Additional file 3

Set 1 of quality standards with the ratings in the first Delphi round.

[a] LOR = level of relevance, median of ratings provided on a 9-point scale from 1 (not relevant at all) to 9 (highly relevant). [b] LOA = level of agreement, proportion of panellists providing a rating ≥ 7. [c] no, if not otherwise stated, [d] requirement was not changed despite indication, [e] requirement was moved to the foreword, as it was a general remark, and therefore was no longer part of the requirements. QS: Quality standard, HCP: Health care professional, PIP: Potentially inappropriate prescribing, ECG: Electrocardiogram, PRN medication: Medication as needed (pro re nata).

	QS I: The medication is reviewed regularly and in defined situations.	Median LOR [a]	LOA [b]	Changed after first round [c]
1	The medication of each resident is reviewed on a regular basis (“regular medication review”)	9	100	
2	• The interval between two regular reviews does not exceed 6 months.	9	80	
3	• The due date for the next regular review is documented in each resident’s individual chart.	9	84	yes
4	• A pharmacist is responsible for managing the due dates, i.e. to monitor each due date.	5	28	yes
5	• If no pharmacist is available, another designated HCP takes on this task.	8	60	yes
6	• The resident’s physician is responsible that due dates are followed, i.e. that medication review is performed.	8	54	yes
7	• If a regular review of the individual medication of single residents is not possible, data on medication (e.g. data of medications delivered) of a larger group of residents is analysed in aggregated form and evaluated.	5	42	yes
8	The medication of each resident is reviewed in defined situations (“situation-based medication review”).	9	100	
9	• Defined situations are:	9	100	
10	– Every clinically relevant change in condition, vital parameters, or laboratory results	9	88	
11	– Admission to nursing home	9	100	
12	– Readmission after hospitalization	9	80	
13	– If a specialist or another physician (e.g. emergency physician, deputy) issues a new prescription	8	80	
14	– Indications from a HCP (e.g. nurse, pharmacist, specialist) that a review is appropriate due to safety concerns	9	96	
15	– Wish of the resident or their relatives	7	60	[d]
16	– If scheduled in monitoring	9	83	yes

17	• The nurse notifies the physician about each of these events as soon as she or he becomes aware of it.	9	100	
18	• The physician is responsible to ensure that a situation-based medication review is carried out in each of these events.	9	80	
19	• The situation-based review is carried out in each of these events, even if a regular review or a situation-based review triggered by another cause has taken place recently.	8	79	yes
20	• Of course there are situations, such as change of health status, vital parameters, laboratory values or a new admission to nursing home, where the activities described here are insufficient. In this case, more in-depth clinical activities of HCP are needed, e.g. a clinical exam or a consultation with the resident.	9	84	yes [e]
QS II: The medication is reviewed in a structured manner.				
21	• This quality standard applies to both regular and situation-based medication reviews, although execution may differ in certain aspects.	9	100	
22	• Each HCP involved in the review ensures that she or he has a complete, up-to-date and correct medication list at hand.	9	92	
	Pharmaceutical Check			
23	• The pharmacist checks the medication, to the extent possible, for misprescribing:	9	89	
24	– Relevant drug interactions	9	100	
25	– Duplication of active substances or therapeutic groups	9	100	
26	– Potentially inappropriate active substance*	9	96	
27	– Potentially inappropriate dosing (incl. dose, intervals, timing)*	9	96	
28	– Potentially inappropriate treatment duration*	9	92	
29	• To check for *, the pharmacist uses an explicit PIP-list.	9	83	
30	• The pharmacist develops specific recommendations and passes on all information to the physician or a designated nurse.	9	96	
31	• For each situation-based medication review, and if no pharmacist is available for the regular medication review, the physician performs the pharmaceutical check.	9	92	yes
	Nursing Observation			
32	• The nursing staff observes the following (cf. QS III):	9	100	
33	– Health status (e.g. confusion, drowsiness, new complaints)	9	100	yes
34	– Potentially inadequate dosage forms or administration routes	9	92	

