Thai Medical Physicist Society

# Treatment Planning Symposium

Komkrit Krongkietleart,
Warinthorn Rattanaareeyakorn,
Narueporn Pischom

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**KOMKRIT KRONGKIETLEARTS**
**Medical Physics**

# Staff Lopburi Cancer Hospital

- Radiation Oncologists 7
- Medical Physicists 7
- Radiation Therapists 16
- Supporter 16

# Treatment Machines

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**Linacs** : VitalBeam, Clinac iX, TrueBeam, Unique and Radixact

**Simulators :** Conventional **(**Acuity iX)

**:** CT – Sim (Tochiba Aquilion LB) #2

**HDR** : Saginova

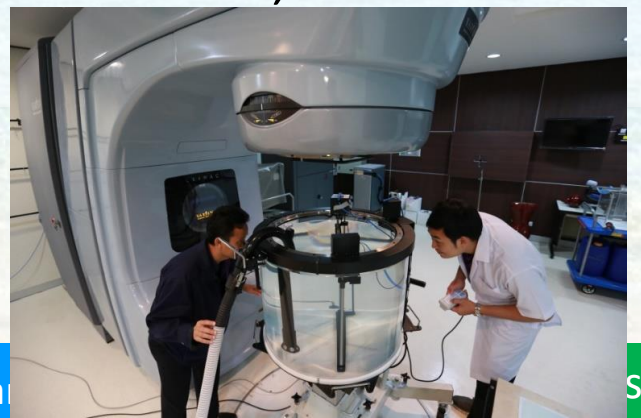
**TPS** : Eclipse V.17.1 (13Wks)

: RayStation V.11B (6Wks)

**Water Phantom** : medtec and 1D Scanner

**Beam Scan** : PTW MP3, 3D Scanner and Blue Phantom2





# Treatment Technique

- Conventional (2d)
- 3Dcrt
- Imrt
- Vmat
- Sbrt, SRT, SRS

ตารางสถิติจำนวนคนไข้ประจำวัน ห้องฉายแสง

วันที่ 8 กุมภาพันธ์ 2567

| Room | จำนวนคนไข้/จำนวน Field | | Room | Port | Eletron | เทคนิคการฉาย | | | | | | | Rest RT | OFF | NEW | สถานะ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ราย | Field | | | | 2D | 3D | IMRT | VMAT | SBRT/SRT | CBCT | Tomo helical | | | | Ward | OPD |
| TOMO | 21 | 21 | TOMO | | | | | 0 | 0 | 0 | 0 | 21 | 2 | 1 | 3 | 2 | 19 |
| Truebeam | 36 | 135 | Linac 2 | | 0 | 0 | 4 | 0 | 32 | 0 | 2 | | 3 | 2 | 0 | 4 | 32 |
| Unique | 41 | 141 | Uuique | 35 | | 3 | 38 | 0 | 0 | | | | 4 | 9 | 1 | 11 | 30 |
| Clinac iX | 42 | 150 | Clinac iX | 32 | | 0 | 18 | 0 | 24 | 0 | 6 | | 6 | 0 | 1 | 10 | 32 |
| Vital Beam | 43 | 158 | Vital Beem | 38 | | | 7 | 0 | 36 | 0 | 5 | | 13 | 1 | 3 | 10 | 33 |
| Total | 183 | 605 | Total | 105 | 0 | 3 | 67 | 0 | 92 | 0 | 13 | 21 | 28 | 13 | 8 | 37 | 146 |

# Patient specific Qa in LBCH

- **Point dose:**

  IC, Diode, microDiamond, Scintillation

- **Planar dose:**

  Film, Portal, MapCHECK2, SRS Mapcheck

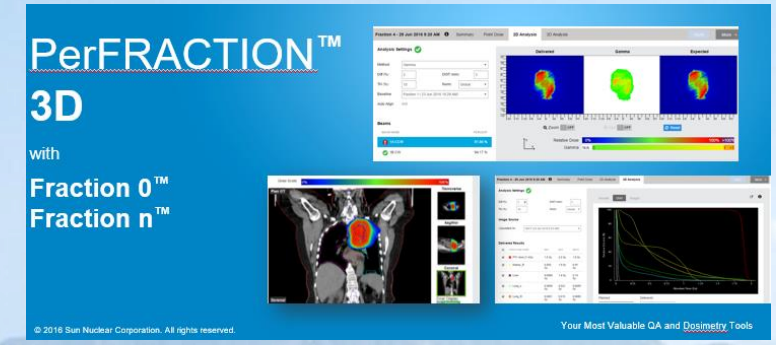
- **Volume dose:**

  Delta4 family, ArcCHECK

- **MU verification:**

  MU check, dose check

# Software patient specific qa




- Perfraction 3D


Radcalc


- adaptivo

มหาวิทยาลัย
สงขลานครินทร์

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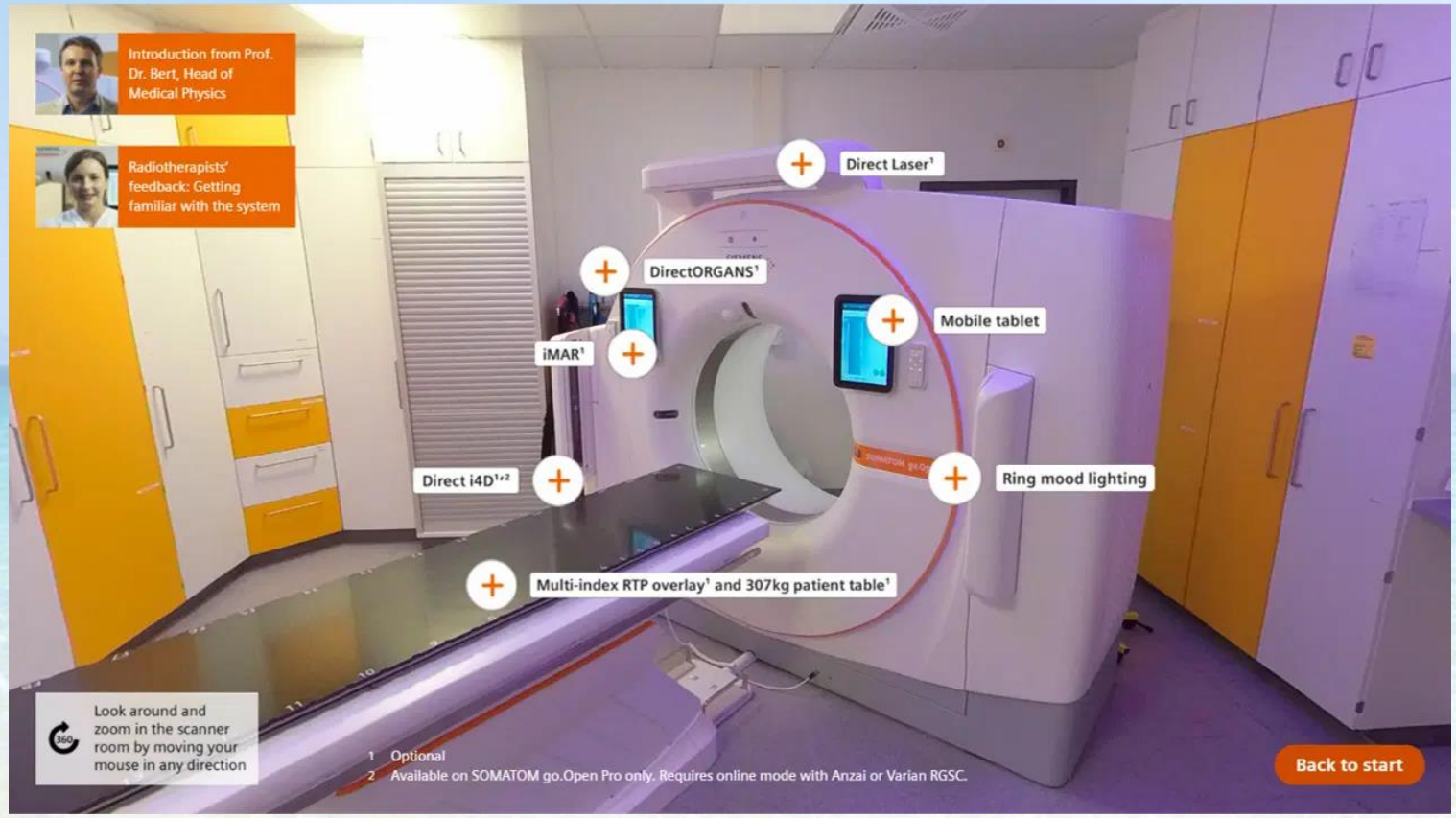
# Radiotherapy Practice
# งานรังสีรักษา โรงพยาบาลสงขลานครินทร์

# Staff

| | |
|---|---|
| • Radiation oncologists | 8 |
| • Medical physicist | 5+1PT |
| • Radiation therapist | 16+1PT |
| • Nurse | 9 |
| • Engineer | 2 |
| • Supporter | 13 |

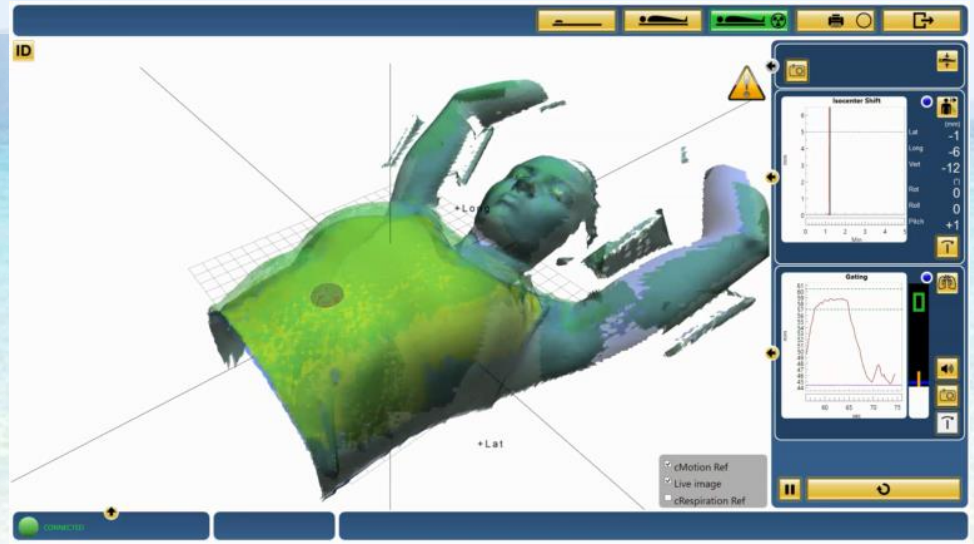
# Simulation




- CT siemens Somatom Go open pro #2
- Big bore 85 cm
- Flat bed with indexer
- External Laser (Direct laser)

