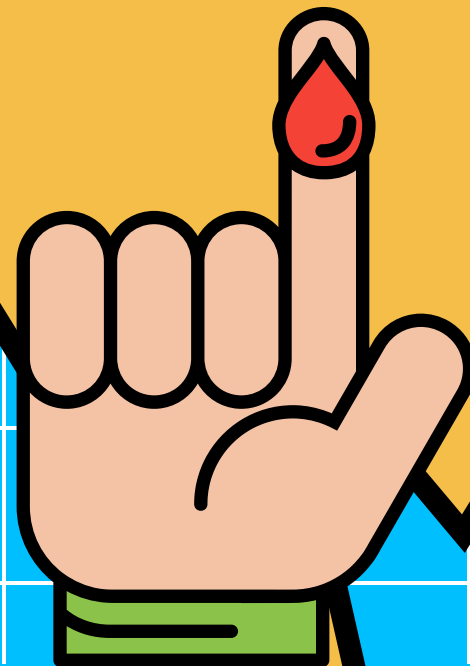


CLINICAL APPLICATIONS OF

POC HS-TROPONIN TESTING

RICK BODY



WE CAN RAPIDLY RULE OUT MI

WITH LABORATORY HIGH-SENSITIVITY TROPONIN ASSAYS

With ONE TEST on arrival...

Using cutoffs around the limit of detection

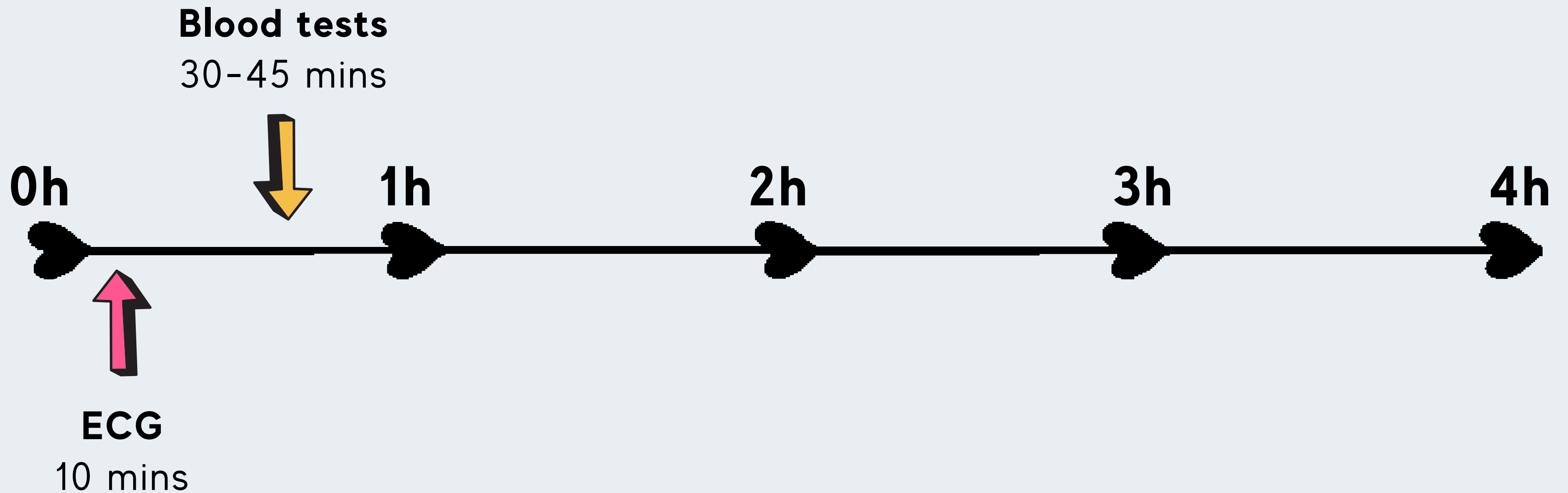
ALSO with ONE test on arrival...

Using decision aids like HEART, T-MACS, EDACS

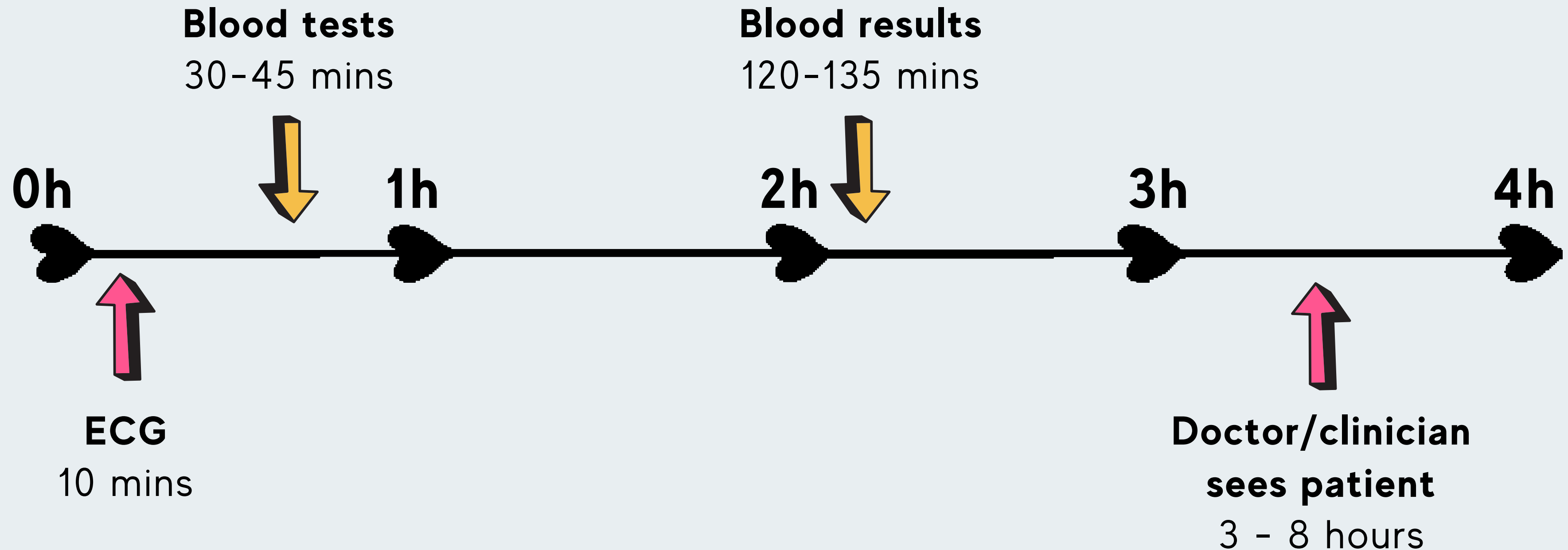
With TWO TESTS 1-3 hours apart...

