

HSE360, BERLIN 07.10.2024



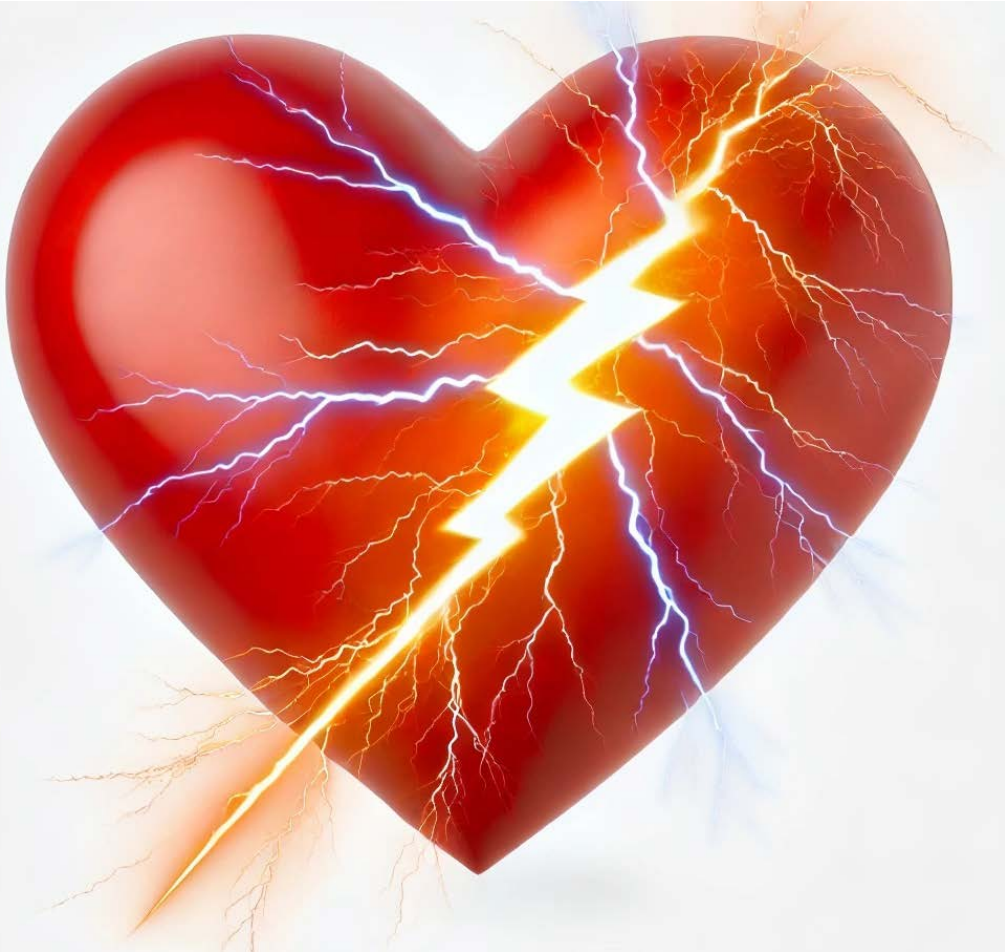
AI IN CORPORATE WELLBEING

Dr. med. Kai Haas



SALZGITTER AG
Mensch, Stahl und Technologie

SILENT KILLER

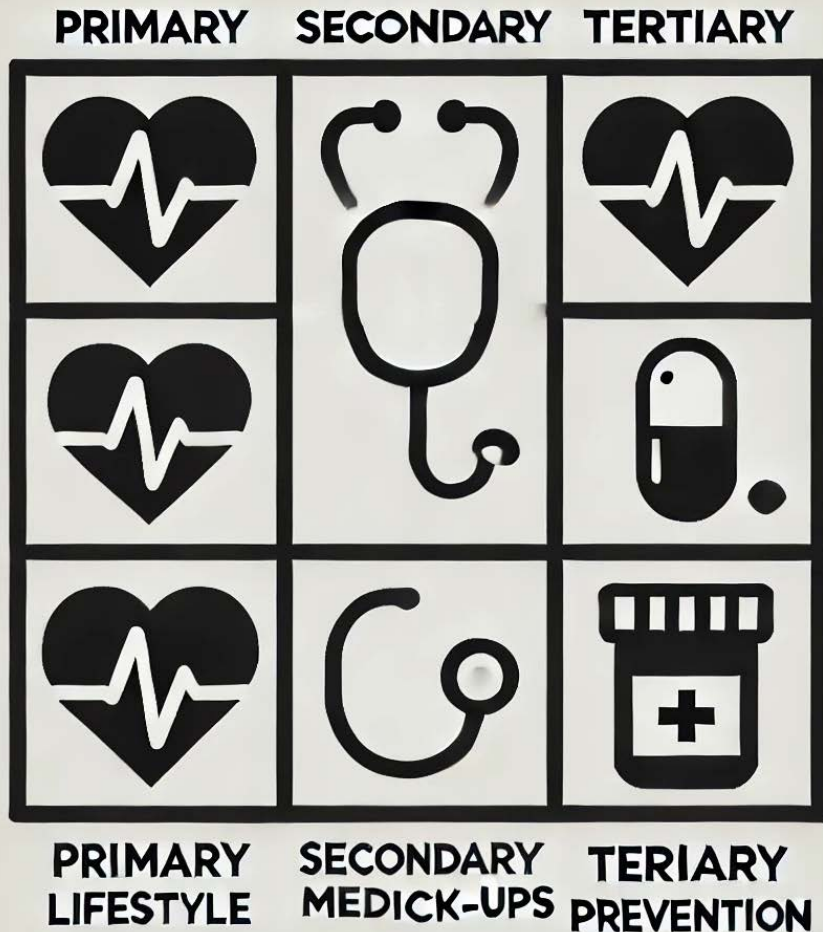


The lifetime risk of atherosclerotic cardiovascular disease (CVD) for persons at