

# Gaps and systemic barriers in the diagnosis of infections: A multi-country assessment

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## Background:

- In 2019, 1.27 million deaths were attributed to anti-microbial resistance (AMR)<sup>1</sup>
- **Effective curtailment strategies are required to limit worldwide morbidity, mortality and economic costs on the healthcare system.**<sup>1</sup>



### Reference:

1. Antimicrobial Resistance Collaborators "Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis". Lancet 2022; 399(10325): 629-655.



*This educational and behavioral needs assessment **investigated gaps and challenges in the utilisation of diagnostic tools** as a strategy to manage infections in four countries  
**(France, USA, Mexico, and India)***

## Disclosure:

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## Methods & Sample:

### Phase 1: Qualitative exploration

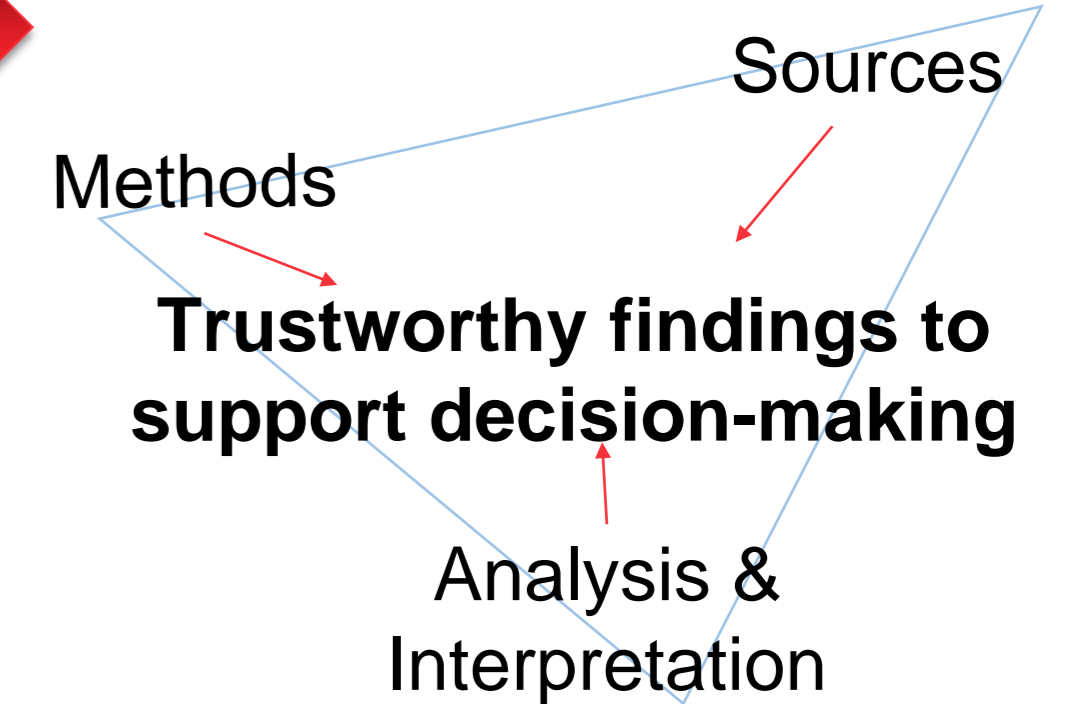
- 45-minute telephone interviews
- Thematic analysis (NVivo)

### Phase 2: Quantitative validation

- 20-minute online survey
- Cross-tabulations + chi-square tests (SPSS)
- Paired t-tests (SPSS)
  - Gap = current knowledge / skill level is LESS than ideal (example below)



### Phase 3: Triangulation<sup>1</sup>



Qualitative sample by country & profession

	FR	IN	MEX	USA	Totals
CP	0	0	2	2	4
CPO	2	2	0	0	4
ID	2	2	3	2	9
CM	2	2	2	2	8
ICS	2	2	2	2	8
<b>Totals</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>32</b>

Quantitative sample by country & profession

	FR	IN	MEX	USA	Totals
CP †	13	10	10	16	49
CPO †	14	11	11	14	50
ID	20	20	21	26	87
CM	20	21	20	21	82
ICS	21	21	20	20	82
<b>Totals</b>	<b>88</b>	<b>83</b>	<b>82</b>	<b>97</b>	<b>350</b>



#### Reference:

1. Turner, Scott F., Laura B. Cardinal, and Richard M. Burton. "Research design for mixed methods: A triangulation-based framework and roadmap." *Organizational Research Methods* 2017; 20(2):243-267.

**Legend:** FR=France; IN=India; MEX=Mexico; USA=United States of America;

CP=clinical pharmacist, CPO=clinical pharmacologist, ID=infectious disease physician, CM=clinical microbiologist, ICS=infection control specialist

† active role in prescription of antibiotics

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## Results:

- **Knowledge gaps** of procalcitonin and rapid diagnostic tools (RDTs) **Darker orange = greater gap**

Gaps (differences between current – ideal level of knowledge on 1-5 scale)

Knowledge gap regarding the role of ...	FR	IN	MEX	USA	ID	CM	CPO	CP
Procalcitonin in determining the likelihood of a bacterial infection	<b>0.99</b>	<b>0.98</b>	0.55	0.63	0.62	0.78	<b>1.12</b>	0.74
RDT in the diagnosis of bacterial infections	<b>0.98</b>	<b>0.97</b>	0.53	0.56	0.72	<b>0.84</b>	<b>0.92</b>	0.49
RDT in the diagnosis of viral infections	<b>0.92</b>	<b>0.95</b>	0.52	0.61	0.64	<b>0.84</b>	<b>1.02</b>	0.49

