Additional file 4

Set 2 and final set of quality standards with ratings in the second Delphi round

The table shows set 2 of quality standards with the ratings in the second Delphi round. With the removal of the six requirements (last column), this set 2 composes the final set of quality standards. [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] yes, if not otherwise stated, [d] new after round 1. 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]	Part of final set [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	100	
3	• The due date for the next regular review is documented for each resident individually.	9	96	
4	• A designated HCP is responsible for managing the due dates, i.e. to monitor each due date.	9	96	
5	• Ideally, this is done by the pharmacist, as they perform the first step of the regular medication review.	7	54	no
6	• The resident’s physician is responsible that an overdue medication review is completely performed.	8	76	no
7	• In addition to the regular review of the individual medication of single residents, data on medication (e.g. on data of medications deliveredof a larger group of residents is analysed in aggregated form and evaluated.	7	67	no
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	92	
11	– Admission to nursing home	9	100	
12	– Readmission after hospitalization	9	88	
13	– If a specialist or another physician (e.g. emergency physician, deputy) issues a new prescription	8	88	
14	– Indications from a HCP (e.g. nurse, pharmacist, specialist) that a review is appropriate due to safety concerns	9	100	

15	– Wish of the resident or their relatives	7	60	no
16	– If scheduled in monitoring (cf. QS III)	9	96	
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	96	
19	• The situation-based review is carried out in each of these events, even if a regular review or another situation-based review has taken place recently.	8	88	
QS II: The medication is reviewed in a structured manner.				
20	• This quality standard applies to both regular and situation-based medication reviews, although execution may differ in certain aspects.	9	100	
21	• Each HCP involved in the review ensures that she or he has a complete, up-to-date and correct medication list at hand.	9	96	
22	*Pharmaceutical Check*			
23	• The pharmacist checks the medication, to the extent possible, for misprescribing:	9	96	
24	– Relevant drug interactions	9	100	
25	– Duplication of active substances or therapeutic groups	9	100	
26	– Potentially inappropriate active substance*	9	100	
27	– Potentially inappropriate dosing (incl. dose, intervals, timing)*	9	96	
28	– Potentially inappropriate treatment duration*	9	96	
29	• To check for *, the pharmacist uses an explicit PIP-list.	9	100	
30	• The pharmacist develops specific recommendations and passes on all information to the physician or a designated nurse.	9	100	
31	• For each situation-based medication review, and if no pharmacist is available for the regular medication review, the physician is responsible for the pharmaceutical check.	9	100	
	Nursing Observation			
32	• The nursing staff observes the following (cf. QS III):	9	100	

33	– Health status (e.g. confusion, drowsiness, new complaints, functional deterioration)	9	100		
34	– Potentially inadequate dosage forms or administration routes	9	96		
35	– Difficulties related to medication intake or application	9	96		
36	• A nurse qualified for this role evaluates the observations. [d]	9	91		
37	• The nurse passes on all information to the physician and contributes her knowledge to finding potential solutions.	9	100		
38	• The nurse forwards this information [from their observation] to the pharmacist and shares their knowledge on possible solutions. [d]	8	75	no	
	Medical Evaluation				
39	• The physician carries out his or her evaluation according to the following steps ("AIMS"):	9	100		
40	– **A**cute Problems: The physician evaluates if there are any acute problems with the medication (e.g. side effects, problems with medication intake).	9	100		
41	– To this end, information pertaining from the nursing observation and, if available, from the pharmaceutical check, are taken into consideration.	9	100		
42	– **I**ndication: The physician evaluates if indication and medication are consistent, i.e. if there is overprescribing or underprescribing.	9	100		
43	– **M**isprescribing*: Based on the information pertaining from the nursing observation and the pharmaceutical check, the physician assesses the medication for misprescribing:	9	100		
44	– Potentially inappropriate active substance*	9	100		
45	– Potentially inappropriate dosing (incl. dose, intervals, timing, dosage form, administration route)*	9	100		
46	– Potentially inappropriate treatment duration*	9	100		
47	– Duplication of active substances or therapeutic groups	9	100		
48	– Relevant drug interactions	9	100		
49	– **S**olutions: The physician develops solutions (e.g. alternatives)	9	100		
	– Recommendations (from pharmaceutical check and nursing observation) are taken into account.	9	100		
50	– Deprescribing, the controlled discontinuation or reduction of medication, is always considered as a potential solution.	9	100		

