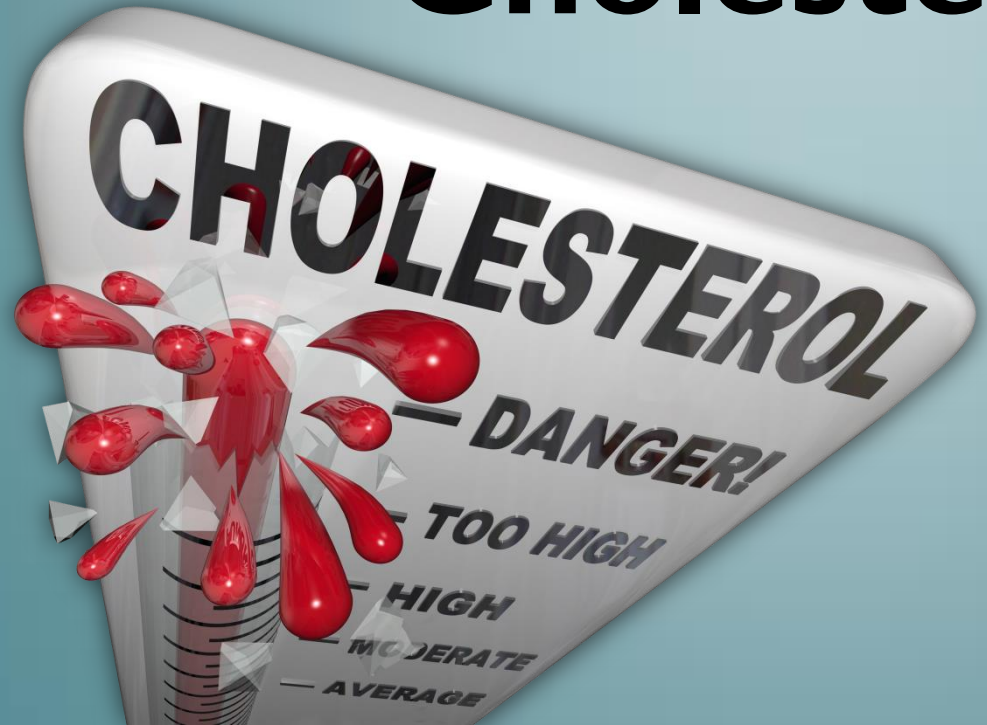
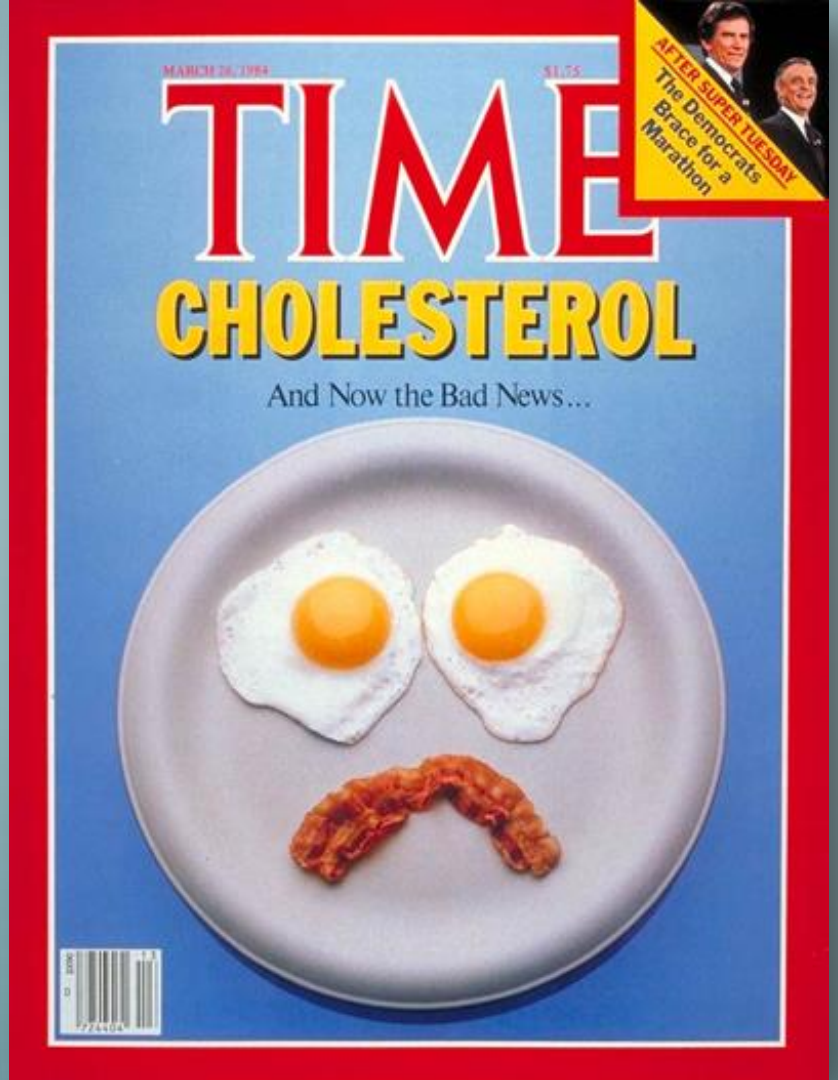
# Cholesterol OMG!




**Jeffry N. Gerber, MD**
Denver's Diet Doctor


The cholesterol expert


- Low carb, high fat
- Paleo, Primal
- Wheat belly
- Weston A. Price


MARCH 26, 1984
$1.75
TIME
CHOLESTEROL
And Now the Bad News...
AFTER SUPER TUESDAY
The Democrats Brace for a Marathon

# The endless war on cholesterol

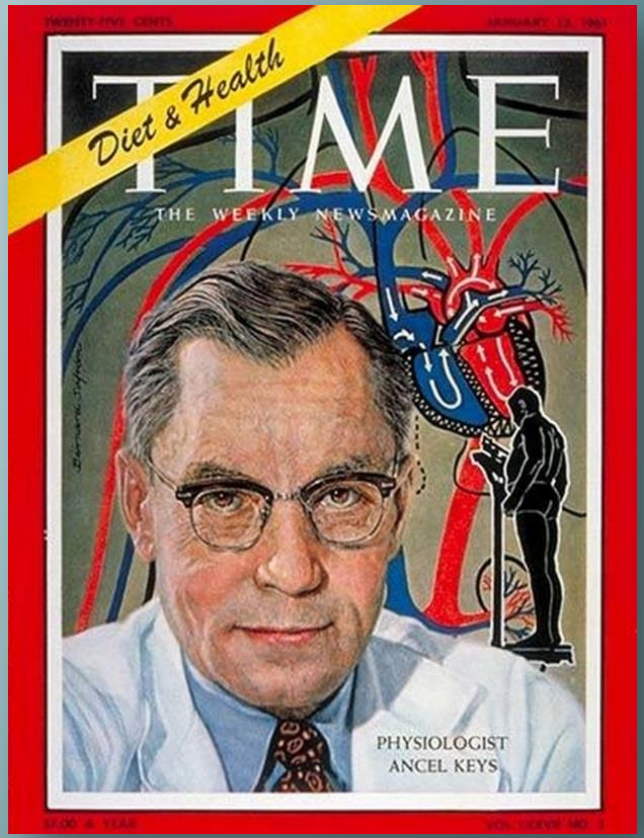
# Cholesterol and cardiovascular disease

