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Impact of rapid antimicrobial susceptibility test Accelerate Pheno™ in antimicrobial stewardship of sepsis

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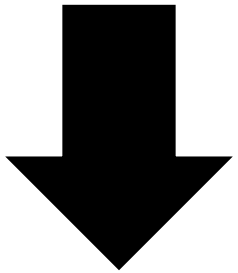
L0001

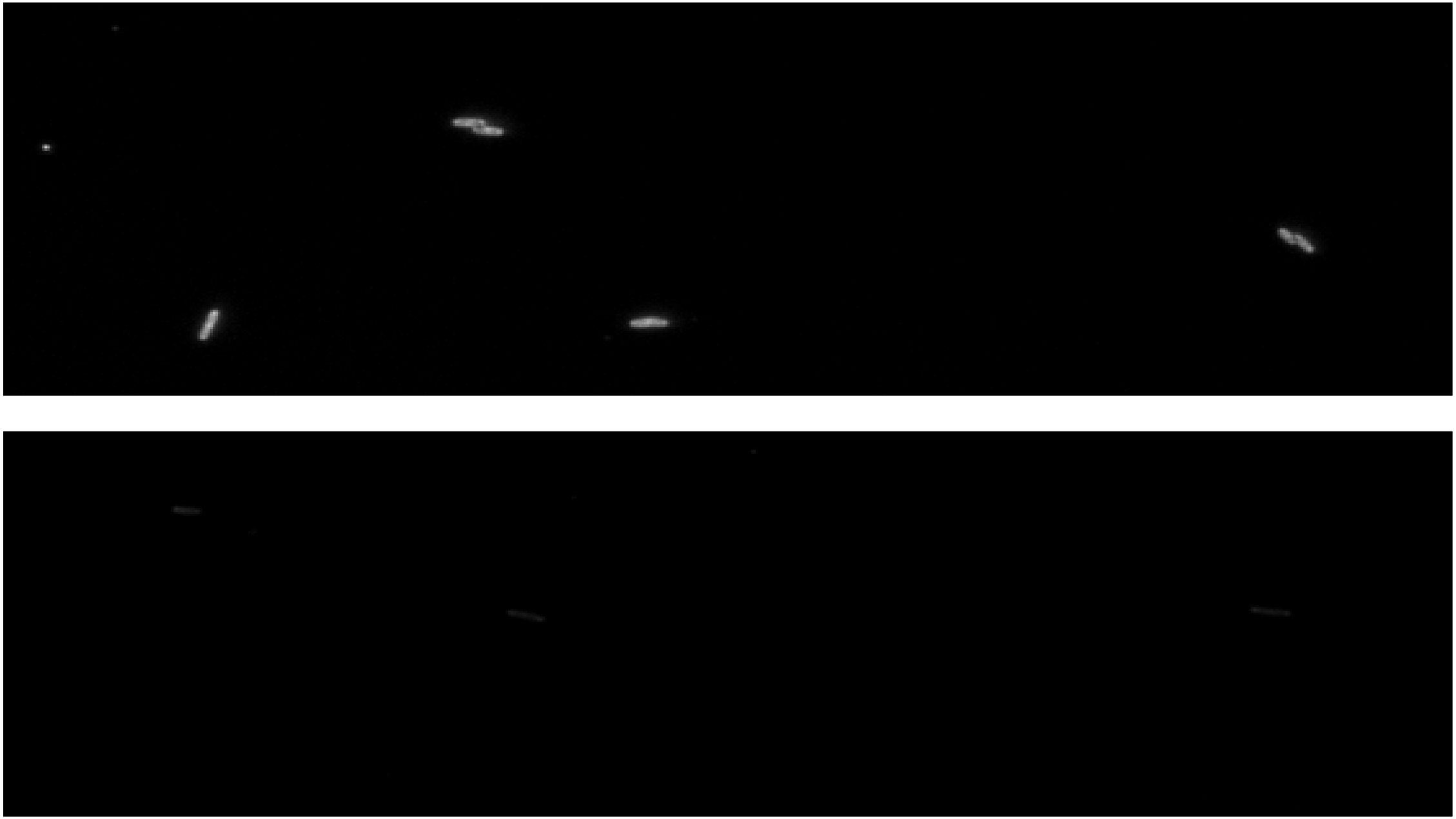
Sepsis

- Life-threatening time-dependent disease
- Effective therapy in MDRO era



RAPID ETIOLOGIC DIAGNOSIS

Singer *et al*., 2016



Accelerate Diagnostics, Tucson, AZ

Accelerate Pheno™: identification