Using a validated algorithm

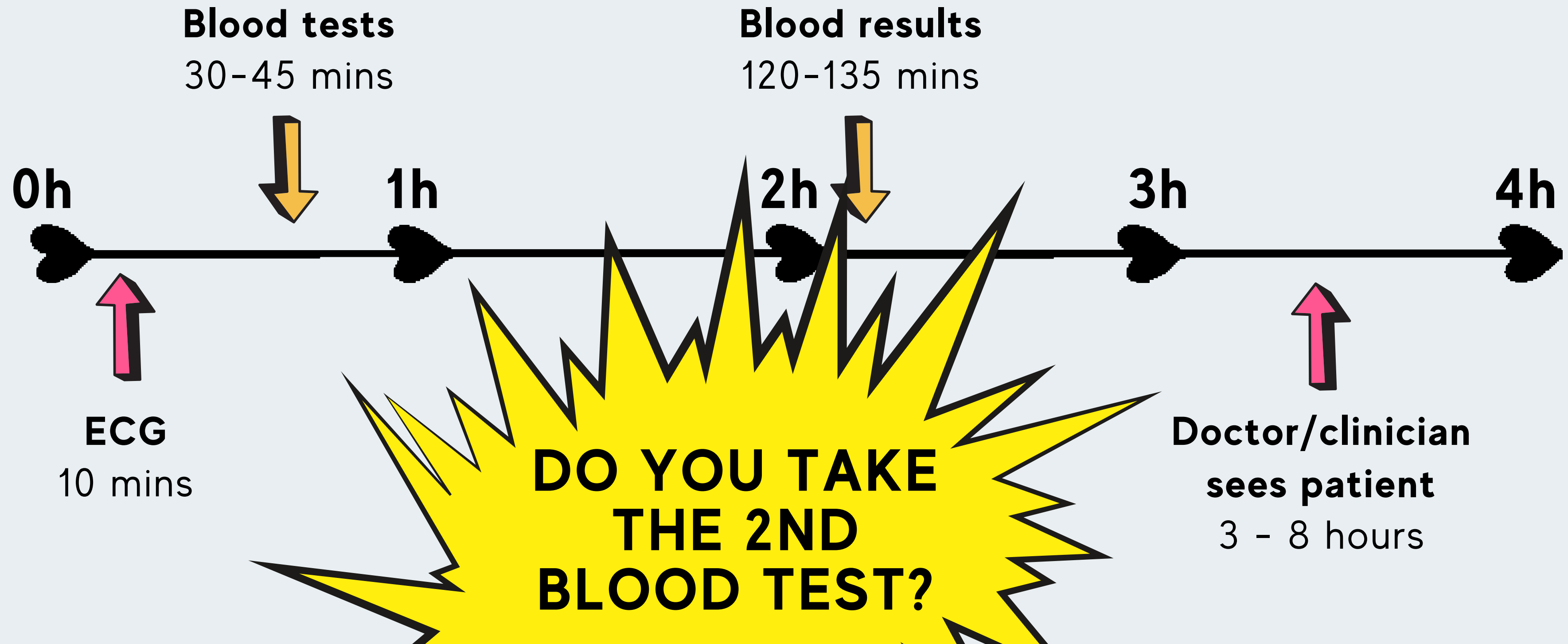
BUT THERE ARE STILL PROBLEMS...



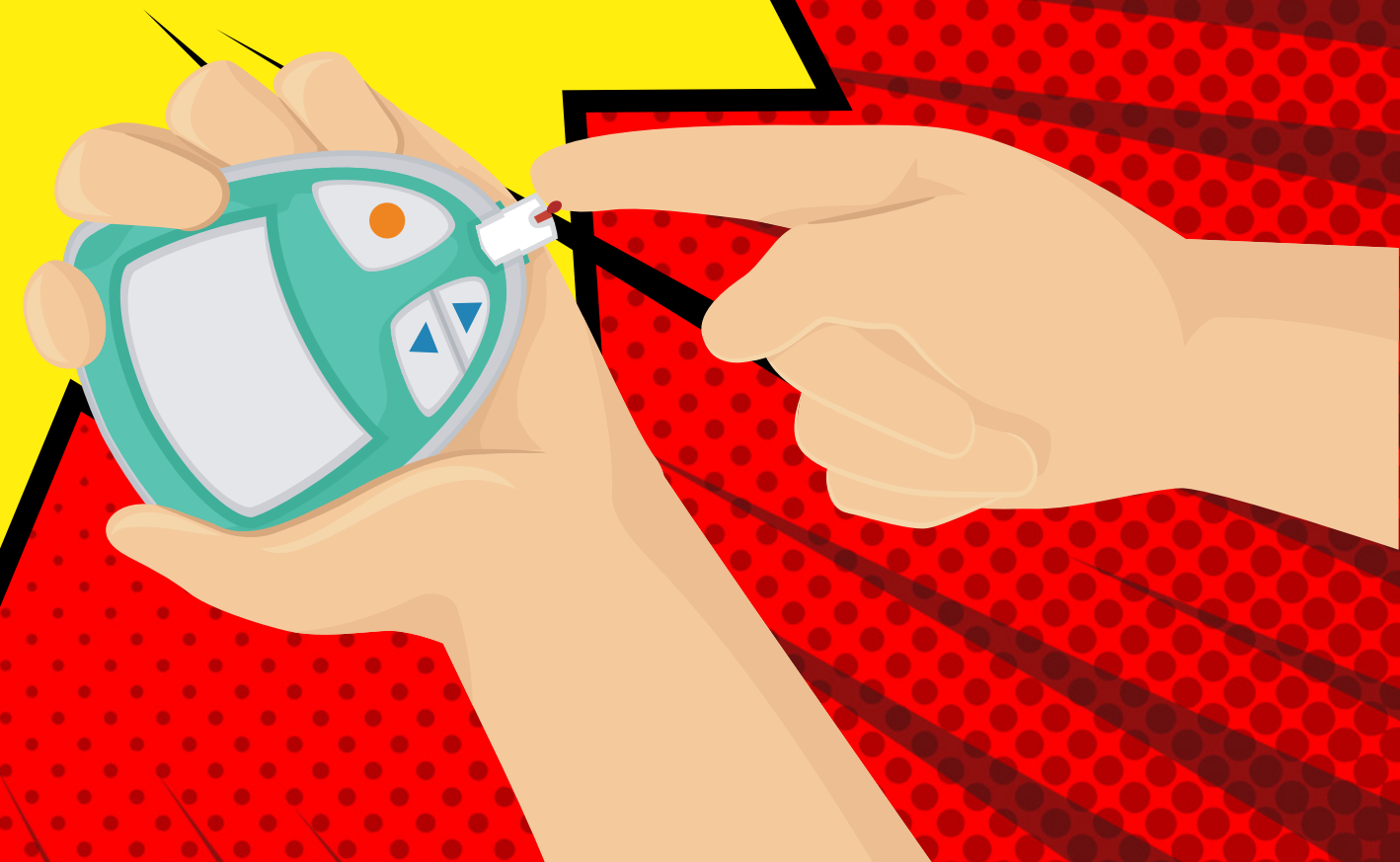
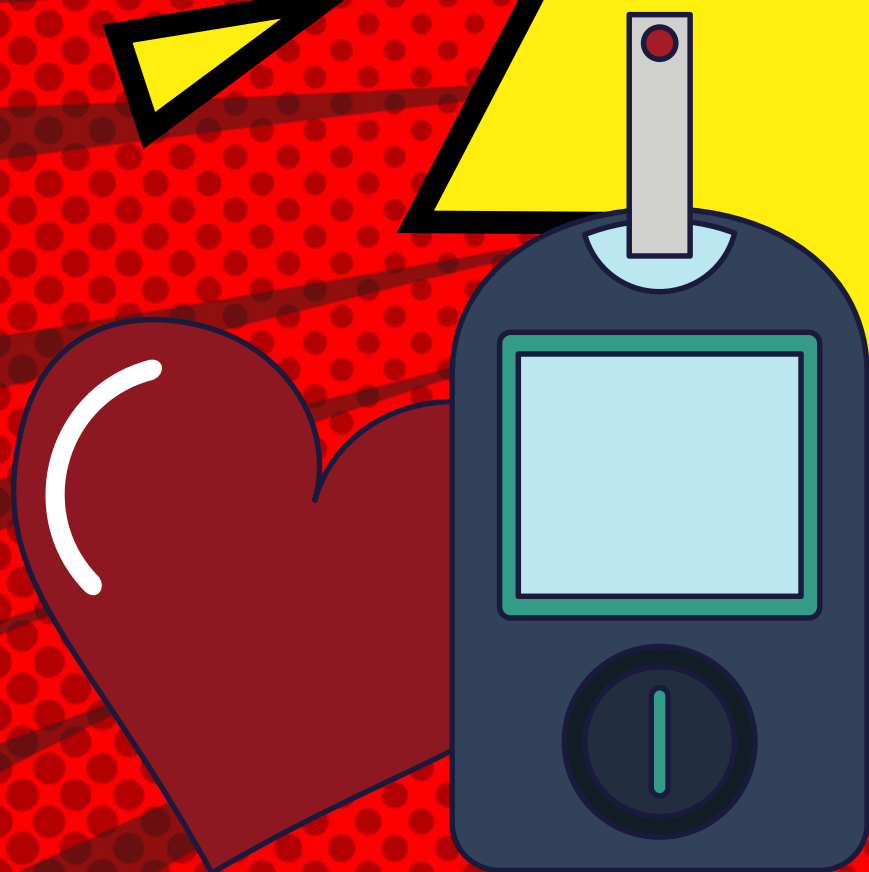
BUT THERE ARE STILL PROBLEMS...