- Diet heart hypothesis

  Avoid saturated fat

- Lipid hypothesis

  Take medication



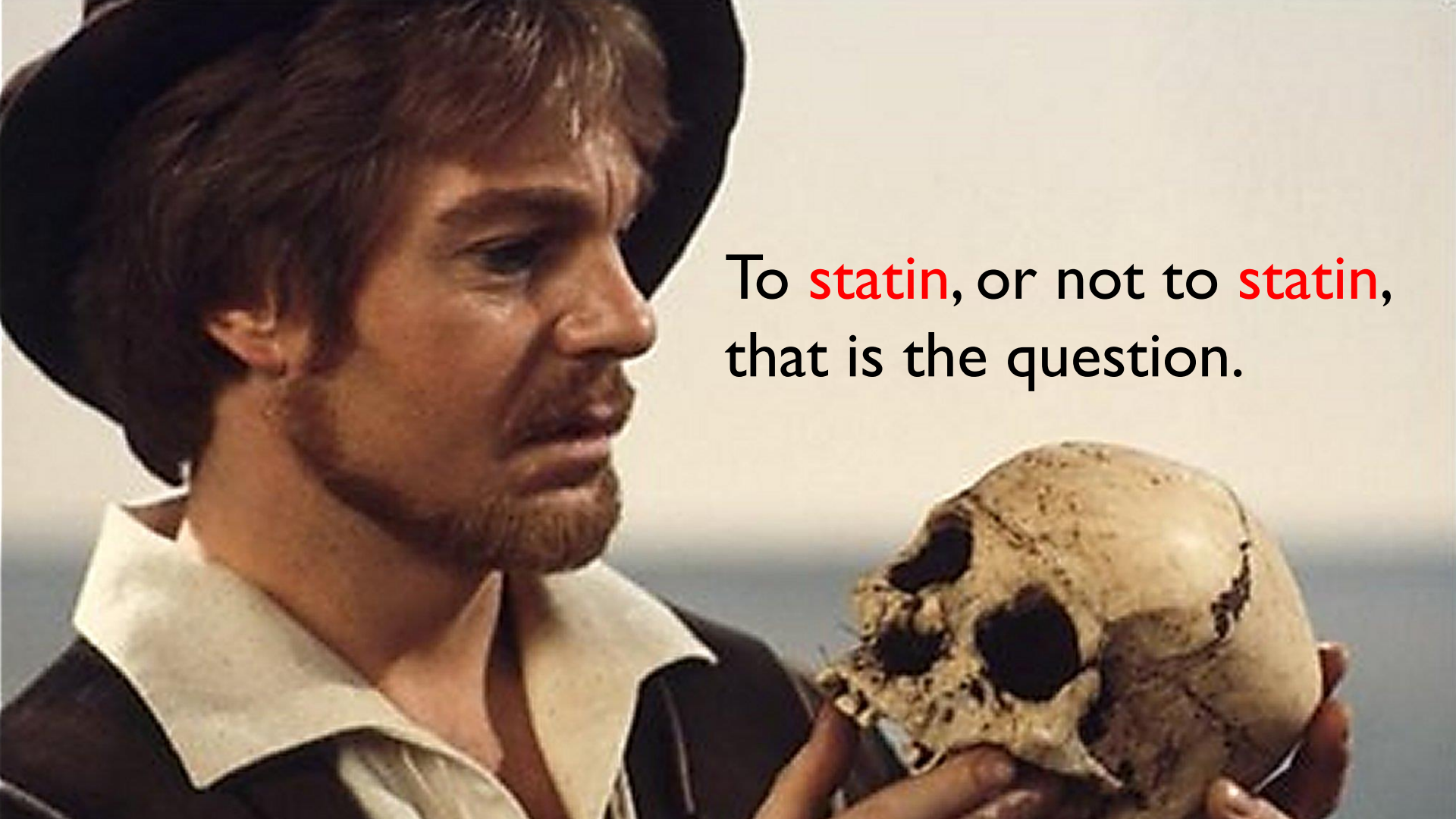
Cholesterol is the enemy

Take more statins!


Center
AM ET
NEW
CHOLESTEROL
RECOMMENDATIONS
SOURCE:
AMERICAN HEART
ASSOCIATION
HEART DISEASE
DIABETES (TYPE 1 OR 2)
TAKE STATIN
10 YEAR RISK OVER 7.5%
BAD CHOLESTEROL OVER 190
NEW GUIDELINES ON STATINS
CHOLESTEROL TARGETS DROPPED, RISK FACTORS IN FOCUS
LIVE
CNN

# Don’t ask, don’t tell policies

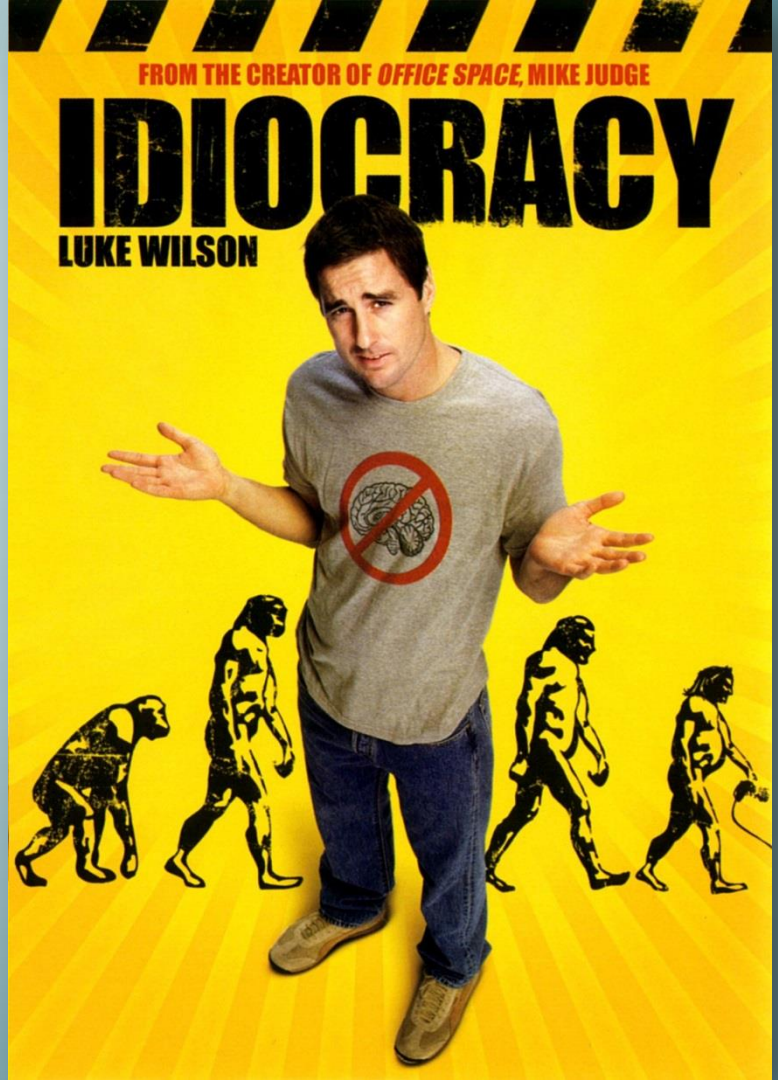
- Absolute risk reduction tiny
- Risk calculator flawed
- Side effects of little importance
- Cholesterol lowering therapy controversial
- Blocking innovation
- Only one therapy


To statin, or not to statin,
that is the question.

