Management of Cholesterol and Lipid Disorders:

Risk Stratification & Care Algorithms

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Learning Objectives

1. Understand lipids, cholesterol, and metabolism
2. Review atherosclerosis pathophysiology
3. Risk assessment and targets
4. Pharmacologic & non-pharmacologic management
5. New therapies (2023-2025)
6. Practical algorithms and monitoring

Outline- What, Why, How, When…

1. What? & Why?

- What is it?
- Why should we care?

2. How?

- How the problems happen?

3. How?

- How we recognize and evaluate

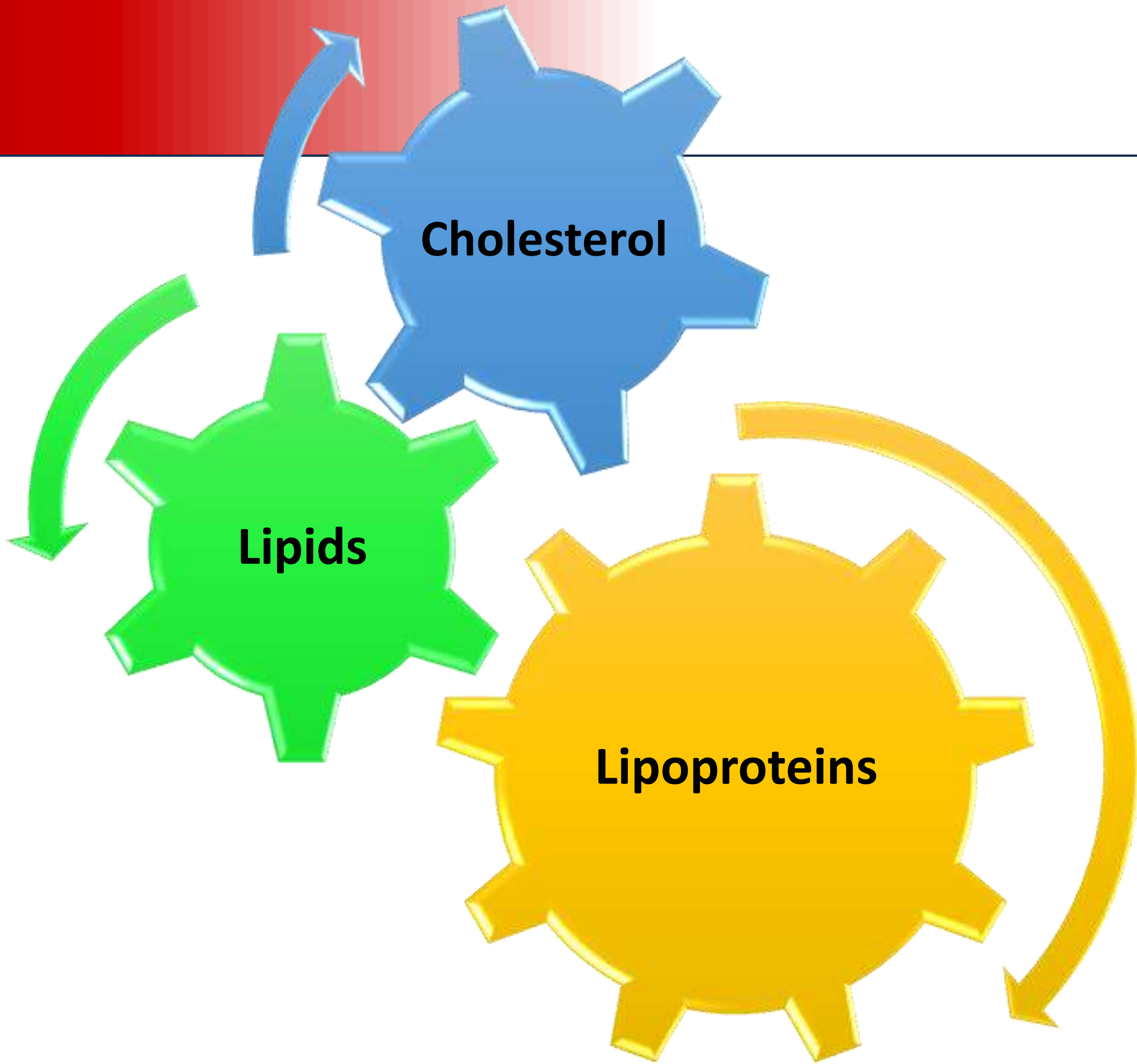
4. How?

- How we manage

5. When

- When to refer

1. What is all this?
and
Why do we care?



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TO SUPPORT & SERVE

1.0 Why is Lipid & Lipoprotein Metabolism all Important?

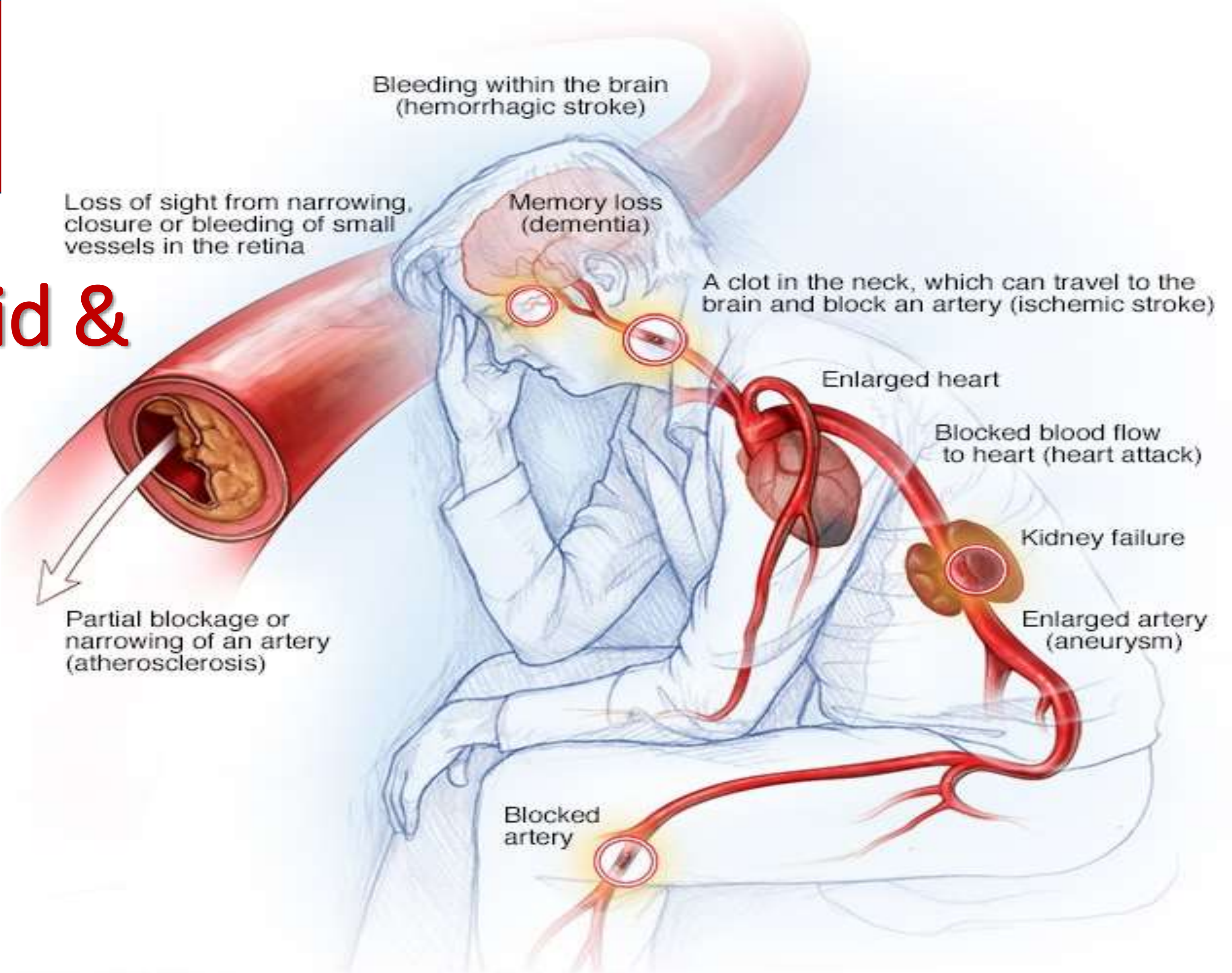
1. The role of **ATHEROGENESIS** and its associated risk of coronary and peripheral vascular disease. (PREDOMINANT)

2. The greatly increased risk of acute **PANCREATITIS** associated with severe hypertriglyceridemia is an additional indication for intervention

3. Disordered lipid metabolism is a critical element in both alcoholic and nonalcoholic **FATTY LIVER DISEASE**

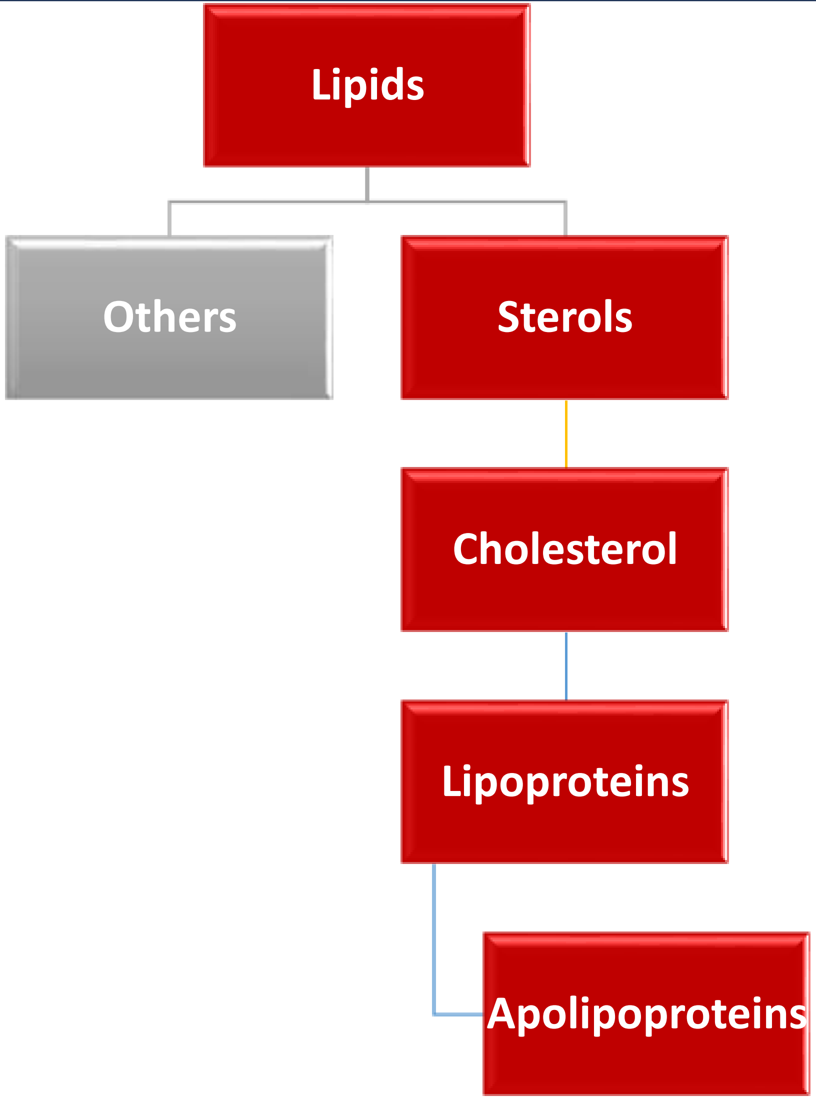
4. Characterization of dyslipidemia is important **for selection of APPROPRIATE TREATMENT** and may provide clues to underlying primary clinical disorders

