Supplemental Online Content

Adusumalli S, Kanter GP, Small DS, et al. Effect of nudges to clinicians, patients, or both to increase statin prescribing: a cluster randomized clinical trial. *JAMA Cardiol*. Published online November 30, 2022. doi:10.1001/jamacardio.2022.4373

This supplemental material has been provided by the authors to give readers additional information about their work.

eFigure 1. Email Describing the Goals of the Study and the Active Choice Prompts in the Electronic Health Record

Introduction Email for Practice Managers

Dear [PracticeManager_name],

The Penn Medicine Primary Care Service Line (PCSL) is testing ways to increase statin prescribing rates for patients that meet US Preventive Services Task Force guidelines and those that have either a clinical atherosclerotic cardiovascular disease diagnosis or familial hyperlipidemia. This initiative is a collaboration between the PCSL and the Penn Medicine Nudge Unit. It includes all primary care practices at CCA and CPUP.

Beginning on **Monday, Oct. 19th**, your practice will take part in this service line initiative for the following 6 months. [Insert description of the intervention or usual care for this practice].

If you have any questions, please reach out to PennStatins@pennmedicine.upenn.edu.

Please forward this email to all providers in your practice.

Thank you for your help with this initiative.

Sincerely,

Primary Care Service Line

Intervention to insert:

Control

During that period of time, we will be monitoring statin prescribing rates within your practice. Please note that patients who meet the following criteria are recommended for moderate or high intensity statin prescribing:

1) Has a clinical ASCVD diagnosis (high intensity statin)
2) Has LDL> 190 (high intensity statin)
3) Has a history of familial hyperlipidemia (high intensity statin)
4) Has diabetes and an ASCVD risk score > 10% (moderate intensity statin)
5) Is a current smoker and has an ASCVD risk score > 10% (moderate intensity statin)
6) Has hypertension and ASCVD score >10% (moderate intensity statin)
7) Has dyslipidemia and ASCVD score >10% (moderate intensity statin)

As a quick reference, please find a chart below of appropriate statin doses based on intensity:

	High-Intensity	Moderate-Intensity	Low-Intensity
LDL-C Lowering	≥50%	30% to 49%	<30%
Statins	Atorvastatin 40/80 mg Rosuvastatin 20/40 mg	Atorvastatin 10/20 mg Rosuvastatin 5/10 mg Simvastatin 20/40 mg	Simvastatin 10 mg

Clinician Arm

First, a PennChart BestPractice Advisory (BPA) will appear at the time of order entry during new or return PCP well visits with patients who are eligible for a statin but not currently prescribed one. The BPA will indicate the reason a patient meets eligibility requirements and a chart of the appropriate statin dose based on recommended intensity.

Second, clinicians will receive monthly feedback on their statin prescribing rates over the preceding 3 months compared with peer clinicians at Penn Medicine. This will be delivered monthly as a staff message in PennChart.

As a quick reference, please find a chart below of appropriate statin doses based on intensity:

	High-Intensity	Moderate-Intensity	Low-Intensity
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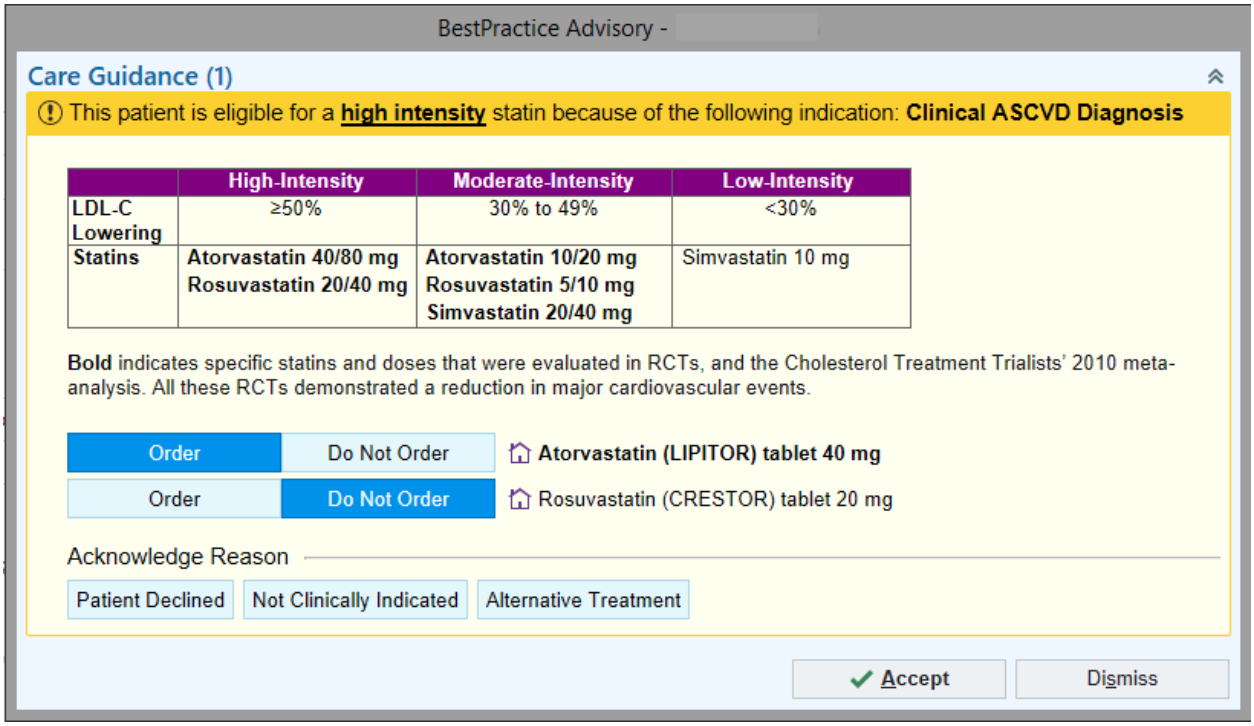
Statins	Atorvastatin 40/80 mg Rosuvastatin 20/40 mg	Atorvastatin 10/20 mg Rosuvastatin 5/10 mg Simvastatin 20/40 mg	Simvastatin 10 mg

Below is an example of the BPA that will appear at the time of order entry during visits with eligible patients:



Patient Arm

In the days prior to a new or return PCP well visit, patients eligible for but not currently prescribed a statin will receive a text message informing them of the risks and benefits of a statin along with a prompt to plan for a discussion about statin prescription during their visit.

As a quick reference, please find a chart below of appropriate statin doses based on intensity:

	High-Intensity	Moderate-Intensity	Low-Intensity
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Clinician and Patient Arm

