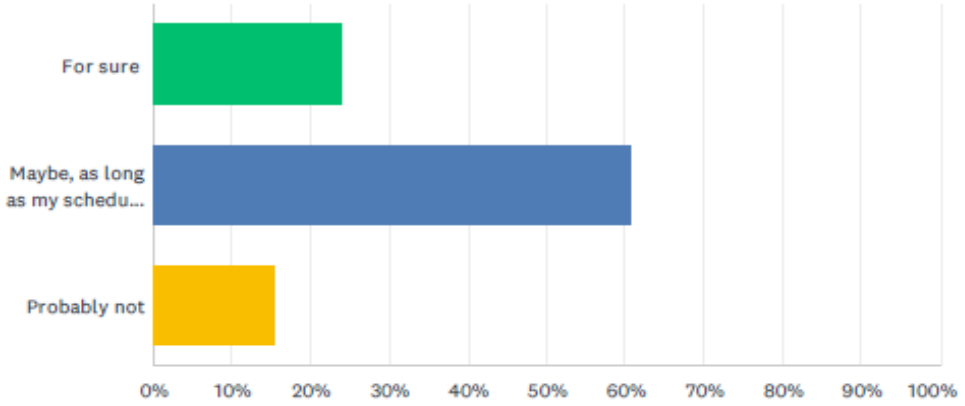
Survey

Q2 Do you think you will participate if the study is designed like this?

Answered: 84 Skipped: 0



ANSWER CHOICES	RESPONSES	
For sure	23.81%	20
Maybe, as long as my schedule permits	60.71%	51
Probably not	15.48%	13
TOTAL		84

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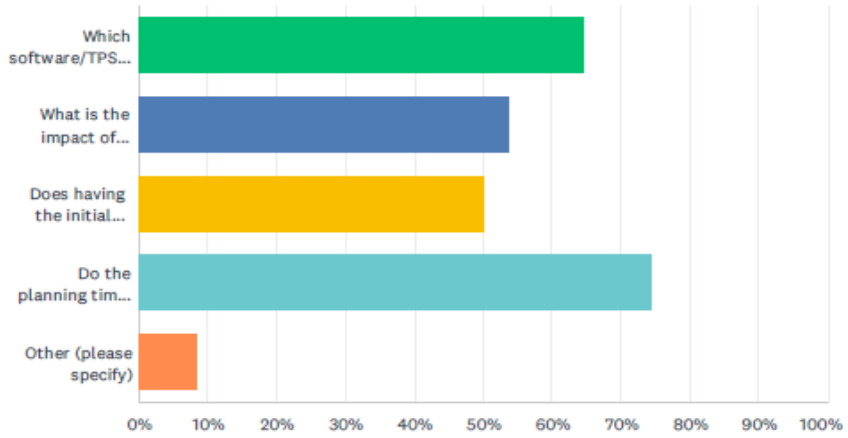
Survey

Q3 What questions do you hope this study would answer? (Select any that apply)

Answered: 82 Skipped: 2



ANSWER CHOICES	RESPONSES	
Which software/TPS systems are most efficient when working in a time crunch?	64.63%	53
What is the impact of computing hardware (age/model of computer, processing power, memory, etc.) on efficiency?	53.66%	44
Does having the initial plan and/or dose make re-planning faster for some software systems?	50.00%	41
Do the planning times observed align with physicians' expectations for urgent replanning orders?	74.39%	61
Other (please specify)	8.54%	7

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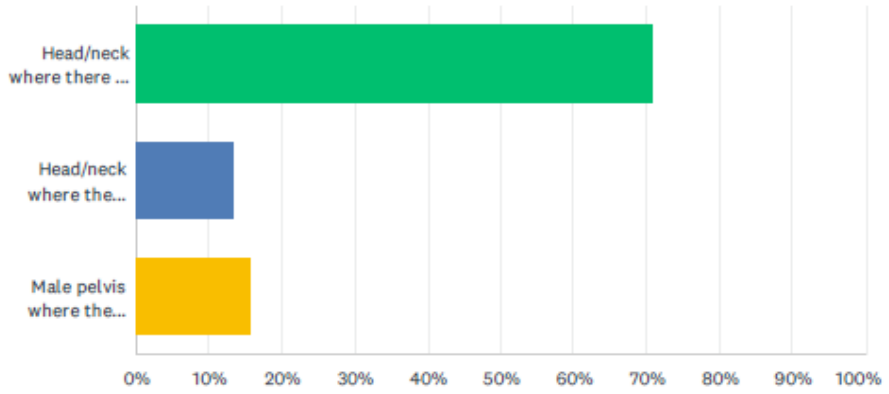
Survey

Q4 Which body site re-plan would you find most useful to study?

Answered: 82 Skipped: 2



ANSWER CHOICES	RESPONSES	
Head/neck where there is significant weight loss during the course of treatment	70.73%	58
Head/neck where the original simulation was in an imperfect position that proved hard to align with using CBCT	13.41%	11
Male pelvis where the target volume decreases drastically during the course of treatment (ex: Target regression with increased bowel presence)	15.85%	13
TOTAL		82

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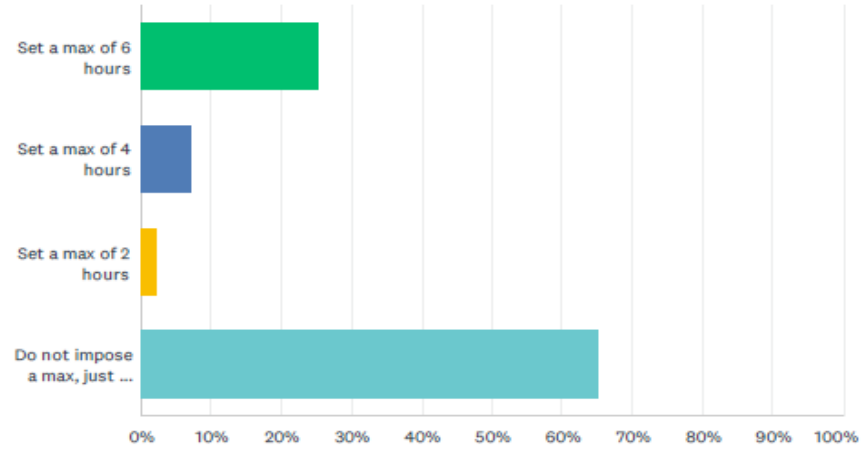
Survey

Q5 Should there be a “max threshold” of time allowed from when you login to download the new dataset to when you achieve all the re-plan metrics?

Answered: 83 Skipped: 1



ANSWER CHOICES	RESPONSES	
Set a max of 6 hours	25.30%	21
Set a max of 4 hours	7.23%	6
Set a max of 2 hours	2.41%	2
Do not impose a max, just let people finish when they finish (perhaps with time management alerts to simulate real world demands in planning for next day treatment)	65.06%	54
TOTAL		83

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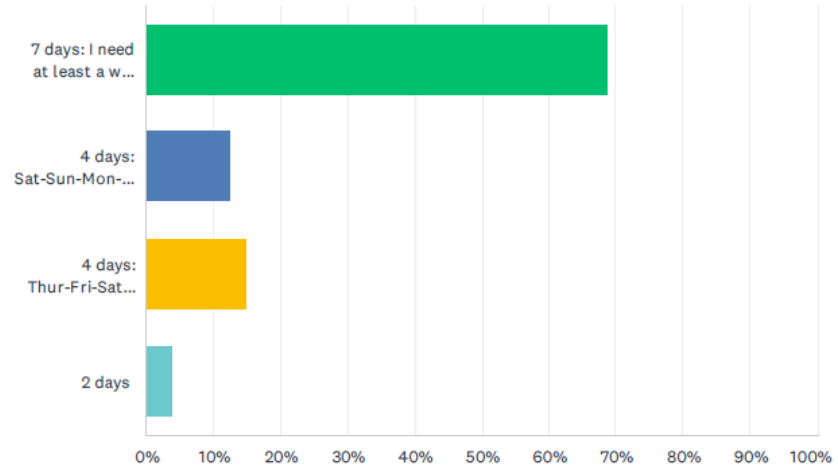
Survey

Q6 What participation window (i.e., how many days) would be sufficient to allow you to pick a time to block off to participate uninterrupted?

