Abstract:
Background: We aimed to compare the yields between settle plates and an air impactor to detect air contamination with carbapenem-resistant Acinetobacter baumannii (CRAB).

Methods: This project occurred in a large teaching hospital in Miami, FL in 2 adult ICUs. Settle plates consisted of leaving open blood agar plates (2-ft from roof) exchanged daily. Upon collection, plates were swabbed with sterile Q-tips, inoculated on TSA, incubated overnight, and then plated on MacConkey. The second method was performed using an impactor (AirTrace® Environmental Sampler) which accommodates 150 mm blood agar plates, which spins 360° in 2 hour period. We used 3 plates consecutively for a total of 6 hrs/day. Subsequently, plates were incubated overnight. Selected colonies were streaked on MacConkey. AB was determined based on colony color, morphology; final identification with Vitek II. Carbapenem susceptibility was checked with meropenem disks, and results interpreted based on CLSI criteria.

Results: During this 4-month surveillance, 4 CRAB pts were followed. Pts 1 & 2 were located in an open layout ICU, while pts 3 & 4 were in a close ICU. With regards to the settle plate method, 22 plates were obtained from all 4 pts. Of those, 5 (22.7%) were CRAB+. The impactor concomitantly tested 87 plates across all 4 patients. Of those, 34 (39%) were CRAB+. The number of CFUs/positive plate detected by impactor was as follows: Patient 1, ranged from 2 to 135, median of 16; with the highest amount of CFU obtained with bed linens change. Patient 2, from 1-86, median of 28; with the highest amount of CFU obtained during physical therapy. Patient 3 (ID3): from 2 to 9, median of 4; with highest CFU obtained with colostomy bag change. Patient 4 (ID4): from 1 to 7, median of 2; with highest CFU obtained when repositioning the patient.

The percentage of agreement between both methods was 12.5, 11 and 33 for patient 1, 2 & 3 respectively.

Aim: We aimed to compare two methods for sampling air, Settle plates and air impactor, to evaluate the yield of these two methods for detecting air contamination with CRAB.

Results:
The number of CFUs/positive plate detected by impactor was as follows:
- Patient 1 (ID1): ranged from 2 to 135, median of 16; with the highest amount of CFU obtained with bed linens change.
- Patient 2 (ID2): from 1 to 86, median of 28; with the highest amount of CFU obtained during physical therapy.
- Patient 3 (ID3): from 2 to 9, median of 4; with highest CFU obtained with colostomy bag change.
- Patient 4 (ID4): from 1 to 7, median of 2; with highest CFU obtained when repositioning the patient.

The percentage of agreement between both methods was 12.5, 11 and 33 for patient 1, 2 & 3 respectively.

Discussion:
In this study, the air impactor was superior for detecting air contamination with CRAB when compared to settle plates. Also, it has the advantage of providing colony counts and gives an approximate time frame of when air contamination was higher in the room. Due to this characteristic, we noticed that air contamination was higher when activities occurred around the patients (e.g. linens change, physical therapy, etc.).

Limitations of this study include having a small sample size. We were not able to follow all the patients for the same length of time and we did not collect clinical or demographic data that may have influenced our results.

References:

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Background:
Carbapenem-resistant Acinetobacter baumannii (CRAB) is one of the most important hospital-acquired pathogens in ICUs worldwide. We have shown how the anatomic source of colonization impacts air contamination with CRAB by using settle plates. Nonetheless, this method did not allow us to obtain colony counts and might not have had enough sensitivity for patients with low “bacterial loads”.

Methods:
1. Settle plate method
2. Air impactor method: Plate rotates 360° over 2 hours