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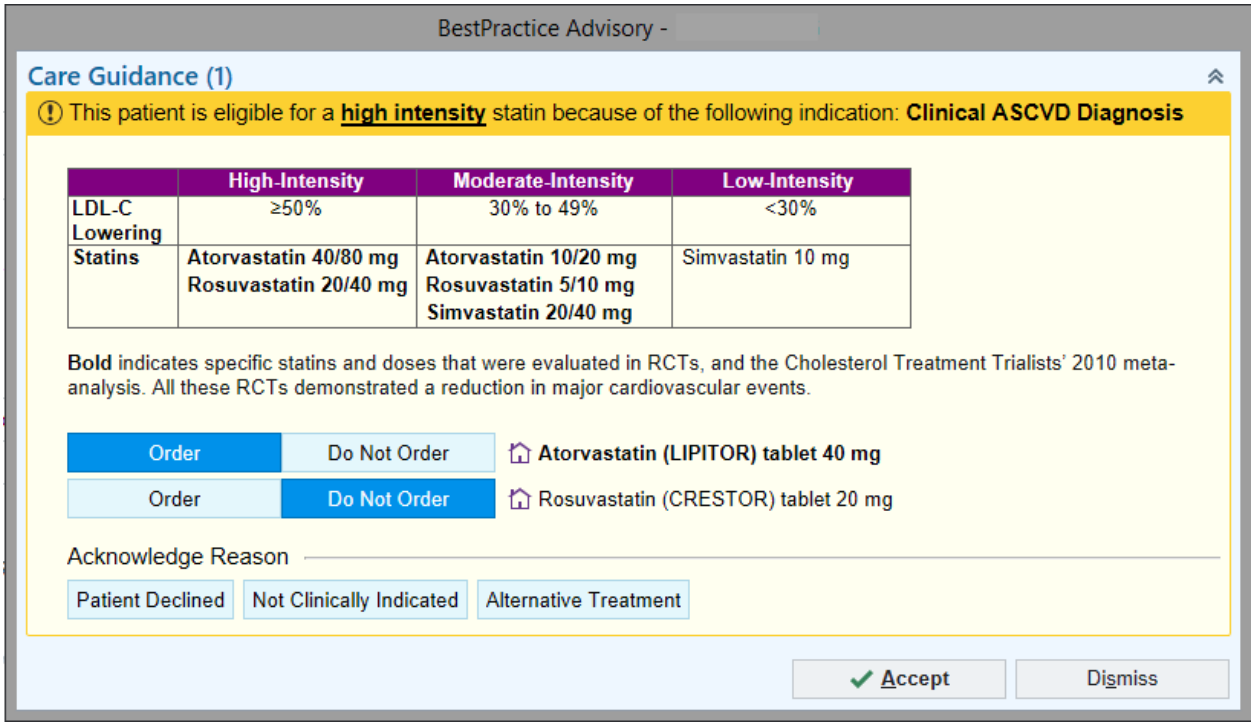
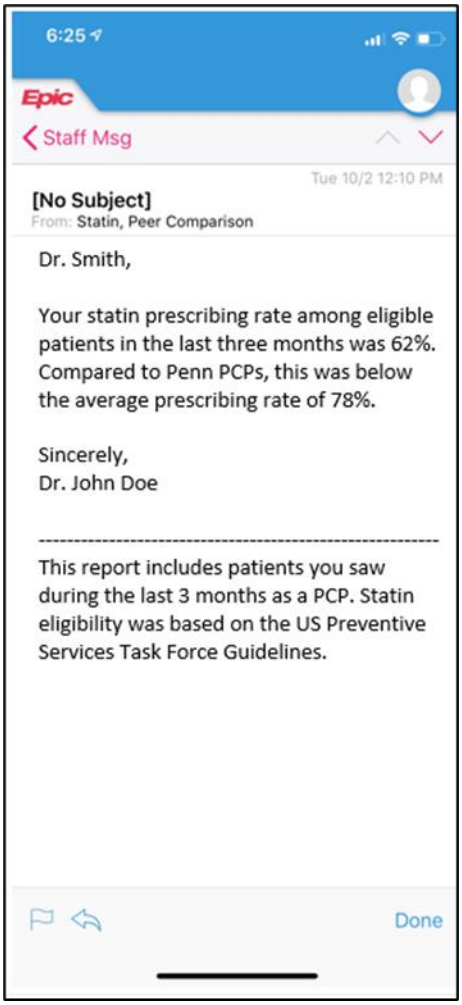


eFigure 2. Example of Peer Comparison Feedback to Clinicians in the Electronic Health Record



eFigure 3. Text Messaging Script for the Patient Nudge Arm

Message 1 Day/time	94 hours prior to the appointment
Message 1 Day/time reminder	This message is sent if there was no response to the original message. 70 hours prior to the appointment
Message 1 content	[Text 1] [First Name], this is a message from Penn Medicine reminding you about your appointment with Dr. [insert] on MM/DD @ HH:MM AM/PM. We also have an important message about your heart health for you to discuss with your doctor. Please reply Y if you would like to read this via text message. If you do not want to hear from us on this topic via text message, please reply STOP. Please note that texting is not 100% secure. Msg and data rates may apply. [Text 2, if "Y etc."] Can you confirm you are [FIRST_NAME][LAST_NAME]? Reply Y to confirm or STOP to let us know we have the wrong number. [Text 3, if "Y etc."] Thank you. Guidelines indicate you should take a statin to reduce the chance of a heart attack. Please discuss this at your upcoming appt w/ Dr. [insert]. Statins are medications that lower cholesterol level and improve heart health. Side effects like muscle pain are rare and go away w/ stopping medication. At Penn Medicine, it is standard of care to prescribe a statin to patients like you. Reply Y if you are interested in taking a statin to reduce your risk of heart disease. Text ? if you are unsure and have questions for your doctor. [Text 4, if "Y etc"] Great! Remember to ask your doctor about taking a statin during your visit. To learn more about statins click here [link to Healthwise decision making tool SHORT LINK INSERT]. [Text 4, if "?"] Please write down your questions or concerns and share them with your doctor during your visit. To learn more about statins click here [link to Healthwise decision making tool SHORT LINK INSERT].