1.0 Why is Lipid & Lipoprotein Metabolism Important?



1.1 What are Lipids?

- **Heterogeneous group of substances that includes fats, oils, waxes and related compounds**
  - Hydrophobic, but soluble in organic solvents
  - Essential as energy stores,
  - Essential as hormones,
  - Essential as structural components of cells,
  - Essential as vitamins and
  - Essential as as protection for internal organs



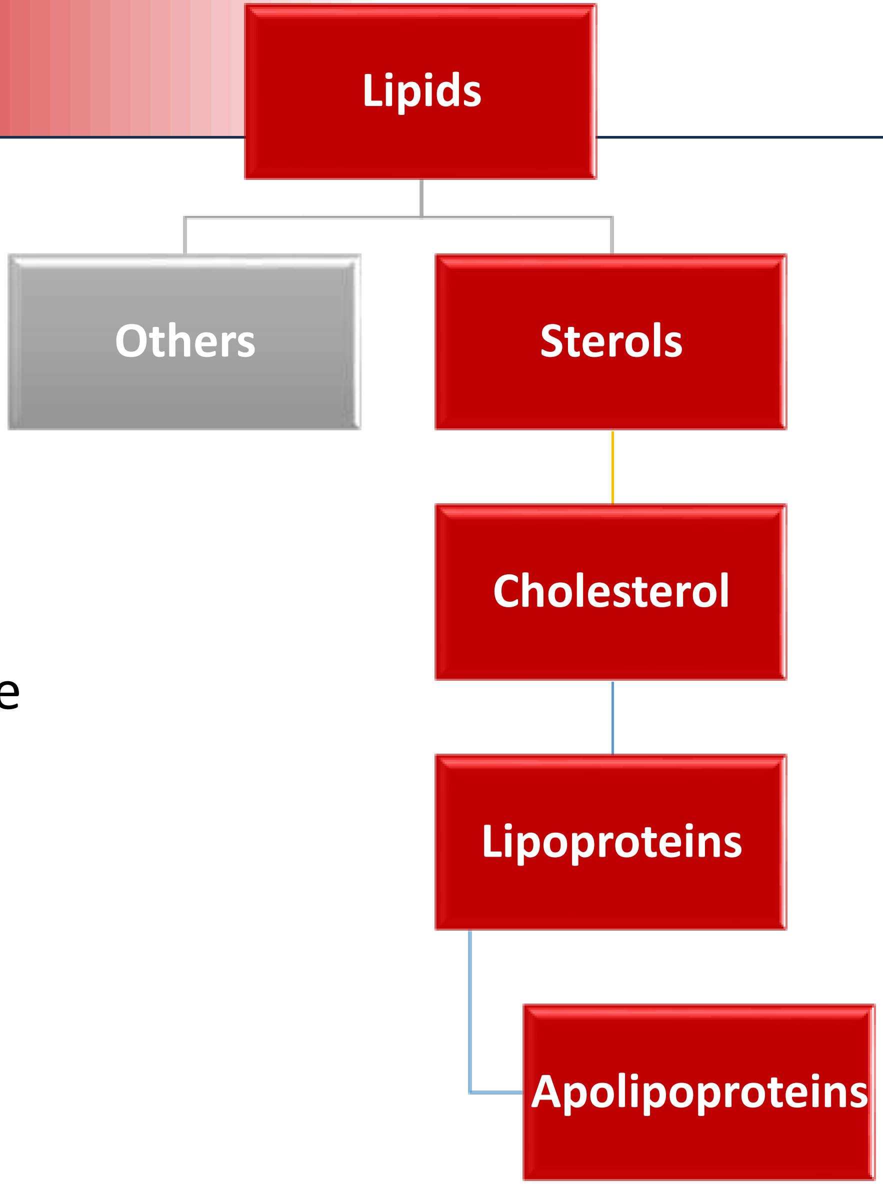
Classification of Clinically Important Lipids

Sterol Derivatives	Fatty Acids	Glycerol Esters	Sphingosine Derivatives	Terpenes (Isoprene Polymers)

• **Cholesterol** and cholesteryl esters
• Steroid hormones
• Bile acids
• Vitamin D
	• Short chain (2 to 4 carbon atoms)
	• Medium chain (6 to 10 carbon atoms)
	• Long chain (12 to 26 carbon atoms)
	• Prostaglandins
		• Acylglycerols
		  • Tri-glycerides,
		  • Di-glycerides, &
		  • Mono-glycerides
		• Phospho-glycerides
			• Sphingo-myelin
			• Glyco-sphingo-lipids
				• Vitamin A
				• Vitamin E
				• Vitamin K

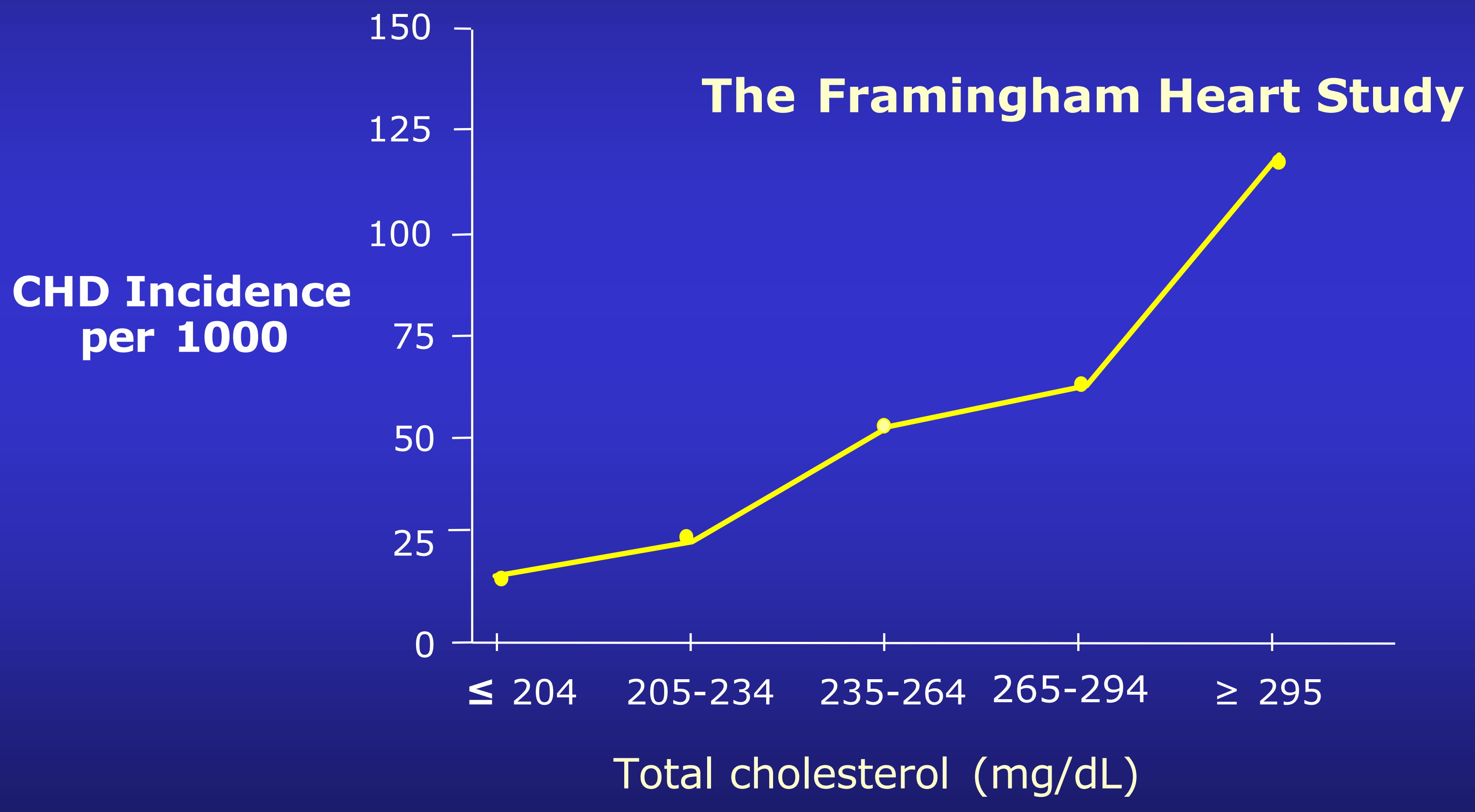
1.2 What is Cholesterol?

- A subtype of Lipid
- Although every living organism has been found to contain sterols, **cholesterol is found almost exclusively in animals**,
- Cholesterol is also the main sterol in man and animals.
  - It is a four-ring hydrocarbon with an eight-carbon side chain
- It is the starting point in many different metabolic pathways:
  1. Vitamin D synthesis
  2. Steroid hormone synthesis, and
  3. Bile acid metabolism.



Founded since 1982 to Support and Serve

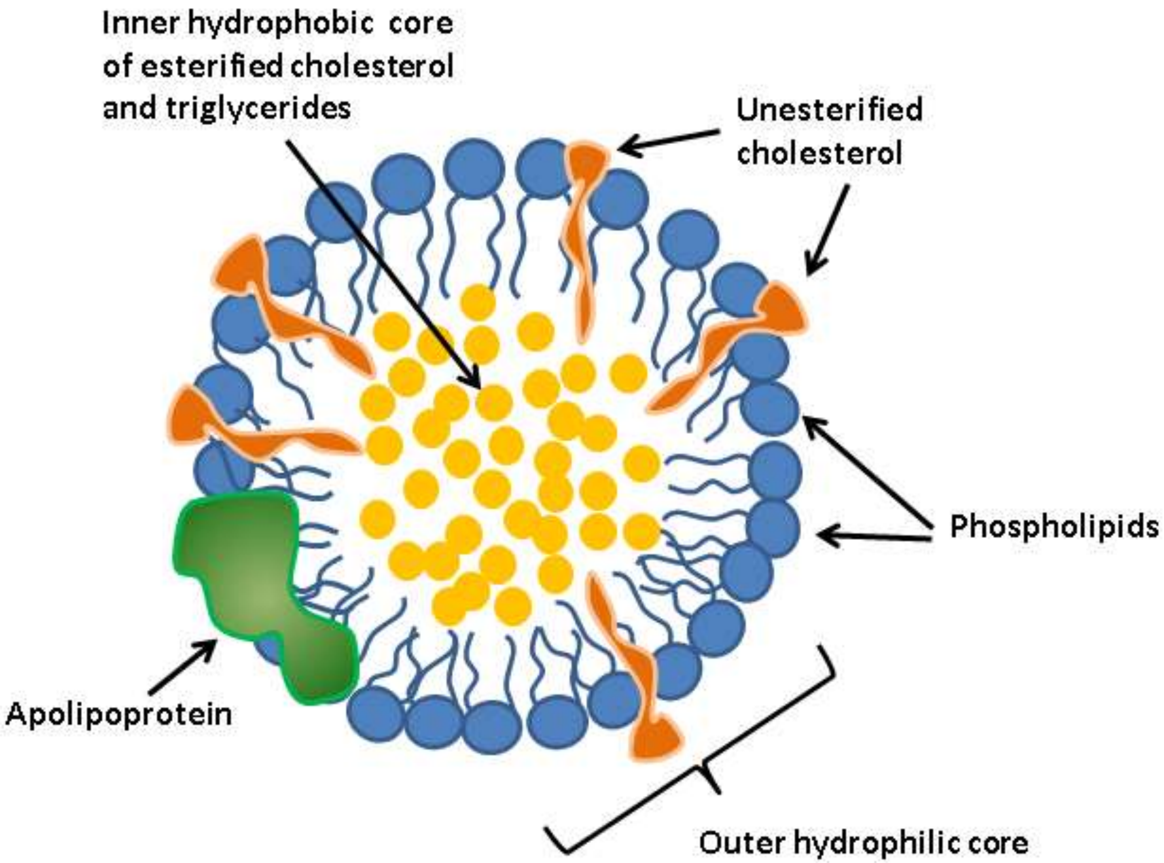
High cholesterol is associated with coronary heart disease



