

# Multidrug resistant bacteria on air, inanimate surface and medical equipment in an Intensive Care Unit in Lima, Perú

K. S. Yauri Condori<sup>1</sup>, L. Rueda Torres<sup>1</sup>, R. G. Gavilán Chávez<sup>1</sup>, W. Quino Sifuentes<sup>1</sup>, D. Flores Leon<sup>1</sup>, L. A. Hernandez Gomez<sup>2</sup>, J. M. Yali Rivera<sup>1</sup>, C. E. Cabanillas Espinoza<sup>1</sup>, L. A. Ormeño Delgado<sup>1</sup>, J. Rosales Rimache<sup>1</sup>; <sup>1</sup>NIH, Lima, Peru, <sup>2</sup>Hosp. Cayetano Heredia, Lima, Peru

## INTRODUCTION

Hospital environment is an important reservoir of multidrug resistant (MDR) bacteria and facilitate the rapid spread of microorganisms from patient to patient, health care workers to patients or all surface to all bodies. There are few studies about bacterial contamination of hospital environment in Perú. Therefore, we aimed to identify MDR bacteria on air, inanimate surface and medical equipment in an Intensive Care Unit in Lima, Perú.

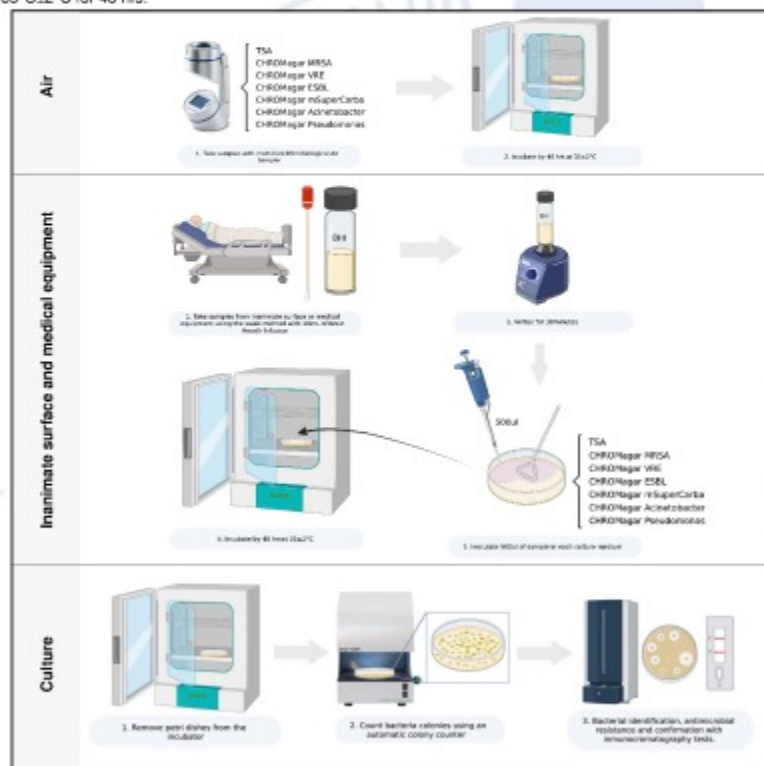
## METHODS

We designed a cross-sectional study with random convenience sampling. We selected 2 points to air sampling (0,7 mts and 1,5 mts), 5 inanimate surfaces (door handle, keyboard, desk, faucet and floor) and 10 medical equipment (2 hospital bed rails, 2 patient food table, 2 infusion pump, 2 medical cart and 2 clinic history).



Figure 1. Sampling. (a) Multi-hole Microbiological Air Sampler (MAS-100 NT, Merck). (b) Air sampling at 1.5 mts. (c) Patient food table sampling using the Swab method. (d) Hospital bed rails sampling using the Swab method.

The air sampling was performed by the impaction system using the multi-hole Microbiological Air Sampler (MAS-100 NT, Merck). Inanimate surfaces and medical equipment were sampled using the swab method with 10mL of Brain Heart Infusion. Each sample was cultivated in Trypticase soya agar and 6 CHROMagar media (MRSA, VRE, ESBL, mSuperCARBA, Acinetobacter and Pseudomonas agar). All media were incubated at 35°C±2°C for 48 hrs.



Bacteria count was performed using an automatic colony counter (Scan 1200, Interscience) and bacterial species were identified by MALDI-TOF mass spectrometry. The antimicrobial resistance was confirmed by Kirby Bauer disc diffusion method and the presence of carbapenemases by immunochromatography tests (Coris BioConcept).

## RESULTS

The result of total count of bacteria in TSA in air is: 128 UFC/m<sup>3</sup> and 107 UFC/m<sup>3</sup> at 0,7 mts and 1,5 mts air sampling points, respectively. Respect of MDR bacteria isolated from CHROMagar media, see Table 1. No one MDR *Acinetobacter baumannii* were positive to KPC, NDM, VIM, IMP and OXA-48 carbapenemases

Table 1. Multidrug resistant bacteria isolated by sampling points

Sampling points	N° samples	Multidrug resistant bacteria isolated
<b>Air</b>		
0,7 mts	1	Methicillin-resistant <i>Staphylococcus haemolyticus</i> NDM carbapenemase-producing <i>Klebsiella pneumoniae</i>
1,5 mts	1	MDR <i>Acinetobacter baumannii</i>
<b>Inanimate Surface</b>		
Door handle	1	Methicillin-resistant <i>Staphylococcus haemolyticus</i> ESBL-producing <i>Enterobacter cloacae</i>
Keyboard	1	Methicillin-resistant <i>Staphylococcus haemolyticus</i>
Desk	1	None
Faucet	1	Methicillin-resistant <i>Staphylococcus haemolyticus</i> NDM carbapenemase-producing <i>Klebsiella pneumoniae</i>
Floor	1	Methicillin-resistant <i>Staphylococcus haemolyticus</i>
<b>Medical Equipment</b>		
Hospital bed rails	2	Methicillin-resistant <i>Staphylococcus haemolyticus</i> ESBL-producing <i>Enterobacter cloacae</i> MDR <i>Acinetobacter baumannii</i>
Patient food table	2	None
Infusion pump	2	Methicillin-resistant <i>Staphylococcus haemolyticus</i>
Medical cart	2	None
Clinic history	2	Methicillin-resistant <i>Staphylococcus haemolyticus</i>
<b>Total</b>	<b>15</b>	

## CONCLUSIONS

The study showed that multidrug resistant bacteria can be present in air and various hospital surface allowing the dissemination of bacteria within the hospital environment. This highlights the need for improved infection prevention and control strategies in intensive care units in Perú.