Answered: 80 Skipped: 4



ANSWER CHOICES	RESPONSES	
7 days: I need at least a week to find a block of time	68.75%	55
4 days: Sat-Sun-Mon-Tues	12.50%	10
4 days: Thur-Fri-Sat-Sun	15.00%	12
2 days	3.75%	3
TOTAL		80

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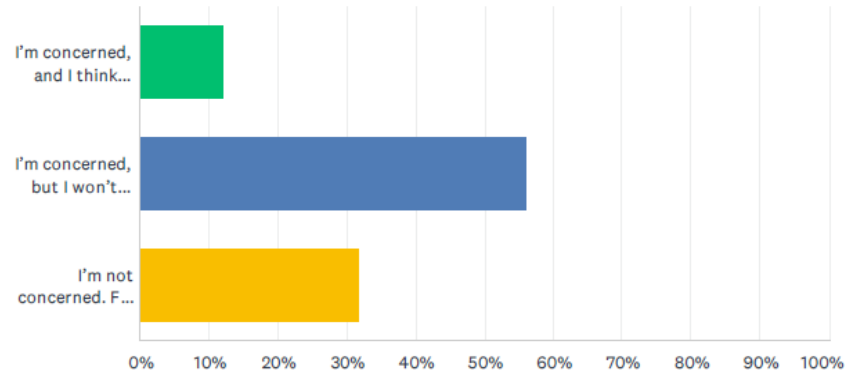
Survey

Q7 Are you concerned about “cheaters” who might get the data from a friend in advance to make it look like their planning time was shorter than it really was?

Answered: 82 Skipped: 2



ANSWER CHOICES	RESPONSES	
I'm concerned, and I think there should be auditing! I think people find ways to game the system and it throws off results.	12.20%	10
I'm concerned, but I won't lose sleep over it. If people want to cheat in an educational exercise, it's on their conscience.	56.10%	46
I'm not concerned. Few if any people would actually do this so it will not overly skew the results.	31.71%	26
TOTAL		82

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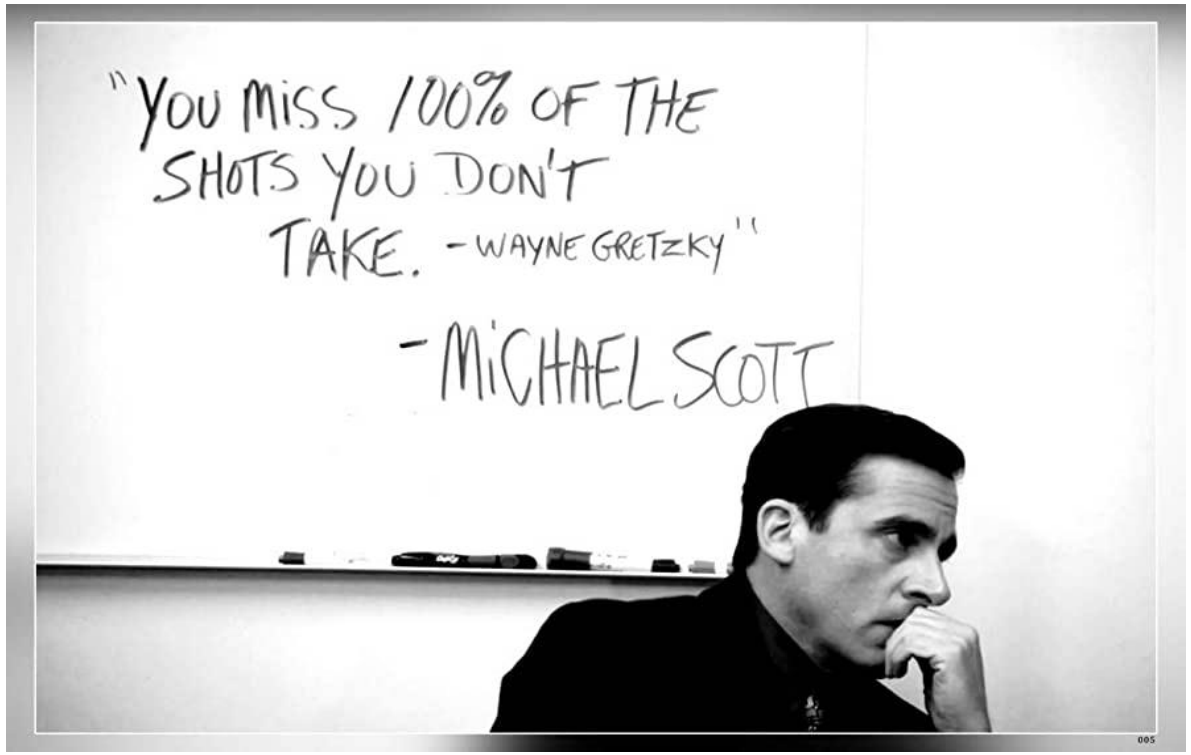
Methods

DECISIONS!



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Phase 1

This is a different Plan Study. We are not focused on the scores for phase 1, we are more focused on time efficiency.

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Methods

- Study is limited to external beam photon plans
- Only one isocenter
- Only Co-Planar treatment beams
- **Ignore the CT FOV cutoff area and design beams that intersect those regions** (rather than attempting to avoid those regions as you might do for a real case).

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Methods

- Use a practical clinical plan
- Do not let the scoring algorithm tempt you to create an overly complex or unrealistic plan for the sake of the score!
- 3 Phases

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Methods

PHASE 1: Original Plan

Original Plan Dataset Published @ ProKnow

(AAMD Organization)

Download Original CT and RT Structure Set

Import to your TPS.

Create Plan for Original CT/Structures

Create and score a plan for the patient's original images and structures. The scorecard for the Phase 1 plan will be in the form of a typical 5-level ProKnow plan study with objectives totaling 150 points.

This step is not the official plan study, so you do not need to work much to maximize your point total. Rather, **the goal of this step is to build what you believe to be a good starting point and/or optimization template for the timed adaptive plan** (Phase 2).

Even though these plan scores are not the focal point of this study, be sure to **Submit** your plan in ProKnow (press "Submit") so that we can do things like study adaptive plan efficiency vs. original plan quality. (See Data Curation and Analyses.)

PHASE 2: Adaptive Plan

Adaptive Plan Dataset Published @ ProKnow

(AAMD Organization)

Download Adaptive CT and RT Structure Set

Import to your TPS.

Start Your Timer!

We will study how quickly you can create a new plan that meets all objectives for new CT images and structures for the same patient.

Plan Until Each Metric's Goal Is Met

The adaptive plan scorecard will have the exact same metrics as Phase 1, but now the goals will be binary ("Goal Met" vs. "Goal Not Met").

Keep planning until you get all results to be "Goal Met" (i.e., all green, no red).

Stop Your Timer!

Once you achieve all goals, record your elapsed time.

Submit Plan and Answer Required Questions

PHASE 3: Analysis & Learning

Close of Submission Phase

Start of Data Analyses

Data Curation and Analyses

The 2023 AAMD Plan Study team will collect all the results and do some useful number crunching, including but not limited to the following:

- Variation in planning time it took to achieve all goals for all metrics under a time crunch
- Variation in adaptive planning time for different TPS models
- Planning time vs. original plan score (to see if a higher quality initial plan makes adaptive planning faster/easier)
- Planning time vs. user-defined "software grade" and "hardware grade" to learn the impact of newer software and faster hardware
- Planning time vs. experience level, both for overall planning experience and experience for the specific PS used in this study
- Other pertinent and possible analyses

AAMD Presentation & Publication of Results

Results presentation and subsequent publication of results and interactive analysis tools on ProKnow.