# Simulation

- 4D-CT (with Direct i4D software)
  - RGSC,
  - Sentinel (C-rad) (Surface tracking)




Sentinel System

RGSC System

# Treatment Planning & QA

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- Eclipse V16.1 (13Workstations)
- Element (Brainlab) (4Workstations)
- Scadidos Delta 4
- SRS mapcheck
- 1D Tankscan
- IBA Bluephantom

# Brachytherapy

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- Oncentra Brachytherapy
- Flexitron afterloader

# Treatment delivery

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Unique

Clinac iX

เครื่องฉายแสงใน ม อ ปัจจุบัน

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# Division of Radiation Oncology
# Department of Radiology
# Surin Hospital

# Facility Resource

- **1** CT simulator : Siemens SOMATOM go.sim
- **1** Brachytherapy : Flexitron
- **2** Linacs
  - Elekta Precise : 3D
  - Elekta Harmony Pro : IMRT, VMAT
- **8** planning workstations
  - 1 Oncentra external beam
  - 1 Oncentra Brachytherapy
  - 6 Monaco external beam

# Radiation Oncology Staffs

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- 3 Radiation oncologists
- 2 Medical physicist
- 6 Radiotherapy technologists
- 6 Radiation nurses
- 10 Radiation assistants

# Patients Statistic

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Since 2557 – 2565 B.E.


2565 B.E.

| Cancer | Percentage(%) |
|---|---|
| Emergency | 19.3 |
| H&N | 17.6 |
| Breast | 17.1 |
| Cervix | 14.0 |
| Rectum | 13.4 |
| Brain | 4.6 |
| Esophagus | 4.0 |
| Other | 3.3 |
| Lung | 2.8 |
| Lymphoma | 2.6 |
| Prostate | 1.4 |

# Commissioning QA of Treatment planning

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**AAPM Medical Physics Practice Guideline 5.a.: Commissioning and QA of Treatment Planning Dose Calculations — Megavoltage Photon and Electron Beams**

Medical Physics Practice Guideline: Jennifer B. Smilowitz, Chair, Indra J. Das, Vladimir Feygelman, Benedick A. Fraass, Stephen F. Kry, Ingrid R. Marshall, Dimitris N. Mihailidis, Zoubir Ouhib, Timothy Ritter, Michael G. Snyder, Lynne Fairobent, AAPM Staff

**American Association of Physicists in Medicine Radiation Therapy Committee Task Group 53: Quality assurance for clinical radiotherapy treatment planning**

Benedick Fraass[a)]
*University of Michigan Medical Center, Ann Arbor, Michigan*

Karen Doppke
*Massachusetts General Hospital, Boston, Massachusetts*

Margie Hunt
*Fox Chase Cancer Center, Philadelphia, Pennsylvania and Memorial Sloan Kettering Cancer Center, New York, New York*

Gerald Kutcher
*Memorial Sloan Kettering Cancer Center, New York, New York*

George Starkschall
*M. D. Anderson Cancer Center, Houston, Texas*

Robin Stern
*University of California, Davis Medical Center, Sacramento, California*

Jake Van Dyke
*London Regional Cancer Center, London, Ontario, Canada*

(Received 15 December 1997; accepted for publication 4 August 1998)

**Accelerator beam data commissioning equipment and procedures: Report of the TG-106 of the Therapy Physics Committee of the AAPM**

Indra J. Das[a)]
*Department of Radiation Oncology, University of Pennsylvania, Philadelphia, Pennsylvania 19104*

Chee-Wai Cheng
*Department of Radiation Oncology, Morristown Memorial Hospital, Morristown, New Jersey 07962*

Ronald J. Watts
*International Medical Physics Services, San Antonio, Texas 78232*

Anders Ahnesjö
*Uppsala University and Nucletron Scandinavia AB, 751 47 Uppsala, Sweden*

John Gibbons
*Department of Radiation Oncology, Mary Bird Perkins Cancer Center, Baton Rouge, Louisiana 70809*

X. Allen Li
*Department of Radiation Oncology, Medical College of Wisconsin, Milwaukee, Wisconsin 53226*

Jessica Lowenstein
*Radiological Physics Center, MD Anderson Cancer Center, Houston, Texas 77030*

Raj K. Mitra
*Department of Radiation Oncology, Ochsner Clinic, New Orleans, Louisiana 70121*

William E. Simon
*Sun Nuclear Corporation, Melbourne, Florida 32940*

Timothy C. Zhu
*Department of Radiation Oncology, University of Pennsylvania, Philadelphia, Pennsylvania 19104*

(Received 4 February 2008; revised 18 July 2008; accepted for publication 18 July 2008; published 22 August 2008)

**IMRT commissioning: Multiple institution planning and dosimetry comparisons, a report from AAPM Task Group 119**

Gary A. Ezzell
*Department of Radiation Oncology, Mayo Clinic Scottsdale, 5777 East Mayo Boulevard, MCSB Concourse, Phoenix, Arizona 85054*

Jay W. Burmeister
*Wayne State University School of Medicine, Karmanos Cancer Center, 4100 John R Street, Detroit, Michigan 48201*

Nesrin Dogan
*Department of Radiation Oncology, Virginia Commonwealth University, 401 College Street B-129, Richmond, Virginia 23298*

Thomas J. LoSasso and James G. Mechalakos
*Department of Medical Physics, Memorial Sloan-Kettering Cancer Center, 1275 York Avenue, New York, New York 10065*

Task Group Report | Free Access

**Tolerance limits and methodologies for IMRT measurement-based verification QA: *Recommendations of AAPM Task Group No. 218***

Moyed Miften, Arthur Olch, Dimitris Mihailidis, Jean Moran, Todd Pawlicki, Andrea Molineu, Harold Li, Krishni Wijesooriya, Jie Shi, Ping Xia, Nikos Papanikolaou, Daniel A. Low

First published: 14 February 2018 | https://doi.org/10.1002/mp.12810 | Cited by: 20

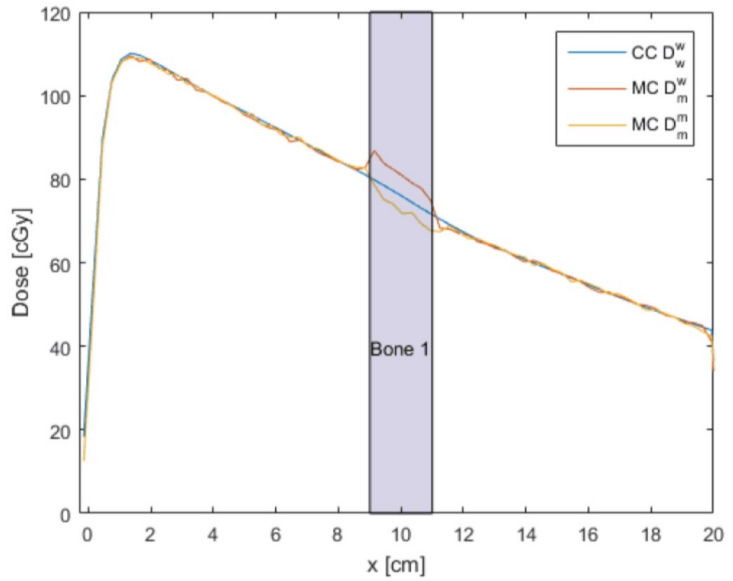
# Non dosimetric TPS Commissioning

- Accurate image interpretation
  - Distance
  - CT number to physical  or electron density
  - volume

# Dosimetry TPS Commissioning

- Algorithm Verification
- Calculation Verification
  - Irregular field shape
  - Heterogeneous material (Lung bone)
  - Differing SSD
  - Dynamically shaped field
  - MLC shape field
- Evaluation of limiting case
- End to End >>> Phantom

**Reference:** Ma, C-M and Li J, *Dose specification of radiation therapy: dose to water or dose to medium?* Phys. Med. Biol. 56 (2011) 9073-3089.

