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Clinical encounter length and initiation of statin therapy for primary prevention among adults with elevated atherosclerotic cardiovascular disease risk

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1. Introduction

Statin medication is a cornerstone therapy for cardiovascular risk reduction and primary prevention among adults with an elevated risk of atherosclerotic cardiovascular disease (ASCVD) [1]. Despite decades of evidence from multiple randomized controlled trials supporting the safety and effectiveness of statins to reduce ASCVD event risk, statin use for guideline-indicated primary prevention remains low, between 40 and 70% depending on clinical indication [2–5]. Analysis of US adults ≥ 40 years with diabetes from 2015 to 2018 found only 53% to be on statin therapy, despite over 90% having a usual source of healthcare [6]. Between 2013 and 2016, only 58.5% of participants in the American College of Cardiology National Cardiovascular Data Registry–Practice Innovation and Clinical Excellence registry who had an LDL-C ≥ 190 mg/dL were on a statin [7]. Determining how to improve indicated statin use is imperative to preventing future ASCVD events.

Clinical inertia, the act of not initiating or intensifying therapy despite indication, contributes to low rates of appropriate statin use. Undertreatment with statin medication for primary prevention of ASCVD is multi-factorial. System-level factors (e.g., medication cost), patient-level (e.g., fear of side effects), and clinician-level (e.g., competing time demands) factors play into low rates of statin prescriptions [8]. Fear of side effects and apprehension about the benefit of statins are leading patient-given reasons against medication initiation [9,10]. Clinical inertia may be a reflection of the multiple competing demands on clinicians, and the limited time and capacity to address a health-related issue. For each patient, clinicians are often required to address a combination of acute and chronic disease management, as well as preventive healthcare. Clinician survey data from 2017 suggests that lipid level control is de-prioritized when visits shorten, with the amount of clinical time required to discuss a preventive service influencing clinician prioritization of the different competing indicated preventive services [11]. Among primary care clinicians nation-wide, only 2.02- and 5.42-minutes for chronic and preventive visits, respectively, are spent discussing cholesterol [12]. Time-constraints may impact clinical inertia and increased time for discussion between clinicians and patients may improve risk-benefit understandings regarding statin use and improve undertreatment with statin therapy for primary prevention [1]. We determined if clinical encounter time is associated with statin prescriptions among statin-naïve adults with an indication for statin therapy based upon the 2018 American Heart Association/American College of Cardiology Guideline on the Management of Blood Cholesterol clinical practice guidelines in an academic tertiary healthcare system (University of Utah) [1].

2. Methods

This cohort study was approved by the University of Utah institutional review board with a waiver for consent because the study posed minimal risk and consent was not feasible to obtain due to the retrospective design. Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guidelines were followed.

We abstracted data from 56 clinic sites in an academic tertiary healthcare system (16 cardiology, 19 internal medicine, 15 family medicine, and six geriatrics), for each qualified index encounter between January 1, 2021, and January 10, 2022. Our cohort included statin-naïve adults aged 18–75 years with an indication for statin use including: PCE ASCVD risk ≥ 7.5% among adults ≥ 40–75 years, LDL-C ≥ 190 mg/dL, or adults ≥ 40–75 years with diabetes mellitus. Adults with a history of ASCVD, taking a statin or other lipid-lowering therapy (LLT), or documented statin intolerance were excluded. Among 15,953 qualified encounters, 12,924 did not include documented encounter time and were excluded. Gender and race/ethnicity were self-reported in the electronic medical record (EMR). Other covariates including

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age, Charlson comorbidity index (CCI), number of medications, insurance type, clinic-setting (cardiology, internal medicine, family medicine, and geriatrics) and patient status (new vs. established) were abstracted from the EMR.

Clinical encounter time was determined by the time documented in the note assigned to the index encounter and treated as a continuous variable. Clinical encounter time includes a clinician's time spent not only seeing and counseling the patient, but also preparing to see the patient, reporting results to the patient, placing orders, completing documentation, coordinating care, obtaining collateral history, referring or communicating with other clinicians on the day of the encounter. Statin initiation was determined by a new statin prescription within 90 days of the index encounter. A conditional logistic regression was fit to determine the association between statin initiation with clinical encounter length, with adjustment for age, gender, race/ethnicity, CCI, number of medications, insurance type, clinic-setting, and patient status (new vs. established patient). Stratified analysis was performed by indication for statin initiation, patient status (new vs. established), and clinical specialty. Two-sided hypothesis tests used a significance level of 0.05, and all analysis was conducted in R version 4.0.0 GUI 1.71 in April 2022.

