Catalan Clinical Audit
Network for Quality Improvement
in Radiotherapy

Collection and benchmarking of QI (and checklists!) in CAT-ClinART

Description and demonstration of the tools for QI (and checklists!) reporting

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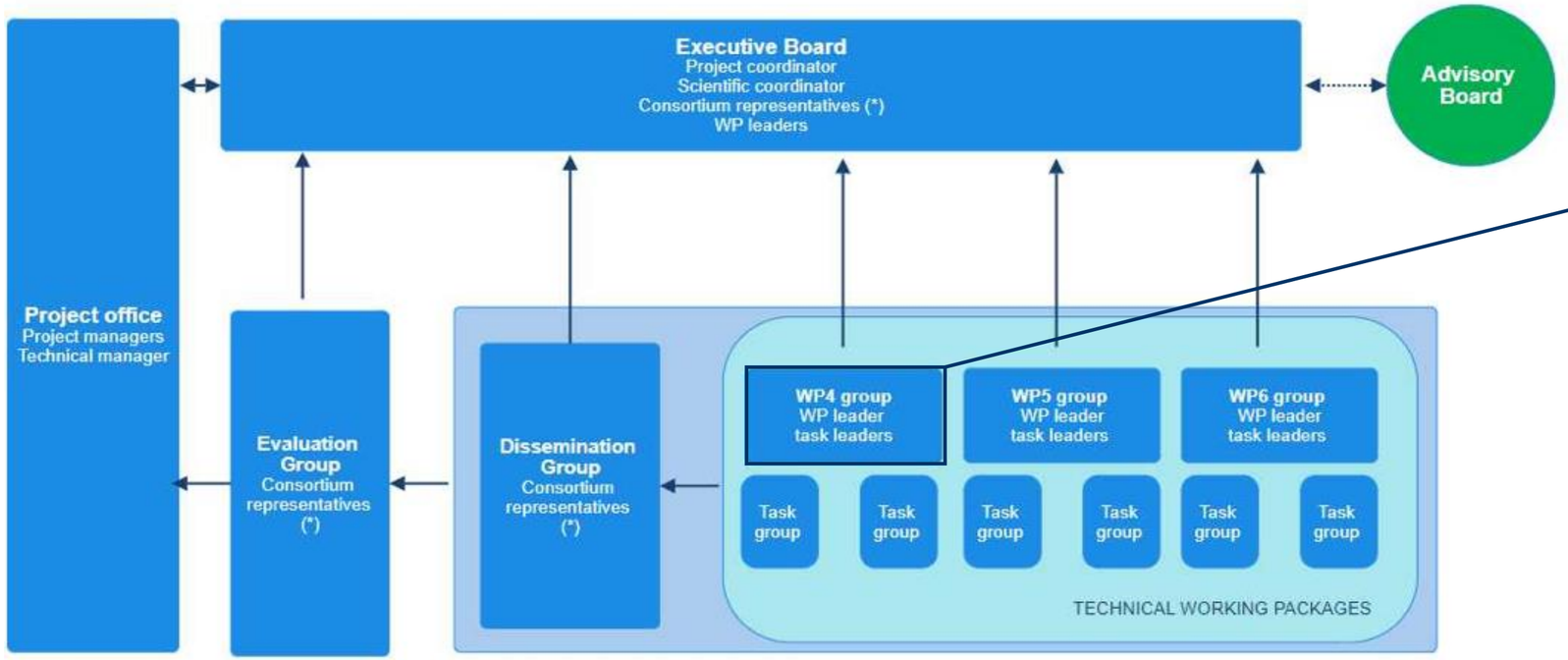
Coordination between different WPs and leadership



(*) 1 member per consortium partner and all disciplines represented (RO, MPE, RTT, National Health authorities representative)

Development of Clinical Audit Methodology and Infrastructure

M1-M36 (October 2024-September 2027)

Objectives:

- Develop a standardized methodology and a solid infrastructure for conducting clinical audits in radiotherapy (RT) in Catalonia
- Proposal for a permanent mechanism for long-term clinical audits in RT

WP4 Development of Clinical Audit Methodology and Infrastructure (What?)