age 50 years, on average, is estimated to be 52% for men and 39% for women.

/ 30% to 50%: No (typical) symptoms

/ Silent heart attacks more common in women

LINE OF DEFENSE



/ Primary Prevention:

Preventing disease before it occurs

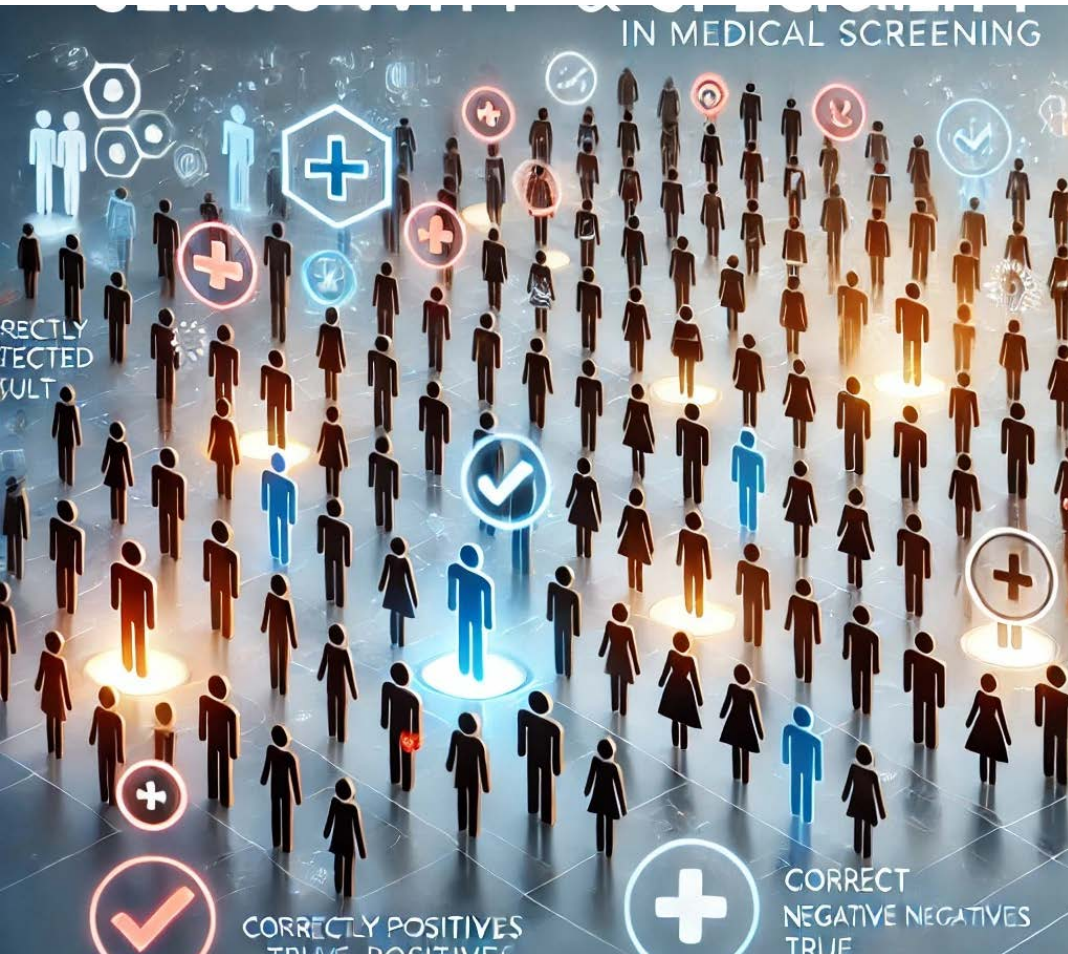
/ Secondary Prevention:

Early detection and intervention to halt or slow the progression of a disease

/ Tertiary Prevention:

Managing and mitigating the impact of an already established disease

IDENTIFYING THE RIGHT ONES IN MEDICAL SCREENING



/ Sensitivity: Refers to a test's ability to designate an individual with disease as positive

A highly sensitive test means that there are few false negative results, and thus fewer cases of disease are missed

/ Specificity: Ability of a test to designate an individual who does not have a disease as negative

A highly specific test means that there are few false positive results so you can avoid healthy people to potentially receive unnecessary diagnostic procedures

DETECTING CARDIOVASCULAR DISEASE



Method	Sensitivity (%)	Specificity (%)
Framingham risk score	71	63
Stress ECG	45-50	85-90
Stress-echocardiography	80-85	80-88
Myocardial perfusion scintigraphy	73-92	63-86
Stress magnetic resonance	67-94	61-91
PET scan	81-97	74-91
Coronary CT angiography	95-99	74-83

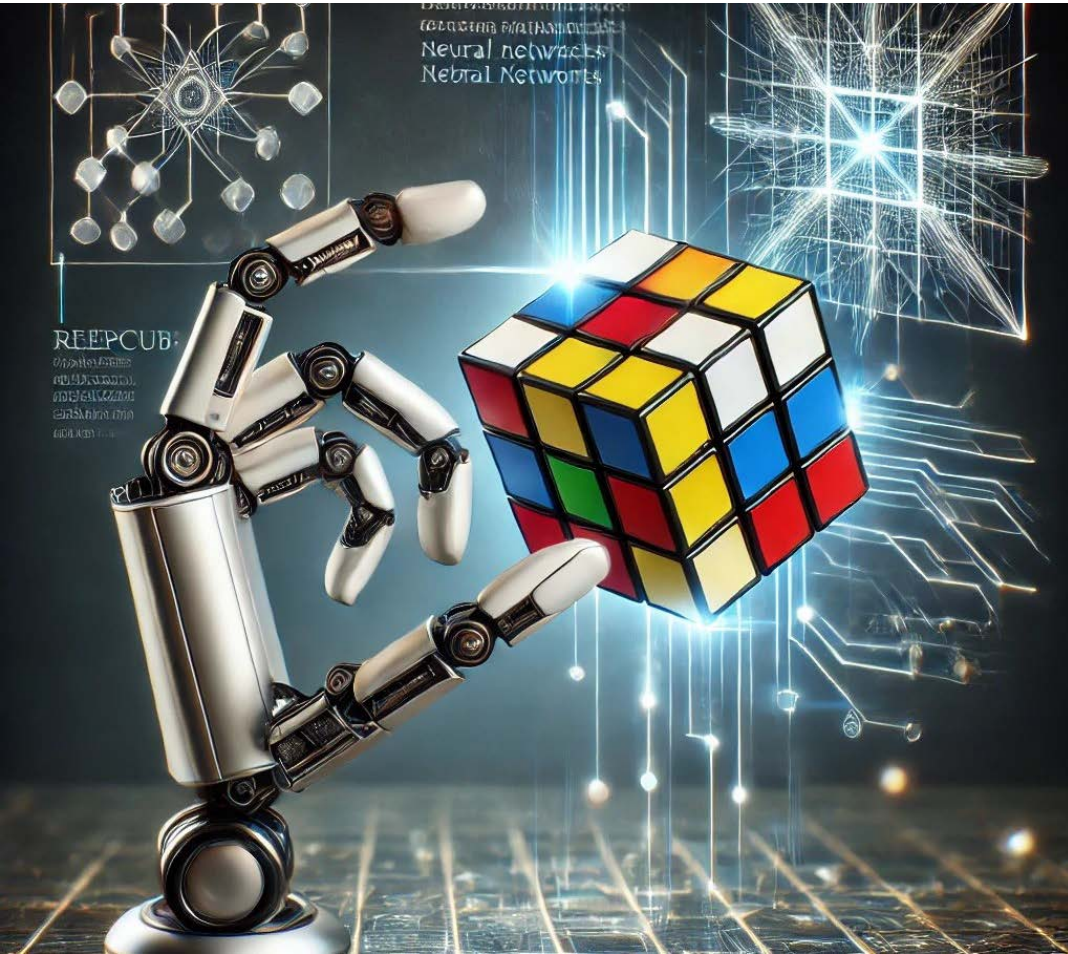
DEFINITION



Support of human intelligence in machines designed to think, learn, and problem-solve.

