

Quality: Why we should 'manage' it and not just 'control' it

Kin Yin Cheung, PhD

Hong Kong Sanatorium & Hospital,
Hong Kong SAR,
China

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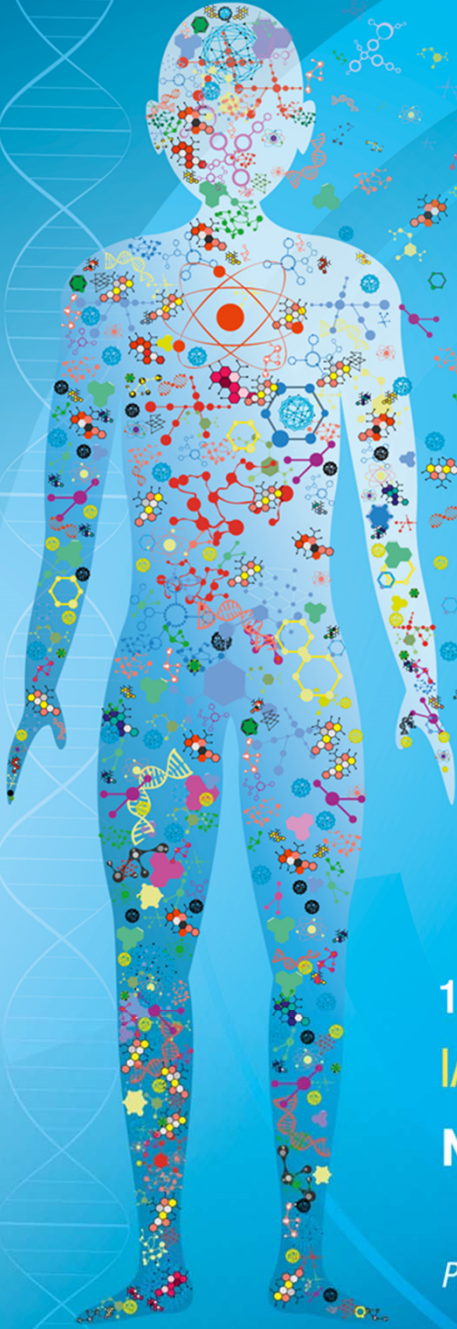
**Nuclear Techniques
in Human Health**

