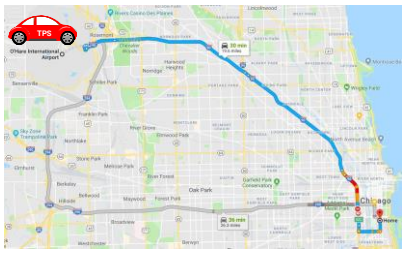
AAPM 2019 JUL 14–18

Siris Medical Artificial Intelligence

# Scripting to enable AI-guided adaptive decision support



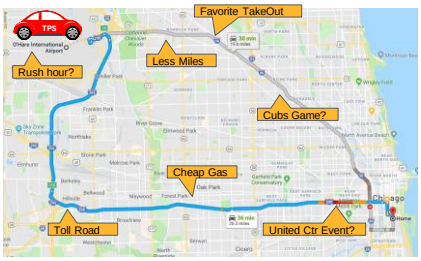
## THE PAST: Going From Point A to B, Faster




- Pick the likeliest / most common path.
  - Add TPS accelerators
- Drive and see what happens
- If it's wrong, make a detour OR go back to the start



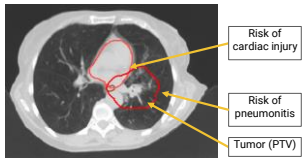
## TODAY: Getting From Point A to B, Better




- How important is saving 6 minutes?
- Are there needs or goals to accomplish along the way?
- Are there events or circumstances unique to today / right now / this patient?

## Trade-Offs Are Many

Deciding on the best treatment requires navigating the trade-offs between delivering lethal target dose and sparing Organs at Risk






## Clinical decision support (CDS)

Radiotherapy &Oncology

"[Enables] the clinical team to determine the best course of treatment before expending resources on a lengthy treatment planning process"

**Clinical Decision Support of Radiotherapy Treatment Planning: A Data-Driven Machine Learning Strategy for Patient-Specific Dosimetric Decision Making**

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## CDS statistical learning

While historical knowledge is used by every clinician

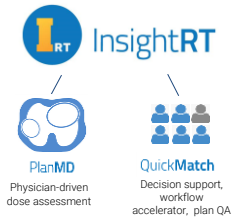
AI recalls massive historical knowledge to enable accurate, on-line decision support

InsightRT AI engine:

Utilizes OIS, imaging, clinic, clinician, & prescription data to match and identify achievable treatments to gain treatment insights.

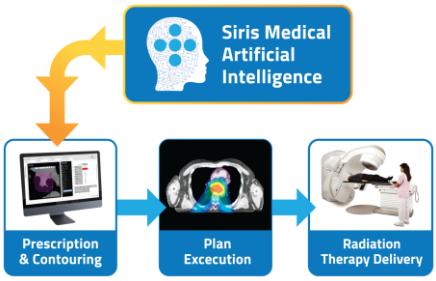
## Siris software platform

Supporting better decisions, better outcomes






## Inform / provide confidence to the physician





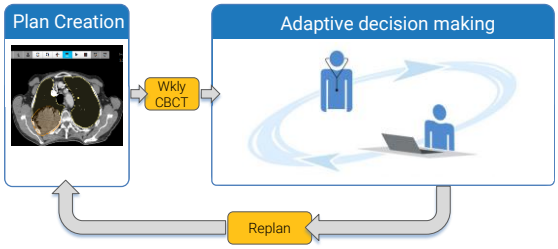

## Standard planning workflow

Planning is complex and resource intensive

## Remove the iterative process

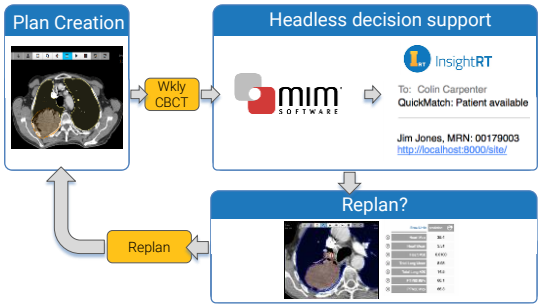



## Adaptive RT






## Headless adaptive RT decision support



## Strategy

**Goal: notification system with zero user intervention**

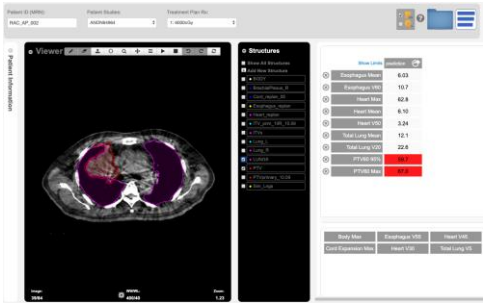
1. Automatically pull CBCT from OIS with InsightRT
2. Send to MiM Assistant
3. Workflow:
   a. Use deformable registration to create new structures
   b. Autocontour lung & subtract from deformed ITV
   c. Expand ITV to PTV
   d. Export to InsightRT
4. Load patient in InsightRT



## Workflow with MiM Software

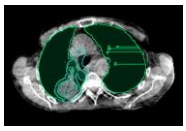


## Adaptive prediction from InsightRT



## Example

**Initial** **Week 4**

| | Initial | Adaptive |
|---|---|---|
| Heart mean | 12.7 | 7.44 |
| Lung mean | 17.5 | 11.6 |
| Lung V20 | 27.3 | 23.8 |
| Lung V5 | 50.1 | 45.8 |
| Esophagus mean | 29.1 | 14.5 |



## Summary of results

- InsightRT can be scripted to create a 'headless' workflow for more efficient determination of the need for adaptive
- New imaging modalities & higher quality imaging will improve decision support capabilities
- Please reach out if you're interested in hearing more:

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