# Obstacles to change

- Human nature
- Industry's arrogance
- Financial & political gain
- Stupidity

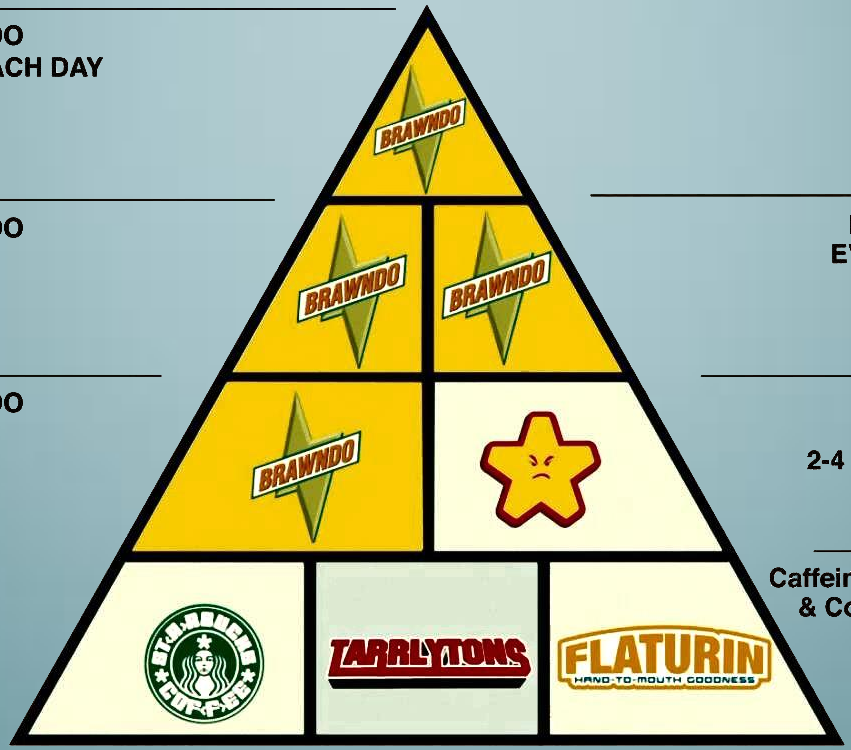
# Defining stupidity




SECRETARY OF DEFENSE

# FDA Food Pyramid

## A Guide to Daily Food Choices




Give plants water.

Water, like out the toilet?

Dust bowl crisis resolved.


• Cholesterol is essential to life
• The innocent bystander

# Atherosclerosis
# The fire within

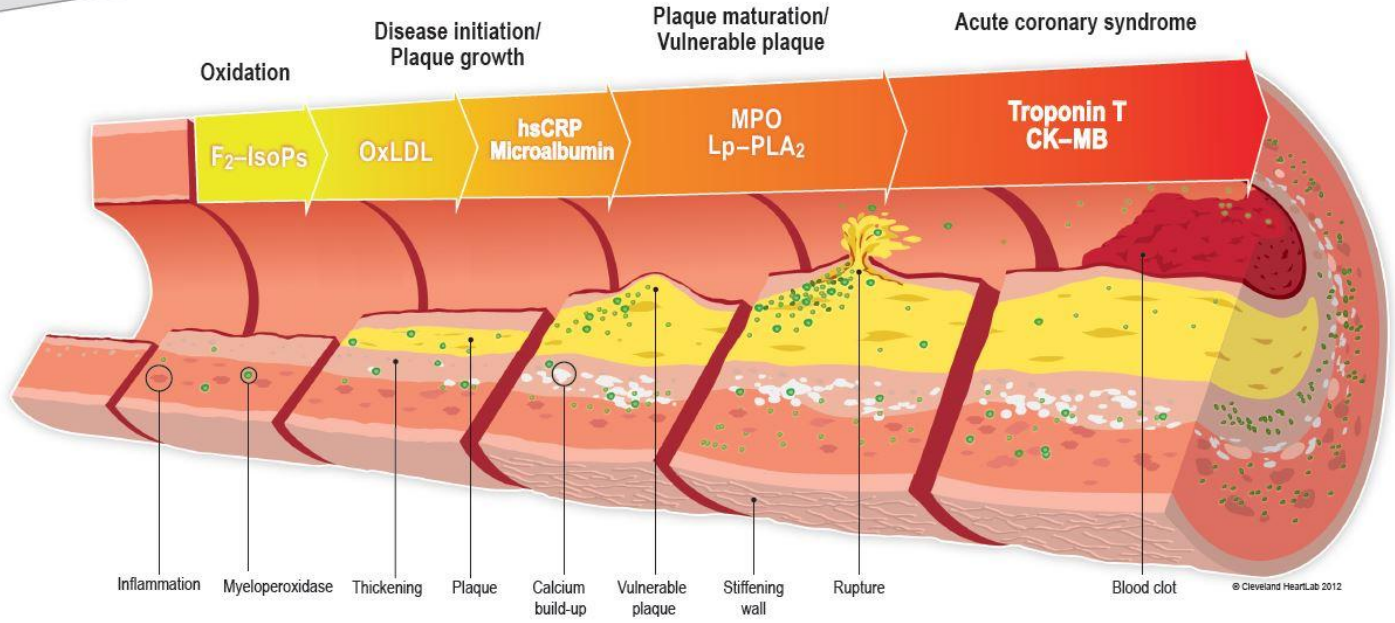
- Inflammation & oxidation
- Response to injury
- Changing cholesterol quality

ClevelandHeartLab®

*Know your risk.*

# Inflammatory Biomarkers and the Progression of Atherosclerosis

The progression of atherosclerosis is marked by specific inflammatory biomarkers, and their levels can be measured to determine a patient's risk for heart disease and cardiac events.