BUT THERE ARE STILL PROBLEMS...



WHY NOT USE A
POINT OF CARE
TEST?



POINT OF CARE TROPONIN ASSAYS:

Limit of detection

Abbott iStat

• This is the 'limit of blank'

Roche Cobas h232

Quidel Triage cTnI*

* Previous generation

Abbott Alinity HS-cTnI

LAB
ASSAY

0ng/L

20ng/L

40ng/L



THE SENSITIVITY OF POCT

with testing 3 hours after arrival

i-STAT

68%

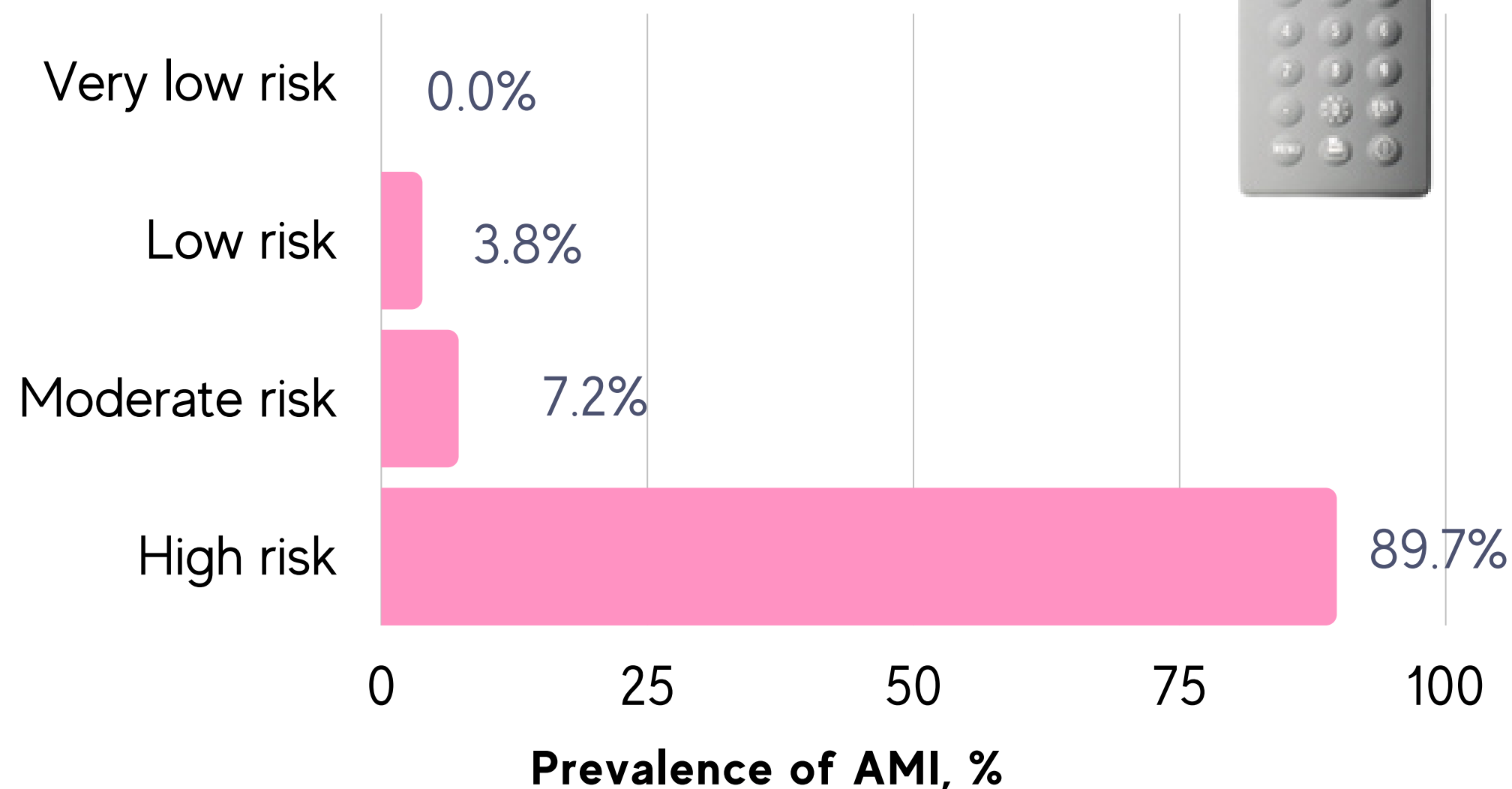
AQT-90

63%

Pathfast

89%

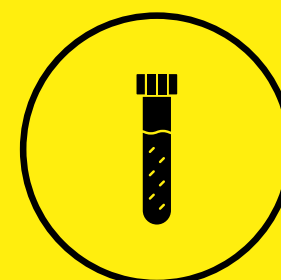
T-MACS WITH ABBOTT I-STAT



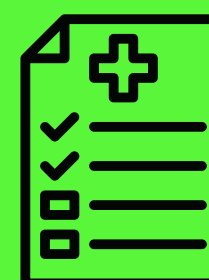
Abbreviations: POCT, point of care test; AMI, acute myocardial infarction