Prevention, Diagnosis, Treatment



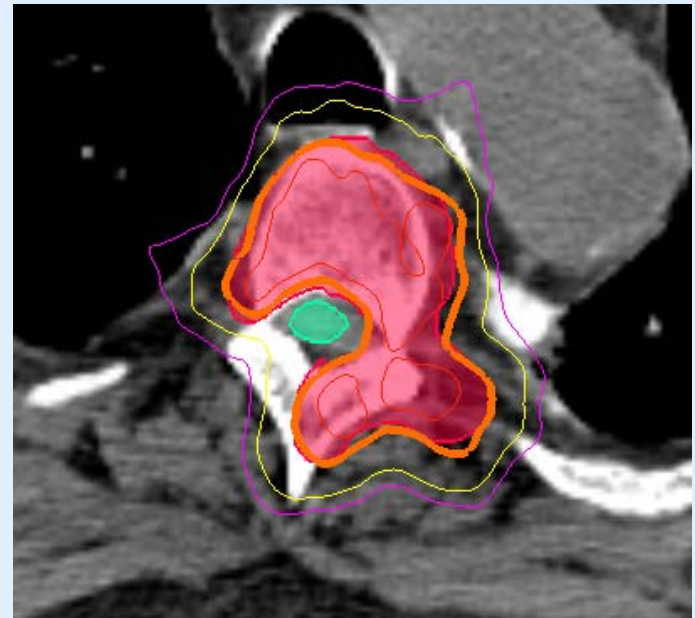
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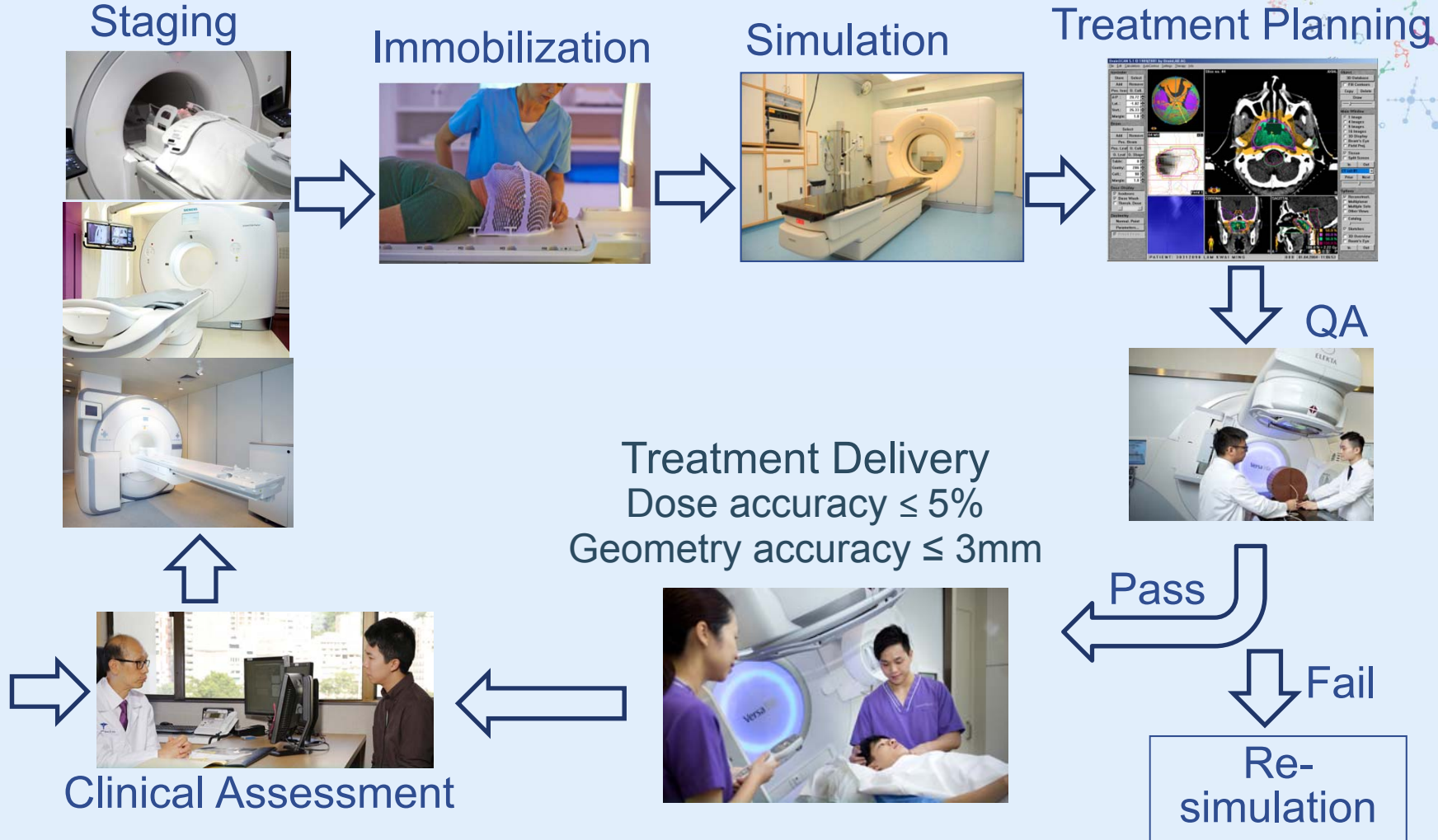


Quality & Safety in Radiation Therapy

- In radiotherapy, the goal is to delivery the right amount of radiation dose to the disease volume precisely.
- The quality of treatment can have direct impact on treatment outcome
- Treatment quality is dependent on:
 - Staff performance
 - Equipment performance