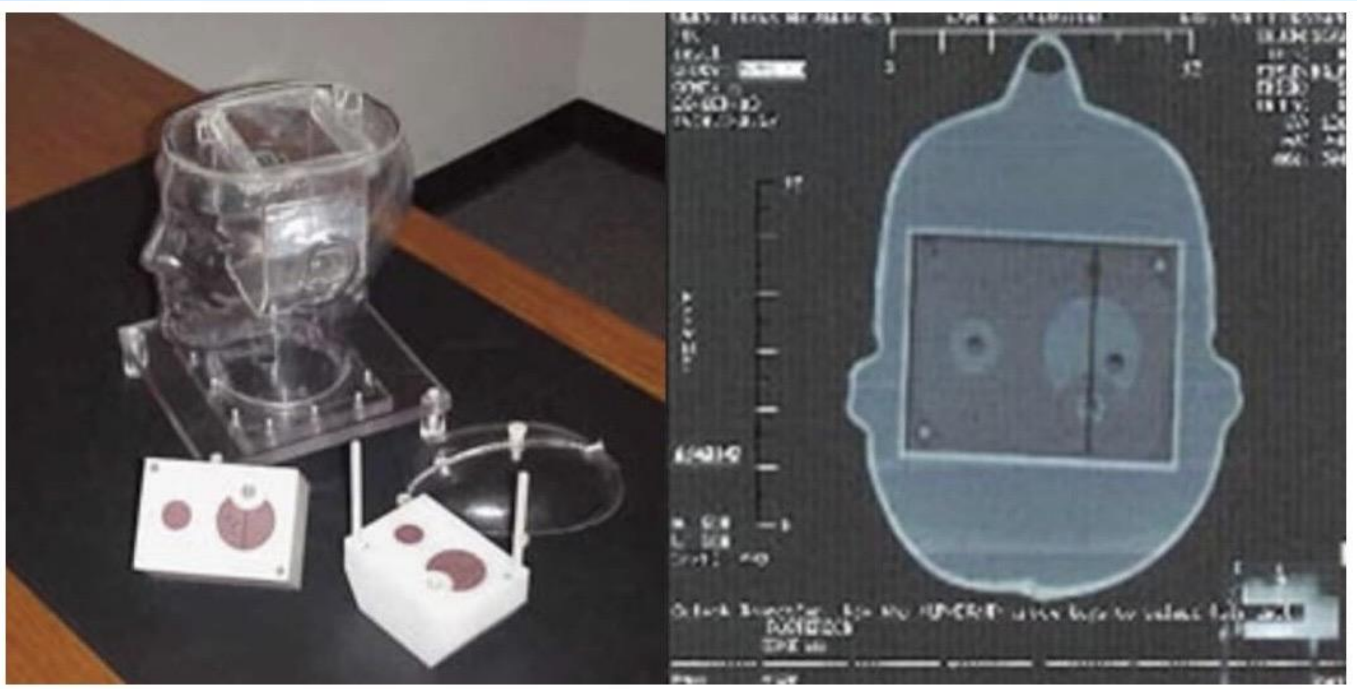


# Treatment Beam data

- PDD
- Profile
- MLC
  - Interleaf leakage
  - Intraleaf leakage
  - Tongue and groove
- Head leakage
- Total Scatter

# IMRT&VMAT

- PDD profile small field (2x2)
- Small field output (2x2)
- MLC



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# Case study

# Head and Neck

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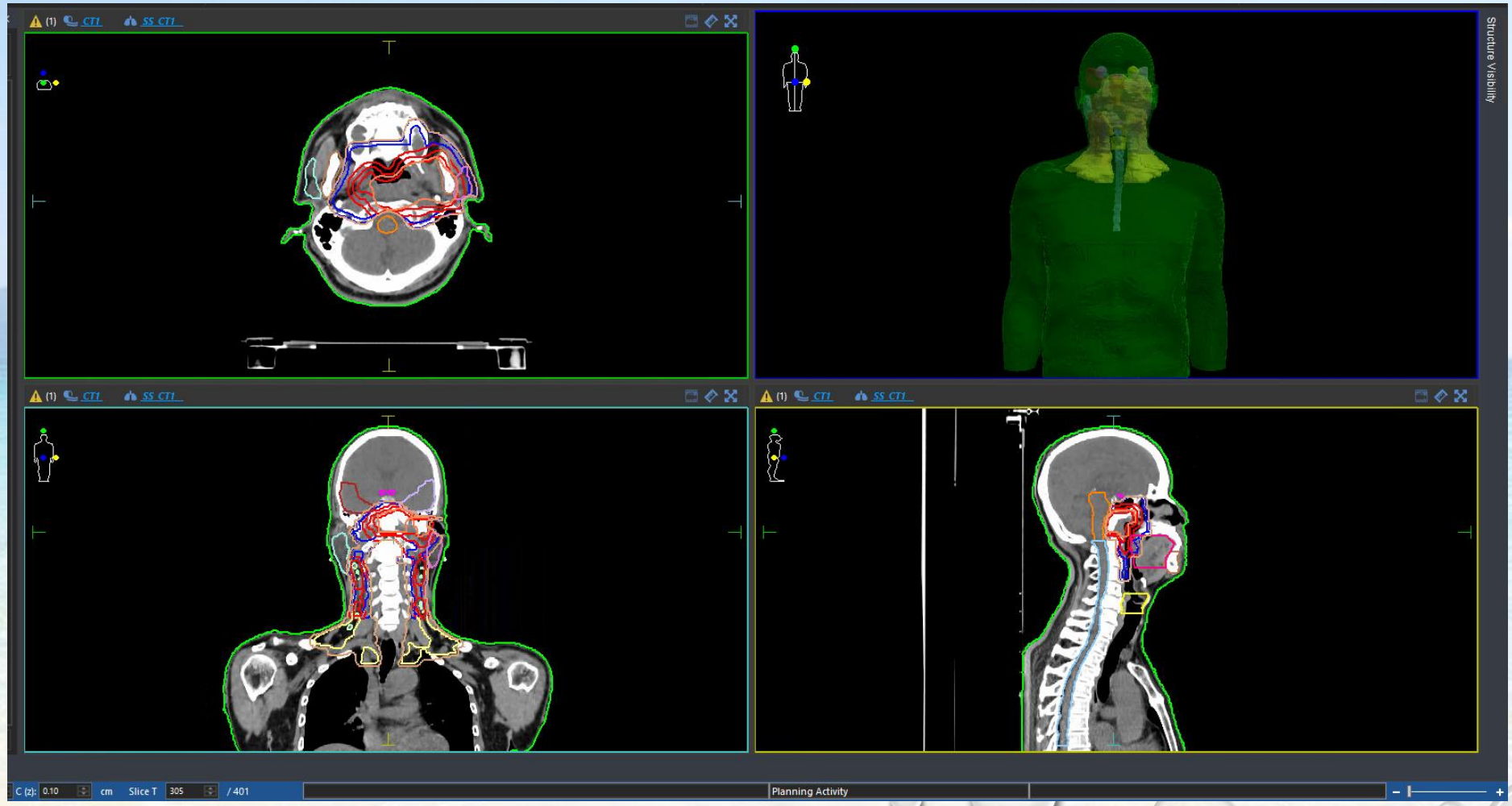
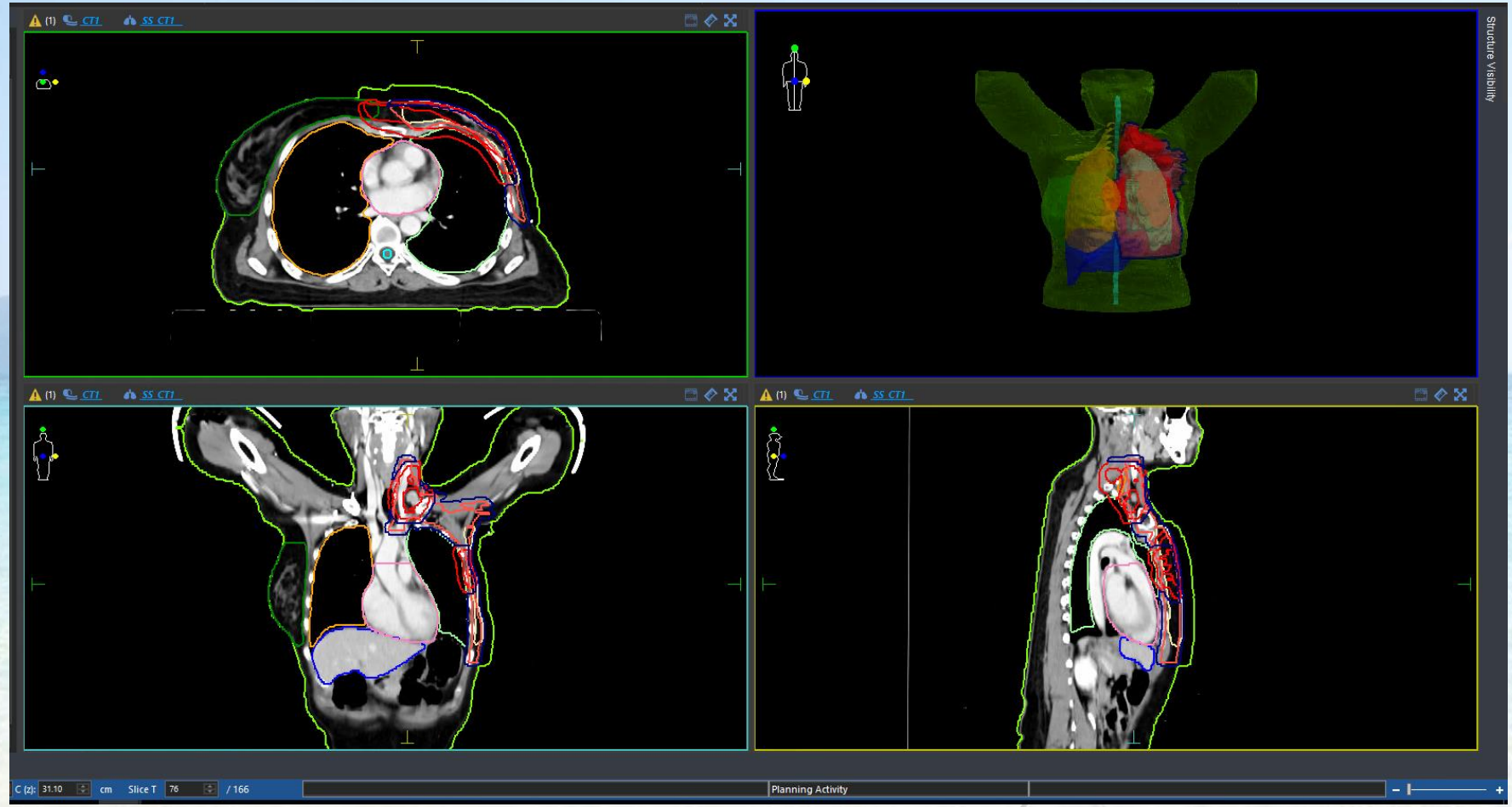