Castelli W. Am J Med 1984;76:4

1.3 What are Lipoproteins?

- Lipoproteins are **transport particles** that carry lipids through the bloodstream (**because lipids cannot dissolve in water**).
- They have:
  - An **outer shell** of **proteins** (apolipoproteins) and phospholipids
  - A **core** of **triglycerides** and **cholesterol** esters
- Examples of lipoproteins:
  - Chylomicrons
  - VLDL → IDL → LDL
  - HDL
  - Lp(a)



1.3 What are Lipoproteins?

Lipids are hydrophobic → **they would clump in the bloodstream if not packaged.**

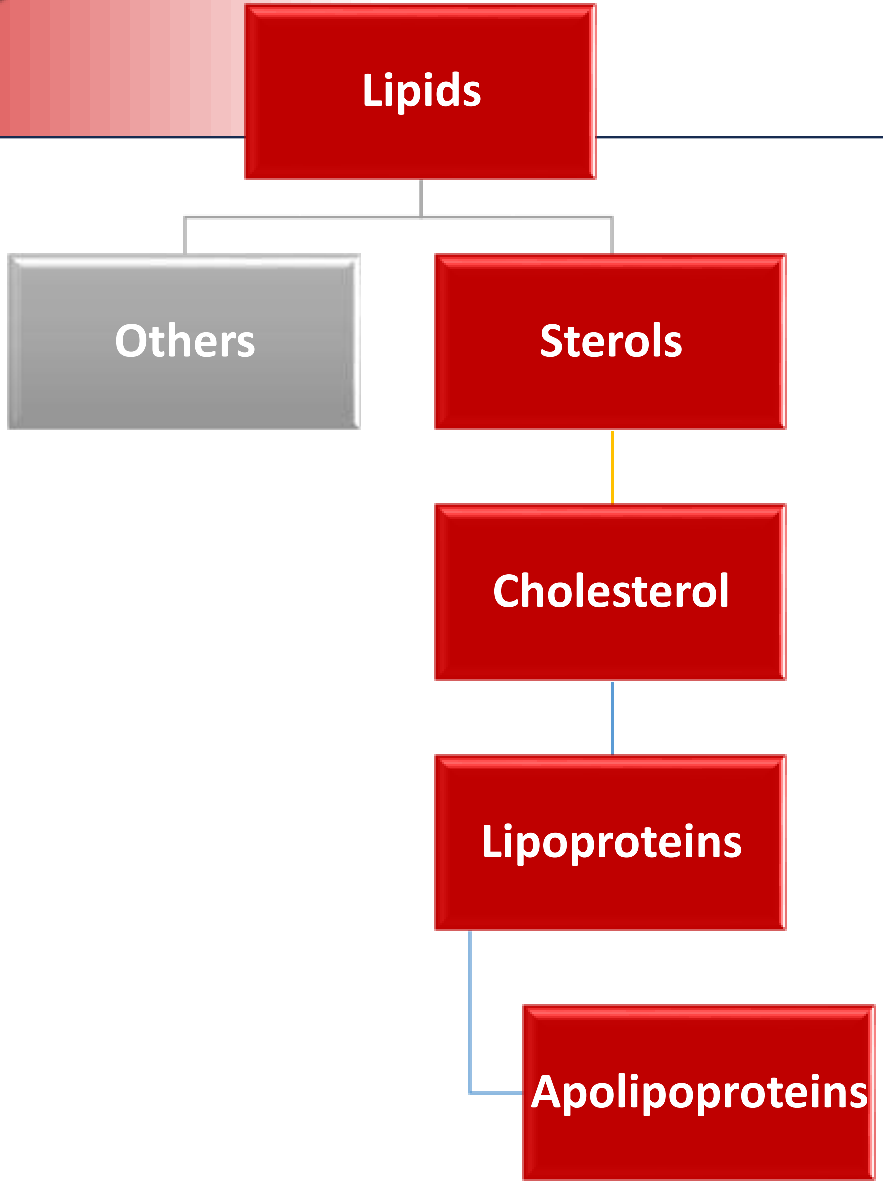
Lipids = the cargo
Lipoproteins = the trucks transporting the cargo

So, the liver and intestine use lipoproteins to:

Transport triglycerides to tissues for energy	**Transport cholesterol for hormone & membrane synthesis**	**Remove excess cholesterol via HDL**

1.4 What are Apolipoproteins?

- Apolipoproteins are the **protein components of a lipoprotein**.
- Each class of lipoprotein has a variety of apolipoproteins in differing proportions, with the exception of **LDL, which contains only apoB-100**
- **Apo A-I is the major protein in HDL**.
- **Apo C-I, C-II, C-III, and E are present in various proportions in all lipoproteins except LDL.**



What are the Cardiocare Multispecialty Hospital's services?

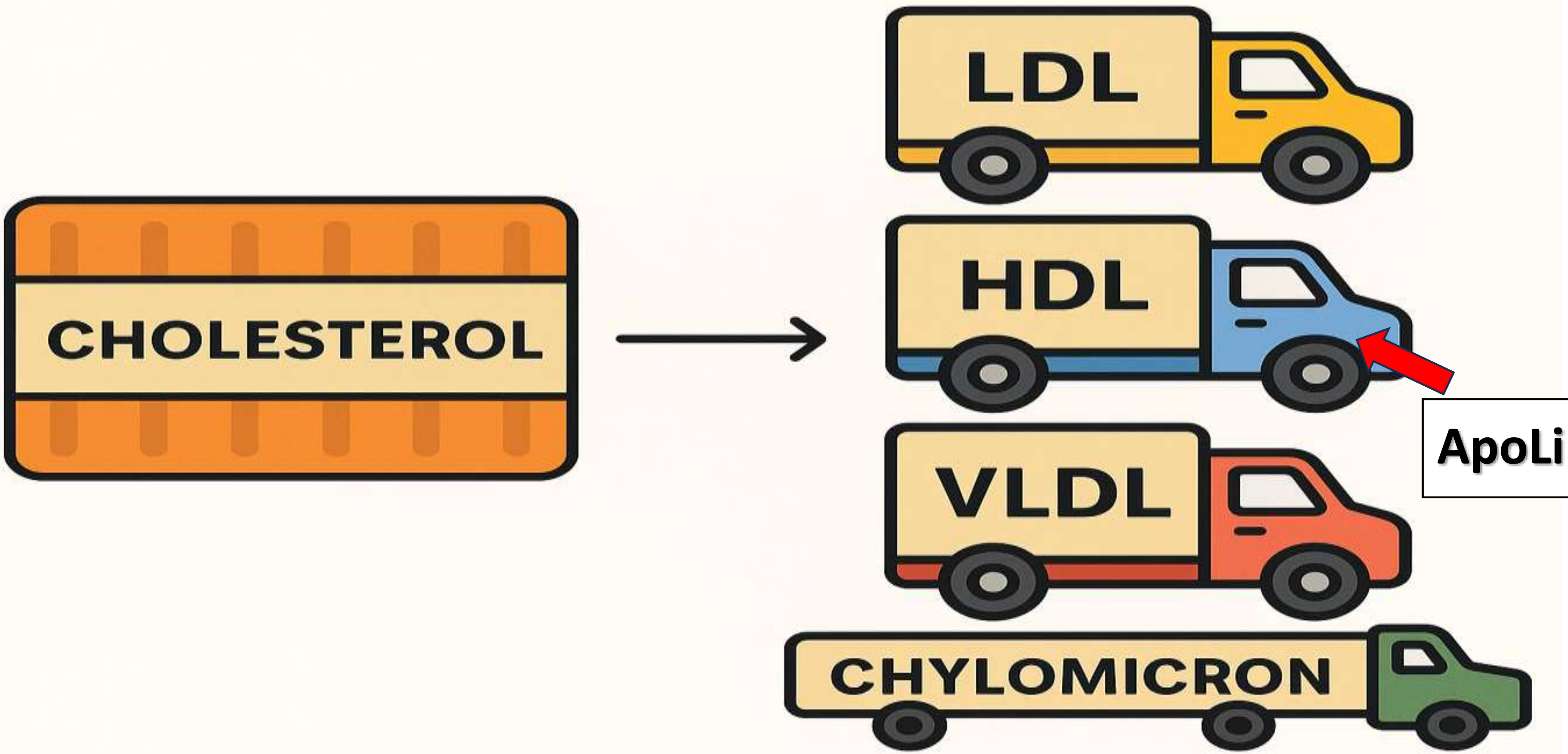
We provide **24/7 world-class healthcare solutions** for patients, hospitals, and their doctors in:

- Interventional Cardiology (Cathlab)
- Endocrinology, Diabetology & Metabolic Medicine
- Cardiology
- Nephrology, Transplant & Dialysis
- Neurology
- Rheumatology
- Pulmonology
- Critical Care
- Cardiothoracic Surgery
- General Internal Medicine
- Comprehensive Medical Checkups