T4.1 - Call and selection of auditors - N. Jornet (HSP)

T4.2 - **Development of clinical audit manuals** - C. Muñoz (ICO) → Checklists & Standardized forms

T4.3 - **Definition of quality indicators (QI) and standards** - X. Maldonado (HVH) and F. Guedea (ICO) → Indicator data

T4.4 - Design of dosimetric audits - C. Candela (HCB)

T4.5 - **Development of IT infrastructure for the collection and evaluation of clinical audit data** - C. Muñoz (ICO)

T4.6 - Needs assessment and development of a strategic plan for a permanent mechanism of clinical audits in RT - D. Segura (DSC) and C. Muñoz (ICO)

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WP4 Team (Who?)

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WP4 Milestones and Deliverables (When?)

	year 1												year 2												year 3											
	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
	2024			2025												2026												2027									
	OCT	NOV	DIC	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP
WP4																																				
4.1 Development of clinical audit manuals												MS4.2																								
4.2 Definition of QI and standards																																				
4.3 Development of IT infrastructure for collection and evaluation of clinical audit data									MVP											D4.2																
4.4 Design of dosimetry audits											D4.1	D4.4																								
4.5 Assessment of needs and development of an strategic plan for a permanent Catalan mechanism for clinical audits in RT																																		D4.3		
4.6 Call and selection of the auditors			MS4.1																																	

We aimed to deliver a Minimum Viable Product for the first audit round

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IT infrastructure requirements (How?)

- **Use interoperable systems** – Ensure compatibility with ARIA, HIS, and other local databases
- **Secure and compliant** – Follow GDPR; encrypt data and control access by role
- **Centralized data platform** – Use a secure, shared database for storing audit data
- **Enable mixed data input** – Support both automatic data extraction and manual entry when needed
- **Provide dashboards** – Offer visual summaries of quality indicators and audit results
- **Plan for maintenance** – Allocate IT staff and plan long-term hosting, updates, and user support

CAT-ClinART IT infrastructure

Extraction using the ARIA reporting tool (level 2)

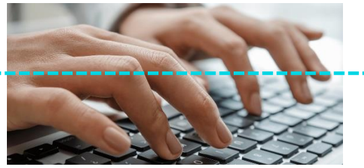
HIS

Extraction of structured data from the HIS of each hospital and/or from HC3/HES (level 3)

Extraction of data from other local databases (level 4)

Local ETLs - Intermediate repository - Integration with RedCap/manual entry

REDCap API Interface



Manual entry (level 1)

CAT-Clinart Database

REDCap-ICO Data Center

Nus Sanitari: secure, shared IT and communications infrastructure managed by the Catalan Department of Health

Minimum Viable Product

Reporting

Microsoft Power BI (365 environment)

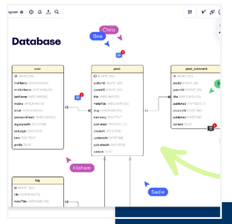
CAT-ClinART IT infrastructure (Why?)

Feature	CAT-ClinART Infrastructure	Excel Files
Data Standardization	Automatic validation & structure	Inconsistent, error-prone
Data Integration	Links to ARIA, HIS, local databases	Manual data entry
Real-Time Access	Centralized, multi-user platform	Version conflicts, file-based sharing
Security & GDPR	Encrypted, role-based access	Weak protection, hard to control copies
Efficiency	ETL processes, reduced manual work	Time-consuming, high risk of mistakes
Analytics & Dashboards	Built-in indicators, live reporting	Manual charts, limited analysis
Scalability	Grows with project needs	Not suited for large or evolving datasets
Sustainability	Long-term, reusable infrastructure	Temporary, not scalable

Please note that we also manage prostate-related quality indicators

CAT-ClinART IT infrastructure (Where are we?)

