



Enabling Better Infection Differentiation

USING INFLAMMATION MARKER PANELS
TO DETERMINE BACTERIAL VS. VIRAL ORIGIN

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Dedication to the IVD industry?

We I.V.DO that TM

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Featured Speakers



Anthony Austin

GLOBAL MARKETING MANAGER

R&D, Manufacturing, Analytical
and Product Management



Gerben Zuiderveld

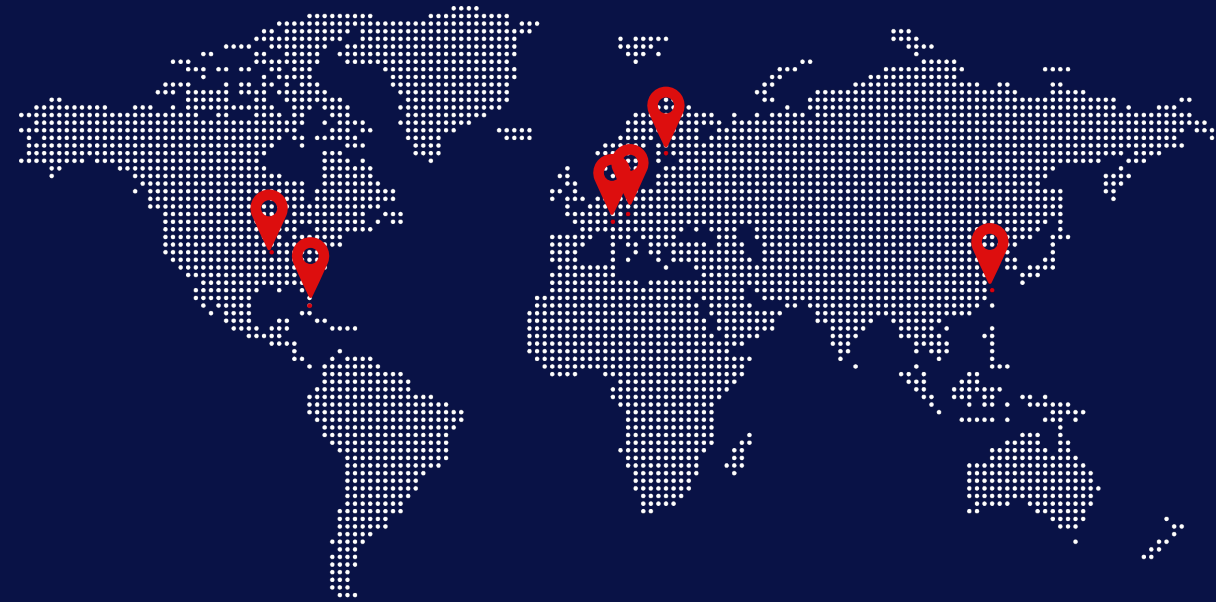
SENIOR GLOBAL PRODUCT MANAGER

Allergy, Autoimmunity and
Infectious Diseases Expert



Independent, International, and Industry-Leading IVD Raw Materials Supplier

- Provider of high quality antibodies, antigens, proteins, enzymes
- Experts in immunoassays, clinical chemistry, molecular diagnostics
- Our portfolio is among the most comprehensive in the IVD industry
- Enabling our customers to develop and manufacture quality, IVD tests