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ProKnow®

Performance Bin Scoring
ProKnow®

Original Plan: 63/60/57/54 Gy in 30 fractions

#	METRIC ID (24 Total Metrics)	WEIGHT (150)	PERFORMANCE BINS				
[01]	Volume (%) of the PTV63 covered by 63 (Gy)	10	< 90 UNACCEPTABLE	90 MARGINAL	95 ACCEPTABLE	97 GOOD	100 IDEAL
[02]	Volume (%) of the PTV60 covered by 60 (Gy)	10	< 90 UNACCEPTABLE	90 MARGINAL	95 ACCEPTABLE	97 GOOD	100 IDEAL
[03]	Volume (%) of the PTV57 covered by 57 (Gy)	12.5	< 90 UNACCEPTABLE	90 MARGINAL	95 ACCEPTABLE	97 GOOD	100 IDEAL
[04]	Volume (%) of the PTV54 covered by 54 (Gy)	12.5	< 90 UNACCEPTABLE	90 MARGINAL	95 ACCEPTABLE	97 GOOD	100 IDEAL
[05]	Dose (Gy) covering 99 (%) of the CTV63	10	< 55 UNACCEPTABLE	55 MARGINAL	59 ACCEPTABLE	61 GOOD	63 IDEAL
[06]	Dose (Gy) covering 99 (%) of the CTV60	10	< 56 UNACCEPTABLE	56 MARGINAL	58 ACCEPTABLE	59 GOOD	60 IDEAL
[07]	Dose (Gy) covering 99 (%) of the CTV57	10	< 54 UNACCEPTABLE	54 MARGINAL	55 ACCEPTABLE	56 GOOD	57 IDEAL
[08]	Dose (Gy) covering 99 (%) of the CTV54	10	< 51 UNACCEPTABLE	51 MARGINAL	52 ACCEPTABLE	53 GOOD	54 IDEAL
[09]	High dose volume of regret (cc) [Vol(67 Gy) outside of CTV63]	5	> 1 UNACCEPTABLE	1 MARGINAL	0.5 ACCEPTABLE	0.2 GOOD	0.03 IDEAL
[10]	Dose (Gy) covering 0.03 (cc) of the SpinalCord	5	> 48 UNACCEPTABLE	48 MARGINAL	45 ACCEPTABLE	40 GOOD	30 IDEAL
[11]	Dose (Gy) covering 0.03 (cc) of the Brainstem	5	> 52 UNACCEPTABLE	52 MARGINAL	45 ACCEPTABLE	40 GOOD	30 IDEAL
[12]	Volume (%) of the Parotid_L covered by 30 (Gy)	5	> 65 UNACCEPTABLE	65 MARGINAL	55 ACCEPTABLE	45 GOOD	35 IDEAL
[13]	Volume (%) of the Parotid_R covered by 30 (Gy)	5	> 50 UNACCEPTABLE	50 MARGINAL	35 ACCEPTABLE	20 GOOD	15 IDEAL
[14]	Mean dose (Gy) to the Parotid_L	5	> 40 UNACCEPTABLE	40 MARGINAL	35 ACCEPTABLE	30 GOOD	26 IDEAL
[15]	Mean dose (Gy) to the Parotid_R	5	> 30 UNACCEPTABLE	30 MARGINAL	26 ACCEPTABLE	23 GOOD	20 IDEAL
[16]	Mean dose (Gy) to the oral avoid	5	> 45 UNACCEPTABLE	45 MARGINAL	40 ACCEPTABLE	35 GOOD	30 IDEAL
[17]	Mean dose (Gy) to the esophagus	5	> 30 UNACCEPTABLE	30 MARGINAL	25 ACCEPTABLE	20 GOOD	18 IDEAL
[18]	Dose (Gy) covering 0.03 (cc) of the pharyngeal constrictors	5	> 65 UNACCEPTABLE	65 MARGINAL	55 ACCEPTABLE	45 GOOD	35 IDEAL
[19]	Mean dose (Gy) to the pharyngeal constrictors	5	> 50 UNACCEPTABLE	50 MARGINAL	45 ACCEPTABLE	40 GOOD	37.5 IDEAL
[20]	Dose (Gy) covering 0.03 (cc) of the BP Avoid	5	> 68 UNACCEPTABLE	68 MARGINAL	63 ACCEPTA	62 GOOD	60 IDEAL
[21]	Global maximum dose (Gy)	5	> 71 UNACCEPTABLE	71 MARGINAL	69 ACCEPTABLE	67 GOOD	65 IDEAL
[22]	[CRITICAL] Number of unique isocenters	-10	> 1 UNACCEPTABLE				1 IDEAL
[23]	[CRITICAL] Number of unique couch angles	-10	> 1 UNACCEPTABLE				1 IDEAL
[24]	Cumulative meterset over all treatment beams	---	Unscored metric and/or performance bins are not defined.				

Phase 1 Scorecard

Traditional “5-level” Performance

ProKnow®

Performance Bin Scoring
ProKnow®

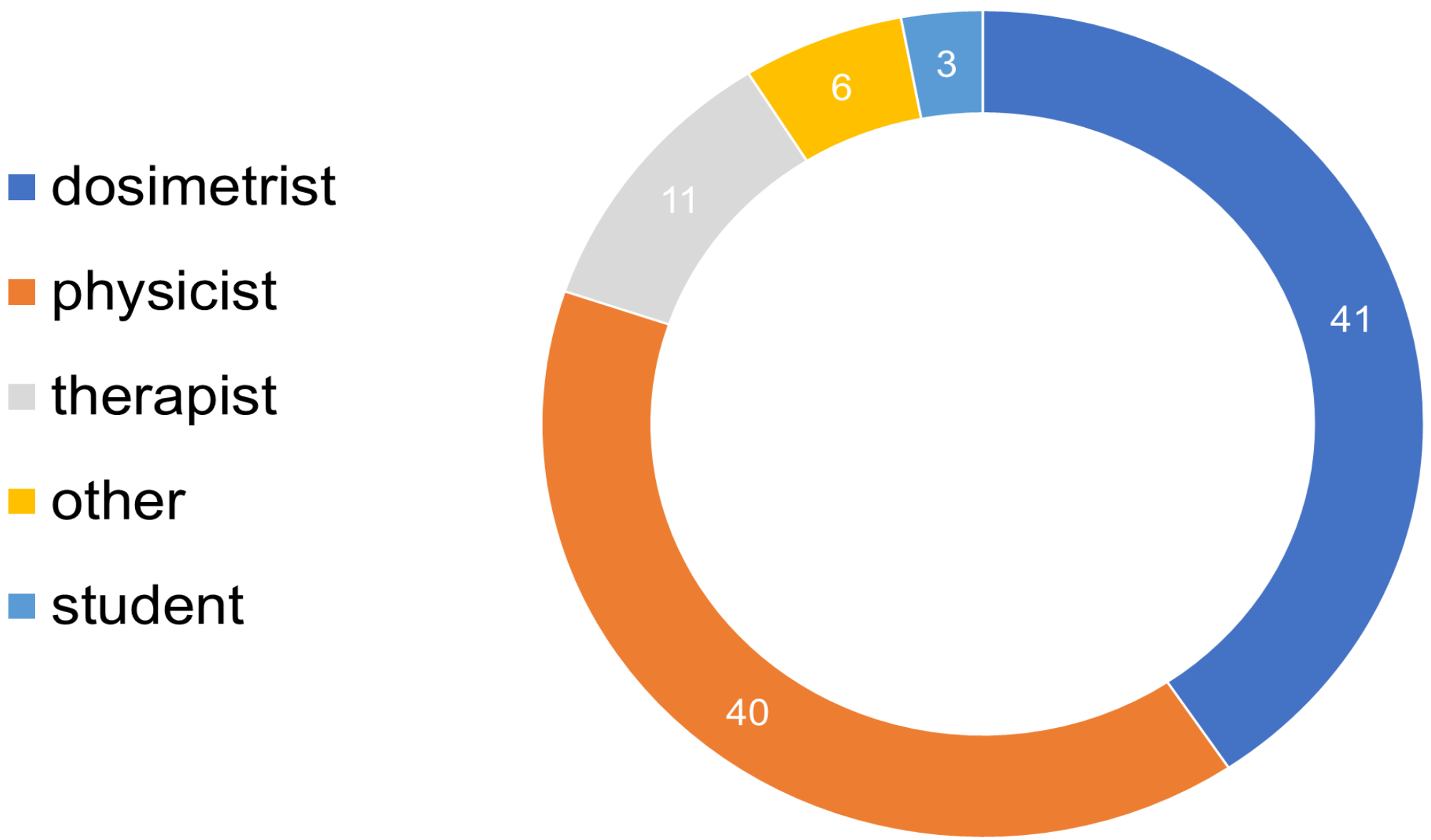
Adaptive Plan: 63/60/57/54 Gy in 30 fractions

#	METRIC ID (24 Total Metrics)	WEIGHT (21)	PERFORMANCE BINS		
[01]	Volume (%) of the PTV63 covered by 63 (Gy)	1	< 97 GOAL NOT MET		97 GOAL MET
[02]	Volume (%) of the PTV60 covered by 60 (Gy)	1	< 97 GOAL NOT MET		97 GOAL MET
[03]	Volume (%) of the PTV57 covered by 57 (Gy)	1	< 97 GOAL NOT MET		97 GOAL MET
[04]	Volume (%) of the PTV54 covered by 54 (Gy)	1	< 97 GOAL NOT MET		97 GOAL MET
[05]	Dose (Gy) covering 99 (%) of the CTV63	1	< 62.37 GOAL NOT MET		62.37 GOAL MET
[06]	Dose (Gy) covering 99 (%) of the CTV60	1	< 59.4 GOAL NOT MET		59.4 GOAL MET
[07]	Dose (Gy) covering 99 (%) of the CTV57	1	< 56.43 GOAL NOT MET		56.43 GOAL MET
[08]	Dose (Gy) covering 99 (%) of the CTV54	1	< 53.46 GOAL NOT MET		53.46 GOAL MET
[09]	High dose volume of regret (cc) [Vol(67 Gy) outside of CTV63]	1	> 0.03 GOAL NOT MET		0.03 GOAL MET
[10]	Dose (Gy) covering 0.03 (cc) of the SpinalCord	1	> 33 GOAL NOT MET		33 GOAL MET
[11]	Dose (Gy) covering 0.03 (cc) of the Brainstem	1	> 30 GOAL NOT MET		30 GOAL MET
[12]	Volume (%) of the Parotid_L covered by 30 (Gy)	1	> 60 GOAL NOT MET		60 GOAL MET
[13]	Volume (%) of the Parotid_R covered by 30 (Gy)	1	> 15 GOAL NOT MET		15 GOAL MET
[14]	Mean dose (Gy) to the Parotid_L	1	> 35 GOAL NOT MET		35 GOAL MET
[15]	Mean dose (Gy) to the Parotid_R	1	> 20 GOAL NOT MET		20 GOAL MET
[16]	Mean dose (Gy) to the oral avoid	1	> 40 GOAL NOT MET		40 GOAL MET
[17]	Mean dose (Gy) to the esophagus	1	> 18 GOAL NOT MET		18 GOAL MET
[18]	Dose (Gy) covering 0.03 (cc) of the pharyngeal constrictors	1	> 58 GOAL NOT MET		58 GOAL MET
[19]	Mean dose (Gy) to the pharyngeal constrictors	1	> 37.5 GOAL NOT MET		37.5 GOAL MET
[20]	Dose (Gy) covering 0.03 (cc) of the BP Avoid	1	> 65 GOAL NOT MET		65 GOAL MET
[21]	Global maximum dose (Gy)	1	> 69 GOAL NOT MET		69 GOAL MET
[22]	[CRITICAL] Number of unique isocenters	-1	> 1 GOAL NOT MET		1 GOAL MET
[23]	[CRITICAL] Number of unique couch angles	-1	> 1 GOAL NOT MET		1 GOAL MET
[24]	Cumulative meterset over all treatment beams	---	Unscored metric and/or performance bins are not defined.		