# Addressing cardiovascular disease

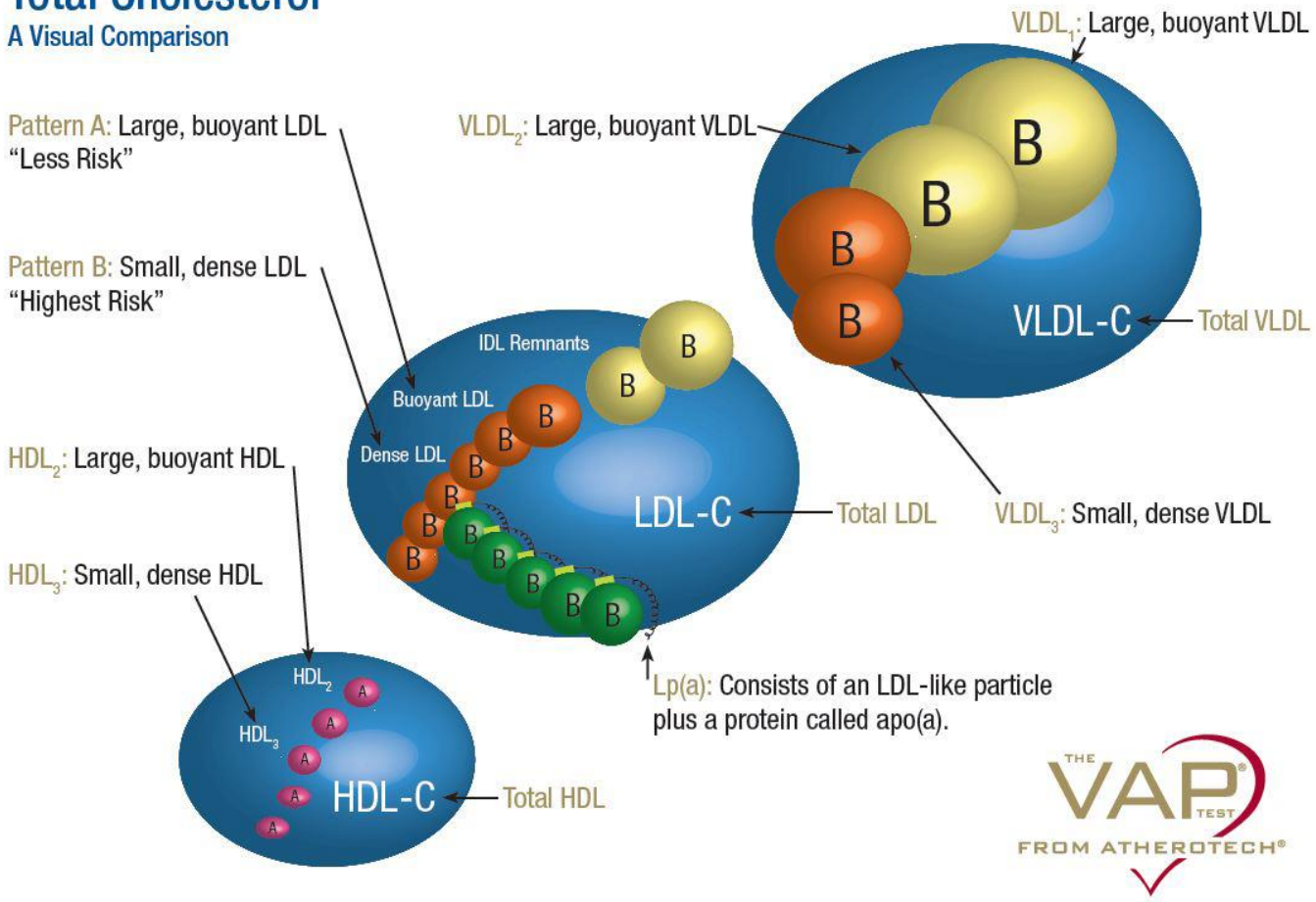

modernmediterranean.com

# Lab testing

- General
- Hormonal / Insulin
- Inflammatory
- Genetic
- Cholesterol & lipids
- CV Imaging
- Functional

# Total Cholesterol

## A Visual Comparison




THE VAP® TEST
FROM ATHEROTECH®

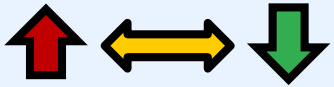
# Standard lipid tests

| Test | Goal mg/dl | Goal mmol/l |
|---|---|---|
| Total cholesterol | <200 | <5.0 |
| Triglyceride | <150 | <1.7 |
| HDL [ApoA1] | >50 | >1.3 |
| LDL | <130 | <3.4 |

# Additional tests

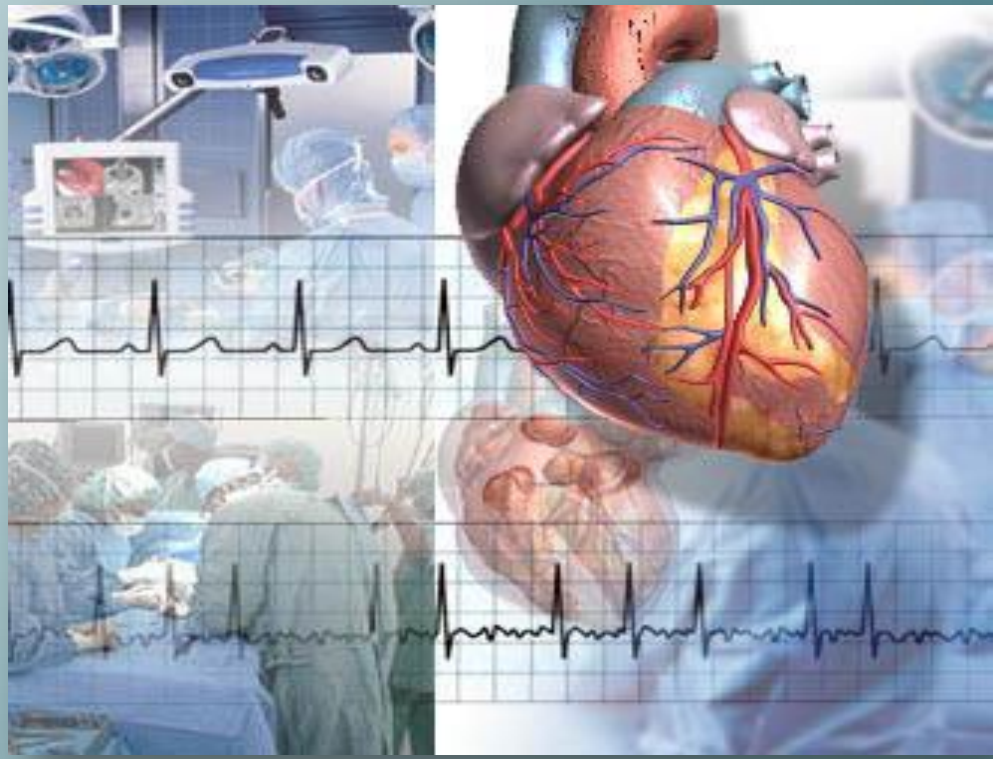
| Test | Goal md/dl | Goal mmol/l |
|---|---|---|
| Total cholesterol/HDL | <4.0 ratio | |
| Triglycerides/HDL | <2.0 ratio | |
| Non-HDL [ApoB100] | <160 | <4.1 |
| Fasting Glucose | <100 | <5.5 |
| HbA1c | <5.7% | |

# Dietary effects

| Test | Low carb high fat | Low fat low calorie |
|---|---|---|
| Triglyceride |  |  |
| HDL |  |  |
| LDL size and quality |  |  |
| LDL |  |  |

# Advanced lipid testing

- VAP
- Berkeley
- NMR
- HDL



The *NMR LipoProfile®* test may be covered by one or more issued or pending patents, including U.S. Patent Nos. 5,343,389; 6,518,069; 6,576,471; 6,653,140; and 7,243,030.

CLIA:34D0952253

LIPOSCIENCE

LipoScience, Inc.
2500 Sumner Boulevard
Raleigh, NC 27616
877-547-6837
www.liposcience.com



| Patient Name | Sex | Age |
|---|---|---|
| | | |

Clinician

Client Name and Address

| Patient ID | Birth Date | Accession Number |
|---|---|---|
| | | |

Client Name
Address 1
Address 2
City, State
Phone:
Client #/Route #
Zip
Fax:

| Date Collected | Date Received | Report Date and Time | Requisition Number | Fasting Status |
|---|---|---|---|---|
| | | | | |

## *NMR LipoProfile®* test

Reference Range[1]

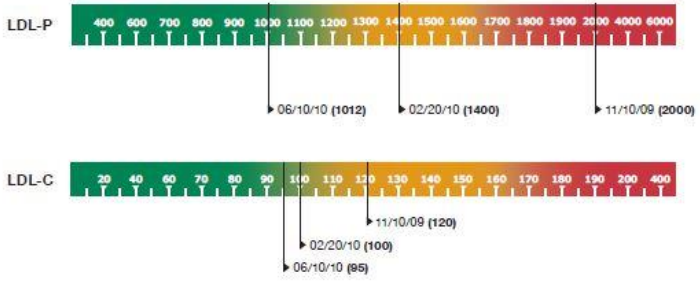
| | | Percentile[1] | 20th | 50th | 80th | 95th |
|---|---|---|---|---|---|---|
| | nmol/L | Low | Moderate | Borderline-High | High | Very High |
| LDL-P (LDL Particle Number) | 1012 | <1000 | 1000-1299 | 1300-1599 | 1600-2000 | >2000 |

### Lipids

| | mg/dL | Optimal | Near or above optimal | Borderline-High | High | Very High |
|---|---|---|---|---|---|---|
| LDL-C (calculated) | 95 | <100 | 100-129 | 130-159 | 160-189 | ≥190 |

| HDL-C | Triglycerides | Total Cholesterol |
|---|---|---|
| 45 | 140 | 171 |
| Desirable ≥ 40 | Desirable < 150 | Desirable < 200 |

### Historical Reporting




1. Reference population comprises 5,362 men and women not on lipid medication enrolled in the Multi-Ethnic Study of Atherosclerosis (MESA). Mora et al. *Atherosclerosis* 2007

91-001-00R1.0



The *NMR LipoProfile®* test may be covered by one or more issued or pending patents, including U.S. Patent Nos. 5,343,389; 6,518,069; 6,576,471; 6,653,140; and 7,243,030.

