

## The Metabolic Syndrome Update 2018

Marc Cornier, M.D.  
Professor of Medicine  
Division of Endocrinology, Metabolism & Diabetes  
Anschutz Health and Wellness Center  
University of Colorado School of Medicine

---

---

---

---

---

---

---

---

## The Metabolic Syndrome Update

- What is it?
- Why do we care?
- How do we define it?
- How should we manage it?

---

---

---

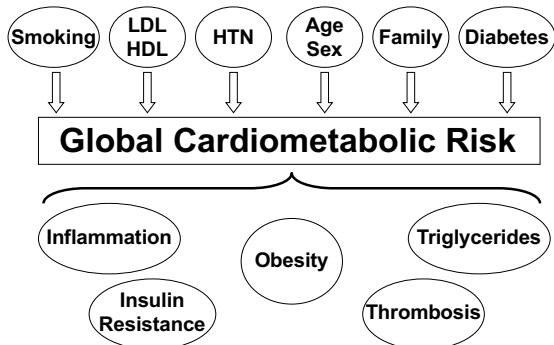
---

---

---

---

---



---

---

---

---

---

---

---

---

## The Metabolic Syndrome: General "Clustering" of Features

---

- Abdominal obesity
- Atherogenic dyslipidemia
  - Elevated Triglycerides
  - Low HDL-Cholesterol
  - Small dense LDL particles
- Raised blood pressure → HTN
- Insulin resistance → IFG, IGT, GDM, T2DM
- Prothrombotic state
- Proinflammatory state
- Non-Alcoholic Fatty liver disease
- Others?

---

---

---

---

---

---

---

---

---

---

## The Metabolic Syndrome *Consensus Definition*

---

Diagnosis Established When 3 or more are Present:

- Elevated Waist Circumference
  - Men: > 40 in; Women: > 35 in
  - Population and country specific
- Elevated Triglycerides: >150 mg/dl\*
- Low HDL Cholesterol\*
  - Men: < 40 mg/dl
  - Women: < 50 mg/dl
- Elevated Blood Pressure: >130/85\*
- Elevated Fasting Glucose: >100 mg/dl\*

Circulation 120:1640-1645, 2009

---

---

---

---

---

---

---

---

---

---

## Population Specific Waist Circumference Thresholds

---

Population	Waist Circumference (cm)	
	Men	Women
Caucasian	102	88
Asian	90	80
Middle East	94	80
Sub-Saharan African	94	80
Central/South America	90	80

Circulation 120:1640-1645, 2009

---

---

---

---

---

---

---

---

---

---

## Problems With the Definitions

- Should all factors be given the same weight?
- Who measures waist circumference?
- Is Impaired Fasting Glucose even at the 100 mg/dl cutoff sensitive enough? And can we use the A1c ( $\geq 5.7\%$ )?
- What about "treated" risk factors, should they still count?

---

---

---

---

---

---

---

---

## Why Should We Care About The Metabolic Syndrome?

---

---

---

---

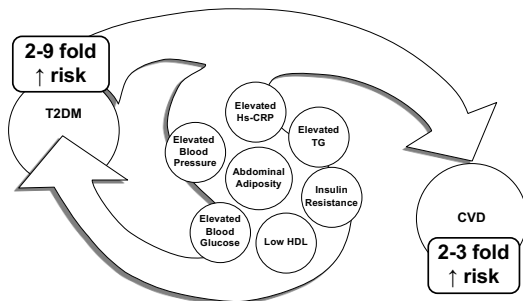
---

---

---

---

## Abdominal Adiposity as a Component of Cardiometabolic Risk



---

---

---

---

---

---

---

---

*The Metabolic Syndrome*  
CVD Risk

---

- **Is the** CVD risk of the syndrome greater than the sum of its parts?
- Does the presence of the Metabolic Syndrome predict CVD incidence better than already established risk assessments?
- Does it matter?

---

---

---

---

---

---

---

---

Factors Supporting the Metabolic Syndrome as a CVD Risk Factor

---

- It is accepted and well established that multiple risk factors confer greater risk.
- Majority of studies show the MetS to be an independent predictor of CVD risk.
- A recent meta-analysis found that the risk for CVD is still increased in people with the MetS (RR, 1.54), even after controlling for the component risk factors<sup>1</sup>.
- Post hoc analysis of 4S and AFCAPS/TexCAPS showed that individuals with the MetS had increased risk for major coronary events irrespective of their FRS<sup>2</sup>.

<sup>1</sup>J Am Coll Cardiol 49:403-414, 2007.  
<sup>2</sup>Am J Cardiol 93:136-141, 2004.

---

---

---

---

---

---

---

---

*The Metabolic Syndrome*  
Other Associated Conditions

---

- Nonalcoholic Fatty Liver Disease
- OSA
- PCOS
- Hypogonadism
- Lipodystrophies
- Microvascular Disease
- Others

---

---

---

---

---

---

---

---

## Is There a Unifying Pathophysiologic Cause of the Metabolic Syndrome?

- Maybe – Maybe Not
- Abdominal adiposity and Insulin Resistance appear to be at core of pathophysiology of the Metabolic Syndrome AND its individual components
- Targeting visceral adiposity and insulin resistance should be central to the management of the Metabolic Syndrome patient
- All of the components of the Metabolic Syndrome improved when adiposity and insulin resistance are targeted

---

---

---

---

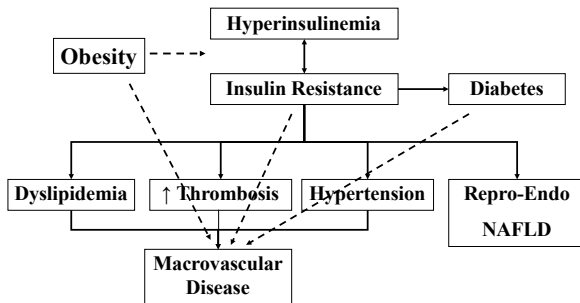
---

---

---

---

## The Consequences of the Metabolic Syndrome




---

---

---

---

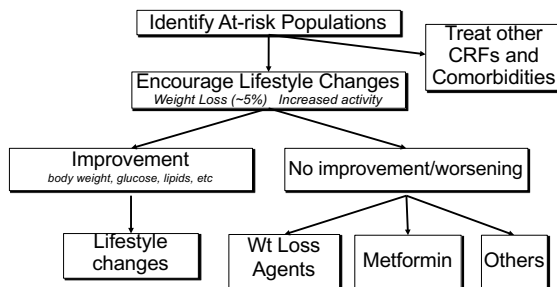
---

---

---

---

## So What Should We Do? Proposed Clinical Approach to Treating the Metabolic Syndrome Patient




---

---

---

---

---

---

---

---

## *The Metabolic Syndrome* Summary of the Problem

---

- Very common
- Associated with significant comorbidities
  - HTN
  - Dyslipidemia
  - Repro-Endo issues
  - Atherosclerotic Cardiovascular Disease
  - Progression to T2DM
- Many unanswered questions...

---

---

---

---

---

---

---

---