Radiation Knowledge
Global Quality Improvement Platform

Ahmad Mahmoud Nobah, M.Sc., DABR
Medical Physicist – Radiation Physics Section
King Faisal Specialist Hospital & Research Centre
Riyadh – Saudi Arabia

International Conference on Advances in Radiation Oncology (ICARO2)
Vienna, Austria
20–23 June 2017
Different Clinical Environments

- All serving THE PATIENT
Same Clinical Settings - Different Outcomes

Clinical Settings 1

- Same Clinical Tools
- Different solutions for “common” problems
- Different personal skills, experience, & passion

Result:
- Sub optimal utilization of resources
- Different Quality
- THE PATIENT receives sub optimal quality
Yes ... We Can

1. Can we open a global knowledge exchange channel?

2. Can we optimize usage of available clinical resources?

3. Can we provide high quality services to patients worldwide?

Let’s find out HOW ...
Result … Health care quality will vary from place to the other – Unfair !
We need …

1. To have an open knowledge sharing channel
2. To share the expert knowledge per vendor products
3. To educate other professionals how their system is powerful
4. To share knowledge efficiently through short videos & focused docs
5. To connect peers with each other to improve quality

Result … We will ensure that same settings will have high quality outcomes .. worldwide
A cloud-based quality improvement platform in radiation medicine

Aims at sharing high quality clinical performance

The Idea …

Unifying global efforts to improve quality of common clinical process
Radiation Knowledge Initiative

Unifying global efforts to improve quality of common clinical process

This can be achieved by:
- Selecting a common global clinical issue/task
- Defining **objective** quality evaluation criteria (Package)
- Distributing the Package worldwide
- Providing time to perform the task
- Collecting the outcomes from participants
- Evaluating the submitted tasks
- Selecting the top quality performance
- Sharing the best performance **per clinical settings** through:
  - Live-webinars
  - Short videos
  - Documents
  - Forum and social media discussions
Examples of Practical Topics Shared ...

Short videos, webinars, documents … describing How To:

• Perform daily clinical imaging or treatment procedures
• Generate high quality plans using 3D-CRT, IMRT/VMAT, IMPT, … etc.
• Perform reference dosimetry (TRS-398 or TG-51)
• Perform TPS QA for several TPSs
• Contour properly for different clinical sites
• Perform QA/QC procedures for imaging or therapy modalities
• Perform cross calibration for different detectors or dose measuring tools
• Perform dose measurements using different detectors with explanation
• Perform MU calculation (photons/electrons) for specific procedures
• Perform electron cutout measurements
• Perform patient specific QA using different tools
• **Perform many tasks in fields of radiotherapy, imaging, dosimetry, … etc.**
• …
Radiation Knowledge Community

In 2 years:
1847 Participants - 96 countries
PART 2

Our Activities
Radiation Knowledge “Current” Activities

Radiation Therapy was our starting point

1. International Plan Competitions
2. Live-webinars & Videos sharing the best RT Plans per TPS
3. Social Media Scientific/Clinical Discussion Groups
International Radiotherapy Plan Competitions

No. of Countries

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<tr>
<th>Year</th>
<th>No. of Countries</th>
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No. Of Participants

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Plan Competitions – 2016 vs. 2017 Major Countries Stats

Number of Participants

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<td>18</td>
<td>28</td>
<td>6</td>
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In 2016 competition: PlanIQ™–SunNuclear software used for evaluation

In 2017, we used our own evaluation software “PyPlanScoring”

Contouring comparison tool (In Progress)

Website: www.radiationknowledge.org

4.1. Knowledge Sharing Online Video Library (In Progress)
4.2. The evaluation software full integration - real time evaluation (In Progress)
4.3. Scientific forum and discussion groups
YouTube Channel & Social Media

Radiation Knowledge YouTube Channel: On June 21st, 2017: # of views more 7550

FaceBook Page: Radiation Knowledge
Twitter Account: @KnowRadiation
WhatsApp Group: RT Plan Competition
Radiation knowledge Committees – Team Work