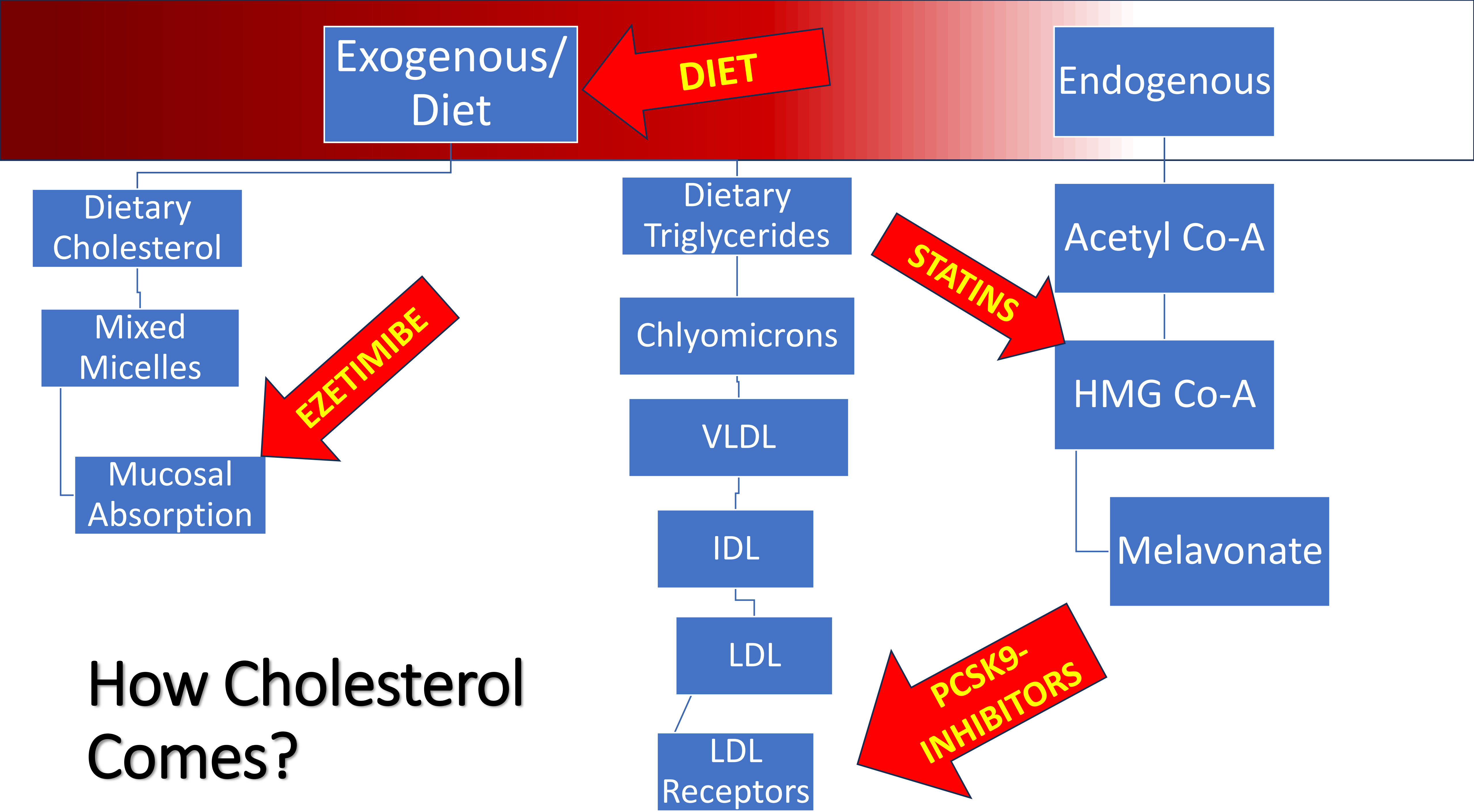
1.4 Apolipoprotein

- Apolipoproteins collectively have three major physiologic functions.
  1. activating important enzymes in the lipoprotein metabolic pathways,
  2. maintaining the structural integrity of the lipoprotein complex, and
  3. facilitating uptake of lipoprotein into cells through their recognition by specific cell surface receptors

Lipoproteins



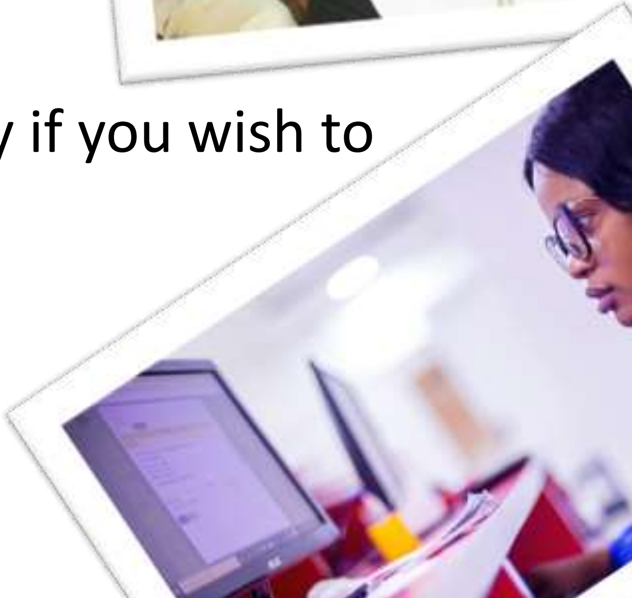
2. How it happens



How Cholesterol Comes?

How to refer patients to Consider Cardiocare Multispecialty Hospital?

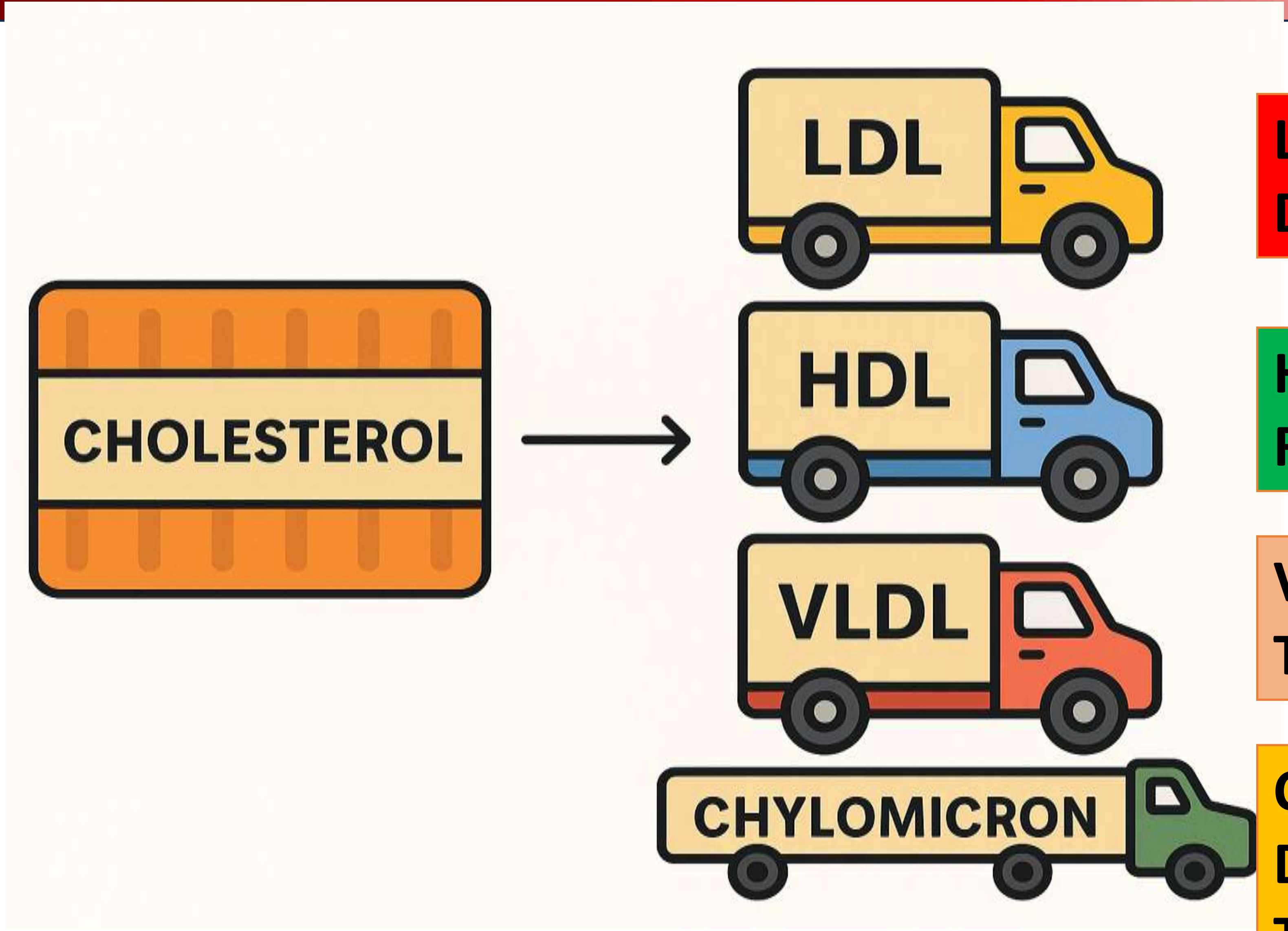
1. Give a standard referral letter & preferably attach any available results
2. **Call:** 0908-331-7777, 0817 444 0888
3. **WhatsApp**: 0908-331-7777, 0806-530-1797
4. **Email**: frontdesk@cardiocare.ng
5. **Visit**: 5, Giza Close Area 11, Garki (off Dunukofia Str- near FCDA) Abuja-FCT.
6. Kindly indicate Doctor's name, & email/phone number especially if you wish to receive a medical report afterwards.



2.3 Reverse Cholesterol Transfer Pathway

- HDL play a major role in the centripetal transport of cholesterol.
- Unesterified cholesterol, exported by the ATP-binding cassette transporter A1 (ABCA 1) , is acquired from the membranes of peripheral tissues by HDL
- Cholesterol effluxed from macrophages by the ATP-binding cassette transporter G 1 (ABCG 1) is also acquired by larger HDL.

Lipoproteins



LDL- The Cholesterol Delivery Truck

HDL- The Cleanup & Recycling Truck

VLDL- The Liver's Export Truck

Chylomicrons – The Dietary Fat Delivery Truck

3. Treatment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Therapy for Dyslipidemia

- DYSLIPIDEMIA
  - 1. Diet
  - 2. Lifestyle
  - 3. Treat Secondary Causes
  - 4. Medications
    - Statins
    - Fibric Acid Derivatives
    - Bile Acid Sequestrants
    - Nicotinic Acid
    - Ezetimibe
    - Omega-3 Fatty Acid
    - PCSK9-Inhibitor

Lipid-Lowering Agents

- Drug Treatment is recommended for 4 groups:

1. Clinical ASCVD
2. Age 40-75 years with diabetes (LDL> 130mg or ASCVD risk >10%)
3. Age 40-75 years with ASCVD risk ≥ 20%
4. LDL-C ≥ 4.9 mmol (190 mg)

ACC/AHA Guidelines. J Am Coll Cardiol 2018 10.1016/j.jacc.2018.11.003

Lipid-Lowering Agents

STATINS

- **STOP ENDOGENOUS CHOLESTEROL-LDL**
- Competitive inhibitors of HMG-CoA reductase
- Reduction in intrahepatic cholesterol
- leading to increased LDL receptor turnover
- Most effective at lowering LDL cholesterol
- Modest effect on TG and HDL, No effect on Lp(a)

FIBRIC ACID DERIVATIVES

- **Very effective in reducing triglycerides (>400)**
- Increase HDL(15-25%)
- Eg. Gemfibrozil, Fenofibrate
- Caution with statins esp. Gemfibrozil
- Contraindications: in Gallbladder disease, hepatic disease, renal dysfunction

Bile Acid Sequestrants

- Convert cholesterol to bile acids and **prevent reabsorption in the gut**
- Eg: Cholestyramine, Colestipol, Colesevelam
- Adverse effects:
  - Mainly GI (nausea, bloating, cramping)-
  - Increased liver enzymes
  - Can aggravate hyper-triglyceridaemia

Lipid-Lowering Agents

NICOTINIC ACID

- **Reduces production and release of LDL**
- Effective in reduction of triglycerides (<400mg/dl)
- Increase HDL
- Eg. Niaspan
- Side effect: flushing (common), hepatotoxicity, hyperglycemia, and exacerbation of PUD

EZETIMIBE

- Impairs **dietary and biliary cholesterol absorption** at the brush border of the intestines by inhibiting NPC1l1 without affecting TG or fat-soluble vitamins
- **LDL decrease** 15-20%
- Trivial effects on HDL and TG

