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01: AI-Driven Antilipidemic Therapy Guidance: A Novel Calculator Based on Latest UpToDate Recommendations

Submitted by:
Areeba Nayab (Clinical Pharmacist)

The integration of artificial intelligence (AI) into clinical decision-support tools has opened new avenues for optimizing the management of chronic diseases. In this context, I have developed an AI-assisted LDL-lowering risk assessment and management calculator designed to support clinicians in selecting appropriate antilipidemic therapies. This tool incorporates the most recent evidence-based recommendations, with its primary flow-chart and treatment pathway derived from the latest UpToDate clinical guideline on lipid management.

The calculator evaluates multiple patient-specific factors, including baseline LDL-C levels, comorbidities such as diabetes, hypertension, chronic kidney disease, and established atherosclerotic cardiovascular disease (ASCVD). It also accounts for previous cholesterol-lowering medication history, including prior use of statins, ezetimibe, PCSK9 inhibitors, or bempedoic acid, along with their treatment responses or documented intolerance. By integrating these parameters, the AI-supported tool provides tailored therapy suggestions classified into low-, moderate-, and high-intensity lipid-lowering strategies and flags situations where add-on therapy may be required to achieve LDL-C goals.

Designed as a point-of-care resource, the calculator aims to improve accessibility to guideline-driven treatment pathways in busy clinical environments, especially in settings where rapid and accurate therapeutic decisions are crucial. A visual representation of the tool will be provided to demonstrate its practical functionality.

Here is a preview of the calculator; for full reference, please use the HTML code.

LDL Medication / Risk Assessment Calculator – Flowchart-accurate

LDL Medication / Risk Assessment - Flowchart-accurate

Follows pathway: Statin → High-intensity → Ezetimibe → PCSK9 or Bempedoic acid | Handles intolerance branches

Risk context (tick all that apply)

Established ASCVD Diabetes CKD stage ≥3

Any of these = "risk factor present that warrants aggressive LDL-C lowering" in the flowchart

Is the patient taking a statin?

High-intensity

Already taking ezetimibe?

Yes No

Most recent LDL-C (mg/dL)

92

If statin-intolerant: Have multiple attempts been made to find a tolerable statin/dose?

Yes No

02: Medication-related Osteonecrosis of the Jaw (MRONJ)

Author: Muhammad Nehal Nadir
Clinical Pharmacist

The Double-Edged Sword of Bone-Strengthening Therapies

Medication-related Osteonecrosis of the Jaw (MRONJ) presents a challenging paradox in modern medicine. While bone-modifying agents like bisphosphonates and denosumab provide crucial protection against skeletal complications in osteoporosis and cancer patients, they carry the rare but serious risk of MRONJ. This condition manifests as exposed jawbone that fails to heal, potentially leading to chronic pain and infection that persists for more than eight weeks.

The likelihood of developing MRONJ depends on multiple factors including treatment duration, medication potency, and administration route. Oncology patients receiving intravenous formulations face the highest risk (1-6%), while those taking oral bisphosphonates for osteoporosis have a substantially lower risk (<0.1%). Though often triggered by dental procedures like extractions, MRONJ can also emerge spontaneously without obvious cause.

Pharmacists serve as vital safeguards against this complication through proactive risk identification and patient education. We ensure safety by coordinating between prescribers and dentists while empowering patients with essential knowledge about preventive dental care and early warning signs.

References:

1. American Dental Association. Osteoporosis Medications and Medication-Related Osteonecrosis of the Jaw. Oral Health Topics.
2. Byrne, H., O'Reilly, S., Weadick, C.S. et al. How we manage medication-related osteonecrosis of the jaw. Eur J Med Res 29, 402 (202).

03: Cardiac Hydatid Cyst: Rare Parasitic Infection Of Heart

Author: Rabiya Mazhar
Inpatient Pharmacist

WHAT IS HYDATID CYST DISEASE

Cystic echinococcosis or Hydatid cyst an infection by larval stages of a parasite Echinococcus granulosus tapeworm or dog tapeworm. Most common site of cyst infection include liver but it can also affect other organs like lungs, bone, kidney, heart, CNS.

TRANSMISSION:

Through ingestion of contaminated soil or water having parasitic eggs or by direct contact with animal host.

CARDIAC HYDATID CYST:

It occurs when fluid filled sac formed around cardiac muscles due to infestation with parasite.