Minimum Viable Product
redcap.iconcologia.net



Phase 1: design (until September 2025)

- Create REDCap database and intermediate repository at ICO
- Study REDCap integration capabilities
- Check possible access to Exadata
- Create checklists and standardized B-QUATRO II forms
- Create indicator data forms
- Make them available to auditors
- Start identifying and using local ARIA Reports
- Hire IT technician

Phase 2: automation (from September2025 until May 2026 and more)

- Standardize and share ARIA reports
- Automate integrations with HC3/HES or at least with the HIS
- Other integrations with local databases
- Create audit reports using Power BI
- Gather ideas for possible future improvements

CAT-ClinART REDCap

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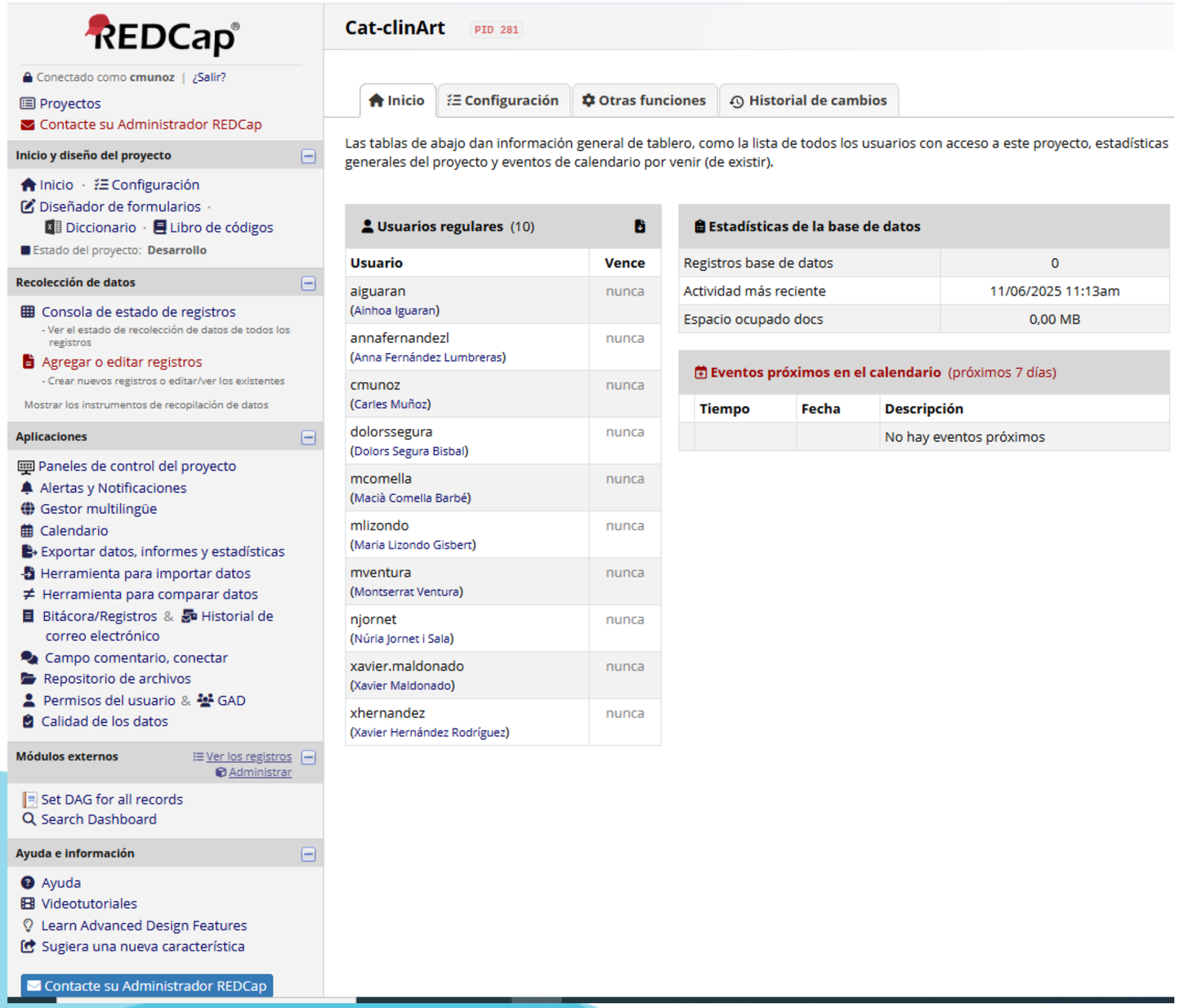

