HYPERLIPIDAEMIA MANAGEMENT

Glomerular disease and the Kidney Ecosystem

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The Barn Hotel and Spa, Marston, Grantham

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What is hyperlipidaemia (in children)

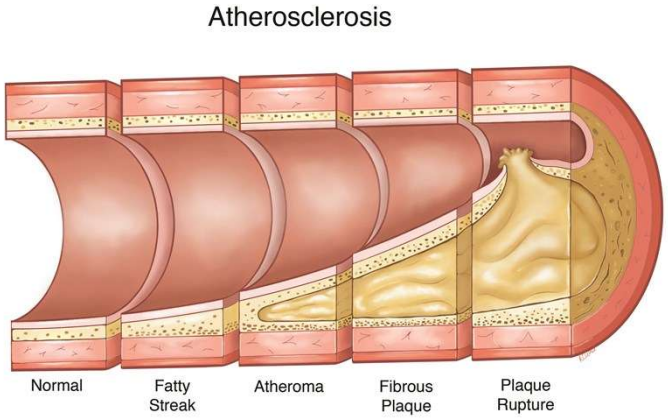
- Age specific cut-offs
  - 95th percentile for high lipids
  - 10th percentile for low HDL-C
- Average of 2 fasting samples
  - 2 weeks to 3 months apart

Lipid measure	Abnormal value
Total cholesterol	**≥200 mg/dL** (≥5.2 mmol/L)
Low-density lipoprotein cholesterol (LDL-C)	**≥130 mg/dL** (≥3.4 mmol/L)
Non-high-density lipoprotein cholesterol (non-HDL-C)	**≥145 mg/dL** (≥3.75 mmol/L)
Triglycerides, age 0–9 years	**≥100 mg/dL** (≥1.1 mmol/L)
Triglycerides, age 10–19 years	**≥130 mg/dL** (≥1.5 mmol/L)
High-density lipoprotein cholesterol (HDL-C)	**<40 mg/dL** (<1.0 mmol/L)

Guideline on the Management of Blood Cholesterol. JACC 2018

Should we care about dyslipidaemia?

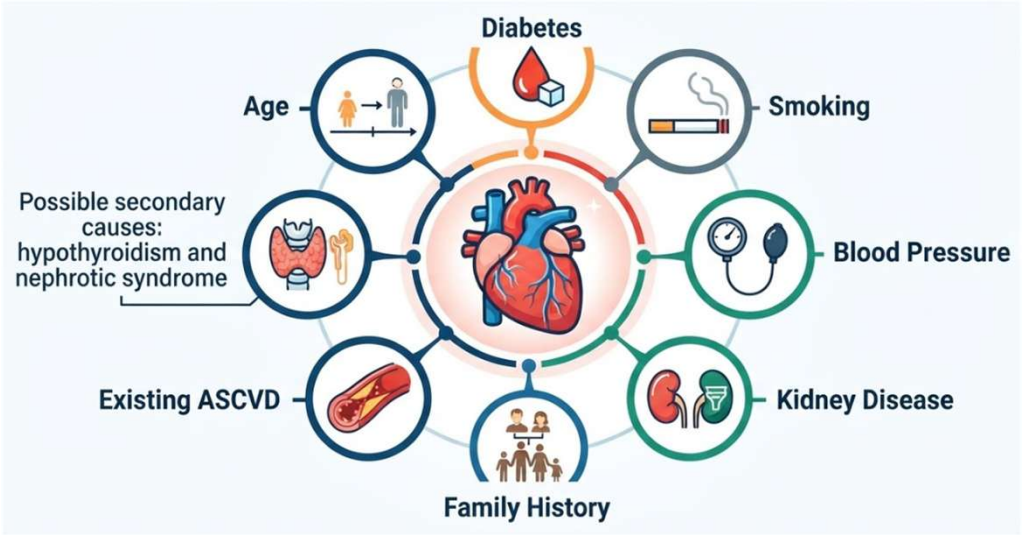
- Excess low-density lipoprotein cholesterol (LDL-C) progressively causes atherosclerosis, which increases risk of:
  - myocardial infarction,
  - ischemic stroke,
  - peripheral arterial disease,
  - and cardiovascular death[1].
- LDL particles accumulate in the arterial wall, → plaque formation → plaque rupture → thrombosis
- Cardiovascular disease is the leading cause of mortality in people with chronic kidney disease (CKD)[2]



[1] 2025 Focused Update of the 2019 ESC/EAS Guidelines for the management of dyslipidaemias. Atherosclerosis.
[2] 2021 ESC Guidelines on cardiovascular disease prevention in clinical practice. Rev Esp Cardiol.