DIAGNOSIS:

Imaging techniques (Ultrasound, CT, MRI) to visualize the cyst and serological test like ELISA to rule out the presence of antigen.

TREATMENT:

ANTIPARASITIC THERAPY:

Imaging techniques (Ultrasound, CT, MRI) to visualize the cyst and serological test like ELISA to rule out the presence of antigen.

DEFINITIVE THERAPY

DRUG	ALBENDAZOLE (DOC)	MEBENDAZOLE(ALTERNATIVE)
DOSE	15 mg/kg/day into two divided dose, Max= 400 mg bid	40-50 mg/kg/day divided q8h.
DURATION OF TREATMENT	Uncertain; Up to 6 months may be required	
ADMINISTRATION	Take with fatty meals for better absorption	Can be given with or without meals
ADVERSE EFFECTS	Reversible hepatotoxicity, elevated aminotransferases headache, alopecia	Abdominal pain, nausea, vomiting, hepatitis.
MONITORING	CBC, LFT at 2 week intervals for first 3 months, then monthly	Periodic CBC, Hepatic function

ADJUNCTIVE TREATMENT:

Imaging techniques (Ultrasound, CT, MRI) to visualize the cyst and serological test like ELISA to rule out the presence of antigen.



Surgery:

Indicated for complicated cysts.



Percutaneous Management:

This is the minimally invasive procedure in which Ultrasound or CT guidance is used throughout the management to puncture the cyst with needle then aspirate the cystic fluid for cyst decompression.

References:

- 1) <https://www.cdc.gov/dpdx/echinococcosis/index.html>
- 2) <https://www.who.int/news-room/fact-sheets/detail/echinococcosis>
- 3) <https://pubmed.ncbi.nlm.nih.gov/articles/PMC8414317/>
- 4) Echinococcus treatment- Uptodate guidelines.

04: Benzodiazepine withdrawal Syndrome

Author: Ghazal Majeed Agha
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The benzodiazepines (BZDs) are anxiolytics, hypnotics, anticonvulsants, muscle-relaxants and induce anaesthesia.

Physiological dependence on benzodiazepines is accompanied by a withdrawal syndrome which is typically characterized by sleep disturbance, irritability, increased tension and anxiety, panic attacks, hand tremor, sweating, difficulty in concentration, dry wretching and nausea, some weight loss, palpitations, headache, muscular pain and stiffness and a host of perceptual changes

Instances are also reported within the high-dosage category of more serious developments such as seizures and psychotic reactions. Withdrawal from normal dosage benzodiazepine treatment can result in a number of symptomatic patterns. The most common is a short-lived "rebound" anxiety and insomnia, coming on within 1-4 days of discontinuation

The second pattern is the full-blown withdrawal syndrome, usually lasting 10-14 days; finally, a third pattern may represent the return of anxiety symptoms which then persist until some form of treatment is instituted.

Physiological dependence on benzodiazepines can occur following prolonged treatment with therapeutic doses, but it is not clear what proportion of patients are likely to experience a withdrawal syndrome. It is also unknown to what extent the risk of physiological dependence is dependent upon a minimum duration of exposure or dosage of these drugs. Withdrawal phenomena appear to be more severe following withdrawal from high doses or short-acting benzodiazepines.

Clinical option for discontinuing benzodiazepine treatment

Gradual tapering : though reduction of dose which will avoid withdrawal symptoms will be vary from patient to patient and depends on dose and duration of treatment, a quarter of the daily dose is generally the maximum amount the medication should be reduced each week

Switching to long-acting benzodiazepine:

Because short-acting benzodiazepine are more likely to cause dependence and withdrawal upon discontinuation for example switching from alprazolam to clonazepam

Treating symptoms of withdrawal

Other medication including carbamazepine and propranolol may be used to treat withdrawal symptoms such as tremor, anxiety and seizure experienced upon either abrupt or gradual discontinuation of benzodiazepine.