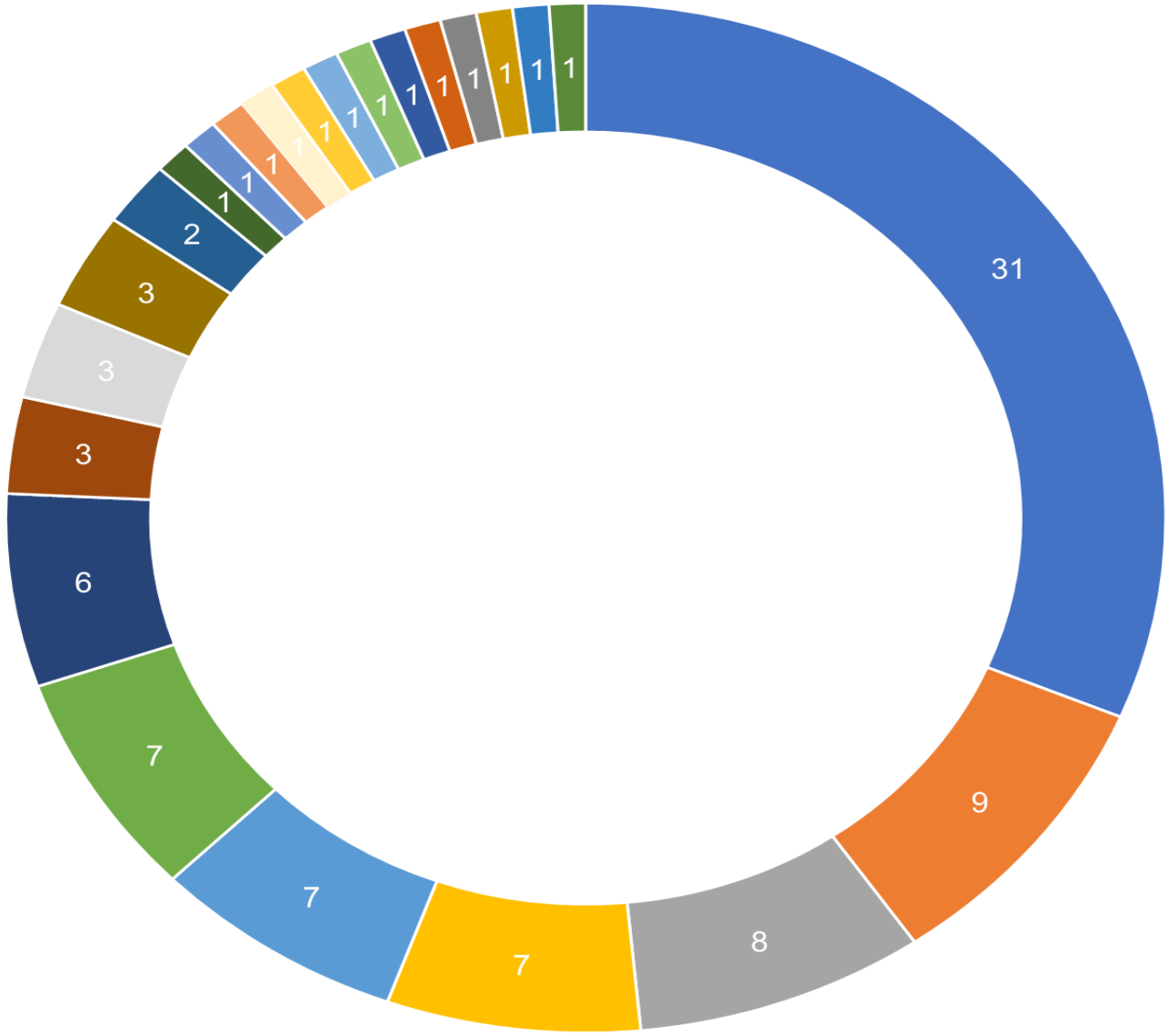
Phase 2 Scorecard

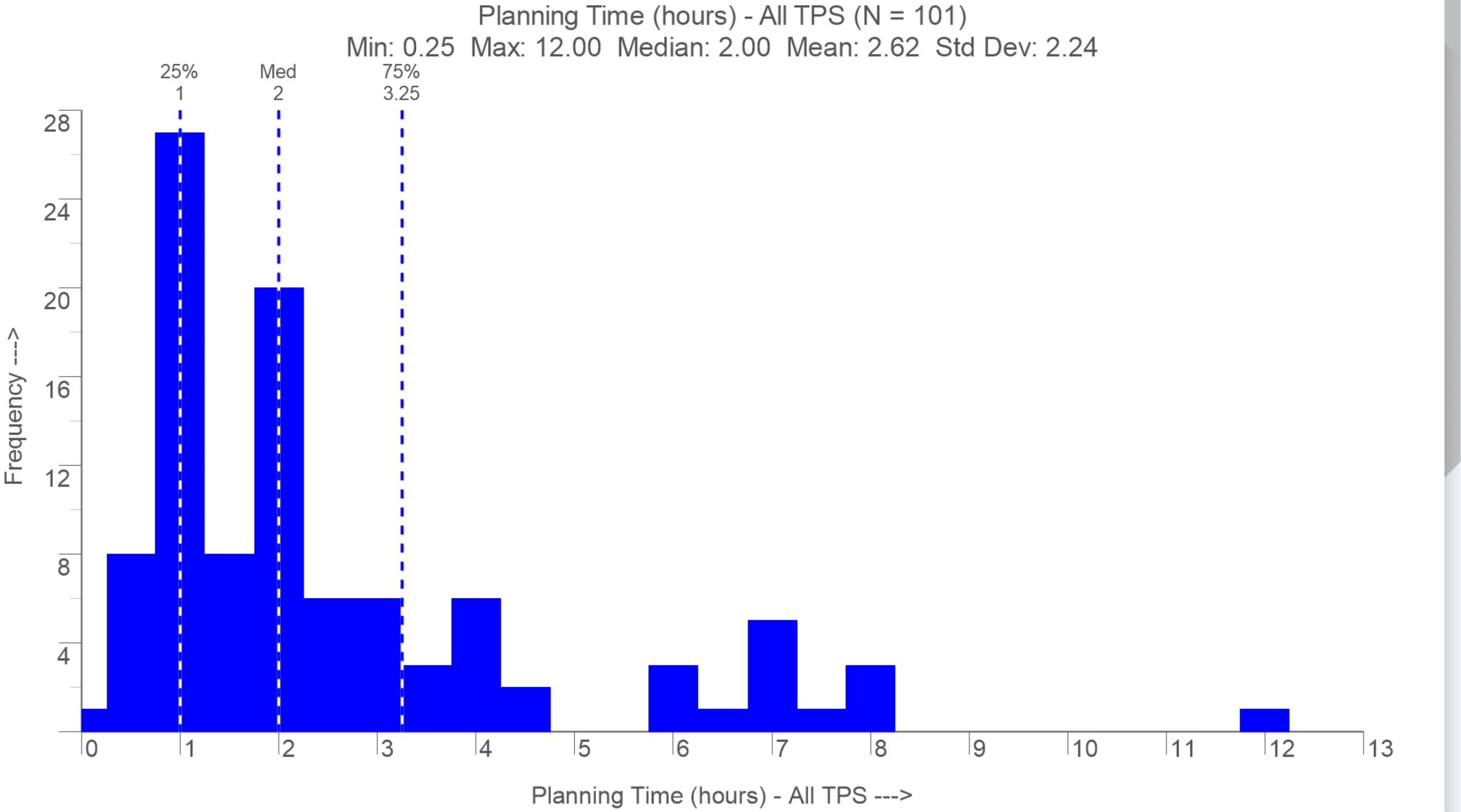
Binary objectives based on expectations from Phase 1