CLIA:34D0952253

LIPOSCIENCE

LipoScience, Inc.
2500 Sumner Boulevard
Raleigh, NC 27616
877-547-6837
www.liposcience.com

Page 1 of 1

| Patient Name | Sex | Age |
|---|---|---|
| | | |

Clinician

Client Name and Address

| Patient ID | Birth Date | Accession Number |
|---|---|---|
| | | |

Client Name
Address 1
Address 2
City, State
Phone:
Client #/Route #
Zip
Fax:

| Date Collected | Date Received | Report Date and Time | Requisition Number | Fasting Status |
|---|---|---|---|---|
| | | | | |

## PARTICLE CONCENTRATION AND SIZE

### LDL and HDL Particles

Lower CVD Risk ← → Higher CVD Risk

Percentile in Reference Population[3]

| | | high | 75th | 50th | 25th | low |
|---|---|---|---|---|---|---|
| HDL-P (total) | µmol/L 28.1 | | 34.9 | 30.5 | 26.7 | |
| SMALL LDL-P | nmol/L 830 | low | 25th | 50th | 75th | high |
| | | | 117 | 527 | 839 | |
| LDL SIZE | nm 20.4 | Large (Pattern A) | | | Small (Pattern B) | |
| | | 23.0 | 20.8 | 20.5 | 19.0 | |

Small LDL-P and LDL size are associated with CVD risk, but not after LDL-P is taken into account.

### Lipoprotein Markers Associated with Insulin Resistance and Diabetes Risk[1,2]

Insulin Sensitive ← → Insulin Resistant

Percentile in Reference Population[3]

| | | low | 25th | 50th | 75th | high |
|---|---|---|---|---|---|---|
| LARGE VLDL-P | nmol/L 8.2 | | 0.9 | 2.7 | 6.9 | |
| SMALL LDL-P | nmol/L 830 | low | 25th | 50th | 75th | high |
| | | | 117 | 527 | 839 | |
| LARGE HDL-P | µmol/L 2.7 | high | 75th | 50th | 25th | low |
| | | | 7.3 | 4.8 | 3.1 | |
| VLDL SIZE | nm 50.4 | small | 25th | 50th | 75th | large |
| | | | 42.4 | 46.6 | 52.6 | |
| LDL SIZE | nm 20.4 | large | 75th | 50th | 25th | small |
| | | | 21.2 | 20.8 | 20.4 | |
| HDL SIZE | nm 8.7 | large | 75th | 50th | 25th | small |
| | | | 9.6 | 9.2 | 8.9 | |

### Insulin Resistance Score

| | | insulin sensitive | 25th | 50th | 75th | insulin resistant |
|---|---|---|---|---|---|---|
| LP-IR SCORE* | 0-100 84 | | 27 | 45 | 63 | |

*The LP-IR Score combines the information from the above 6 markers to give improved assessment of insulin resistance and diabetes risk.

These laboratory assays, validated by LipoScience, have not been cleared by the US Food and Drug Administration. The clinical utility of these laboratory values has not been fully established.

1. Garvey WT, et al. *Diabetes*. 2003;532:453-462. 2. Goff DC, et al. *Metabolism*. 2005;54:264-270. 3. Reference population comprises 4,588 men and women not on lipid medication enrolled in the Multi-Ethnic Study of Atherosclerosis (MESA).

91-002-00R1.0

# Advanced NMR Lipoprofile testing

| Test | Green | Yellow | Red |
|---|---|---|---|
| Total LDL-P nmol/l | <1000 | 1001-1599 | >1600 |
| Small LDL-P nmol/l | <117 | 118-838 | >839 |
| Average LDL size nm | 23.0-20.6 | - | 20.5-19.0 |
| Small/Total LDL-P % | <11 | 12-52 | >53 |

# Additional testing

| Test | Green | Yellow | Red |
|---|---|---|---|
| ApoB100 mg/dl [non HDL-C] | ≤90 | 90-120 | >120 |
| Lp(a) mass mg/dl | <30 | - | ≥30 |
| hs-CRP mg/l | ≤1.0 | 1-3 | 3.1-10 |
| Lp-PLA2 ng/ml | ≤200 | 200-235 | >235 |
| Cardiac Myeloperoxidase pmol/l | <480 | - | ≥480 |

# Low Carb Patsy

# Low carb Patsy standard lipids

| Test | Before | After | Goal mg/dl | Goal mmol/l |
|---|---|---|---|---|
| Total cholesterol | 225 | 164 | <200 | <5.0 |
| Triglyceride | 163 | 84 | <150 | <1.7 |
| HDL [ApoA1] | 62 | 66 | >50 | >1.3 |
| LDL | 130 | 81 | <130 | <3.4 |

# Additional results

| Test | Before | After | Goal mg/dl | Goal mmol/l |
|---|---|---|---|---|
| Total cholesterol/HDL | 3.6 | 2.4 | <4.0 ratio | |
| Triglycerides/HDL | 2.6 | 1.3 | <2.0 ratio | |
| Non-HDL [ApoB100] | 163 | 114 | <160 | <4.1 |
| Fasting Glucose | 131 | 88 | <100 | <5.5 |
| HbA1c | 5.7 | 4.8 | <5.7% | |

# Low carb Patsy NMR

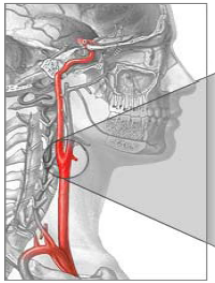
| Test | Result | Green | Yellow | Red |
|---|---|---|---|---|
| Total LDL-P nmol/l | 1459 | <1000 | 1001-1599 | >1600 |
| Small LDL-P nmol/l | 578 | <117 | 118-838 | >839 |
| Average LDL size nm | 20.8 | 23.0-20.6 | - | 20.5-19.0 |
| Small/Total LDL-P % | 39 | <11 | 12-52 | >53 |

# Additional results

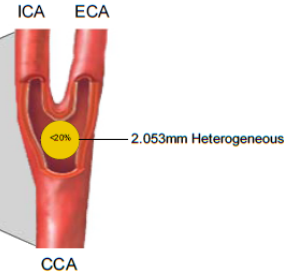
| Test | Result | Green | Yellow | Red |
|---|---|---|---|---|
| ApoB100 mg/dl [non HDL-C] | 93 | ≤90 | 90-120 | >120 |
| Lp(a) mass mg/dl | 37 | <30 | - | ≥30 |
| hs-CRP mg/l | 2.9 | ≤1.0 | 1-3 | 3.1-10 |
| Lp-PLA2 ng/ml | 231 | ≤200 | 200-235 | >235 |
| Cardiac Myeloperoxidase pmol/l | 274 | <480 | - | ≥480 |

# Visualized Plaque and Atherosclerotic Burden Assessment

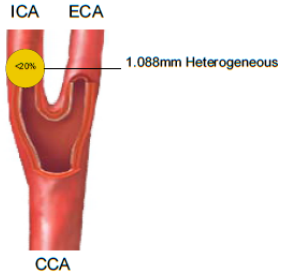
**Name:** PATSY **DOB:** **Age:** 58 **Gender:** Female **Date:** 5/8/13



**Right** **Plaque Description**




**Left** **Plaque Description**




*Plaque noted above was measured through arterial area diameter reduction, which is deliberated by measuring the circumference of the outside of the vessel subtracting any visible stenosis.

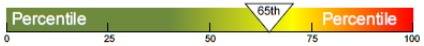
*Carotid velocities provided on reverse.

