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**Evaluation of two automated urinalysis systems as primary screening method in urine samples compare with urine culture**

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**Background:** Urinary tract infections are the most common infections in both hospitalized and community patients and are associated with high morbidity and costs. Therefore a rapid and reliable screening method would be useful to screen out negative samples, in order to reduce the time of analysis, workload, and costs. The aim of this study was to compare the diagnostic performance of the Sysmex UF-1000i (TOA Medical Electronics, Japan) and the FUS200 (Changchun Dirui Industry, China) systems with the gold standard, urine culture.

**Material/methods:** between March and June 2016, a total of 1,220 urine samples from inpatients and outpatients were tested in the Clinical Microbiology Laboratory at Miguel Servet Hospital. All urine specimens were tested in parallel by culture and UF-1000i and FUS200 cytometer analyzers. The urine specimens were cultured by The WASP® (Copan) on Brilliance UTI agar (Oxoid Ltd). Cultures were incubated at 35°C for 18-24 hours. Growth of >10<sup>5</sup> CFU/mL was considered positive. Grown colonies were identified by MALDI-TOF (MALDI Microflex LT, Bruker Daltonics). Statistical analysis was carried out by SPSS® vs 21.0. To determine the best cut-off values, the ROC curve technique for bacteria and white blood cells (WBCs) were performed. Sensitivity (Se), Specificity (Sp), Positive predictive value (PPV) and negative predictive value (NPV) at the best cut-off values for bacteria and

WBCs were also calculated considering the urine culture as the reference. We also investigated whether a combination of cut-off values for bacteria and/or WBCs might improve the combination of sensitivity and specificity.

**Results:** 1,220 urine samples were included, 650 from outpatients and 476 from hospitalized patients. Two hundred and thirteen (17.4%) of all cultures were positive. E. coli was the most commonly isolated with a percentage of 62%. ROC curves were used to set cut-offs for a positive culture. Overall, the area under the curve (AUC) for bacteria was greater than for WBCs as a predictor of culture results. The most balanced cut-off values and the combined model using both bacteria and/or WBC cut-off together for the two techniques are depicted in the table above. Processing speed was 120 samples/hour in FUS200 and 66 samples/hour in UF1000i. The decrease in plates could be 37.4% in FUS200 and 58.3% in UF1000i.

Technique		AUC	Cut-off	Se	Sp	PPV	NPV
UF1000i	Bacteria	0.943	89.4	94.8%	69.2%	39.5%	98.4%
	WBC	0.832	3.8	94.8%	36.7%	24.1%	97.1%
	Bac-WBC		138-119.8	95.3%	70.4%	40.5%	98.6%
FUS200	Bacteria	0.864	1.4	95.8%	45.3%	27%	98.1%
	WBC	0.834	2.1	93.9%	33.4%	22.9%	96.3%
	Bac-WBC		5.7-4.3	95.8%	44.4%	26.7%	98%

**Conclusions:** This study shows that both techniques improve the workflow in laboratory, UF1000i by the highest specificity at any sensitivity and FUS used less processing time. These systems contribute to the reduction of unnecessary urine cultures.