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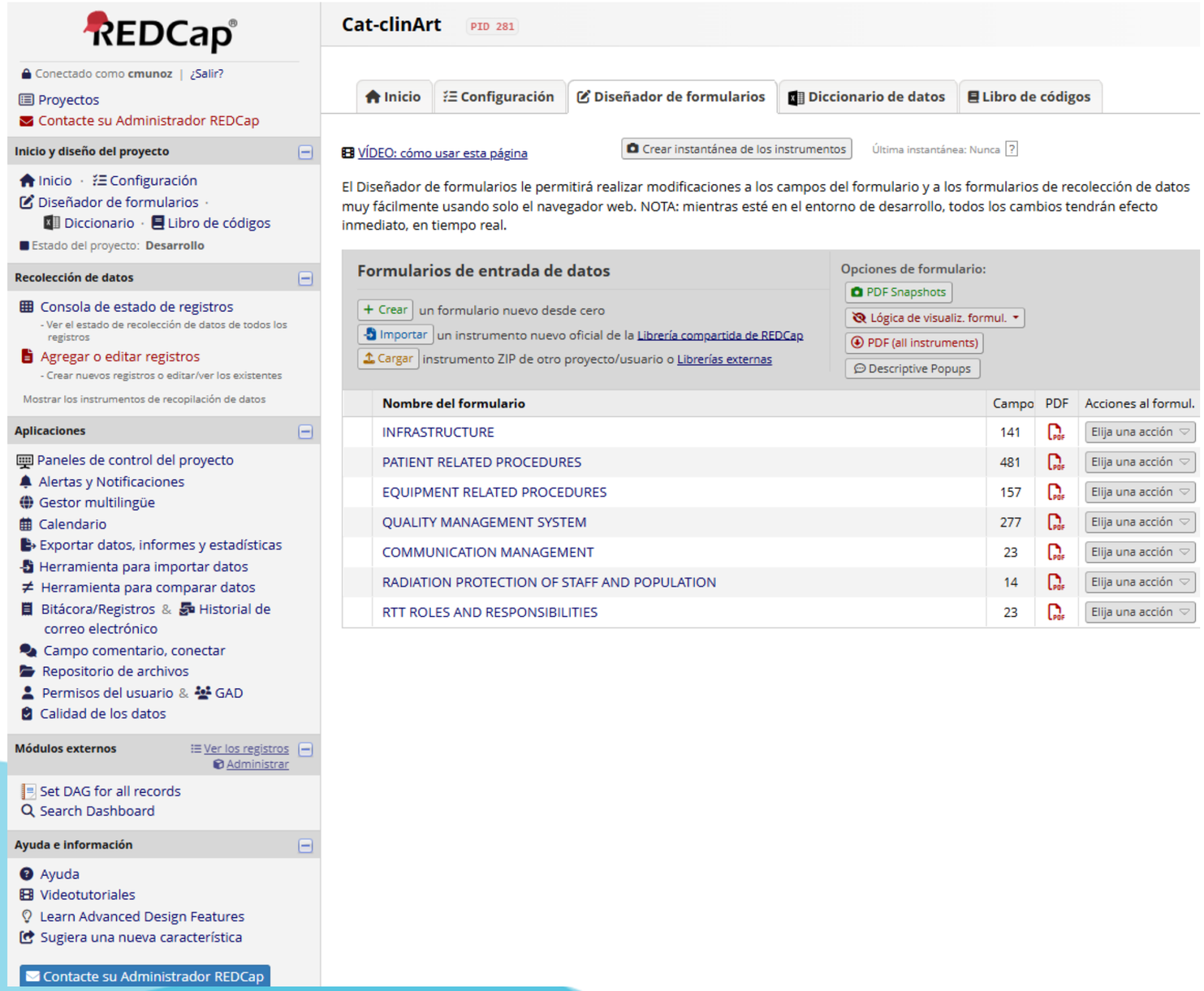