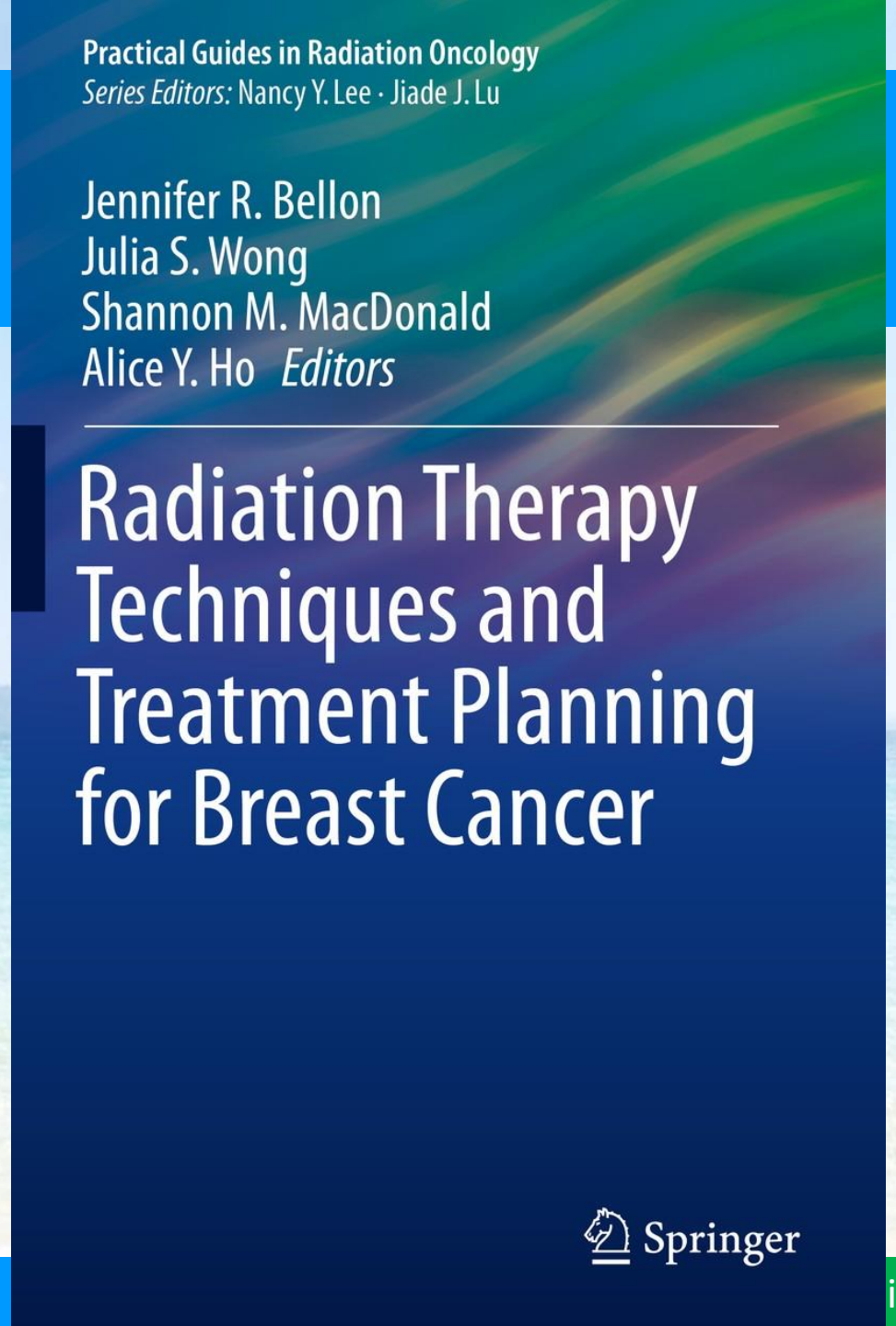
Table 1. QUANTEC Summary: Approximate Dose/Volume/Outcome Data for Several Organs Following Conventional Fractionation (Unless Otherwise Noted)*

| Organ | Volume segmented | Irradiation type (partial organ unless otherwise stated)† | Endpoint | Dose (Gy), or dose/volume parameters† | Rate (%) | Notes on dose/volume parameters |
|---|---|---|---|---|---|---|
| Brain | Whole organ | 3D-CRT | Symptomatic necrosis | Dmax <60 | <3 | Data at 72 and 90 Gy, extrapolated from BED models |
| | Whole organ | 3D-CRT | Symptomatic necrosis | Dmax = 72 | 5 | |
| | Whole organ | 3D-CRT | Symptomatic necrosis | Dmax = 90 | 10 | |
| | Whole organ | SRS (single fraction) | Symptomatic necrosis | V12 <5–10 cc | <20 | Rapid rise when V12 > 5–10 cc |
| Brain stem | Whole organ | Whole organ | Permanent cranial neuropathy or necrosis | Dmax <54 | <5 | |
| | Whole organ | 3D-CRT | Permanent cranial neuropathy or necrosis | D1–10 cc‖ ≤59 | <5 | |
| | Whole organ | 3D-CRT | Permanent cranial neuropathy or necrosis | Dmax <64 | <5 | Point dose <<1 cc |
| | Whole organ | SRS (single fraction) | Permanent cranial neuropathy or necrosis | Dmax <12.5 | <5 | For patients with acoustic tumors |
| Optic nerve / chiasm | Whole organ | 3D-CRT | Optic neuropathy | Dmax <55 | <3 | Given the small size, 3D CRT is often whole organ‡‡ |
| | Whole organ | 3D-CRT | Optic neuropathy | Dmax 55–60 | 3–7 | |
| | Whole organ | 3D-CRT | Optic neuropathy | Dmax >60 | >7-20 | |
| | Whole organ | SRS (single fraction) | Optic neuropathy | Dmax <12 | <10 | |
| Spinal cord | Partial organ | 3D-CRT | Myelopathy | Dmax = 50 | 0.2 | Including full cord cross-section |
| | Partial organ | 3D-CRT | Myelopathy | Dmax = 60 | 6 | |
| | Partial organ | 3D-CRT | Myelopathy | Dmax = 69 | 50 | |
| | Partial organ | SRS (single fraction) | Myelopathy | Dmax = 13 | 1 | Partial cord cross-section irradiated |
| | Partial organ | SRS (hypofraction) | Myelopathy | Dmax = 20 | 1 | 3 fractions, partial cord cross-section irradiated |
| Cochlea | Whole organ | 3D-CRT | Sensory neural hearing loss | Mean dose ≤45 | <30 | Mean dose to cochlear, hearing at 4 kHz |
| | Whole organ | SRS (single fraction) | Sensory neural hearing loss | Prescription dose ≤14 | <25 | Serviceable hearing |
| Parotid | Bilateral whole parotid glands | 3D-CRT | Long term parotid salivary function reduced to <25% of pre-RT level | Mean dose <25 | <20 | For combined parotid glands¶ |
| | Unilateral whole parotid gland | 3D-CRT | Long term parotid salivary function reduced to <25% of pre-RT level | Mean dose <20 | <20 | For single parotid gland. At least one parotid gland spared to <20 Gy¶ |

(*Continued*)

# LT Breast



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| | MSKCC dosimetric planning guidelines for breast VMAT/IMRT (assuming a prescription dose of 50Gy/25F) (book: radiation therapy techniques and treatment planning for breast cancer 2016) | Book: Pracitce Guides in Radiation Oncology, Nancy Y. Lee, chapter12: regional lymph node irradiation for breast cancer, Alice Y. Ho, 2022 | MA39 (arm2 breast+/-boost and regional nodal irradiation, chest wall and regional nodal irradiation, IMRT) Dose 50Gy/25F and 42.56Gy/16F | | | | NSABP B51 arm2 breast+/-boost and regional nodal irradiation, chest wall and regional nodal irradiation,3DCRT and IMRT) Dose 50Gy/25F | |
|---|---|---|---|---|---|---|---|---|
| | | | | Protocol | Variation acceptable | Maximum dose | Per protocol | Variation acceptable |
| PTV | D95%≥95%<br>D05%≤110% | D95%≥95%<br>V95%≥95%<br>D05%≤110% | | | | | | |
| IMN | D95%≥100% | D95%≥90% | | | | | | |
| | | | Breast or chestwall PTV_Eval (calculated without boost) | ≥95% receives 95% of prescribed dose | ≥90% receives 90% of prescribed dose | Photons only:<br><10cc receives 107% (up to 110%)<br>< 0.03cc receives 115% (up to 120%) | At least 95% of the PTV-Eval receives at least 95% of 50Gy | At least 90% of the PTV-Eval receives at least 90% of 50Gy |
| | | | Lumpectomy boost PTV_Eval and mastectomy scar PTV_Eval (calculalted only if boost used) | ≥95% receives 95% of prescribed dose | ≥90% receives 90% of prescribed dose | <10cc receives 110%<br>< 0.03cc receives 120% | At least 95% of the lumpectomy PTV Eval receives 95% of cumulative boost dose 62-64Gy | At least 90% of the lumpectomy PTV Eval receives 90% of boost dose |
| | | | Supraclavicular SCL_PTV | ≥95% receives 95% of prescribed dose | ≥90% receives 90% of prescribed dose | <10cc receives 105%<br>< 0.03cc receives 110% | At least 95% of the SCL PTV receives 95% of 50Gy | At least 90% of the SCL PTV receives 90% of 50Gy |
| | | | Axillary PTV | ≥95% receives 95% of prescribed dose | ≥90% receives 90% of prescribed dose | <10cc receives 105%<br>< 0.03cc receives 110% | At least 95% of the Ax PTV receives 95% of 50Gy | At least 90% of the Ax PTV receives 90% of 50Gy |
| | | | IMN_PTV | ≥95% receives 90% of prescribed dose | ≥90% receives 80% of prescribed dose | <10cc receives 110%<br>< 0.03cc receives 115% | At least 95% of the IMN PTV receives 90% of 50Gy | At least 90% of the IMN PTV receives 80% of 50Gy |
| Ipsilateral lung | - V20Gy ≤33%, ≤30% (with DIBH)<br>- V10Gy ≤68%, ≤63% (with DIBH)<br>- Mean dose ≤20Gy, ≤18Gy (with DIBH) | - V20Gy ≤30-33%, ≤27-30% (with DIBH)<br>- V10Gy ≤65-68%, ≤60-63% (with DIBH)<br>- Mean dose ≤18Gy | | V5 ≤ 65% [b]<br>V10 ≤ 45% [b]<br>V20 ≤ 25% | V20 ≤ 35% | | V20 ≤ 35% | V20 ≤ 40% |
| Contralateral lung | V20Gy ≤8% | V20Gy ≤5% | | V5 ≤ 10%<br>V10 ≤ 5% [b] | V5 < 15% | | | |
| Bilateral lung | | | | V20 ≤ 15%<br>Mean dose≤10Gy | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Heart | V25 Gy ≤25% maximum point dose ≤50Gy | | | | | | Mean dose ≤4Gy | Mean dose ≤5Gy |
| Heart, Lt breast | mean dose ≤9Gy (if IMN D95 ≥100%), ≤8Gy (if IMN D95≥90%) [a] | mean dose<br>- Non-DIBH:<br>≤8-9Gy (if IMN D95 ≥100%),<br>≤ 7-8Gy (if IMN D95≥90%)<br>- DIBH:<br>≤7-8Gy (if IMN D95 ≥100%),<br>≤ 6-7Gy (if IMN D95≥90%) | | Mean dose≤3Gy and V25≤10% | Mean dose≤5Gy and V30≤10% | | V25≤10% | V30≤10% |
| Heart, Rt breast | mean dose ≤5Gy (if IMN D95≥100%), ≤4Gy (if IMN D95≥90%) | mean dose<br>- Non-DIBH:<br>≤ 5Gy (if IMN D95 ≥100%),<br>≤ 4Gy (if IMN D95≥90%) | | Mean dose≤2Gy and V25≤2% | Mean dose≤5Gy and V30≤2% | | V25≤2% | V30≤2% |
| | | If any of the constraints above cannot be achieved:<br>Mean dose<br>- Non-DIBH: ≤10-12Gy<br>DIBH: ≤9-10Gy | | | | | | |
| Left anterior descending artery maximum point dose | ≤50Gy | ≤25-35Gy | | | | | | |
| Thyroid mean dose | ≤20Gy | ≤20Gy | | | | | | |
| Esophagus maximum point dose | ≤50Gy | ≤35-40Gy | | | | | | |
| Brachial plexus maximum point dose | ≤55Gy | ≤55Gy | | | | | | |
| Contralateral intact breast mean dose | ≤5Gy | ≤6Gy | | V10 ≤ 15% | | | V3≤10% | V5≤10% |
| Contralateral implant mean dose | ≤8Gy | ≤8Gy | | | | | | |
| Liver (for right sided cases) mean dose | ≤10Gy | ≤8-10Gy | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Stomach (for left sided cases) mean dose | ≤5Gy, ≤3Gy (with DIBH) | ≤5Gy, ≤3Gy (with DIBH) | | | | | | |
| Cord maximum point dose | ≤20Gy | ≤20Gy | | | | | | |

