

A photograph of two scientists, a woman and a man, in a laboratory setting. They are both wearing white lab coats. The woman is on the left, looking down at something out of frame. The man is on the right, wearing safety glasses and looking at a tablet device. In the background, there is a large piece of laboratory equipment, possibly a centrifuge or a storage unit, with the brand name 'Eppendorf' visible. The overall lighting is bright and clinical.

Siemens Healthineers Troponin eBook

SIEMENS
Healthineers 

Table of Contents

The Need for High-Sensitivity Troponin	3	High-Sensitivity Troponin in the ED	12
History of Coronary Heart Disease Diagnosis	4	High-Sensitivity Troponin in the Clinical Lab	14
What is Troponin.....	5	High-Sensitivity Troponin for Cardiologists	16
Siemens Healthineers High-Sensitivity Troponin I Assay	6	High-Sensitivity Troponin for Hospitals	18
Guidelines for Using Troponin to Diagnose AMI.....	10	Summary.....	20
		References	21

The Need for High-Sensitivity Troponin

Heart disease is the leading cause of death in the U.S.¹ In fact, more than one million Americans will have an acute myocardial infarction (AMI, known more commonly as a heart attack) this year, claiming more than 100,000 lives and costing the United States more than \$200 billion.²

Unfortunately, diagnosing an AMI in the Emergency Department (ED) can be difficult. First, EDs are full of people complaining of chest pain, but few are actually experiencing an AMI. In fact, while chest pain is the cause of more than eight million visits annually nationwide to EDs, just 5.5 percent of those visits lead to serious diagnoses such as heart attacks.³

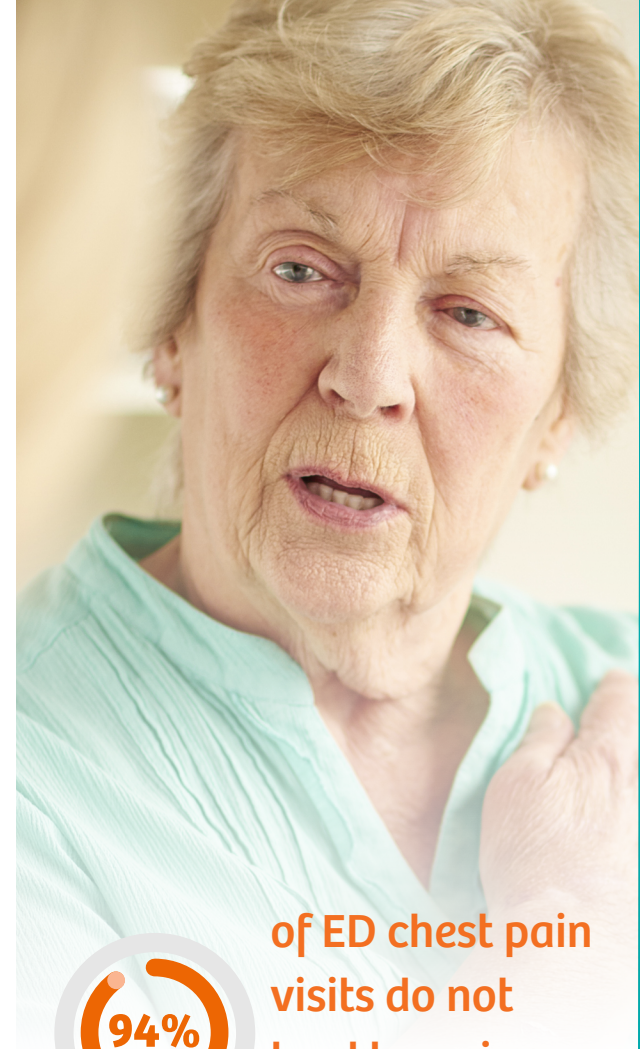
This means EDs remain crowded with people who aren't having a cardiac emergency, making it harder to treat those who are. When diagnosing an AMI, every minute increases the chance the patient will die.⁴ Worse, as much as 8 percent of AMIs are critically missed.⁵

The gold standard test for the ED is to measure the level of troponin in the patient's blood. Troponin is a protein released as heart tissue dies. An AMI causes the level of troponin in the blood to rise dramatically. ED doctors order a series of troponin tests to see if such a rise occurs.