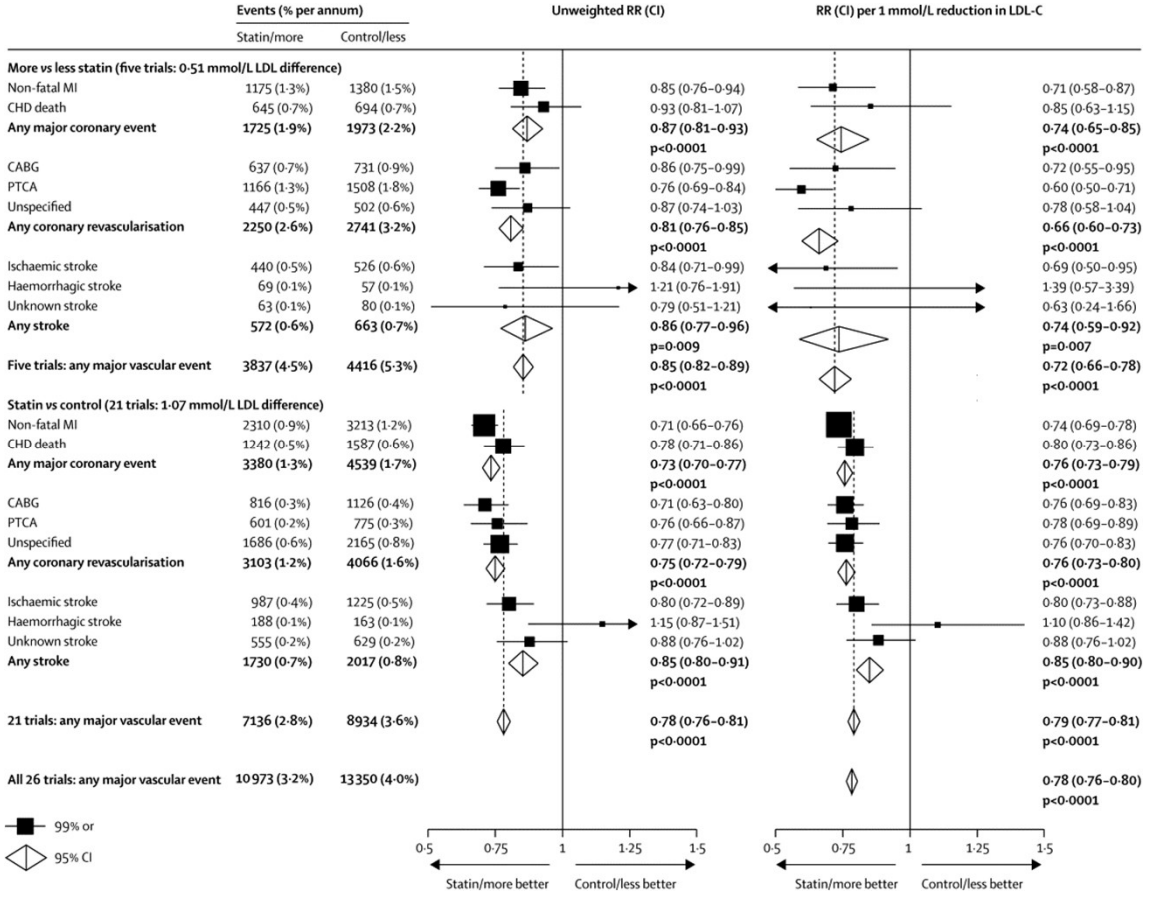
How treatment should be decided

- Treatment is not based on the cholesterol value alone.
- Strategy:
  1. Treat underlying driver
  2. Lifestyle and nutrition therapy
  3. Confirm persistence and risks
  4. Drugs:
     1. Statins
     2. Ezetimibe
     3. Fibrates
     4. PCSK9