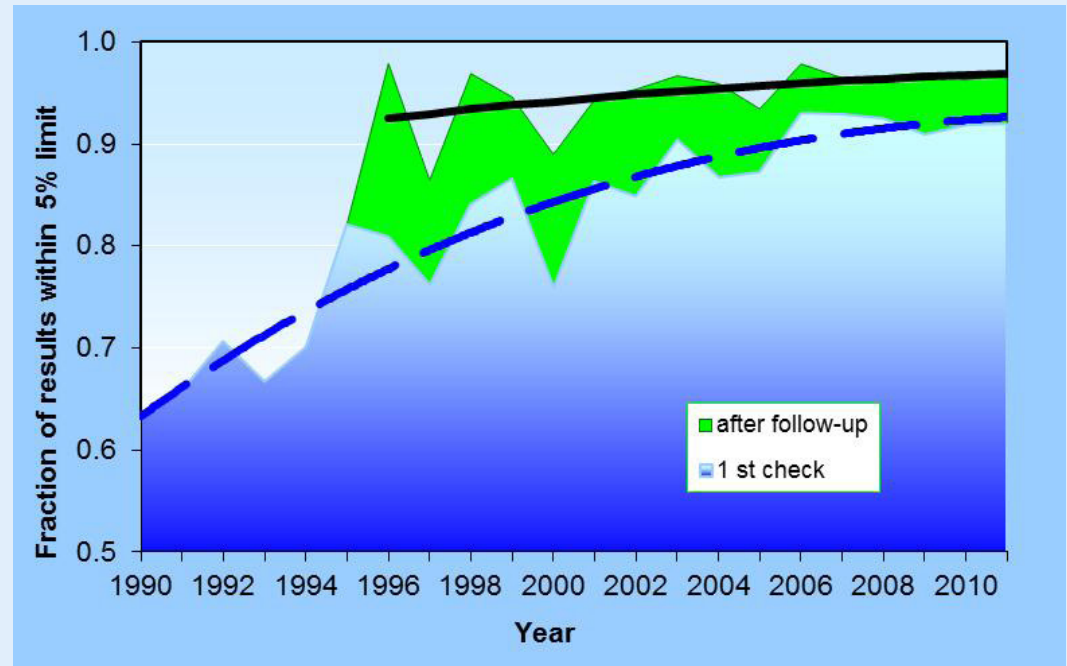
Typical Workflow in Radiotherapy- Each procedure is subject to human and machine errors



Treatment Error Arising from Improper Machine Calibration

IAEA/WHO TLD Dosimetry Audit on External Beam Radiotherapy Machines

8000 machines in 120 countries audited during 1969–2009. 50% of the machines were found incorrectly calibrated (> 5% dose error)- i.e. about 50% of the patients treated were given significantly wrong dose.



Source: J. Izewska, IAEA



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Errors & Uncertainties in Treatment Planning

Treatment Planning System Calculation Errors Are Present in Most Imaging and Radiation Oncology Core-Houston Phantom Failures

James R. Kerns, PhD,^{*,†,‡} Francesco Stingo, PhD,[§]
David S. Followill, PhD,^{*,†,‡} Rebecca M. Howell, PhD,^{*,†}
Adam Melancon, PhD,^{*} and Stephen F. Kry, PhD^{*,†,‡}

^{}Department of Radiation Physics, [†]Imaging and Radiation Oncology Core-Houston, and [§]Department of Biostatistics, The University of Texas MD Anderson Cancer Center; and [‡]Graduate School of Biomedical Sciences, The University of Texas Health Science Center-Houston, Houston, Texas*

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Some Errors Cause Serious Accidents-

Medical radiation incidents happened in both developed & developing countries. Many might not have been reported.

SKY NEWS

Teen May Die After Radiation Blunder

9:58pm UK, Wednesday February 08, 2006

A teenager faces an uncertain future after a top cancer hospital gave her a potentially fatal overdose of radiation. Lisa Norris, 15, was given the overdose 17 times while she received treatment for a brain tumour at the Beatson Oncology Centre in Glasgow.



Human error has been blamed for the mistakes which happened at each of her 17 radiotherapy sessions. The effects of the blunder are not yet known - but doctors have warned the girl's family they could be devastating. Lisa told Sky News: "I've got burns down the back of my neck and burns down my ear. It's really sore and I can't really do much."

It is uncertain what the future holds for Lisa. Her brain has been damaged, she could be left with a permanent disability. The problems with radiotherapy operation and a course of Professor Alan Rodger, said: "Initial meetings have been held to discuss the error. We will do everything in our power to help Lisa and her family in the challenges ahead."

