# Supplementary Material S1

## Questionnaire on CBCT-based online adaptive radiotherapy (oART)

### *(English translation)*

The survey aims to evaluate the clinical use of CBCT-based online adaptive radiotherapy (oART) in German-speaking countries (Germany, Austria and Switzerland) and is addressed to all professional groups involved in radiation oncology. It seeks to systematically capture clinical experience and provide a comprehensive overview of indications, implementation and personal experience.

# Part A. General questions

**A1. Which professional group do you belong to?** *(single-choice, with an 'other' option)*

- Physician
- Medical physics expert (MPE) / physicist
- Medical technical radiology assistant (MTRA)
- Medical assistant (MFA)
- Other (please specify)

**A2. Which department (location) do you work in?** *(free-text response)*

- Please provide the location and the name of the hospital/medical center.

**A3. What type of institution do you work at?** *(single-choice, with an 'other' option)*

- University hospital
- Maximum-care hospital
- Regional hospital
- Private clinic
- Private practice / medical care center (MVZ)
- Other (please specify)

**A4. Is online adaptive radiotherapy (oART) available at your institution?** *(single-choice)*

- Yes
- No

**A5. If yes, which type is offered?** *(multiple-choice (multiple answers possible))*

- CBCT-based
- MR-based

**A6. For how long has oART been offered at your institution?** *(single-choice)*

- No patients treated to date
- 0–6 months
- 7–12 months
- 13–24 months
- More than 24 months

**A7. Which oART platforms do you use?** *(multiple-choice, with an 'other' option)*

- Varian Ethos (CBCT-oART)
- Elekta Evo (CBCT-oART)
- Elekta Unity (MR-oART)
- ViewRay MRidian (MR-oART)

- Other (please specify)

**A8. How many patients do you treat with oART on an average day?** *(single-choice)*
Excluding patients treated using conventional treatment plans on the same machine.
- 0
- 1–3
- 4–6
- 7–9
- 10 or more

**A9. How much time do you allocate for a complete oART session per patient (from patient positioning to the end of irradiation)?** *(single-choice)*
- 0–10 min
- 11–20 min
- 21–30 min
- 31–45 min
- 46–60 min
- More than 60 min

**A10. Which professional groups are continuously present throughout the oART workflow?** *(multiple-choice)*
- Physician
- Medical physicist
- Radiotherapy technician (RTT)
- Medical assistant
- Other (please specify)

**A11. Which professional group is responsible for daily adaptation of target volumes in your department?** *(single-choice, with an 'other' option)*
- Physician
- Medical physicist
- Radiotherapy technician (RTT)
- Medical assistant
- Other (please specify)

# Part B. Indications

**B1. For which clinical indications do you use oART?** *(multiple-choice)*
- Prostate cancer
- Cervical cancer
- Bladder cancer
- Rectal cancer
- Vulvar / vaginal cancer
- Pancreatic cancer
- Bronchial cancers
- Liver tumours (including hepatic metastases from other primary tumour types)
- Breast cancer
- Head and neck tumours
- Oesophageal cancer (excluding oesophagogastric junction [AEG] tumours)
- Oesophagogastric junction (AEG) tumours / gastric cancer
- Bone metastases
- Soft-tissue metastases
- Other (please specify)

**B2. For which clinical indications are you planning to introduce oART in the near future?** *(multiple-choice)*

- Prostate cancer
- Cervical cancer
- Bladder cancer
- Rectal cancer
- Vulvar / vaginal cancer
- Pancreatic cancer
- Bronchial cancers
- Liver tumours (including hepatic metastases from other primary tumour types)
- Breast cancer
- Head and neck tumours
- Oesophageal cancer (excluding oesophagogastric junction [AEG] tumours)
- Oesophagogastric junction (AEG) tumours / gastric cancer
- Bone metastases
- Soft-tissue metastases
- Other (please specify)

