

# In-house Automatic Radiation Oncology Physics Chart Check: Initial Experience

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## INTRODUCTION

Due to complexity of radiation oncology treatment planning and delivery system, it is either tedious or impractical to check every bit of essential information. The variances reported to our QSRC (Quality and Safety Review Committee) show that even experienced physicists cannot catch all the errors (sometimes serious errors) during the physics chart check (initial/weekly/end of treatment). This work reports the initial experience of an in-house auto chart check (IHACC) system by University of Maryland, based on TG-275 and TG-315 and our own clinical practice guidelines and data governance.

## AIM

To show feasibility and necessity of full automation of physics chart checks by sharing our auto chart check experience with our own in-house system based on TG-275 and TG-315 in the era of electronic medical records (EMR).

## METHOD

IHACC focuses on four aspects of chart check:

1. compliance check;
2. quality check;
3. deliverability check;
4. error check.

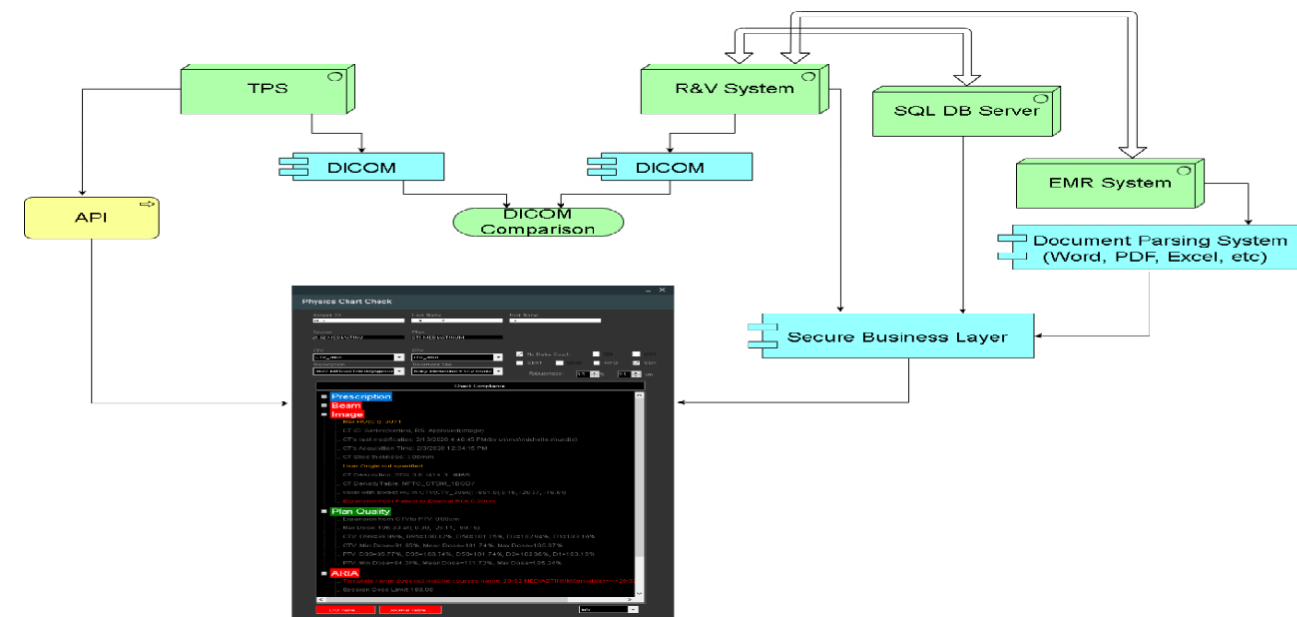
This tool is implemented for items mentioned in TG-275 and TG-315 as well as our own clinical practice guidelines with the help of scripting interface provided by the TPSs (Varian's Eclipse and RaySearch's RayStation). It also addresses weak spots in our clinical procedures identified by our QSRC. IHACC has recently been installed and implemented in the clinic and its resulting benefits in physics chart check practice are being evaluated.

IHACC is a combination of multiple underlying complex systems. Its multiple secure business layers provide indirect secure access to the EMR documents and the SQL database of the R&V system without potential patient data risks. It also builds up a bridge between TPS and R&V system through DICOM comparison. Currently, this tool is mainly for initial chart check/weekly chart check/end of treatment chart check with all external beam modalities (photon/electron/proton).

## RESULTS

IHACC covers 135 comprehensive check items and so far has been implemented for about 200 initial chart checks in our clinic. With IHACC, the manual chart check time may be reduced to 10min or less, regardless of plan complexity; some of manually impossible check items (e.g., the PTV margin and how proton beams pass the couch edge/wedge) can be efficiently quantified; several items that were frequently missed in the past (e.g., wrong field name, wrong machine tolerance table and prescription inconsistency) were correctly identified.

Here is a brief list of items caught by this tool: dose fractionation error in plan/prescription, missing items in prescription, couch not inserted during planning, dose limit in ARIA incorrect, old courses left open, tolerance table of treatment field incorrect. The comparative study shows that this system will be an effective auto chart check tool for radiation oncology physicists.



Infrastructure of IHACC. IHACC

## CONCLUSIONS

Our experience shows that IHACC is imperative for modern radiation oncology to greatly improve patient safety, chart check efficiency, practice uniformity, efficiency of resource utilization and yield financial benefits.

## REFERENCES

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