Outline

Differential diagnosis is difficult and subjective

Dangers in getting it wrong

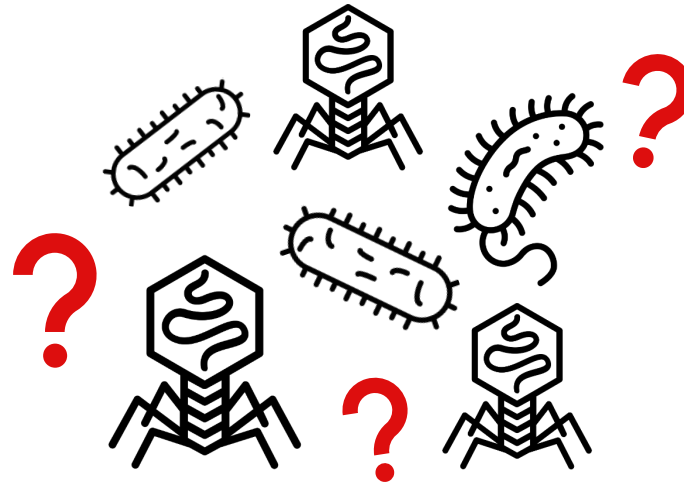
Biomarker panel testing supports better outcomes

Bacteria vs. Virus – What's the Difference?

Virus	Bacteria
Non-living	Living
Require host cells to reproduce	Ubiquitous in nature, serve many purposes
Submicroscopic	Microscopic
Systemic infection	Localized infection typical
Examples of diseases Influenza, common colds, chicken pox, viral gastroenteritis, COVID-19	Examples of diseases Tuberculosis, food poisoning, lyme disease, tetanus, many more
Treatment <ul style="list-style-type: none">• Antiviral• Symptom relievers	Treatment <ul style="list-style-type: none">• Antibiotics• Symptom relievers

Bacteria vs. Virus – Differential Diagnosis

Currently, differential diagnosis is subjective



Improper diagnosis can lead to antimicrobial resistance or sepsis!

Symptom

Length of illness^{1,4}

Color of mucus²

Observing throat³

Fever⁴

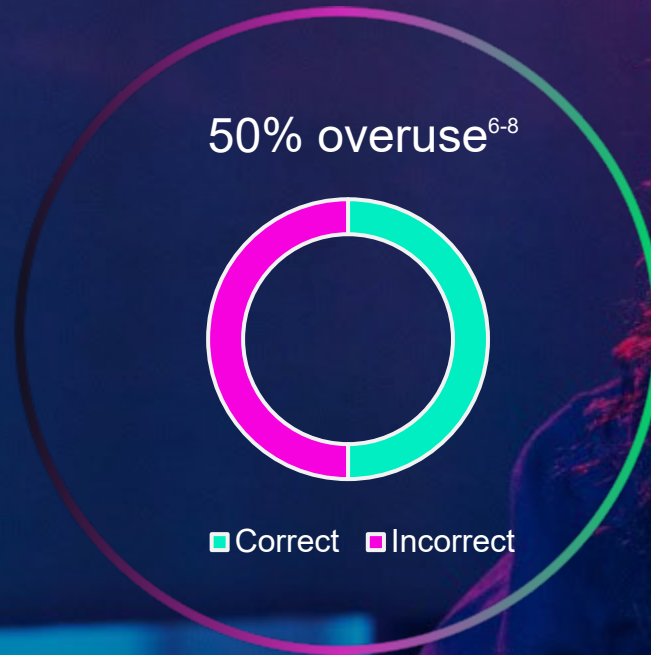


“

Antimicrobial resistance (AMR) is one of the top 10 global public health threats facing humanity. One of the most important drivers of AMR include the misuse and overuse of antimicrobials. The cost of inaction to stem AMR could cost the global economy \$100 trillion annually by 2050.

- World Health Organization (WHO)