Accidental Overexposure of Radiotherapy Patients in San José, Costa Rica

The New York Times

WORLD U.S. N.Y. / REGION BUSIN

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THE RADIATION BOOM

Radiation Offers New Cures, and Ways to Do Harm

By WALT BOGDANICH
Published: January 23, 2010

As Scott Jerome-Parks lay dying from a massive radiation overdose — which left him blind, deaf, and paralyzed — he was turned, with his teeth clenched in pain, to a nurse who was nauseated, in several instances, and talked about putting him to death.

Enlarge This Image

Ottawa

Short-staffing led to dosage error


Pub goes all-Asian

Department of medical physics. "We were actually over-staffed," she said. "They were up to seven physicians at the time of the incident, compared to 14 now, she said. The report states two recommendations — the hospital should create a safety protocol to prevent the possibility of radiation therapy staff to maintain a checklist where medical physics staffing is below that level. The hospital has agreed to do so."

Patient patients

Although patients in a few instances were told about the error, most were not. "DoseCalc doesn't expect any adverse results for patients. There are low-grade tumors that grow very slowly," he said. "We're sorry this happened, but ... the likelihood of anyone being affected is extremely low." The patients will be seen twice a year for five years, compared to the usual once-a-year consultation, he said.


Safety Reports Series
No. 17



LESSONS LEARNED FROM ACCIDENTAL EXPOSURES IN RADIOTHERAPY

INVESTIGATION OF AN ACCIDENTAL EXPOSURE OF RADIOTHERAPY PATIENTS IN PANAMA

Accidental Overexposure of Radiotherapy Patients in Bialystok



Cancer error well handled

Report says hospital reacted properly following blunder

SUN VIDEO

Dr. Jeff Hubbard discusses steps taken by the hospital in the aftermath of an error.

NEW ZEALAND

Stressed staff lead to cancer patient getting triple radiation dose

14 Aug 2017

nzherald.co.nz
New Zealand
Friday, 18 August 2017

RADIATION ONCOLOGY

Mr. Jerome-Parks died several weeks later in 2007. He was 43.

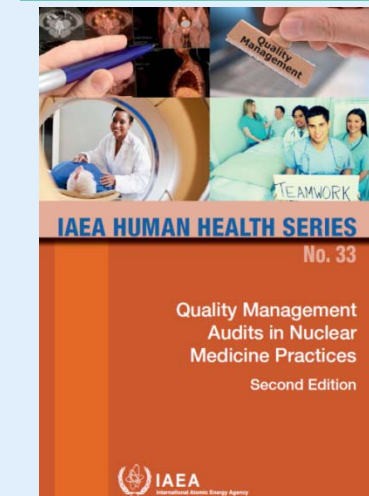
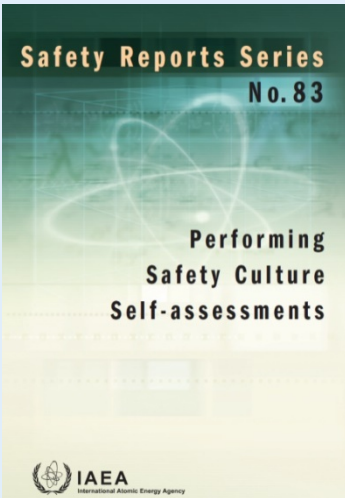
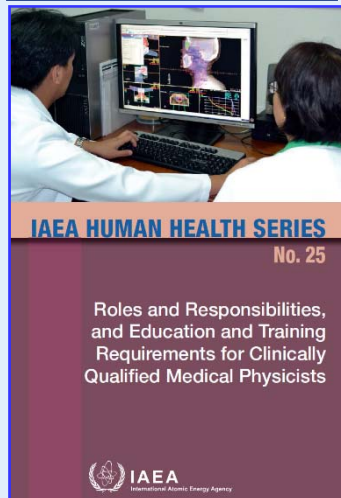
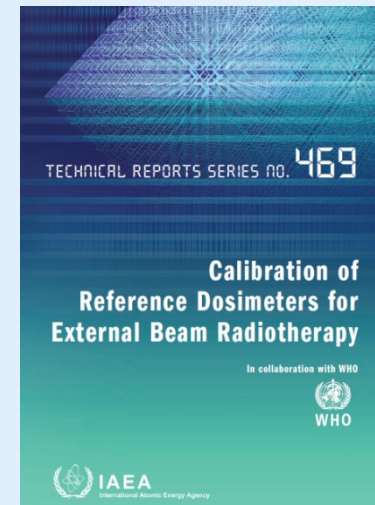
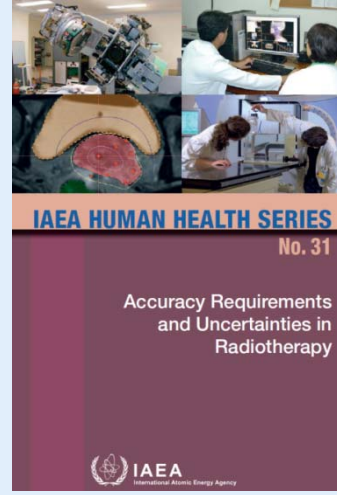
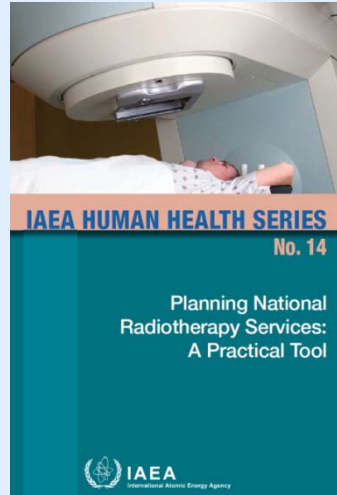
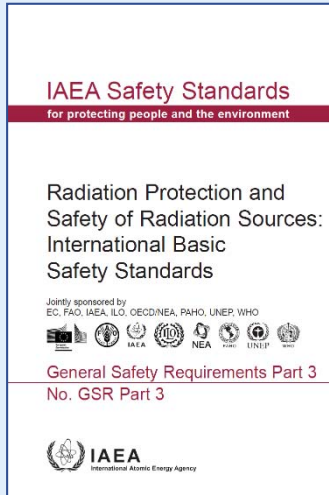
A New York City hospital treating him for tongue cancer had failed to detect a computer error that directed a linear

