Paper Summary

<!--META_START-->

Title: Development of actionable quality indicators and an action implementation toolbox for appropriate a

Authors: Marlot C. Kallen, Marie-Jose Roos-Blom, Dave A. Dongelmans, Jeroen A. Schouten, Wouter T.

DOI: https://doi.org/10.1371/journal.pone.0207991

Year: 2018

Publication Type: Journal Article

Discipline/Domain: Medical Informatics / Intensive Care Medicine

Subdomain/Topic: Antibiotic stewardship, quality indicators, ICU performance improvement

Eligibility: Eligible

Overall Relevance Score: 92

Operationalization Score: 95

Contains Definition of Actionability: Yes

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: No

Contains Framework/Model: Yes (modified-RAND Delphi, Flottorp et al. checklist)

Operationalization Present: Yes

Primary Methodology: Mixed Methods (systematic literature review + expert consensus + framework-bas

Study Context: Adult ICU antibiotic use quality measurement and improvement

Geographic/Institutional Context: Netherlands, multicenter ICU context

Target Users/Stakeholders: ICU clinicians, microbiologists, pharmacists, stewardship teams, policy make

Primary Contribution Type: Development of actionable quality indicators + implementation toolbox

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Partial

GA: Yes

Reason if Not Eligible: n/a

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Discipline/Domain:

Medical Informatics / Intensive Care Medicine

Subdomain/Topic:

Antibiotic stewardship, ICU quality improvement, actionable indicators

Contextual Background:

The paper addresses the challenge of inappropriate antibiotic use in intensive care units (ICUs), a driver

Geographic/Institutional Context:

Netherlands, involving 15 Dutch ICU experts across university and non-university hospitals.

Target Users/Stakeholders:

ICU physicians, clinical microbiologists, pharmacists, infection control teams, policy makers.

Primary Methodology:

Mixed Methods — modified-RAND Delphi consensus with systematic literature review, guideline extractio

Primary Contribution Type:

Framework and tool development (quality indicators + action implementation toolbox).

General Summary of the Paper

This study develops a set of four actionable quality indicators (QIs) and one quantity metric to guide and i

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Eligibility

Eligible for inclusion: **Yes**

How Actionability is Understood

Actionability is explicitly defined as an indicator offering **clear direction to improve performance in daily p

> “Actionability, meaning that the indicator offers clear direction to improve performance in daily practice,

> “Indicators with a median score… on actionability were defined as potentially suitable” (p. 3)

What Makes Something Actionable

- Relevance to patient outcomes or healthcare efficiency.
- Clear direction for quality improvement.
- Feasibility of data collection (preferably from routine EHR/PDMS data).
- Defined target values (100% for process indicators).
- Specificity to ICU context where possible.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** Modified-RAND Delphi procedure; Flottorp et al. checklist for barrier
- **Methods/Levers:** Expert consensus, literature & guideline synthesis, barrier identification, strategy m
- **Operational Steps / Workflow:**
  1. Identify potential indicators (expert input + literature + guidelines).
  2. Online rating for relevance & actionability.
  3. Face-to-face consensus refining and feasibility assessment.
  4. Develop detailed indicator definitions, numerators, denominators, and targets.
  5. Build toolbox: map barriers to strategies using checklist.
- **Data & Measures:** EHR/PDMS-derived metrics, process & structure measures, DOT for benchmarki
- **Implementation Context:** Dutch ICU registry (NICE) integration for feedback dashboards.

> “Targets for indicator 1, 2 and 3 were set at 100%, which is a theoretical optimum…” (p. 7)

> “…toolbox displays the suggested improvement strategies associated with the selected barriers.” (p. 9)

Dimensions and Attributes of Actionability (Authors’ Perspective)

- **CL (Clarity):** Yes — indicators have explicit operational definitions and targets.
- **CR (Contextual Relevance):** Yes — ICU-specific, clinically grounded.
- **FE (Feasibility):** Yes — prioritization of electronically extractable data.
- **TI (Timeliness):** Partial — targets set for frequency (e.g., biannual meetings) but less emphasis on ra
- **EX (Explainability):** Partial — rationale provided but no deep interpretability framework.
- **GA (Goal Alignment):** Yes — aligned with stewardship goals and resistance reduction.
- **Other Dimensions:** Reliability (implicitly required), Benchmarking value (explicit for quantity metric).

Theoretical or Conceptual Foundations

- OECD and AHRQ criteria for good quality indicators.
- Flottorp et al. framework for determinants of practice.
- Tailored intervention literature (Wensing et al.).

Indicators or Metrics for Actionability

- **Indicators:**
  1. Blood cultures before empirical therapy (100%).
  2. Therapeutic drug monitoring within 48h for vancomycin/aminoglycosides (100%).
  3. Surveillance cultures if SDD/SOD applied (100%).
  4. Biannual ICU-microbiology meetings on resistance (≥2/year).
- **Quantity Metric:** DOT per 100 patient-days or admissions (no fixed target).

Barriers and Enablers to Actionability

- **Barriers:** Inadequate local guidelines, insufficient familiarity with protocols, poor ICU team communic
- **Enablers:** Standardized protocols, interdisciplinary meetings, educational materials, EHR integration

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Relation to Existing Literature

The study builds on ICU quality measurement literature but distinguishes itself by **explicitly integrating a

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Summary

This study delivers a rigorously developed, ICU-specific set of four actionable quality indicators and one b

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Scores

- **Overall Relevance Score:** 92 — Strong explicit definition of actionability, clear criteria, ICU-specific c
- **Operationalization Score:** 95 — Detailed process, measurable targets, integrated barrier-strategy too

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Supporting Quotes from the Paper

- “Actionability, meaning that the indicator offers clear direction to improve performance in daily practice…
- “Targets for indicator 1, 2 and 3 were set at 100%…” (p. 7)
- “…toolbox displays the suggested improvement strategies associated with the selected barriers.” (p. 9)

Actionability References to Other Papers

- Flottorp SA et al., 2013 — Determinants of practice checklist.
- OECD, 2006; AHRQ, 2011 — Criteria for quality indicators.
- Wensing M et al., 2011; 2010 — Tailored implementation for chronic diseases and overcoming barriers.
- van den Bosch CM et al., 2014; 2016 — Antibiotic treatment indicators.