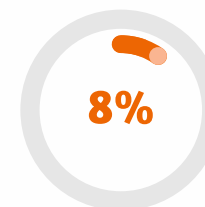
However, current troponin assays are not precise enough to accurately spot small differences. It often takes 6 to 12 hours for troponin levels to raise enough for ED doctors to be confident that the patient is or is not experiencing an AMI.

This is problematic for the patient and their families, who have to endure a lengthy stay in the ED for something that is statistically unlikely to be an AMI. It is also difficult for hospitals with EDs clogged with patients who ultimately didn't need to be there. The overcrowding this causes is expensive and slows down care to other patients.

This is poised to change with the introduction of a new class of high-sensitivity cardiac troponin assays (hs-cTn). In this eBook, we'll explore these exciting new assays and show how they can help speed AMI diagnosis, lower ED costs, improve the patient experience and ultimately save lives.

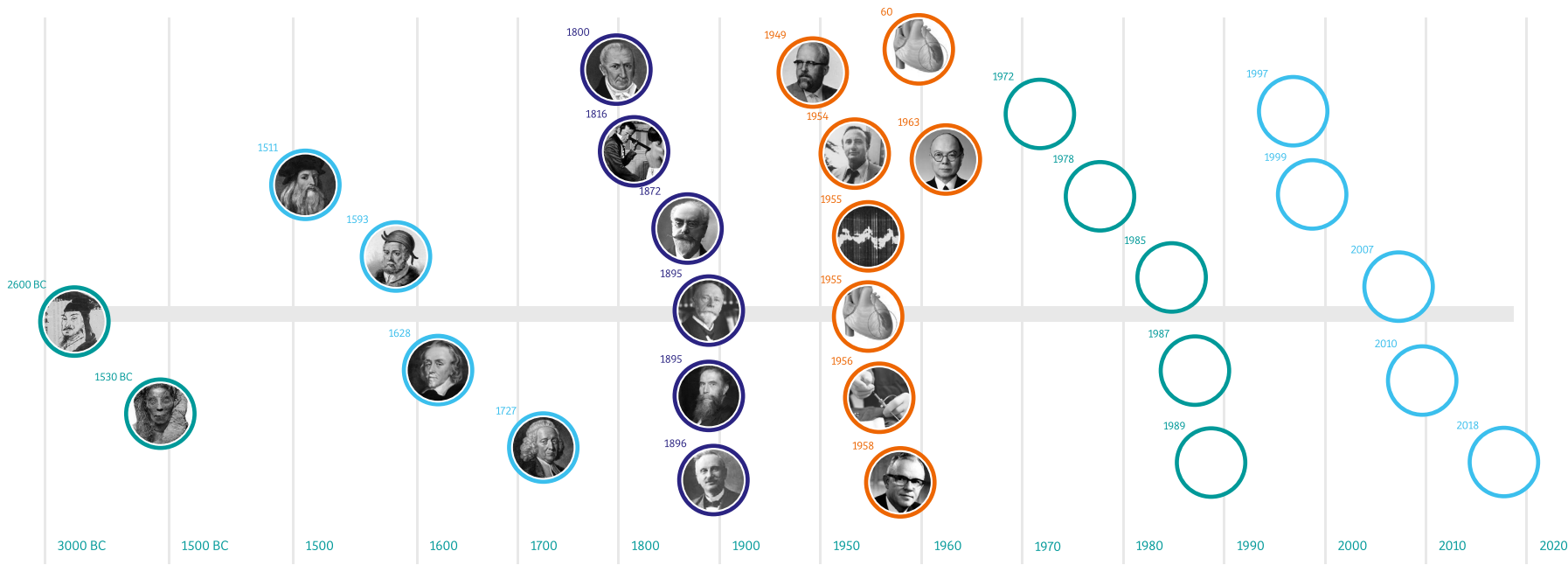


94% of ED chest pain visits do not lead to serious diagnoses.