716 PATIENTS
At 8 Emergency
Departments

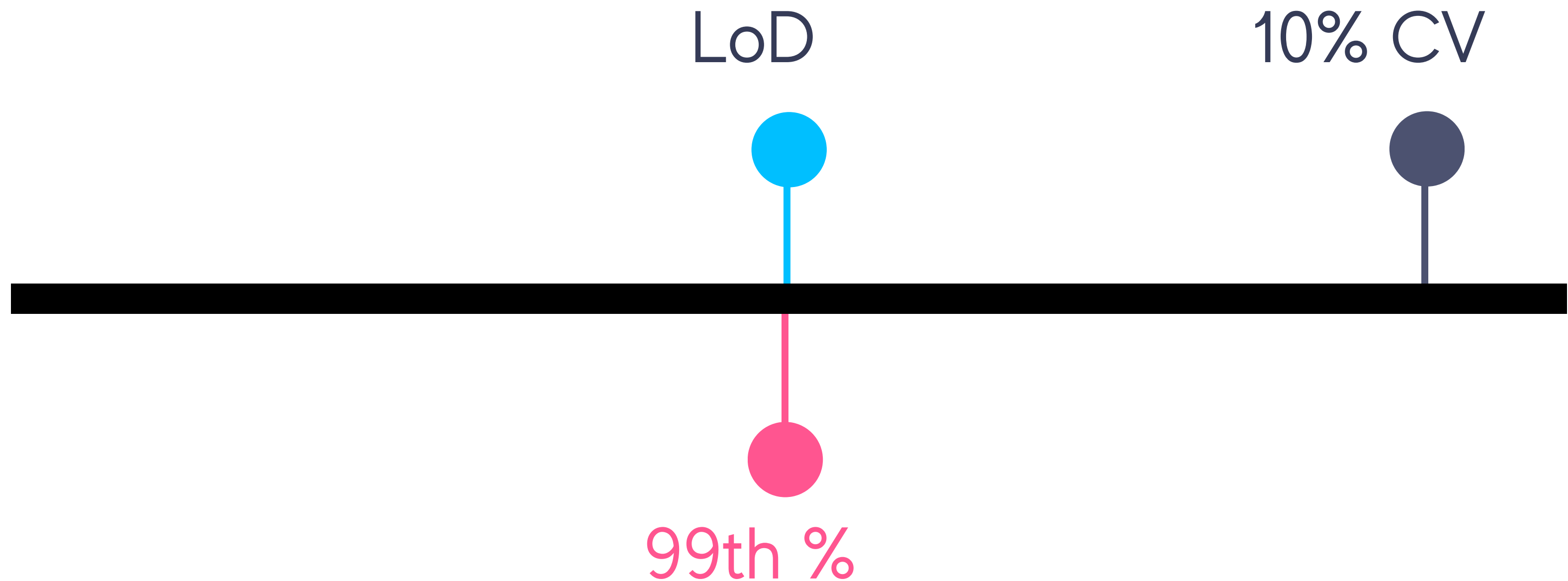


I-STAT TROPONIN
Measured on arrival and 3
hours later



DIAGNOSIS OF AMI
Adjudicated by 2 investigators
based on lab assays

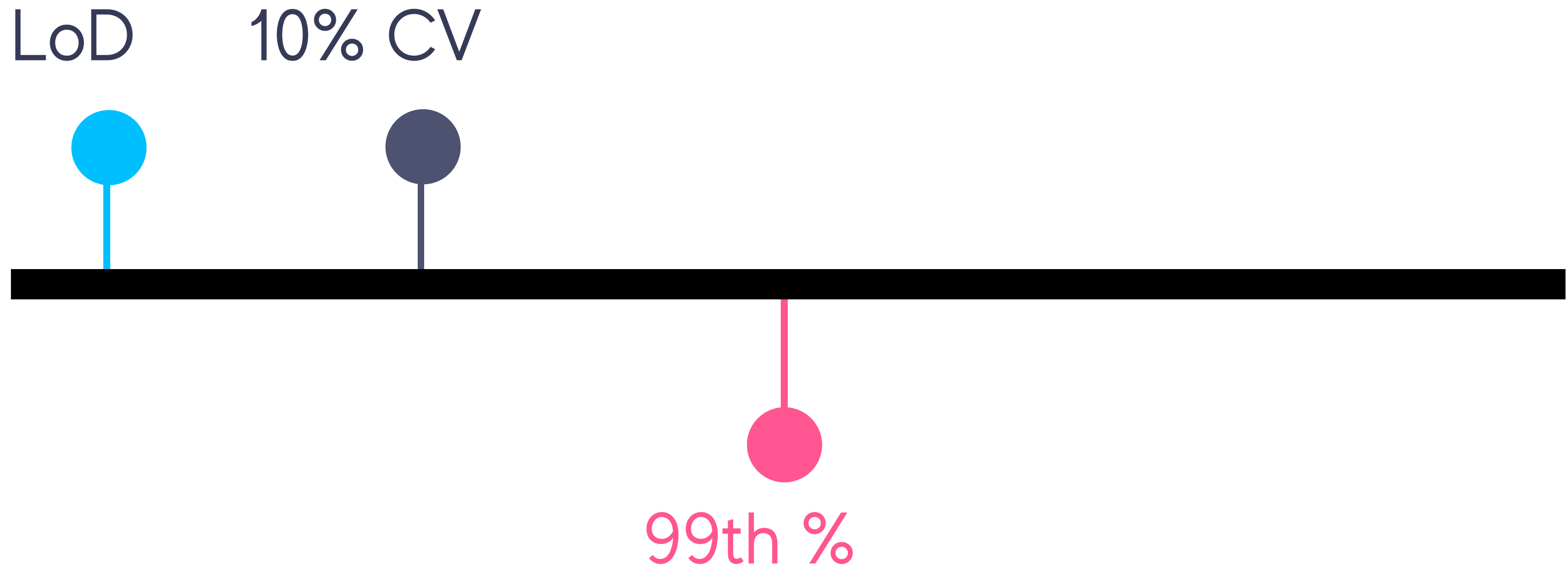
CARDIAC TROPONIN ASSAYS



Contemporary assay (example)

LoD: limit of detection; 99th%, 99th percentile; CV, co-efficient of variation

CARDIAC TROPONIN ASSAYS



High-sensitivity troponin assay (example)

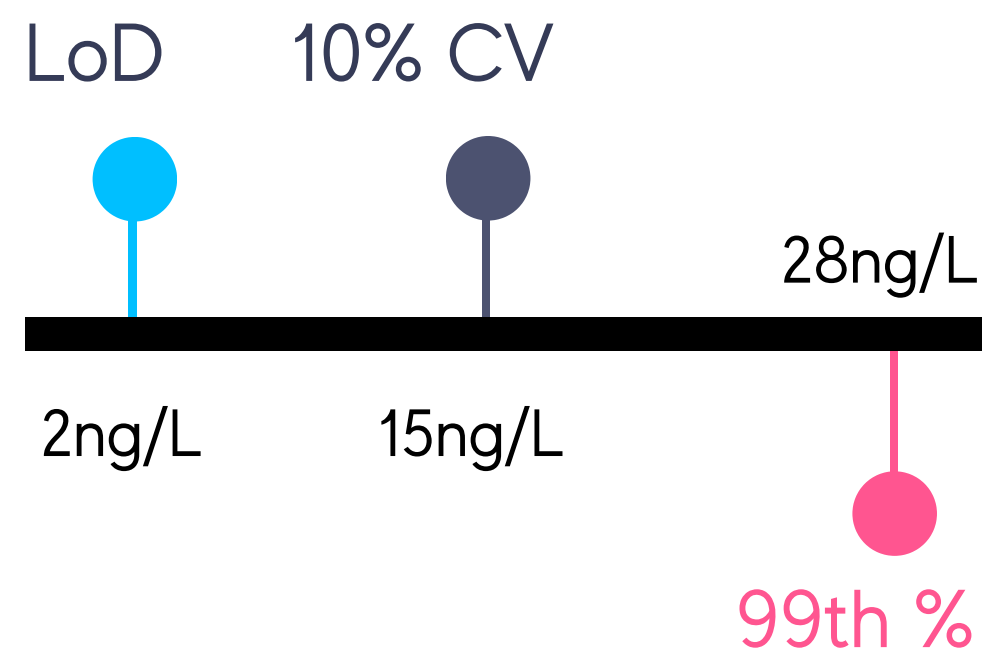
LoD: limit of detection; 99th%, 99th percentile; CV, co-efficient of variation