**How often
according to
literature are
antibiotics
misused?**

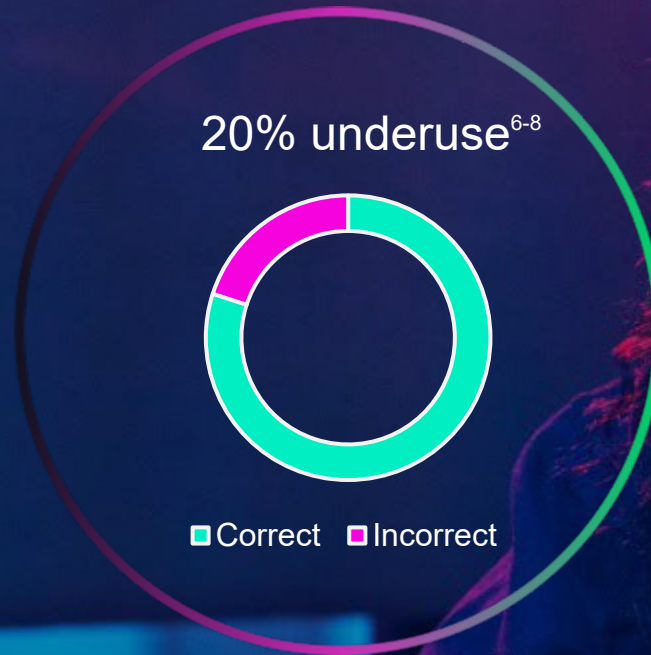


When the
infection is
viral

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**How often
according to
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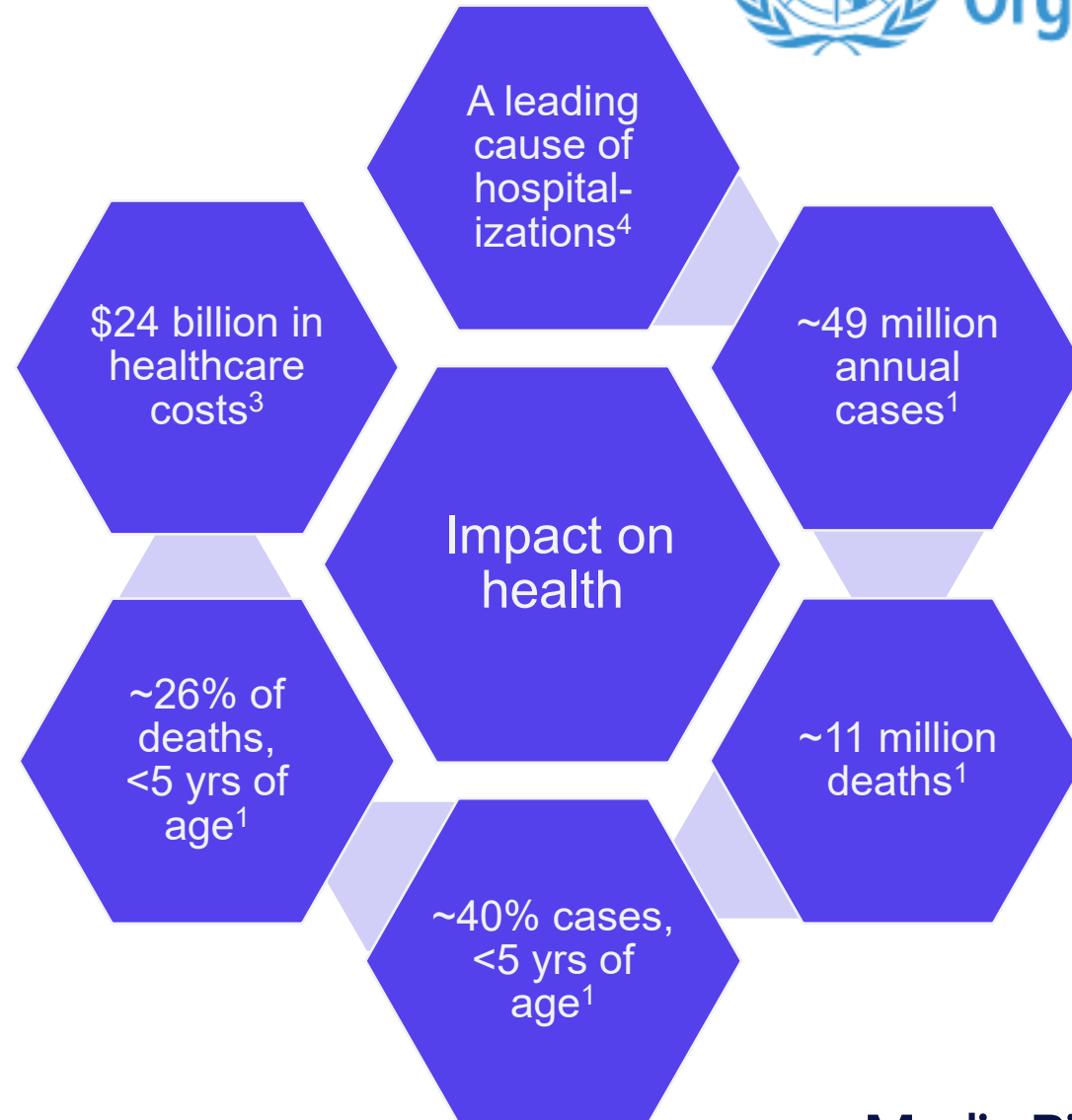
When the
infection is
bacterial