Message 2 Day/time	15 minutes prior to the appointment
Message 2 content	[Text 6] PENNMED: As a reminder, speak with your doctor about taking a statin medication to reduce your risk of a heart attack.
Message Opt-Out	[Text if "STOP"] You will no longer receive messages like this from Penn Medicine.

eTable 1. Clinician Sample

Characteristic	Usual Care (N = 40)	Patient Nudge (N = 45)	Clinician Nudge (N = 32)	Combined Nudge (N = 41)
Gender, No. (%)				
Male	18 (45.0)	21 (46.7)	11 (34.4)	24 (58.5)
Female	22 (55.0)	24 (53.3)	21 (65.6)	17 (41.5)
Specialty, No. (%)				
Family Medicine	27 (67.5)	12 (26.7)	13 (40.6)	5 (12.2)
Internal Medicine	13 (32.5)	33 (73.3)	19 (59.4)	36 (87.8)

eTable 2. Patient Sample in Preintervention Period

Characteristic	Usual Care (N=1876)	Patient Nudge (N=2022)	Clinician Nudge (N=1723)	Combined Nudge (N=1752)
Age, Mean (SD)	64.6 (10.1)	65.6 (10.7)	64.9 (10.9)	65.3 (10.8)
Gender, No. (%)				
Male	963 (51.3)	1025 (50.7)	870 (50.5)	967 (55.2)
Female	913 (48.7)	997 (49.3)	853 (49.5)	785 (44.8)
Race/Ethnicity, No. (%)				
White non-Hispanic	1123 (59.9)	1437 (71.1)	1270 (73.7)	1144 (65.3)
Black non-Hispanic	673 (35.9)	487 (24.1)	368 (21.4)	508 (29.0)
Hispanic	35 (1.9)	52 (2.6)	47 (2.7)	62 (3.5)
Other	45 (2.4)	46 (2.3)	38 (2.2)	38 (2.2)
Insurance, No. (%)				
Commercial	808 (43.1)	882 (43.6)	805 (46.7)	706 (40.3)
Medicare	957 (51.0)	1078 (53.3)	880 (51.1)	972 (55.5)
Medicaid	111 (5.9)	62 (3.1)	38 (2.2)	74 (4.2)
Annual household income, No. (%)				
Less than $50,000	527 (28.1)	347 (17.2)	235 (13.6)	370 (21.1)
$50,000 to $100,000	871 (46.4)	1235 (61.1)	1001 (58.1)	1027 (58.6)
Greater than $100,000	460 (24.5)	424 (21.0)	476 (27.6)	339 (19.3)
Missing	18 (1.0)	16 (0.8)	11 (0.6)	16 (0.9)
Practice specialty, No. (%)				
Family Medicine	958 (51.1)	735 (36.4)	702 (40.7)	361 (20.6)
Internal Medicine	918 (48.9)	1287 (63.6)	1021 (59.3)	1391 (79.4)
Encounter type, No. (%)				
In Person Visit	1413 (75.3)	1602 (79.2)	1330 (77.2)	1434 (81.8)
Teleheath Visit	463 (24.7)	420 (20.8)	393 (22.8)	318 (18.2)
Visit type, No. (%)				
New	127 (6.8)	138 (6.8)	79 (4.6)	87 (5.0)
Return	1749 (93.2)	1884 (93.2)	1644 (95.4)	1665 (95.0)
Clinical measures				
Clinical ASCVD, No. (%)	411 (21.9)	472 (23.3)	437 (25.4)	402 (22.9)
ASCVD risk score, mean (SD)	16.3 (7.1)	16.5 (7.4)	16.0 (7.3)	16.5 (7.2)
Body mass index, mean (SD)	29.5 (6.7)	29.6 (6.4)	29.7 (6.6)	29.4 (6.5)
Charlson comorbidity index, median (IQR)	1 (0-2)	1 (0-2)	1 (0-2)	1 (0-2)

