Abbott

CORE DIAGNOSTICS

STRATIFYING FUTURE CARDIAC RISK

How Abbott's High Sensitive Troponin-I test can help to identify risk of future cardiac events in the asymptomatic population and inform appropriate treatment decisions for your patients – a physician resource.

HIGH SENSITIVE TROPONIN-I

FOR USE IN ASYMPTOMATIC PATIENTS

Abbott's High Sensitive Troponin-I (hsTnI) cardiac specific biomarker was the first laboratory test to be commercially available that aids in predicting future cardiac events in asymptomatic individuals. In conjunction with clinical and diagnostic findings, it may be used to help stratify the risk of cardiovascular disease (CVD), including cardiovascular (CV) death, myocardial infarction (MI), coronary revascularisation, heart failure (HF) or ischemic stroke in asymptomatic individuals.[1,2]

If patients can be better stratified, then their care pathways will be clearer and measures can be put in place to help prevent further disease, potentially saving and improving lives.

WHY ABBOTT'S HIGH SENSITIVE TROPONIN-I?

Abbott's hsTnI is the first biomarker that uses the unmatched power of cardiac specificity, substantiated by published studies of over 100,000 people,[1–3] to help identify the risk of future cardiac events in the apparently healthy population. The results should be used in conjunction with clinical and diagnostics findings to help patients manage their cardiac risk, with appropriate support. Abbott's hsTnI can be integrated into daily practice and added to existing patient wellness checks, helping to inform clinical decision-making.

HIGH SENSITIVE TROPONIN-I AND ITS USES

Abbott's hsTnI test is a chemiluminescent, microparticle immunoassay for the quantitative determination of cardiac troponin-I in human plasma and serum. The cardiac troponin-I values can be used:[1,2]

AS DATA-GUIDED CV RISK STRATIFICATION IN ASYMPTOMATIC INDIVIDUALS

- In conjunction with clinical and diagnostic findings, it aids in categorizing asymptomatic individuals at risk of CVD, including CV death, MI, coronary revascularisation, HF or ischemic stroke.

TO ENHANCE CLINICAL DECISION MAKING IN EMERGENCY SETTINGS

- As an aid in the diagnosis of MI
- To aid in the assessment of 30-day and 90-day prognosis relative to all-cause mortality and major adverse cardiac events consisting of MI, revascularisation, and cardiac death in patients who present with symptoms suggestive of acute coronary syndrome (ACS).

HIGH SENSITIVE TROPONIN-I AND CVD

CVD is the number 1 cause of death worldwide. In 2019, there were an estimated 523 million patients with CVD.[3] Around 47% of sudden cardiac deaths occur outside the hospital.[4]

Cardiac troponin-I is a cardiac-specific biomarker for myocardial injury (e.g., AMI).[3] Troponin-I, in conjunction with troponin-C and troponin-T, plays an integral role in the regulation of muscle contraction.[1,2] The cardiac isoform of troponin-I is distinct from other isoforms, exhibiting only 60% similarity with the skeletal muscle isoform.[5]

Cardiac troponin is the preferred biomarker for the detection of myocardial injury based on improved sensitivity and superior tissue specificity compared to other available biomarkers of necrosis, including CK-MB, myoglobin, lactate dehydrogenase and others.[1,2]

hsTnI assays can detect elevated levels of cardiac troponin-I (above the 99th percentile of an apparently healthy reference population) within three hours after onset of chest pain.[1,2]

STRATIFYING RISK IN ASYMPTOMATIC INDIVIDUALS

There are a variety of CV risk prediction models currently available, many of which estimate CV risk by taking into account the presence of CV risk factors. This method of stratifying CV risk poses challenges, in particular in the local setting and between patients of different ethnicities.[6,7] Existing models also have specific limitations, such as applicability only in certain populations and the ability to measure only a limited number of CV outcomes.

