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Original article

## Reassessment of antibiotic therapy in hospitals<sup>☆</sup>

### Réévaluation de l'antibiothérapie dans les hôpitaux

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#### Abstract

**Introduction.** – French national guidelines state that antibiotic therapies should be reassessed between 48 and 72 hours after treatment initiation and that reassessment of antibiotic therapy (RA) must be recorded in patients' files.

**Objective.** – To determine whether RA is performed and recorded in patients' files in hospitals in a region of France.

**Methods.** – Setting: hospitals participating in the National nosocomial infection point-prevalence survey (NPS) in Upper-Normandy, France. Patients included those receiving antibiotic therapy (excluding antibiotic prophylaxis) on NPS day, started in the hospital in which the survey was conducted and ongoing for more than 72 hours. Data collected included characteristics of participating hospitals and, for each included patient, characteristics of ward, infection and antibiotic therapy, and mention in the patients' files of explicit or implicit RA. The rate of explicit and implicit RA was calculated and factors associated with explicit or implicit RA were evaluated using a univariate analysis.

**Results.** – Thirty-three hospitals representing 87% of hospital beds region-wide were included in the study. In addition, 933 prescriptions were assessed for 724 infections in 676 patients. The overall rate of RA was 67.6% (49.3% of explicit RA and 18.3% of implicit RA). The rate of RA differed significantly according to infection and antibiotic class but not according to hospital or ward characteristics.

**Conclusion.** – Our study provides new and reassuring results regarding reassessment of antibiotic therapy.

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**Keywords:** Empirical antibiotic therapy; Antibiotic stewardship; Antibiotic reassessment

#### Résumé

**Introduction.** – Les recommandations françaises précisent qu'un traitement antibiotique doit être réévalué 48 à 72 heures après son institution et que cette réévaluation doit être enregistrée dans le dossier du patient.

**Objectif.** – Évaluer dans une région française si la réévaluation de l'antibiothérapie hospitalière est réalisée et si elle est enregistrée dans le dossier des patients.

**Méthode.** – Établissements : établissements de santé de Haute-Normandie participant à l'Enquête nationale de prévalence des infections nosocomiales de 2012 et volontaires pour participer à cette enquête. Patients inclus : ceux recevant une antibiothérapie (antibioprophylaxie exclue) le jour de l'enquête, débutée depuis 72 heures au moins dans l'établissement. Données recueillies : caractéristiques de l'établissement et du service, site d'infection, antibiotiques utilisés, mention dans le dossier du patient d'une réévaluation explicite ou implicite de l'antibiothérapie. Analyse : calcul de la proportion d'antibiothérapies avec réévaluation explicite ou implicite, et recherche par une analyse univariée des facteurs associés à la réévaluation.

<sup>☆</sup> This work was presented as a poster at the 32nd international meeting of anti-infective chemotherapy (RICAI) on November 22 and 23, 2012 in Paris, France.

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**Résultats.** – Trente-trois établissements (87 % des lits d’hospitalisation de la région) ont participé à l’enquête ; 933 prescriptions, pour 724 infections chez 676 patients, ont été évaluées. La proportion d’antibiothérapies avec réévaluation était de 67,6 % [IC 95 % 63,9–71,1] (explicite 49,3 % [IC 95 % 45,4–53,1], implicite 18,3 % [IC 95 % 15,5–21,5]). Le type d’infection et la classe d’antibiotique influençaient la fréquence de réévaluation mais pas les caractéristiques des hôpitaux ni des services.

**Conclusion.** – Notre étude fournit des résultats nouveaux et rassurants concernant la réévaluation de l’antibiothérapie dans les établissements de santé.

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**Mots clés :** Antibiothérapie empirique ; Bon usage des antibiotiques ; Réévaluation de l’antibiothérapie

## 1. Introduction

Antimicrobial resistance is a serious public health concern with worldwide repercussions, leading to rising healthcare costs, treatment failures, and deaths [1]. New pathogens that have become resistant to multiple types or classes of antibiotics are easily crossing international borders and spreading within and between continents. The Center for Disease Control and Prevention (CDC) estimated that in the United States more than two million people every year present with antibiotic-resistant infections, with at least 23,000 associated deaths [2]. In 2009, the European CDC (ECDC) estimated that in the European Union 25,000 patients per year died from an infection caused by multidrug-resistant bacteria [3].