*Abbreviations: SD=standard deviation, No.=Number of, IQR=interquartile range
**Data are for patients in the pre-intervention period from Oct 19, 2019 to Oct 18, 2020. ASCVD risk score is only among patients without clinical ASCVD

eTable 3. Subgroup Analyses

Characteristic	Clinician Nudge Main Effect Interaction		Patient Nudge Main Effect Interaction	
	Odds Ratio (95% CI)	P Value	Odds Ratio (95% CI)	P Value
Gender, No. (%)				
Male	Ref	NA	Ref	NA
Female	1.2 (0.8, 1.8)	0.36	1.1 (0.7, 1.5)	0.66
Race/Ethnicity, No. (%)				
White non-Hispanic	Ref	NA	Ref	NA
Black non-Hispanic	1.2 (0.8, 2.0)	0.41	1.3 (0.8, 2.0)	0.35
Hispanic	0.9 (0.3, 3.5)	0.92	0.7 (0.2, 2.5)	0.54
Other	0.6 (0.2, 1.8)	0.36	1.2 (0.4, 3.8)	0.74
Insurance, No. (%)				
Commercial	Ref	NA	Ref	NA
Medicare	1.2 (0.8, 1.7)	0.43	1.1 (0.8, 1.6)	0.54
Medicaid	0.8 (0.2, 2.5)	0.64	3.0 (0.9, 9.5)	0.07
Annual household income, No. (%)				
Less than $50,000	1.7 (0.8, 3.4)	0.14	1.7 (0.9, 3.3)	0.10
$50,000 to $100,000	1.0 (0.6, 1.7)	0.95	1.5 (0.9, 2.4)	0.11
Greater than $100,000	Ref	NA	Ref	NA

*Estimates are from 4 models that included interactions of the intervention main effect and the subgroup (gender, race/ethnicity, insurance, and annual household income). Each of the 4 models also adjusted for the following: main effect, calendar month, age, gender, race/ethnicity, insurance, annual household income, Charlson comorbidity index

eTable 4. Prescribing Rates by Clinical Atherosclerotic Cardiovascular Disease (ASCVD) and ASCVD Risk Score

	Usual Care	Patient Nudge	Clinician Nudge	Combined Nudge
Clinical ASCVD, %				
Pre-Intervention	5.1% (21/411)	5.7% (27/472)	5.5% (24/437)	5.0% (20/402)
Intervention	7.0% (14/201)	7.0% (19/273)	8.1% (20/246)	11.7% (25/213)
ASCVD Risk >20%				
Pre-Intervention	7.6% (22/290)	5.3% (17/320)	7.2% (18/249)	4.5% (12/266)
Intervention	8.2% (17/208)	11.2% (23/205)	11.0% (18/164)	20.3% (37/182)
ASCVD Risk 16-20%				
Pre-Intervention	6.2% (21/338)	5.4% (19/353)	4.5% (12/264)	5.1% (17/335)
Intervention	8.9% (15/168)	6.4% (12/187)	15.0% (21/140)	18.5% (30/162)
ASCVD Risk 11-15%				
Pre-Intervention	4.3% (30/691)	2.0% (14/694)	3.8% (23/605)	3.2% (19/590)
Intervention	7.0% (20/284)	6.7% (21/314)	15.6% (42/269)	14.4% (36/250)
ASCVD Risk 6-10%				
Pre-Intervention	16.7% (6/36)	7.0% (4/57)	20.8% (10/48)	11.1% (6/54)
Intervention	5.5% (6/110)	10.5% (13/124)	16.5% (17/103)	14.5% (11/76)
ASCVD Risk 0-5%				
Pre-Intervention	3.4% (2/58)	13.4% (9/67)	16.9% (11/65)	8.6% (5/58)
Intervention	2.9% (1/35)	20.9% (9/43)	9.4% (3/32)	17.2% (5/29)
ASCVD Risk unknown				
Pre-Intervention	5.8% (3/52)	11.9% (7/59)	10.9% (6/55)	6.4% (3/47)
Intervention	7.7% (2/26)	8.6% (3/35)	25.9% (7/27)	4.0% (1/25)

*Abbreviations: ASCVD=atherosclerotic cardiovascular disease
**Groups in the table are mutually exclusive (e.g. patients with clinical ASCVD are only shown in that category and did not have a risk score estimated)