3. Results

Overall, 3029 (1680 unique patients) encounters with documented clinical encounter time were included. The mean age of included adults was 60.1 (SD 10.2), while 57.3% were self-identified female adults, and 74.8%, 3.6%, 16.1%, and 2.5% self-identified as non-Hispanic White, non-Hispanic Black, Hispanic, and American Indian and Alaska Native or Native Hawaiian and other Pacific Islander (AIAN or NHPI), respectively. The average clinic encounter length was 39.7 min (SD 15.9), and 375 (12.4%) patients were prescribed a statin medication within 90 days of the index encounter (Table 1). Overall, 165 (5.4%), 1408 (46.5%), 1065 (35.2%), and 391 (12.9%) index encounters occurred at a cardiology clinic, an internal medicine clinic, a family medicine clinic, and a geriatric clinic, respectively. Clinical encounter length was 48.9 (SD 12.8), 37.7 (SD 15.1), 37.7 (13.5), and 48.6 (20.9) for encounters at cardiology clinics, an internal medicine clinics, a family medicine clinics, and a geriatric clinics, respectively. Statin initiation for patients seen in a cardiology clinic, internal medicine clinic, family medicine clinic, and geriatric clinic was 16.4%, 12.3%, 13.1%, and 9.2%, respectively. The difference in statin initiation by clinic specialty was not statistically significant following multivariable adjustment.

In the unadjusted model, a one-minute increase in encounter length was associated with 1.01 (95% CI 1.00,1.02; $p < 0.01$) OR for statin prescription. After multivariable adjustment, this associated was similar (OR 1.01 95% CI 1.00,1.02; $p = 0.03$; Table 2). When stratified by indication for statin therapy, increased encounter time was associated with an increased likelihood of statin prescription among adults $\geq$ 40–75 years with diabetes mellitus (OR 1.02, 95% CI 1.01,1.03; $p < 0.01$; Table 2). Among established patients, an increase in encounter length by one-minute correlated to an OR of 1.02 (95% CI 1.01,1.03; $p < 0.01$) for a new statin prescription (Table 2). When stratified by clinical specialty, a one-minute increase encounter length by one-minute was associated with greater statin initiation among patients receiving care in internal medicine clinics, though not other clinical specialties (Table 2).

Table 1
Baseline demographic data among adults with an indication for statin therapy, overall and by statin initiation status, January 1, 2021, and January 10, 2022.

	Overall $N = 3029$	Statin initiated $N = 375$	No statin initiated $N = 2654$	P-value
Age, mean (SD)	60.6 (10.2)	59.6 (10.2)	60.7 (10.2)	0.05
Female, n (%)	1737 (57.3)	177 (47.2)	1560 (59.0)	<0.01
Race/ethnicity, n (%)				0.12
Non-Hispanic White	2091 (74.8)	250 (71.4)	1841 (75.2)	
Non-Hispanic Black	101 (3.6)	10 (2.9)	91 (3.7)	
Hispanic/Latino	450 (16.1)	72 (20.6)	378 (15.4)	
AIAN or NHPI	70 (2.5)	6 (1.7)	64 (2.6)	
Not-listed/other	85 (3.0)	12 (3.4)	73 (3.0)	
Co-morbidity index, mean (SD)	1.6 (1.9)	1.6 (2.1)	1.7 (1.9)	0.73
Medications, mean (SD)	7.0 (5.3)	6.5 (5.6)	7.0 (5.3)	0.08
Insurance, n (%)				0.03
Private	1334 (44.0)	166 (44.3)	1168 (44.0)	
Public	1612 (53.3)	195 (52.0)	1417 (53.4)	
Uninsured	83 (2.7)	14 (3.7)	69 (2.6)	
PCE ASCVD Risk, mean (SD)	13.4 (9.1)	14.8 (10.1)	13.1 (8.9)	<0.01
Indication for statin, n (%)				<0.01
Diabetes Mellitus	1561 (51.5)	184 (49.1)	1377 (51.9)	
PCE ASCVD Risk $\geq$ 7.5%	1338 (44.2)	155 (41.3)	1183 (44.6)	
LDL-C $\geq$ 190 mg/dL	130 (4.3)	36 (9.6)	94 (3.5)	
Clinic Setting, n (%)				0.05
Internal Medicine	1408 (46.5)	173 (46.1)	1235 (46.5)	
Cardiology	165 (5.4)	27 (7.2)	138 (5.2)	
Family Medicine	1065 (35.2)	139 (37.1)	926 (34.9)	
Geriatrics	391 (12.9)	36 (9.6)	355 (13.4)	
New patient, n (%)	537 (19.2)	94 (27.8)	443 (18.0)	<0.01
Appointment length, mean (SD)	39.72 (15.9)	42.0 (17.1)	39.4 (15.7)	<0.01

Percentages are based on column totals.
Hypothesis testing is *t*-test for continuous variables and chi-square for categorical variables.