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Sepsis

remains a deadly and expensive global threat



Marker Panels

C-Reactive Protein

Serum Amyloid A

Interleukin-6

Procalcitonin

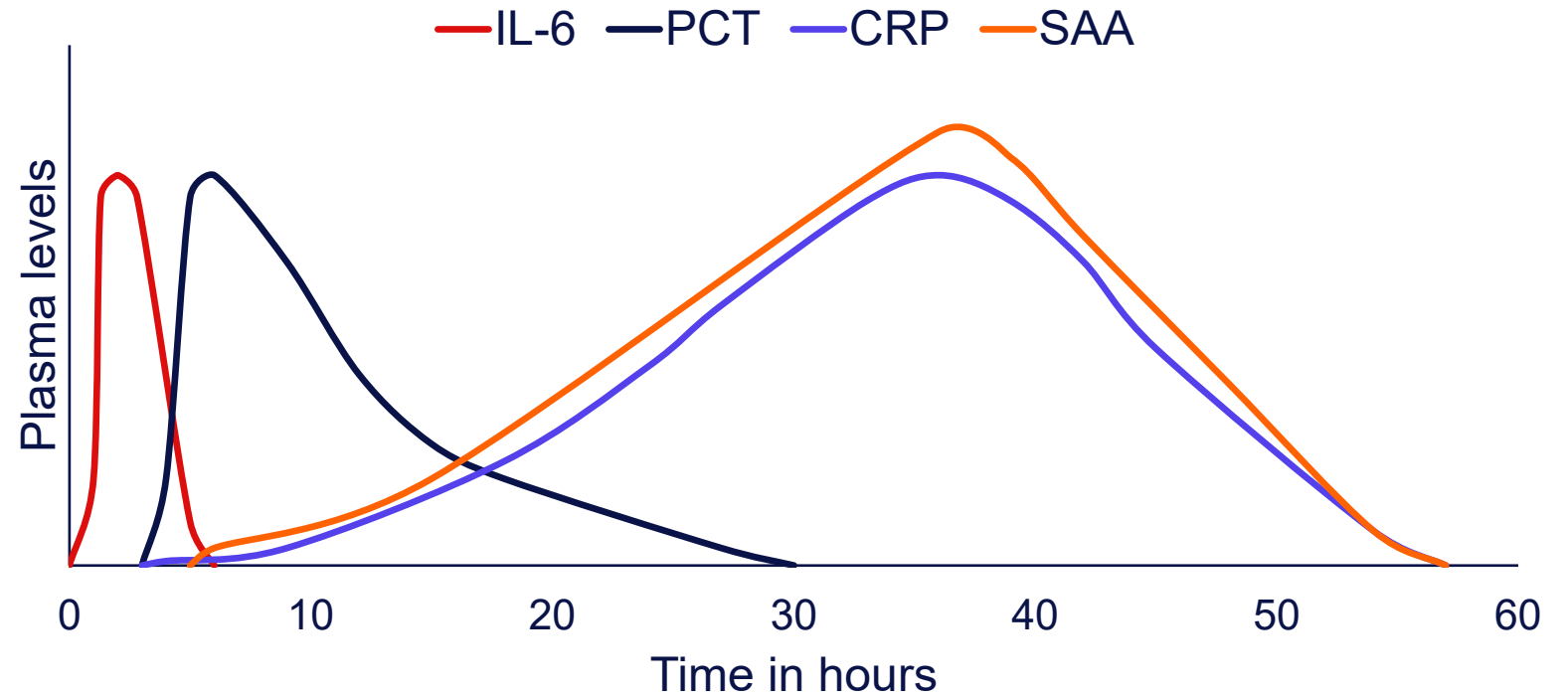
TRAIL

IP-10

NGAL

Inflammation Kinetics

Inflammation Kinetics



For illustrative purposes only

Graph adapted from publications:

- Gabay, Cem & Kushner, Irving Acute-Phase Proteins and Other Systemic Responses to Inflammation The New England journal of medicine P 1999/03/0
- Niehues T . C-reactive protein and other biomarkers—the sense and non-sense of using inflammation biomarkers for the diagnosis of severe bacterial infection. LymphoSign Journal. 5(2): 35-47
- Meisner M., J Lab Med 1999;23:263-72 came from VIDAS B.R.A.H.M.S Procalcitonin (PCT).| bioMérieux Clinical Diagnostics (biomerieux-diagnostics.com)

Marker Panels

Combinations of different tests will enable better differentiation

Marker	Healthy	Virus	Bacteria
CRP ^{13-19,21}	< 5 mg/L	▲	▲
SAA ^{14-19,24}	< 3 mg/L	▲	▲
IL-6 ^{20,27}	< 10 pg/mL	Normal	▲
Procalcitonin ^{14,18,19,21}	< 0.1 ng/mL	▲	▲
TRAIL ^{13,14,25}	40-80 pg/mL	▲	▼
