PRECISION MEDICATION SELECTION

MedsEngine® Cholesterol

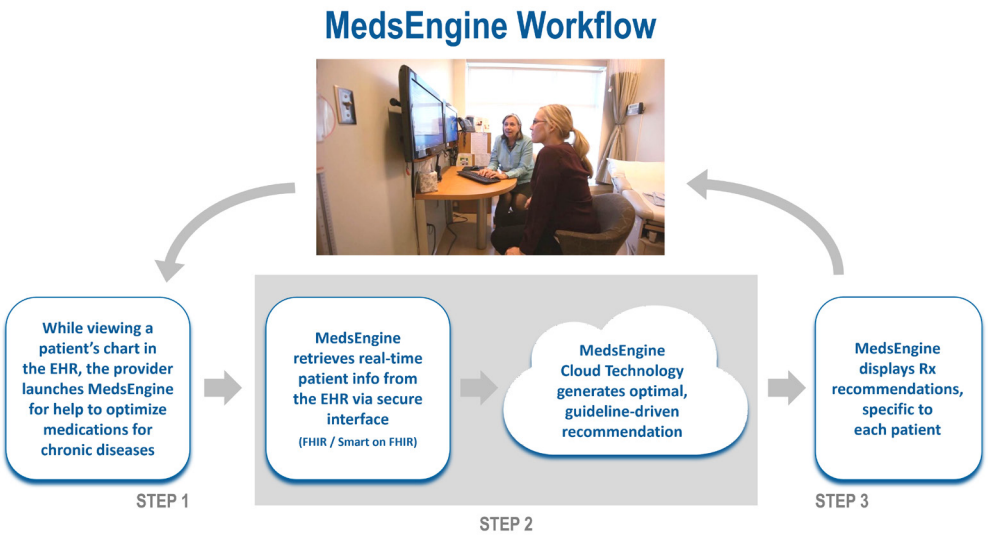
An EHR-integrated Clinical Decision Support Application to Improve the Treatment of Cholesterol

Introduction to MedsEngine for Chronic Disease

Clinical decision support (CDS) tools have been around for years, mainly in the form of alerts, reminders, and drug interactions. Often these induce "alert fatigue" and are disregarded. Other CDS tools, such as the CHA_2DS_2-Vasc score for atrial fibrillation stroke risk, Wells score for DVT or PE prediction, and ASCVD risk calculators are used more routinely to address specific problems but most require phone apps, and data input and take too much time. What is missing and tremendously needed, are CDS tools to effectively treat chronic diseases.

MedsEngine is an EHR-integrated clinical-decision support application for chronic diseases that harnesses the power of cloud-based software (Figure 1). It uses industry standard FHIR integration to connect to any EHR and absorbs the huge amounts of data stored in EHRs to provide evidence-based therapeutic recommendations at the point of care. MedsEngine codifies complex clinical guidelines and uses the EHR data to recommend guideline-directed medical therapy (GDMT), so patients receive consistent, personalized care regardless of the provider's level of training. Physicians and advanced practice providers (APPs) can provide high quality patient care without affecting patient throughput when utilizing MedsEngine. Practices using MedsEngine for hypertension, type-2 diabetes, cholesterol management, and HFrEF have reported increased patient engagement, better chronic disease control, higher HEDIS scores, and lower medical loss ratios (MLRs).

Figure 1. Point of care workflow



Cholesterol Guidelines

The 2018 Guideline on the Management of Blood Cholesterol by the American College of Cardiology (ACC) and the American Heart Association (AHA) is 70 pages long with an additional 50 pages of references. The guideline is detailed, complex, and difficult to follow, because it requires the use of demographics, lab values, risk enhancers, diabetic risk enhancers, major events, secondary identifiers, high-risk conditions, etc.; 77 clinical factors in all. These factors determine one of 13 distinct treatment pathways, 35 unique treatment endpoints, 5 different LDL-C goals and multiple medication recommendations[1]. In addition, the 10-year ASCVD risk calculator and Coronary Artery Calcium (CAC) score are only recommended in certain specific situations. In an effort to simplify the guidelines, the ACC/AHA condensed the 120 pages into a two-page GUIDELINES MADE SIMPLE flow chart, but it is vague, incomplete, and often requires calculations, making it too time consuming for everyday use.

MedsEngine Cholesterol rapidly and accurately applies the complex guideline at the point of care. At the launch of the application, MedsEngine searches the patient's EHR for the 77 clinical factors and determines if the patient:

- is at goal, not at goal, or risk has never been assessed, or need reassessment after a medication change.
- has had a change in status (an ASCVD event, age change, new clinical factor, etc.)
- needs guideline recommended reassessment according to age and risk level.