**B3. In your opinion, which indications benefit most from oART?** *(multiple-choice)*

- Prostate cancer
- Cervical cancer
- Bladder cancer
- Rectal cancer
- Vulvar / vaginal cancer
- Pancreatic cancer
- Bronchial cancers
- Liver tumours (including hepatic metastases from other primary tumour types)
- Breast cancer
- Head and neck tumours
- Oesophageal cancer (excluding oesophagogastric junction [AEG] tumours)
- Oesophagogastric junction (AEG) tumours / gastric cancer
- Bone metastases
- Soft-tissue metastases
- Other (please specify)

**B4. Based on your experience with patients treated to date, how does this benefit manifest itself?** *(multiple-choice)*

- Improved target-volume coverage
- Improved sparing of organs at risk (OARs)
- Enabling higher total doses
- Treatment of indications for which conventional radiotherapy is technically not feasible
- Other (please specify)

**B5. Do you omit routine planning CT for certain indications (i.e. calculate the treatment plan directly on the CBCT, so-called "direct-to-treatment")?** *(single-choice)*

- Yes
- No

**B6. If yes, for which indications do you use "direct-to-treatment" irradiation?** *(multiple-choice)*

- Emergency irradiation (e.g. obstruction-related emergencies)
- Prostate cancer
- Cervical cancer
- Bladder cancer

- Rectal cancer
- Vulvar / vaginal cancer
- Pancreatic cancer
- Bronchial cancers
- Liver tumours (including hepatic metastases from other primary tumour types)
- Breast cancer
- Head and neck tumours
- Oesophageal cancer (excluding oesophagogastric junction [AEG] tumours)
- Oesophagogastric junction (AEG) tumours / gastric cancer
- Bone metastases
- Soft-tissue metastases
- Benign conditions
- Other (please specify)

**B7. For which indications would you consider conventional IGRT superior to CBCT-based oART, or prefer a non-adaptive IGRT approach?** *(multiple-choice)*

- Prostate cancer
- Cervical cancer
- Bladder cancer
- Rectal cancer
- Vulvar / vaginal cancer
- Pancreatic cancer
- Bronchial cancers
- Liver tumours (including hepatic metastases from other primary tumour types)
- Breast cancer
- Head and neck tumours
- Oesophageal cancer (excluding oesophagogastric junction [AEG] tumours)
- Oesophagogastric junction (AEG) tumours / gastric cancer
- Bone metastases
- Soft-tissue metastases
- None of the indications listed (oART is superior to IGRT in all cases)
- Other (please specify)

**B8. What are the reasons for preferring IGRT over oART for certain indications?** *(multiple-choice)*

- Limited practicability of oART / shorter treatment time with IGRT
- No improvement in target volume coverage or OAR sparing
- Technical reasons (e.g. lack of respiratory gating or insufficient CBCT image quality)
- Anatomical / patient-related reasons (long treatment duration, substantial intrafractional movement of organs / target volume)
- Economic considerations

**B9. In which clinical situations / fractionation schedules do you primarily use oART?** *(multiple-choice)*

- Routinely in primary treatment
- In the primary setting only in selected cases (e.g. exceeding OAR dose constraints, poor target-volume coverage, poor reproducibility) during conventional radiotherapy
- Reirradiation
- Dose escalation
- Hypofractionated regimens
- Stereotactic body radiotherapy (SBRT)

# Part C. Technique and fractionation

**C1. For which fractionation schedules and/or treatment techniques do you use oART?** *(multiple-choice)*

- Normofractionation (1.8–2.2 Gy per fraction)
- Hypofractionation (2.3–4.9 Gy per fraction)
- Hyperfractionation (twice daily; BID)
- Ultrahypofractionation (at least 5 Gy per fraction)
- Stereotactic body radiotherapy (SBRT)

**C2. Do you routinely acquire a second CBCT after adaptation and before treatment delivery?** *(single-choice with an additional conditional response)*

- Yes
- No
- For selected patients

**C3. Do you routinely acquire a third CBCT after treatment delivery for verification?** *(single-choice with an additional conditional response)*