GRAM POS

Staphylococcus aureus

CoNS

Enterococcus faecalis

Enterococcus faecium

***Streptococcus* spp.**

GRAM NEG

Escherichia coli

***Klebsiella* spp.**

Serratia marcescens

***Proteus* spp.**

Pseudomonas aeruginosa

Acinetobacter baumannii

***Enterobacter* spp.**

***Citrobacter* spp.**

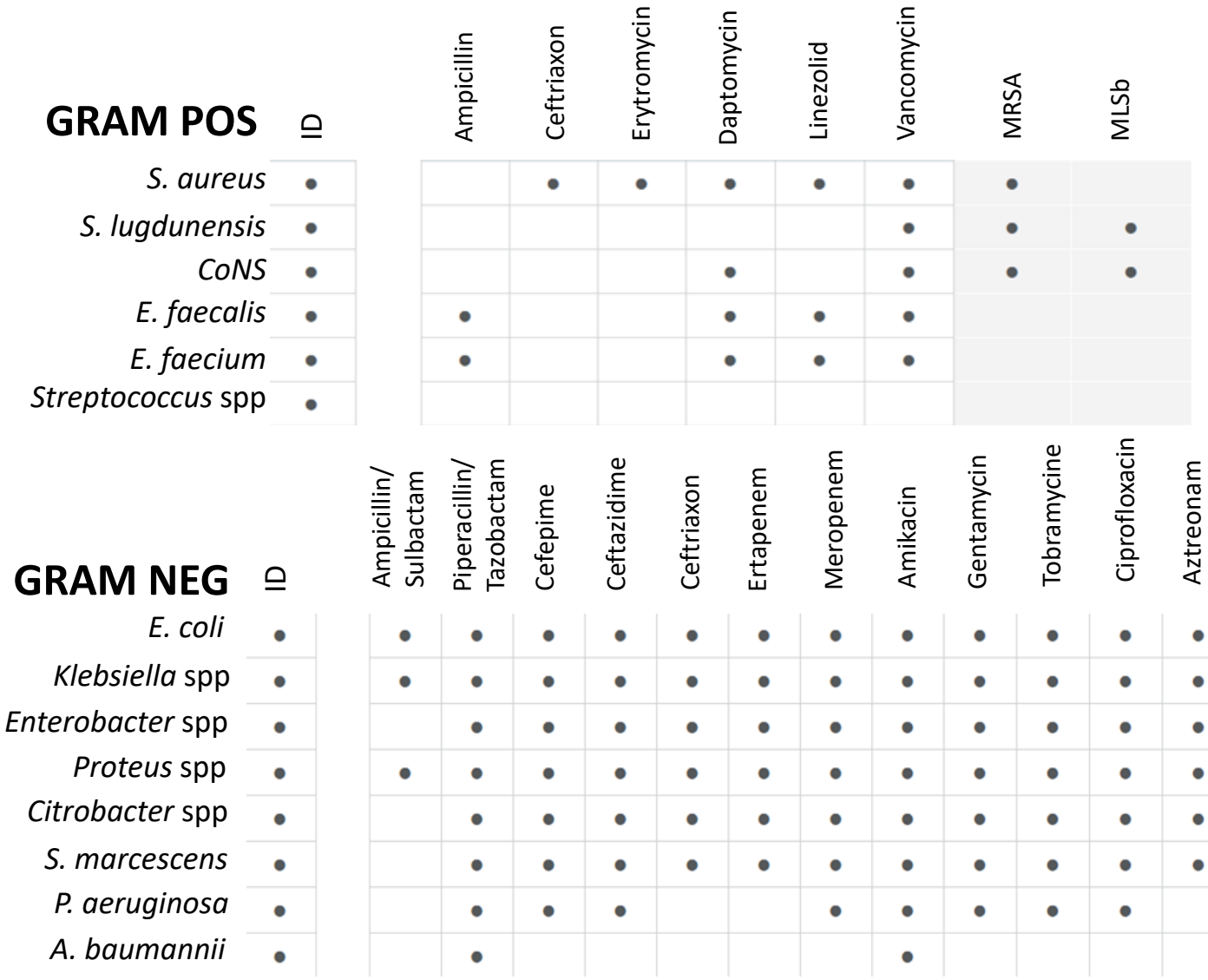
FUNGI

Candida albicans

Candida glabrata

Accelerate Diagnostics, Tucson, AZ

Accelerate Pheno™: antimicrobial susceptibility

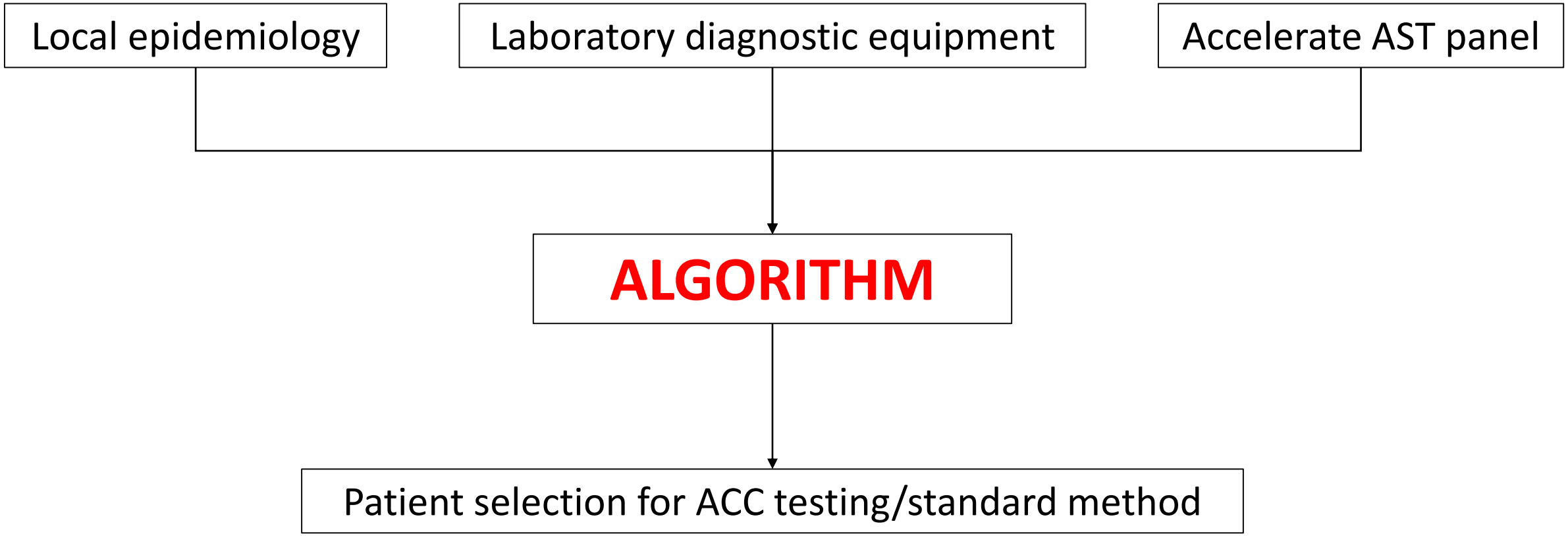