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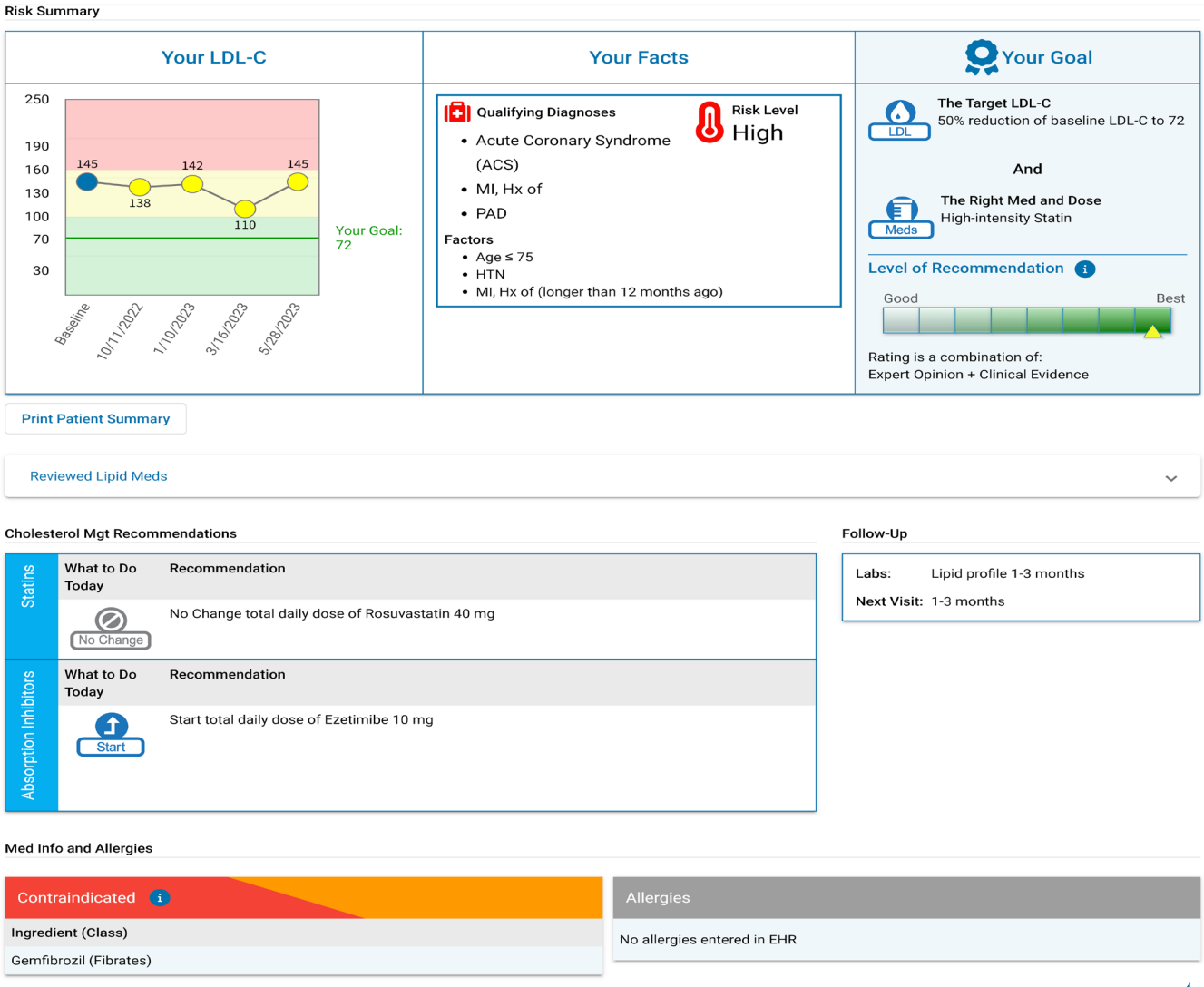
A *Validation Screen* displays the patient's pertinent guideline-directed clinical factors and allows a primary care provider (PCP) to amend any erroneous data found in the EHR as well as to include any factors not documented in the EHR. The data determines the need for Primary vs. Secondary prevention. If the patient is primary prevention, the 10-Year ASCVD Risk calculator is displayed and completed with discrete data. Upon confirmation of the validation screen data, thousands of combinations and permutations are processed to determine one of the 35 management recommendations.