CAT-ClinART REDCap

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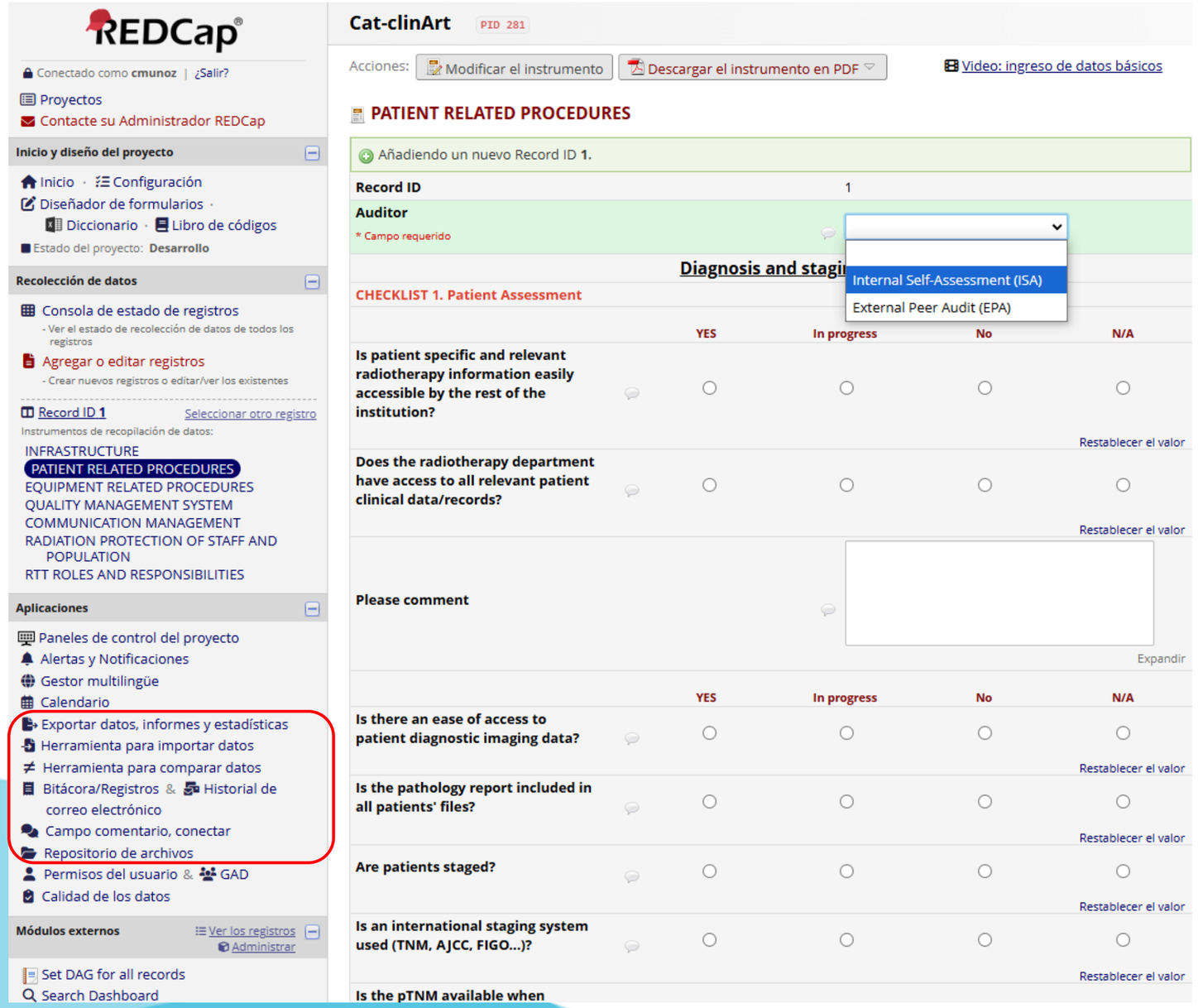

CAT-ClinART REDCap

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Confidencial

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Página 1

PATIENT RELATED PROCEDURES

Record ID _____

Auditor
○ Internal Self-Assessment (ISA)
○ External Peer Audit (EPA)