Benefits of treating

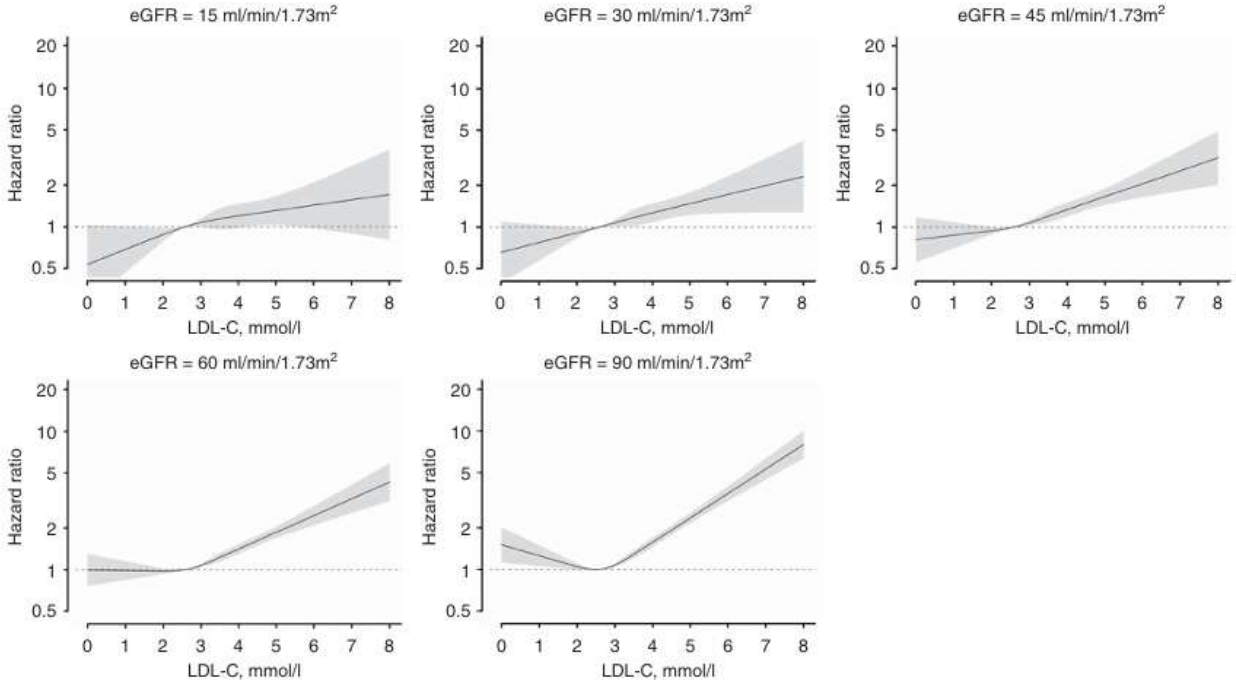
- The Cholesterol Treatment Trialists' Collaboration:
  - Meta-analysis of 26 statin trials
  - n = 170 000
  - each 1 mmol/L reduction in LDL-C reduced major atherosclerotic cardiovascular disease (ASCVD) events by approximately 22%.[3]



[3] Efficacy and safety of more intensive lowering of LDL cholesterol: a meta-analysis of data from 170 000 participants in 26 randomised trials. The Lancet 2010.

Guidelines (Adults)

- KDIGO 2024 - CKD:
  - <u>In adults aged >50 years</u>
    - eGFR <60 (no dialysis / transplantation): statin or statin/ezetimibe
    - eGFR >60: statin.[4]
  - <u>Adults 18-49 years if:</u>
    - known coronary disease (myocardial infarction or coronary revascularization)
    - diabetes mellitus
    - prior ischemic stroke
    - estimated 10-year incidence of coronary death or non-fatal myocardial infarction >10%



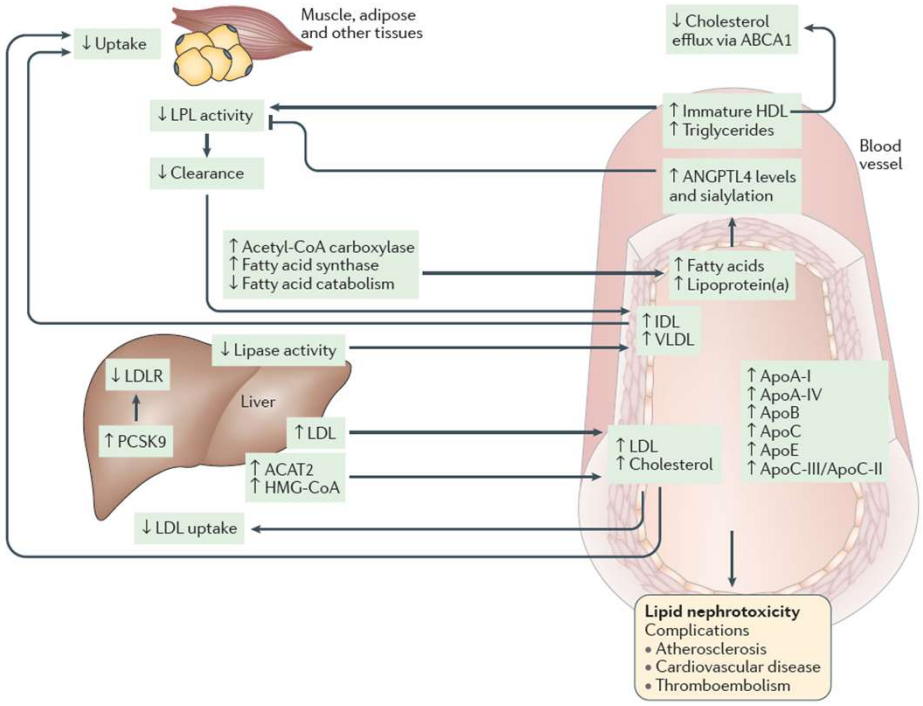
[4] Kidney International (2024) 105 (Suppl 4S), S117–S314