The top of the *Recommendation Screen* (Figure 2) informs the PCP and patient about "Your LDL-C" historical results and current targeted goal. Patients can clearly "see" if their LDL-C is in a safe zone or not. "Your Facts" include the Risk Level, determined by Qualifying Diagnoses or 10-Year ASCVD Risk score, along with any of the 77 factors that influence risk and treatment recommendations. "Your Goal" includes The Target LDL-C goal and Right Med and Dose. If a 30% or 50% reduction in baseline LDL-C is recommended, the calculated goal is displayed. A Level of Recommendation, derived from guideline Class of Recommendation (COR) and Level of Evidence (LOE), is presented in a graphic that is easy to understand (Figure 2).

Figure 2. Recommendation Screen.



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A CAC Score is occasionally suggested to strengthen borderline treatment recommendations. The management recommendation can be to start, increase, decrease, switch, or stop medications. If other cholesterol lowering drug classes (e.g., cholesterol absorption inhibitors, bile acid sequestrants, PCSK9 inhibitors) are needed to reach LDL-C goals, they are also advised. Contraindications and allergies are easily reviewed.

A Patient Summary report can be printed that provides a detailed explanation of all the information on the recommendation screen in addition to providing general information about cholesterol. This personalized summary promotes improved understanding and medication adherence.

Results

MedsEngine Cholesterol allows PCPs to effectively evaluate patients ≥ 18 years old for guideline-directed cholesterol management. With early use of MedsEngine, two primary care groups have evaluated over 18K unique patients and started statin therapy in 63.6% (11,492 / 18,080). When applying the guidelines with MedsEngine to an adult population, data reveals a significant percentage of patients < 40 years old (16.1%) require statin therapy and an even larger percentage of older patients would benefit from statin therapy (Figure 3).

Figure 3. Usage to date and treatment recommendations by age group.

	LDL-C Treatment Goals					Patient Totals	
Age Groups	**30% reduction of untreated LDL-C**	**50% reduction of untreated LDL-C**	**LDL-C less than 100**	**LDL-C less than 70**	**No LDL-C Goal**	**Patient Count Total**	**Patient % Total**
18-39							
Lifestyle					1,081	**1,081**	**83.9%**
Statin Therapy		13	47	2	146	**208**	**16.1%**
18-39 Total		**13**	**47**	**2**	**1,227**	**1,289**	**100.0%**
40-59							
Lifestyle					3,680	**3,680**	**61.6%**
Statin Therapy	624	558	197	25	888	**2,292**	**38.4%**
40-59 Total	**624**	**558**	**197**	**25**	**4,568**	**5,972**	**100.0%**
60-75							
Lifestyle					1,172	**1,172**	**14.2%**
Statin Therapy	2,928	2,722	207	304	894	**7,055**	**85.8%**
60-75 Total	**2,928**	**2,722**	**207**	**304**	**2,066**	**8,227**	**100.0%**
76+							
Lifestyle					655	**655**	**25.3%**
Statin Therapy	77	208	24	242	1,386	**1,937**	**74.7%**
76+ Total	**77**	**208**	**24**	**242**	**2,041**	**2,592**	**100.0%**
Grand Total	**3,629**	**3,501**	**475**	**573**	**9,902**	**18,080**	

Premier Health Associates, a primary care group (Pittsburgh, PA), started using MedsEngine Cholesterol in 2022 to identify patients with ASCVD and provide secondary prevention with high intensity statins. The number of patients appropriately treated with the 2018 guideline recommendation of high-intensity statins doubled from 1,100 to 2,271 in six months.

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Conclusion

MedsEngine Cholesterol enables physicians and APPs to evaluate all patients ≥ 18 and provide personalized, guideline-directed medical therapy at the point of care for either primary or secondary prevention. The recommendations are accurate, clear, and easily understood. The recommendation screen and printed patient summary engage patients to a high level of understanding that encourages increased medication adherence. PCPs report MedsEngine Cholesterol takes little time, does not interrupt patient flow, and increases statin acceptance. Once the patient has been evaluated and reached the personalized LDL-C and medication dosage goals, the only further intervention needed is medication refills and lab monitoring unless the patient's status changes.

1. Grundy SM, Stone NJ, Bailey AL, Beam C, Birtcher KK, Blumenthal RS, Braun LT, de Ferranti S, Faiella-Tommasino J, Forman DE, Goldberg R, Heidenreich PA, Hlatky MA, Jones DW, Lloyd-Jones D, Lopez-Pajares N, Ndumele CE, Orringer CE, Peralta CA, Saseen JJ, Smith SC Jr, Sperling L, Virani SS, Yeboah J. 2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA guideline on the management of blood cholesterol: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation.* 2018; 139:e1082-e1143. DOI: 10.1161/CIR.0000000000000625.