

Selection of hospital antimicrobial prescribing quality indicators (QIs): a consensus among German ABS networkers

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Introduction and Purpose

Simple, valid, evidence-based indicators to measure the quality of antimicrobial prescribing in acute-care hospitals are urgently needed, and are increasingly requested by policy makers. This study aimed to develop new consensus QIs for hospital ABS and infection management to be used for internal quality management and external quality assessment in Germany.

Methods

Based on an extensive literature review, the Austrian-German hospital ABS guideline committee and selected members of the German ABS expert network discussed and drafted a list of 99 potential indicators for hospitals reflecting structural prerequisites for successful ABS (35 items), ABS core activities (18 items), additional ABS measures (5 items), and process of care indicators (both generic and disease-specific, 12 and 29 items, respectively). Questionnaires were mailed to ABS experts and healthcare professionals. Participants scored (Likert scale: 1, completely disagree, to 9, completely agree) relevance (clinical, ecological/resistance, economical/expenses), and presumed practicability (in 6 categories: effort to collect data, barriers to implementation, clarity of definition, verifiability, suitability for external quality assessment, quality gap), considering their local work environment. The scores were processed according to the RAND/UCLA appropriateness method. QIs were judged relevant if the median (clinical plus ecological and/or economical) score were >6 (see fig. 1). Relevant QIs with borderline practicability scores and items with overlapping areas were rediscussed in a final ABS expert panel workshop convened in November 2012.

Fig. 1
Method of systematic item reduction

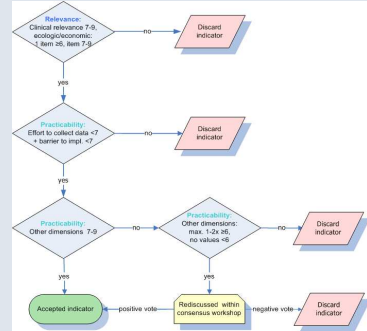
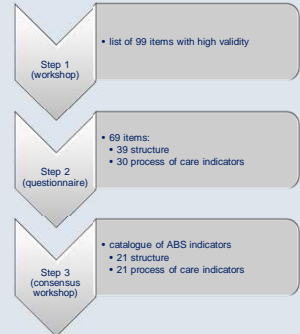


Fig. 2
Results of systematic item reduction



Results

75 of 340 mailed questionnaires were completed and returned. 21 structural and 21 process of care QIs were finally selected including 4 QIs with high clinical and ecological, but limited economical relevance, and 3 QIs with high clinical and economical but limited ecological relevance (tab. 1+2). Among the selected QIs, efforts to collect data and implementation barrier were scored as suboptimal in 18 and 6 cases, respectively.

Conclusion

A catalogue of valid, consented structural and process of care ABS-QIs was established, which should undergo piloting and feasibility studies in the German hospital care sector. The panelists were most critical regarding resource use/complexity issues and presumed implementation barriers. How this may limit applicability of QIs remains to be determined.

Tab. 1

Selected **structure indicators** for hospital antimicrobial stewardship with median scores (1-9 Likert scale) after a survey among 75 physicians and pharmacists. Suboptimal scores in grey. ABS=Antibiotic Stewardship

Thematic area/scope	Indicator description	Relevance			Practicability					
		Clinical	Ecological / resistance	Economical / cost	Effort to collect data	Barriers to implementation	Data verifiability / reliability	Quality gap		
ABS structural prerequisites: personnel, mandate, objectives, support	Multidisciplinary ABS team is appointed and authorized by the hospital management and is headed by an infectious disease physician (or physician trained in ABS) plus pharmacist	9	8	7	3	5	9	9	8	8
	ABS team is represented in the pharmacy & therapeutics committee	8	7	7	1	3	9	9	8	8
	At least 2 official and minuted ABS team meetings per year	8	7	6	2	4	9	9	8	8
	ABS strategic report includes quantitative objectives with selected indicators	7	7	6	5	5	8	8	7,5	7,5
ABS structural prerequisites: antimicrobial drug use surveillance	In-house preanalytical requirements for microbiologic samples, including rejection criteria, have been defined	9	7	8	3	5	8	8	8	7
	Antimicrobial drug use data (in the form of defined daily doses per occupied bed days or per admission) available at least once per year for several clinical services	8	8	8	6	4,5	9	9	8	7
ABS structural prerequisites: pathogen and antimicrobial drug resistance surveillance	Rate of oral versus parenteral dispensed or prescribed daily doses of the most important and relevant drugs or drug classes available at least once per year for several clinical services	7	6	8	6	5	9	8	8	7
	Selected resistance rates and corresponding incidence figures (for clinical isolates) available at least once per year for at least one clinical service	7	8	6	5	4	8	7	7	5*
ABS core activities: drug formulary and practice guidelines	Incidence figures for C. difficile-associated diarrhea available at least once per year for several clinical services and/or for general wards vs. intensive care units	8	7	7	5	4	9	7	8	6
	Hospital-wide incidence density for nosocomial sepsis/bacteremia available at least once per year	8	7	7	5	4	9	7	8	7
ABS core activities: audits	In-house list of antimicrobials is available and up to date (not older than 2 years)	9	8	8	3	4	9	8	8	7
	Prescription of restricted/alert antimicrobials from a defined list is individualized (specific patients) and must be approved	8	8	8	3	5	9	8	7	7
	Written, locally consented practice guidelines for empiric therapy, detailing the most important indications and infectious diseases are available and up to date (not older than 2 years)	9	8	8	4	6	9	8	8	8
	Written, locally consented practice guidelines for surgical prophylaxis are available and up to date (not older than 2 years)	9	8	7	3	5	9	8	8	7
ABS core activities: education	Written, locally consented practice guidelines for parenteral-to-oral switch antimicrobial therapy are available and up to date (not older than 2 years)	8	7	8	3	5	9	8	8	8
	Regular ward rounds by ABS-team members with attending physicians in at least 3 clinical services, at least 3 times each per year	8	7,5	7	6	6	8	7	7	7
ABS core activities: education	Educational sessions about local practice guidelines (tailored to clinical services needs and/or ward types) organized by ABS team members or ABS representatives from clinical services at least every other year	7	7	6	4	4	8	7	7	7
	In-house and/or extramural ABS-relevant continuing professional education offered for at least 10% of medical staff who are not ABS representatives with at least 4 ABS-relevant CME credits per year	8	7	7	5	6	8	7	7	7
ABS core activities: education	ABS-relevant continuing professional education offered for ABS team members and ABS representatives from clinical services with at least 8 ABS-relevant CME credits per year	8	7	7	4	5	8,5	8	7	7
	Use of selected antibiograms (communication of reduced findings, adapted according to local guidelines)	8	8	7	3,5	6	8	7	7	7
ABS supportive activities	Electronically available guidance and/or assisted decision analysis (adapted to or representing locally consented practice guidelines) via personal computer, PDA or smart phone	7,5	7	7	4	5	8	8	7	7