8% of AMI cases are critically missed.

History of Coronary Heart Disease Diagnosis



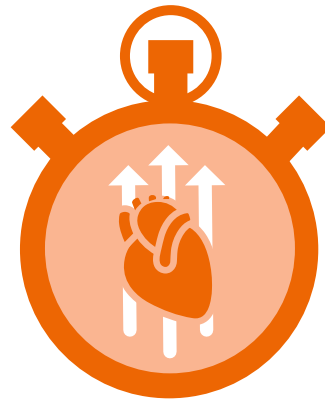
What is Troponin?

First discovered in 1965,⁶ troponins are proteins that are found in both skeletal and cardiac muscle fibers. Troponins regulate muscular contraction. The types of troponin proteins include troponin C, troponin T, and troponin I. While troponin C is virtually the same for both skeletal and cardiac muscle, troponin I and troponin T are different.

When cardiac muscle dies, it releases troponins into the bloodstream. The presence of cardiac-specific troponin T or I, is therefore a specific marker for cardiac muscle death; measuring the amount of cardiac-specific troponin T or troponin I in the blood can help identify individuals who have experienced damage to their heart. Specifically, levels of cardiac-specific troponins become elevated in the blood within 3 or 4 hours after injury and may remain elevated for 10 to 14 days. Since it is rarely known what a specific patient's base-level of troponin is, healthcare professionals must perform sequential tests to look for an increase in troponin levels.

Since cardiac-specific troponins exist in the blood only when cardiac muscle has died, testing for troponins is an excellent biomarker for cardiac damage, especially for an AMI. In fact, guidelines published in 2000 recommended troponin as the

preferred diagnostic marker for AMI.⁶ However, AMI is not the only cause of cardiac damage. Other conditions that directly or indirectly lead to heart muscle damage and death can also increase troponin levels, such as renal failure or severe tachycardia.



Cardiac-specific troponins become elevated in the blood within 3 or 4 hours after injury and may remain elevated for 10 to 14 days.



Setsuro Ebashi, a Japanese physiologist, discovered the troponin protein in 1965.

Siemens Healthineers High-Sensitivity Troponin I Assay

High-Sensitivity Troponin I is the latest addition to Siemens Healthineers' comprehensive cardiac menu to assist clinicians with the diagnosis and treatment of chest pain patients. Designed to aid in diagnosing AMIs through the quantitative measurement of cardiac troponin I in serum or plasma, high-sensitivity troponin plays a critical role in the timely diagnosis of AMI, or heart attacks.

High-sensitivity Troponin I is now available on the Atellica® IM Analyzer and ADVIA Centaur® XP and XPT Immunoassay Systems.

- Offers improved patient care with a high-sensitivity cardiac troponin assay that meets current guideline recommendations
- Allows measurement of slight, yet critical, changes between serial troponin I values, giving you confidence in patient results at the low end of the assay range.
- Delivers reliable results from proven, trusted technology coupled with three new monoclonal antibodies.

Compared to traditional troponin assays, the Siemens Healthineers Atellica IM and ADVIA Centaur XP and XPT TNIH assays are able to detect lower levels of troponin and smaller changes to a patient's troponin levels, which may be an early indication of AMI. This design affords clinicians greater confidence in patient results at the low end of the assay range by delivering precision that provides the ability to measure slight, yet critical, changes between serial troponin I values.

Precision at the low end is important to minimize analytic variation that could confuse a clinician's assessment of a clinically significant change. With this data in hand, clinicians have the ability to more quickly diagnose and treat patients with suspected AMI, in some cases in as little as one to two hours.