In France, the rate of methicillin-resistant *Staphylococcus aureus* (MRSA) dropped from 21.6% in 2010 to 17% in 2013. Conversely, the proportion of *Escherichia coli* strains resistant to third-generation cephalosporins (3GC) increased from 7.2% in 2010 to 9.5% in 2013, with three quarters of them producing extended-spectrum beta-lactamases (ESBL). The rate of *Klebsiella pneumoniae* strains resistant to 3GCs increased from 17.8% in 2010 to 28% in 2013, with two thirds being ESBL-producing strains. In 2013, the European Antimicrobial Resistance Surveillance System (EARSS) found that, in France, *E. coli* resistance to 3GCs was similar to that observed in other European countries and that of *K. pneumoniae* was higher [4]. Up to 50% of all antibiotic prescriptions are not needed or are not optimally prescribed [2,5–8]. Excessive use and misuse of antibiotics are the single most important factor leading to antibiotic resistance worldwide.

To preserve the effectiveness of antibiotics, the Institute of Medicine recommended prioritizing a strategy: the “prudent use of available antibiotics, i.e. only when they are needed, with the correct dosage, dose intervals and duration” [9]. Therefore, antimicrobial stewardship programs are increasingly being advocated as a means of improving the quality of prescriptions: CDC’s “Get Smart program” in the US [10], National Health Service’s English Surveillance Programme for Antimicrobial Utilization and Resistance (ESPAUR) [11] in the United Kingdom, and French Ministry of Health’s 2011–2016 National Plan on Antibiotics issued in November 2011 [12]. In 2012, in Europe, France was in fourth and fifth position for systemic use of antimicrobials in community and hospital settings, respectively [13].

Antibiotic therapy reassessment provides an opportunity to detect intolerance or failure, to narrow the agent’s spectrum of

activity, or to stop useless antibiotic therapy [14–16]. Antibiotic therapy reassessment between 48 and 72 hours is mentioned in international guidelines on empirical treatments [10,17]. French national guidelines state that the use of antibiotics should be reassessed 48–72 hours after treatment initiation and that antibiotic therapy reassessment must be recorded in the patient’s file [12,17–20].

The French National Authority for Health (French acronym HAS) and the French Infectious Diseases Society (French acronym SPILF) suggested tools for evaluating antibiotic therapy reassessment [21,22]. However, little data is available on the effective implementation of antibiotic therapy reassessment in patients hospitalized in France. We aimed to determine to what extent antibiotic therapy reassessment at 48–72 hours was performed and recorded in hospital patient files in Upper-Normandy, France.

## 2. Method

Participation in the study was proposed to hospitals located in Upper-Normandy as an additional module to the National nosocomial infection and antimicrobial treatment point-prevalence survey (NPS). The latter is proposed every 5 years to all hospitals in France by Public Health France. NPS method has already been described [18–23]. It provides data on patients’ characteristics and hospital infections, as well as on the type and indication (treatment of a community-acquired or hospital-acquired infection, or prophylactic treatment) of antibiotic therapies. The NPS does not usually evaluate antibiotic therapy reassessments.

A questionnaire on antibiotic therapy reassessment was drafted by a working group including epidemiologists, infection control physicians, and pharmacists from Rouen University Hospital; the regional observatory of drugs, medical devices, and therapeutic innovation (OMEDIT); and the local coordination center for nosocomial infections (ARLIN). This additional questionnaire was added to the basic NPS questionnaire (Appendices 1 and 2, respectively). It was based on the grid evaluation of professional practices developed by the HAS and clinical audit guidelines developed by the SPILF [21,22]. An investigator tested the questionnaire for feasibility and intelligibility with six patient files from one participating hospital. The NPS coordinating center in Upper-Normandy organized a training session for local NPS coordinators on April 19, 2012. The NPS coordinating center then proposed the survey on antibiotic reassessment to 44 of 76 healthcare facilities in Upper-Normandy, which had volunteered for NPS at the training session. The questionnaire on

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