* classified / consented as essential after discussion even though median < 6

Tab. 2

Selected **process of care indicators** for hospital antimicrobial stewardship with median scores (1-9 Likert scale) after a survey among 75 physicians and pharmacists. Suboptimal scores in grey. ABS=Antibiotic Stewardship

Thematic area/scope	Indicator description	Relevance			Practicability					
		Clinical	Ecological / resistance	Economical / cost	Effort to collect data	Barriers to implementation	Data verifiability / reliability	Quality gap		
Community-acquired pneumonia	Initial therapy (drugs and dosing) according to practice guideline	9	8	8	6	4	9	7	8	6
	Two sets of blood cultures obtained on the day of therapy initiation	9	7,5	7	5	5	9	7	8	7
	Combination therapy not longer than three days (patients on normal wards only)	7	7	7	5	5	9	7	6	6
	Therapy duration not longer than seven days (patients on normal wards only)	8	8	8	6	6	9	7	7	7
Hospital-acquired pneumonia	Initial therapy (drugs and dosing) according to practice guideline	9	8	7	6,5	5	9	7	7	6
	Two sets of blood cultures obtained on the day of therapy initiation	9	8	7	6	4	9	8	8	7
	Therapy duration not longer than ten days	8	8,5	8	6	5	9	7,5	7	7
Bloodstream infection	Heart ultrasound (TEE) within ten days after first blood culture positivity (bloodstream infection due to <i>Staphylococcus aureus</i> , streptococci, non-nosocomial enterococci, HACEK organisms)	9	7	7	5	5	9	7	8	7
	Follow-up blood cultures four to seven days after initial blood culture positivity (bloodstream infection due to <i>Staphylococcus aureus</i> and fungus)	8	7	7	6	5	8,5	7	7	7
Urinary tract infection	Documented significant single-organism bacteriuria	9	8	7	5,5	5	8	7	7	6
	Initial therapy (drugs and dosing) according to practice guideline	9	8	8	6	5	9	7	7	7
	Therapy duration not longer than ten days (pyelonephritis, patients on normal wards only)	8	9	8	6	5	9	7	7	6
Empiric therapy for indications other than pneumonia and urinary tract infection	Oral antimicrobial drugs initiated not later than day five (pyelonephritis, patients on normal wards only)	8	7	8	6	5	9	7	7	7
	No antimicrobials for asymptomatic catheter-associated bacteriuria	8	9	9	5,5	5	8,5	7	7	7
Parenteral-to-oral switch therapy	Initial therapy (drugs and dosing) according to practice guideline	9	8	8	6	5	9	7	7	7
	Oral administration of antimicrobial drugs with excellent oral bioavailability (fluoroquinolones, clindamycin, cotrimoxazole, doxycycline/minocycline, linezolid, metronidazole, rifampicin, fluconazole, voriconazole)	8	6	9	5,5	5	9	7	7	7
Dosing	Dose adaptation according to renal function within 2 days	9	5,5	7	6	5	8	7	7	7
	Prophylaxis (drugs and dosing) according to practice guideline	9	8	8	5	5	9	7	8	7
Surgical prophylaxis (colorectal surgery, cardiac surgery, hysterectomy, knee and hip joint prosthesis implant surgery)	Timing: prophylaxis initiation within one hour before incision	9	8	7	5	4	9	7	8	7
	Timing: prophylaxis discontinued within one day	9	8	8	6	6	9	8	8	7
Management of multidrug-resistant organisms (MDRO)	MDRO infection and/or colonization explicitly listed in discharge summary	8	8	7	5	4	9	7	7	6

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