Accelerate Diagnostics, Tucson, AZ

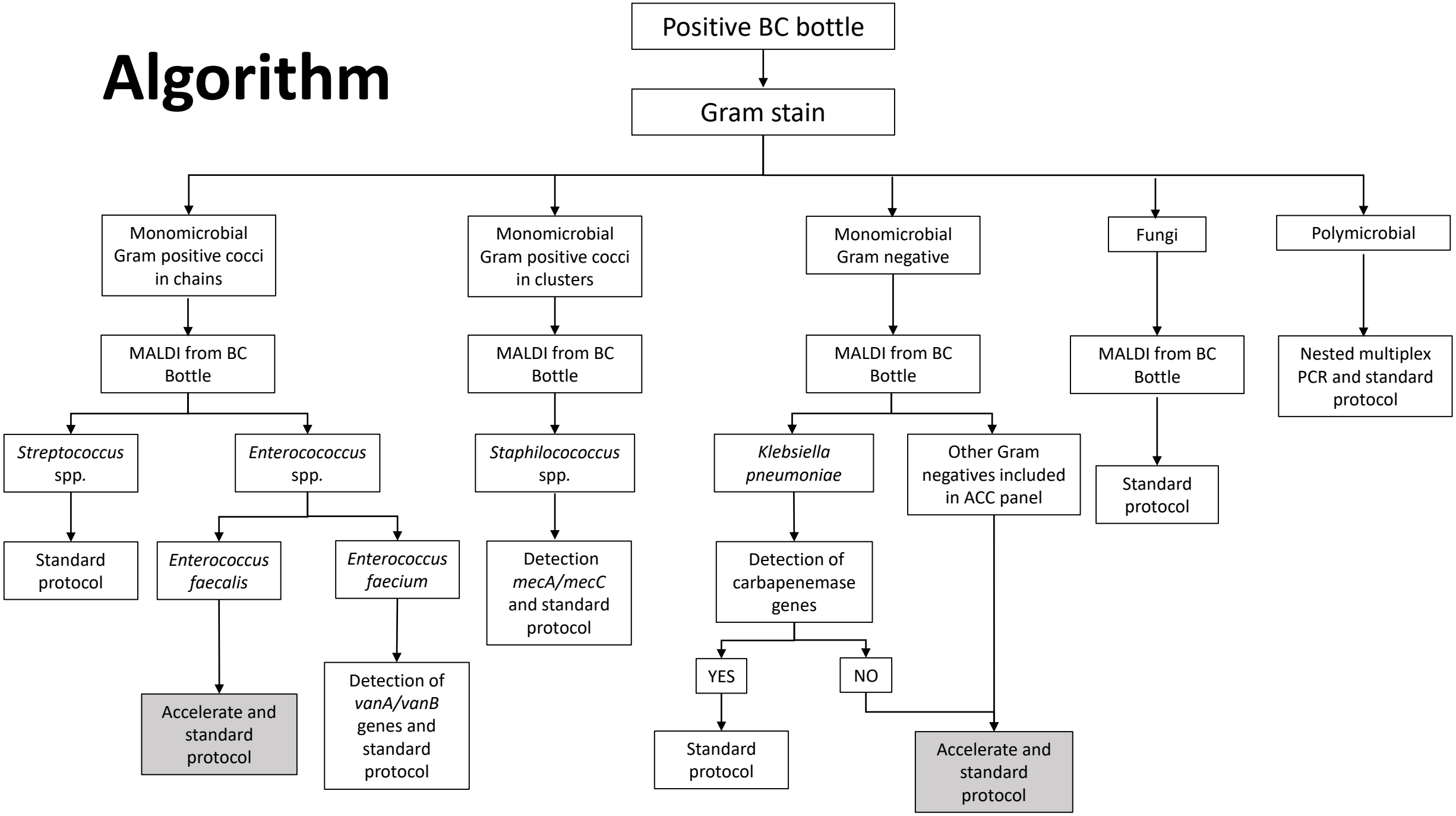
Aim of the study

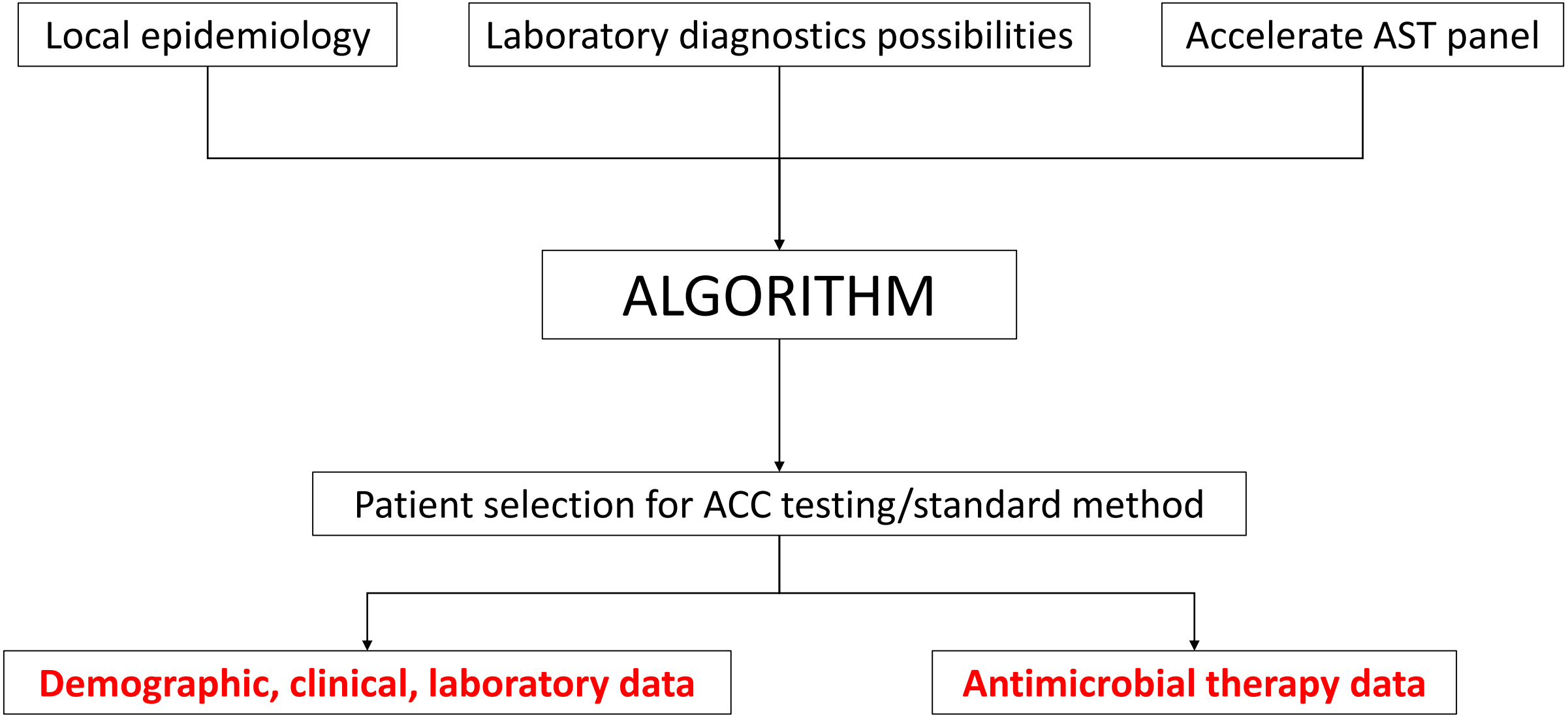
To verify how the use of the Accelerate Pheno™ could impact on management of patients with sepsis and promote AS programs

Materials and Methods



Algorithm


Positive BC bottle
Gram stain
Monomicrobial Gram positive cocci in chains
MALDI from BC Bottle
Streptococcus spp.
Standard protocol
Enterococcus spp.
Enterococcus faecalis
Accelerate and standard protocol
Enterococcus faecium
Detection of vanA/vanB genes and standard protocol
Monomicrobial Gram positive cocci in clusters
MALDI from BC Bottle
Staphilococcus spp.
Detection mecA/mecC and standard protocol
Monomicrobial Gram negative
MALDI from BC Bottle
Klebsiella pneumoniae
Detection of carbapenemase genes
YES
Standard protocol
NO
Other Gram negatives included in ACC panel
Accelerate and standard protocol
Fungi
MALDI from BC Bottle
Standard protocol
Polymicrobial
Nested multiplex PCR and standard protocol

