Long-term analysis of beam monitoring with the gantry-mounted ion-chamber

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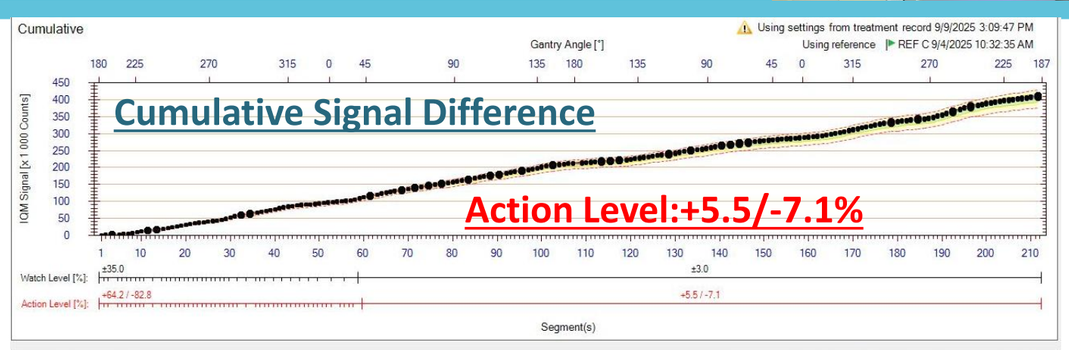
Introduction/Objectives

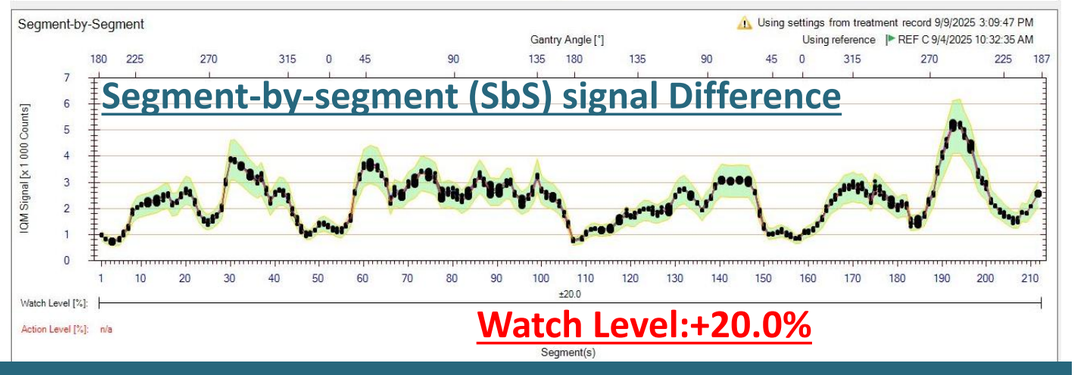
- Our department has performed intra-treatment beam QA for all treatments for approximately 2.5 years since the introduction of IQM.
- Data obtained from IQM

->Segment-by-segment signal Difference (SbS-D): Error per segment

->Cumulative signal Difference (CSD): Error relative to the cumulative signal value per segment

- Further utilization of IQM (real-time quality management of the treatment beam) requires statistical analysis of clinical data.





Utilizing long-term IQM data analysis for real-time beam QA

Methods and Materials

Subject of analysis

- 1,204 pts/1,248 plans/28,821 beams(2023.5-2025.10)
- All treatments are irradiated by rotational technique (VMAT,DCAT,SRT)
- RTPS:Monaco, Linac: VersaHD™/Harmony Pro

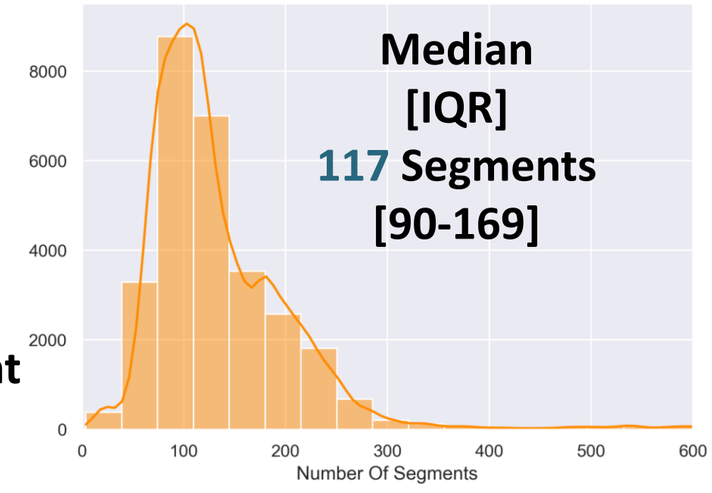
計測解析

Obtain the SbS-D and CSD for each treatment session

→ Calculate the median (IQR: 25%-75%) and control limits (CL: 3σ)

