

**TITLE:** ISOLATION OF GRAM-NEGATIVE BACTERIA FROM AIR AND SURFACES IN HOSPITAL ENVIRONMENTS.

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**ABSTRACT:**

The indoor air quality is important to ensure the health and high performance at labor activities. Inside the intensive care units it interferes in inpatients recovery, but there is no certainty about its importance in occurrence of nosocomial infections. By the way, Gram-negative bacteria (GNB) resistant to multiple drugs have a preponderant role in these questions. In this study, it was realized six samplings, fortnightly and consecutive, of air (n=60) and surfaces (n=186) at the intensive care unit (ICU), at the postoperative (POP) unit and in the halls of ICU, the hall of the floor, and the building entrance of Hospital Federal dos Servidores at Rio de Janeiro state. These samplings were performed between January and March of 2016. To the air collections it was used a one stage Andersen sampler, settled at  $\geq 2$ m from the beds and the media used was PCA (Plate Count Agar) e agar MacConkey while the surfaces collections it was used swabs. Isolated cultures from air samples and surfaces were submitted to the conventional tests for the previous species identification (BacTray, Laborclin). Subsequently, this identification was confirmed by MALDI-TOF (*Mass Spectrometry for Microorganism Identification-Time of Flyth*) technique, performed in Laboratório de Investigação em Microbiologia Médica, UFRJ. These cultures were also submitted to the antimicrobial susceptibility test by the disk diffusion method. Some collection points of the intensive care unit were out of the international established standards to these hospital units. Were found five GNB in the air, being: *Klebsiella pneumoniae*, at the nursing pre-set (n=2); *Serratia marcescens*, from the nursing pre-set (n=1) and from bed 11 of POP (n=1); and *Enterobacter sp.*, at the hall of ICU (n=1). Ten GNB were isolated from surfaces: *Klebsiella pneumoniae*, from the respirator of the bed two, in ICU, on the grid and at Mayo's table at the bed five, in ICU; *Serratia marcescens*, on Mayo's table at bed five, in ICU; *Enterobacter sp.*, on the shelf of bed five, in ICU; *Escherichia coli*, at Mayo's table at bed six and on the grid of bed 13, both in ICU; and *Pseudomonas aeruginosa*, at the respirator of bed 12, in POP unit, on the grid of bed two, in ICU, and on the Mayo's table at bed 4, in ICU. In the study 93,3% of isolated bacteria showed multiple drug resistance. Most of *Klebsiella pneumoniae* (n=4) showed XDR resistance, being only one culture sensible to drugs. All cultures of *Serratia marcescens* (n=2) and *Enterobacter sp.*(n=2) showed MDR resistance. *Escherichia coli* and *Pseudomonas aeruginosa* (one culture of each) showed MDR and XDR resistance. These cultures will be submit to molecular analysis by PCR (Polymerase Chain Reaction) to enforce the results of the identification and to show the genes of resistance and compared to other cultures isolated from inpatient allocated in the same sectors of the hospital, in the period of the sampling. This study allowed us to conclude, that the air and surfaces of hospital environments can act as a source of GNB, contributing to its dissemination.

**Keywords:** indoor air, surfaces, Gram-negative bacteria, multiple drugs resistance.

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