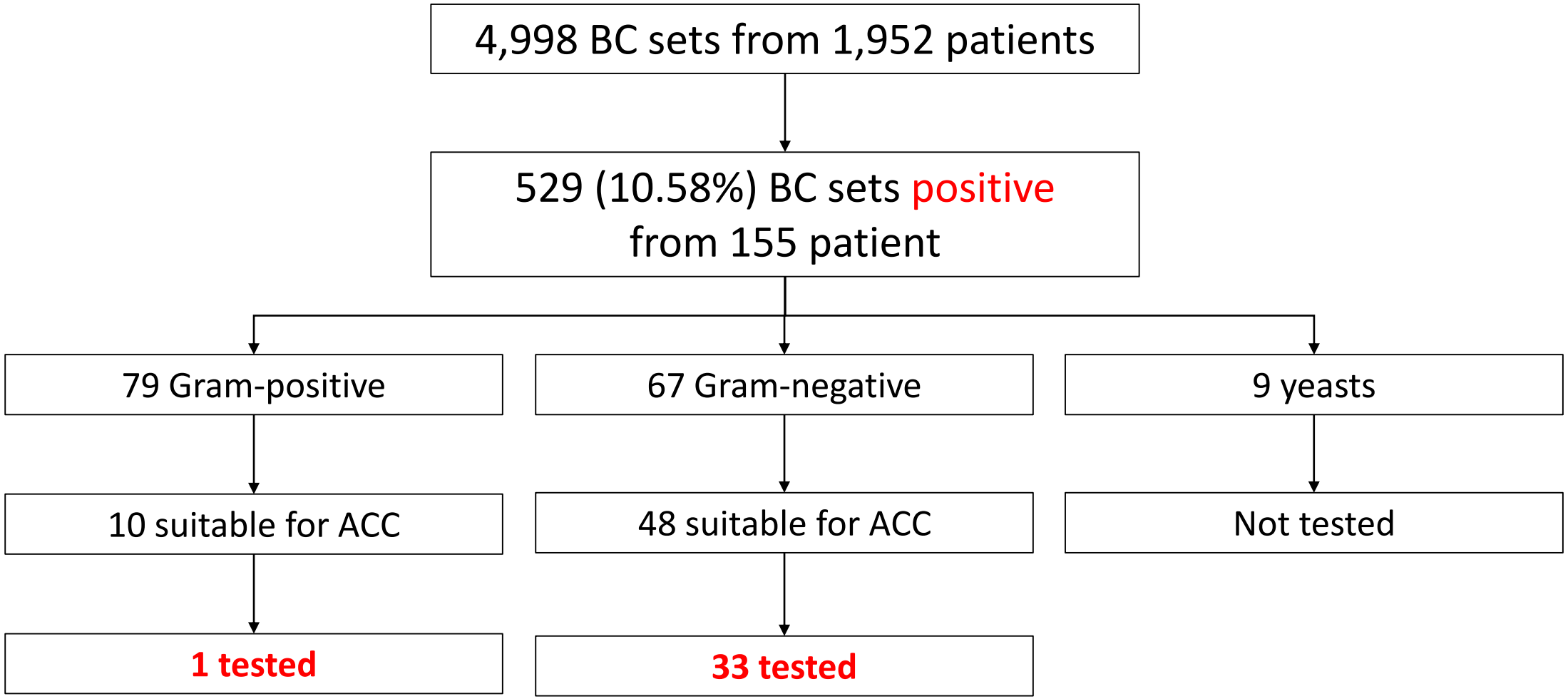

Local epidemiology
Laboratory diagnostics possibilities
Accelerate AST panel
ALGORITHM
Patient selection for ACC testing/standard method
Demographic, clinical, laboratory data
Antimicrobial therapy data

Evaluation of:

- Accuracy of Accelerate Pheno™
- Time to report compared to standard protocol
- Impact on therapeutic decisions