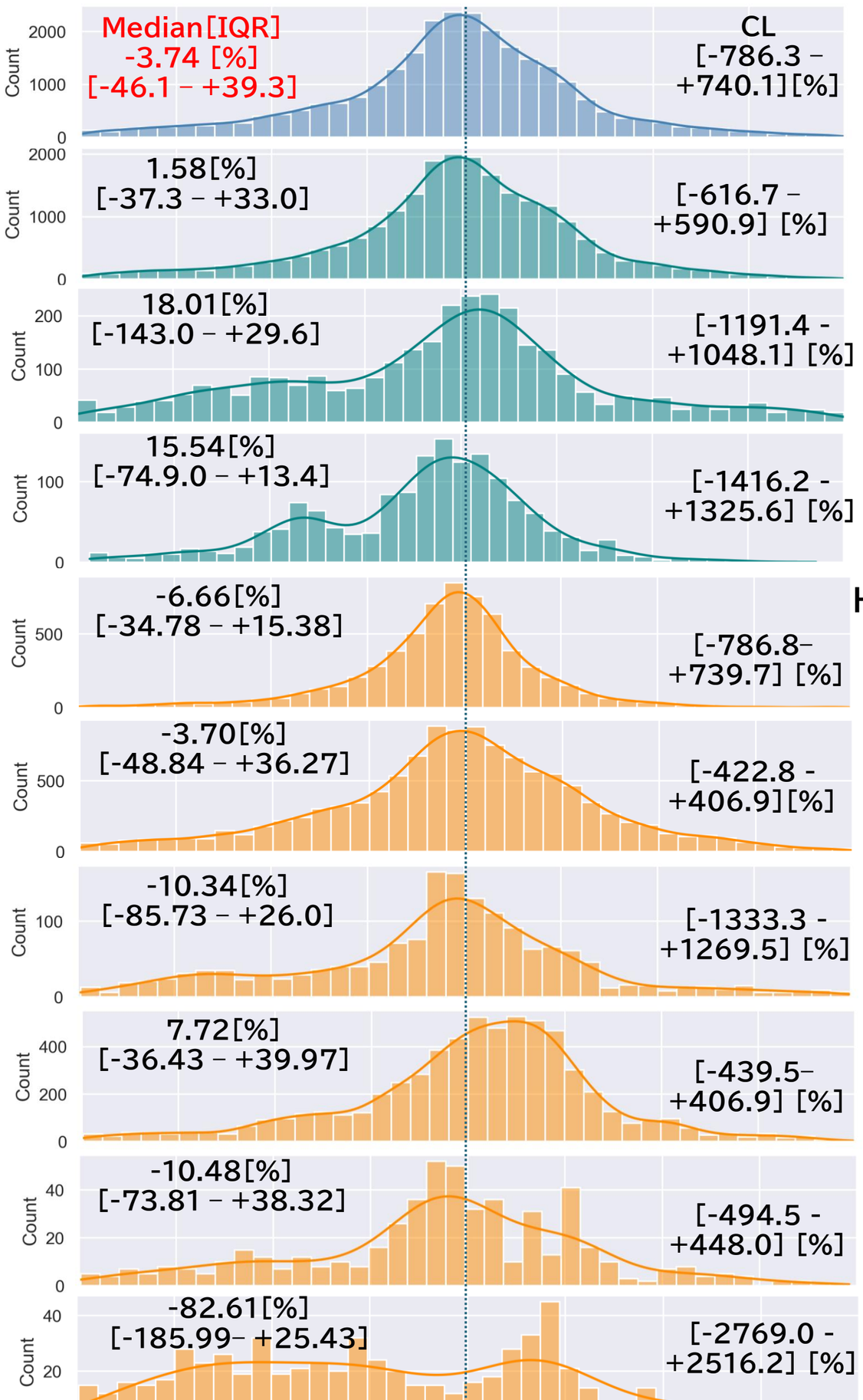
- Analyse the above for the entire patient cohort and separately by treatment field* and irradiation technique