- **Similar level of skill gap** when using these tools

- **Systemic barriers** to using rapid molecular diagnostic techniques, especially in resource-limited settings

### Additional barriers reported:

- ✓ **Shortage of HCPs** - 52% of those surveyed
- ✓ **COVID-19 pandemic** - 79% of those surveyed



*“There are new tools with molecular techniques [...] But they should be more accessible, because they’re very expensive. Really, really expensive.”*

- Infectious control specialist, Mexico



*“... it has not necessarily reached the hospital. I am thinking for example about rapid molecular diagnostic techniques ...”*

- Infectious disease physician, France

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## Results:

### ➤ Approaches to diagnosing and initiating antibiotic therapies varied by country

**Case:** Patient with ventilator-associated pneumonia. Suspect of gram-negative nosocomial infection. Busy intensive care unit. New hospital.

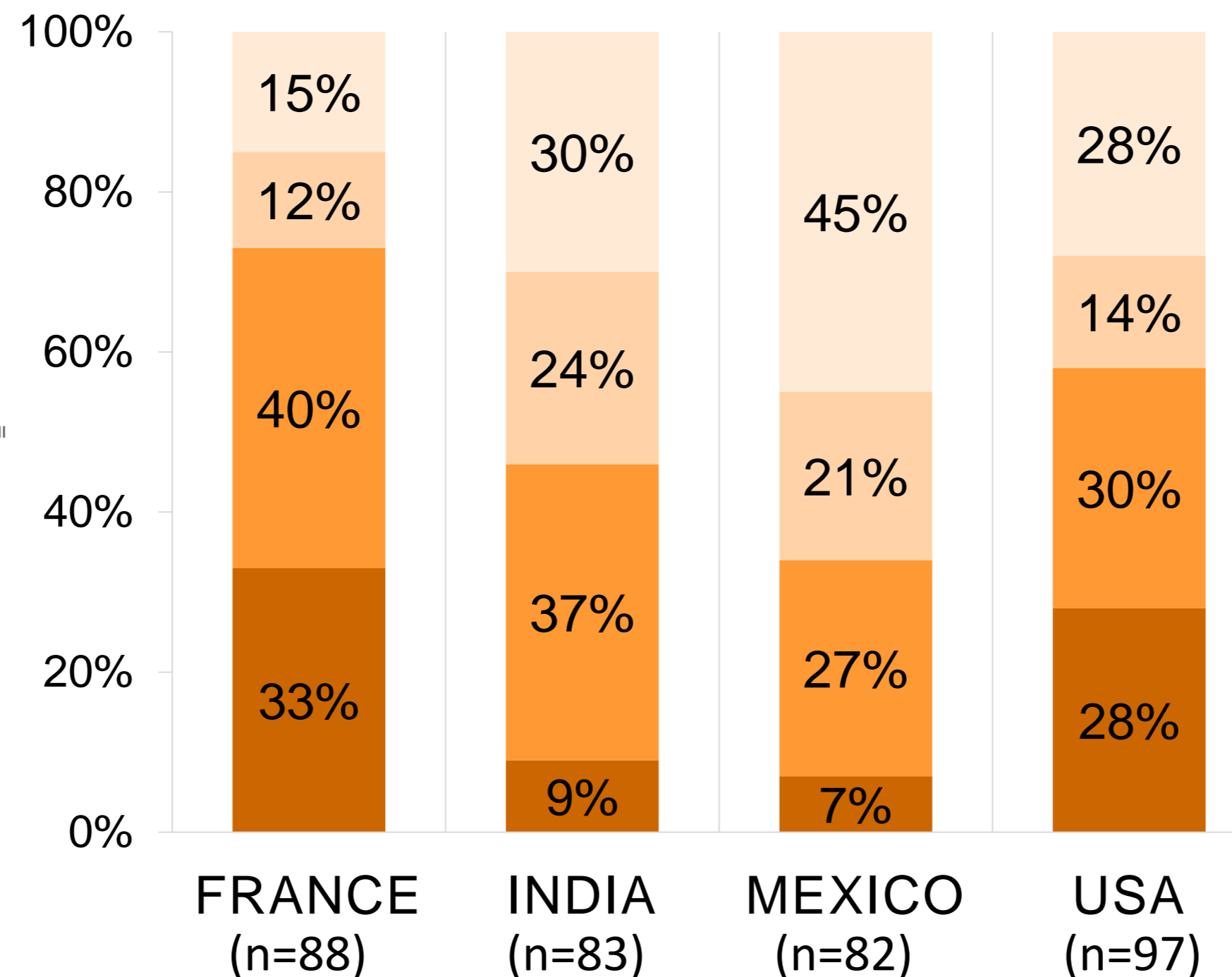
**Question:** Which of the following steps would be best to optimize patient treatment?

A) Initiate broadest spectrum antibiotics (e.g., carbapenem)

B) Initiate combination antibiotics to cover for pseudomonas aeruginosa

C) Evaluate hospital antibiogram/AST prior to initiation of antibiotics

D) Evaluate gram stain, obtain culture and ask for hospital antibiogram/AST prior to initiation of antibiotic



## Conclusions:

- **Identification of knowledge/skill gaps and systemic barriers in the utilisation of diagnostic tools**
- **Country variations may be due to differing policies, funding and professional development opportunities**
- **Essential to understand factors impacting AMS implementation, different diagnostic and treatment approaches to tailor interventions locally**