LIMITATIONS OF VARIOUS CV RISK SCORING SYSTEMS

RISK SCORING SYSTEM	LIMITATIONS
European SCORE risk chart[6]	• Estimates only fatal CV risk • May not be applicable in non-European populations • Limited to the major determinants of risk • Limited age range (40–65 years)
SCVD risk score calculator (AHA/ACC)	• May overestimate CV risk in both men and women[7] • Inferior to the Framingham Risk Score in identifying high CV risk individuals when evaluated in an Asian population[8]
Framingham Risk Score[9]	• May overestimate CV risk in both men and women[7] • May not be accurate in those with markedly elevated risk factors (e.g. those with markedly elevated LDL levels)[10]

CV RISK STRATIFICATION OF ASYMPTOMATIC PATIENTS USING ABBOTT'S hsTnI

Abbott's hsTnI blood test can more accurately predict which asymptomatic individual is likely to be at low, moderate or elevated risk for future adverse cardiac events. In conjunction with clinical and diagnostic findings, individuals at higher-risk can then be directed to where their condition will be best managed, in turn helping to prevent adverse cardiac outcomes.

The following cut-off points may be used to aid in categorizing the risk of CVD in asymptomatic individuals: [1,2,11]

TROPONIN LEVEL		INTERPRETATION
MALE (pg/mL)	FEMALE (pg/mL)	
<6	<4	**Low risk** of a future cardiac event
≥6 to ≤12	≥4 to ≤10	**Moderate risk** of a future cardiac event
>12	>10	**Elevated risk** of a future cardiac event

In conjunction with clinical and diagnostics findings, sex-specifc thresholds help enable clinicians to appropriately stratify an individual's risk of a future cardiac event and prioritize preventative measures for each person to help improve their cardiac health.

This strategy also provides greater accuracy in identifying lower risk patients and may avoid unnecessary investigations, treatments and potential side effects, compared to existing CV risk stratification tools.[11]

CV risk stratification, in this context, refers to the use of hsTnI as a tool for identifying and predicting who is likely to be at low, moderate or elevated risk for future adverse CV events, such as heart attack, heart failure or death. Accurately identifying the risk of a future CV event is paramount to help ensure patients receive the appropriate care in a timely manner.

IT'S MORE THAN A TEST. IT'S INSIGHT TO ENHANCE CLINICAL DECISION-MAKING.

Several studies have demonstrated the clinical utility of Abbott's hsTnI test in the assessment of CV risk[11–14]

CLINICAL EVIDENCE OF hsTnI IN CV RISK STRATIFICATION OF ASYMPTOMATIC INDIVIDUALS

NORD-TRØNDELAG HEALTH (HUNT) STUDY

The HUNT study was a prospective observational study that included 9,005 participants that were free from known CVD at baseline.[11]

ASSOCIATION BETWEEN hsTnI CONCENTRATIONS AND CV DEATH OR ADMISSION FOR AMI OR HF

		UNADJUSTED HAZARD RATIO (EVENTS = 733)
hsTnI (ng/L)	<4 (♀); <6 (♂)	REF
≥6 to ≤12	4–10 (♀); 6–12 (♂)	4.33 (3.69–5.08)
<6	>10 (♀); >12 (♂)	9.76 (7.97–11.95)

KEY FINDINGS:

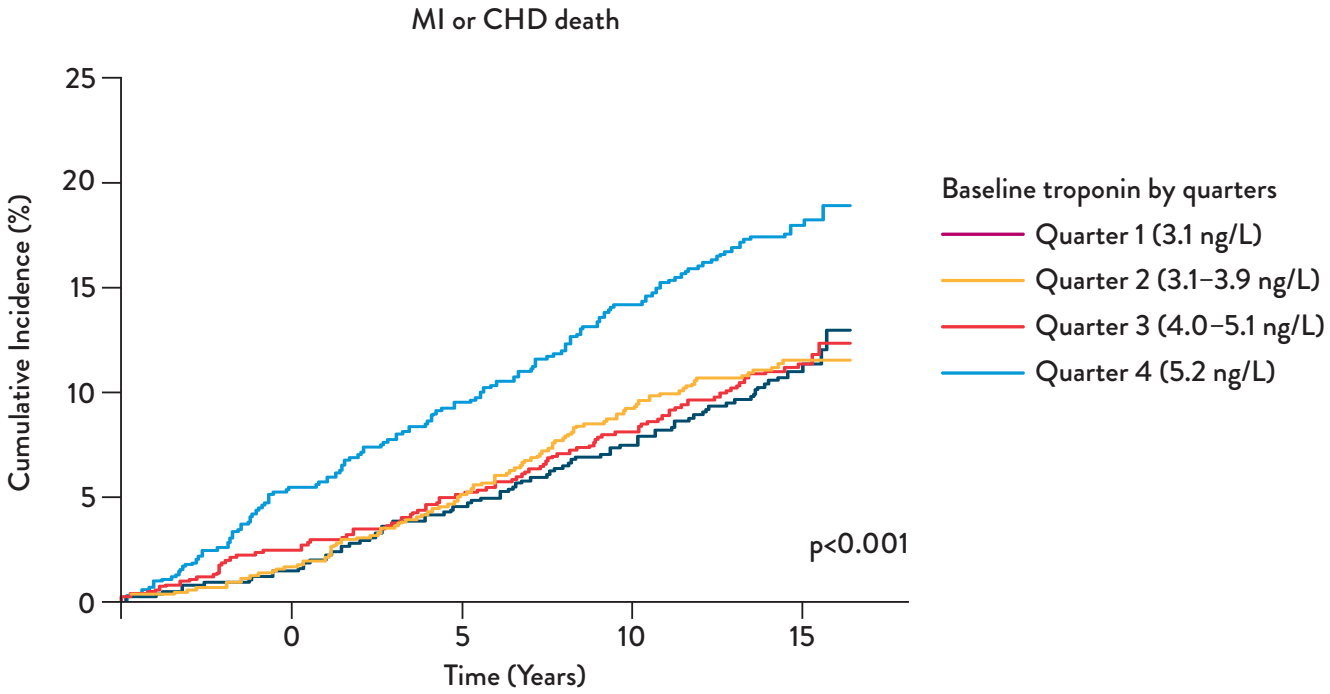
- Compared with individuals in the lowest hsTnI category (<4 ng/L for women and <6 ng/L for men):
  - Those in the highest hsTnI category (>10 ng/L for women and >12 ng/L for men) had a hazard ratio of 9.76
  - Those with hsTnI of 4–10 (women) or 6-12 ng/L (men) had a hazard ratio of 4.33
- Addition of hsTnI to the Framingham Risk Score[9] showed an improvement in net reclassification index (NRI 0.3456). This indicates that hsTnI reclassified subjects ~68% more accurately than hsCRP.

CLINICAL EVIDENCE OF hsTnI IN CV RISK STRATIFICATION OF ASYMPTOMATIC PATIENTS

WEST OF SCOTLAND CORONARY PREVENTION STUDY (WOSCOPS)

WOSCOPS randomised men with raised low-density lipoprotein cholesterol and no history of AMI to pravastatin 40 mg once daily or placebo for 5 years.[12]

CUMULATIVE INCIDENCE OF CV OUTCOMES BY BASELINE hsTnI



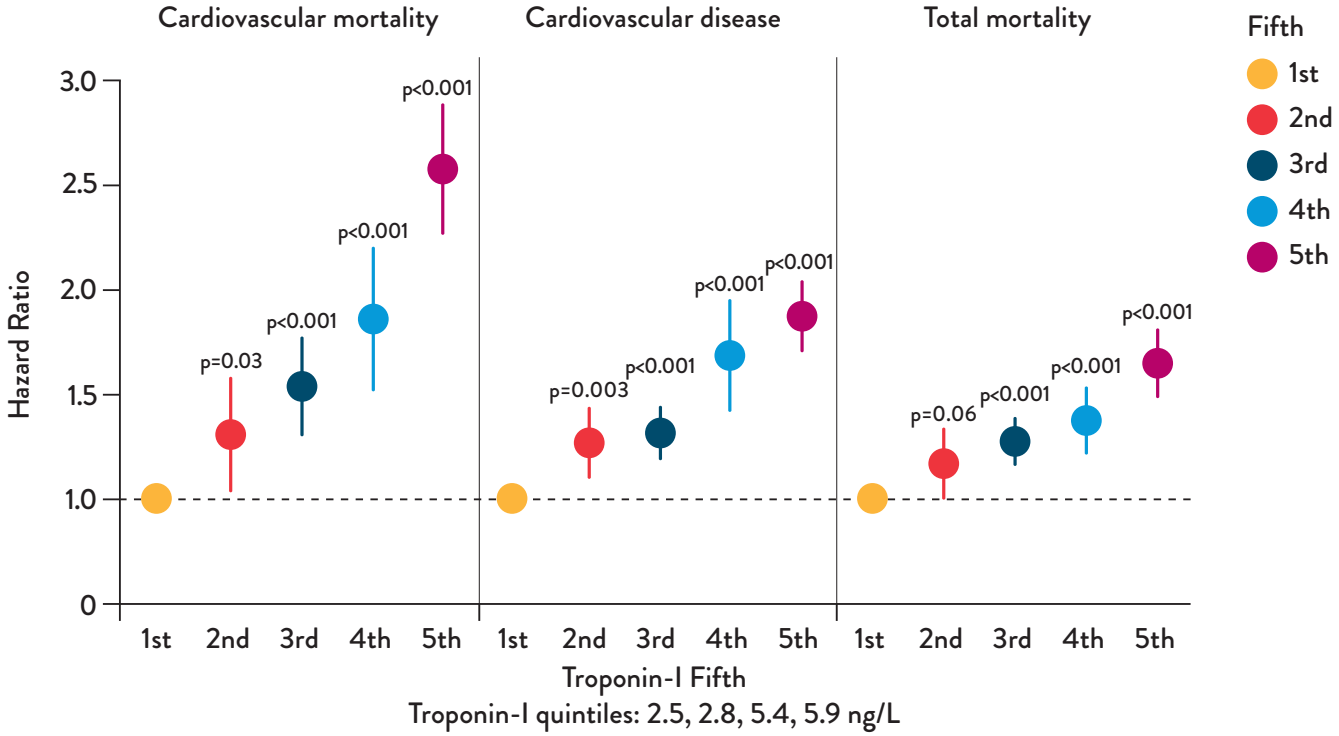
KEY FINDINGS:

- Compared to the lowest quarter (≤3.1 ng/L), patients in the highest quarter (≥5.2 ng/L) were at the highest risk for non-fatal MI or death from coronary heart disease at 5 and 15 years (HR 2.27)
- Pravastatin reduced troponin concentration and doubled the number of men whose troponin fell by more than a quarter, which identified them as having the lowest risk for future coronary events (1.4% over 5 years).

BIOMARKERS FOR CARDIOVASCULAR RISK ASSESSMENT IN EUROPE (BIOMARCARE) PROJECT

The BiomarCaRE project analyzed individual-level data from 10 prospective population-based studies. The analysis was able to include 74,738 participants.[13]

RISK OF OUTCOMES BY TROPONIN-I QUINTILES



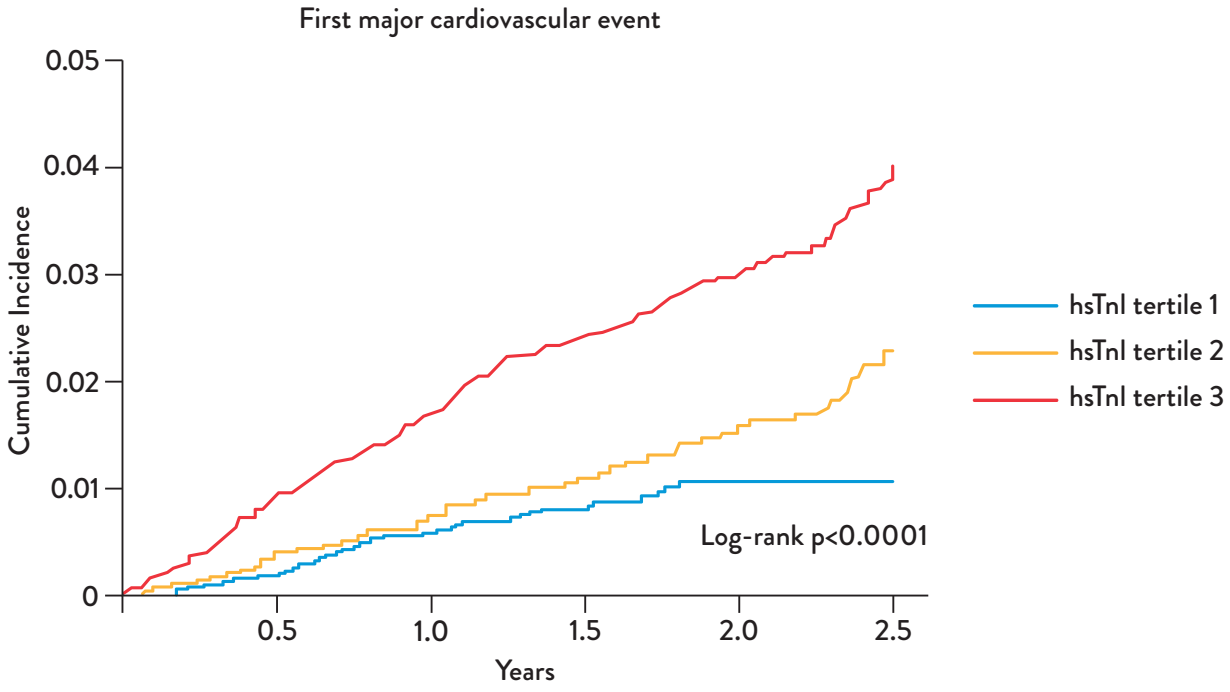
KEY FINDINGS:

- Individuals in the top fifths of the troponin-I distribution, compared with the bottom fifth, had a 160% increase in mortality from CV causes, 92% increase in risk for a first CV event, and a 63% increase in the risk of overall mortality.

JUPITER STUDY

The Justification for the Use of Statins in Prevention: An Intervention Trial Evaluating Rosuvastatin (JUPITER) trial measured the hsTnI levels of 12,956 enrolled individuals without CVD before randomisation to treatment.[14] Participants were then followed up for a mean of 2 years.

CUMULATIVE INCIDENCE OF A FIRST MAJOR CV EVENT BY BASELINE TERTILE OF hsTnI



KEY FINDINGS:

- The incidence of the composite primary end point (i.e. the occurrence of a first major CV event) depended upon the hsTnI category
- Participants with hsTnI values in the top tertile were at increased risk of first major CV event, CV mortality and non-fatal MI.

FREQUENTLY ASKED QUESTIONS[15]

HOW DOES ABBOTT'S HIGH SENSITIVE TROPONIN-I BLOOD TEST COMPARE WITH THE CURRENT TOOLS USED BY PHYSICIANS?

The current tools, such as Framingham 2008[9] and SCORE (ESC), involve measurements that are not specific to the heart and are overly dependent on age, which may not necessarily provide the true cardiac risk status of a patient. Since troponin-I is specific to the heart, it can help to more accurately categorize patients' risk compared to the above-mentioned tools, as demonstrated in several publications, when used in conjunction with clinical and diagnostic findings.[11–14, 16]

WHAT DO YOU DO WITH ABBOTT'S HIGH SENSITIVE TROPONIN-I RISK STRATIFICATION RESULTS? IS THERE ANY SPECIFIC COURSE OF ACTION TO BE FOLLOWED?

Compared to above mentioned tools, Abbott's hsTnI more accurately categorizes a patient into low, moderate or elevated risk categories, and when used in conjunction with clinical and diagnostic findings, can help to inform clinical decision-making.

Healthcare providers should use clinical judgement and follow their recommended CV prevention guidelines to determine the standard of care based upon their patients' level of risk. The risk category and the guidelines followed at their (physicians') institution for CVD prevention in clinical practice will help determine the course of action.

IT'S MORE THAN A TEST.
IT'S CLINICAL CONFIDENCE.

The journey towards better CV outcomes in asymptomatic individuals should begin with a more accurate risk assessment, in conjunction with clinical and diagnostic findings. To add Abbott's High Sensitive Troponin-I cardiac specific blood test to your patient's health check, please contact your local Abbott Diagnostics representative.

ABBOTT'S hsTnI SPECIFICATIONS[1,2]

	Alinity i STAT hsTnI	ARCHITECT STAT hsTnI
Specimen Type	**Serum:** With and without separator; serum with thrombin-based clot activator **Plasma:** Lithium Heparin with and without separator; K2 EDTA and K3 EDTA	
Sample Volume	Priority: 210 µL for the first test plus 160 µL for each additional	
Limit of Quantitation (LoQ)	≤3.2 ng/L†	
Limit of Detection (LoD)	LoD ranged from 0.7 to 1.6 ng/L	LoD range from 1.1 to 1.9 ng/L
Limit of Blank (LoB)	LoB ranged from 0.1 to 1.0 ng/L	LoB range from 0.7 to 1.3 ng/L
99th Percentile; Precision at the 99th Percentiles	**Overall** = 26.2 ng/L 4.0%CV; **Females** = 15.6 ng/L 5.3% CV **Males** = 34.2 ng/L 3.5% CV	

CV = concentration value

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For *in vitro* diagnostic use

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