- **Advisory Committee**
  Dr. Belal Moftah, RT Physicist, KFSH&RC-Riyadh, KSA
  Dr. Waleed Al-Najjar, RT Physicist, KFSH&RC-Riyadh, KSA
  Dr. Shada Ramahi, RT Physicist, KFSH&RC-Riyadh, KSA
  Dr. Adnan Hebshi, Rad. Onc., JHAH, KSA
  Dr. Mahmoud Rana, Rad. Onc., CHU, UK

- **Scientific Committee**
  Dr. Francois DeBlois, RT Physicist, McGill University, Canada
  Dr. Victor Gabriel, RT Physicist, INCA, Brazil
  Mr. Saad Aldelaijan, RT Physicist, KFSH&RC-Riyadh, KSA
  Dr. Arib Mehanna, Health Physicist, KFSH&RC-Riyadh, KSA
  Mr. Ahmad Nobah, RT Physicist, KFSH&RC-Riyadh, KSA

- **Website Committee**
  Mr. Mubin Shaikh, RT Physicist, USA
  Ms. Rikka Santos, System Admin, KFSH&RC-Riyadh, KSA

- **Organizing Committee**
  Dr. Noha Jastaniyah, Rad. Onc, KFSH&RC-Riyadh, KSA
  Dr. Amin Al-Omair, Rad. Onc., KFSH&RC-Riyadh, KSA
  Dr. Hussein Al-Hussein, Rad. Onc., KFMC-Riyadh, KSA
  Dr. Nasser Al-Dhaibany, Rad. Onc., KAMC-Jeddah, KSA
  Ms. Christine Higby, Dosimetrist, OUHSC, USA
  Dr. Moamen Aly, Physicist, KFMC-Riyadh, KSA
  Mr. Bilal Jalal, Physicist, KFSH-Dammam, KSA
  Dr. Tarek El-Keissi, Physicist, NCCCR, Qatar
  Mr. Abdallah Al Shareef, Adminstration, SFDA, KSA
  Mrs. Isabel Palazon-Cano, Dosimetrist, Ruber Intern., ESP
  AND
  Ms. Samah Abu-Ghalieh *(My Wife)*
Two Years So Far..

- **Dec 2015**: Idea
- **May 2016**: 1st Plan Competition (Launch: LT Breast Case)
- **Feb 2016**: Results & Webinars
- **May 2016**: Results
- **June 2017**: Results – ICARO2
- **Aug 2017**: Webinars Per TPS
- **May 2018**: Results
- **May 2018**: July 2017 Webinars Per TPS
- **June 2017**: Results – ICARO2
- **Feb 2017**: 2017 Competition (Launch: H&N – Nasopharynx)
- **Feb 2018**: 2018 Competition (3 in 1)
  - SBRT
  - 3D-CRT
  - IMRT/VMAT/IMPT
- **July 2017**: Webinars Per TPS
- **Sept 2018**: RT Global Physics Task
PART 3
What we have Learned … & More …
What we have learned ...

Professionals are so keen to participate in global initiatives

Many practitioners need help, we can be the link to provide professional help globally

Unifying global efforts to solve common challenges improves quality of performance

From our experience:

1. Vendors’ training is not enough to maximize the outcome of their products

2. Quality varies based on individual performance (skills & passion)

3. Sharing the knowledge of experts saves time & resources required to improve quality

4. Social media can help a lot in sharing the knowledge efficiently

5. Professionals realize the “real” power of their clinical tools
To aim high … Our goal is to reach every professional in the field of radiation in medicine.

The **Radiation Knowledge** community is getting bigger every day …
More experts are joining to manage this initiative and enrich it …
We started with humble steps .. Passion made us reaching this far …

**Radiation Knowledge Team**

We simply love what we are doing .. Despite all difficulties .. We will keep moving **FORWARD**
If you want to walk fast ... Walk alone

If you want to walk *far* ... *Walk Together*

*We need to go far in quality improvement ... So, we need to work together*

Our goal is to reach ALL professionals worldwide ... *We will get there 😊*
THANK YOU
Radiotherapy Plan Competition

Head & Neck – Nasopharyngeal Case

Ahmad Mahmoud Nobah, M.Sc., DABR
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Global efforts unified to accomplish a single common task
1. Introduction
2. Statistics
3. H&N Nasopharynx Competition Details
4. PyPlanScoring Dose Evaluation Tool
5. Data Analysis
PART 1

Introduction
Why Competition?