[a] using DIBH, the mean heart dose (MHD) can further reduced for left-sided cases to within 5-6Gy, when the IMN D95≥100%

[b]: These criteria are required and no variation is acceptable

# Esophagus

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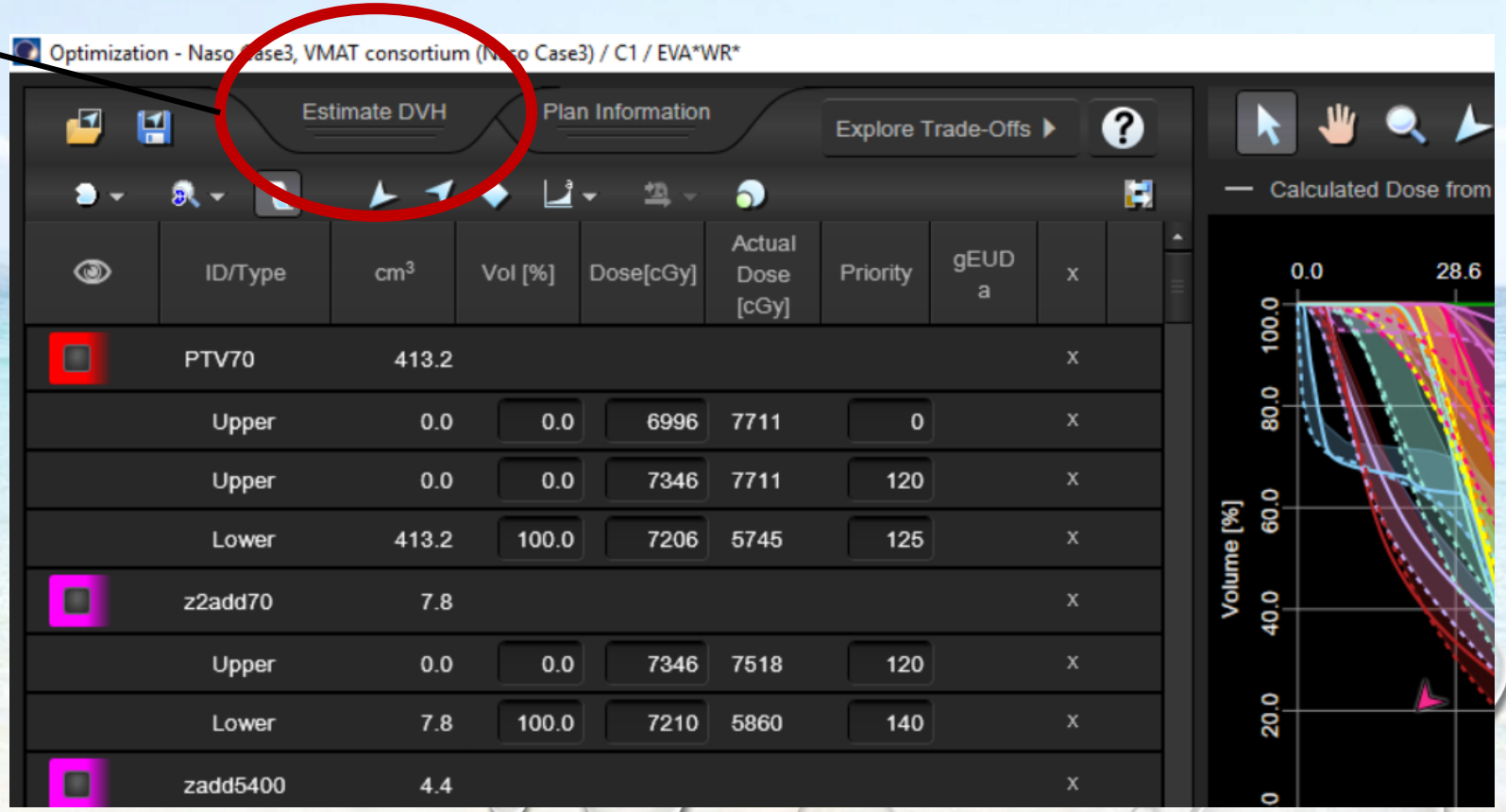
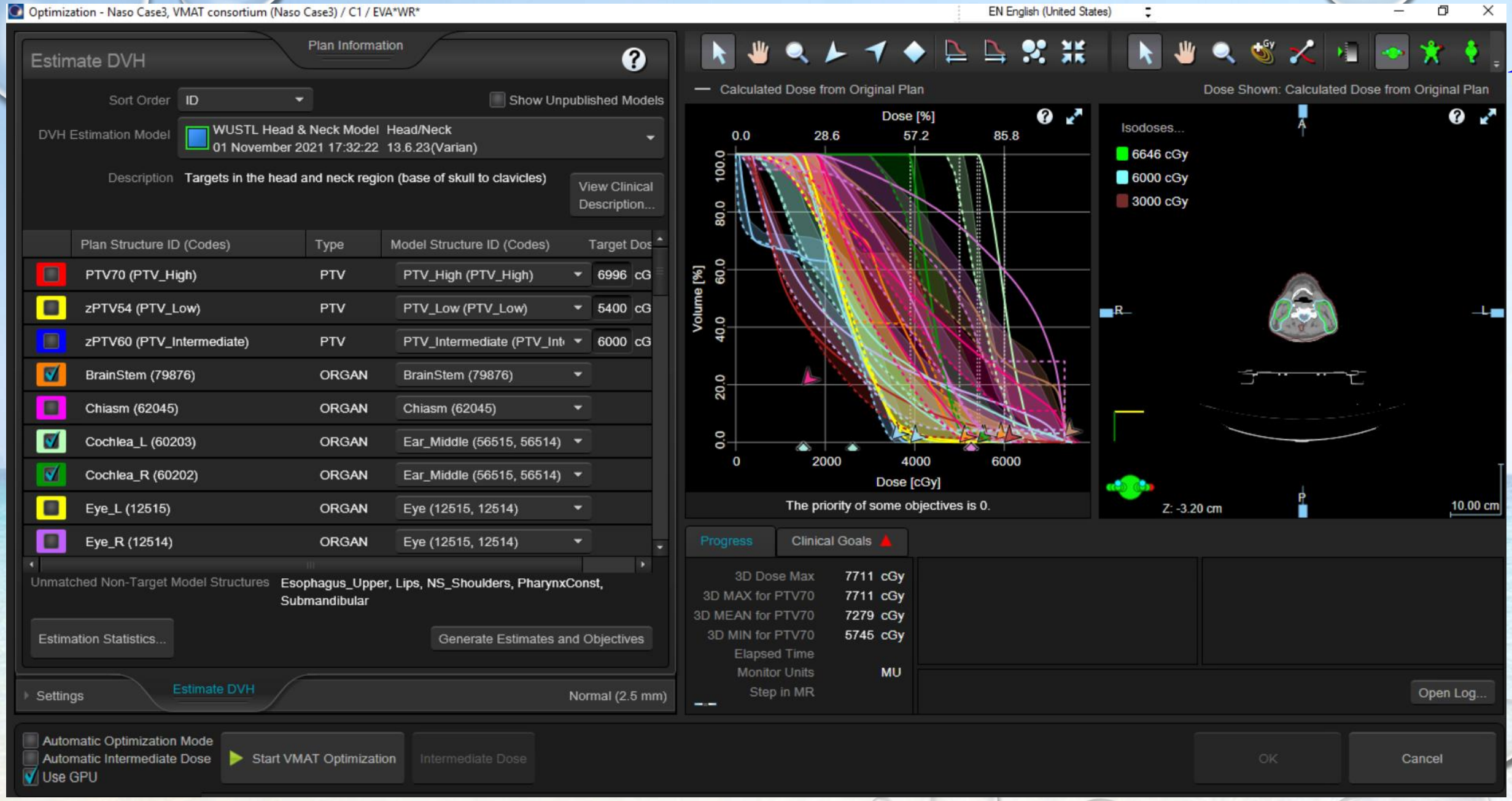
# Eclipse Feature