35	– Difficulties related to medication intake	9	100	yes
36	• The nurse passes on all information to the physician and contributes her knowledge to finding potential solutions.	9	92	
	Medical Evaluation			
37	• The physician carries out his or her evaluation according to "AIMS":	9	79	yes
38	– **A**cute Problems: The physician evaluates if there are any acute problems with the medication (e.g. side effects, problems with medication intake).	9	96	
39	– To this end, information pertaining from the nursing observation are taken into consideration.	9	96	yes
40	– **I**ndication: The physician evaluates if indication and medication are consistent, i.e. if there is overprescribing or underprescribing.	9	100	
41	– **M**isprescribing*: Based on the information pertaining from the nursing observation and the pharmaceutical check, the physician assesses the medication for misprescribing:	9	100	
42	– Potentially inappropriate active substance*	9	96	
43	– Potentially inappropriate dosing (incl. dose, intervals, timing, dosage form, administration route)*	9	96	
44	– Potentially inappropriate treatment duration*	9	100	
45	– Duplication of active substances or therapeutic groups	9	100	
46	– Relevant drug interactions	9	100	
47	– **S**olutions: The physician develops solutions (e.g. alternatives)	9	100	
48	– Recommendations (from pharmaceutical check and nursing observation) are taken into account.	9	100	
49	– Deprescribing, the controlled discontinuation or reduction of medication, is always considered as a potential solution.	9	100	
50	– The procedure is determined.	9	92	
51	– Follow-up will be ensured by monitoring (cf. QS III)	9	92	
52	• General health condition, laboratory results, vital parameters, allergies, age, frailty, comorbidities, and the residents' wishes and needs (cf. QS V) are taken into account.	9	100	
53	• To evaluate the *, the physician uses an explicit PIP-list.	8	82	
	Conditions / Implementation			
54	• The regular medication review includes at least one personal exchange …	9	100	

55	– between physician and nurse (cf. QS IV)	9	96	
56	– between a HCP and the resident, where the results from the review are discussed with the resident (cf. QS V)	9	83	yes
57	• At least one part of the regular medication review must take place on location in the nursing home, to ensure that the above-mentioned exchange between physician and nurse becomes a routine.	9	88	yes
58	• For situation-based medication reviews, the location and form of the personal exchange may vary and are adapted to the respective situation.	8	63	yes
QS III: The medication is monitored in a structured manner.				
	The following steps are performed by the respective HCP:			
	Task of the physician			
59	• Every change in medication, incl. new prescriptions, requires the definition of:	9	100	
60	– Start and stop date, or a date for a re-evaluation. The re-evaluation occurs after 6 months during the next regular medication review, the latest (cf. QS I)	9	92	yes
61	– Further measures for monitoring the drug therapy (e.g. laboratory, ECG, mini-mental test)	8	88	
62	– Information on important side effects to watch out for due to the change in medication	9	92	
63	– Procedure in case of the occurrence of side effects (e.g. PRN medication, contact with physician)	9	88	
64	• Ensure that all above-mentioned information is communicated to the nursing staff and documented.	9	92	yes
65	• Monitoring of the desired therapeutic effect and potential side effects. Observations passed on by the nursing staff are taken into account in this process.	9	100	
	Task of the nurse			
66	• Monitor potential side effects according to the information provided by the physician. A tool is used to support this (e.g. from the AMPEL project).	9	76	yes
67	• Observe the general health condition with the help of a tool (e.g. STOP & WATCH early warning tool: INTERACT™ Quality Improvement Tool).	9	67	yes
68	• Implement the procedure as defined by the physician in case of the occurrence of side effects (e.g. administer PRN medication, immediately contact physician).	9	96	
69	• Observe if there are potentially inadequate dosage forms and administration routes or any difficulties related to medication intake.	9	92	yes
70	• Documentation of all above-mentioned observations for the regular medication review.	9	96	
71	• Knowledge of the events that require a situation-based medication review, and notification to the physician if such an event occurs (cf. QS I).	9	100	

IV: All health care professionals are committed to an optimal interprofessional collaboration.					
72	•	The competencies of the other HCPs involved are known and respected.	9	100	
73	•	The tasks and responsibilities of all HCPs involved in the medication process are defined and known to everyone.	9	100	
74	•	For each resident, all HCPs determine and pursue a common treatment goal.	9	92	
75	•	A culture of open communication between the HCPs is nurtured, i.e. they share knowledge, mutually express concerns and provide feedback.	9	100	
76	•	Observations, concerns and information of other HCPs (e.g. concerning safety, treatment decisions or health status) are taken seriously and included when performing one's own tasks.	9	100	
77	•	Communication routes (how/who/when/where) between the HCPs are defined.	9	100	
78	•	HCPs ensure that they can be reached by other HCPs within a reasonable time frame.	9	92	
79	•	The jointly performed steps are well organised, e.g. a date for a joint meeting with the resident is set or ward rounds are prepared).	9	100	
80	•	Opportunities for interprofessional exchange are created and used, e.g. regular interprofessional team meetings concerning organisational or clinical topics, quality circles.	9	88	
81	•	Measures to promote interprofessional collaboration are initiated and supervised by a designated person.	7	56	yes
V: Residents are actively involved in the medication process.					
82	•	HCPs encourage residents and their relatives to communicate their needs, concerns and changes in health condition.	9	96	
83	•	The residents' needs and preferences are considered when developing treatment options.	9	100	
84	•	HCPs ensure that residents can be involved in treatment decisions.	9	92	
85	•	Residents receive sufficient and comprehensible information so that they can participate in treatment decisions.	9	96	
86	•	HCPs ensure that the resident understands all the information provided.	9	96	
87	•	For residents lacking capacity, the person who is legally entitled to act as a representative, will be involved.	9	84	yes