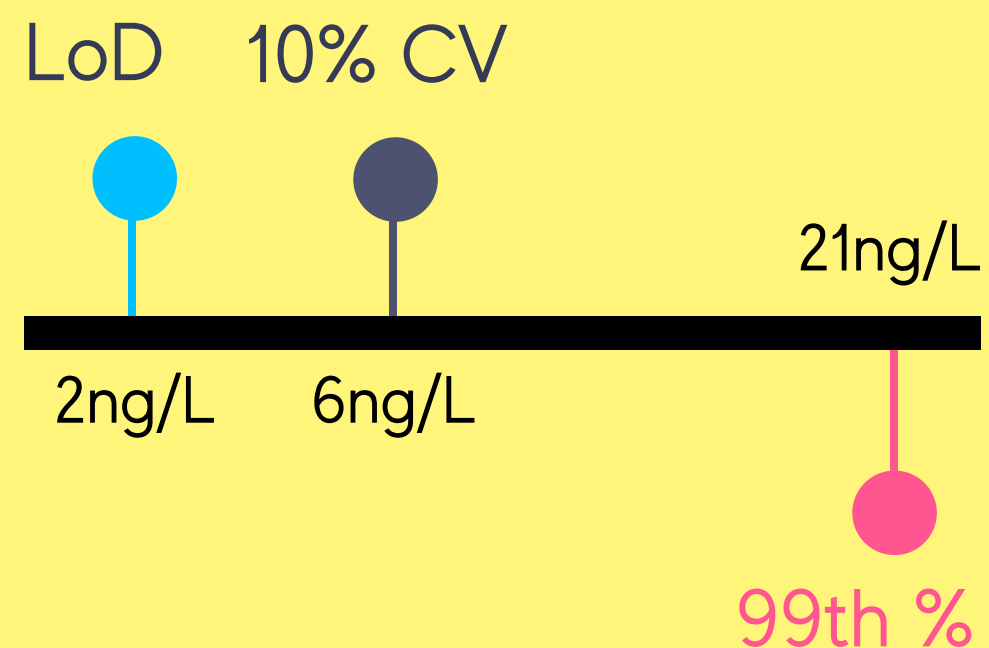
POC HS-TROPONIN ASSAYS

Values rounded to integers (ng/L) and provided for whole blood

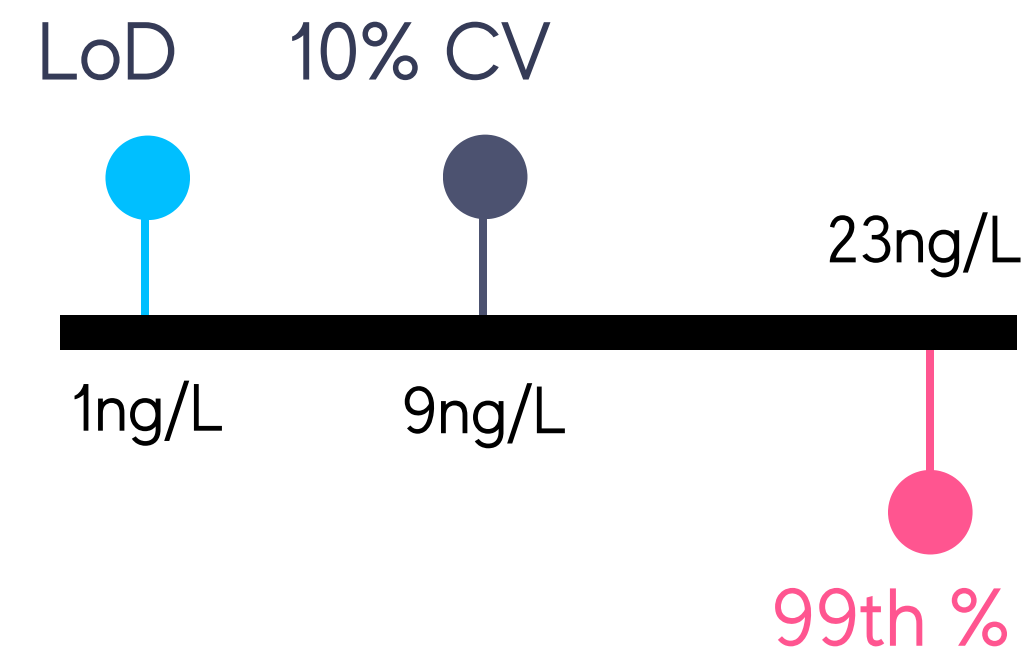
Diagrams not to scale



LSI MEDIENCE
PATHFAST



QUIDEL-ORTHO
TRIAGETRUE



SIEMENS
ATELLICA VTLI

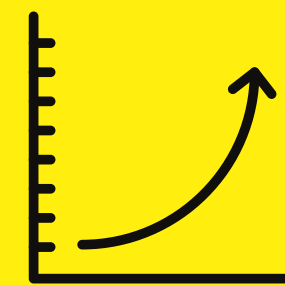
ABBOTT I-STAT TNI NX

Early evaluation of a prototype assay



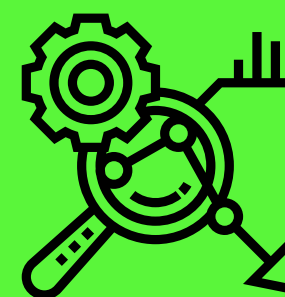
354 PATIENTS

57 had AMI



THE AUC WAS 0.975

This compared to 0.970 for
Abbott ARCHITECT hs-cTnI

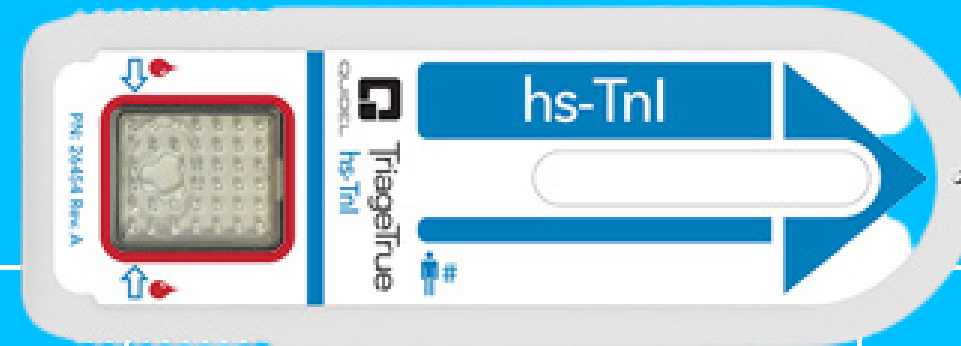


100% SENSITIVITY

With a single test, cutoff 11ng/L
95% CI 93.7-100.0%

QUIDEL-ORTHO TRIAGETRUE HS-CTNI

Boeddinghaus et al, J Am Coll Cardiol. 2020; 75 (10) 1111-1124



APACE SUBSTUDY

- Analysed in plasma samples
- 1,261 patients with suspected NSTEMI

RULE-OUT WITH 1 TEST

Cut-off 3ng/L

- Sensitivity **100.0%**
(95% CI 98.0 - 100.0%)
- **45%** of patients ruled out

RULE-OUT AT 1 HOUR

<5ng/L on arrival and
delta <3ng/L

- Sensitivity **100.0%**
(95% CI 95.9 - 100.0%)
- Another **10%** of patients ruled out

SIEMENS ATELICA VTLI

First published evaluation



1,089 patients who had troponin measured

91 had an adjudicated diagnosis of AMI

The assay could rule out 21% of patients

Cut-off 4ng/L

NPV was 99.6%

95% CI 98.8 - 100.3%

Sensitivity 98.9% (95% CI 97.1-100.6%)