- Rapid plan
- MCO
- Eclipse Scripting

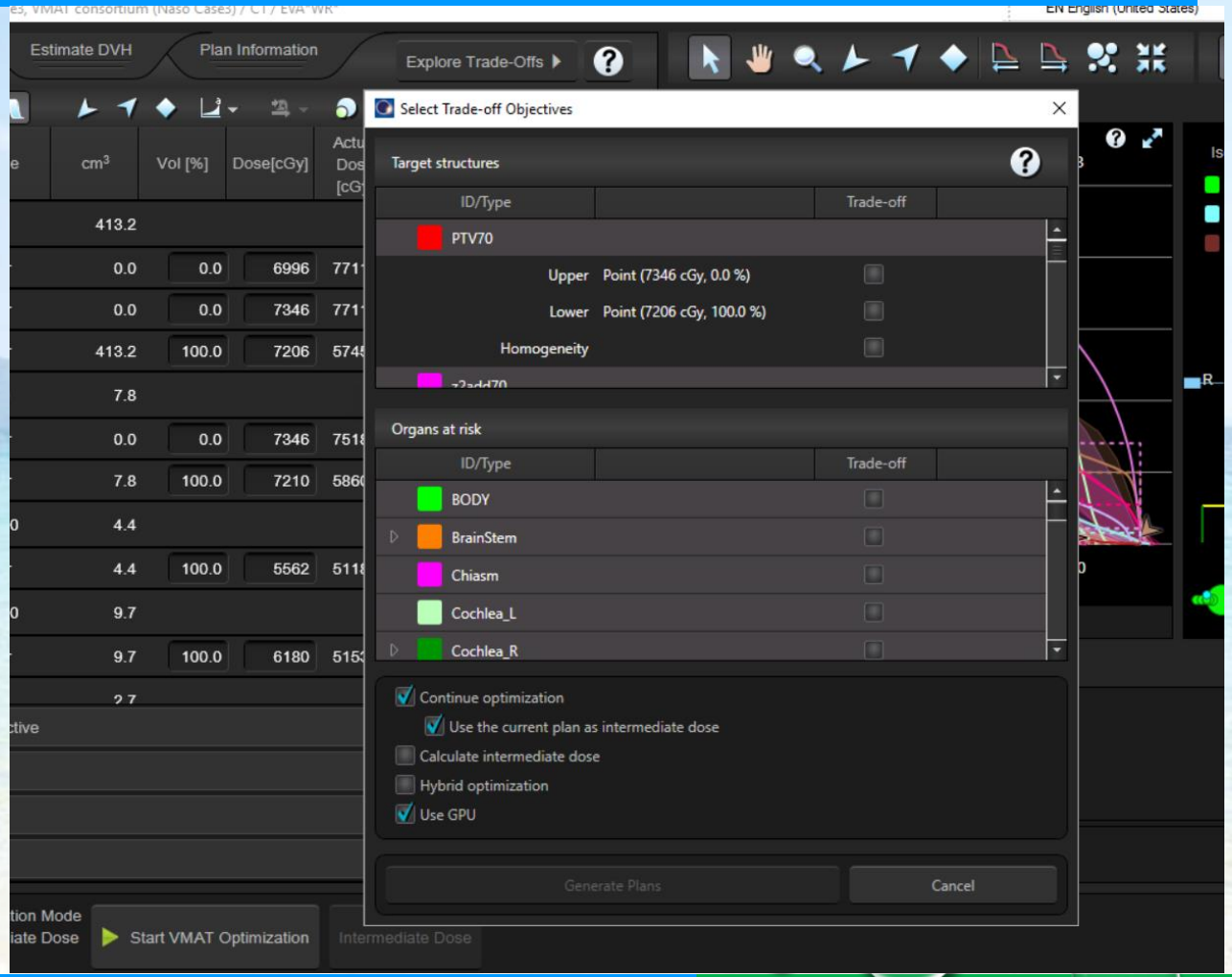
# Rapid plan

- Knowledge-based treatment planning software




Optimization - Naso Case3, VMAT consortium (Naso Case3) / C1 / EVA*WR*
EN English (United States)
Estimate DVH
Plan Information
Sort Order
ID
Show Unpublished Models
DVH Estimation Model
WUSTL Head & Neck Model Head/Neck
01 November 2021 17:32:22 13.6.23(Varian)
Description
Targets in the head and neck region (base of skull to clavicles)
View Clinical Description...
Plan Structure ID (Codes)
Type
Model Structure ID (Codes)
Target Dos
PTV70 (PTV_High) PTV PTV_High (PTV_High) 6996 cG
zPTV54 (PTV_Low) PTV PTV_Low (PTV_Low) 5400 cG
zPTV60 (PTV_Intermediate) PTV PTV_Intermediate (PTV_Int 6000 cG
BrainStem (79876) ORGAN BrainStem (79876)
Chiasm (62045) ORGAN Chiasm (62045)
Cochlea_L (60203) ORGAN Ear_Middle (56515, 56514)
Cochlea_R (60202) ORGAN Ear_Middle (56515, 56514)
Eye_L (12515) ORGAN Eye (12515, 12514)
Eye_R (12514) ORGAN Eye (12515, 12514)
Unmatched Non-Target Model Structures
Esophagus_Upper, Lips, NS_Shoulders, PharynxConst, Submandibular
Estimation Statistics...
Generate Estimates and Objectives
Settings
Estimate DVH
Normal (2.5 mm)
Calculated Dose from Original Plan
Dose Shown: Calculated Dose from Original Plan
Dose [%]
0.0
28.6
57.2
85.8
Volume [%]
100.0
80.0
60.0
40.0
20.0
0.0
0
2000
4000
6000
Dose [cGy]
The priority of some objectives is 0.
Isodoses...
6646 cGy
6000 cGy
3000 cGy
R
L
A
P
Z: -3.20 cm
10.00 cm
Progress
Clinical Goals
3D Dose Max 7711 cGy
3D MAX for PTV70 7711 cGy
3D MEAN for PTV70 7279 cGy
3D MIN for PTV70 5745 cGy
Elapsed Time
Monitor Units MU
Step in MR
Open Log...
Automatic Optimization Mode
Automatic Intermediate Dose
Use GPU
Start VMAT Optimization
Intermediate Dose
OK
Cancel

# MCO


Estimate DVH
Plan Information
Explore Trade-Offs
Select Trade-off Objectives
Target structures
ID/Type
Trade-off
PTV70
Upper Point (7346 cGy, 0.0 %)
Lower Point (7206 cGy, 100.0 %)
Homogeneity
Organs at risk
ID/Type
Trade-off
BODY
BrainStem
Chiasm
Cochlea_L
Cochlea_R
Continue optimization
Use the current plan as intermediate dose
Calculate intermediate dose
Hybrid optimization
Use GPU
Generate Plans
Cancel
Start VMAT Optimization
Intermediate Dose