References:

1. Lader M. Benzodiazepine harm: how can it be reduced? *Br J Clin Pharmacol*. 2014 Feb;77(2):295-301. doi: 10.1111/j.1365-2125.2012.04418.x. PMID: 22882333; PMCID: PMC4014015.
2. Pétursson H. The benzodiazepine withdrawal syndrome. *Addiction*. 1994 Nov;89(11):1455-9. doi: 10.1111/j.1360-0443.1994.tb03743.x. PMID: 7841856.
3. O'Brien CP. Benzodiazepine use, abuse, and dependence. *J clin Psychiatry*. 2005 Feb 15;66(Suppl 2):28-33

05: Update on Therapeutic Choices in Heart Failure with Reduced Ejection Fraction (HFrEF)

Author: Evan Joshva
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Recent advancements in the management of Heart Failure with Reduced Ejection Fraction (HFrEF) have broadened therapeutic options and strengthened the shift toward rapid, comprehensive treatment. Contemporary guidelines emphasize the early initiation of four foundational therapies, collectively known as quadruple therapy, to improve survival and reduce hospitalization rates.

Angiotensin receptor–neprilysin inhibitors (ARNIs), particularly sacubitril/valsartan, are now preferred over traditional ACE inhibitors because they provide superior reductions in mortality and heart-failure–related admissions. Evidence-based beta-blockers, including carvedilol, bisoprolol, and metoprolol succinate, remain essential for controlling heart rate, reducing arrhythmias, and slowing disease progression. Mineralocorticoid receptor antagonists (MRAs) such as spironolactone and eplerenone further decrease morbidity and are recommended for symptomatic patients with stable renal function.

The introduction of SGLT2 inhibitors—notably dapagliflozin and empagliflozin—has transformed heart-failure therapy by offering cardiovascular and renal benefits independent of diabetic status. Their proven ability to reduce hospitalization risk has made them a core component of guideline-directed medical therapy.

Additional emerging treatments, including vericiguat and omecamtiv mecarbil, provide targeted options for patients who remain symptomatic despite optimal therapy. Together, these advancements reinforce the importance of early combination therapy, individualized titration, and continuous monitoring to achieve meaningful long-term improvement in HFrEF.

References:

1. McDonagh TA et al., ESC Heart Failure Guidelines, 2021.
2. Heidenreich PA et al., AHA/ACC/HFSA Guidelines, 2022.

06: Tirzepatide (type 2 diabetic management)

Author: Syeda Sarwat Jabeen
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ABSTRACT:

Tirzepatide is a groundbreaking medication that's revolutionizing the treatment of type 2 diabetes and obesity. This dual-action GLP-1 and GIP receptor agonist works by stimulating insulin release, reducing glucagon secretion, and slowing gastric emptying, making it a game-changer for blood sugar control and weight loss.

BENEFITS:

- **Cardiovascular Benefits:** Early studies suggest reduced risk of cardiovascular events and improved lipid profiles.
- **Convenience:** Once-weekly subcutaneous injection makes it easy to incorporate into daily routines.

BENEFITS OF TIRZEPATIDE

New You Wellbeing and weight loss
www.NewYouWW.com



01 Average 22.5% loss of body weight

02 Activates GLP-1 & GIP receptors

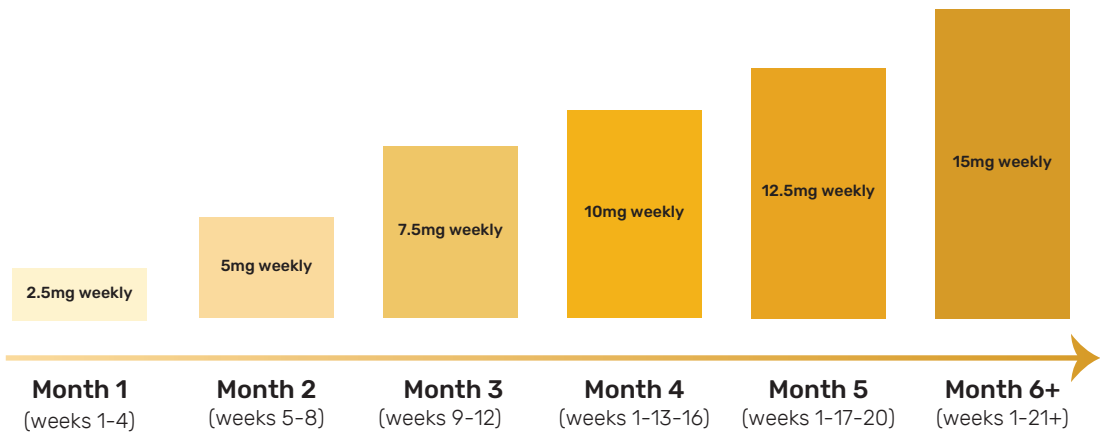
03 Helps you lose weight faster

04 Curbs your appetite

05 More effective than semaglutide

TIRZEPATIDE DOSAGE CHART

Applies to both Zepbound® and Mounjaro®



- Administration: Subcutaneous injection, typically in the abdomen, thighs, or upper arms.