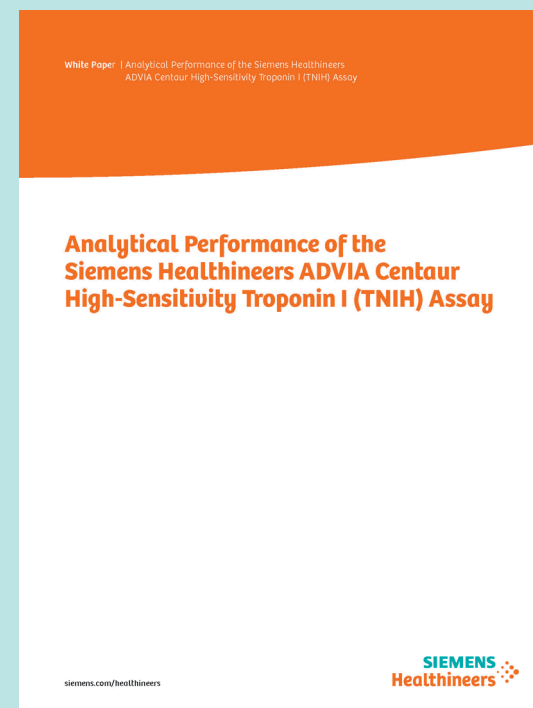


Video: Learn Key Design Features of New High-Sensitivity Troponin I Assay. Take a look behind the design of Siemens Healthineers new high-sensitivity troponin I assay and learn why it supports improved cardiac patient care.

Assay Specifications

Atellica IM High-Sensitivity Cardiac Troponin I Assay

Sample Type	Serum, lithium heparin plasma
Sample Volume	100 µL
Assay Range	2.51 - 25,000.00 pg/mL
Time to First Result	10 minutes
On-board Stability	31 days
Calibration Interval	47 days
LoB	0.50 pg/mL
LoD	1.60 pg/mL
LoQ (20% CV)	2.50 pg/mL
LoQ (10% CV)	<6.0 pg/mL
99th percentile	45.2 ng/L (pg/mL)



White Paper: Analytical Performance of the Siemens Healthineers ADVIA Centaur High-Sensitivity Troponin I (TNIH) Assay.

[click to read](#)

ADVIA Centaur High-Sensitivity Cardiac Troponin I Assay

Sample Type	Human serum, plasma (lithium heparin)
Sample Volume	100 µL
Assay Range	2.50 – 25,000.00 pg/mL (ng/L)
Time to First Result	XP/XPT: 18 minutes
Throughput	Up to 240 tests/hour
On-board Stability	28 days
Calibration Interval	14 days
LoB	0.50 pg/mL (ng/L)
LoD	1.60 pg/mL (ng/L)
LoQ (20% CV)	2.50 pg/mL (ng/L)
LoQ (10% CV)	<6.0 pg/mL (ng/L)
99th percentile	47.3 ng/L (pg/mL)

Cardiac Menu

	<u>Atellica® Solution</u>	<u>ADVIA Centaur® Systems</u>	<u>Dimension EXL® Systems</u>	<u>Dimension Vista® Systems</u>	<u>IMMULITE® Systems</u>	<u>Stratus® CS Systems</u>
BNP	√	√				
CKMB Mass	√	√	√	√	√	√
CKMB Isoenzyme			√	√		
High-Sensitivity CRP			√	√	√	√
High-Sensitivity Troponin I	√	√ ¹				
Myoglobin	√	√	√	√	√	√
NT-proBNP			√	√		√
TnI-Ultra™	√ [‡]	√ [‡]				
Troponin I			√ [‡]	√ [‡]	√	√ [‡]

[‡]Guideline-acceptable

¹ Available on the ADVIA Centaur XP and XPT Systems only

The products featured here may not be commercially available in all countries. Due to regulatory restrictions, their future availability cannot be guaranteed. Please contact your local Siemens Healthineers representative for further details.