- / Ability to process vast amounts of data quickly
- / Can recognize patterns and make decisions
- / Enhances human abilities, especially in fields like healthcare

EXAMPLE: DEEPCUBEA

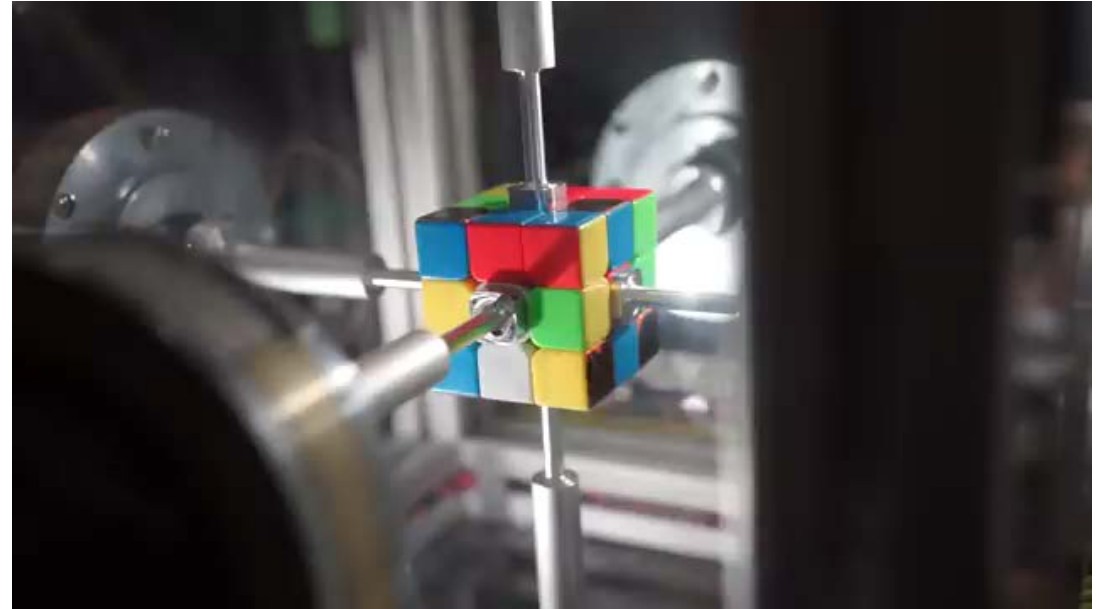


- / Solves Rubik's cube faster than humans (fraction of a second)
- / Deep reinforcement learning algorithm
- / Completions path typical ranging in the billions with only one goal state
- / DeepCubeA solved 100% of test configurations

HUMAN VS. AI&ROBOT:WORLD RECORD(S)