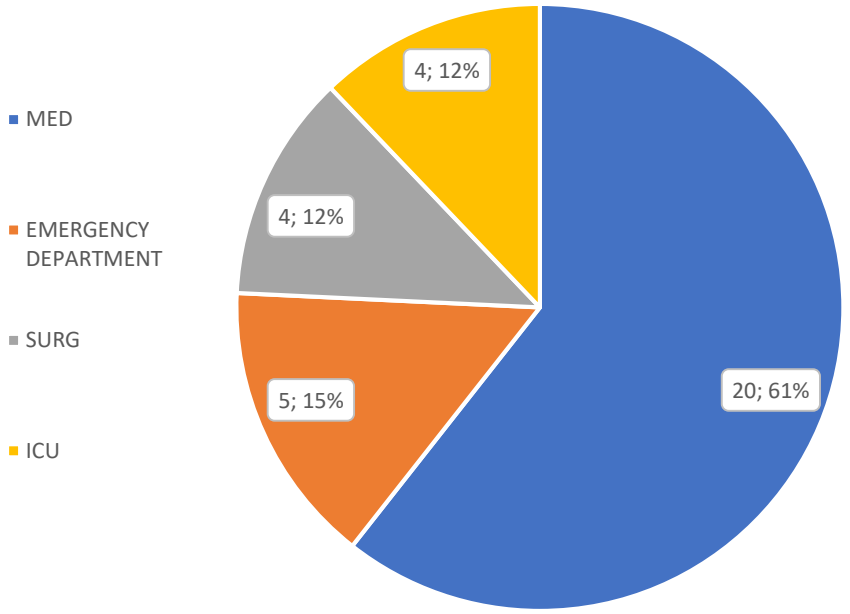
Results

October 1, 2018 - January 31, 2019



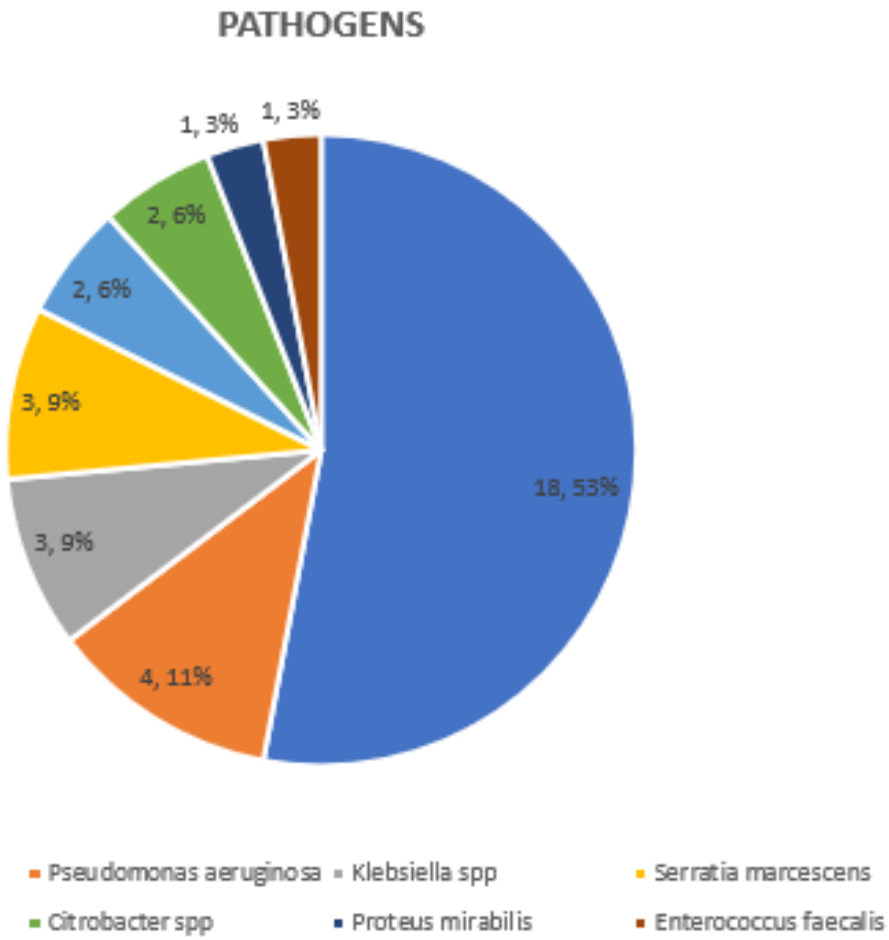
Patient population

Variable	Value
Patients	34
Years, median (IQR)	73 (69-80)
Men	16 (47.06)
Hospital ward	
Medicine	15 (44.12)
Hematology/BMT	6 (17.65)
Surgical	4 (11.76)
Intensive Care	4 (11.76)
Emergency Department	5 (14.71)
Laboratory parameters	
Leucocytes, cells x10^3/mL, Median (IQR)	12.15 (3.14-16.57)
Leukocytosis, >12 x10^3/mL	20 (60,6)
Leucopenia, <4 x 10^3/mL	10 (30.3)
Neutrophils percentage, Median (IQR)	87.8 (79.22-92.28)
PCR, mg/dL, Median (IQR)	8.35 (5.0-17.2)
PCT, ng/mL, Median (IQR)	27.02 (3.25-47.35)
Lactate, mM/L, Median (IQR)	2,65 (1.1 – 4.5)
Clinical data	
Body temperature, °C, Median (IQR)	38.25 (37.3-38.6)
Temperature >38°C	17 (51.52)
Temperature <36°C	6 (18.18)
Heart rate, beats/min, Mean ± SD	96.5 ±19.14
Mean Arterial Pressure, mmHg, Mean ± SD	75.17 ±18.62
Septic shock	9 (27.27)
SOFA Score	**Median (IQR) 7.00 (5.00-10.00)**
Concomitant diseases	
Hypertension	18 (54.55)
History of CV Disease	13 (39.39)
Chronic Renal Failure	12 (36.36)
Malignancy	12 (36.36)
Diabetes	9 (27.27)
Chronic Lung Disease	8 (24.24)
Dyslipidemia	5 (15.15)
Chronic Liver Disease	3 (9.09)
Dementia	2 (6.06)