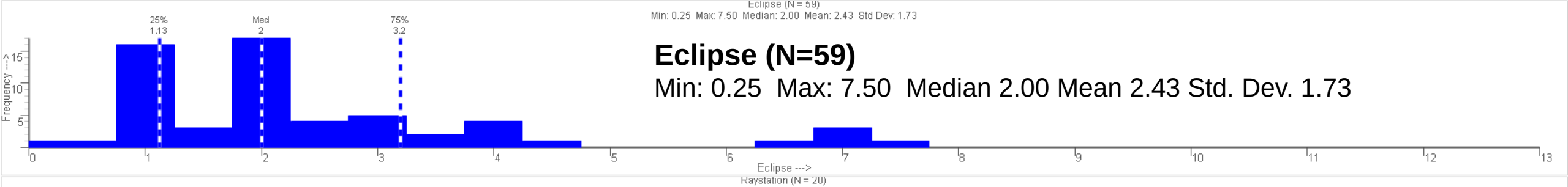
Participation by Role



Participation by Country

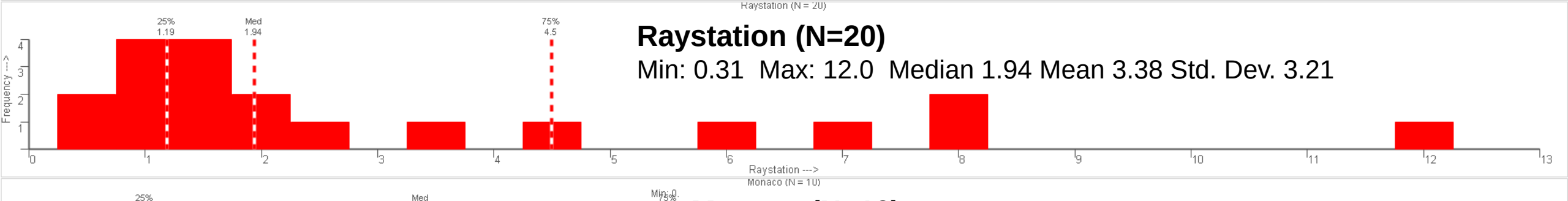



Planning Time (hours) - All TPS (N = 101)
Min: 0.25 Max: 12.00 Median: 2.00 Mean: 2.62 Std Dev: 2.24
25%
1
Med
2
75%
3.25
Frequency --->
28
24
20
16
12
8
4
0
1
2
3
4
5
6
7
8
9
10
11
12
13
Planning Time (hours) - All TPS --->



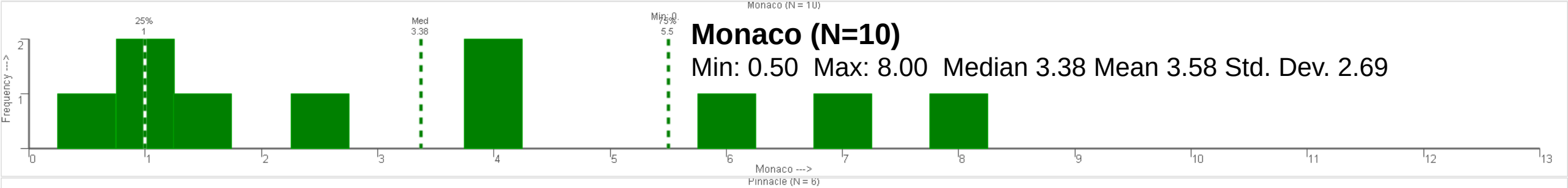
Eclipse (N=59)

Min: 0.25 Max: 7.50 Median 2.00 Mean 2.43 Std. Dev. 1.73



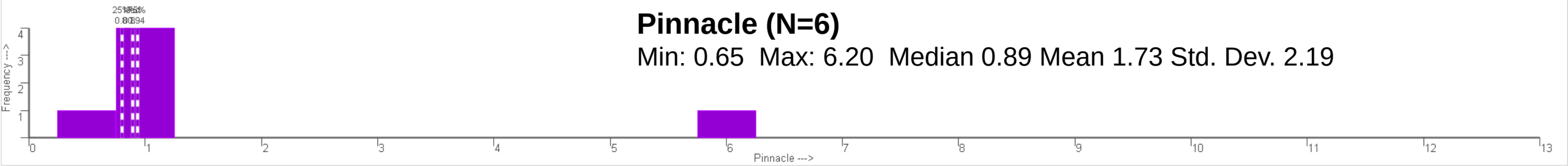
Raystation (N=20)

Min: 0.31 Max: 12.0 Median 1.94 Mean 3.38 Std. Dev. 3.21



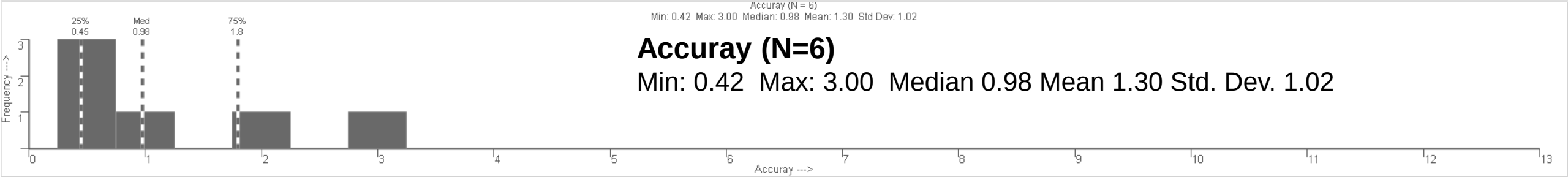
Monaco (N=10)

Min: 0.50 Max: 8.00 Median 3.38 Mean 3.58 Std. Dev. 2.69



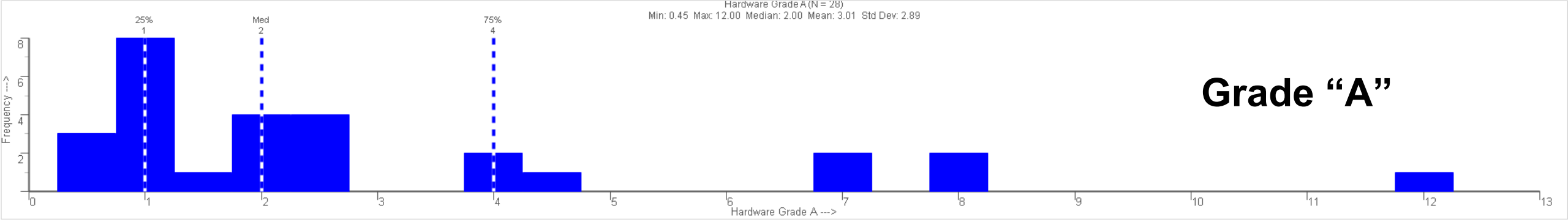
Pinnacle (N=6)

Min: 0.65 Max: 6.20 Median 0.89 Mean 1.73 Std. Dev. 2.19

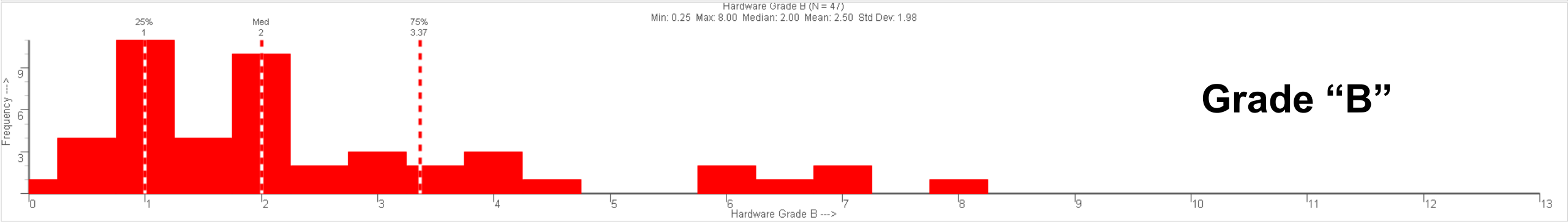


Accuray (N=6)

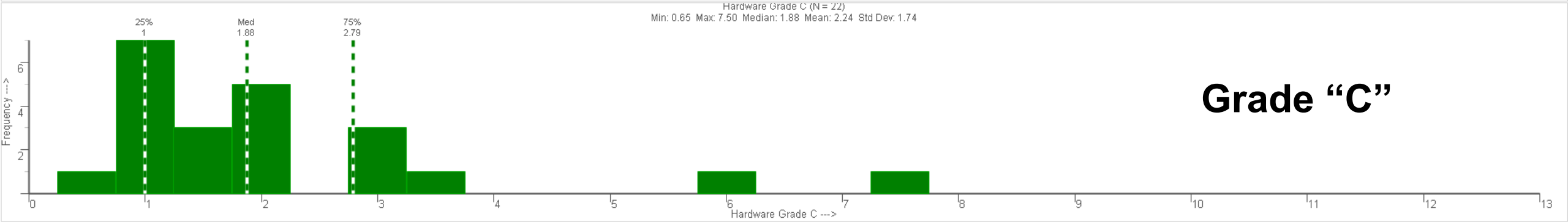
Min: 0.42 Max: 3.00 Median 0.98 Mean 1.30 Std. Dev. 1.02