IP-10 ^{13-15,25}	< 10 pg/mL	▲	▲
NGAL ^{21,22}	< 120 ng/ml	Negative	▲

Poll Question #1: Based on the symptoms can you differentiate between viral and bacterial infection?
Viral or Bacterial



5 year old boy
Difficult breathing
Makes squeaking noises when breathing
Fever
Tired
Coughing up yellow/green mucus

Test Results

CRP	Normal	2.5 mg/L
SAA	Elevated	10 mg/L
IL-6	Normal	3.5 pg/mL
Procalcitonin	Normal	0.05 ng/mL
TRAIL	Elevated	100 pg/mL
IP-10	Elevated	60 pg/mL
NGAL	Normal	75 mg/mL

Poll Question #2: Based on the lab results can you differentiate between viral and bacterial infection?
Viral or Bacterial

Poll Question #3: Based on the lab results what kind of infection is this?
Viral or Bacterial



79 year old man
Difficult breathing
Makes squeaking noises when breathing
Fever
Tired
Coughing up yellow/green mucus

Test Results		
CRP	Elevated	53 mg/L
SAA	Elevated	75 mg/L
IL-6	Elevated	25 pg/mL
Procalcitonin	Elevated	0.50 ng/mL
TRAIL	Decreased	25 pg/mL
IP-10	Elevated	54 pg/mL
NGAL	Elevated	150 ng/mL

Poll Question #4: Based on the lab results what kind of infection is this?
Viral or Bacterial



