

Workflows in Cancer Treatment and their influence upon clinical documentation

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Abstract

We intend to realize single source cancer documentation for an entire comprehensive cancer center (CCC) based on clinical documentation during patient treatment. Previously, we had established workflow driven single source clinical data entry and data reuse for cancer center certification and research for colon and prostate cancer cases [1], see Fig. 1. Transfer to bladder and renal cancer cases was comparatively easy but documentation of melanoma cases frequently treated as outpatients required redesign.

Therefore, we have now performed a systematic analysis of diagnostic, therapeutic and documentation workflows for 13 cancer entities. Results of this analysis suggest that we require three types of clinical documentation workflows to cover all certified cancer entities of the Erlangen CCC.

Current digital documentation

The digital prostate cancer documentation for certification purposes within the commercial hospital information system went live in 2009. It starts with a multidisciplinary tumor board session to determine the appropriate treatment for a patient. Depending on the designated therapeutic pathway (surgery, radiation, chemotherapy or combinations) the system, after an appropriate time interval, prompts for documentation of the respective therapy. For surgery this includes e.g. worklist entries for pathology results and surgical complication reporting after three months. Furthermore, the time schedule comprises appropriate follow up requests to be sent to the patient and his general practitioner according to the respective cancer follow up scheme (see Fig. 1). This documentation workflow has been generalized for other solid cancer entities [2].

Analysis of thirteen cancer entities

82 paper forms were analyzed and 73 workflows were created to represent diagnostic and therapeutic activities for 13 cancer entities. Activities were structured and compared in tabular format.

Taking an example from diagnostic staging we discovered similar workflows for the entities prostate, kidney, bladder and colon/rectum but interestingly also among bronchial and thyroid carcinoma. In contrast, leukemia and plasmacytoma showed different behavior necessitating e.g. differential blood count, bone marrow aspiration, cardiac echo and lung function tests (Table 1). Similar tables for therapeutic activities allowed to classify non solid entities, solid entities needing first line surgery (prostate, kidney, bladder, cervix, colon, lung) and solid entities requiring mixed therapy (e.g. thyroid: surgery combined with radio chemotherapy). Thus we compiled the following workflows:

- A generic workflow for solid cancer entities with first line surgery
- A modified workflow for solid entities with outpatient treatment
- A distinct workflow for non solid cancer entities.

Conclusion

It is impossible to cover all cancer entities of a CCC with only one single source cancer documentation workflow. But three documentation workflows with some adaptation to the respective cancer entity requirements (e.g. different follow up schedules) should be sufficient. Generic documentation activities, such as pathology, radiotherapy and oncology treatment, can be structured identically for all entities.