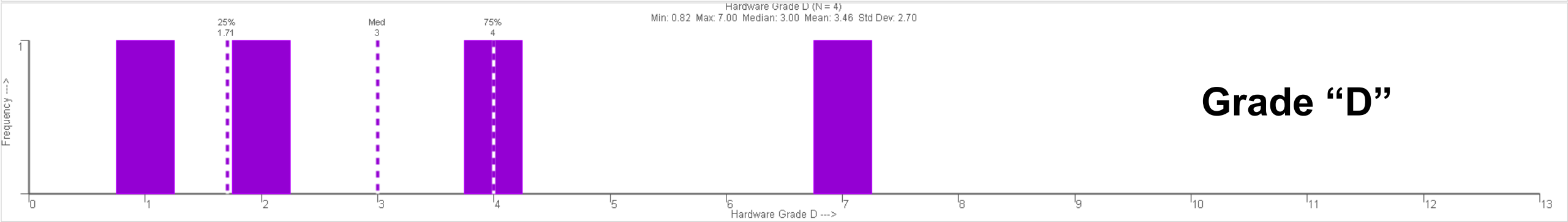
Grade “A”



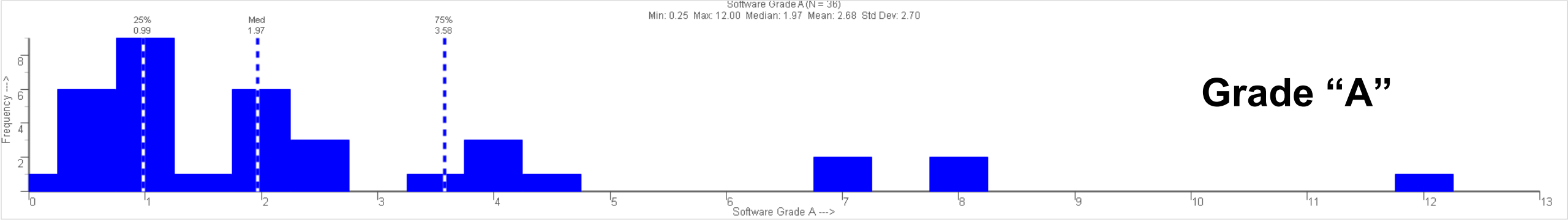
Grade “B”



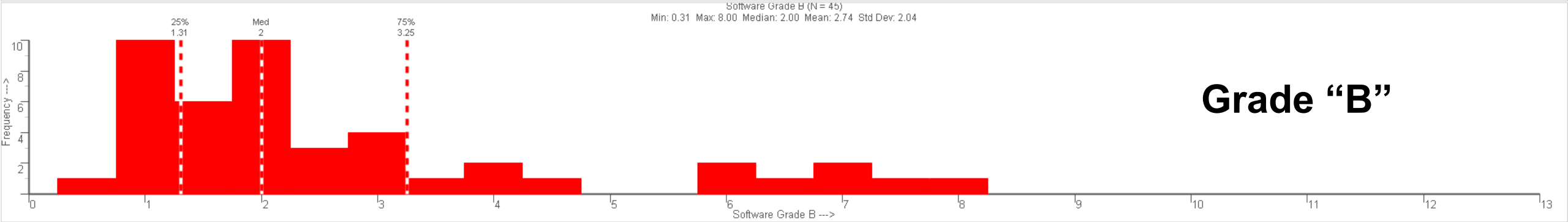
Grade “C”



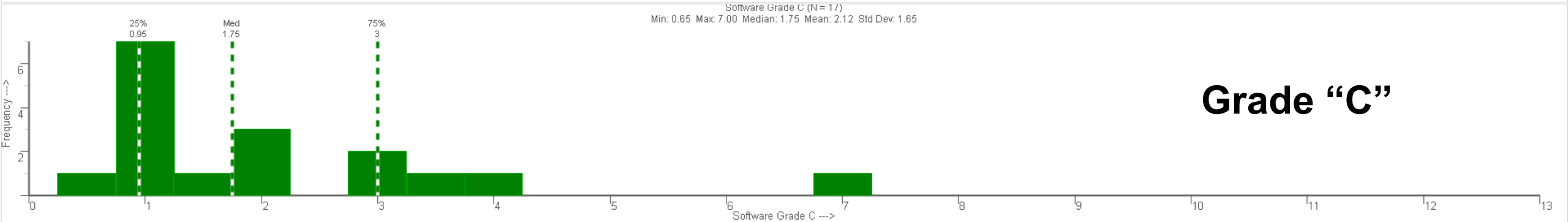
Grade “D”



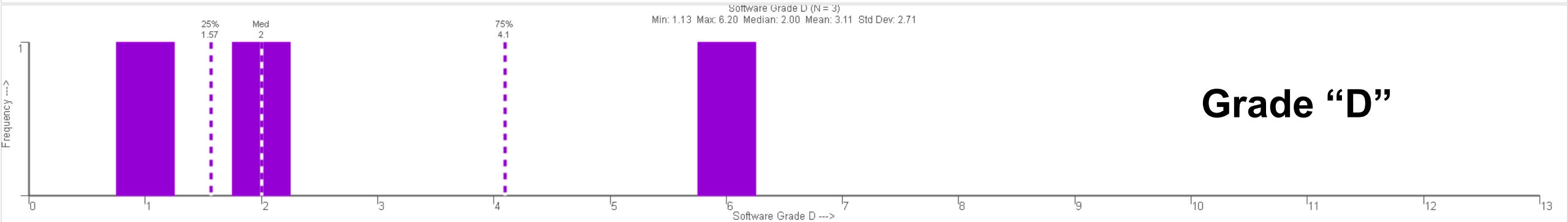
Grade “A”



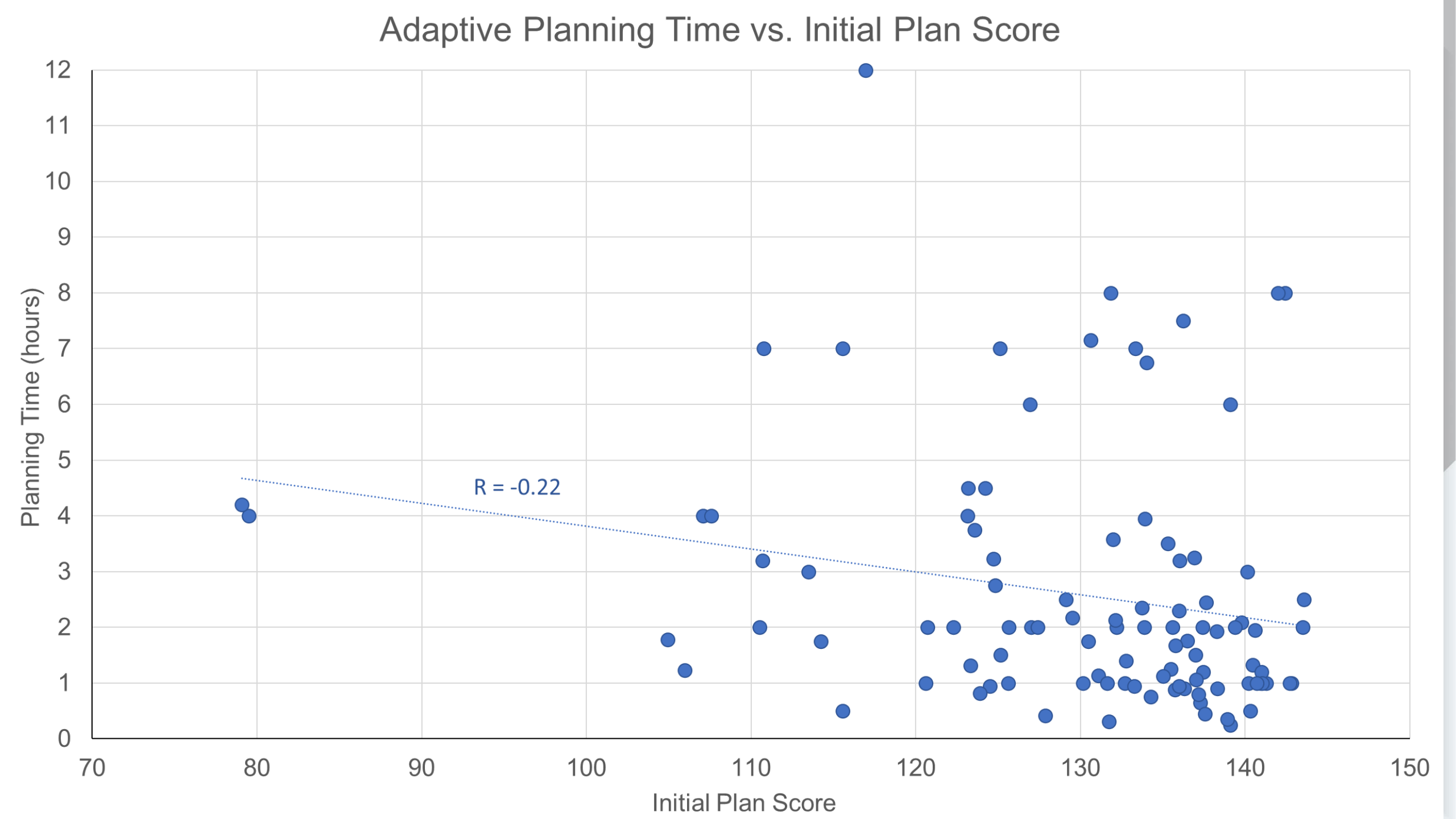
Grade “B”