Guidelines for Using Troponin to Diagnose AMI

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Video: Frank Peacock, MD, FACEP, FACC, discusses the assays used to detect circulating troponin for fast diagnosis of acute myocardial infarction and the impact this has on patient outcomes.



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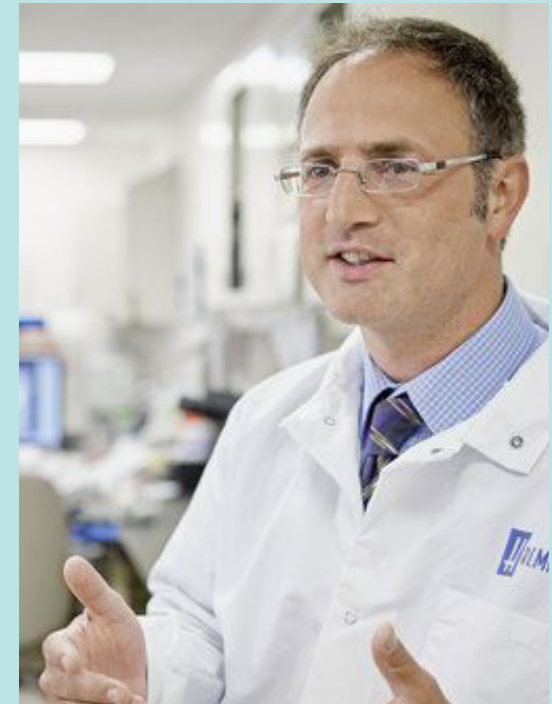
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High-Sensitivity Troponin I Assays: A Breakthrough in AMI Diagnosis.

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High-Sensitivity Troponin in the ED

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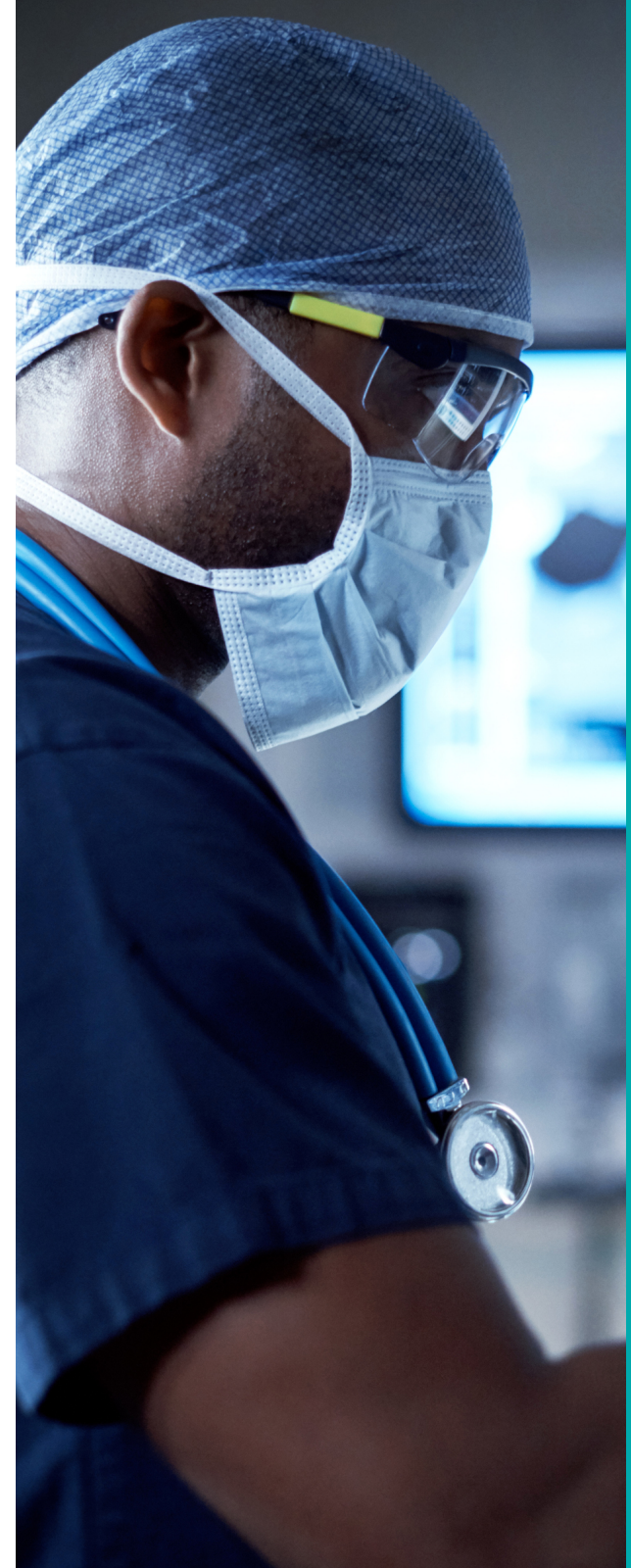
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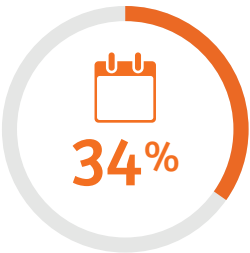