Control of Quality Standard

- Service providers are obliged to meet the country specific requirements on service quality and safety in radiation medicine
- Protection of patient's interest can be achieved by implementing a system of quality assurance (QA) in the service structure
- QA in radiation medicine, particularly in radiation therapy, should be implemented under regulatory control
- The IAEA has published the scientific basis, standards and guidance documents which can serve as useful reference for Member States in establishing regulatory control on quality and safety in radiation medicine



IAEA Safety Standards and Guidelines Relevant to Radiation Therapy



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System for Control of Quality

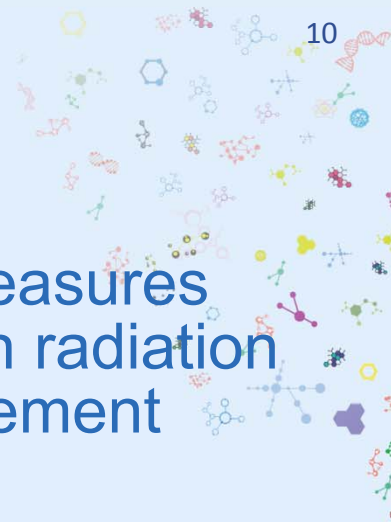
Service providers should systematically implement a QA system to ensure the defined quality is achieved in each process in the radiotherapy workflow.

- QA structure
- QA teams- terms of reference & designation of QA staff
- QC protocols:
 - Quality standard
 - Work procedures
 - Equipment performance assessment
 - Radiation dosimetry