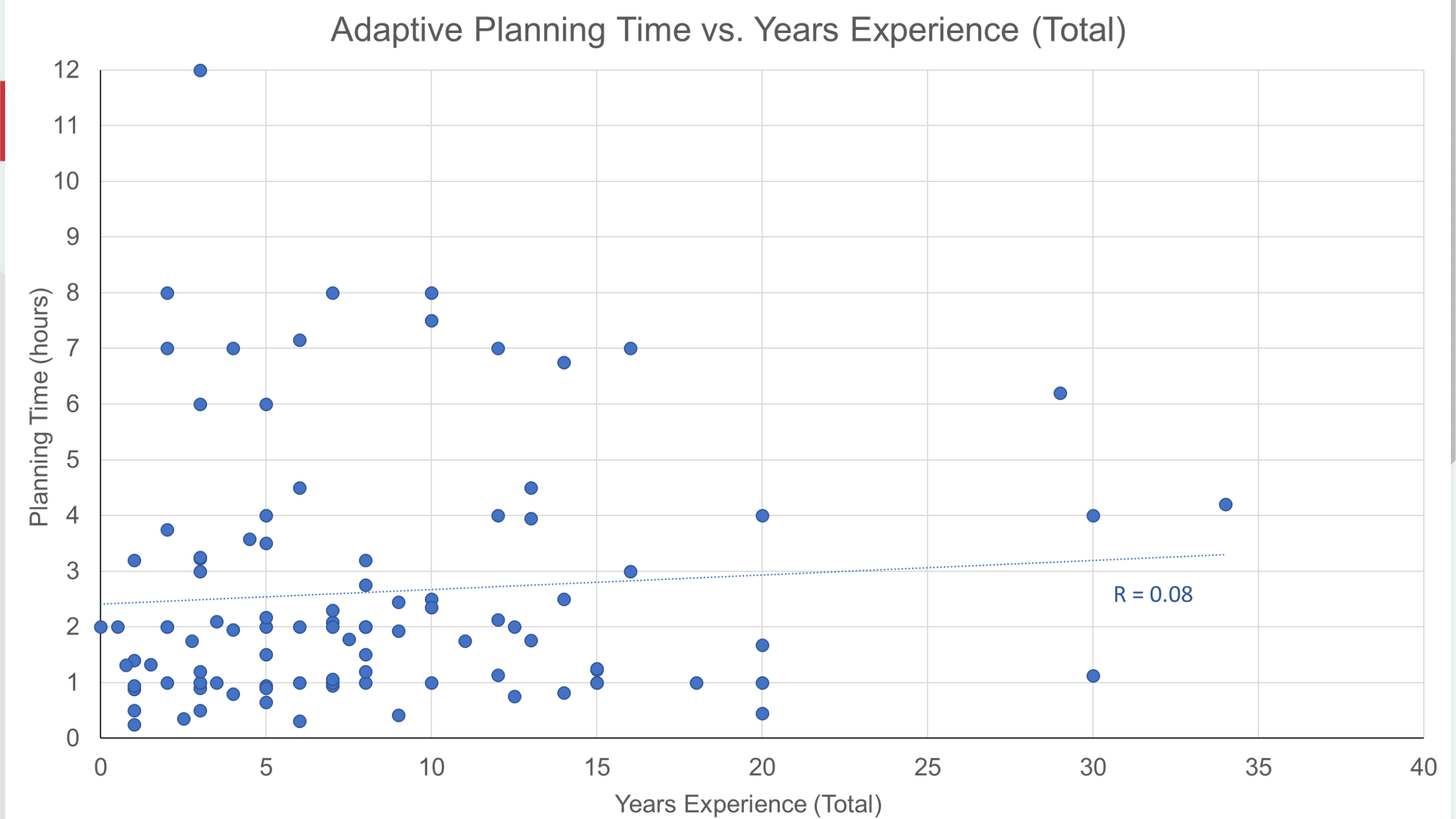


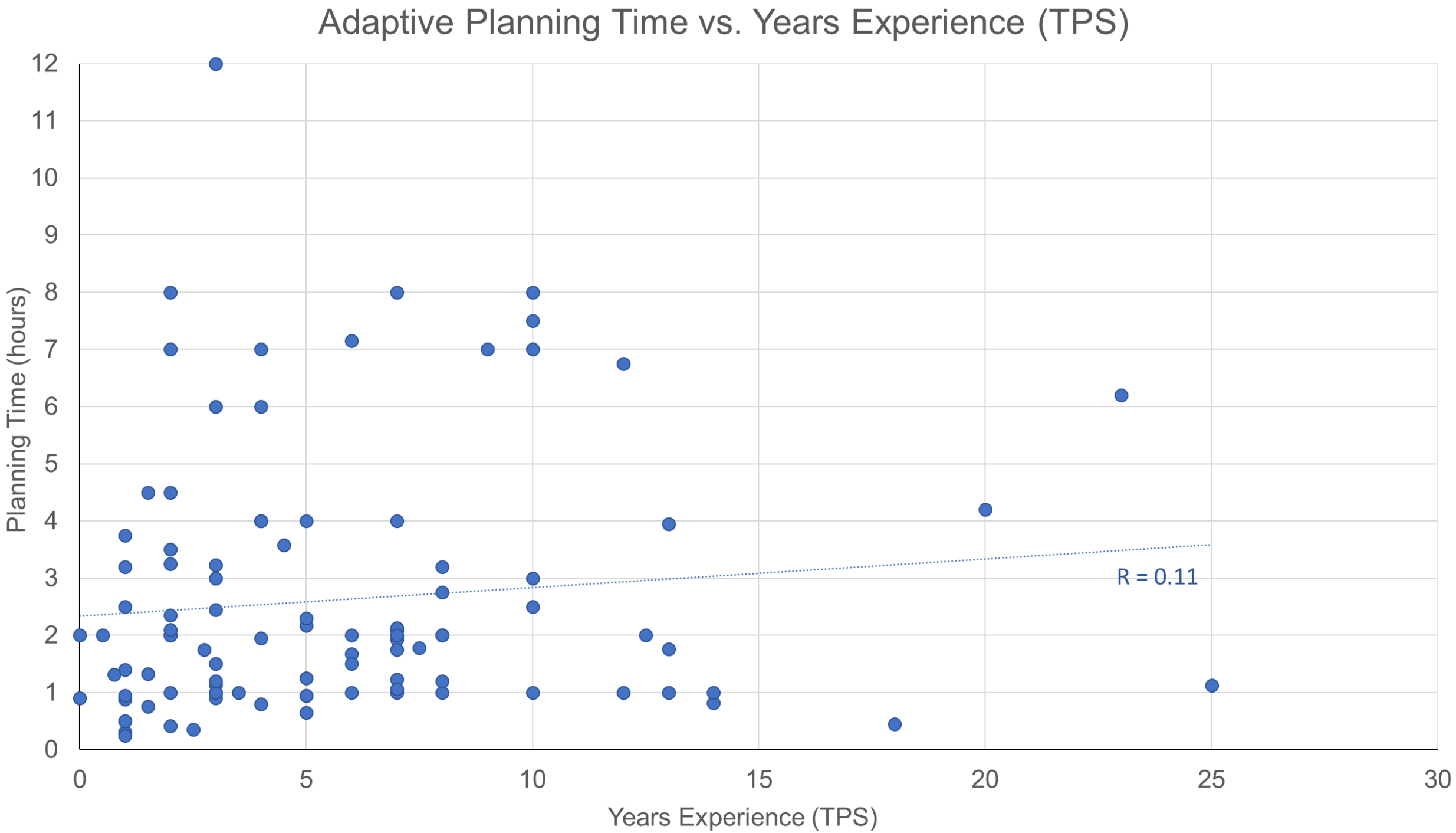
Grade “C”