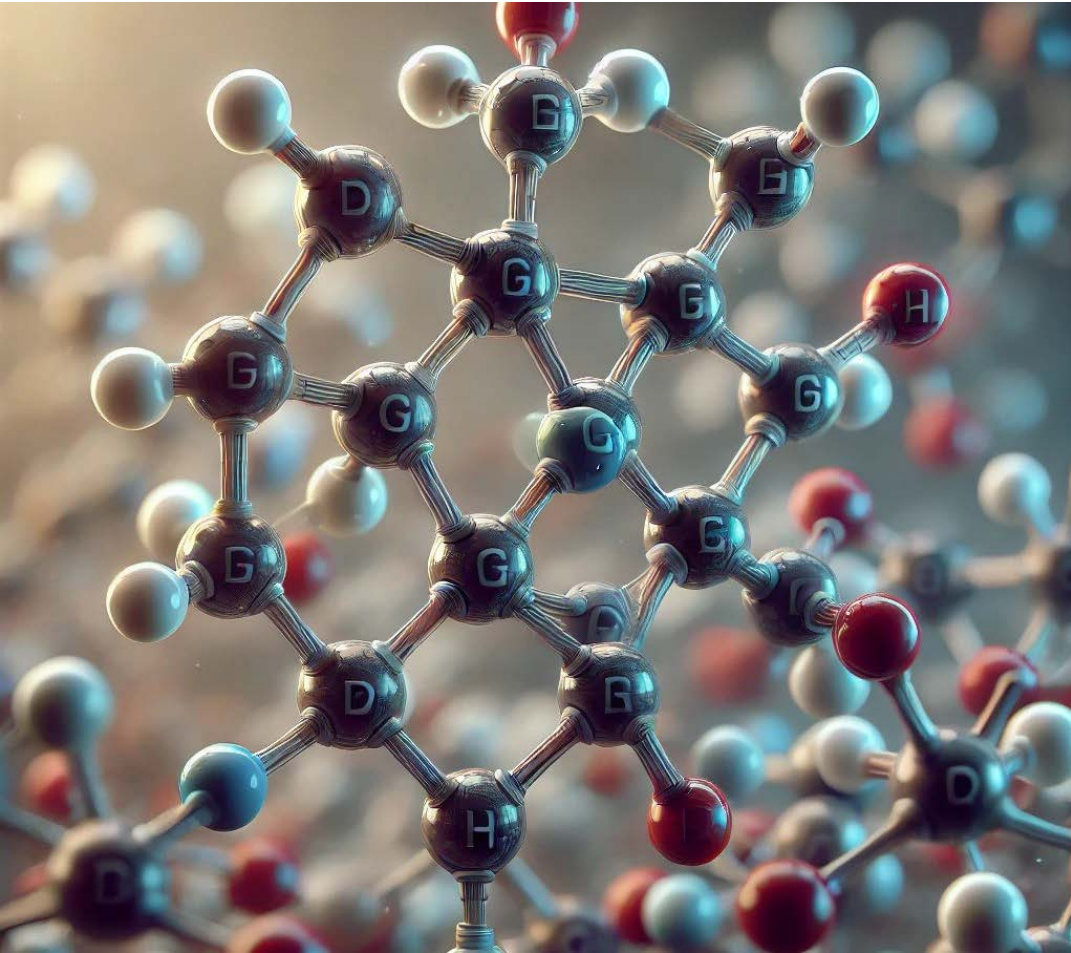


Max Park; US Cube Master; J une 11, 2024



TOKUFASTBot; Mitsubishi Electric; May 2, 2024

GAME CHANGER



AI already is already is driving innovation in medicine.

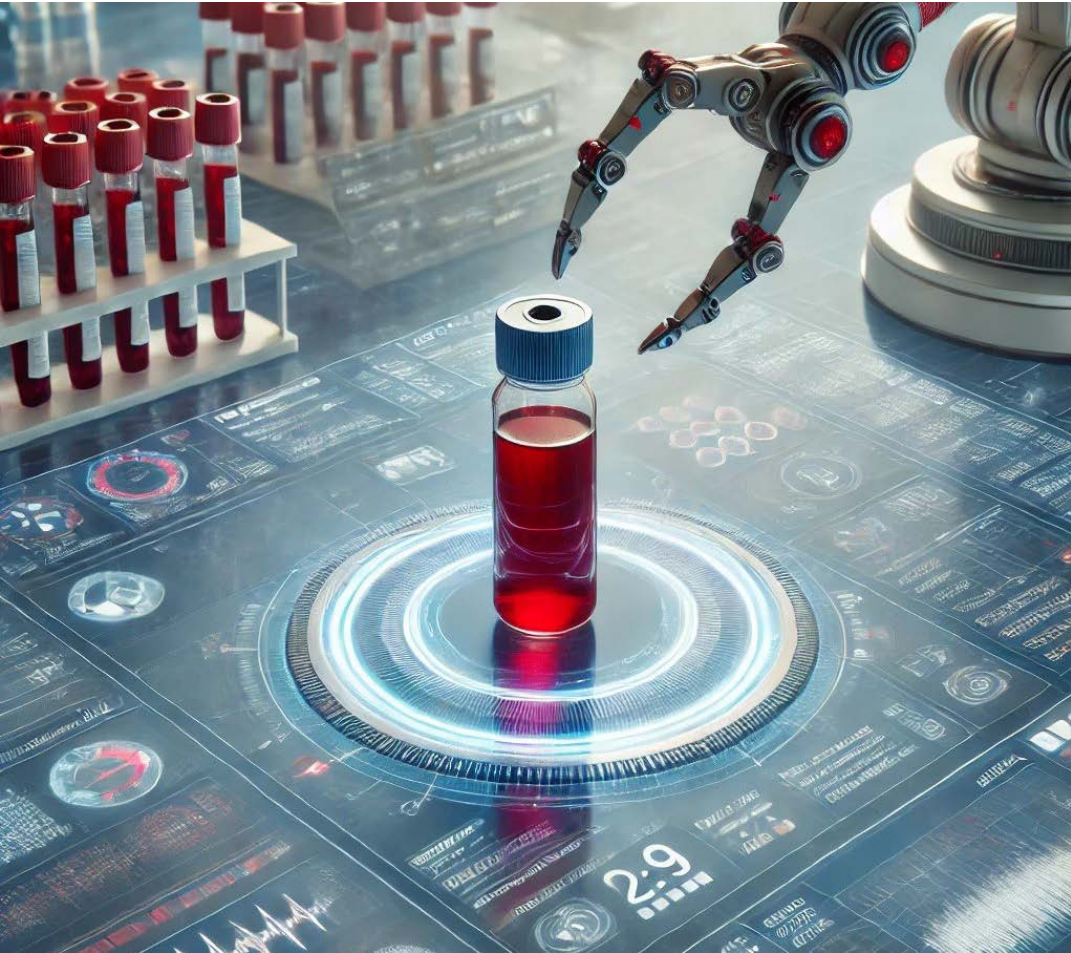
- / Disease diagnosis
- / Drug discovery
- / Personalized medicine
- / Robotic surgeries
- / Predictive analytics