SIDE EFFECTS:

- Serious: Pancreatitis, thyroid tumors, and allergic reactions (rare but possible).

CONTRAINDICATIONS:

- Oral hormonal contraceptives efficacy decreases.
- Tirzepatide is contraindicated in patients with medullary thyroid cancer and in multiple endocrine neoplasia syndrome type-2 (MEN-2).
- Patients with known severe hypersensitivity to tirzepatide or any excipients.

References:

<https://www.fda.gov/news-events/press-announcements/fda-approves-new-medication-chronic-weight-management>
<https://www.ncbi.nlm.nih.gov/books/NBK585056/>

07: TYPE 5 DIABETES

Author: Iqra Yaseen
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Type 5 diabetes mellitus (T5DM), now more accurately termed malnutrition-related diabetes, is a distinct form of severe insulin-deficient diabetes caused by chronic undernutrition, especially during childhood and adolescence. Unlike type 1 diabetes (autoimmune β -cell destruction) and type 2 diabetes (insulin resistance), T5DM arises from impaired pancreatic growth and reduced insulin-producing capacity due to long-term nutritional deficiencies.

The condition is most prevalent in low- and middle-income countries, where food insecurity, poverty, and limited access to healthcare contribute to lifelong nutritional deficits.



Symptoms:

Typical symptoms resemble those of type 1 diabetes—such as weight loss, excessive thirst, frequent urination, and fatigue—but individuals with T5DM usually have a BMI below 19 kg/m² and show no evidence of autoimmunity.

Diagnosis has long been challenging due to the absence of clear criteria, leading to frequent misclassification as type 1 or type 2 diabetes and inadequate treatment.

Treatment:

Effective management requires addressing both glucose control and underlying malnutrition, including nutritional rehabilitation, insulin-stimulating oral medications, and low-dose insulin when needed.

Prevention:

Prevention centers on eliminating the root causes of undernutrition through improved maternal and child nutrition, food security initiatives, poverty reduction, and stronger primary healthcare systems. Accurate recognition and classification of T5DM are essential for developing appropriate treatment strategies and reducing global disparities in diabetes care.

References:

<https://idf.org/about-diabetes/types-of-diabetes/type-5-diabetes/>
<https://pubmed.ncbi.nlm.nih.gov/40657327/>

08: Safety Alert of Risk of persistent corneal injury and significant visual impairment with Chlorhexidine (cutaneous use)

Author: Iqra Yaseen
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The Drug Regulatory Authority of Pakistan (DRAP) issued a safety alert following the EMA's Pharmacovigilance Risk Assessment Committee (PRAC) recommendation to update product information for chlorhexidine used for skin disinfection. Reports from post-marketing surveillance indicate that accidental ocular exposure to chlorhexidine has caused severe corneal erosion, persistent corneal injury, and permanent visual impairment, with some cases requiring corneal transplants.

PRAC advised manufacturers to update warnings to clearly state that chlorhexidine must not come into contact with the eyes, and that extreme care is required during surgical preparation to prevent solution migration—especially in anesthetized patients. If exposure occurs, immediate and thorough washing with water and urgent ophthalmologic evaluation are required.

WHO previously reported multiple cases of serious eye injury in newborns where chlorhexidine—intended for umbilical cord care—was mistakenly administered to the eyes. Over 40 such incidents have occurred since 2015. WHO recommends clearer labeling, safer packaging, training, and culturally appropriate instructions to prevent misuse.

In Pakistan, the DRAP committee has mandated updating product labels to include warnings about corneal injury, adding these risks to adverse reaction sections, ensuring the use of protective equipment in hospitals, and labeling chlorhexidine as an “irritating agent” in material safety sheets. Healthcare professionals are reminded to exercise caution, avoid eye exposure, and report any adverse drug reactions through national reporting systems.

References:

https://www.dra.gov.pk/safety_info/safety_communication/safety_updates/56-safety-alert-of-risk-of-persistent-cornea-l-with-chlorhexidin/

PHOTO GALLERY