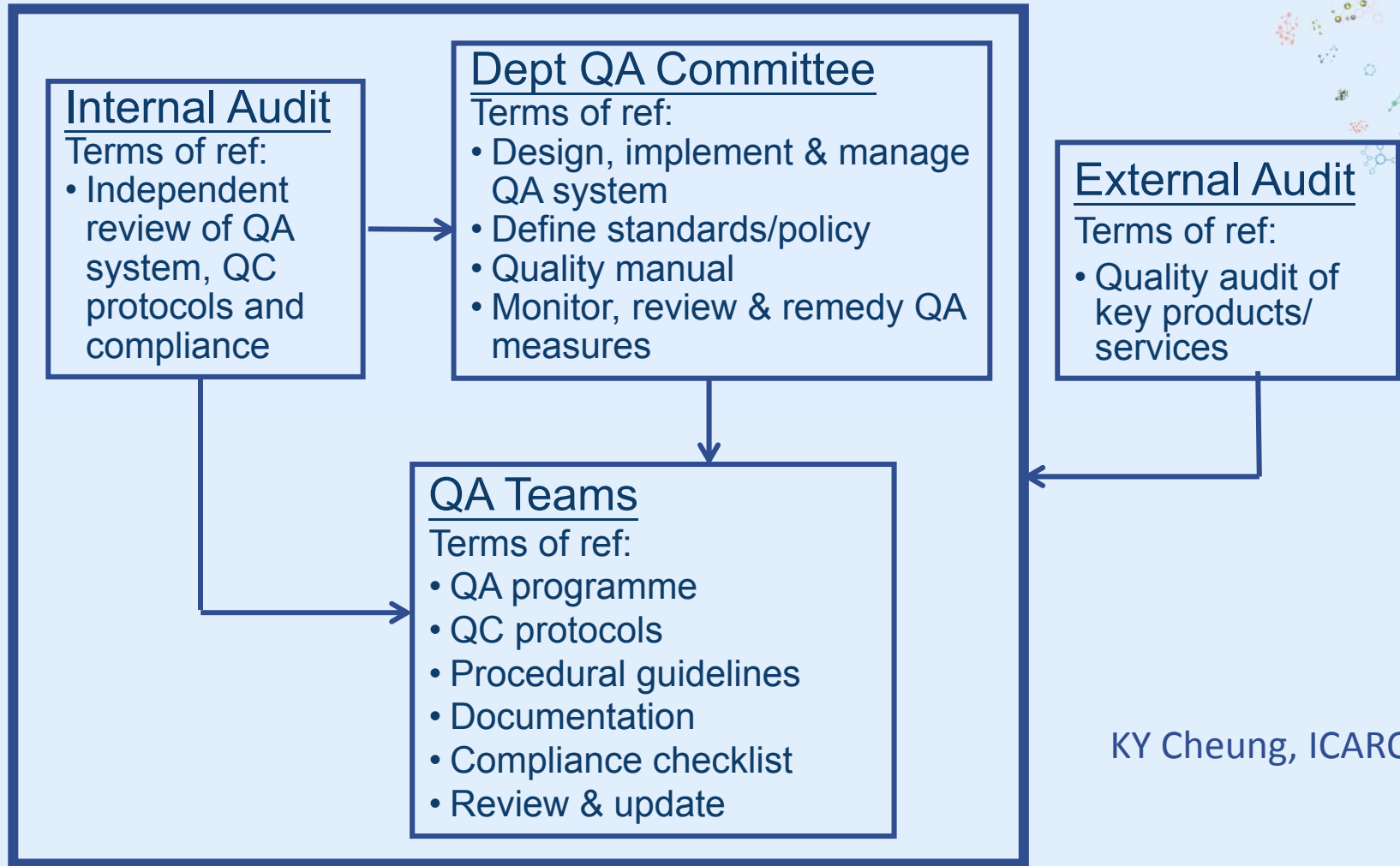


Quality Management

- Effective implementation of the quality control measures in achieving and maintaining quality and safety in radiation therapy requires the implementation of a management system to:
 - Plan, coordinate and manage all QA activities & measures
 - Cultivate quality & safety awareness & culture amongst the staff
 - Plan and manage the required resources
 - Plan and manage staff training & development
 - Implementation of quality audit, system & procedural review and improvement



Quality Management Structure in Radiotherapy



KY Cheung, ICARO1



Conclusion

- Quality of service have direct impact on treatment outcome in radiation therapy
- Quality & safety is strongly dependent on both technologies and work procedures involved
- Each equipment used and work procedure involved in radiation therapy should be subject to a system of quality control measures
- The performance of medical technologies and professional competence of the key healthcare professionals in radiation therapy should be subject to legislative control
- Effective implementation of a QA system should be appropriately planned, coordinated and managed to achieve and maintain the defined service quality