OMEGA-3 FATTY ACID

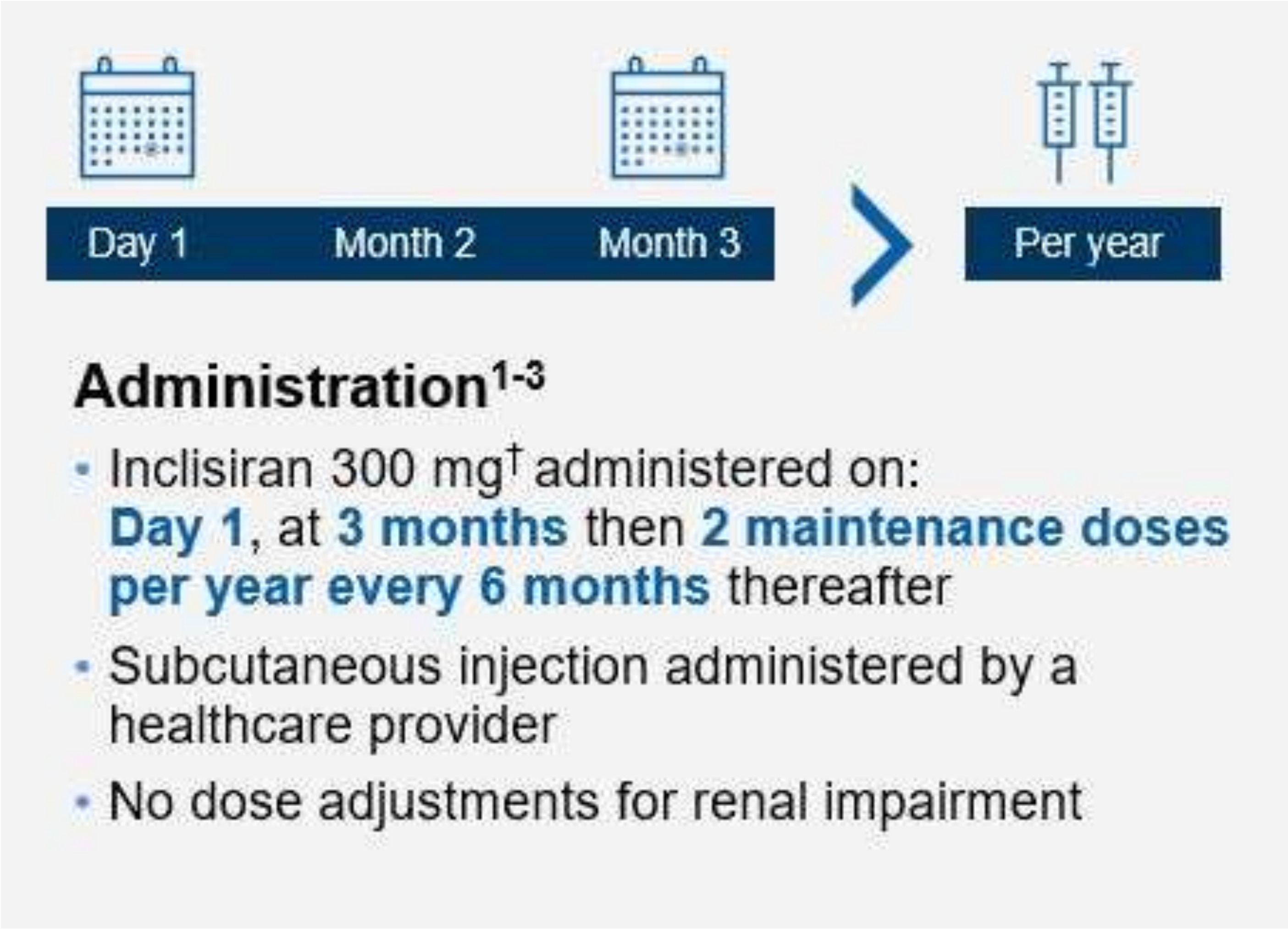
- **Inhibit the secretion of VLDL** due to intracellular apo B-100 destruction.
- Mainly indicated in Hypertriglyceridaemia.
- As high doses are needed, this is a high calorie load and may increase obesity.

Lipid-Lowering Agents: PCSK9 Inhibitor

- New Agent: Inclisiran (Norvatis)

- Proprotein convertase subtilisin/kexin type 9 (PCSK9) is produced in the liver
  - It shortens the life span of LDL receptors in the hepatocytes,

- **The inhibitors allows prolongation of the receptors and enhances clearance of LDL**



4. How we Recognize and Evaluate

Why Travel Abroad?
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4.1 Dyslipidemia

- A consequence of abnormal lipoprotein metabolism
- It includes:
  1. High total cholesterol
  2. High low-density lipoproteins (LDL)
  3. High triglycerides (TG)
  4. Low high-density lipoproteins (HDL)

- Also
  - Primary Dyslipidemia
  - Secondary Dyslipidemia

4.2 Primary Dyslipidemia

- Single or multiple gene mutation resulting in disturbance of LDL, HDL and/or triglyceride production or clearance

- Suspect in patients with :
  - Premature Heart Disease
  - Family history of atherosclerotic disease
  - T. cholesterol Level > 6.2 mmol (240 mg)
  - Physical signs of dyslipidemia (xanthoma, xanthelasma)

4.3 Primary Dyslipidemia: Xanthoma

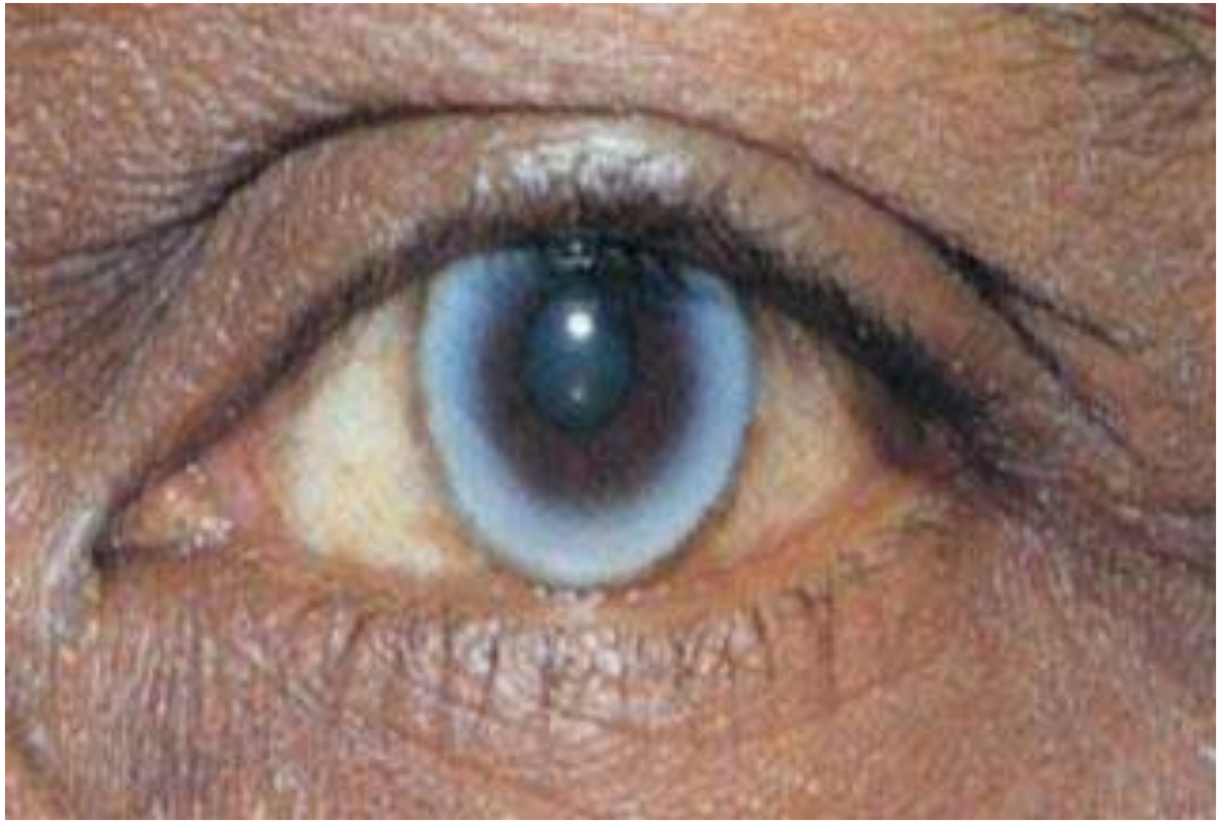
OUR FOCUS

- We aim to provide the best possible care with respect to

- SAFETY
- EFFECTIVENESS
- PATIENT CENTEREDNESS
- INTERNATIONAL STANDARDS

4.4 Primary Dyslipidemia: Others

Xanthelasma



Arcus senilis

4.5 Secondary dyslipidemia

<u>High LDL:</u>

1. Obesity,
2. hypothyroidism,
3. obstructive liver disease,
4. nephrotic syndrome,
5. corticosteroids, diuretics, cyclosporine, amiodarone

<u>High TG:</u>

1. Obesity,
2. hypothyroidism,
3. diabetes,
4. nephrotic syndrome, CKD,
5. corticosteroids, oral estrogens, anabolic steroids, Beta-blockers, thiazides, alcohol, antiretroviral therapy

4.6 Screening for dyslipidemia
(ATP3, United States Preventive Services Task Force & Cardiocare recommendations)

- Men age ≥ 35
- Women age ≥ 45
- Men 20-35 & Women 20-45 if any CHD risk factors:
  - Prior CHD or abdominal aortic aneurysm, peripheral artery disease, carotid artery stenosis
  - DM
  - HTN
  - Smoking
  - A family history of cardiovascular disease
  - Obesity
- Sample- total cholesterol, LDL-C, HDL-C, and TG
- Lipid screening tests should <u>NOT</u> be performed during an acute illness or hospitalization, which may transiently lower LDL-C

4.7 Serum LDL-Cholesterol Targets

Risk category	LDL-C goal (mg/dL)	LDL-C goal (mmol/L)	Additional target/remark
EXTREMELY HIGH RISK recurrent events despite therapy	**<40 mg/dL** *(used/considered for patients with recurrent events within 2 years)*	**<1.0 mmol/L**	Consider aggressive combination therapy (statin + ezetimibe ± PCSK9). (Archives of Medical Science)
VERY-HIGH RISK (established ASCVD — e.g., prior MI, stroke, PAD; or multiple major events / multiple high-risk conditions)	**<55 mg/dL**	**<1.4 mmol/L**	**AND ≥50% reduction from baseline**. Consider ezetimibe/PCSK9 if on maximally tolerated statin and goal not reached. (EAS)
HIGH RISK (e.g., diabetes with other risks, severe CKD, markedly elevated single risk factors, or some primary prevention high-risk states)	**<70 mg/dL**	**<1.8 mmol/L**	AND aim for ≥50% reduction when appropriate. (EAS)
MODERATE RISK (eg. 1 risk factor eg Hypertension)	**<100 mg/dL**	**<2.6 mmol/L**	Lifestyle ± moderate-intensity statin depending on overall risk. (EAS)
LOW RISK (generally young, no/few risk factors)	**<116 mg/dL**	**<3.0 mmol/L**	Emphasize lifestyle; pharmacotherapy only if risk rises. (EAS)

Our Offered Services

We provide advanced solution to all aspect of Cardiovascular Medicine and Surgeries.