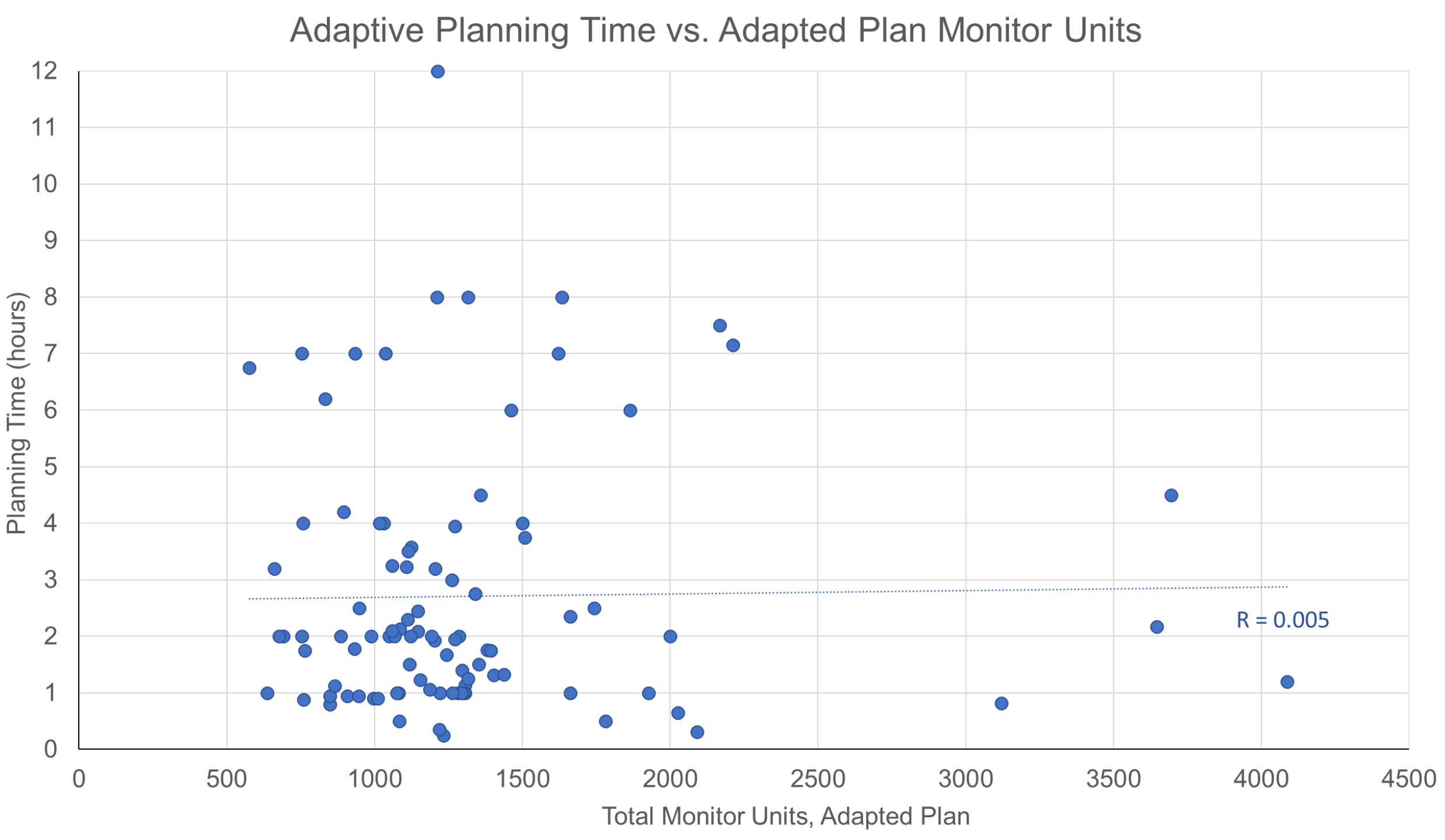


Grade “D”


Adaptive Planning Time vs. Initial Plan Score
Planning Time (hours)
Initial Plan Score
R = -0.22
0
1
2
3
4
5
6
7
8
9
10
11
12
70
80
90
100
110
120
130
140
150


Adaptive Planning Time vs. Years Experience (Total)
Planning Time (hours)
Years Experience (Total)
R = 0.08
0
1
2
3
4
5
6
7
8
9
10
11
12
0
5
10
15
20
25
30
35
40


Adaptive Planning Time vs. Years Experience (TPS)
Planning Time (hours)
Years Experience (TPS)
R = 0.11
0
1
2
3
4
5
6
7
8
9
10
11
12
0
5
10
15
20
25
30


Adaptive Planning Time vs. Adapted Plan Monitor Units
Planning Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Total Monitor Units, Adapted Plan
R = 0.005

Results

Fastest Times by Planning Software

Accuray	Elekta	RayStation	Philips	Varian
.45	1	.31	.8	.25
.75	1.5	.5	.88	.35
2	2.75	.9	.9	.95

MARY BIRD PERKINS CANCER CENTER™

Results – Yin Gao

- PhD Candidate at UT Southwestern
- Dissertation Topic –Automatic treatment planning
- CMD
- 2.5 years of planning experience
- Submitted two plans
- Fastest overall time using iPlanbot (.25)
- Third fastest time overall (.35-Varian)

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Results – Hiroji Koyanagi

- Chief Medical Physicist
- Omuta City Hospital
- Tkarazaka Omuta City Fukuoka, Japan
- Second fastest overall time
  (.31)
- Fastest overall time using RayStation

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Results – Richard Vaden

- CMD ARRT
- AMS Clinical Support Team
- 18 years of Tomotherapy planning experience
- Fastest overall time using Accuray
- Fourth fastest time overall (.45)

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Results – Rick Scherer

- CMD, RT(R)(T)
- Clinical Applications Specialist, Elekta
- Fastest overall time using Elekta

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Results – Simon Heinze

- Medical Physicist SSRMP
- AMS Clinical Support Team
- Kantonsspital St. Gallen, Switzerland
- 13 years of planning experience
- 10 years of Tomotherapy Experience
- 1 ½ years experience with Precision/VOLO ultra
- Second fastest time using Accuray

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Results – Qi Fu

- Medical Physicist
- Department of Radiation Oncology
  Cancer Institute & Hospital,
  Chinese Academy of Medical Sciences
  No 17 Panjiayuan Nanli, Chaoyang District
  Beijing, China
- Fastest overall time using Philips

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Results – Yunxiang Wang

- Medical Physicist
- 1 year of treatment planning experience
- Department of Radiation Oncology
  Cancer Institute & Hospital,
  Chinese Academy of Medical Sciences
- Second fastest time using Philips

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CANCER CENTER™

Results – Ji Zhu

- Medical Physicist
- Department of Radiation Oncology
  Cancer Institute & Hospital,
  Chinese Academy of Medical Sciences &
  Peking Union Medical College
- Third fastest time using Philips

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CANCER CENTER™

Results – Kyuing-min, Yoo

- Medical Dosimetrist
- Radiation Oncology

  Yonsei Cancer Hospital, Korea
- 5 years experience
- Second fastest time using RayStation

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Results – Reza Farjam

- Ph.D, DABR Medical Physicist
- John Hopkins University School of Medicine
  Bayview Medical Center,
  Sidney Kimmel Cancer Center White Awning
  Department of Radiation Oncology &
  Molecular Radiation Sciences
- Third fastest time using RayStation

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Results – Ryan Pohl

- CMD
- St. Luke's Cancer Institute,
  Boise, Idaho
- 5 years of experience
- Third fastest time using Varian

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Results – Yuta Miyake

- Order Fulfillment Division Application Physicist
- Elekta K.K.
- 8 years experience
- Third fastest time using Elekta

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Tips and Tricks

- Accuray – VOLO Ultra reduces planning time and improves plan quality and efficiency
- Accuray – Weight the target goals 10x higher than the critical structures in using the VOLO Ultra optimizer.
- Elekta – Change the isoconstraint in the first stage and weight in the second stage.
- Pinnacle – Use scripting as much as possible

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Tips and Tricks

- Pinnacle – Manually stop the optimizer as long as the plan objectives are met, instead of waiting for the auto stop
- Pinnacle – Use coarse gantry spacing
- Pinnacle – Use coarse dose grid resolution for the first two times of optimization
- RayStation – Use scripting and protocols
- RayStation – Create ring structures and then optimize by opening the MLC around the target by defining objectives on PTV's, and loose constraints on the ring structures

Tips and Tricks

- Varian – Select the optimal collimator angles
- Varian – Use optimization structures to sculpture the dose
- Varian – Having a GPU is a gamechanger, allows the objective function to fully flatten out sooner
- Varian – Consider duplicating structures that are not meeting the constraints and convert them to “High Resolution Segments”

Conclusion

- For every variable studied, there was no clear correlation with adaptive planning efficiency.
- Quality of the initial plan (score for phase 1) did not dictate efficiency of the adaptive plan (time for phase 2).
- Also, the planner experience, planning system, and hardware and software “grades” were not predictive of efficiency.
- As of now, the main factor that determines the speed of the plan ***is the planner.***

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Special Thank You!

- Special Thank You to Elekta/ProKnow

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Questions?

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