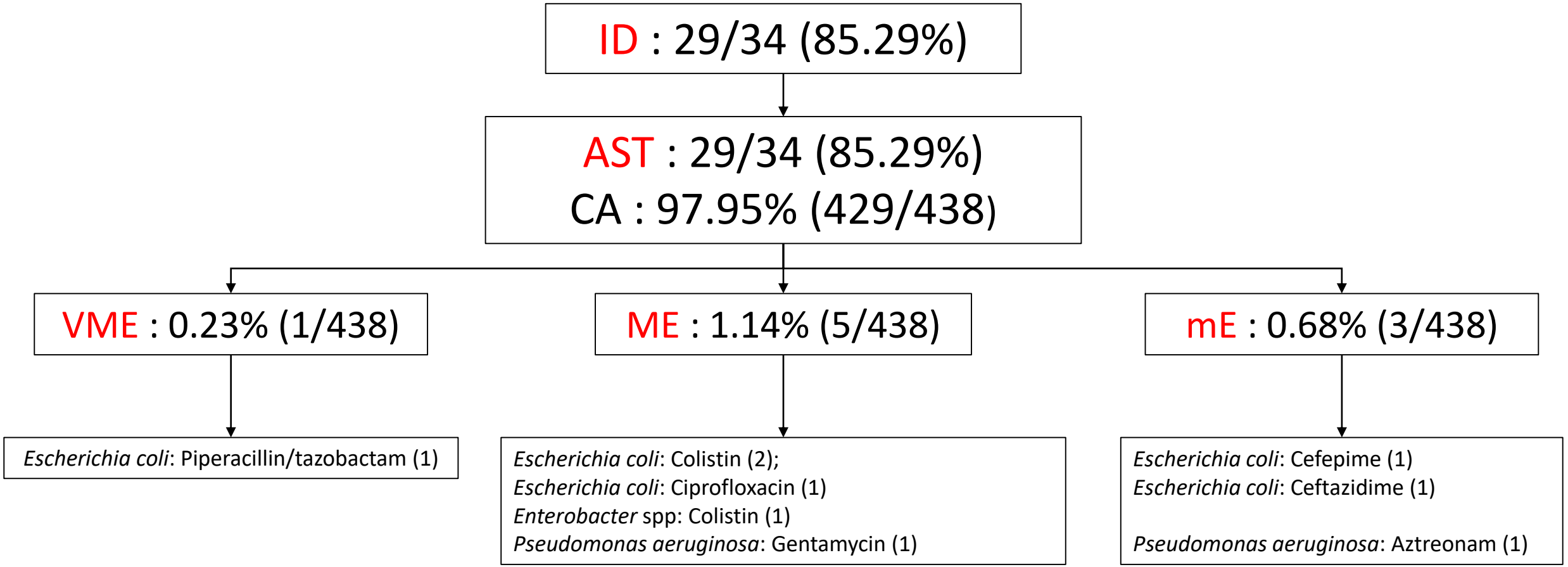


Tested bacterial isolates

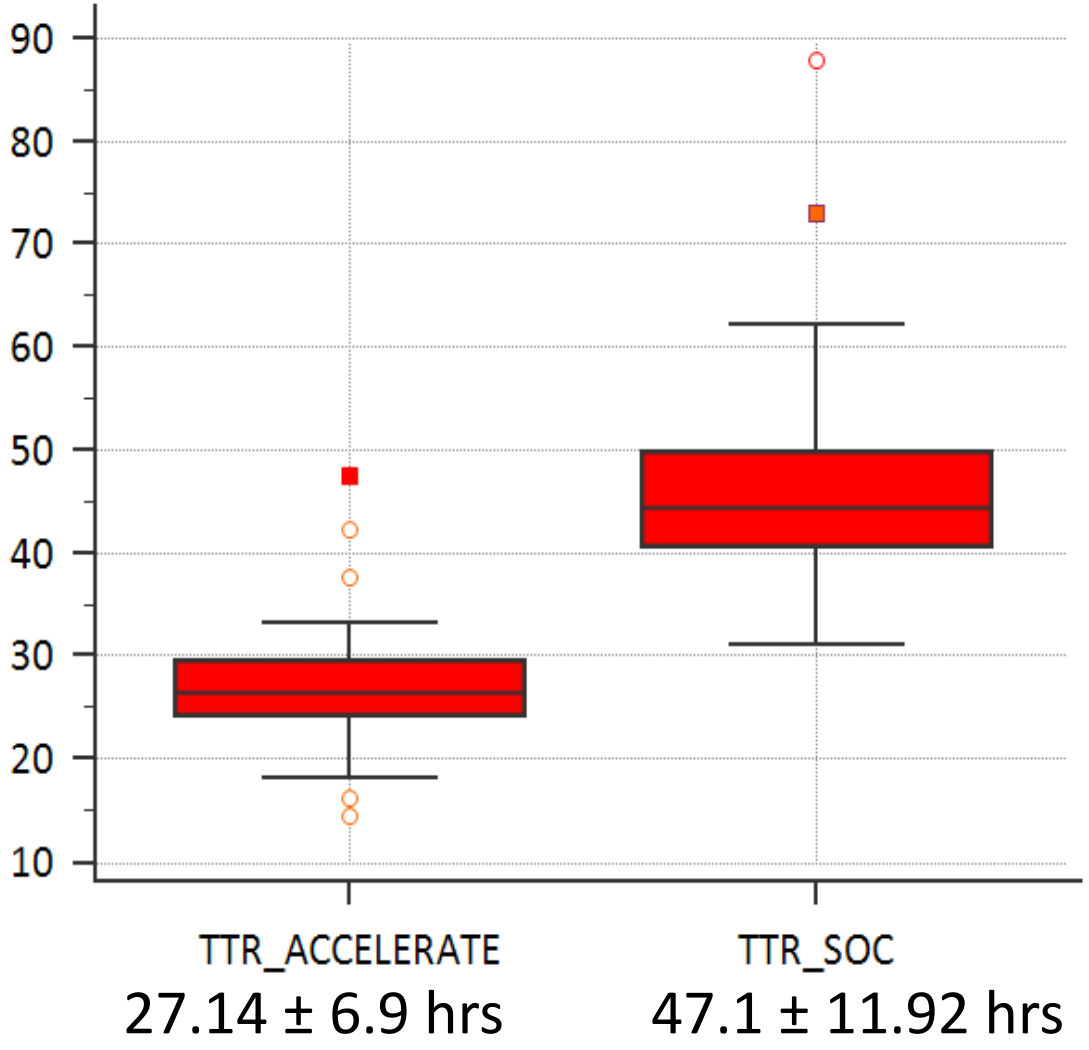
Bacterial species	Isolates	Isolates suitable for ACC testing according to the algorithm	Isolates tested by ACC
Escherichia coli	24	24	18
Klebsiella pneumoniae	12	6	3
Pseudomonas aeruginosa	4	4	4
Enterobacter spp	4	4	2
Serratia marcescens	4	4	3
Proteus spp	2	2	1
Klebsiella oxytoca	2	2	0
Citrobacter spp	2	2	2
Others not included in ACC panel	13	0	0
Total	**67**	**48**	**33**