51	– The procedure is determined.	9	100
52	– Follow-up will be ensured by monitoring (cf. QS III)	9	100
53	• 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
54	• To evaluate the *, the physician uses an explicit PIP-list.	8	96
	Conditions / Implementation		
55	• The regular medication review includes at least one personal exchange …	9	100
56	– between physician and nurse (cf. QS IV)	9	100
57	– between physician (or a HCP designated by the physician) and the resident, where the results from the review are discussed with the resident (cf. QS V)	9	92
58	• The regular medication review must take place at least in parts on location in the nursing home, to ensure that the above-mentioned exchange between physician and nurse becomes a routine.	9	100
59	• In contrast to the regular medication review, in the case of situation-based medication reviews the location and form of the personal exchange may vary and are adapted to the respective situation.	8	80
QS III: The medication is monitored in a structured manner.			
	The following steps are performed by the respective HCP:		
	Task of the physician		
60	• Every change in medication, incl. new prescriptions, requires the definition of:	9	100
61	– Start and stop date, or a date for a re-evaluation. The re-evaluation occurs at the next regular medication review, the latest (cf. QS I)	9	100
62	– Further measures for monitoring the drug therapy (e.g. laboratory, ECG, mini-mental test)	9	100
63	– Information on important side effects to watch out for due to the change in medication	9	100
64	– Procedure in case of the occurrence of side effects (e.g. PRN medication, contact with physician)	9	96
65	• Ensure that all above-mentioned information is communicated to the nursing staff.	9	100
66	• 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			
67	• Make sure that the monitoring information provided by the physician is documented. [d]	9	96	
68	• Monitor the general health condition and potential side effects according to the information provided by the physician.	9	96	
69	• A tool is used to support the nurses' observation (e.g. observation form used in the AMPEL project) or to communicate their observations (STOP & WATCH Tool).	8	75	no
70	• 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	100	
71	• Observe if there are potentially inadequate dosage forms or administration routes.	9	92	
72	• Observe if there are difficulties related to medication intake or application. [d]	9	96	
73	• Documentation of all above-mentioned observations for the regular medication review.	9	96	
74	• 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.				
75	• The HCPs know each other. [d]	9	92	
76	• The competencies of the other HCPs involved are known and respected.	9	100	
77	• The tasks and responsibilities of all HCPs involved in the medication process are defined and known to everyone.	9	100	
78	• For each resident, all HCPs determine and pursue a common treatment goal.	9	100	
79	• A culture of open communication between the HCPs is nurtured, i.e. they share knowledge, mutually express concerns and provide feedback.	9	100	
80	• 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	
81	• Communication routes (how/who/when/where) between the HCPs are defined.	9	96	
82	• HCPs ensure that they can be reached by other HCPs within a reasonable time frame.	9	100	
83	• 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	
84	• Opportunities for interprofessional exchange are created and used, e.g. regular interprofessional team meetings concerning organisational or clinical topics, quality circles.	9	100	

85	• Nursing home directors appoint one person among their staff who initiates measures to promote interprofessional collaboration and ensures their implementation.	9	83
V: Residents are actively involved in the medication process.			
86	• HCPs encourage residents and their relatives to communicate their needs, concerns and changes in health condition.	9	100
87	• The residents' needs and preferences are considered when developing treatment options.	9	100
88	• HCPs ensure that residents can be involved in treatment decisions.	9	100
89	• Residents receive sufficient and comprehensible information so that they can participate in treatment decisions.	9	100
90	• HCPs ensure that the resident understands all the information provided.	9	96
91	• For residents lacking capacity, the person who is legally entitled to act as a representative is involved in all of the abovementioned activities.	8	92