## Carotid - IMT

Your average Carotid-IMT is **0.713**

You are a *58* year old with arteries of a **64** year old Female.

This graph indicates your percentile score for similar sex and age.




A C-IMT of less than 0.60mm is generally considered healthy.

**Technical Notes:**

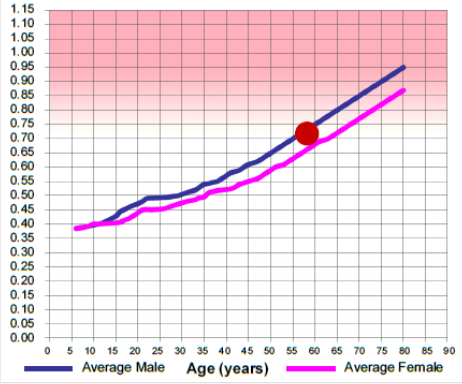
58 year old Female for cardiovascular risk stratification.

**Physicians Notes:**

**Current CIMT Measurement**

| Date | Age | CIMT | Percentile |
|---|---|---|---|
| May 2013 | 58 | 0.713 | 65th |

Mean Distal 1 cm CCA IMT of General Population with No Coronary Heart History



# Primal Eric W

# Primal Eric W standard lipids

| Test | Before | After | Goal mg/dl | Goal mmol/l |
|---|---|---|---|---|
| Total cholesterol | 222 | 225 | <200 | <5.0 |
| Triglyceride | 91 | 39 | <150 | <1.7 |
| HDL [ApoA1] | 65 | 80 | >50 | >1.3 |
| LDL | 139 | 139 | <130 | <3.4 |

# Additional results

| Test | Before | After | Goal mg/dl | Goal mmol/l |
|---|---|---|---|---|
| Total cholesterol/HDL | 3.4 | 2.8 | <4.0 ratio | |
| Triglycerides/HDL | 1.4 | 0.5 | <2.0 ratio | |
| Non-HDL [ApoB100] | 157 | 145 | <160 | <4.1 |
| Fasting Glucose | - | 77 | <100 | <5.5 |
| HbA1c | - | 5.3 | <5.7% | |

# Primal Eric W NMR

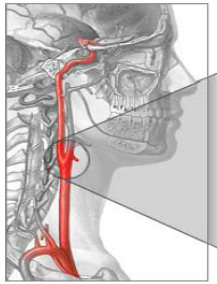
| Test | Result | Green | Yellow | Red |
|---|---|---|---|---|
| Total LDL-P nmol/l | 1528 | <1000 | 1001-1599 | >1600 |
| Small LDL-P nmol/l | 135 | <117 | 118-838 | >839 |
| Average LDL size nm | 21.3 | 23.0-20.6 | - | 20.5-19.0 |
| Small/Total LDL-P % | 9 | <11 | 12-52 | >53 |

# Additional results

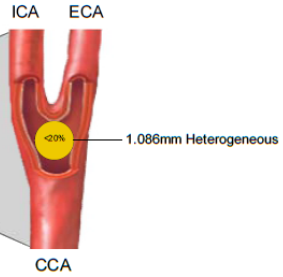
| Test | Result | Green | Yellow | Red |
|---|---|---|---|---|
| ApoB100 mg/dl [non HDL-C] | 110 | ≤90 | 90-120 | >120 |
| Lp(a) mass mg/dl | 4 | <30 | - | ≥30 |
| hs-CRP mg/l | 0.5 | ≤1.0 | 1-3 | 3.1-10 |
| Lp-PLA2 ng/ml | 197 | ≤200 | 200-235 | >235 |
| Cardiac Myeloperoxidase pmol/l | 263 | <480 | - | ≥480 |

# Visualized Plaque and Atherosclerotic Burden Assessment

**Name:** W ERIC **DOB:** **Age:** 45 **Gender:** Male **Date:** 8/14/13



**Right** **Plaque Description**




**Left** **Plaque Description**


No Plaque Noted

*Plaque noted above was measured through arterial area diameter reduction, which is deliberated by measuring the circumference of the outside of the vessel subtracting any visible stenosis.

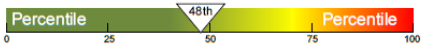
*Carotid velocities provided on reverse.

## Carotid - IMT

Your average Carotid-IMT is **0.601**

You are a *45* year old with arteries of a **44** year old Male.

This graph indicates your percentile score for similar sex and age.




A C-IMT of less than 0.60mm is generally considered healthy.

**Technical Notes:**

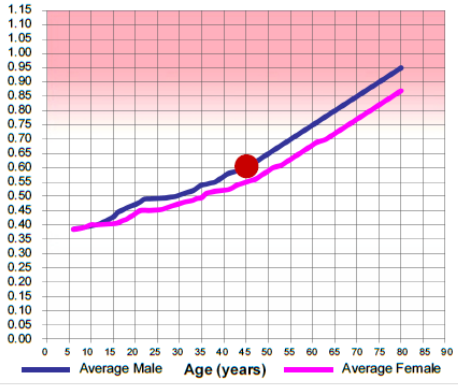
45 year old Male for cardiovascular risk stratification.

**Physicians Notes:**

**Current CIMT Measurement**

| Date | Age | CIMT | Percentile |
|---|---|---|---|
| Aug 2013 | 45 | 0.601 | 48th |

Mean Distal 1 cm CCA IMT of General Population with No Coronary Heart History



# Primal Eric P

# Primal Eric P standard lipids

| Test | Before | After | Goal mg/dl | Goal mmol/l |
|---|---|---|---|---|
| Total cholesterol | 195 | 264 | <200 | <5.0 |
| Triglyceride | 89 | 86 | <150 | <1.7 |
| HDL [ApoA1] | 34 | 48 | >50 | >1.3 |
| LDL | 137 | 191 | <130 | <3.4 |

# Additional results

| Test | Before | After | Goal mg/dl | Goal mmol/l |
|---|---|---|---|---|
| Total cholesterol/HDL | 5.7 | 5.5 | <4.0 ratio | |
| Triglycerides/HDL | 2.6 | 1.8 | <2.0 ratio | |
| Non-HDL [ApoB100] | 161 | 216 | <160 | <4.1 |
| Fasting Glucose | 90 | 82 | <100 | <5.5 |
| HbA1c | - | 5.0 | <5.7% | |

# Primal Eric P NMR

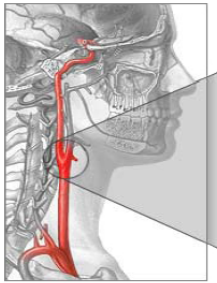
| Test | Result | Green | Yellow | Red |
|---|---|---|---|---|
| Total LDL-P nmol/l | 2159 | <1000 | 1001-1599 | >1600 |
| Small LDL-P nmol/l | 958 | <117 | 118-838 | >839 |
| Average LDL size nm | 20.8 | 23.0-20.6 | - | 20.5-19.0 |
| Small/Total LDL-P % | 44 | <11 | 12-52 | >53 |

# Additional results

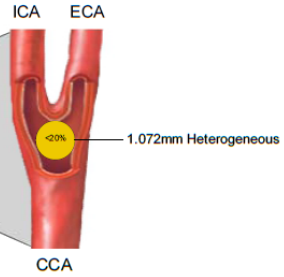
| Test | Result | Green | Yellow | Red |
|---|---|---|---|---|
| ApoB100 mg/dl [non HDL-C] | 138 | ≤90 | 90-120 | >120 |
| Lp(a) mass mg/dl | 5 | <30 | - | ≥30 |
| hs-CRP mg/l | 0.5 | ≤1.0 | 1-3 | 3.1-10 |
| Lp-PLA2 ng/ml | 207 | ≤200 | 200-235 | >235 |
| Cardiac Myeloperoxidase pmol/l | 120 | <480 | - | ≥480 |

# Visualized Plaque and Atherosclerotic Burden Assessment

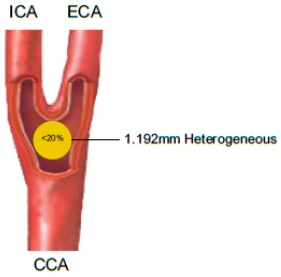
**Name:** P ERIC **DOB:** **Age:** 44 **Gender:** Male **Date:** 2/13/13



**Right** **Plaque Description**




**Left** **Plaque Description**




*Plaque noted above was measured through arterial area diameter reduction, which is deliberated by measuring the circumference of the outside of the vessel subtracting any visible stenosis.