CHALLENGES

EVIDENCE BASE

- We need more prospective clinical studies, in whole blood

COST

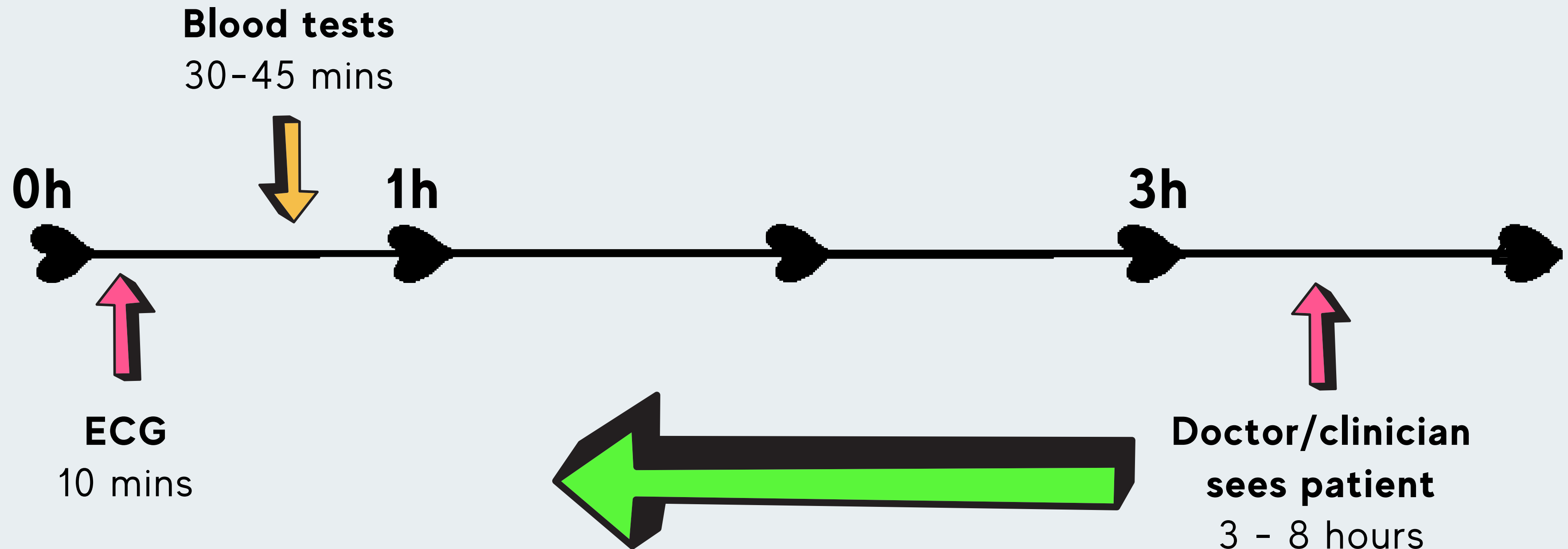
- POCT costs **MORE**
- How do we get and show the value?

TRAINING

- Busy staff need to see the benefit of POCT over lab testing

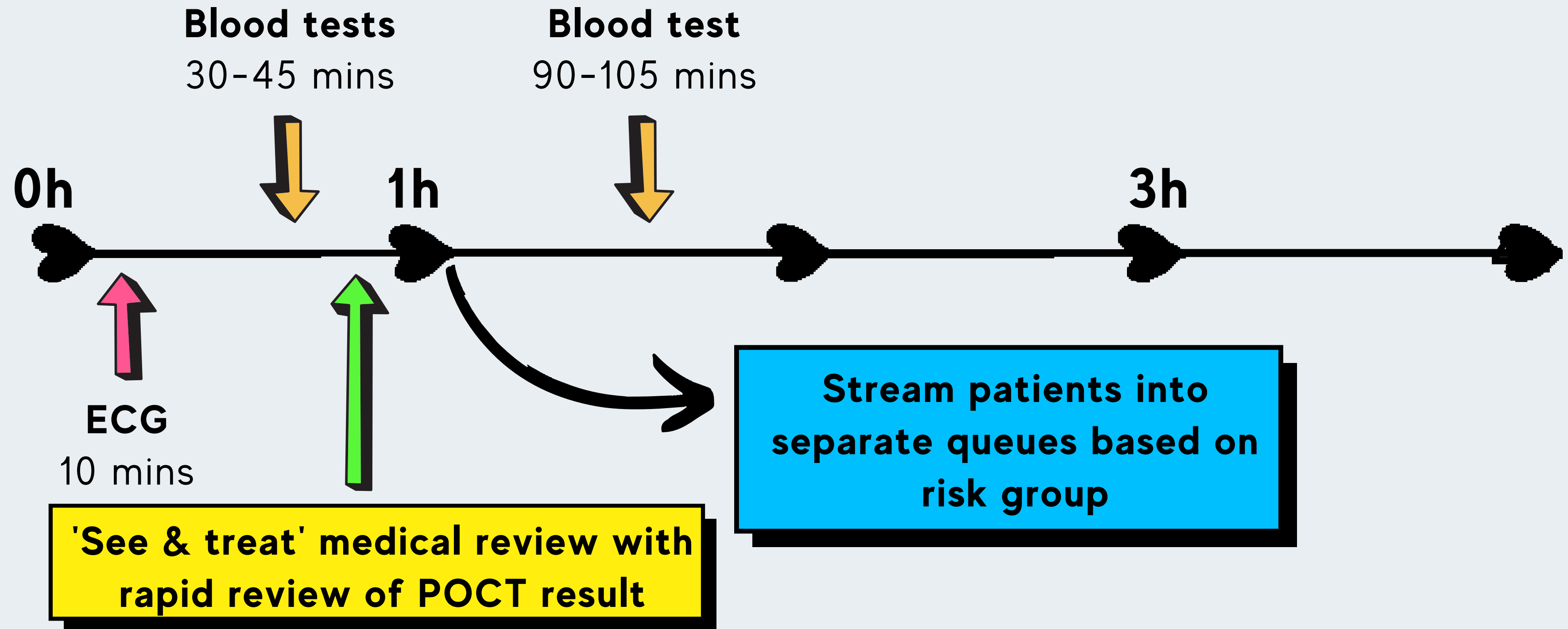
WE WILL NEED TO DISRUPT CARE PATHWAYS

to make POCT work



WE WILL NEED TO DISRUPT CARE PATHWAYS

to make POCT work



RAPID ASSESSMENT

The background image shows a clinical setting, likely a hospital room or emergency department. It features two gurneys with white and blue bedding. The walls are light-colored and equipped with various medical devices, including monitors, IV stands, and outlets. A blue curtain is visible in the center. The floor is a light green linoleum.