- ✓ **Cardiology**
- ✓ **Interventional Cardiology (Cathlab)**
- ✓ **Endocrinology, Diabetology &**
- ✓ **Nephrology, Transplant & Dialysis**
- ✓ **Neurology**
- ✓ **Rheumatology**
- ✓ **Pulmonology**
- ✓ **Critical Care**
- ✓ **Cardiothoracic Surgery**
- ✓ **General Internal Medicine**
- ✓ **Comprehensive Medical Checkups**

5. Risk Assessment and Treatment Approach

5-Step Evaluation of Dyslipidemia

if Yes, Jump to next Level; If No, Jump to next Step

Level1. Step A. Is there ASCVD? (Y/N)

Very High Risk	Stable	Extreme (Multiple Events)

Level1. Step B. ASCVD Risk >10% or DM + Age>40yrs old? (Y/N)

Low <10%	Medium 10-20%	High 20-30%	Very High >30%

Level1.Step C. LDL Level above 190mg/dl? (Y/N)

Level 2 TREATMENT

Lifestyle	Diet	Medications	Secondary Causes if Applicable

Level 3 FOLLOW-UP (+/- Escalation)

Normal & >20 years, every 5years	Normal & >45 years, every 2 years	Abnormal every 3-6 months

Level 1, StepA: ASCVD?

- ASCVD refers to **atherosclerotic plaque–related disease** affecting **coronary, cerebrovascular, and peripheral arteries**.
- **Major ASCVD events:**
  - **Acute coronary syndrome within 1 year, Myocardial infarction, ischemic stroke, symptomatic PAD**
- **High risk conditions in Association with ASCVD Event that further increase risk:**
  - **Age ≥ 65,**
  - **CABG, PCI,**
  - **DM, HTN, CKD,**
  - **Smoking,**
  - **Familial hypercholesterolemia,**
  - **LDL ≥ 2.6 mmol (100 mg) while on Statin & Ezetimibe**

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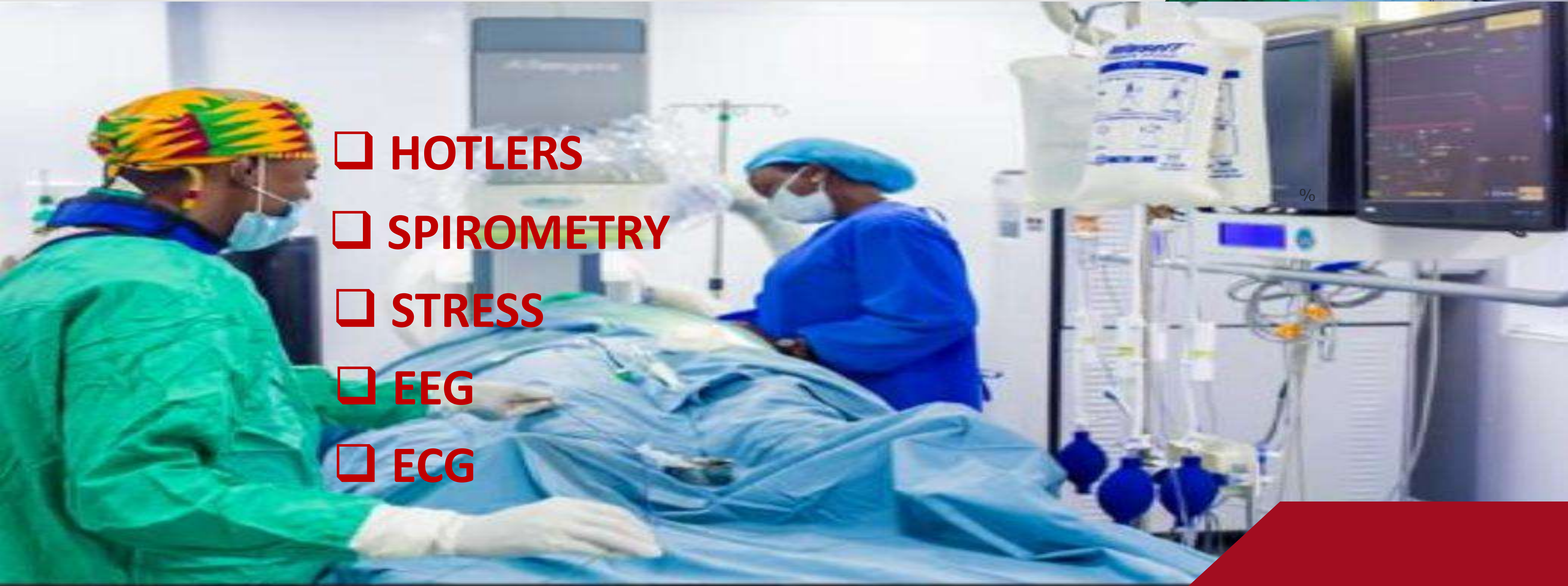
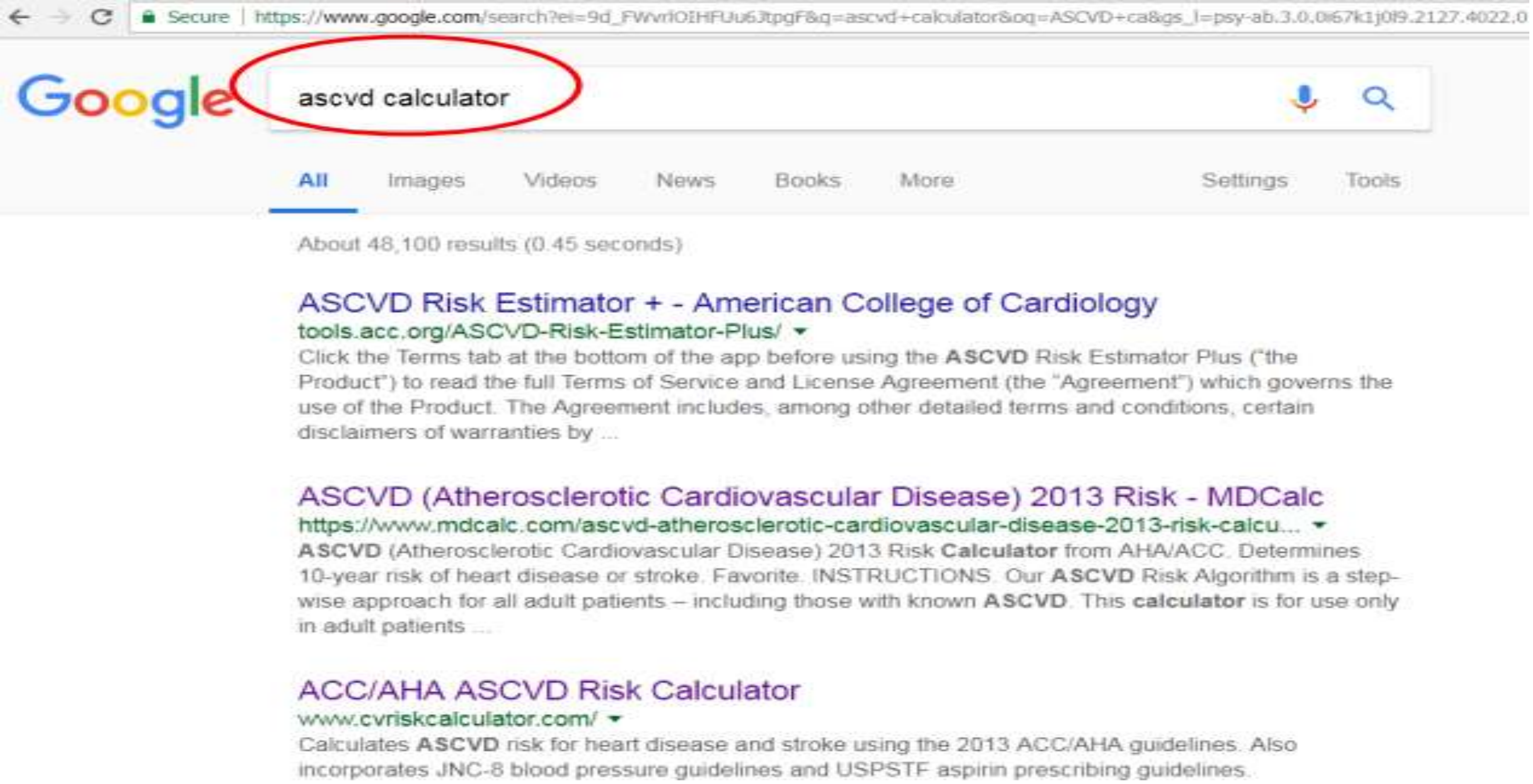
Our Non-Invasive Assessment services



- HOTLERS
- SPIROMETRY
- STRESS
- EEG
- ECG

Level 1, Step B: ASCVD Risk?



http://www.cvriskcalculator.com/calculated?age=58&gender=1&race=0&total-chol=200&hdl=31&sbp=130&dbp=72&treated=0&diabetes=0&smoker

Favorites | Suggested Sites | Web Slice Gallery

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Heart Risk Calculator

Home | About | Contact

For a 58-year-old not African-American, nonsmoking male with a history of no diabetes and a blood pressure of 130/72 not on anti-hypertensives and with total cholesterol of 200 mg/dL and HDL-C of 31 mg/dL:

10.8%

10-year risk of heart disease or stroke

On the basis of your age and risk for heart disease or stroke, the ACC/AHA guidelines suggest you should be on a **moderate to high intensity statin**.

Based on your age, your blood pressure is **well-controlled**.

Note: **moderate intensity statin** may be atorvastatin 10mg, pravastatin 40mg, or simvastatin 20-40mg. **High intensity statin** may be atorvastatin 40mg-80mg.

Medications in diabetes

Age 40-75 yrs

- If age 40-75 years OR
- Multiple CV risk factors OR
- 10-year ASCVD risk > 20 %

High intensity statin

Moderate intensity statin

- **CV risk factors:**

(LDL ≥ 2.6 mmol, HTN, CKD, albuminuria, smoking, F/H of premature ASCVD)

American Diabetes Association. Diabetes Care 2019;42(Suppl.1):S103.
ACC/AHA Guidelines. J Am Coll Cardiol 2018 10.1016/j.jacc.2018.11.003

OUR FACILITIES

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BED SPACE

VIP SUITES,

PRIVATE SUITES,

GENERAL SUITES etc

2

INTENSIVE CARE UNIT

HDU&ICU

3

THEATERS

ULTRAMORDEN CATHLAB, CARDIAC OPERATION THEATER

1

DIALYSIS SUITE

PHYSIOLOGY LAB

RADIOLOGY SIUTE

Level 1; Step C

Is the LDL > 190mg.dl

CASES?