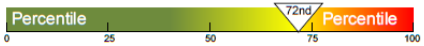
*Carotid velocities provided on reverse.

## Carotid - IMT

Your average Carotid-IMT is **0.66**

You are a *44* year old with arteries of a **50** year old Male.

This graph indicates your percentile score for similar sex and age.




A C-IMT of less than 0.60mm is generally considered healthy.

**Technical Notes:**

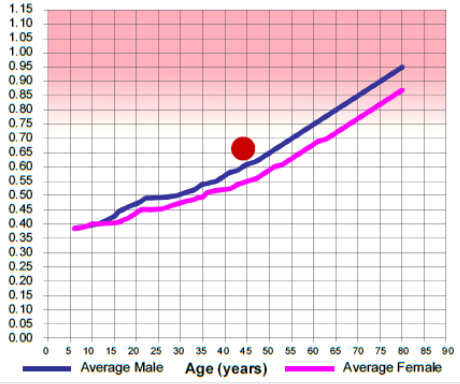
44 year old Male for cardiovascular risk stratification.

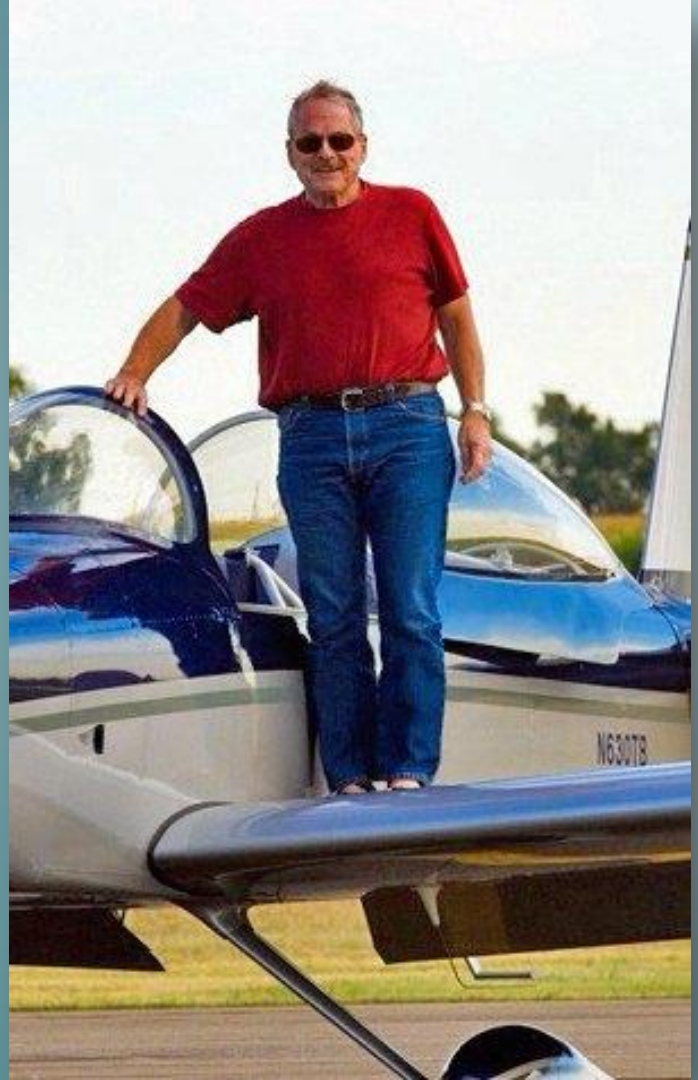
**Physicians Notes:**

**Current CIMT Measurement**

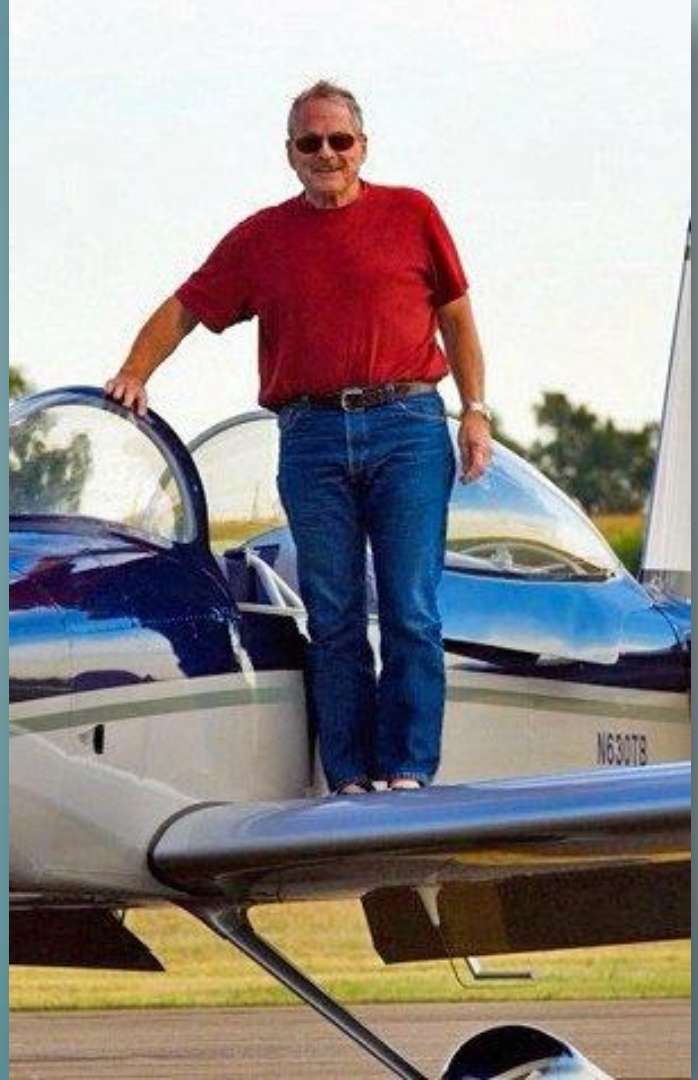
| Date | Age | CIMT | Percentile |
|---|---|---|---|
| Feb 2013 | 44 | 0.66 | 72nd |

Mean Distal 1 cm CCA IMT of General Population with No Coronary Heart History





# Wheat belly Tom



# Wheat belly Tom standard lipids

| Test | Before | After | Goal mg/dl | Goal mmol/l |
|---|---|---|---|---|
| Total cholesterol | 153 | 219 | <200 | <5.0 |
| Triglyceride | 121 | 69 | <150 | <1.7 |
| HDL [ApoA1] | 46 | 66 | >50 | >1.3 |
| LDL | 84 | 139 | <130 | <3.4 |

# Additional results

| Test | Before | After | Goal mg/dl | Goal mmol/l |
|---|---|---|---|---|
| Total cholesterol/HDL | 3.3 | 3.3 | <4.0 ratio | |
| Triglycerides/HDL | 2.6 | 1.0 | <2.0 ratio | |
| Non-HDL [ApoB100] | 107 | 153 | <160 | <4.1 |
| Fasting Glucose | - | 90 | <100 | <5.5 |
| HbA1c | 6.6 | 5.8 | <5.7% | |