Diagnosis and staging

CHECKLIST 1. Patient Assessment

	YES	In progress	No	N/A
Is patient specific and relevant radiotherapy information easily accessible by the rest of the institution?	○	○	○	○
Does the radiotherapy department have access to all relevant patient clinical data/records?	○	○	○	○

Please comment _____

	YES	In progress	No	N/A
Is there an ease of access to patient diagnostic imaging data?	○	○	○	○
Is the pathology report included in all patients' files?	○	○	○	○
Are patients staged?	○	○	○	○
Is an international staging system used (TNM, AJCC, FIGO...)?	○	○	○	○
Is the pTNM available when indicated?	○	○	○	○
Is the patient's performance status assessed (WHO, Karnofsky or ECOG)?	○	○	○	○
Is systematic geriatric assessment carried out in patients >75 years old?	○	○	○	○

Next step: indicator data forms

Definition	Formula	Green	Yellow	Red	Action Level	Frequency
Average time between biopsy diagnosis and start of radiotherapy	Median in days +/- SD of all patients who started radiotherapy treatment for prostate cancer with curative intent	≤30 days	30-60 days	>60 days		annual (cross-sectional)
Percentage of patients with PSMA-PET prior to radiotherapy indication for oligometastatic disease	n patients with PSMA-PET and oligometastatic disease treated with radiotherapy / n patients with oligometastatic disease by CT/GGO treated with radiotherapy	≥90%	70–89%	<70%		annual
% of patients with documented and specific informed consent for radiotherapy	n patients with signed informed consent for pelvic radiotherapy / n without specific signed consent	≥90%	80–89%	<79%		semestral (cross-sectional)
% of re-planning requirements due to non-compliance with setup or critical organs	n patients requiring re-simulation due to non-compliance with setup limits or critical organ discrepancies in IGRT / procedures without re-simulation	≤5%	6-10%	>10%		semestral (cross-sectional)
Existence of peer review procedures for volume delineation	Active peer review procedures for prostate cancer radiotherapy treatments	yes	partial	no		annual
% of patients with dosimetric planning reviewed by independent double-check	n patients with dosimetric planning reviewed by independent double-check for prostate cancer / n patients planned for prostate cancer	≥90%	70–89%	<70%		annual (cross-sectional)
% of patients receiving hypofractionated radiotherapy based on risk criteria	n patients with localized prostate cancer (non-postoperative) receiving hypofractionated RT / n patients receiving treatments with 2 Gy/fraction	≥90%	70–89%	<70%		annual (cross-sectional)
% of treatments integrating simultaneous modulated boost (SIB)	n patients with integrated boost technique treatment / n patients with sequential treatments (includes radical and postoperative)	≥90%	70–89%	<70%		annual (cross-sectional)
% of medical records with structured toxicity registration (CTCAE v4.0 or v5.0)	n medical records of prostate cancer patients treated with radiotherapy registering toxicity in a structured way / medical records without structured toxicity registration	≥90%	70–89%	<70%		semestral (cross-sectional)
% of treatment reports including detailed and structured mandatory information	n treatment reports including detailed and structured mandatory information on fractionation, dose, and technique used / n reports not meeting criteria	≥95%	90-94%	<89%		annual (cross-sectional)
% of patients with documented baseline functional assessment (urinary, intestinal, sexual)	n patients with correct assessment at follow-up / total patients treated with radiotherapy for prostate cancer	≥90%	70–89%	<70%		annual (cross-sectional)
% of patients with documented treatment summary in medical record	n prostate cancer patients treated with radiotherapy with correct summary / n prostate cancer patients treated with radiotherapy	≥95%	90-94%	<89%		annual (cross-sectional)
Prevalence of urinary toxicity grade 2 or higher at 6 months	n prostate cancer patients treated with radiotherapy presenting grade 2 or higher toxicity at six months / n patients treated with radiotherapy for prostate cancer	≤15%	15-20%	>20%		annual (cross-sectional)

- Most of the data/indicators are at the patient level ⇒ individual registries
- Required for conducting statistical tests
- Patient selection? Randomize N patients within a date range?
- Are the data entered from each center? By whom?