Case 1

- A 58-year-old man followed up for hypertension
- No diabetes, Non-smoker
- He had a minor stroke 3 years ago
- Total cholesterol 4.7 mmol (182 mg)
- LDL 2.4 mmol (92 mg)
- HDL 1 mmol (38 mg)

- **How would you manage his lipids?**

5-Step Evaluation of Dyslipidemia

if Yes, Jump to next Level
If No, Jump to next Step

Level1. Step1. Is there ASCVD? (Y/N)

Stable	High Risk	Extreme (multipl

Level1. Step2. ASCVD Risk >10% or DM + Age>40yrs old? (Y/N)

Medium 10-20%	High 20-30%	Very High >30%

Level1.Step3. LDL Level above 190mg/dl? (Y/N)

Level 2 TREATMENT

Lifestyle	Diet	Medication	Secondary Causes if Applicable

Level 3 FOLLOW-UP (+/- Escalation)

Normal & >20 years, every 5years	Normal & >45 years, every 2 years	Abnormal every 3-6 months

Patients with ASCVD

- No need for ASCVD risk assessment
- They need statins regardless of other risk factors or age

- Those are classified into:

  1. Stable ASCVD
  2. Very High Risk ASCVD (If more than one high risk conditions in association)
  3. Extreme-Risk ASCVD (if multiple events)

Level 1, Step A: ASCVD?

Category	Description	Examples	LDL Target
Stable ASCVD	Atherosclerotic disease in coronary, cerebral, or peripheral arteries	MI, stroke, TIA, PAD, CABG/PCI, carotid stenosis, AAA	**<55 mg/dL**
Very High-Risk ASCVD	1 or more ASCVD events + major high-risk conditions	MI + CKD; Stroke + PAD; Elderly + diabetes + CAD	**<55 mg/dL**
Extreme-Risk ASCVD	Recurrent events despite therapy; poly-vascular disease	MI + stroke + PAD; recurrent ACS	**<40 mg/dL**

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Our Milestones

OVER 600 CATHLAB PROCEDURES

CARDIOCARE HAS PERFORMED OVER 500 CARDIAC PROCEDURES FOR NIGERIANS AND FOREIGN NATIONALS SUCCESSFULLY AND RELIABLY OVER THE YEARS

AWARDS & RECORGNITION

WE ARE HAPPY TO HAVE RECEIVED AWARD OF EXCELLENCE IN CARDIOVASCULAR CARE FROM THE NIGERIAN CARDIAC SOCIETY

RESEARCH & COLLABOTRATIONS

CARDIOCARE HAS PROVIDED AVENUES FOR LOCAL RESEARCH & TRAINING.

COLLABORATED WITH FOREGN AND LOCAL ORGANIZATIONS TO HOST CARDIAC OUTREACHES THAT OFFERED LIFE SAVING INTERVENTIONAL PROCEDURES TO INDIGENT NIGERIANS

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PG RESIDENCY ROTATION

TRAINING MOUS WITH (UPTH, OAUTH)

SIGNIFICANT ASCVD RISK AS A GUIDE

- Moderate Risk (10-20%)
  - Escalate to Target LDL <100mg/dl
  - Start with Lifestyle/Diet
- High Risk (20-30%)
  - Escalate to Target LDL <70mg/dl
  - Moderate Intensity Statin plus lifestyle
- Very High Risk (>30%)
  - Escalate to Target <55mg/dl
  - Maximally tolerated Statins

Statin Intensity

HIGH INTENSITY STATIN	MODERATE INTENSITY STATIN	LOW INTENSITY STATIN
• **Lower LDL by ≥ 50 %** • Atorvastatin 40 or 80mg od • Rosuvastatin 20 or 40mg od	• **Lower LDL by 30 to 49 %** • Atorvastatin 20mg od • Rosuvastatin 10mg od	• **Lower LDL by <30 %** • Atorvastatin 10mg od • Rosuvastatin 5mg od

Remember

- **STATIN:**
- S - Start at recommended intensity;
- T - Targets (LDL goals) should be aimed for by 3-6months;
- A - Adherence;
- T - Tolerability monitoring (check LFT at onset);
- I - Intensify if needed (or escalate);
- N - Non-statin add-ons

ESCALATION ALGORITHM FOR DYSLIPDEMIA TREATMENT

LIFESTYLE

H - Healthy diet (Mediterranean)
E - Exercise
A - Avoid smoking & alcohol moderation
R - Reduce weight
T - Treat comorbidities (DM, HTN)

+ STATINS

Atorvastatin

Rosuvastatin

Simvastatin

Do ALT & AST before starting… if normal repeat only if liver dysfunction

+ EZETIMIBE

Ezetrol

Higher incidence of myopathy and elevated transaminases when co-administered with a statin

Give PCSK9 if Ezetimibe is not available or Very High Risk

PSCK9

If Ezetimibe is not available

OR

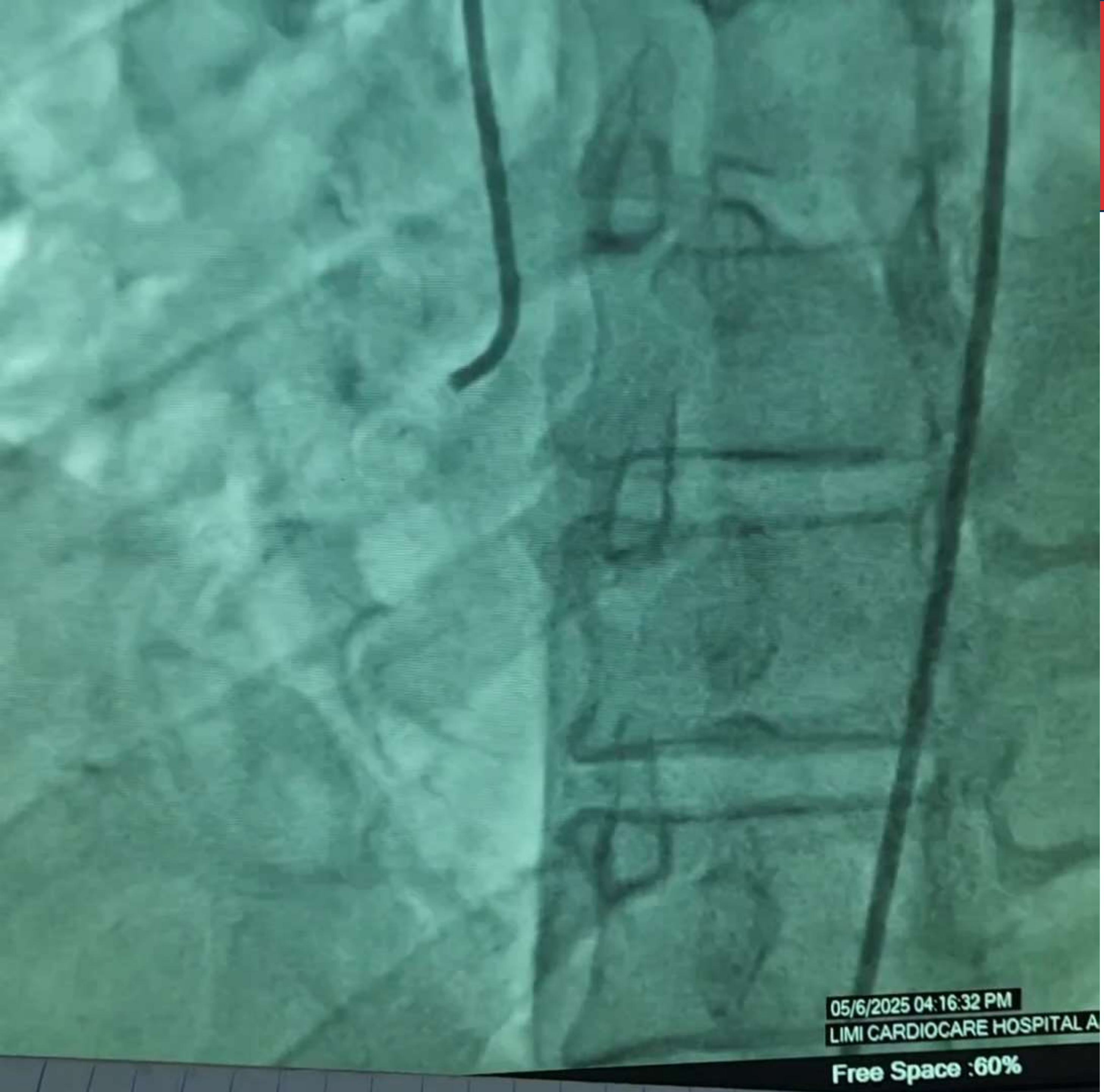
Target not achieved in 3months after it

Give Bempedoic Acid if unable to afford PCSK9

Case 2

- A 54-year-old man with DM 2 & HTN
- He had CAD (acute MI with stent) 1 year ago
- Atorvastatin 40 mg qd, insulin, ACEi, BB, ASA
- T. cholesterol 5.1 mmol (198 mg)
- LDL 3.1 mmol (120 mg)
- HDL 1 mmol (38 mg)

- **What is your advice regarding lipid treatment?**



RCA TOTAL OCCLUSION & RE-VASCULARIZATION

High LDL despite statin

- •Target LDL :
  - < 1.8 mmol (70 mg) if ASCVD
  - < 2.6 mmol (100 mg) if severe primary hypercholesterolemia (baseline ≥ 4.9 mmol [190 mg])
- Assess adherence
- Assess response to statin (LDL before & after)
- ADD non-statin (Ezetimibe or PCSK9)

ACC/AHA Guidelines. J Am Coll Cardiol 2018 10.1016/j.jacc.2018.11.003

LETS SUPPORT YOUR PATIENTS WITH WORLD CLASS CARDIAC SOLUTIONS

When to add non-statin therapy?

- **<u>Ezetimibe or PCSK9i</u>:**

1. ASCVD on maximal tolerated statin with LDL ≥ 1.8 mmol (70 mg)
2. Severe primary hypercholesterolemia (baseline LDL ≥ 4.9 mmol [190 mg]) on maximal tolerated statin with LDL ≥ 2.6 mmol (100 mg)

ACC/AHA Guidelines. J Am Coll Cardiol 2018 10.1016/j.jacc.2018.11.003

Indications for PCSK-9 inhibitors

1. Very high risk ASCVD on maximal tolerated statin & Ezetimibe with LDL ≥ 1.8 mmol (70 mg)
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ACC/AHA Guidelines. J Am Coll Cardiol 2018 10.1016/j.jacc.2018.11.003

Case 3

- A 52-year-old man had a health check up
- No diabetes, No hypertension
- Non-smoker
- **Total cholesterol: 8.0 mmol (310 mg)**
- **LDL 6.2 mmol (240 mg)**
- HDL 1.1 mmol (40 mg)

- **How to manage his lipids?**

Case 3- Approach

Start by:

1. **Does my patient have ASCVD?**
   a) if yes, start statin
   b) **if no,** go to question 2

2. **Is their ASCVD Risk >10% or they have DM>**
   a) if yes, start statin
   b) **if no,** go to question 3

3. **Is their LDL level >190mg/dl ?**
   a) if yes, start statin
   b) **if no, start** lifestyle

HOW TO REFER TO CARDIOCARE

1	**REFERRAL LETTER:** Give a standard referral letter & preferably attach any available results of previous investigations
2	**ON-SITE REFERRAL:** Visit no 5 Giza Close, Area 11 Garki off Dunukofia Str- near FCDA) Abuja-FCT.
3	**EMAIL:** Send an email to frontdesk@cardiocare.ng or o.solomon@limihospital.org or e.james@limihospital.org
4	**WHATSAPP:** Send a Whatsapp message to 0908-331-7777 0806-530-1797
5	**CALL:** 0908-331-7777, 0817 444 0888
6	**IDENTIFICATION:** Kindly indicate Doctor's name, & email/phone number especially if you wish to receive a medical report afterwards.

