Background. Pulmonary nocardiosis is an infection targeting immunocompromised patients characterized by high mortality and requires frontline antibiotics for treatment. Nocardiosis is currently confirmed or excluded by Bacteroid fluid culture followed by further phenotypic identification steps. A culture-independent method with more timely results would accelerate the administration of appropriate treatment. A rapid Nocardia (NOC) PCR assay for Bacteroid has not been previously validated nor offered for clinical testing to our knowledge.

Methods. Oligonucleotides for a rapid NOC PCR comprehensive of the causative agents of nocardiosis were aligned to the 16S regions of common NOC species and other genera. Specificity was confirmed against publicly available bacterial 16S sequences. Rapid automated nucleic acid extraction (<1 hour for 24 samples) followed by fast PCR (<1 hour) was validated according to relevant compliance standards. Spiked/unspiked human Bacteroid samples were used to assess analytical specificity, limit of detection (LOD), precision and accuracy using NOC and non-NOC strains.

Results. The NOC PCR detected, among others, the most common NOC species (N. cyriacigeorgica, N. nova, N. farcinica and N. brasiliensis). We estimate more than 95% of causative agents of nocardiosis are detectable by the assay. No cross-reactivity was detected from 30 non-NOC bacterial pathogens except for Rhodococcus and Crossiella spp. LOD in Bacteroid fluid was determined to be 206, 41, and 24 copies/mL for N. cyriacigeorgica, N. nova, and N. transvalensis, respectively. Intra- and inter- assay precision studies revealed %CV’s of <10% and <8% at a high concentration and <21% and <26% at a low concentration, respectively. Accuracy studies yielded 100% concordance with 33 Bacteroid positives and 20 Bacteroid negatives.

Conclusion. The specificity, inclusivity, sensitivity, precision and accuracy of a qualitative PCR have been deployed as an aid in the diagnosis of pulmonary nocardiosis. NOC PCR allows for a culture-independent method that can rapidly detect clinically relevant NOC species with an improved turnaround time, leading to prompt diagnosis and administration of appropriate treatment.

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1997. Impact of Blood Culture Fill Volumes

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Background. Historically, increases in blood culture (Bacteroid) fill volumes (FVs) have been shown to increase yield of Bacteroid and lower contamination rates. Low FVs are a common cause of false negative Bacteroid. 10 mL is considered an ideal FV for a Bacteroid. In 2015 and 2016, at North Shore University Hospital, FVs averaged <5 mL per Bacteroid. In 2017, several interventions were implemented to increase FVs, including convening informal meetings and seminars to educate nursing staff, educational pamphlet posters, placing 10–5 mL markings on Bacteroid bottles and using butterfly catheters and test tubes for collection. Our aim was to assess trends in overall yield (Y), contaminant and FVs.

Methods. Average FVs, positive Bacteroid quantities and organism identification were obtained from 2015 through 2017. Contaminants included bactillus, coagulase-positive staphylococcus, micrococcus and single sets of alpha-hemolytic streptococcus. Y was the number of positive sets, excluding contaminants, divided by the total number of Bacteroid FVs. Groupby yield (SY) was the number of positive sets in a subgroup divided by the total number of Bacteroid FVs. Trends in Y, SY, and contaminant were assessed using the Cochran Armitage Trend test. The one-way ANOVA test was used to assess differences between FVs by year.

Results. Y increased over the 2015–2017 period (Table 1: P < 0.0001). All SYs increased except for staphylococcus and anaerobes. Contaminants did not show a decreasing trend (Table 2: P = 0.9022).

Table 1. Yield by Year

| Year | Total BC ordered | Y | SY | P/Value |
|------|-----------------|---|----|---------|
| 2015 | 35,624          | 2.57 | 6.37 | <0.0001 |
| 2016 | 38,440          | 2.39 | 6.11 | <0.0001 |
| 2017 | 37,042          | 2.88 | 6.11 | <0.0001 |

*Includes staphylococcus and enterococcus.

Table 2. Mean FV by Year

| Year | Total BC ordered | Contaminants, % | Mean FV (SD), mL |
|------|-----------------|-----------------|------------------|
| 2015 | 35,624          | 2.57            | 4.32 (0.26)      |
| 2016 | 38,440          | 2.39            | 4.39 (1.39)      |
| 2017 | 37,042          | 2.88            | 6.11 (0.98)      |

Conclusion. BC FVs successfully increased with interventions implemented. While Y increased each year, an association between yield and FVs could not be determined due to small sample sizes. Further evaluation at quarterly intervals is ongoing and may help establish a correlation.

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1998. Urine Culture Incubation Time: One vs. 2 Days

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Background. One day incubation time for non-invasive urinary cultures makes the lab operation and workflow more efficient. However, it has been a matter of debate since striking a balance between confirmation of slow-growing pathogens, significant saving in labor and incubation space for large volume laboratories, or laboratories with total microbiology automation.

Methods. Only routinely collected urine cultures has been included in this study and invasive collection such as nephrostomy, straight or diagnostic catheter collection were excluded. SHSL urine culture procedure defines the workup cut off for uropathogenic organisms (300 CFU/mL). Total of 2,709 urine specimens were processed using W ASP automated plating system. 1 µL sterile loops were used to inoculate BAP/MAC bi-plates. Plates were incubated in 5% CO2 at 35°C for at least 18 hours and maximum 24 hours for the first day evaluation. All no-growth plates were examined with a regular bench top magnifier/light for evidence of growth, and if verified, they were incubated for an extra day of incubation. Organism identifications performed by Vitek MS instrument.