# Eclipse scripting

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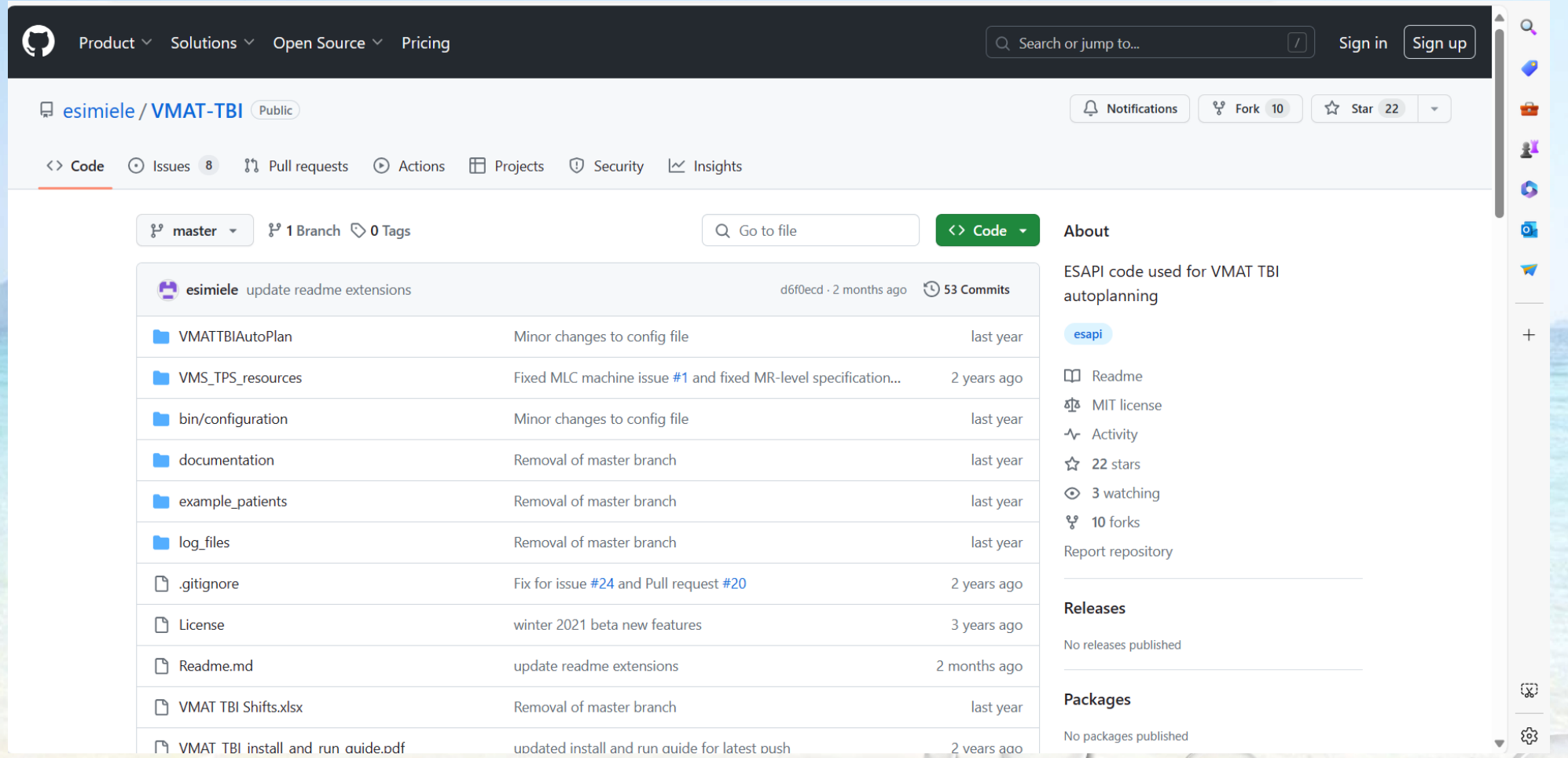
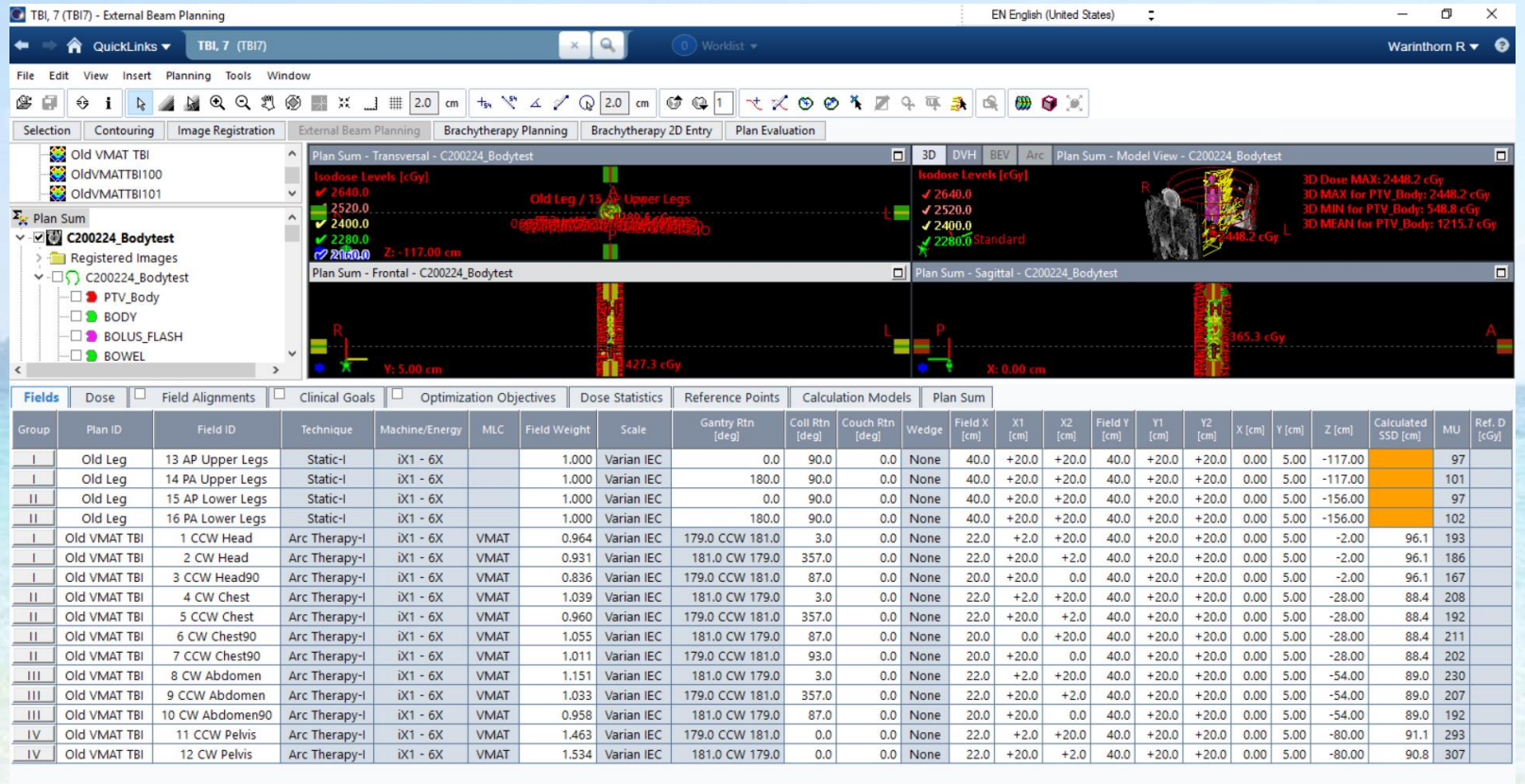
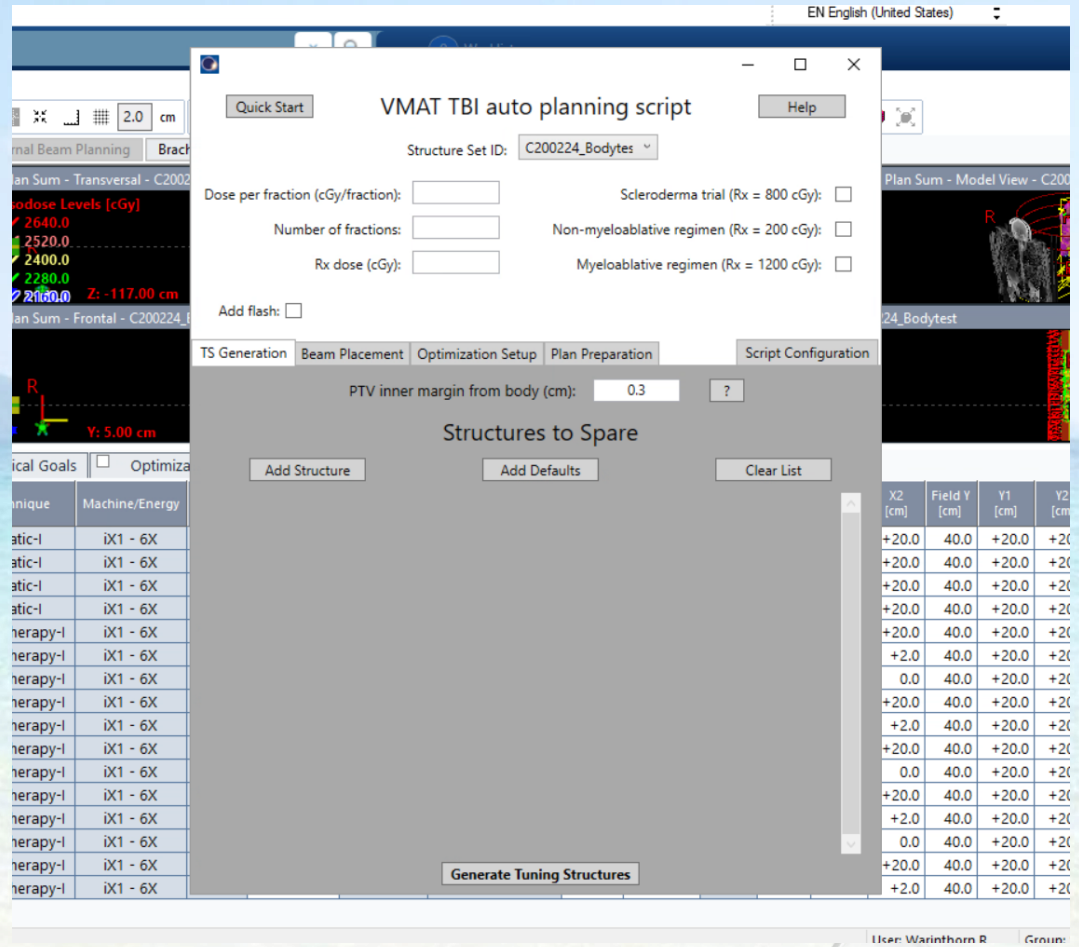