4. Discussion

In the current analysis of adults receiving care at an academic tertiary healthcare system with a primary prevention-based indication for statin medication, increased clinical encounter length was associated with a new statin prescription within 90 days of the index encounter. These findings suggest that increased clinician time in clinical encounters may reduce the impact of clinical inertia on appropriate use of statin therapy for primary prevention. Notably, an increase in one-minute of encounter time correlated to a small but significant increase in statin prescription among adults with diabetes mellitus and established patients. Care delivery models and policies to protect and promote clinician time allotted towards patient care tasks both during and outside the face-to-face encounter is an important mechanism in addressing clinical inertia contributing to the low uptake of statin therapy for primary prevention.

Despite strong guideline recommendations for primary prevention depending on indication, statin use remains underutilized [1]. Conceptions surrounding statin-related side effects persist despite evidence that statins are not associated with cognitive decline, myalgia severity, or incident diabetes mellitus [13–15]. Bridging the gap between patient apprehension about starting indicated statin medication requires informed discussion. However, these discussions occur in the context of limited clinical time and competing interests. A shift to value this component of the patient encounter was signified on January 1, 2021, when the Centers for Medicare and Medicaid Services transitioned to allow time-based coding for office visits. In a busy clinical setting, compensating clinicians for time spent discussing the risks and benefits of diagnostic or therapeutic interventions may help to improve patient care.

The current analysis is limited by restriction to patients receiving care at a single-health system, and the observational design which is

Table 2
Adjusted odds of statin initiation by clinical encounter length.

	Unadjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-Value
Overall [a]	1.01 (1.00,1.02)	<0.01	1.01 (1.00,1.02)	0.03
By Indication [b]				
PCE ASCVD Risk ≥ 7.5%	1.00 (0.99,1.01)	0.37	1.00 (0.99,1.02)	0.57
Diabetes mellitus	1.02 (1.01, 1.03)	<0.01	1.02 (1.01, 1.03)	<0.01
LDL-C ≥ 190 mg/dL	1.00 (0.97,1.02)	0.92	1.02 (0.98, 1.07)	0.28
By new vs established patients [c]				
New	0.99 (0.98,1.01)	0.28	0.99 (0.98,1.01)	0.46
Established	1.01 (1.01,1.02)	<0.01	1.02 (1.01, 1.03)	<0.01
By clinical setting [d]				
Cardiology	1.01 (0.97,1.04)	0.69	1.00 (0.96,1.05)	0.83
Internal medicine	1.02 (1.01,1.03)	<0.01	1.02 (1.01, 1.03)	<0.01
Family medicine	1.01 (0.99,1.02)	0.12	1.00 (0.99,1.02)	0.54
Geriatrics	1.00 (0.99,1.02)	0.72	0.99 (0.97,1.02)	0.58

All odds-ratios represent a one-minute increase in encounter length.

[a] Adjusted for age, sex, race/ethnicity, insurance, Charlson comorbidity index, indication for statin, number of medications, new patient status, and clinical specialty.

[b] Adjusted age, sex, race/ethnicity, insurance, Charlson comorbidity index, number of medications, new patient status, and clinical specialty.

[c] Adjusted for age, sex, race/ethnicity, insurance, Charlson comorbidity index, indication for statin, number of medications, and clinical specialty.

[d] Adjusted for age, sex, race/ethnicity, insurance, Charlson comorbidity index, indication for statin, number of medications, and new patient status.

susceptible to residual confounding. Further, as our study was in an academic healthcare setting the average clinical encounter length of 39.7 min may limit generalizability to other practice settings. In the total cohort, only 19.0% of clinical encounters used time-based billing, which may introduce bias in assessing the impact of clinical encounter time and statin initiation. However, in the overall cohort, statin initiation was 13.0% compared to 12.4% ($p = 0.31$) suggesting that the sample in the current analysis is representative of the broader patterns for statin initiation for primary prevention. Additionally, we cannot comment on the cumulative time each clinician spent over multiple clinical encounters, EMR messaging, and non-clinic visit phone calls – all of which may contribute to time spent discussing statin initiation not captured in our analysis. Though there was not a significant association between increased clinical encounter time and statin initiation among patients seen in cardiology clinics, these patients had the highest initiation rate for statin therapy for primary prevention. While this may reflect patients with higher baseline risk referred specifically to cardiology to address ASCVD risk reduction, the current analysis cannot comment on the intended goal of any specific clinic visit.

Overall, our findings suggest that there may be a small but meaningful impact that increased encounter time can have on initiating statin medication for primary prevention among adults with a guideline-recommended indication. Efforts designed to promote quality-based interactions between clinicians and patients may allow for more engaged and informed decision-making with improved outcomes.

CRediT authorship contribution statement

Alexander R. Zheutlin, Molly B.Conroy: Study design. **Alexander R. Zheutlin, Mingyuan Zhang:** Analysis. **Alexander R. Zheutlin, Mingyuan Zhang, Molly B.Conroy:** Wrote and edited the manuscript. **Alexander R. Zheutlin, Mingyuan Zhang, Molly B.Conroy:** Final review of manuscript.

Disclosures

The authors have nothing to disclose.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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