Number of segments in the treatment plan

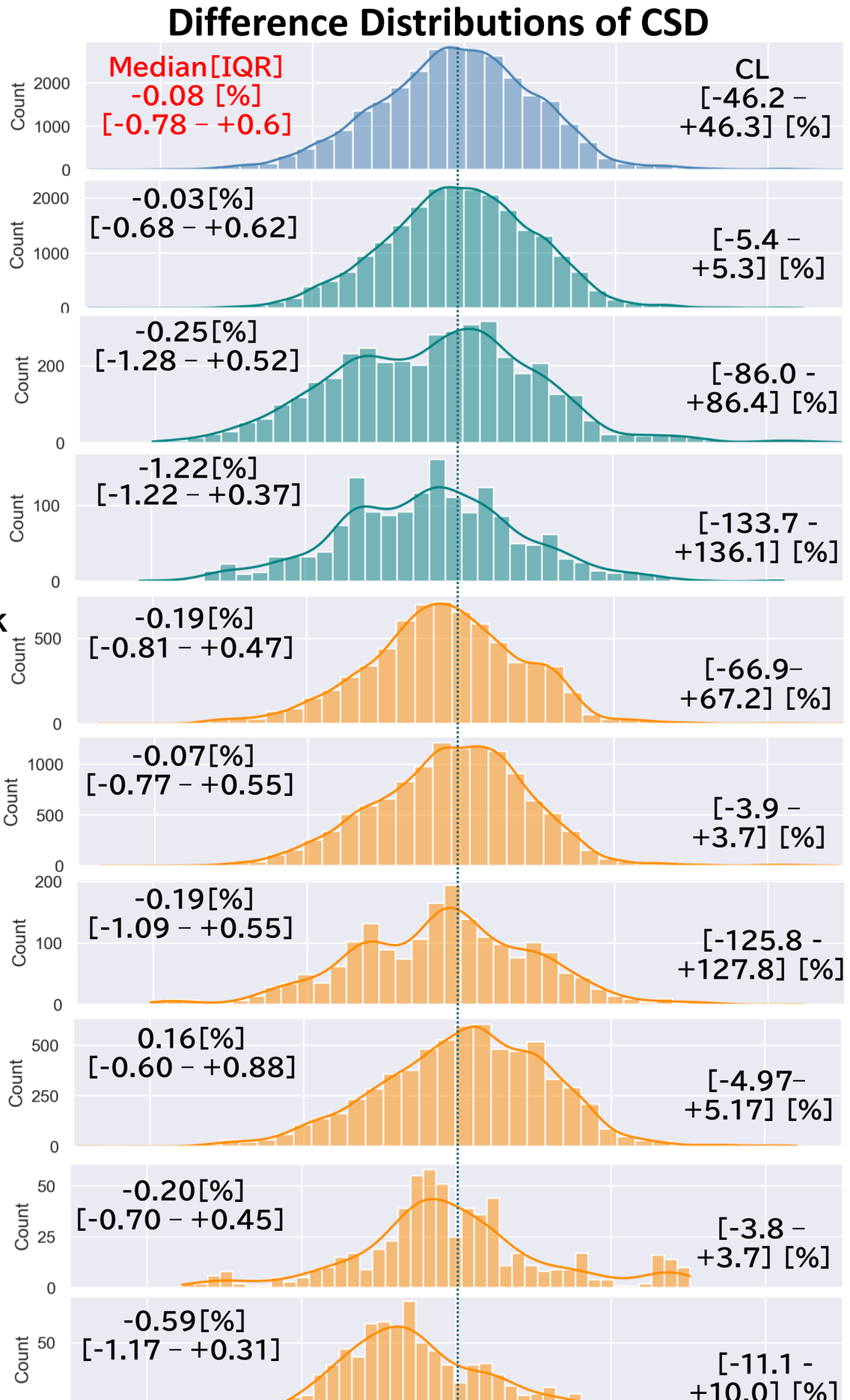


Results and Discussions

Difference Distributions of Sbs-D



Difference Distributions of CSD



Conclusions

Statistical measures and control limits were determined from IQM's long-term data.