Having taken into consideration the NASA links provided for public health data we developed a health calculator.

The solution takes into account five key parameters to evaluate the risk of developing a heart disease. Following these key indications provided here:

https://www.cdc.gov/heartdisease/risk_factors.htm

Several health conditions, your lifestyle, and your age and family history can increase your risk for heart disease. These are called risk factors. About **half of all Americans**(47%) have at least one of the three key risk factors for heart disease: high blood pressure, high cholesterol, and smoking.

Some of the risk factors for heart disease cannot be controlled, such as your age or family history. But you can take steps to lower your risk by changing the factors you **can** control.

The factors we evaluate are:

1. Gender

2. Smoking habits (smoker/non smoker)

3. Age

4. Systolic blood pressure.

5. Cholesterol

1.Gender

Heart disease was the number one killer of both men and women from 2013.

3. **Age**

Your risk for heart disease increases as you get older.

4. Systolic blood pressure

High blood pressure is a major risk factor for heart disease. It is a medical condition that occurs when the pressure of the blood in your arteries and other blood vessels is too high. The high pressure, if not controlled, can affect your heart and other major organs of your body, including your kidneys and brain.

High blood pressure is often called a “silent killer” because many people do not notice symptoms to signal high blood pressure. Lowering blood pressure by changes in lifestyle or by medication can reduce your risk for heart disease and heart attack.

5. Cholesterol

Cholesterol is a waxy, fat-like substance made by the liver or found in certain foods. Your liver makes enough for your body’s needs, but we often get more cholesterol from the foods we eat. If we take in

more cholesterol than the body can use, the extra cholesterol can build up in the walls of the arteries, including those of the heart. This leads to narrowing of the arteries and can decrease the blood flow to the heart, brain, kidneys, and other parts of the body.

Some cholesterol is “good,” and some is “bad.” High cholesterol is the term used for high levels of low-density lipoprotein, or LDL, which are considered “bad” because they can lead to heart disease. A higher level of high-density lipoprotein cholesterol, or HDL, is considered “good” because it provides some protection against heart disease.

A blood test can detect the amount of cholesterol and triglycerides (a related kind of fat) in your blood.

According to this other resource provided by NASA:

Kochanek KD, Xu JQ, Murphy SL, Miniño AM, Kung HC. Deaths: final data for 2009 [PDF-500K]. Nat Vital Stat Rep. 2011;60(3).

the number one factor of deaths in 2009 amongst USA population was by heart diseases:

Rank[1]	Cause of death (based on the ICD–10, 2004)	Number	Percent of total deaths	2009 crude death rate	Age-adjusted death rate			
					2009	Percent change 2008 to 2009	Ratio Male to female	Ratio Black[2] to white
...	All causes	2,437,163	100.0	793.8	741.1	–2.3	1.4	1.3
1	Diseases of heart (I00–I09,I11,I13,I20–I51)	599,413	24.6	195.2	180.1	–3.4	1.6	1.3
2	Malignant neoplasms (C00–C97)	567,628	23.3	184.9	173.2	–1.2	1.4	1.2
3	Chronic lower respiratory diseases (J40–J47)	137,353	5.6	44.7	42.3	–3.9	1.3	0.7
4	Cerebrovascular diseases (I60–I69)	128,842	5.3	42.0	38.9	–4.4	1.1	1.5
5	Accidents (unintentional injuries) (V01–X59,Y85–Y86)	118,021	4.8	38.4	37.3	–3.9	2.1	0.8
6	Alzheimer's disease (G30)	79,003	3.2	25.7	23.5	–3.7	0.8	0.9
7	Diabetes mellitus (E10–E14)	68,705	2.8	22.4	20.9	–4.1	1.4	2.1
8	Influenza and pneumonia (J09–J18)	53,692	2.2	17.5	16.2	–4.1	1.4	1.1
9	Nephritis, nephrotic syndrome and nephrosis (N00–N07, N17–N19,N25–N27)	48,935	2.0	15.9	14.9	0.7	1.4	2.3
10	Intentional self-harm (suicide) (*U03, X60–X84,Y87.0)	36,909	1.5	12.0	11.8	1.7	3.9	0.4
11	Septicemia (A40–A41)	35,639	1.5	11.6	10.9	–1.8	1.2	2.0
12	Chronic liver disease and cirrhosis (K70,K73–K74)	30,558	1.3	10.0	9.2	0.0	2.1	0.7
13	Essential hypertension and hypertensive renal disease (I10,I12,I15)	25,734	1.1	8.4	7.7	0.0	1.1	2.5
14	Parkinson's disease (G20–G21)	20,565	0.8	6.7	6.4	0.0	2.3	0.4
15	Assault (homicide) (*U01–*U02,X85–Y09,Y87.1)	16,799	0.7	5.5	5.5	–6.8	3.6	5.4
...	All other causes (residual)	469,367	19.3	152.9	...	...	...	...

