

Introducing a smartphone application as a point-of-care tool for antimicrobial stewardship significantly improved compliance with guidelines and clinical outcomes of adults admitted with common antimicrobial indications

Impact of a Smartphone Application on Antimicrobial Guideline Adherence and Clinical Outcomes: A Pre- and Post-intervention Study

Background: The impact of adopting smartphone applications hosting antimicrobial management guidelines on prescribers' adherence to guidelines and patient outcomes is uncertain.

Result 1: Baseline characteristics of adult patients with pneumonia, urinary tract infections, and skin and soft tissue infections before and after adopting Firstline™ smartphone application

| Characteristic | Pre-intervention n 280 ^a | Post-intervention n 272 ^a | P-value |
|---------------------------------------|--|---|---------|
| Age (mean, SD) ^b | 61 (21) | 60 (20) | 0.48 |
| Gender n (%) | | | 0.67 |
| male | 161 (58%) | 161 (59%) | |
| female | 119 (43%) | 111(41%) | |
| Charlson comorbidity index (mean, SD) | 1.9 (2.2) | 2.1 (1.8) | <0.16 |
| Antimicrobial indication n (%) | | | 0.09 |
| pneumonia | 120 (42.9%) | 146 (48.3%) | |
| skin and soft tissue infection | 60 (21.4%) | 51 (20.1%) | |
| urinary tract infection | 100 (35.7%) | 74 (31.6%) | |

^a number of patients; ^b standard deviation

Result 2: Adherence to antimicrobial guidelines and clinical outcomes before and after adopting Firstline™ smartphone application

| Characteristic | Pre-intervention n 280 ^a | Post-intervention n 272 ^a | P-value |
|---|--|---|---------|
| Adherence to guidelines n (%) | | | |
| choice | 132 (47%) | 174 (64%) | <0.01 |
| dose | 268 (96%) | 271 (99%) | <0.01 |
| route | 272 (97%) | 266 (98%) | 0.62 |
| overall adherence | 142 (51%) | 170 (63%) | <0.01 |
| Length of stay (days) median (IQR) ^b | 8.5 (4.7, 16) | 6.5 (3.7, 11.2) | <0.01 |
| 30-day readmission rate n (%) | 77 (28%) | 53 (20%) | 0.027 |
| 30-day mortality rate n (%) | 60 (21%) | 27 (10%) | <0.01 |

^a number of patients; ^b interquartile range

Methods: A retrospective pre- and post-intervention study assessing the impact of a smartphone application (Firstline™, <https://firstline.org>) that provided point-of-care antibiogram-tailored empirical antimicrobial treatment recommendations and detailed antimicrobial monographs.

Comparative retrospective clinical chart review for 12 months before and after implementing Firstline™

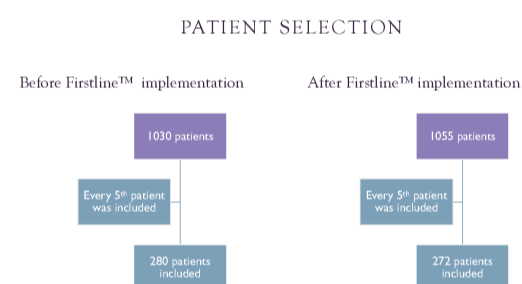
Hospitalized patients aged ≥16 years receiving antibiotic therapy through oral, parenteral, or inhalational routes

ICD-10 codes were used to search electronic records for the most frequent empirical indications for antibiotic therapy:

- Pneumonia
- Skin and soft tissue infection (SSTI)
- Urinary tract infection (UTI)

Every 5th patient from each arm was included to randomize selection and minimize selection bias

Approved antimicrobial guidelines used the comparative periods were considered a gold standard



Limitations: The impact of the smartphone application on guideline adherence and patient outcomes in paediatric and outpatient settings was not assessed in this study. Further research is needed to assess its influence on other aspects of prescriber behaviour and antimicrobial stewardship metrics.

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