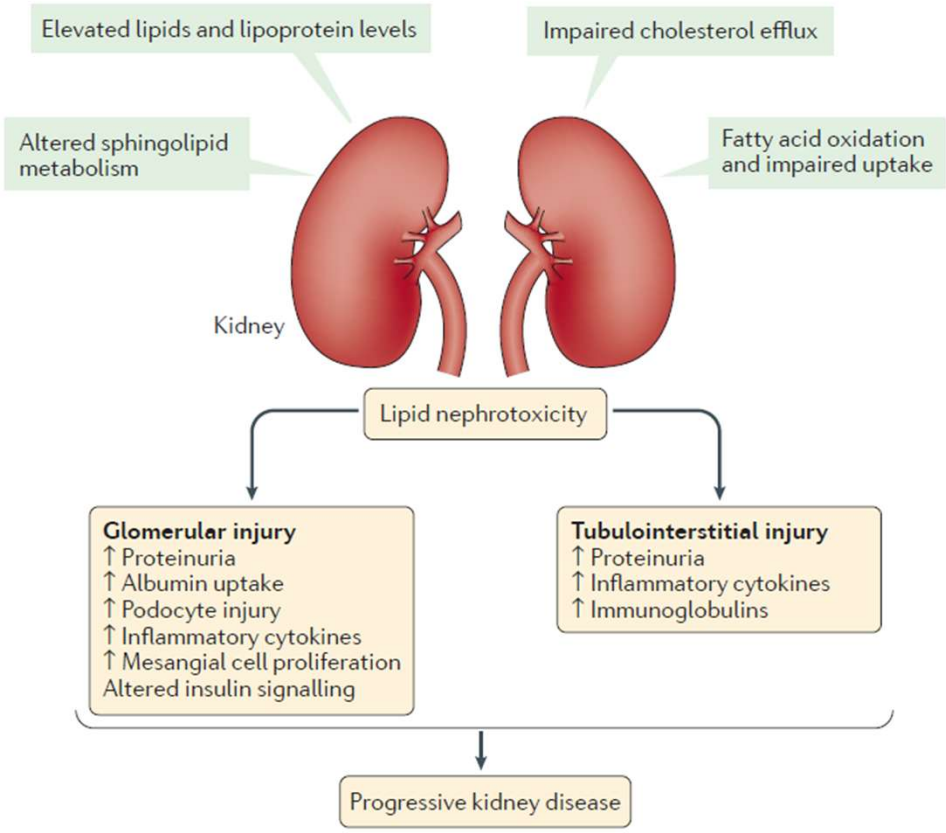
Children - Scenario 1: CKD

- KDIGO 2013 - CKD:
  - Annually testing
  - Hypercholesterolemia treatment:
    - *< 10 years: not recommended*
    - *??statin in >10 years if severely elevated LDL-c and:*
      1. *family history of premature coronary disease,*
      2. *diabetes,*
      3. *hypertension,*
      4. *smoking*
      5. *and ESKD.*
  - Hypertriglyceridemia treatment:
    - *Lifestyle changes*
    - *Consider metabolic referral in severe elevations (>11.3mmol/L)*

[5] Kidney International (2013)

Scenario 2: Nephrotic Syndrome





[6]Nature Reviews Nephrology 2018. Dyslipidaemia in nephrotic syndrome: mechanisms and treatment

