



THE DIAGNOSTIC GAP IN HEART DISEASE

Substantial need for modern low-cost, effective front-line cardiac testing tools

THE GLOBAL BURDEN OF CARDIOVASCULAR DISEASE (CVD):

- An estimated 17.7 million people died from CVD in 2015, representing **31%** of all global deaths¹ with heart disease accounting for the majority of CVD deaths.
 - CVD represents the largest expenditure for most health authorities around the world. Each year, CVD accounts for more than **\$300 billion** in direct costs and \$235 billion in lost productivity in the United States², as well as nearly **€111 billion** in direct costs and €99 billion in lost productivity in the European Union.³
 - As populations age, the economic and human costs of CVD will only continue to rise.
 - By 2035, total costs in the United States will top **\$1.1 trillion**.³
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FINDING THE PATIENTS THAT NEED TREATMENT THE MOST IS A SIGNIFICANT PROBLEM:

- Lack of low cost, effective front-line tools drive up costs in both **symptomatic and asymptomatic patients**.
 - More than half of patients find out they have heart disease through an adverse event such as a heart attack – having not demonstrated traditional cardiac symptoms in advance of the event.⁴
 - 50% of men and 64% of women who die suddenly of a heart attack had no symptoms.⁴
 - Approximately 47% of sudden cardiac deaths occur outside of a hospital.⁵
 - For patients who do survive, the average total hospital cost of treating a heart attack will set them back more than **\$21,500** in the United States.⁶
 - Electrocardiograph (ECG) is a key frontline tool used by physicians to detect heart disease, yet limited innovations have occurred since it was invented in 1903.
 - Current ECGs have a limited sensitivity in detecting coronary or structural heart disease. Healthcare guidance around the world does not recommend use of ECG testing on asymptomatic patients.⁷
 - The next steps in the cardiac diagnostic process typically involve much more expensive testing procedures that may involve patient risks and are not feasible as front-line tests.
 - The lack of low cost, effective front-line tools for cardiac testing has led to substantial testing with low yields. Duke University conducted a review of 400,000 patients in the United States undergoing invasive catheterization. It found that **only 38%** of patients without previously known heart disease who underwent invasive angiography had obstructive coronary artery disease.⁸
 - An invasive angiogram, costs **\$8,500** on average in the United States and **£2,000** on average⁹ in the United Kingdom.
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INNOVATION IS NEEDED: EXISTING ECG TECHNOLOGY WAS INVENTED 1903, THE SAME YEAR THAT:

- Marie Curie became the first woman to win a Nobel Prize for her pioneering research on radioactivity.
- The Wright brothers completed the first successful flight.
- The treaty to begin construction on the Panama Canal was signed.
- The first Tour de France took place.

¹ World Health Organization. (2017, May). *Cardiovascular diseases (CVDs)*. Retrieved from <http://www.who.int/mediacentre/factsheets/fs317/en/>

² American Heart Association and American Stroke Association. (2017). *Cardiovascular Disease: A Costly Burden for America – Projections through 2035*. Retrieved from https://www.heart.org/idc/groups/heart-public/@wcm/@adv/documents/downloadable/ucm_491543.pdf.

³ European Heart Network. (2017, Feb.). *European Cardiovascular Disease Statistics: 2017 Edition*. Retrieved from <http://www.ehnheart.org/cvd-statistics.html>

⁴ American Heart Association. (2017, March 7). *Heart Disease and Stroke Statistics—2017 Update: A Report from the American Heart Association*. Retrieved from <http://circ.ahaajournals.org/content/early/2017/01/25/CIR.0000000000000485>.

⁵ CDC. State Specific Mortality from Sudden Cardiac Death: United States, 1999. *MMWR*. 2002;51(6):123–126

⁶ Agency for Healthcare Research and Quality (AHRQ). (2012, July 10). *Cardiovascular/Cerebrovascular Conditions and Procedures, 2001–2012*. Retrieved from <https://www.hcup-us.ahrq.gov/reports/projections/2012-02.pdf>

⁷ Guidelines from the U.S. Preventive Services Task Force (USPSTF) (2011), (AAFP) (2011), (ACC) (2010), and the American Heart Association (AHA) (2010).

⁸ *N Engl J Med* 2010;362:886-95 Duke Study.

⁹ Private Health UK. (2017). *Coronary Angiogram Costs*. Retrieved from <http://www.privatehealth.co.uk/conditions-and-treatments/coronary-angiogram/costs/>