DETECTING CARDIOVASCULAR DISEASE



Method	Sensitivity (%)	Specificity (%)
CE; low-risk population screening	98	83
CE; high-risk population	75	83
Framingham risk score	71	63
Stress ECG	45-50	85-90
Stress-echocardiography	80-85	80-88
Myocardial perfusion scintigraphy	73-92	63-86
Stress magnetic resonance	67-94	61-91
PET scan	81-97	74-91
Coronary CT angiography	95-99	74-83

CARDIOEXPLORER®



Cardioexplorer uses a blood, anamnesis, lifestyle data, blood pressure and ecg.

/ CardioExplorer has learned from data of literally thousands of patients

/ Conventional scores determine the risk within the next 10 years and are based on a limited number of data points

/ Cardioexplorer detects and analyzes complex patterns in regard to show the actual risk


DATAPPOINTS

Patient data (Units lab values: Conventional -)

Anamnesis	Medication	Clinical findings
<p>Patient ID <input type="text"/></p> <p>Input date <input type="text" value="TT.mm.]]]]"/></p> <p>Age, years <input type="text"/></p> <p>Sex <input type="button" value="female"/> <input type="button" value="male"/></p> <p>Height, cm <input type="text"/></p> <p>Weight, kg <input type="text"/></p> <p>Thoracic pain <input type="button" value="no"/> <input type="button" value="unspecific"/> <input type="button" value="possible"/> <input type="button" value="typical"/></p> <p>Nicotine consumption (NC) <input type="button" value="no"/> <input type="button" value="St. a. NC"/> <input type="button" value="yes"/></p>	<p>Diabetes <input type="button" value="no"/> <input type="button" value="NIDDM"/> <input type="button" value="IDDM"/></p> <p>Cholesterol lowering (Statin) <input type="button" value="no"/> <input type="button" value="yes"/></p> <p>Tc aggregation inhibitor <input type="button" value="no"/> <input type="button" value="yes"/></p> <p>ACE Inhibitor <input type="button" value="no"/> <input type="button" value="yes"/></p> <p>Ca Antagonist <input type="button" value="no"/> <input type="button" value="yes"/></p> <p>Betablocker <input type="button" value="no"/> <input type="button" value="yes"/></p> <p>Diuretic <input type="button" value="no"/> <input type="button" value="yes"/></p> <p>Organic Nitrate <input type="button" value="no"/> <input type="button" value="yes"/></p>	<p>Systolic blood pressure, mm HG <input type="text"/></p> <p>Diastolic blood pressure, mm HG <input type="text"/></p> <p>Resting ECG - pathological Q-wave consistent with previous heart attack <input type="button" value="no"/> <input type="button" value="yes"/> <input type="button" value="screening"/></p>
Enzymes	Diabetes	Metabolite
<p>Pancreatic amylase, U/L <input type="text"/></p> <p>Alkaline phosphatase, U/L <input type="text"/></p> <p>hs Troponin T <input type="text"/> , pg/ml</p> <p>ALAT, U/L <input type="text"/></p>	<p>Glucose <input type="text"/> , mg/dl</p>	<p>Bilirubin (total) , mg/dl <input type="text"/></p> <p>Urea , mg/dl <input type="text"/></p> <p>Uric acid , mg/dl <input type="text"/></p>
Lipids	Protein	Hematology
<p>Cholesterol (total) , mg/dl <input type="text"/></p> <p>HDL , mg/dl <input type="text"/></p> <p>LDL , mg/dl <input type="text"/></p>	<p>Protein (total), g/L <input type="text"/></p> <p>Albumin, g/L <input type="text"/></p>	<p>Leucocytes , Tausend/μl <input type="text"/></p> <p>MCHC , g/dl <input type="text"/></p>

ESC* RECOMMENDATIONS

Cardio Explorer® Readouts



Recomendations, further procedures	Range Score
No further examination necessary	0-0.71
Consider non-invasive examination	0.71-0.87
Non-invasive examination recommended	0.87-0.92
Non-invasive examination strongly recommended / Consider invasive examination	0.92-1

2019 ESC* recommendations

No testing (conservative therapy)
CCAT (morphological testing; ruling out)
MRI etc (functional testing; ruling in)
urgent MRI or CA (with FFR)