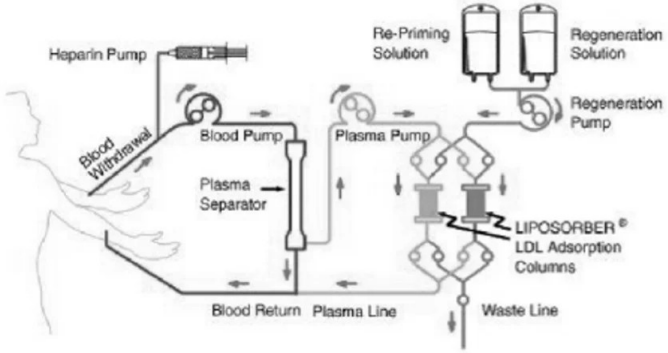
Children - Scenario 2: Nephrotic Syndrome

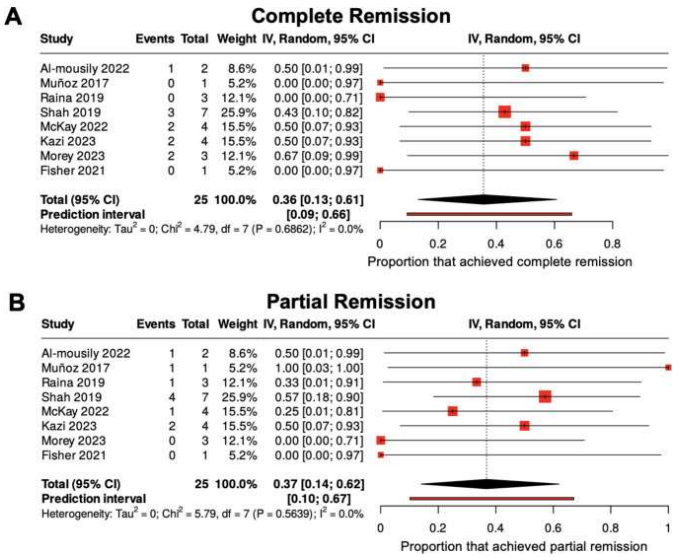
- IPNA 2023 – SSNS[7]:
  - "*We do not recommend routine lipid-lowering agents during SSNS relapses*"
- IPNA 2020 – SRNS[8]:
  - Consider use of statins if:
    - persistently LDLc > 3.4mmol/L (and significant other CV risks)
    - LDLc> 4.1mmol/L
  - Lack of evidence to support
    - *Hari et al (2018)[9]: RCT atorvastatin 10mg vs placebo. No superiority in lowering LDLc.*
    - *Coleman et al (1996)[10]: uncontrolled (n =7). 41-44% reduction in lipid levels.*

[7] IPNA clinical practice recommendations for the diagnosis and management of children with SSNS. Pediatr Nephrol. 2023
[8] IPNA clinical practice recommendations for the diagnosis and management of children with SRNS. Pediatr Nephrol. 2020
[9] Effect of atorvastatin on dyslipidemia and carotid intima-media thickness in children with refractory NS: a RCT. 2018
[10] Hyperlipidaemia, diet and simvastatin therapy in steroid-resistant nephrotic syndrome of childhood. Pediatr Nephrol. 1996

Children - Scenario 2: Nephrotic Syndrome

- LDL Apheresis[11]:
  - Increasingly use for treatment resistant NS
  - KDIGO 2025[12]:
    - "*should be considered an experimental or rescue therapy—not standard treatment*"
  - *Hayes et al (2026):*
    - *Post-trasnsplant recurrent FSGS (meta-analysis)*
    - *CR 36% / PR 37%*





[11] An update on LDL apheresis for nephrotic syndrome. Pediatr Nephrol. 2019

[12] KDIGO 2025 Clinical Practice Guideline for the Management of NS in Children. Kidney International 2025

IgA Nephropathy / Vasculitis (children)

- Zhang et al.'s 2026 [13]:
  - systematic review and meta-analysis
  - children with IgAV nephritis had higher LDLc and Triglicerides than comparison groups,
  - substantial heterogeneity and absent pre-treatment lipid data prevented causal inference or use as an early predictive marker.
- Adult IgAN:
  - evaluated statins as part of broader supportive regimens
  - do not establish a statin-specific renal benefit
  - ?worse renal outcomes in hyperlipidaemia (no evidence that reduction improves prognosis)

[13] Associations between lipid metabolism and HSP nephritis in children: a systematic review and meta-analysis. Italian journal of pediatrics. 2026

SUMMARY

- Management of hypercholesterolemia in children with CKD and/or multidrug resistant nephrotic syndrome remains evidence based-less.

- Priority should be focus on life-style changes and modifying of known cardiovascular risks.

- Persistent severe hypercholesterolemia multidrug resistant NS and/or CKD should be considered for treatment.