Plan Competition

A challenge
Reach your max skills
Reach TPS Max
From Planner’s perspectives
RADIATION KNOWLEDGE

2017 RT PLAN COMPETITION

H & N - NASOPHARYNX

BE THE STRONGEST LINK IN THE RADIOThERAPY CHAIN
Plan Competition Concept

Package

Planning

Four Weeks

Best Plans

Share Best Plans
Webinars & Documents

Download
Plan Competition Process

Every Year

- Download
- Register
- Webinars
- Plans' Document
- Follow-Up Plan
- Plan
- Evaluation
- Upload
2017 Competition - Level Of Participation

Asia - 755
Africa - 113
Europe - 471
North America - 193
Latin America - 101
Australia - 38
International Radiotherapy Plan Competitions

No. of Countries

<table>
<thead>
<tr>
<th>Year</th>
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</tr>
</tbody>
</table>
TPS Statistics – 1672 Planners – 94 Countries

**Varian - Eclipse:**
786 planners from 69 countries

**Elekta – Monaco, XiO, & Oncentra:**
Monaco 254, XiO 88 & Oncentra 24 planners
Monaco 49, XiO 27 & Oncentra 12 countries

**Philips - Pinnacle:**
192 planners from 24 countries

**RaySearch - RayStation:**
104 planners from 18 countries

**Acuray – Tomotherapy & Multiplan:**
Tomo 105 & Multiplan 13 planners
Tomo 25 & Multiplan 3 countries
PART 3

H&N Nasopharynx: Competition Details
Rad. Onc. Consultant: Dr. Hussain Al-Hussain, Radiation Oncology Consultant
King Fahd Medical City, Riyadh, Saudi Arabia

Dosimetric Protocol: Dose Objectives for Head and Neck IMRT Treatment Planning
Recommendation Report
A project developed by the Head and Neck Community of Practice of the Radiation Treatment Program of Cancer Care Ontario for circulation to Regional Cancer Programs.
Report Date: February 2014

Dose Details: 70 Gy (PTV70), 63 Gy (PTV63), and 56 Gy (PTV56) in 33 fractions

Plans’ Categories
Clinical Plan: Plan with practical settings (trt. time, # fields, ... etc)
Fantasy Plan: Planner can use any possible planning parameters, sky is the limit

Allowed Techniques: 3D-CRT, IMRT, VMAT, HT, IMPT, Hyprid tech, electrons, ... etc
2017 Plan Competition – H&N Nasopharynx
2017 Plan Competition – General Criteria

• General
  - Total Score of 100 points
  - Total of 31 dosimetric objectives
  - Nine PTV objectives (30 points out of 100)
  - Three Accept/Reject Criteria for Plans Submitted:
    1. No marks (points) assigned to these criteria
    2. If, and ONLY IF, they are achieved, the plan will be evaluated
  - Prizes will be distributed based on TPS – To overcome TPS-to-TPS differences

• Dataset Package
  - DICOM files: Image set, RS, RD, and RP
  - General Planning Guidelines
  - Dosimetric Planning Criteria
  - Questions & Answers
Plan Submission Categories:
- Clinical Plan
- Fantasy Plan