Patients seen on arrival by a senior clinician

POCT in Rapid Assessment Unit

The patient does not move until results have been reviewed

TRIAGE TO SDEC

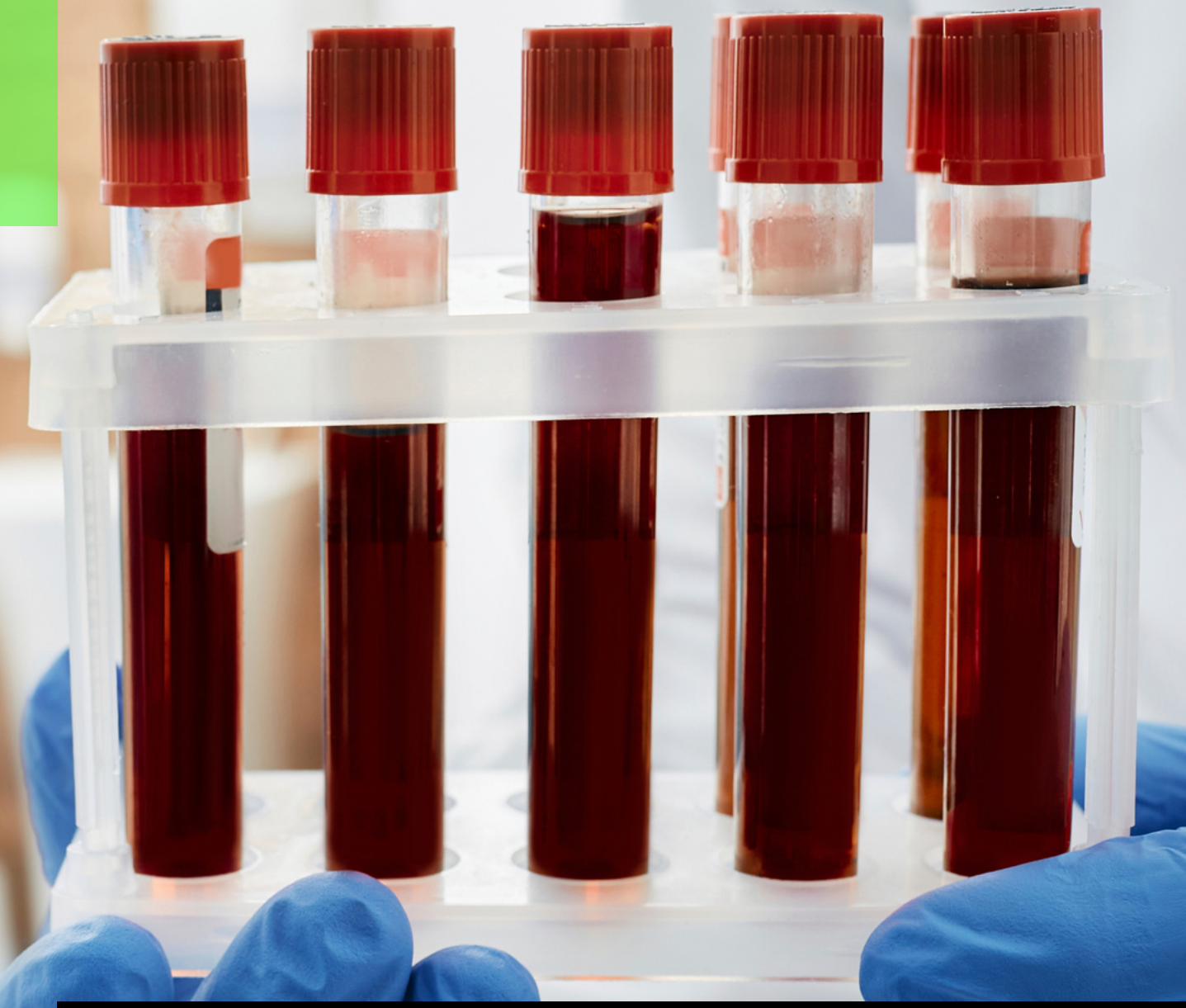
A healthcare professional in blue scrubs is talking to an elderly male patient in a hospital gown. The patient is looking at the professional, who is holding a clipboard. The background is a clinical setting with medical equipment.

POCT on arrival

Immediate risk stratification

Low risk patients go to SDEC;
repeat POCT when indicated

HOT LAB



Biomedical scientists based in the ED to run the POCT

HOW ABOUT TESTING IN AMBULANCES?

THE ACCESS STUDY

HEART score + POC
troponin **CAN NOT**
rule out AMI

Sensitivity 87.0%
(Samsung LabGeo)