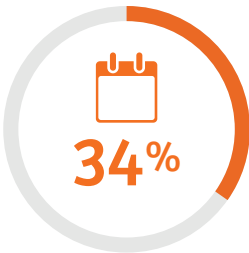
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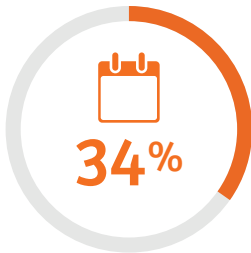
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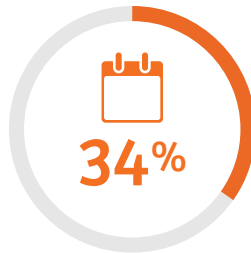
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High-Sensitivity Troponin in the Clinical Lab

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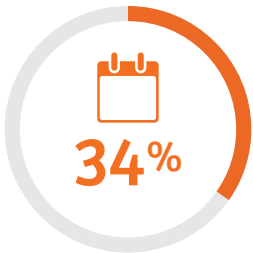
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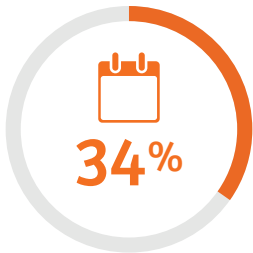


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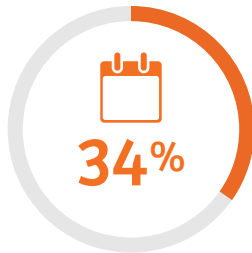
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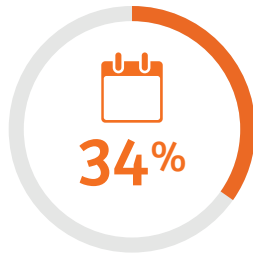
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High-Sensitivity Troponin for Hospitals

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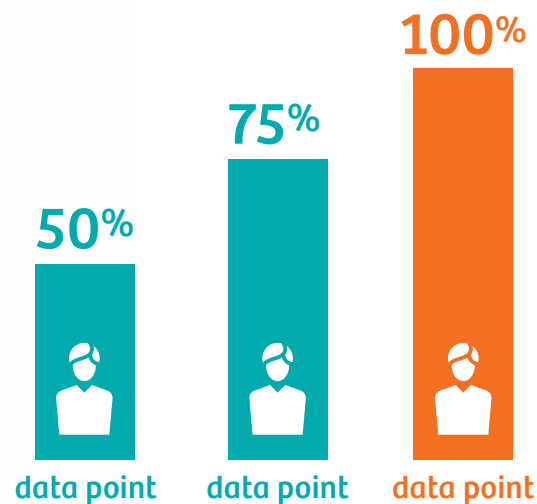
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