Clinical Plan:
- Clinical settings
- Reasonable Beam-On Time

Fantasy Plan:
- Use all available resources
- Be creative

### General Plan Requirements

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<th>Criteria</th>
<th>Clinical Plans</th>
<th>Fantasy Plans</th>
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<td>External Beam Radiation Therapy ONLY</td>
<td>External Beam Radiation Therapy ONLY</td>
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<td>RT Technique</td>
<td>3D-CRT/IMRT/VMAT/TOMO/CK/IMPT</td>
<td>3D-CRT/IMRT/VMAT/TOMO/CK/IMPT/...</td>
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<td># of Isocenters</td>
<td>ONE, unless machine limitations exist</td>
<td>ONE, unless machine limitations exist</td>
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<td>Uniform size AND size &lt; 3mm</td>
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<tr>
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<td>Heterogeneity Corr. Should be used</td>
<td>Heterogeneity Corr. Should be used</td>
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<td>Energy</td>
<td>Single or mixed beams</td>
<td>Single or mixed beams</td>
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<td>Bolus</td>
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<td>Hybrid Technique</td>
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<tr>
<td># of Fields</td>
<td>3D-CRT Max of 9 fields, Max of 5 non-coplanar</td>
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<tr>
<td></td>
<td>IMRT Max of 9 fields, All should be coplanar</td>
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<tr>
<td></td>
<td>VMAT Max of 4 arcs, All should be coplanar</td>
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<tr>
<td></td>
<td>IMPT Max of 5 arcs, All should be coplanar</td>
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<tr>
<td>Beam On Time</td>
<td>3D-CRT Should be less than 10 min</td>
<td>Should be less than 10 min</td>
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<tr>
<td></td>
<td>IMRT Should be less than 25 min</td>
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<td>VMAT Should be less than 10 min</td>
<td>Should be less than 15 min</td>
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<tr>
<td></td>
<td>IMPT Should be less than 10 min</td>
<td>Should be less than 15 min</td>
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<tr>
<td></td>
<td>TOMO Should be less than 20 min</td>
<td>Should be less than 30 min</td>
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### Dosimetric Criteria Summary

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<th>X1</th>
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<td>1</td>
<td>D95%</td>
<td>PTV10</td>
<td>Gy</td>
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<td>OAR CHAM PRV</td>
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<tr>
<td>25</td>
<td>CTV(66.5 Gy)</td>
<td>PTV70-BRONCHUS-4MM</td>
<td>Gy</td>
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<td>≤ 0.65</td>
<td>4</td>
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<td>26</td>
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<td>Gy</td>
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<td>0</td>
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<td>CTV(50.4 Gy)</td>
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<td>Gy</td>
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<td>≤ 0.65</td>
<td>2</td>
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<td>28</td>
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<td>≤ 0.13</td>
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<td>CTV(53.2 Gy)</td>
<td>PTV56</td>
<td>Gy</td>
<td>0</td>
<td>≥ 0.87</td>
<td>3</td>
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<td>30</td>
<td>Hi</td>
<td>PTV56</td>
<td>Gy</td>
<td>3</td>
<td>≥ 0.14</td>
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<tr>
<td>31</td>
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<td>BODY</td>
<td>Gy</td>
<td>3</td>
<td>≥ 27.0</td>
<td>0</td>
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</tr>
</tbody>
</table>

Ch_{ROI}=\text{Volume of ROI covered by Dose (Gy)}/\text{Volume of ROI (Gy)}

H_{ROI}=\text{Volume of ROI covered by 1% of the Dose (Gy)}/\text{Volume of ROI (Gy)}

22-Feb-17
Radiation Knowledge - Dosimetric Criteria
PART 4

PyPlanScoring
Dose Evaluation Tool
PyPlanScoring: Dose-Volume Histogram & Score Calculations

• Coded By Dr. Victor Gabriel Leandro Alves, D.Sc.
  SQRI-INCA - Brazil
  Radiation Knowledge scientific committee

• Why develop an independent scoring software?
  • Built based on scientific Python packages
  • Avoid DVH calculation differences among TPS models.

• Features:
  • Own scoring metrics
  • Tested over more than 800 plans: Compatible with all available TPS systems, including IMPT TPS

• Consistency
  • All plans are evaluated using same DVH estimation algorithm.

• Flexibility
  • Perform batch DVH calculation

• Accuracy
  • Possibility to up-sample each to very small voxels (down-to 0.2 mm or less)
PyPlanScoring – Calculation Methodology

• Calculation Methodology
  • Volume up-sampling and adaptive rasterization.
  • 3D dose extraction - Trilinear interpolation.
  • Multiprocessing

• Improved DVH calculation accuracy
  • DVHs and conformity indices
  • Complex or small structures
Published benchmark datasets

Nelms BE, Stambaugh C, Hunt D, Tonner B, Zhang G, and Feygelman V. "Methods, software and datasets to verify DVH calculations against analytical values: Twenty Years Late(r)“, Med Phys. 2015 Aug; 42(8).