*European Society of Cardiology

HEALTH PROMOTION



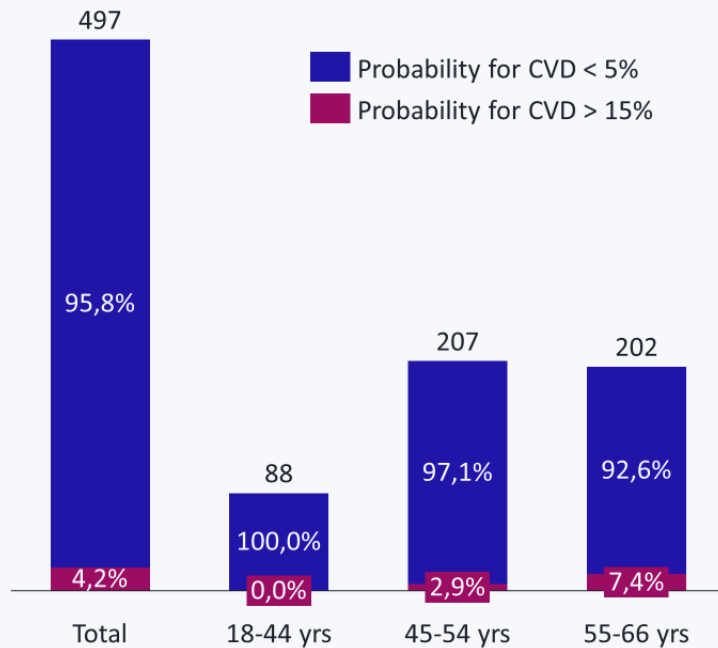
/ We offered CardioExplorer as voluntary health promotion (with a specific recommendation on risk factors that would increase the benefit of testing for the individual).

/ Collaboration with health insurance, hospital and public medical care center in regard to clinical pathways

/ Extensive information material for physicians and employees/ patients

RESULTS

—
Cardio Explorer® deployed at Salzgitter Flachstahl GmbH
01. March 2024 – 15. September 2024



497 tests were carried out

95.8% currently have no relevant risk for a relevant stenosis (CHD risk <5%)

4.4% received a positive result (CAD+ = CHD risk > 15%)

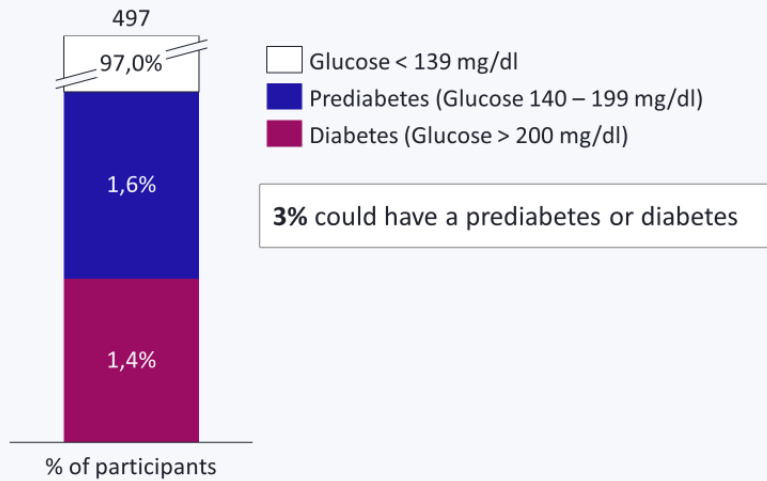
76.2% of those followed the recommended clinical pathway

According to the ESC guidelines, further specialist cardiological examination is indicated for these people (e.g. with CCTA etc.)!

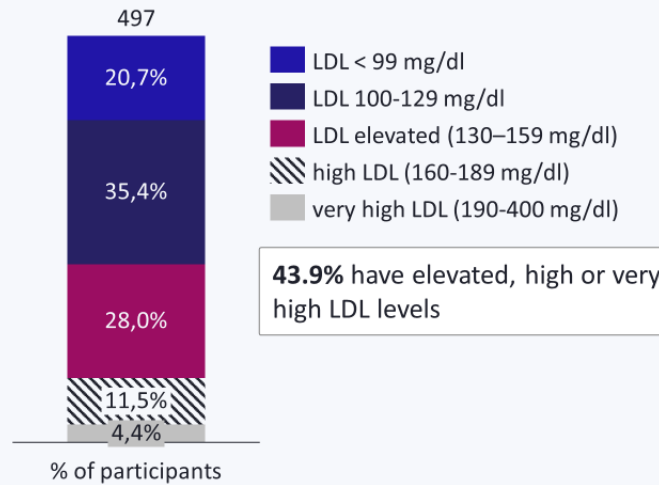
RISK FACTORS

—
Cardio Explorer® reveals undetected risk factors, such as diabetes or high LDL levels

An unhealthy **blood sugar** level on a non-fasting test is over 140 mg/dl. If blood sugar levels are between 140 and 199 mg/dL, you may have prediabetes. If blood sugar levels are above 200 mg/dl, this may indicate diabetes.