By taking into consideration all the above mentioned references we develop a formula for calculating heart disease risk.

We evaluate the risk to be a number in the range 1-26.

The formula we use is the SCORE recommended by european guidelines in cvd prevention.

https://www.nvvc.nl/media/richtlijn/148/2016_CVD_eurheartj.ehw106.full-1.pdf

Let's take all possible combinations for a specific example.

Female, 65 years old, 120 blood pressure,800 cholesterol, smoker.

According to the guidelines the parametrization of age is as below:

<=45--> 40 years old

>45 but < 53-->50 years old

>=53 but <58 → 55 years old

>=58 but <63 → 60 years old

>=63 → 65 years old

According to the guidelines the parametrization of systolic blood pressure (120-180) is as below:

<=130 → 120

>130 but <= 150 → 140

>150 but <=170 → 160

>170 → 180

According to the guidelines the parametrization of cholesterol is (150-800):

<=175 → 150

>175 but <=225 → 200

>225 but <=275 → 250

>275 but <=550 → 300

>550 → 800

After this parametrization to include age and gender we take into consideration the following graphics from the SCORE metodology:


SCORE
15% and over
10%–14%
5%–9%
3%–4%
2%
1%
<1%
10-year risk of fatal CVD in populations at low CVD risk
WOMEN
MEN
Non-smoker
Smoker
Non-smoker
Smoker
Age
65
60
55
50
40
Systolic blood pressure
180 160 140 120
4 5 6 7 8
Cholesterol (mmol/L)
150 200 250 300
mg/dL
© ESC 2016

By reading the table for the above specified example we get the risk of 4.

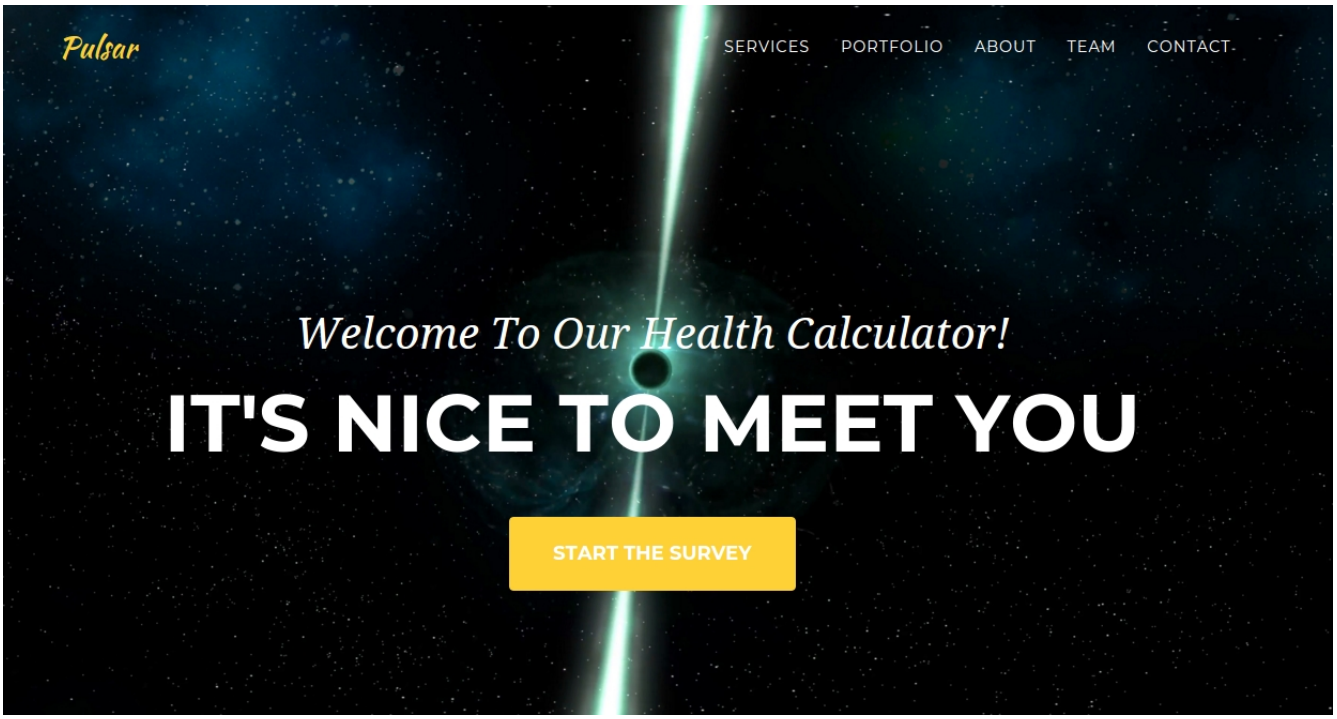
Our app:

Registers the above graphics in a tabular data.

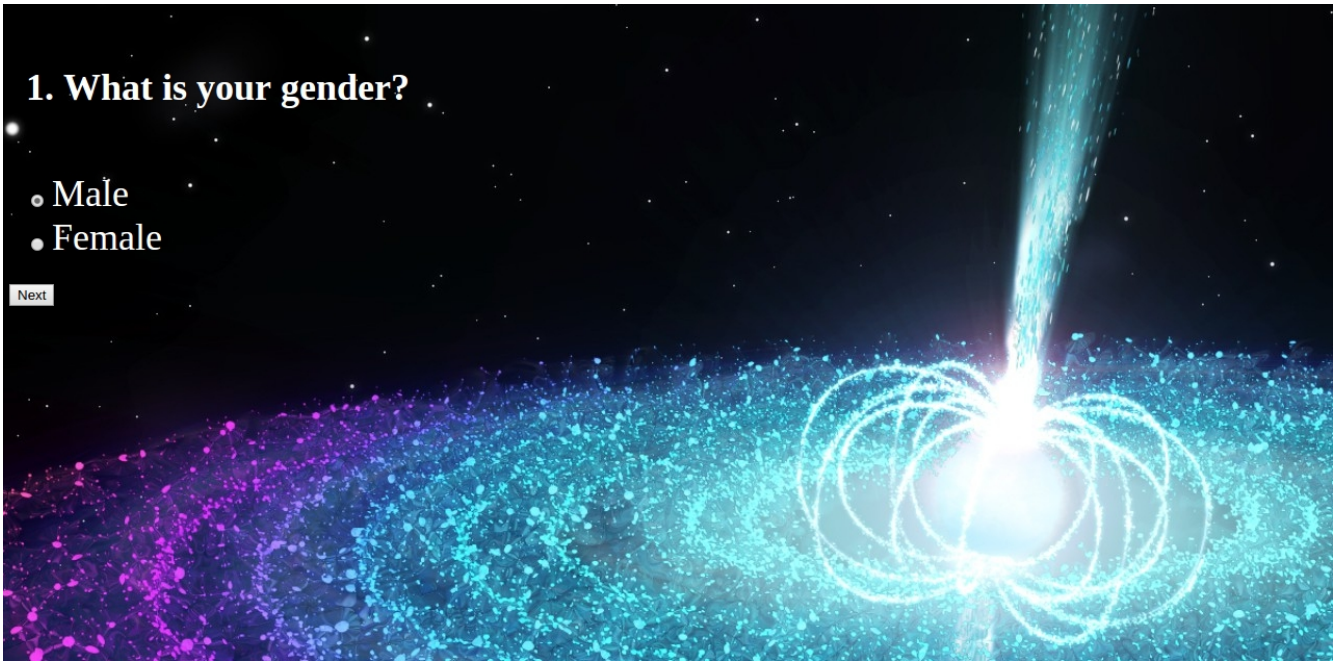
Has an integrated survey to get the data by questioning people taking the test.

