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## Quality improvement program of adult urinary tract infection management: Review and impact

*Programme d'amélioration de la qualité de la prise en charge des infections urinaires chez l'adulte :  
bilan et impact*

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### Abstract

**Objective.** – A quality improvement program for adult urinary tract infection management was established to avoid unnecessary antibiotic treatment and to promote adequate prescription, associated with financial and time savings.

**Methods.** – Management was integrated into a three-step approach: clinical diagnosis, bacteriological diagnosis, and therapeutic decision. For each step, areas for improvement were prioritized and implemented through corrective measures and key messages, measured by indicators. This program was applied to the whole hospital, which includes an emergency department and hospital units (672 beds).

**Results.** – The diffusion of new recommendations on clinical diagnosis helped limit the use of Urine Dipstick Tests (UDT) and identify situations requiring the prescription of urine cytobacteriological test (UCBE) and antibiotic treatment: decreased annual consumption of UDTs (34%) and UCBEs (25%). The implementation of a new sampling system for UCBEs was associated with a 21% increase in conclusive analysis. Results of antimicrobial susceptibility testing were also optimized. Trainings on the proper use of antibiotics led to a 5.0% decline in global consumption. Only 23 antibiotic prescriptions for UTI resulted in pharmaceutical advice to prescribers in 2014.

**Conclusion.** – The program is part of a practice improvement strategy. Integrating the management of urinary tract infections into a global process helped improve each step of patient management.

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**Keywords:** UCBE; Antibiotherapy; Healthcare quality; Urinary tract infections

### Résumé

**Objectifs.** – Un programme d'amélioration de la qualité de la prise en charge des infections urinaires de l'adulte a été établi pour éviter toute antibiothérapie inutile et promouvoir la juste prescription ; des objectifs d'économie financière et de temps étaient associés.

**Méthodes.** – La prise en charge a été assimilée à un processus en trois étapes: diagnostic clinique, bactériologique et décision thérapeutique. Pour chacune d'entre elles, des axes d'amélioration ont été priorisés et mis en œuvre par des actions correctives et messages clés, évalués par des indicateurs. Ce programme a été appliqué à l'ensemble d'un centre hospitalier général, constitué d'un service d'urgence et de services d'hospitalisation (672 lits).

**Résultats.** – La diffusion de nouvelles recommandations concernant le diagnostic clinique a permis de limiter l'utilisation des bandelettes urinaires, d'identifier les situations justifiant la prescription d'un ECBU et d'une antibiothérapie : diminution annuelle des bandelettes urinaires

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de 34 % et des ECBU de 25 %. L'instauration d'un nouveau système de prélèvement des ECBU est corrélée à une augmentation de 21 % des analyses concluantes. Le rendu des résultats des antibiogrammes a été optimisé. Les formations sur le bon usage des antibiotiques ont entraîné une baisse de 5,0 % des consommations globales. Seulement 23 antibiothérapies urinaires ont donné lieu à une intervention pharmaceutique auprès des prescripteurs en 2014.

*Conclusion.* – Le programme s'inscrit dans une démarche d'amélioration des pratiques. Assimiler la prise en charge des infections urinaires à un processus global a permis d'améliorer chacune des étapes pour le bénéfice des patients.

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*Mots clés :* ECBU ; Antibiothérapie ; Qualité des soins ; Infections urinaires

## 1. Introduction

Antibiotic consumption in France has been constantly increasing over the past 10 years. It is estimated that 4 in 10 hospitalized patients received a dose of antibiotic in 2013 [1] and misuse is estimated at 30–50% [2–4]. Urinary Tract Infections (UTIs) are the second localization of community-acquired bacterial infections following respiratory tract infections, and the first localization of nosocomial bacterial infections [5,6]. The simultaneous rise in bacterial resistance to antibiotics and particularly of Enterobacteriaceae strains to third-generation cephalosporins (3GCs) and fluoroquinolones (FQ) is significant, rapid, and worrying [7]. Several factors contribute to this growing resistance, but the impact of antibiotic usage does play a crucial role. The evolution of *Escherichia coli* resistance in community-acquired UTIs is thus highly correlated with the consumption of urinary anti-infective agents [8].

The Committee for Nosocomial Infection Control (French acronym CLIN) and the Committee for Anti-Infective Agents (French acronym CAI) of our facility decided to look into unnecessary or inappropriate prescriptions made to patients presenting with UTI. The study was performed from 2011 to 2014 in the whole hospital, which is made of the emergency department and hospital units, i.e. 672 beds: 184 in the Medicine-Surgery-Obstetrics unit (MSO), 90 in the Rehabilitation and Long-Term Care ward (RLTC), and 398 in medicalized nursing homes (French acronym EHPAD).

The study objectives were to avoid unnecessary prescription of antibiotics and to promote a proper use of antibiotics. Secondary objectives were to make savings and to avoid any waste of time. We aimed to present the implementation of our strategy, the results obtained, and its impact.

## 2. Methods

To reach our objectives, we implemented a Quality Improvement Program (QIP) and used the methods described by the National Agency for Accreditation and Evaluation of Healthcare (French acronym ANAES) [9]. The management of adult bacterial UTIs was integrated into a three-step process: clinical diagnosis, bacteriological diagnosis, and therapeutic management with treatment choice and follow-up.

The project was directed by the hospital hygiene operating team (made of the hygiene lead specialist, the head of the CLIN, the hygiene health executive, a nurse, and the pharmacist of

the CAI) and by the hospital infectious disease operating team (infectious disease lead specialist, head pharmacist of the CAI, the hygiene health executive, and a bacteriologist).

### 2.1. Assessment of the current situation – diagnosis of disparities: 2011–2012

Several evaluations were performed in 2011 to assess the current approach:

- evaluation of practices on the systematic screening of bacteriuria using Urine Dipstick Test (UDT) in adult patients, excluding pregnant women;
- evaluation of device use for Urine Cytobacteriological Examination (UCBE);
- evaluation of the surveillance of antibiotic prescriptions focusing on carbapenems (SPA-CARB), coordinated by the French Infectious Diseases Society (French acronym SPILF) and the French National Observatory for Epidemiology of Bacterial Resistance to Antibiotics (French acronym ONERBA) [10];
- internal evaluation of 50 nosocomial UTIs.

This initial approach led to identifying, at each step of the process, many discrepancies between our practices and what was mentioned in national guidelines or internal procedures: UDTs almost always routinely performed at patient admission and absence of procedure, UCBEs performed without any prescription and without complying with the existing sampling procedure, multimicrobial and inconclusive UCBEs, and inappropriate antibiotic treatments related or unrelated to difficulties in interpreting the antibiotic susceptibility testing results.

Following these observations of non-compliance at each step of the management of patients suspected of UTI, we investigated potential causes. The results were then transmitted to the CLIN and CAI. The benefit of the QIP was even more important considering the potential for improvement at each of the three steps of the process.

### 2.2. Process improvement strategies – 2012–2014

We gave priority to some areas for improvement for each step of the process to define the measures to implement, key messages to communicate, and appropriate efficacy indicators. Indicators

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