When it comes to **LDL cholesterol**, lower levels are better because high LDL levels can increase your risk of coronary heart disease and related problems. LDL levels below 129 mg/dl are considered optimal or near optimal.

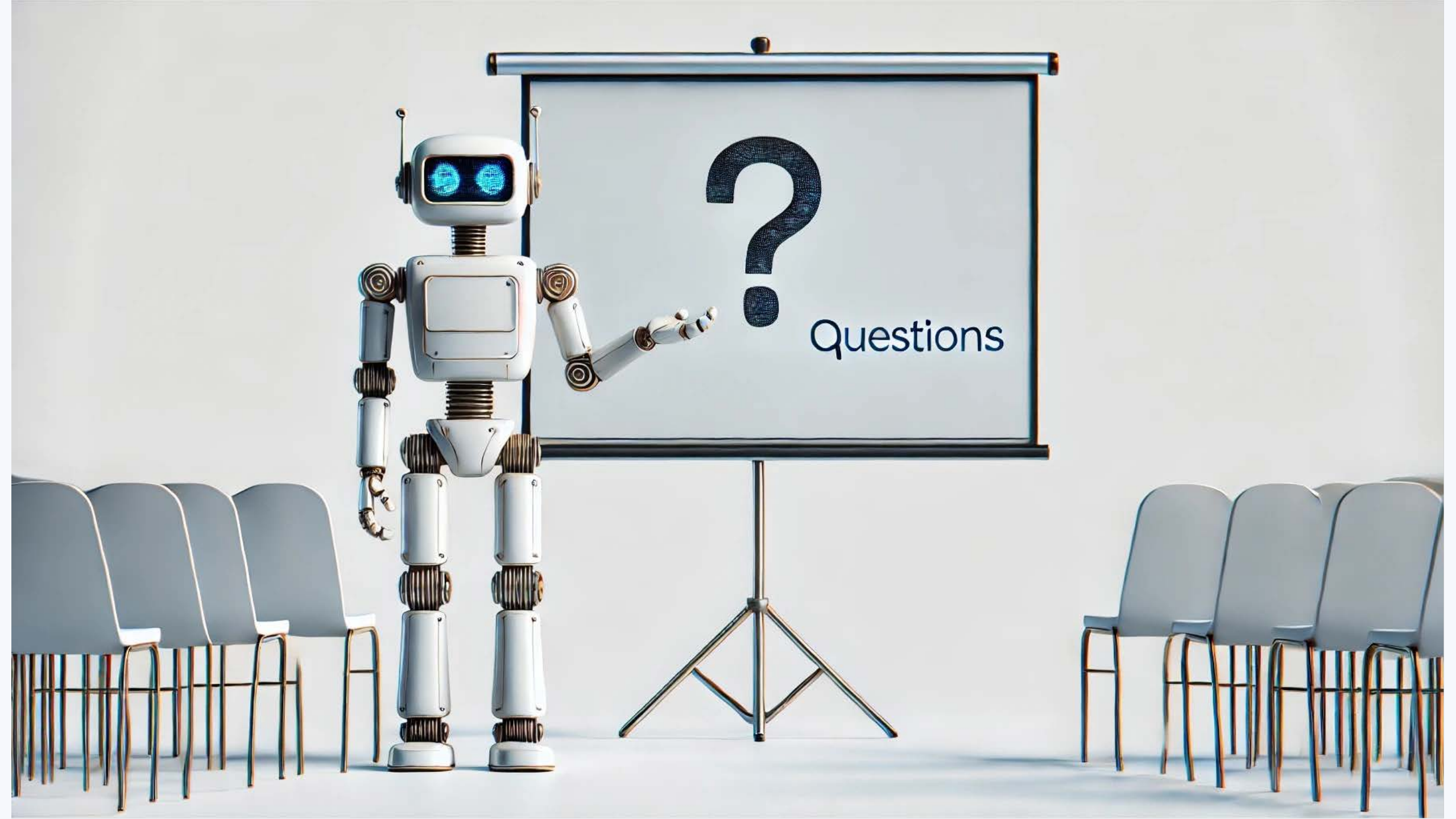


10

OUTLOOK



- / Integration of CardioExplorer® in regular check ups for a defined population
- / Stronger focus on potential risk factors selecting test participants
- / Combination of short term and long term risk scores to drive a healthy lifestyle



Questions