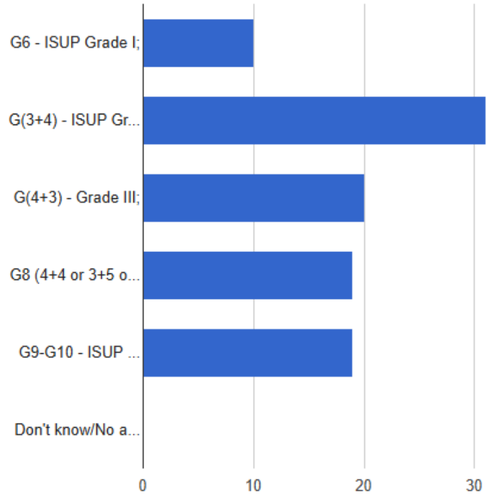
To be discussed…

Examples of a first level of reporting and benchmarking within REDCap

COMBINED HISTOLOGIC GRADE (GLEASON): *(combined_histologic_grade)* Refresh Plot | View as Bar Chart

Total Count (N)	Missing*	Unique
99	0 (0,0%)	5

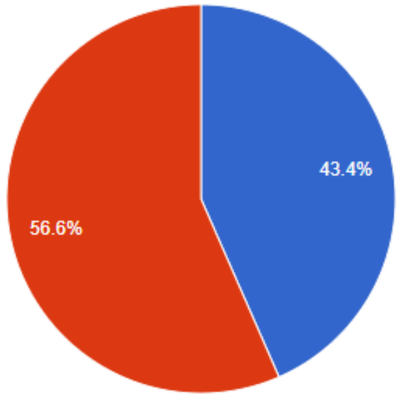
Counts/frequency: G6 - ISUP Grade I; (10, 10,1%), G(3+4) - ISUP Grade II; (31, 31,3%), G(4+3) - Grade III; (20, 20,2%), G8 (4+4 or 3+5 or 5+3) - ISUP Grade IV; (19, 19,2%), G9-G10 - ISUP Grade V; (19, 19,2%), Don't know/No answer (0, 0,0%)



TREATMENT INTERRUPTION OF EBRT *(treatment_interruption_ebrt)*

Total Count (N)	Missing*	Unique
99	15 (13,2%)	2

Counts/frequency: Yes (43, 43,4%), No (56, 56,6%), Don't know/No answer (0, 0,0%)



- Automated reports for each audit/center (Data Access Group)
- Fast self-evaluations for the Checklists (similar to spiderwebs)
- The administrator can visualize comparisons of the different DAGs for benchmarking
- The data can be exported to Excel if needed