Analytical Values Method

- DVH Curve comparison against analytical values.

Small sphere, cylinder, and cone.

- **Dicom-RT files**
  - Voxel sizes: 0.4×0.2×0.4, 1, 2 and 3 mm.
  - AP and SI linear dose gradience
  - 6%/mm at the center of the structure

Benchmark Tests

- **Test 1**: Dose grid resolution is varied with fixed 0.2mm axial contour spacing (40 dose/str. combinations)
- **Test 2**: Dose grid resolution and contour spacing are matched at 1, 2, and 3 mm
- **Test 3**: Curves plotted to calculate differences in dose/volumes over the entire range of the curves.
PyPlanScoring – Dose & Volume Tests

• Test volumes:

Cone – 10 mm slice thickness

Cylinder – 30 mm slice thickness
## Calculated versus analytical values

**Test 1 – varying dose grid resolution: 0.2 mm to 3 mm**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Delta &gt; +/- 3%</th>
<th>Delta %</th>
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<tr>
<td>Total Volume (cc)</td>
<td>0</td>
<td>-0.7 - 0.5</td>
</tr>
<tr>
<td>Dmin</td>
<td>0</td>
<td>-0.1 - 2.6</td>
</tr>
<tr>
<td>Dmáx</td>
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<td>-0.4 - 0.0</td>
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<tr>
<td>Dmean</td>
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<td>-0.2 - 0.3</td>
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<tr>
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<td>-0.1 - 0.2</td>
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<tr>
<td>D0.03cc</td>
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<td>-0.1 - 5.8</td>
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</table>

**Test 2 – Matched contour and dose grid resolution**

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<th>Delta %</th>
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<td>0</td>
<td>-0.2 - 2.6</td>
</tr>
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<td>Dmáx</td>
<td>0</td>
<td>-0.4 - 0.0</td>
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<td>Dmean</td>
<td>0</td>
<td>-0.8 - 0.7</td>
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<tr>
<td>D99</td>
<td>8</td>
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<tr>
<td>D95</td>
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<td>D5</td>
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<td>-1.1 - 2.7</td>
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<tr>
<td>D0.03cc</td>
<td>11</td>
<td>0.2 - 10.0</td>
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</table>

![Cone_10_0 Dose Gradient Z(AP).png](image)
PART 5

Participants’ Score Curve
2017 Plan Competition – Performance Statistics

• Total Number of Submitted Plans: ~ 475 plans
• Scores’ range 23.7-100 out of 100

2017 Plan Competition - Score Curve
Why Knowledge Sharing is a MUST?

2017 Plan Competition - Score Curve

- Same Clinical Setting
Scores' Histogram

Scores > 99: 8 Planners
Scores > 97: X Planners
Scores > 90: Y Planners
Acknowledgements

- All participants who made our plan competition a story of success
- **King Faisal Specialist Hospital & Research Centre**, represented by my boss Dr. Belal Moftah, for the support, guidance and encouragements
- **Saudi Oncology Society (SOS)**, represented by Dr. Adnan Al-Hebshi for the sponsorship of the 2016 competition and continuous support
- **King Fahd Medical City** and more specifically Dr. Hussain Al-Hussain for his major contribution in the case selection, contouring and dosimetric criteria preparation
- The **International Atomic Energy Agency** (IAEA) for their continuous support and their invitation to present our Radiation Knowledge initiative in **ICARO-2**
- Dr. Victor Gabriel for his time and efforts in the past seven months developing the PyPlanScoring
- Dr. Francois De-Blois for his efforts and guidance
- All committee members from Saudi Arabia and worldwide
- Ms. Christine Higby, Dr. Waleed Al-Najjar & Dr. Shada Wadi-Ramahi for their valuable guidance
- Mr. Imran Azhar, Ms. Rikka Santos, Mr. Mubin Shaikh, and for building & maintaining the website
Radiotherapy Plan Competition 2017