- Yes
- No
- In exceptional cases

**C4. Do you use smaller PTV margins compared with IGRT?** *(single-choice with an additional conditional response)*

- Yes
- No
- For selected patients

**C5. What typical PTV margin do you use for CBCT-oART (e.g., for pelvic irradiation)?** *(single-choice, with an 'other' option)*

- No PTV margin (PTV = CTV)
- 1–2 mm
- 3–5 mm
- 6–7 mm
- 8–9 mm
- 10 mm or more
- Individual margin / other (please specify)

**C6. How satisfied are you with the quality of CBCT imaging on your system?** *(5-point Likert scale))*

- Very satisfied (1)
- Rather satisfied (2)
- Neither satisfied or dissatisfied (3)
- Dissatisfied (4)
- Very dissatisfied (5)

**C7. How satisfied are you with the auto-contouring performance on your system?** *(5-point Likert scale))*

- Very satisfied (1)
- Rather satisfied (2)
- Neither satisfied or dissatisfied (3)
- Dissatisfied (4)
- Very dissatisfied (5)

**C8. How satisfied are you with the speed of plan calculation on your system?** *(5-point Likert scale)*

- Very satisfied (1)

- Rather satisfied (2)
- Neither satisfied or dissatisfied (3)
- Dissatisfied (4)
- Very dissatisfied (5)

**C9. How satisfied are you with the adapted plans quality on your system?** *(5-point Likert scale)*
- Very satisfied (1)
- Rather satisfied (2)
- Neither satisfied or dissatisfied (3)
- Dissatisfied (4)
- Very dissatisfied (5)

# Part D. Healthcare structure and reimbursement

**D1. In your opinion, does CBCT-oART require an increased organizational effort?** *(5-point Likert scale)*
- Substantially increased (1)
- Slightly increased (2)
- Comparable to conventional IGRT workflow (3)
- Slightly reduced (4)
- Substantially reduced (5)

**D2. Does CBCT-oART require increased staffing compared with conventional IGRT workflow?** *(5-point Likert scale)*
- Strongly agree (1)
- Mostly agree (2)
- Undecided / neither agree nor disagree (3)
- Rather disagree (4)
- Disagree (5)

**D3. Is the current German Uniform Value Scale (EBM) reimbursement structure adequate to compensate for additional staffing and organizational effort associated with oART?** *(5-point Likert scale)*
- Fully adequate (1)
- Mostly adequate (2)
- Partially adequate (3)
- Largely inadequate (4)
- Completely inadequate / not economically viable (5)

**D4. To what extend do you agree with the following statement: The additional time and staffing required for oART are justified by the benefits for patients.** *(5-point Likert scale)*
- Strongly agree (1)
- Agree (2)
- Undecided / neither agree nor disagree (3)
- Disagree (4)
- Strongly disagree (5)

**D5. Does your institution have specific agreements with health insurance providers for reimbursement of oART?** *(single-choice)*
- Yes
- No
- Cannot assess

**D6. Is the availability of oART in your department communicated to patients (e.g. on your department's website)?** *(single-choice)*

- Yes
- No
- Cannot assess

**D7. Have you experienced patients actively asking for oART as their preferred treatment option, e.g., during the consultation / informed-consent discussion?** *(single-choice)*

- Yes
- No
- Cannot assess

**D8. Do you perceive an increase in patient referrals to your department as a result of offering oART?** *(single-choice)*

- Yes
- No
- Cannot assess

# Part E. Use in research

**E1. Is your department involved in clinical studies on oART?** *(single-choice)*

- Yes
- No
- Cannot assess

**E2. If yes, what type of studies?** *(multiple-choice)*

- Prospective clinical
- Prospective physical / technical
- Retrospective clinical
- Retrospective physical / technical
- Other (please specify)

**E3. Does your department conduct its own studies on oART?** *(single-choice)*

- Yes
- No
- Cannot assess

**E4. If yes, what type of studies?** *(multiple-choice)*

- Prospective clinical
- Prospective physical / technical
- Retrospective clinical
- Retrospective physical / technical
- Other (please specify)

**Thank you for completing the survey!**