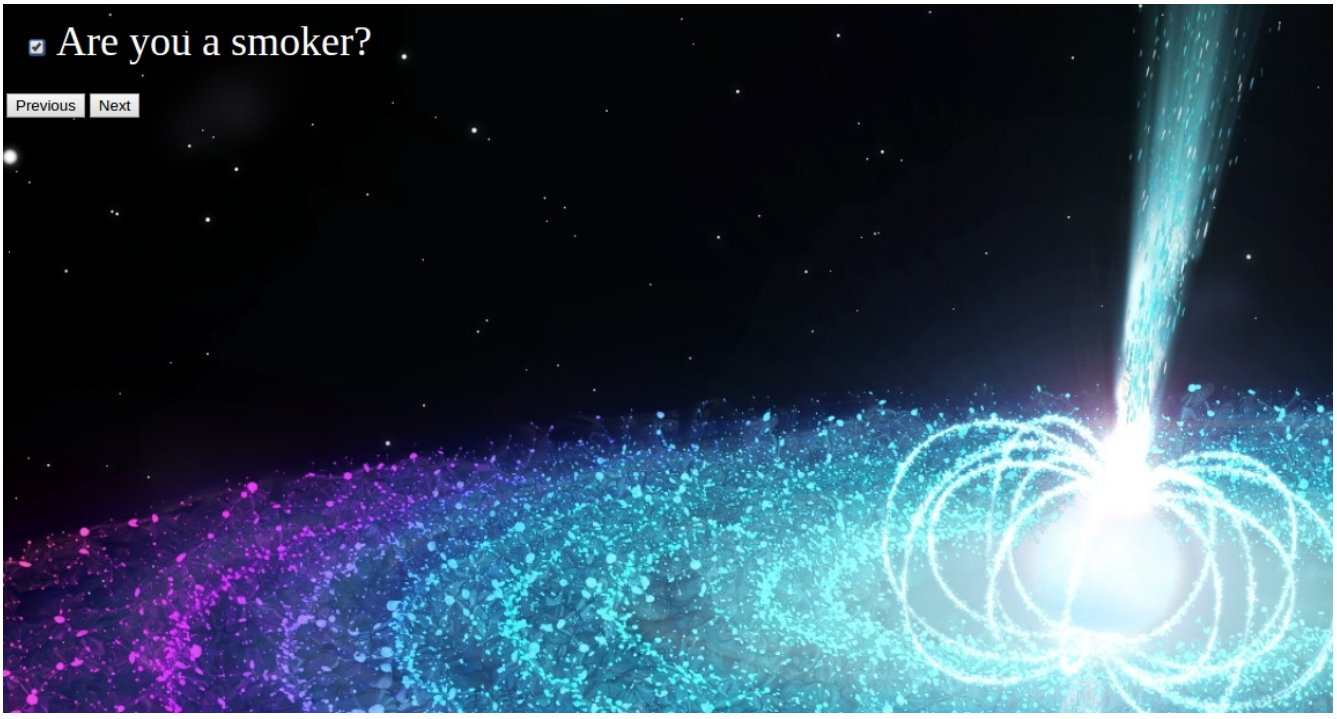
Shows the risk result via a widget/mail

Leading page:

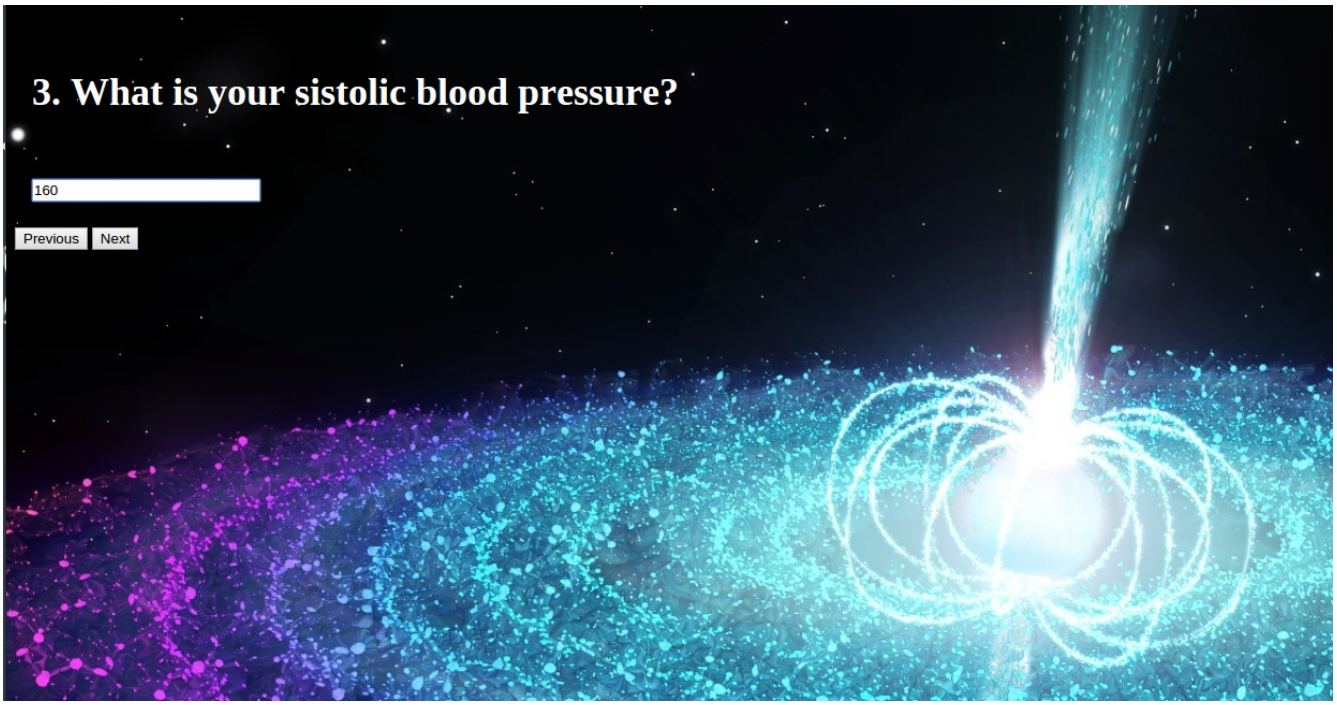


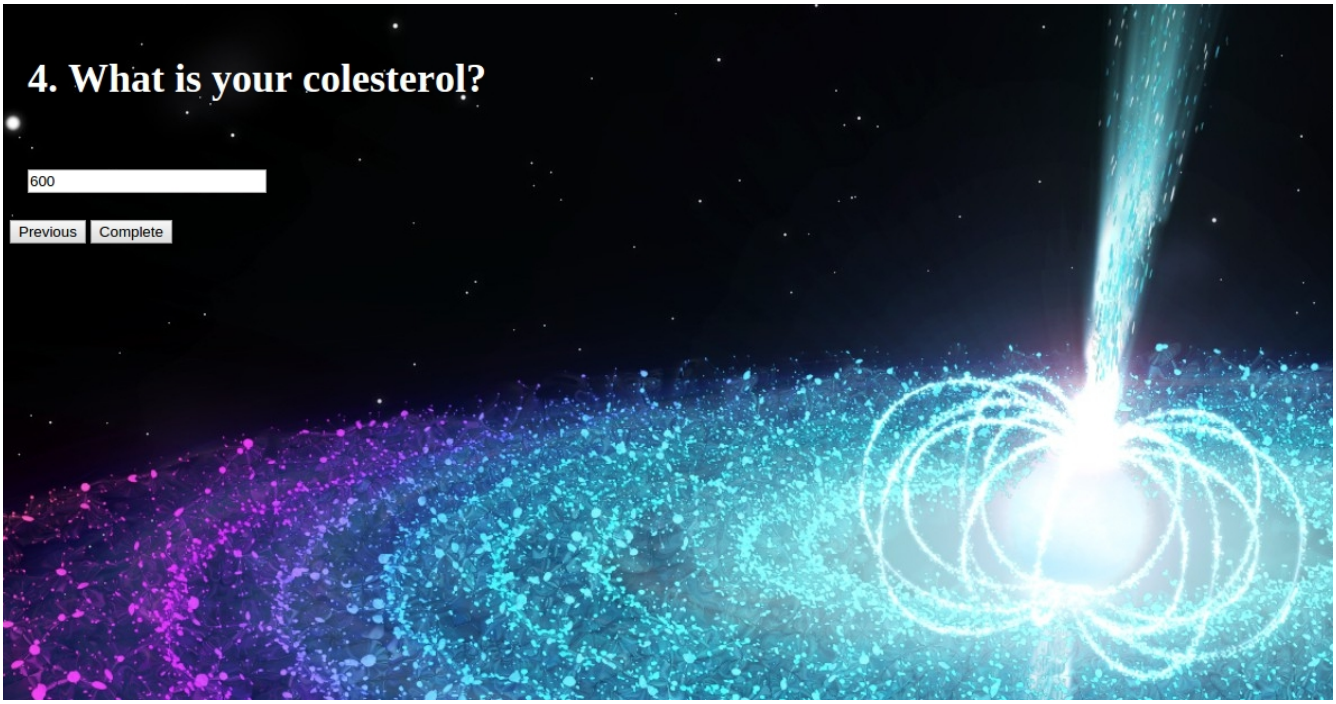
Survey part:


1. What is your gender?
Male
Female
Next

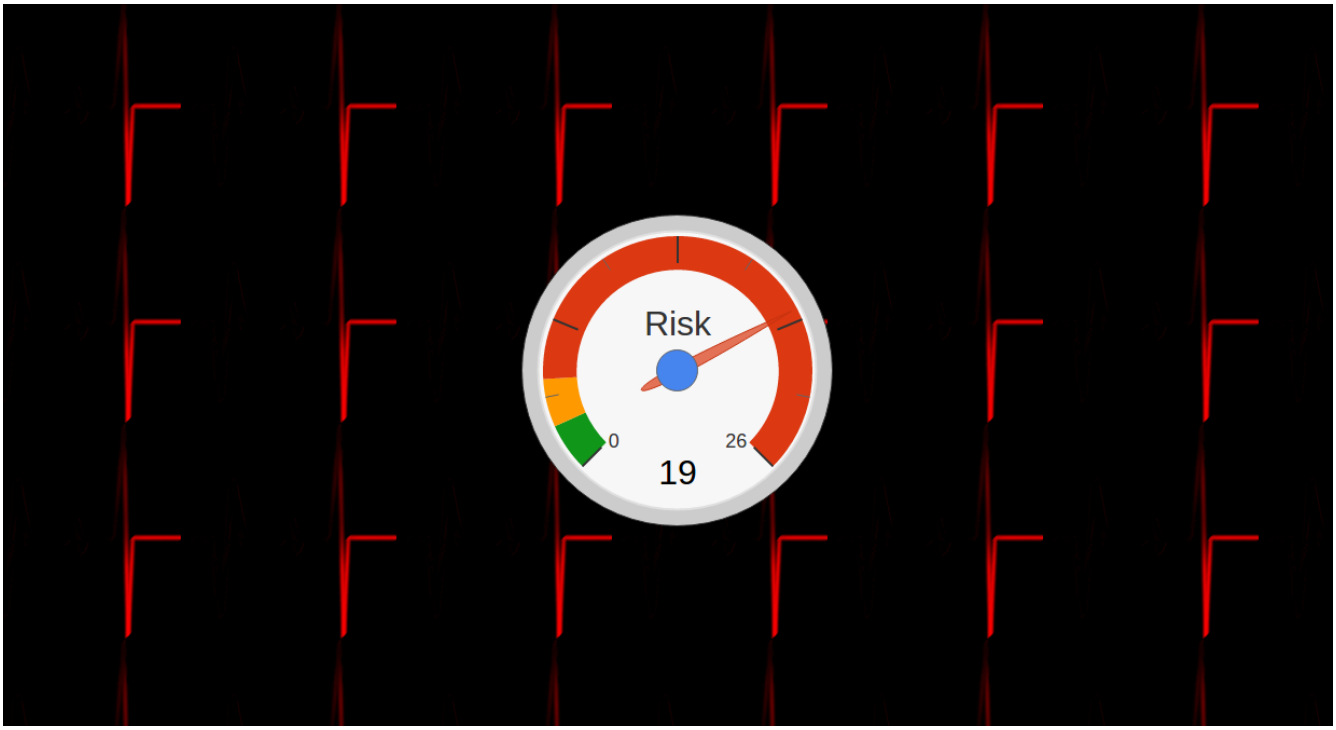

Are you a smoker?
Previous
Next


2. What is your age?
70
Previous
Next


3. What is your sistolic blood pressure?
160
Previous
Next



The final result:



Nasa references:

https://www.cdc.gov/pcd/issues/2016/15_0282.htm

https://www.cdc.gov/heartdisease/risk_factors.htm

https://www.cdc.gov/heartdisease/statistics_maps.htm

https://www.cdc.gov/heartdisease/prevention.htm