Severe primary hypercholesterolemia

- For adult patients with:

LDL-C ≥ 4.9 mmol (190 mg)

- No need for ASCVD risk assessment
- They need statins regardless of risk or age

- High intensity statin
- Escalate after 3-6months if not at target (<130)

ACC/AHA Guidelines. J Am Coll Cardiol 2018 10.1016/j.jacc.2018.11.003

Lifestyle changes

For all patients regardless of risk factors:

- DASH-like diet:
  - Rich in fruits, vegetables, low fat diary products
  - Reduce saturated and total fat
- Physical activity
- Weight control
- Smoking cessation

ACC/AHA Guidelines. Circulation 2014;129 (Suppl 2).

How effective are lifestyle changes?

- Modified diet and weight loss
- Upto 10-20 % ↓ in LDL levels in some patients
- Overall average 2-6 % ↓

Jenkins D et al. JAMA. 2011;306:831

LETS SUPPORT YOUR PATIENTS WITH WORLD CLASS CARDIAC SOLUTIONS

CASE 4

- A 60-year-old man with diabetes and hypertension
- No smoking
- B.P.124/60
- T. cholesterol: 5.0 mmol (192 mg)
- LDL 2.4 mmol (92 mg)
- HDL 1 mmol (38 mg)
- **How to manage lipids?**

Case 4: approach

1) No ASCVD

2) LDL is < 4.9 mmol (190 mg)

Next question:

3) Does the patient have DM or elevated ASCVD risk score and age ≥ 40 years?

- If yes, start statin

cardiocare
MULTISPECIALTY HOSPITAL

Connect with us.

Website

www.cardiocare.ng

Email

info@cardiocare.ng

Visit

5 Giza Close, off Dunokofia Street
Area 11 Garki, Abuja, Nigeria

Call us

0908-331-7777

Guidelines on lipids in DM

- There are 2 guidelines for patients with DM:
  - American College of Cardiology/American Heart Association (ACC/AHA)
  - American Diabetes Association (ADA)

1) They differ in age criteria to prescribe statins

- ACC/AHA recommends statins for age 40-75 years
- ADA recommends statins for all patients age ≥ 40 years

Guidelines on lipids in DM

2) They also differ on how to decide on type of statins:

- ACC/AHA recommends assessing risk factors :
  - Generally use moderate intensity statins
  - High intensity statin if age 50-75 or multiple risk factors
- ADA recommends calculating 10- year ASCVD risk:
  - Generally use moderate intensity statin
  - Use high intensity if ASCVD risk > 20 % or multiple risk factors

LETS SUPPORT YOUR PATIENTS WITH WORLD CLASS CARDIAC SOLUTIONS

Medications in diabetes

Age 40-75 yrs

- If age 40-75 years OR
- Multiple CV risk factors OR
- 10-year ASCVD risk > 20 %

High intensity statin

Moderate intensity statin

- **CV risk factors:**

(LDL ≥ 2.6 mmol, HTN, CKD, albuminuria, smoking, F/H of premature ASCVD)

American Diabetes Association. Diabetes Care 2019;42(Suppl.1):S103.

ACC/AHA Guidelines. J Am Coll Cardiol 2018 10.1016/j.jacc.2018.11.003

How about DM age < 40 or >75?

- Assess other risk factors:
- Consider Medications if:
  - LDL ≥ 4.1 mmol (160 mg)
  - Family history of premature ASCVD
  - Elevated high sensitive CRP level
  - Low ankle brachial index
  - Multiple risk factors (High Intesity)
  - High coronary artery calcium on CT-scan

Case 5

- A 58-year-old man no DM, no HTN
- No smoking
- BMI 31, B.P. 124/72
- T. cholesterol 5.2 mmol (200 mg)
- LDL 3.2 mmol (123 mg)
- HDL 0.8 mmol (31 mg)
- Lab reference range indicates “desirable LDL < 3.3 mmol (130 mg)”
- **How would you approach?**

Our Milestones

OVER 600 CATHLAB PROCEDURES

CARDIOCARE HAS PERFORMED OVER 500 CARDIAC PROCEDURES FOR NIGERIANS AND FOREIGN NATIONALS SUCCESSFULLY AND RELIABLY OVER THE YEARS

AWARDS & RECORGNITION

WE ARE HAPPY TO HAVE RECEIVED AWARD OF EXCELLENCE IN CARDIOVASCULAR CARE FROM THE NIGERIAN CARDIAC SOCIETY

RESEARCH & COLLABOTRATIONS

CARDIOCARE HAS PROVIDED AVENUES FOR LOCAL RESEARCH & TRAINING.

COLLABORATED WITH FOREGN AND LOCAL ORGANIZATIONS TO HOST CARDIAC OUTREACHES THAT OFFERED LIFE SAVING INTERVENTIONAL PROCEDURES TO INDIGENT NIGERIANS

TRAINING & SYMPOSIUM

TRAINING OVER 600 HEALTHCARE PROFESSIONALS VIA MONTHLY WEBINARS AND ANNUAL CARDIOVASCULAR SYMPOSIUM NOW IN ITS 8TH EDITION.

PG RESIDENCY ROTATION

TRAINING MOUS WITH (UPTH, OAUTH)

Case 5: approach

1) No ASCVD

2) LDL is < 4.9 mmol (190 mg)

3) No DM with age ≥ 40 years

Next step:

4) Is age 40-75 years?

- If yes, do **10-year ASCVD risk calculation**

When to refer to a Nearby Specialist (eg Cardiocare)

Uncontrolled LDL despite maximal therapy,

Suspected Primary or Familial Dyslipidemia,

Statin intolerance,

Recurrent ASCVD despite low LDL,

Young patients with premature ASCVD

SUMMARY

OUR FACILITIES

cardiocare
MULTISPECIALTY HOSPITAL

24

BED SPACE

VIP SUITES,

PRIVATE SUITES,

GENERAL SUITES etc

2

INTENSIVE CARE UNIT

HDU&ICU

3

THEATERS

ULTRAMORDEN CATHLAB, CARDIAC OPERATION THEATER

1

DIALYSIS SUITE

PHYSIOLOGY LAB

RADIOLOGY SIUTE

1. 5-Step Evaluation of Dyslipidemia

if Yes, Jump to next Level; If No, Jump to next Step

Level1. Step A. Is there ASCVD? (Y/N)

Very High Risk	Stable	Extreme (Multiple Events)

Level1. Step B. ASCVD Risk >10% or DM + Age>40yrs old? (Y/N)

Low <10%	Medium 10-20%	High 20-30%	Very High >30%

Level1.Step C. LDL Level above 190mg/dl? (Y/N)

Level 2 TREATMENT

Lifestyle	Diet	Medications	Secondary Causes if Applicable

Level 3 FOLLOW-UP (+/- Escalation)

Normal & >20 years, every 5years	Normal & >45 years, every 2 years	Abnormal every 3-6 months

2. ASCVD RISK SCORING PLANS

- Moderate Risk (10-20%)
  - Escalate to Target LDL <100mg/dl
  - Start with Lifestyle/Diet
- High Risk (20-30%)
  - Escalate to Target LDL <70mg/dl
  - Moderate Intensity Statin plus lifestyle
- ASCVD or Very High Risk (>30%)
  - Escalate to Target <55mg/dl
  - Maximally tolerated Statins

LDL-Cholesterol(mg/dl) Targets

Risk category	LDL-C goal (mg/dL)	LDL-C goal (mmol/L)	Additional target/remark
EXTREMELY HIGH RISK recurrent events despite therapy	**<40 mg/dL** *(used/considered for patients with recurrent events within 2 years)*	**<1.0 mmol/L**	Consider aggressive combination therapy (statin + ezetimibe ± PCSK9). (Archives of Medical Science)
VERY-HIGH RISK (established ASCVD — e.g., prior MI, stroke, PAD; or multiple major events / multiple high-risk conditions)	**<55 mg/dL**	**<1.4 mmol/L**	**AND ≥50% reduction from baseline**. Consider ezetimibe/PCSK9 if on maximally tolerated statin and goal not reached. (EAS)
HIGH RISK (e.g., diabetes with other risks, severe CKD, markedly elevated single risk factors, or some primary prevention high-risk states)	**<70 mg/dL**	**<1.8 mmol/L**	AND aim for ≥50% reduction when appropriate. (EAS)
MODERATE RISK (eg. 1 risk factor eg Hypertension)	**<100 mg/dL**	**<2.6 mmol/L**	Lifestyle ± moderate-intensity statin depending on overall risk. (EAS)
LOW RISK (generally young, no/few risk factors)	**<116 mg/dL**	**<3.0 mmol/L**	Emphasize lifestyle; pharmacotherapy only if risk rises. (EAS)

ADVANCED CARE

cardiocare
MULTISPECIALTY HOSPITAL

1 **CORONARY ANGIOGRAPHY & INTERVENTIONS-** For patients presenting with chest pains, acute coronary syndrome

2 **PERIPHERAL ANGIOGRAPHY & INTERVENTIONS-** For patients presenting with Peripheral vascular diseases causing tissue loss or gangrene

3 **CARDIAC DEVICE IMPLANTATION & PROGRAMMING** such as Pacemakers, ICDs,CRTs for patients presenting with heart failure & Cardiac rhythm abnormalities

4 **STRUCTURAL HEART INTERVENTIONS –** for patients presenting with ASD, VSD, PDA etc..

5 **THROMBOEMBOLIC THERAPIES such as IVC Filters,** for VTE (Venous Thrombo-embolic) treatment and management

6 **CARDIAC SURGERY –** Open Heart Surgery

7 **KIDNEY TRANSPLANT & DIALYSIS**

8 **CRITICAL CARE**

9 **ADVANCED CARDIAC INVESTIGATIONS**

3. DYSLIPIDEMIA MANAGEMENT ALGORITHM FOR PRIMARY CARE: ESCALATION!

LIFESTYLE

H - Healthy diet (Mediterranean)
E - Exercise
A - Avoid smoking & alcohol moderation
R - Reduce weight
T - Treat comorbidities (DM, HTN)

+ STATINS

Atorvastatin

Rosuvastatin

Simvastatin

Do ALT & AST before starting… if normal repeat only if liver dysfunction

+ EZETIMIBE

Ezetrol

Higher incidence of myopathy and elevated transaminases when co-administered with a statin

Give PCSK9 if Ezetimibe is not available or Very High Risk

PSCK9

If Ezetimibe is not available

OR

Target not achieved in 3months after it

Give Bempedoic Acid if unable to afford PCSK9

4. DYSLIPIDEMIA MANAGEMENT ALGORITHM FOR PRIMARY CARE:
Statin Intensity

HIGH INTENSITY STATIN	MODERATE INTENSITY STATIN	LOW INTENSITY STATIN
• **Lower LDL by ≥ 50 %** • Atorvastatin 40 or 80mg od • Rosuvastatin 20 or 40mg od	• **Lower LDL by 30 to 49 %** • Atorvastatin 20mg od • Rosuvastatin 10mg od	• **Lower LDL by <30 %** • Atorvastatin 10mg od • Rosuvastatin 5mg od

5. When to add non-statin therapy?

- **Ezetimibe or PCSK9i (eg Inclisiran):**

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6. Indications for PCSK-9 inhibitors- eg Inclisiran

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- THANKS

THANK YOU

Our vision to curb medical tourism
Is incomplete without your collaborations

Lets do it together!

Lets support your practice for better patients outcomes.

Lets partner with you…

Cardiocare Hospital Abuja appreciates you & the opportunity to be here!