# Eclipse scripting




| Group | Plan ID | Field ID | Technique | Machine/Energy | MLC | Field Weight | Scale | Gantry Rtn [deg] | Coll Rtn [deg] | Couch Rtn [deg] | Wedge | Field X [cm] | X1 [cm] | X2 [cm] | Field Y [cm] | Y1 [cm] | Y2 [cm] | X [cm] | Y [cm] | Z [cm] | Calculated SSD [cm] | MU | Ref. D [cGy] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I | Old Leg | 13 AP Upper Legs | Static-I | iX1 - 6X | | 1.000 | Varian IEC | 0.0 | 90.0 | 0.0 | None | 40.0 | +20.0 | +20.0 | 40.0 | +20.0 | +20.0 | 0.00 | 5.00 | -117.00 | | 97 | |
| I | Old Leg | 14 PA Upper Legs | Static-I | iX1 - 6X | | 1.000 | Varian IEC | 180.0 | 90.0 | 0.0 | None | 40.0 | +20.0 | +20.0 | 40.0 | +20.0 | +20.0 | 0.00 | 5.00 | -117.00 | | 101 | |
| II | Old Leg | 15 AP Lower Legs | Static-I | iX1 - 6X | | 1.000 | Varian IEC | 0.0 | 90.0 | 0.0 | None | 40.0 | +20.0 | +20.0 | 40.0 | +20.0 | +20.0 | 0.00 | 5.00 | -156.00 | | 97 | |
| II | Old Leg | 16 PA Lower Legs | Static-I | iX1 - 6X | | 1.000 | Varian IEC | 180.0 | 90.0 | 0.0 | None | 40.0 | +20.0 | +20.0 | 40.0 | +20.0 | +20.0 | 0.00 | 5.00 | -156.00 | | 102 | |
| I | Old VMAT TBI | 1 CCW Head | Arc Therapy-I | iX1 - 6X | VMAT | 0.964 | Varian IEC | 179.0 CCW 181.0 | 3.0 | 0.0 | None | 22.0 | +2.0 | +20.0 | 40.0 | +20.0 | +20.0 | 0.00 | 5.00 | -2.00 | 96.1 | 193 | |
| I | Old VMAT TBI | 2 CW Head | Arc Therapy-I | iX1 - 6X | VMAT | 0.931 | Varian IEC | 181.0 CW 179.0 | 357.0 | 0.0 | None | 22.0 | +20.0 | +2.0 | 40.0 | +20.0 | +20.0 | 0.00 | 5.00 | -2.00 | 96.1 | 186 | |
| I | Old VMAT TBI | 3 CCW Head90 | Arc Therapy-I | iX1 - 6X | VMAT | 0.836 | Varian IEC | 179.0 CCW 181.0 | 87.0 | 0.0 | None | 20.0 | +20.0 | 0.0 | 40.0 | +20.0 | +20.0 | 0.00 | 5.00 | -2.00 | 96.1 | 167 | |
| II | Old VMAT TBI | 4 CW Chest | Arc Therapy-I | iX1 - 6X | VMAT | 1.039 | Varian IEC | 181.0 CW 179.0 | 3.0 | 0.0 | None | 22.0 | +2.0 | +20.0 | 40.0 | +20.0 | +20.0 | 0.00 | 5.00 | -28.00 | 88.4 | 208 | |
| II | Old VMAT TBI | 5 CCW Chest | Arc Therapy-I | iX1 - 6X | VMAT | 0.960 | Varian IEC | 179.0 CCW 181.0 | 357.0 | 0.0 | None | 22.0 | +20.0 | +2.0 | 40.0 | +20.0 | +20.0 | 0.00 | 5.00 | -28.00 | 88.4 | 192 | |
| II | Old VMAT TBI | 6 CW Chest90 | Arc Therapy-I | iX1 - 6X | VMAT | 1.055 | Varian IEC | 181.0 CW 179.0 | 87.0 | 0.0 | None | 20.0 | 0.0 | +20.0 | 40.0 | +20.0 | +20.0 | 0.00 | 5.00 | -28.00 | 88.4 | 211 | |
| II | Old VMAT TBI | 7 CCW Chest90 | Arc Therapy-I | iX1 - 6X | VMAT | 1.011 | Varian IEC | 179.0 CCW 181.0 | 93.0 | 0.0 | None | 20.0 | +20.0 | 0.0 | 40.0 | +20.0 | +20.0 | 0.00 | 5.00 | -28.00 | 88.4 | 202 | |
| III | Old VMAT TBI | 8 CW Abdomen | Arc Therapy-I | iX1 - 6X | VMAT | 1.151 | Varian IEC | 181.0 CW 179.0 | 3.0 | 0.0 | None | 22.0 | +2.0 | +20.0 | 40.0 | +20.0 | +20.0 | 0.00 | 5.00 | -54.00 | 89.0 | 230 | |
| III | Old VMAT TBI | 9 CCW Abdomen | Arc Therapy-I | iX1 - 6X | VMAT | 1.033 | Varian IEC | 179.0 CCW 181.0 | 357.0 | 0.0 | None | 22.0 | +20.0 | +2.0 | 40.0 | +20.0 | +20.0 | 0.00 | 5.00 | -54.00 | 89.0 | 207 | |
| III | Old VMAT TBI | 10 CW Abdomen90 | Arc Therapy-I | iX1 - 6X | VMAT | 0.958 | Varian IEC | 181.0 CW 179.0 | 87.0 | 0.0 | None | 20.0 | +20.0 | 0.0 | 40.0 | +20.0 | +20.0 | 0.00 | 5.00 | -54.00 | 89.0 | 192 | |
| IV | Old VMAT TBI | 11 CCW Pelvis | Arc Therapy-I | iX1 - 6X | VMAT | 1.463 | Varian IEC | 179.0 CCW 181.0 | 0.0 | 0.0 | None | 22.0 | +2.0 | +20.0 | 40.0 | +20.0 | +20.0 | 0.00 | 5.00 | -80.00 | 91.1 | 293 | |
| IV | Old VMAT TBI | 12 CW Pelvis | Arc Therapy-I | iX1 - 6X | VMAT | 1.534 | Varian IEC | 181.0 CW 179.0 | 0.0 | 0.0 | None | 22.0 | +20.0 | +2.0 | 40.0 | +20.0 | +20.0 | 0.00 | 5.00 | -80.00 | 90.8 | 307 | |

# Eclipse scripting



# Monaco scripting

What is Scripting?

- Scripting is a series of commands being executed automatically to complete the steps of a process that could alternatively be executed one-by-one by a human operator.

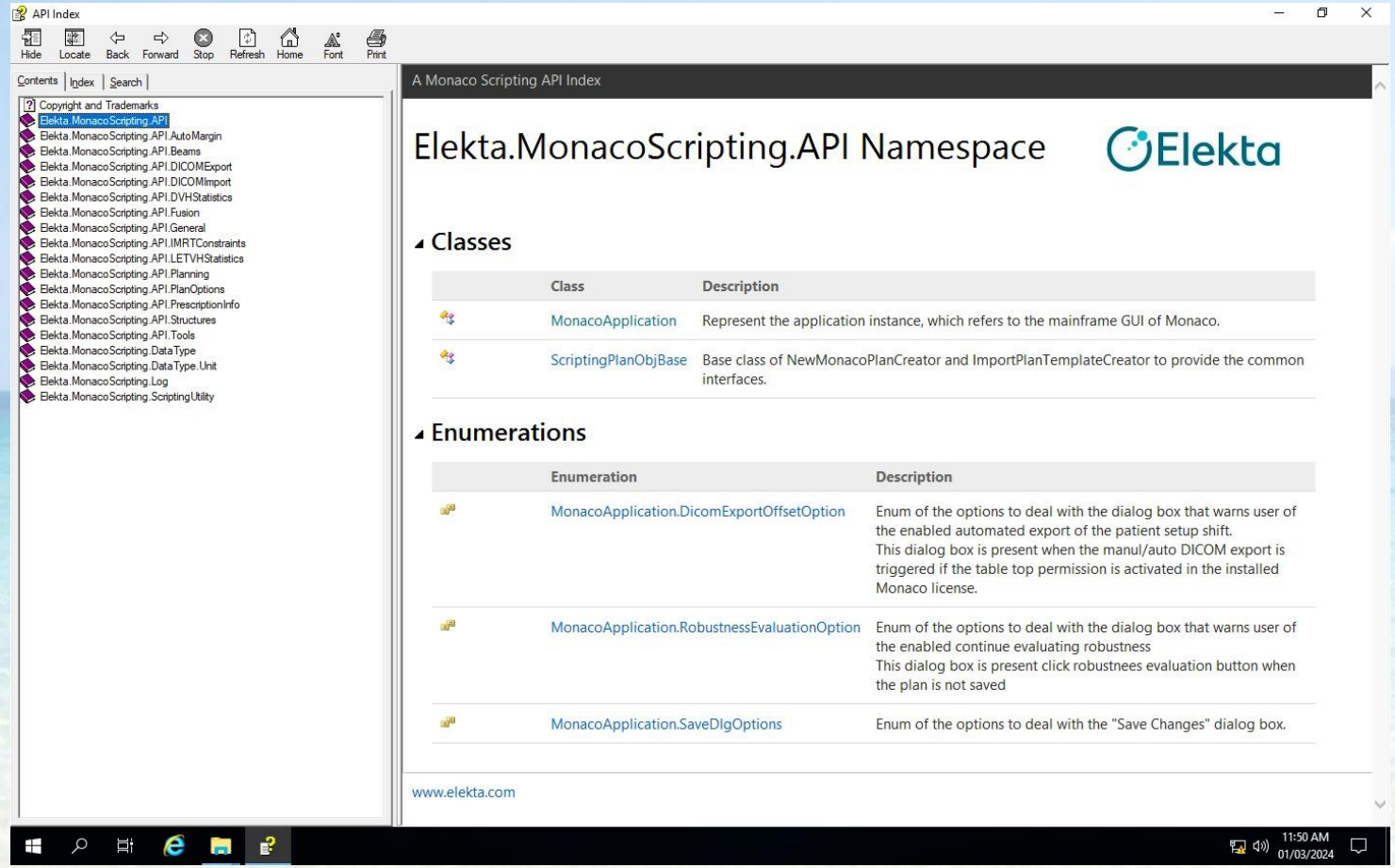
What are the advantages of using Scripting?

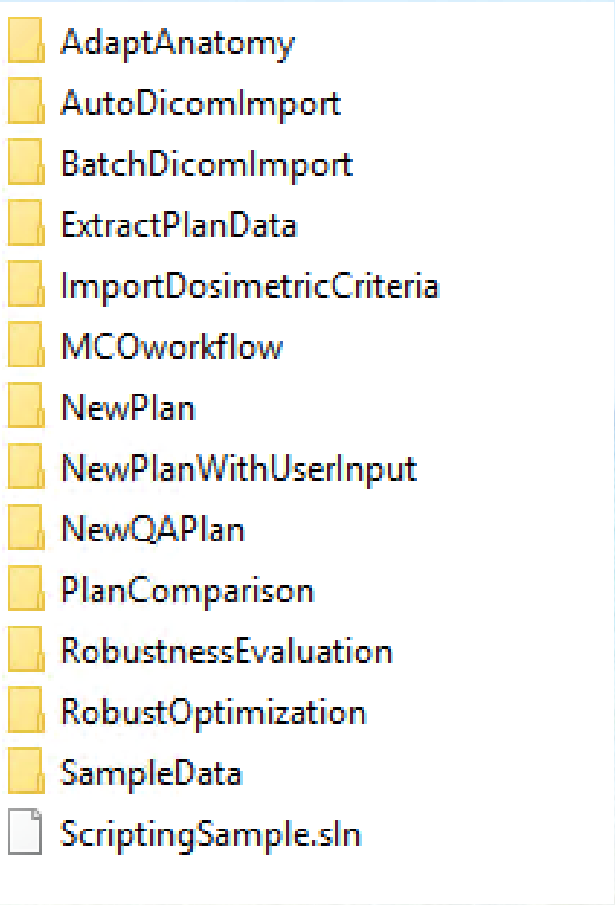
- Improves efficiency
- Standardize workflows

What kind of tasks could be automated in Monaco using Scripting?

- Import and export patients
- Create and calculate plans
- Generate reports
- Generate QA plans
- And much more

# Monaco Sample Script



Thai Medical Physicist Society

# Thank you