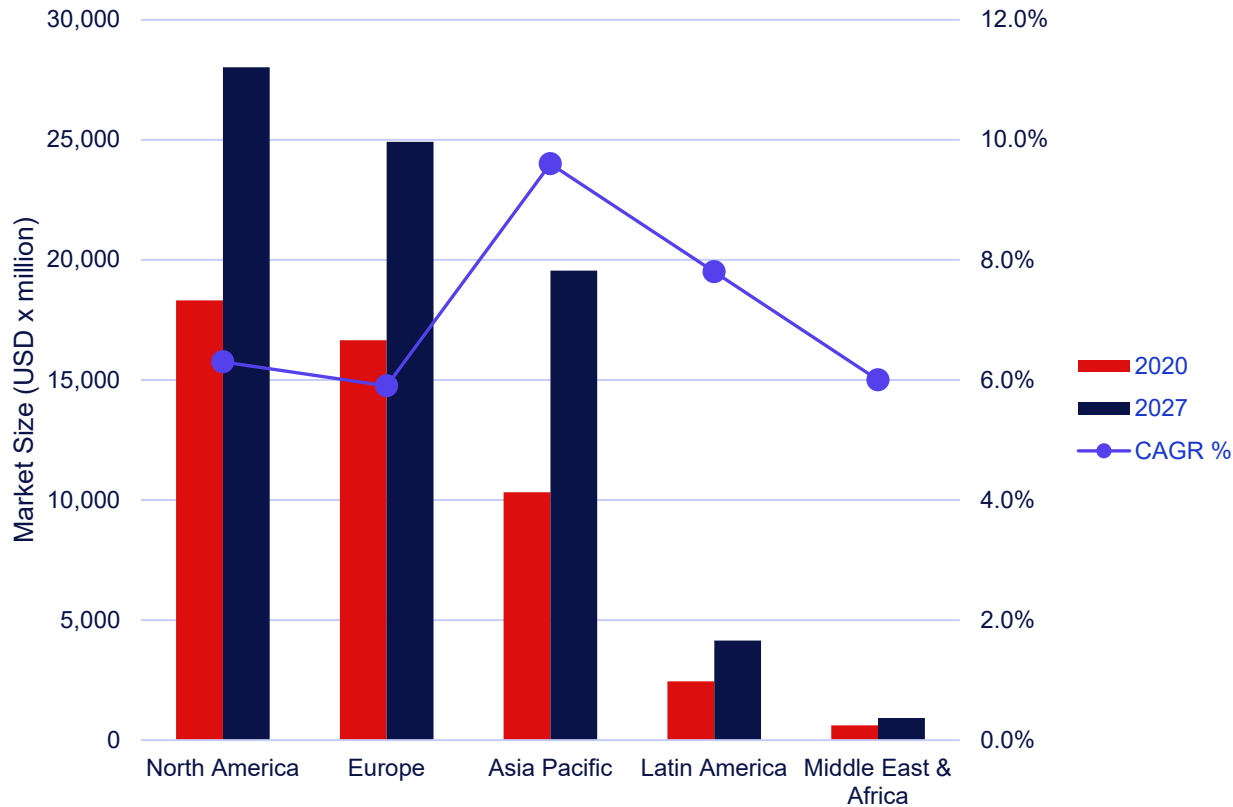
77 year old female
Difficult breathing
Makes squeaking noises when breathing
Fever
Tired
Coughing up yellow/green mucus

Test Results

CRP	Elevated	53 mg/L
SAA	Elevated	75 mg/L
IL-6	Elevated	25 pg/mL
Procalcitonin	Elevated	0.45 ng/mL
TRAIL	Elevated	90 pg/mL
IP-10	Highly Elevated	100 pg/mL
NGAL	Normal	67 ng/mL

Panel Testing Makes Sense for an Aging Population and Growing IVD Industry

Global IVD Reagents Market, by Region



Graph: Meticulous research IVD reagents market global forecast 2027 report (2021)

- By 2030: 1 in 6 people will be aged 60 years or over
- From 2020 to 2050 people aged 60 years and older will double.
- From 2020 to 2050 people aged 80 years and older will triple

Data: [Ageing and health \(who.int\)](https://www.who.int)

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Thank you

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