Results. Total of 501 out of 2,709 samples were determined No-Growth on the first day examination and after second day of incubation 435 stayed as No-Growth (86.8%), 66 samples (13.2%) indicated growth of normal Uro-Genital (UG) microbe and no uropathogenic organisms detected. Among those with growth 54 (10.8%) samples grew <10K, 10 samples (2.0%) grew 10-50K, and 2 samples (0.4%) [95% CI= 0.1% to 1.5%] grew >50K CFU/mL of normal UG microbiota.

Conclusion. Although small percentage with low level urogenital microbiota was missed on the first day of incubation, there were no uropathogenic organisms missed. Therefore, the 1-day incubation of routine urine culture plates in CO2, and careful examination of the plates appeared to have same efficiency of 2-day incubation in urine culture identification. One-day incubation saves time and space, and may help establish a correlation.

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1999. Performance of Pneumococcal Urinary Antigen Testing: Riding the Vaccination Waves?

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Background. Urinary antigen testing for Streptococcus pneumoniae (PAGT) is rapid, and can still be used days after initiation of antibiotic therapy or when conventional methods are failing. PAGT is recommended by international guidelines in severe community acquired pneumonia (CAP). The test attains an excellent specificity (>90%) in adults but shows a varying sensitivity (80–85%). We aimed to analyze the PAGT sensitivity in a population with blood culture proven invasive pneumococcal disease (IPD) and to study its performance for the different pneumococcal serotypes.

Methods. PAGT (BinaxNOW®, Alere®) was introduced in 2009 in a large secondary care hospital in Ghent, Belgium. PAGT is requested by the attending physician or when conventional methods are failing. PAGT is recommended by international guidelines in severe community acquired pneumonia (CAP). The test attains an excellent specificity (>90%) in adults but shows a varying sensitivity (80–85%). We aimed to analyze the PAGT sensitivity in a population with blood culture proven invasive pneumococcal disease (IPD) and to study its performance for the different pneumococcal serotypes.

Results. Over a 9-year period, (2009–2017), 235 bacteremia episodes in 234 patients were observed with an average of 26 episodes/year (range 12–36). 31/235 (13%) episodes occurred in pediatric patients. Most prevalent serotypes were 1, 12, 8, 3, 7, 9, 5, and 6 for the whole time period. PAGT was performed in 161/225 (69%), test execution for the individual most prevalent serotypes ranged from 55 to 86%.
prevalent serotypes >70% for types 1, 3, 7and 5, 50% for type 9 and <50% for types 12, 8 and 6. From 2014 on, disappearance of serotype 1 and a significant decrease in serotype 7 were observed.

Conclusion. A 70% compliance to the diagnostic algorithm for IPD was observed. PAgT detects C-polysaccharide (teichoic acid) on the pneumococcal cell wall. Differences in concentration for the individual serotypes have been described and may account for the varying sensitivity in our dataset. Introduction of 10/13-valent childhood pneumococcal vaccines (2014) in Belgium has changed the overall serotype distribution, also possibly leading to a shift in PAgT performance. A dynamic validation of PAgT accuracy remains warranted.

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2000. Rapid, Point-of-care Diagnosis of Tuberculosis with Novel Truenat Assay: Cost-Effectiveness and Budgetary Impact Analysis for India’s Public Sector

Methods. We used the CEPAC-International microsimulation model to compare four TB diagnostic strategies for adult, HIV-negative patients with suspected TB: (1) sputum smear microscopy in DMCs (SSM); (2) Xpert MTB/RIF in DMCs (Xpert); (3) Truenat in DMCs (Truenat DMC); and (4) Truenat in public healthcare facilities (Truenat POC). We projected life expectancy (LE), costs, incremental cost-effectiveness ratios (ICERs), and 5y budget impact of full scale-up. A strategy was cost-effective if its ICER was <$990/YLS (i.e., <50% of India annual per capita GDP).

Results. Compared with SSM, other strategies increased TB case detection >86%, was cost-effective and sometimes cost-saving compared with Xpert (Figure 1). Compared with Xpert, Truenat DMC decreased LE and cost, but Truenat POC improved LE by 0.3 years with ICER $210/YLS (Table 1).

Conclusion. When used at the point of care, Truenat for TB diagnosis should improve linkage to care, increase LE, and be cost-effective compared with SSM or Xpert and, thus, should be more widely utilized in India.

Table 1: Clinical impact, costs, and cost-effectiveness of TB diagnostic strategies among patients with suspected TB seeking care in India’s public sector.

Table 2: TB burden included in the budget impact projection for each category. The calculations were made using exact numbers before rounding to the nearest $1 million for display in the figure.

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2001. Susceptibility of Aerococcus urinae to Fluoroquinolones: Broth Microdilution and Gradient Diffusion

Methods. The susceptibility of Aerococcus urinae to fluoroquinolones was determined by the broth microdilution method according to the Clinical and Laboratory Standards Institute (CLSI;document M07-A7, 2011) for broth microdilution using 96-well microtiter plates. Minimal inhibitory concentrations (MIC) were determined by the broth microdilution method using 96-well microtiter plates. The broth dilution method was performed in triplicate and the results were interpreted according to the CLSI guidelines. The MIC values were determined by visual inspection of the growth inhibition pattern and were recorded in each well counted as the lowest concentration of drug that resulted in complete inhibition of growth compared to the drug-free control values. MIC values were recorded as the lowest concentration of drug that resulted in complete inhibition of growth compared to the drug-free control values. MIC values were recorded as the lowest concentration of drug that resulted in complete inhibition of growth compared to the drug-free control values.