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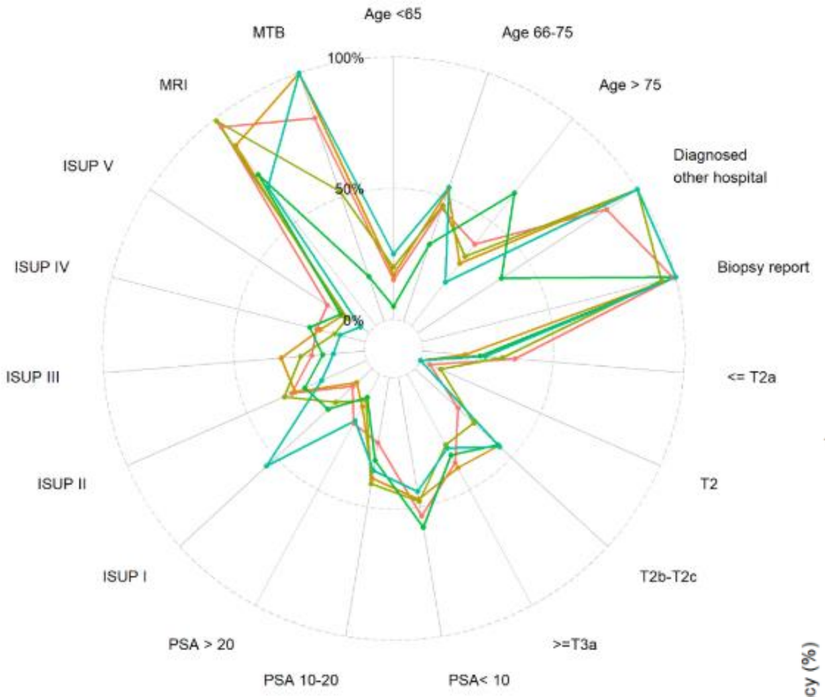
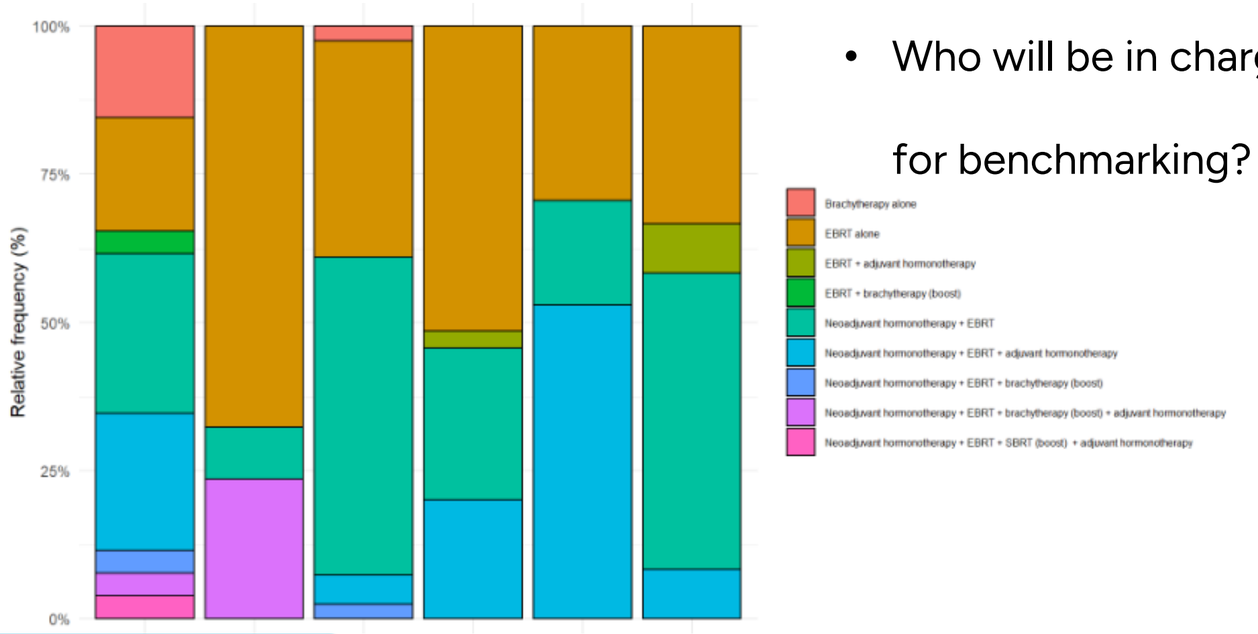
Examples of a second level of reporting and benchmarking outside REDCap



	N=83	*N=57*	*N=96*	*N=100*	*N=90*	*N=426*	
Difference between theoretical and actual sessions*, Median [Q1;Q3]	3.00 [2.00;6.00]	-1.00 [-1.00;0.00]	0.00 [-0.25;0.00]	2.00 [1.00;3.00]	3.00 [1.25;4.00]	1.00 [0.00;3.00]	426
Completed the treatment in prescribed time **, N (%)	7 (8.43%)	5 (8.77%)	61 (63.5%)	7 (7.00%)	11 (12.2%)	91 (21.4%)	426
Completed the treatment in prescribed time +/-4 days **, N (%)	50 (60.2%)	56 (98.2%)	96 (100%)	87 (87.0%)	78 (86.7%)	367 (86.2%)	426



- Power BI? Alternative tools?
- Who will be in charge of the statistics for benchmarking? Standards? Mean?

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