Cooper et al, Ann Emerg Med 2021 Jun;77(6):575-588



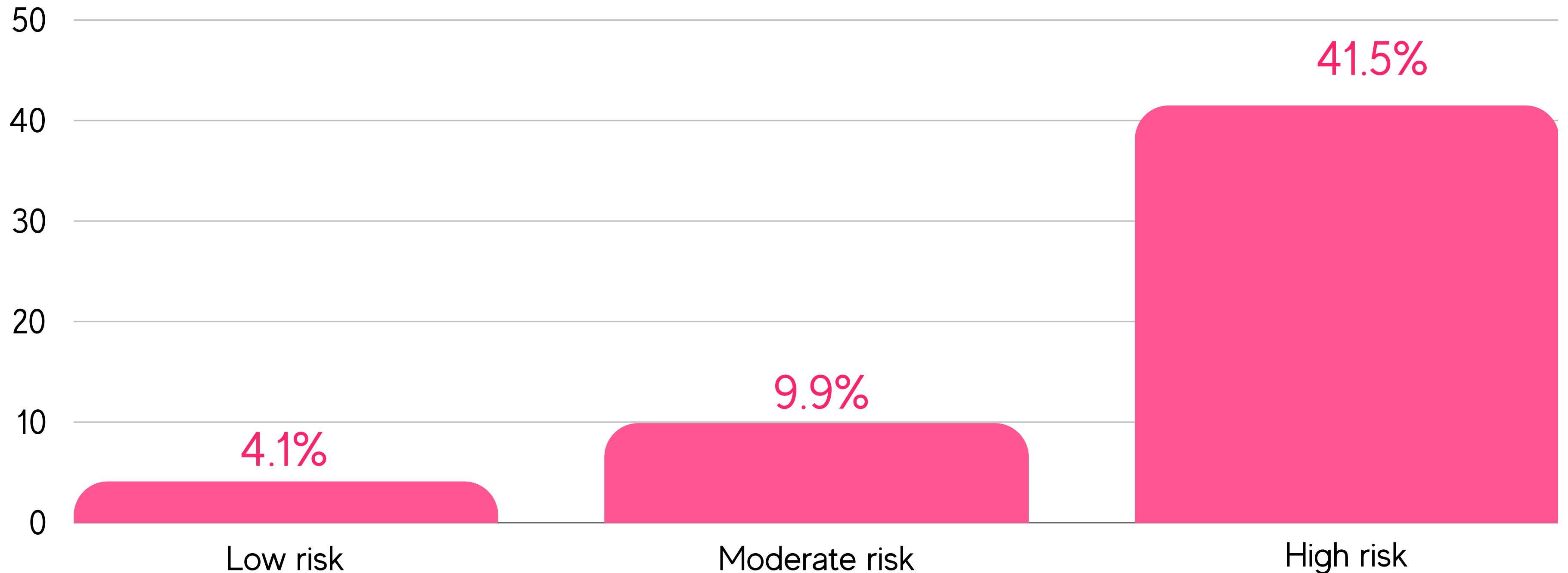
THE PRESTO STUDY

ROCHE COBAS H232 CTNT HAD A
SENSITIVITY OF **50.8%** FOR TYPE 1 MI

95% CI 37.7 - 63.9%

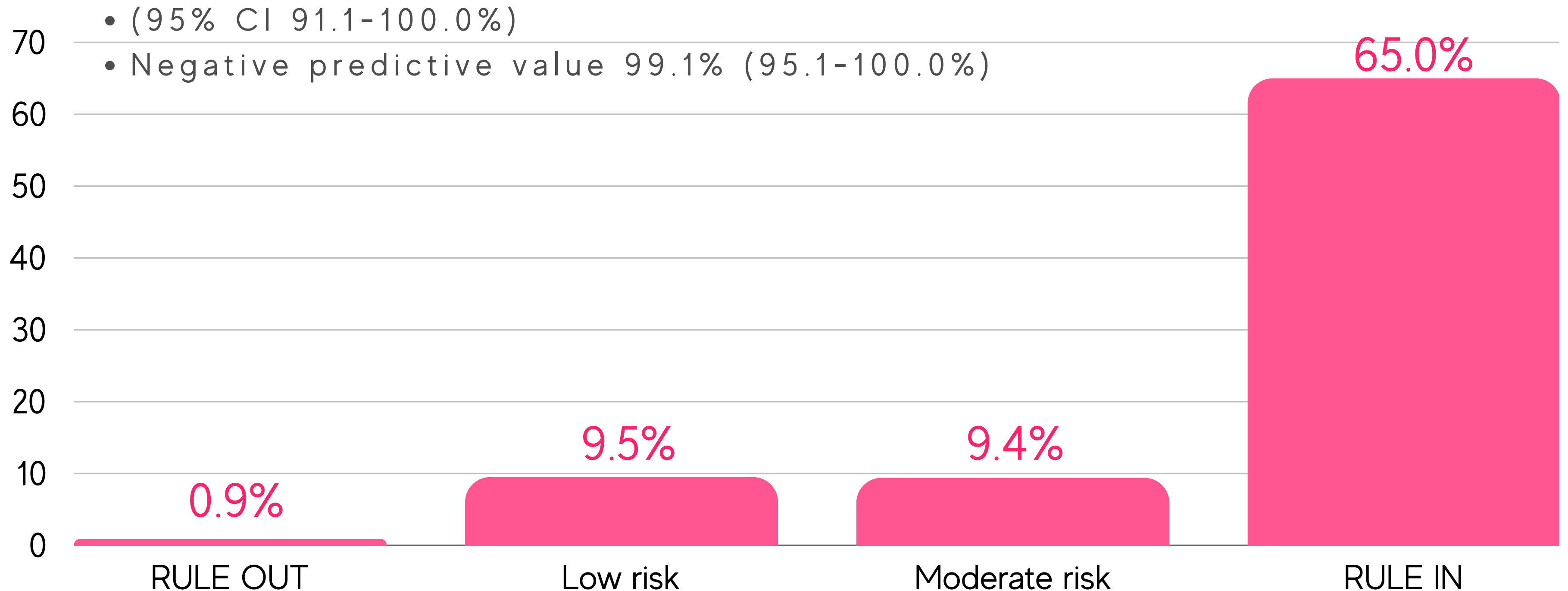


THE HEART SCORE HAD A SENSITIVITY OF 86.4%

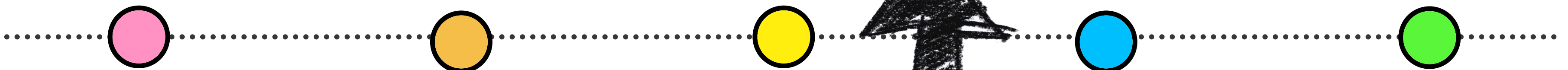
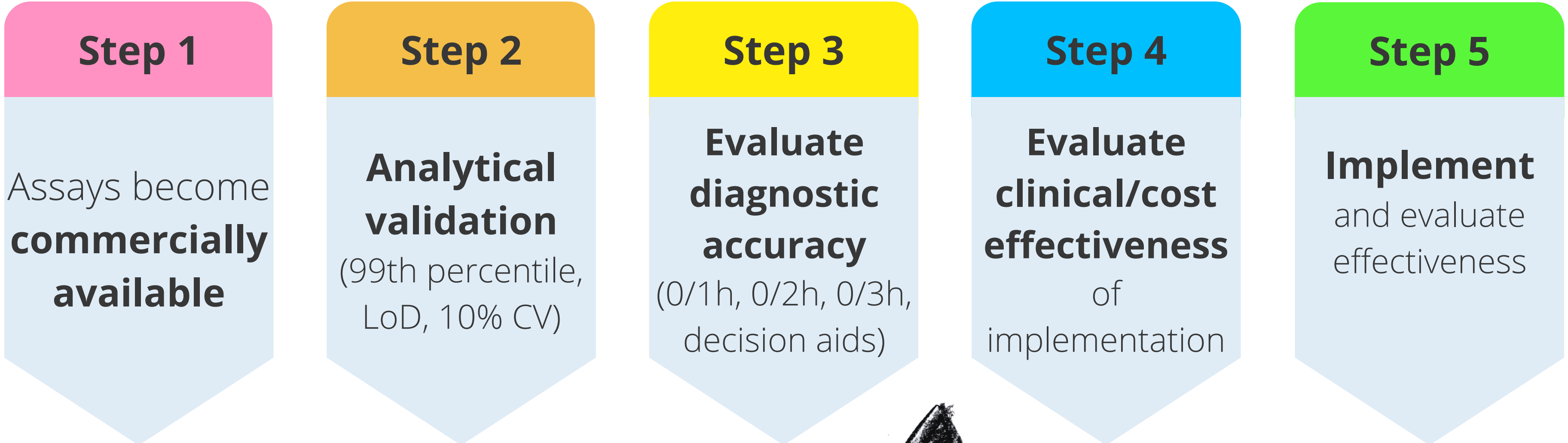


INCIDENCE OF TYPE 1 MI BY RISK GROUP

T-MACS HAD A SENSITIVITY OF 98.3%



INCIDENCE OF TYPE 1 MI BY RISK GROUP

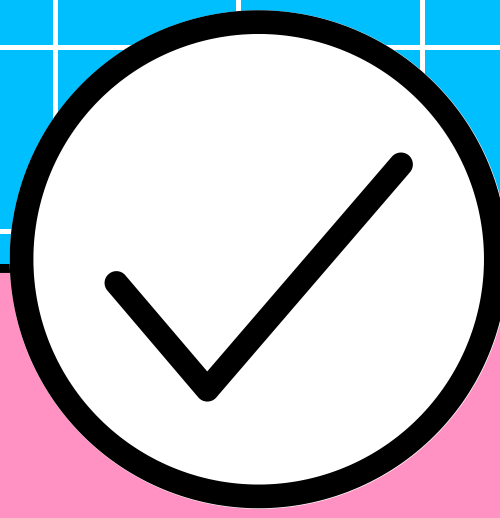


WE ARE HERE

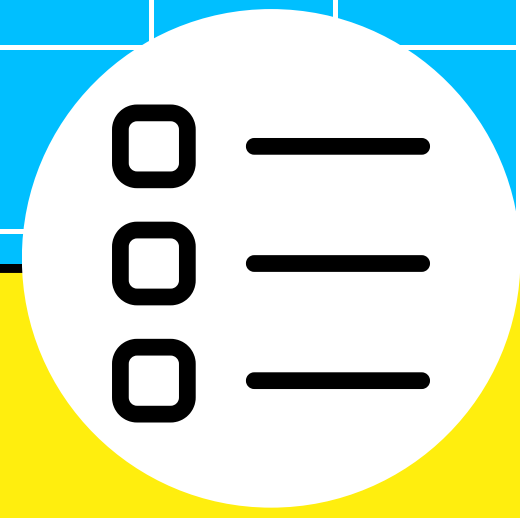
IN SUMMARY



To date, point of care troponin tests have been unable to **rule out** acute MI



There are now several commercially available **high-sensitivity** troponin assays at the point of care



Prior to implementation, we need more evidence of **diagnostic accuracy** and **cost-effectiveness**, & we must define new care pathways