# Wheat belly Tom NMR

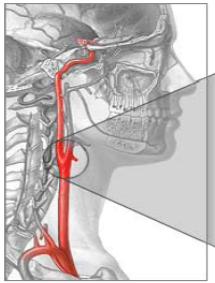
| Test | Result | Green | Yellow | Red |
|---|---|---|---|---|
| Total LDL-P nmol/l | 1108 | <1000 | 1001-1599 | >1600 |
| Small LDL-P nmol/l | < 90 | <117 | 118-838 | >839 |
| Average LDL size nm | 21.7 | 23.0-20.6 | - | 20.5-19.0 |
| Small/Total LDL-P % | 8 | <11 | 12-52 | >53 |

# Additional results

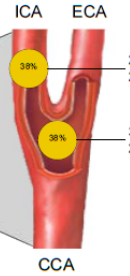
| Test | Result | Green | Yellow | Red |
|---|---|---|---|---|
| ApoB100 mg/dl [non HDL-C] | 84 | ≤90 | 90-120 | >120 |
| Lp(a) mass mg/dl | 23 | <30 | - | ≥30 |
| hs-CRP mg/l | 0.5 | ≤1.0 | 1-3 | 3.1-10 |
| Lp-PLA2 ng/ml | 174 | ≤200 | 200-235 | >235 |
| Cardiac Myeloperoxidase pmol/l | 763 | <480 | - | ≥480 |

# Visualized Plaque and Atherosclerotic Burden Assessment

**Name:** THOMAS **DOB:** **Age:** 71 **Gender:** Male **Date:** 11/13/13



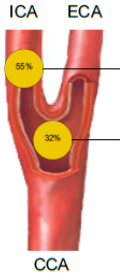
**Right** — Plaque Description




2.018mm Calcified
2.008mm Calcified

3.459mm Calcified
2.503mm Calcified

**Left** — Plaque Description




2.841mm Calcified
2.195mm Calcified

2.122mm Heterogeneous
1.864mm Heterogeneous

*Plaque noted above was measured through arterial area diameter reduction, which is deliberated by measuring the circumference of the outside of the vessel subtracting any visible stenosis.

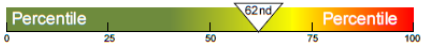
*Carotid velocities provided on reverse.

## Carotid - IMT

Your average Carotid-IMT is **0.919**

You are a *71* year old with arteries of a **76** year old Male.

This graph indicates your percentile score for similar sex and age.




A C-IMT of less than 0.60mm is generally considered healthy.

**Technical Notes:**

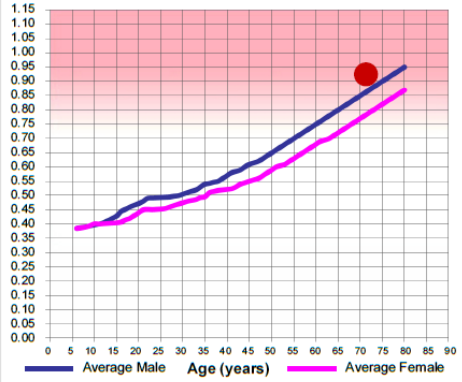
71 year old Male for cardiovascular risk stratification.

**Physicians Notes:**

**Current CIMT Measurement**

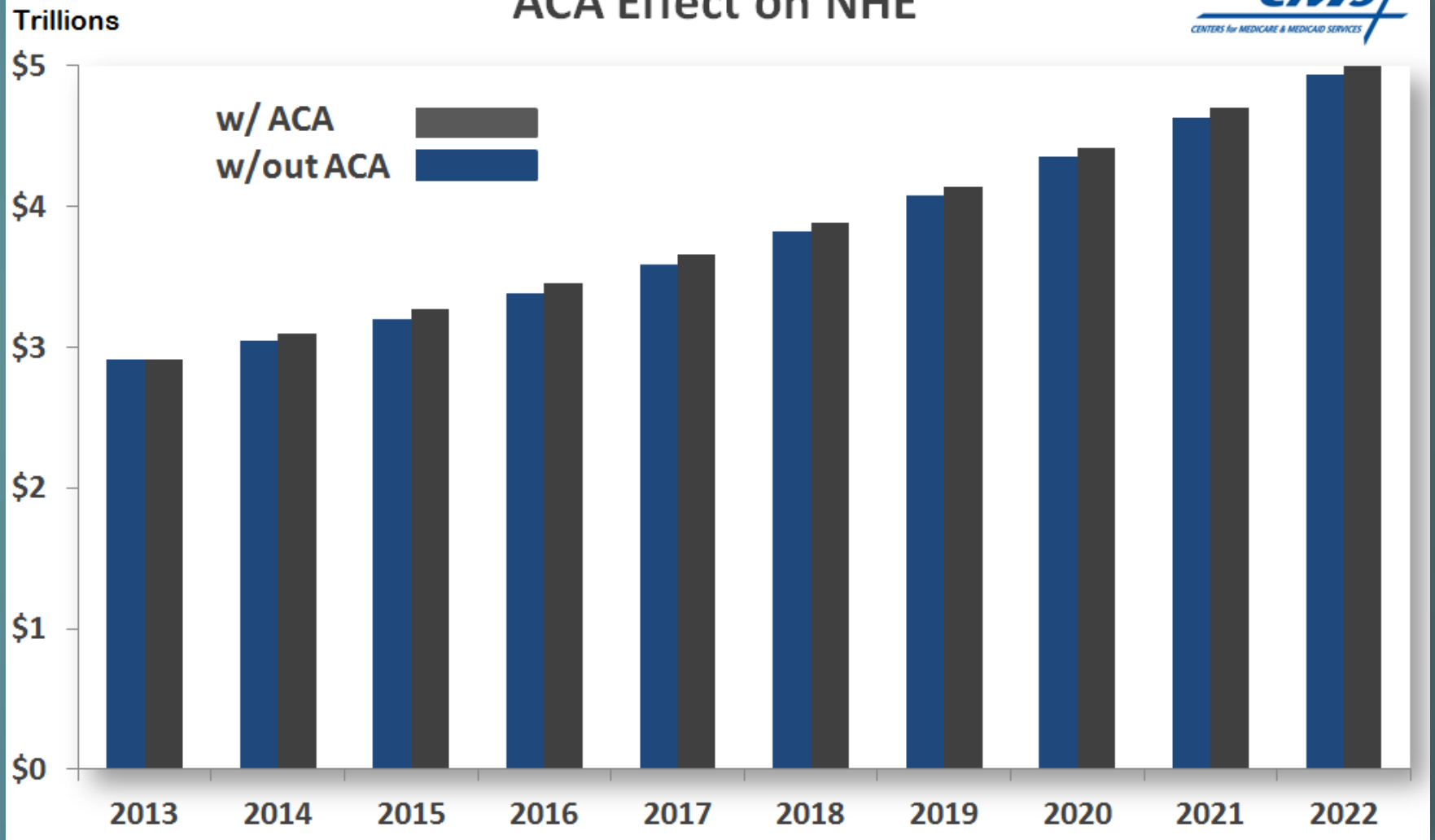
| Date | Age | CIMT | Percentile |
|---|---|---|---|
| Nov 2013 | 71 | 0.919 | 62nd |

Mean Distal 1 cm CCA IMT of General Population with No Coronary Heart History



# Affordable care

# ACA Effect on NHE



# Shoveling money

- Health insurance bubble bursting
- Broken healthcare
- Sick care
- Prevention hardly addressed

# Repairing healthcare

# Healthcare reform

- Address chronic disease
- Nutritional approach
- Wellness & prevention