Accuracy of Accelerate Pheno™



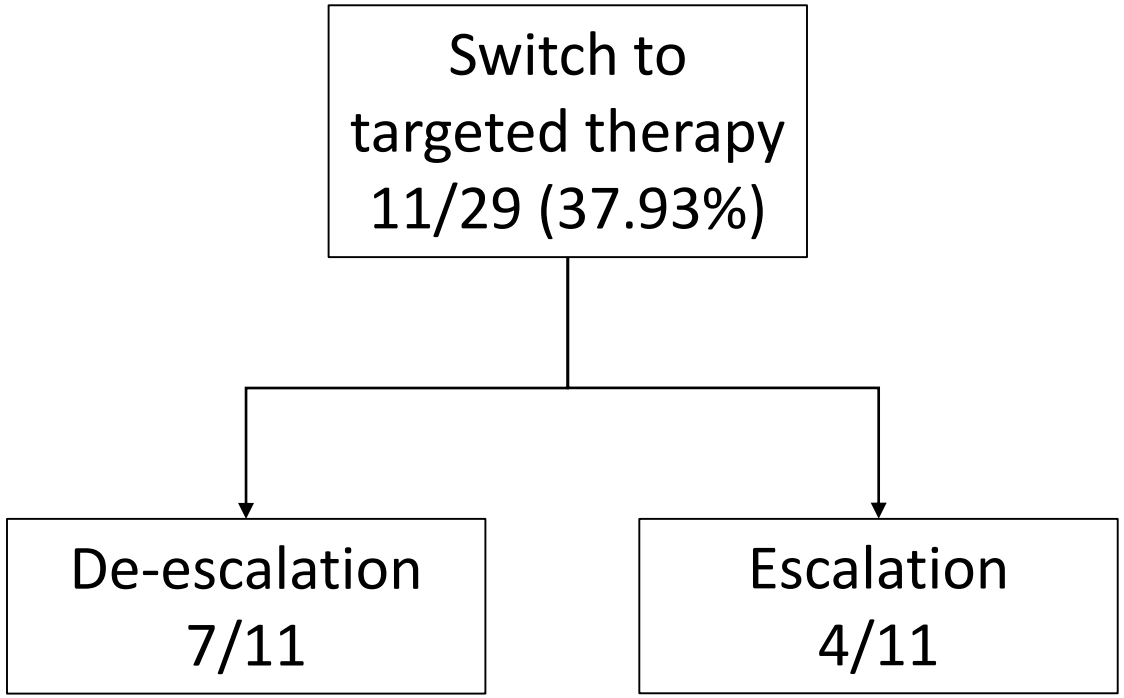
Reduction of time to report



Δ = 19.96 hrs
95% CI: 24.71 – 15.22

$p < 0.001$

Impact on clinical management of patients



Time to switch:
34.97 ± 22.04 hrs

VS

Inferior to the standard time to report
47.1 ± 11.92 hrs

Why?

- Lack of antimicrobial stewardship programs
- Lack of a multidisciplinary «sepsis team»
- Lack of therapeutic decision soon after laboratory results

Conclusions

- ACC reduces time to report
- ACC reduces time to switch
- ACC can impact on broad-spectrum antibiotic sparing

- **Antibiotic Stewardship Programs**
- **Sepsis team and Microbiology laboratory 24/7**