Customer Case Study

Improving cardiovascular risk assessments with IT

Ensuring the correct patients are identified for lifesaving medications

University of Michigan

Michigan, USA

Lab Profile

The Clinical Core Laboratory at the University of Michigan is a full-service hospital and reference lab primarily serving Michigan Medicine – one of the largest healthcare systems in the world.

- **University hospital lab**
- **~ 60,000 discrete tests per day (~16,000 panels)**
- **~10,500 tubes processed per day**

Challenge

Improve the identification and clinical management of patients at risk for cardiovascular disease (CVD) by implementing the Martin/Hopkins LDL cholesterol (LDL-C) equation into lipid panel testing workflows.

Risk

Current widely-used Friedewald LDL-C equation can lead to misclassification of patients who could benefit from lipid-lowering therapy, and overutilization of direct LDL-C (d-LDL) tests.[1]

"Although the extended Martin/Hopkins equation required significant IT resources, we were fortunate to have the support from Siemens Healthineers information specialists in building the equation in Atellica Data Manager which expedited the implementation process."

Carmen Gherasim, PhD
Associate Professor, Chemical Pathology
Section Director, Clinical Core Laboratory University of Michigan

↗ **Simplify your workload with advanced informatics solutions**

SIEMENS Healthineers

The Martin/Hopkins and NIH/Sampson equations demonstrate superior performance in correctly classifying patients at risk for CVD

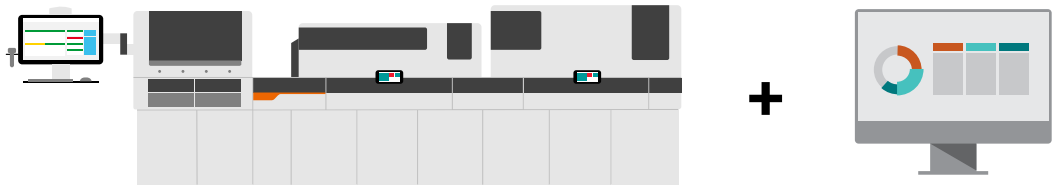
Study and Outcomes

University of Michigan assessed the accuracy of the Martin/Hopkins and NIH/Sampson equations for estimating LDL-C levels in their patient population and quantified the previous misclassification of patients with dyslipidemia into incorrect LDL-C based treatment groups.

- ☑ Lipid panel and d-LDL results are obtained using Siemens Healthineers Atellica Solution chemistry analyzers.
- ☑ Data analysis included the calculation of mean absolute difference (MAD) between d-LDL and calculated LDL-C and analysis of treatment group misclassification for TG < 400 and TG 400 – 800 mg/dL.

Retrospective Analysis

Martin/Hopkins and NIH/Sampson equations were found to be a more accurate estimation of LDL-C levels[2] compared to the traditional Friedewald equation -- consistent with literature evidence[3]. Based on the analysis, University of Michigan sought to create new rules to implement the Martin/Hopkins equation and reflex direct LDL (d-LDL) when triglycerides (TG) were over 800 mg/dL.



Configuration: Atellica Solution + Atellica Diagnostics IT

35%
improvement in classification of patients at risk for CVD with TG levels between 400-800 mg/dL

~10%
reduction in the number of d-LDL tests required for identifying patients at risk for CVD*

✓
Successful implementation into Atellica Data Manager with d-LDL reflex at higher TG levels.

Streamlined workflow

- ☑ **Advanced Calculation:** The Martin/Hopkins equation was built into Atellica Data Manager to automatically run when lipid panels are ordered by clinicians.
- ☑ **Built-in Reflex Logic:** Change of the d-LDL reflex cutoff for TG from 400 mg/dL to 800 mg/dL.

Both the Martin/Hopkins and NIH/Sampson (original and modified) LDL-C equations are available for Atellica Data Manager users who want to improve patient classification.

Success Factors

1	Instill confidence in CVD risk classification
2	Seamless IT Integration
3	Improved clinically-warranted d-LDL reflex ordering

** Based on retrospective analysis of patient data gathered between 2021 to 2023*
-- number is total volume dependent and may differ from lab to lab.

References

1. Narasimhan M, et al. Fatigued with Friedewald: why isn't everyone onboard yet with the new LDL-C equations? Front Cardiovasc Med. 2025 Feb 27; https://pmc.ncbi.nlm.nih.gov/articles/PMC11903449/
2. M. Bayes, D. Manthei, C. Gherasim, Comparison of Martin/Hopkins, Sampson/NIH, and Friedewald Equations for the Estimation of Low-Density Lipoprotein Cholesterol and its Effect on Treatment Thresholds for Patients..., American Journal of Clinical Pathology, Volume 162, Issue Supplement_1, October 2024, Pages S168–S169, https://doi.org/10.1093/ajcp/aqae129.371
3. Samuel, C., et al., Accuracy of 23 Equations for Estimating LDL Cholesterol in a Clinical Laboratory Database of 5,051,467 Patients', Global Heart, 18(1), p. 36. https://doi.org/10.5334/gh.1214.

The statements by Siemens Healthineers' customers described herein are based on results that were achieved in the customer's unique setting. Because there is no "typical" hospital or laboratory and many variables exist (e.g., hospital size, samples mix, case mix, level of IT and/or automation adoption) there can be no guarantee that other customers will achieve the same results.

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