WINNERS’ ANNOUNCEMENT

Ahmad Mahmoud Nobah, M.Sc., DABR
Medical Physicist – Radiation Physics Section
King Faisal Specialist Hospital & Research Centre
Riyadh – Saudi Arabia

International Conference on Advances in Radiation Oncology (ICAR02)
Vienna, Austria
20–23 June 2017
Plan Submission Categories:
- Clinical Plan
- Fantasy Plan

Clinical Plan:
- Clinical settings
- Reasonable Beam-On Time

Fantasy Plan:
- Use all available resources
- Be creative

<table>
<thead>
<tr>
<th>GENERAL PLAN REQUIREMENTS</th>
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<tr>
<td>Criteria</td>
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<td>Chung Yin Mak</td>
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<tr>
<td>Trinh Nguyen</td>
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<td>Shing cheung Yik</td>
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### Clinical Plans – Top Planners Per TPS

<table>
<thead>
<tr>
<th>Planner Name</th>
<th>Country</th>
<th>Technique</th>
<th>Final Score</th>
<th>TPS USED</th>
<th>Hospitals</th>
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<td>IMRT</td>
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<td>Elekta-Monaco</td>
<td>King Hamad University Hospital</td>
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</table>

Lucky Hospitals … Multiple Top Planners from same hospital
Fantasy Plans – Top Planners
## Top Planners - Fantasy Plans

<table>
<thead>
<tr>
<th>Planner Name</th>
<th>Country</th>
<th>Technique</th>
<th>TPS</th>
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<th>Hospital/Company</th>
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Clinical Plans – Top Planners – Per TPS
### Clinical Plans – Top Two Planners of every TPS

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<td>Bahrain</td>
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<td>93.3</td>
<td>Elekta-Monaco</td>
</tr>
</tbody>
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Clinical Plans – Top Planners – Varian Eclipse
Plan Details:

Energy: 6FFF, 4 Full Arcs, Linac: TrueBeam

Name: Chung Yin Mak
Country: Hong Kong
Hospital: St. Teresa’s Hospital
Technique: VMAT
Rank: Top Eclipse/Comp Planner
Job Title: Radiation Therapist
Name: Friedemann Herberth
Country: Switzerland
Hospital: Kantonsspital St.Gallen
Technique: VMAT
Rank: Second Top (Eclipse)
Job Title: Medical Engineer

Plan Details:
Energy: 6FFF, 4 Full Arcs, Linac: TrueBeam

Also .. Top planner in Fantasy Plan submission (100/100) ...
Amazing!
Name: Jonathan Stenbeck  
Country: United States  
Hospital: Greenville Health System  
Technique: VMAT  
Rank: Third Top (Eclipse)  
Job Title: Medical Physicist

Plan Details:
Energy: 6FFF, 4 Full Arcs, Linac: TrueBeam
Clinical Plans – Top Planners – RaySearch RayStation
Name: Fazal Khan  
Country: United States  
Hospital: Mayo Clinica - Arizona  
Technique: IMPT  
Rank: Top RayStation  
Job Title: Medical Dosimtrist

Plan Details:
70 to 195 MeV, 5 fields, IBA Cyclotron
Clinical 98.5/100

Name: Rolland Julien
Country: France
Hospital: Institut Paoli-Calmettes – Centre Hospitalier des
Technique: VMAT
Rank: Second Top (RayStation)
Job Title: Medical Physicist

Plan Details:
Energy: 6MV, 4 full arc, Linac: Agility
Clinical Plans – Top Planners – Accuray Tomotherapy
Name: Simon Hienz
Country: Switzerland
Hospital: Kantonsspital St.Gallen
Technique: VMAT
Rank: Top Tomotherapy
Job Title: Medical Physicist

Plan Details:

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<td>Sinogram Segments</td>
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<td>Planning Modulation Factor (Actual)</td>
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<tr>
<td>Plan Calculation Grid</td>
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</table>
Name: Lum Liang Soo  
Country: Malaysia  
Hospital: Mount Miriam Cancer Hospital  
Technique: VMAT  
Rank: Second Top (Tomotherapy)  
Title: Medical Physicist

Plan Details:

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Clinical Plans – Top Planners – Philips Pinnacle
Name: Mok Wa Wai  
Country: China  
Hospital: Tianjin Medical University Cancer Institute and Hospital  
Technique: VMAT  
Rank: Top Pinnacle  
Job Title: Medical Physicist

Plan Details:

Energy: 6MV, 2 full arcs, Linac: Agility
Name: Mok Wa Wai  
Country: Hong Kong  
Hospital: Tuen Mun Hospital  
Technique: VMAT  
Rank: Second Top (Pinnacle)  
Job Title: Radiation Therapist  

Plan Details:

Energy: 6MV, 4 Full Arcs, Linac: Synergy Agility
Clinical Plans – Top Planners – Elekta Monaco
**Plan Details:**

Energy: 6 & 10MV, 9 Beams, Linac: Agility

Name: **Irina Fotina**  
Country: **Germany**  
Hospital: **Self-Employed**  
Technique: **IMRT**  
Rank: **Top (Monaco)**  
Job Title: **Medical Physicist**

**Plan Details:**

Energy: 6 & 10MV, 9 Beams, Linac: Versa HD

Name: **Charbel Attieh**  
Country: **Bahrain**  
Hospital: **King Hamad University Hospital**  
Technique: **IMRT**  
Rank: **Second Top (Monaco)**  
Job Title: **Medical Physicist**
All Top Planners will be invited to share their planning knowledge through Webinars & Knowledge Sharing Document.
THANK YOU
Radiation Knowledge

What’s Next

Ahmad Mahmoud Nobah, M.Sc., DABR
Medical Physicist – Radiation Physics Section
King Faisal Specialist Hospital & Research Centre
Riyadh – Saudi Arabia

International Conference on Advances in Radiation Oncology (ICARO2)
Vienna, Austria
20–23 June 2017
Unifying The World To Solve One Global Clinical Task/Issue
Radiation Knowledge Initiative

Unifying global efforts to improve quality of common clinical tasks/issues

This can be achieved by:

- Selecting a common global clinical issue/task
- Defining **objective** quality evaluation criteria (**Package**)
- Distributing the **Package** worldwide
- Providing time to perform the task
- Collecting the outcomes from participants
- Evaluating the submitted tasks
- Selecting the top quality performance
- Sharing the best performance **per clinical settings** through:
  - Live-webinars
  - Short videos
  - Documents
  - Forum and social media discussions
Examples of Global Clinical Tasks/Issues...

- Perform daily clinical imaging or treatment procedures
- Generate high quality plans using 3D-CRT, IMRT/VMAT, IMPT, … etc.
- Perform reference dosimetry (TRS-398 or TG-51)
- Perform TPS QA for several TPSs
- Contour properly for different clinical sites
- Perform QA/QC procedures for imaging or therapy modalities
- Perform cross calibration for different detectors or dose measuring tools
- Perform dose measurements using different detectors with explanation
- Perform MU calculation (photons/electrons) for specific procedures
- Perform electron cutout measurements
- Perform patient specific QA using different tools
- **Perform many tasks in fields of radiotherapy, imaging, dosimetry, … etc.**

**3D Printing Technology:**
- Design, fabricate QA Phantoms: KFSH&RC Advanced 3D Printing & machine shop facilities
- Send them to Medical Physics societies
- Collect data and analyze them
Website:

- Automated Plan Evaluation & e-Contouring module to be enabled
- Online Library:
  - Practical Document: Sharing steps to perform clinical tasks
  - Short Videos: Sharing the right way of performing clinical tasks

PyPlanScoring Software

- To improve the calculation accuracy and speed
- Graphical User Interface: To be improved

Contouring Comparison Software

- In progress
3D Printing Technology

- Design, fabricate QA Phantoms: KFSH&RC Advanced 3D Printing & machine shop facilities
- Send them to Medical Physics societies
- Perform clinical tasks
- Send it to Radiation Knowledge
- Collect data and analyze them

Experts will prepare the reference dosimetry related to technical details and accuracy of reference dosimetry of Radiation Knowledge detectors
Join Us …

Radiation Knowledge

www.radiationknowledge.org

THANK YOU