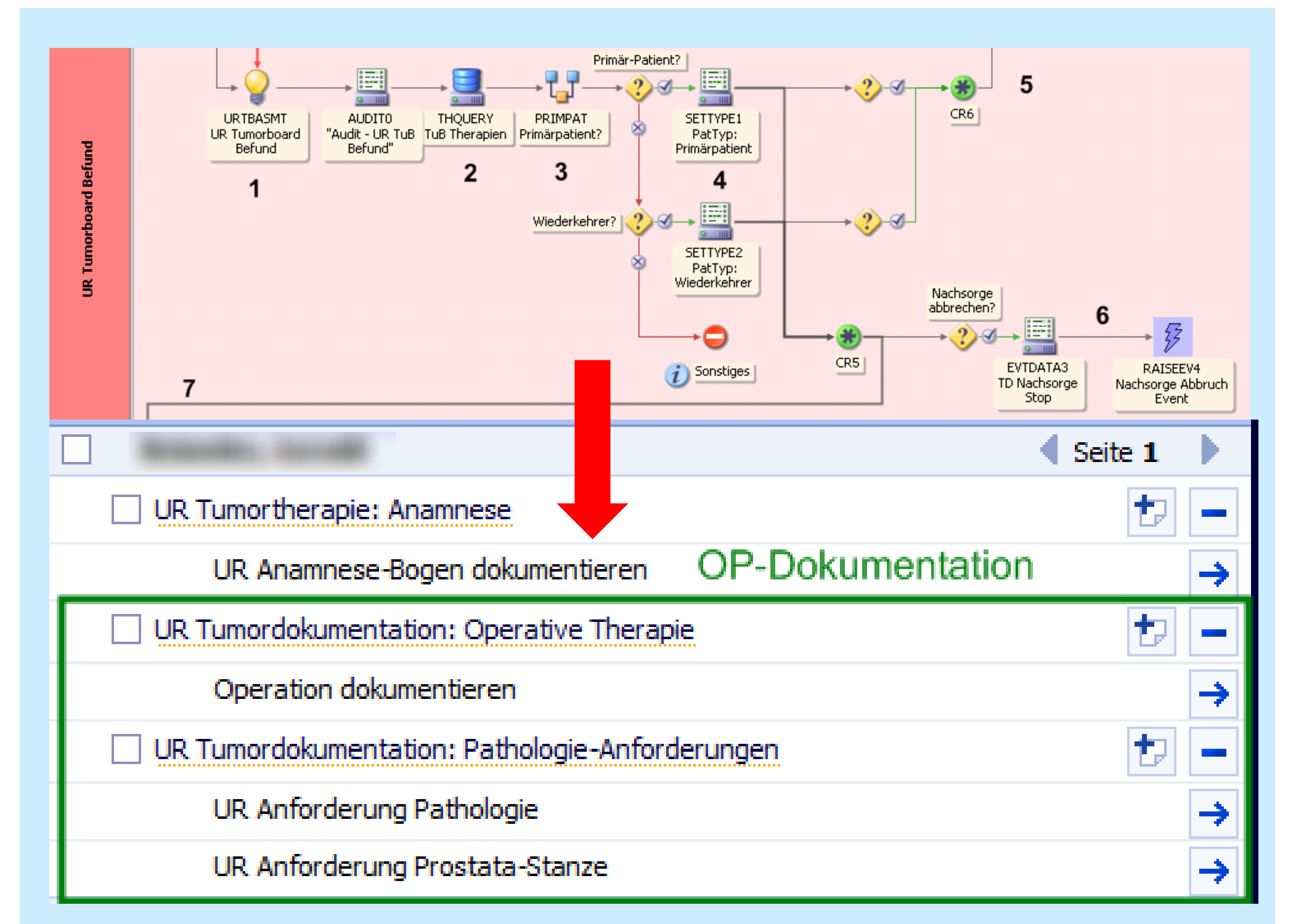


Fig. 1: Partial workflow for prostate cancer causes worklist entries

Diagnostic steps	prost ate	kidn ey	blad der	melan oma	col on	mam ma	cervix	thyr oid	leuke mia	lu ng
Anamnesis	X	X	X	X	X	X	X	X	X	X
Clinical exam	X	X	X	X	X	X	X	X	X	X
Digitalrectal gyn exam	X		X		X		X			
microscopy pictures taken				X						
mammographie						X				
mamma ultrasound						X				
neck ultrasound								X		
urology ultrasound	(X)	X								
lymphnode US				X						
endosonography					X					
cervix ultrasound							X			
biopsy / histology	X	X	X	X	X	X	X	X	KMP	X
sentinelnode biopsy				(X)	X					
chest xray	X	X	(X)	X	X	X	X	(X)		
abdominal ultrasound				X	X	X	X			
bone scintigraphy		X				X				
CT	X	X	(X)	X	X	X	X	(X)		X
MRT	X	X	(X)	X	X	X	X	X		X
FDG-PET/PET-CT/SPECT	(X)					(X)		X		X
HPV-test							X			
colposcopy							X			
...	(X)						X			

Table 1: Comparison of diagnostic staging activities: similarities between lung and thyroid cancer

References:

1. Prokosch HU, et al. IT infrastructure components to support clinical care and translational research projects in a comprehensive cancer center. Stud Health Technol Inform. 2011;169:892-6.
2. Ries M, et al. Single-source tumor documentation - reusing oncology data for different purposes. Onkologie. 2013;36(3):136-41.