



# EHR "nudges" and beyond: New ways to use the EHR and connected tools to influence behaviors

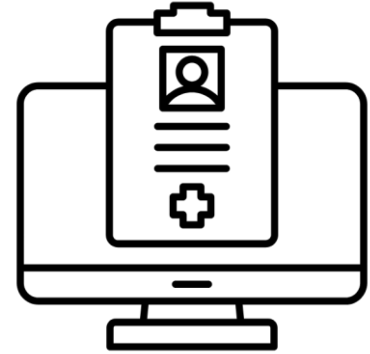
Devin Mann, MD  
Professor, Population Health and Medicine

Strategic Director, Digital Health Innovation, MCIT Department of Health Informatics  
NYU Langone Health



# Nudging in the EHR

- Changing clinician behavior is hard and has been resistant to many interventions
- Nudging leverages behavioral economics and social psychology inspired approaches to influence behavior
- Clinicians spend a lot of time in the EHR so it's a logical place to attempt to nudge their choices



# Nudging in the EHR... 1st attempt

Embedded nudges into multiple EHR locations to promote evidence-based diabetes prescribing in the elderly

Did not work because....

- Nudges don't force, they influence...so if docs don't agree...
- Not in the workflow, enough



Older Adult Guidelines (1)

Attention - Target A1C is Different for Patients Over 75!

Based on the patient's active problems, visit diagnoses, and age, a HIGH life expectancy has been calculated.

**Guidelines for this patient:**  
High life expectancy ⇒ A1C target = 7.0 - 7.5%

**Patient's most recent A1C:**  
HEMOGLUCOBIN A1C, POC (%)  
Date: 04/02/2019 Value: 3 (A) Status: Final  
No results found for HGBA1C

Tighter control can lead to dizziness, confusion, and other problems from hypoglycemia

Consider joining your colleagues by:  
• Reducing current diabetes medication

[Life Expectancy Algorithm](#)  
[Choosing Wisely Guidelines](#)

Jump to Orders

Acknowledge Reason

Clinically inappropriate. Please explain. Agree with recommendation. Action taken

ACCEPT

Choosing Wisely:  
Are you overtreating? = Overtreated

You Levitt Medical NYU

You are receiving this message because you have seen a patient age 76 or older with diabetes in the last month. According to Choosing Wisely 76 or older with diabetes are in their A1C target range; the rest are too tightly controlled. This compares to an average of 31 out of 101 older adults who are most successful (top 10%) at keeping their older diabetic patients' A1C within target range. If you would like more information

Join your colleagues in Choosing Wisely by:

- Reducing prescription of diabetes medication for older patients
- Using metformin, only if clinically appropriate

[Choosing Wisely Guidelines](#)

Sincerely,  
Dr. Susan Levitt  
Medical Director

**WINNER**  
• Geriatric Diabetes Edition •

A 8.0-9.0%  
B 7.0-7.5%  
C 7.5-8.0%

**WINNER**  
• Geriatric Diabetes Edition •

A 8.0-9.0%  
B 7.0-7.5%  
C 7.5-8.0%

Order Search

Order: 162143701

Star Only Favorites

First-line Type 2 Diabetes

- Metformin (GLUCOPHAGE-XR) XR tablet 500 mg
- Metformin 500 mg Oral Tab

Cardiovascular

- acetabULIDE (SECTRAL) capsule 200 mg
- acetaZOLAMIDE (DIAMOX) tablet 250 mg
- amlodipine (NORVASC) tablet 10 mg
- amlodipine (NORVASC) tablet 2.5 mg
- amlodipine (NORVASC) tablet 5 mg
- amlodipine-atrovastatin (CADUET) per tablet 10-10 mg
- amlodipine-atrovastatin (CADUET) per tablet 10-20 mg

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POCT HEMOGLOBIN A1C

Status: Edited Result - FINAL Visible to patient: No (Not Released) Dx: Type 1 diabetes mellitus with complic...

| HEMOGLOBIN A1C, POC | Ref Range & Units | 14:10 (12/14/18) | 1mo ago (10/24/18) | 1mo ago (10/23/18) | 2mo ago (9/27/18) |
|---------------------|-------------------|------------------|--------------------|--------------------|-------------------|
|                     | 4 - 5.7 %         | 3 †              | 5                  | 6 †                | 3 †               |

Resulting Agency: NYU PERFORMED NYU PERFORMED NYU PERFORMED NYU PERFORMED

Specimen Collected: 12/14/18 14:10 Last Resulted: 12/14/18 14:10

Lab Flowsheet Order Details View Encounter Lab and Collection Details Routing Result History

Older Adult Guidelines

Based on the patient's active problems, visit diagnoses, and age, a HIGH life expectancy has been calculated.

**Guidelines for this patient:**  
High life expectancy ⇒ A1C target = 7.0 - 7.5%

**Patient's most recent A1C:**  
HEMOGLOBIN A1C, POC (%)  
Date: 12/14/2018 Value: 3 (A) Status: Final  
No results found for HGBA1C

Tighter control can lead to dizziness, confusion, and other problems from hypoglycemia

Consider joining your colleagues by reducing their metformin, still the treatment of choice for older adults.

[Life Expectancy Algorithm](#)  
[Choosing Wisely Guidelines](#)

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Based on one patient's active problems, visit diagnoses, and age, a HIGH life expectancy has been calculated.

**Guidelines for this patient:**  
High life expectancy ⇒ A1C target = 7.0 - 7.5%

**Patient's most recent A1C:**  
HEMOGLUCOBIN A1C, POC (%)  
Date: 09/20/2018 Value: 3 (A) Status: Final  
HEMOGLUCOBIN A1C, POC (%)  
Date: 07/05/2018 Value: 6.4 % (H) Status: Final  
HEMOGLUCOBIN A1C, POC (%)  
Date: 06/17/2018 Value: 6.5 Percent (H) Status: Final

Tighter control can lead to dizziness, confusion, and other problems from hypoglycemia

Consider joining your colleagues by:  
• Reducing current diabetes medication  
• Using metformin, only if clinically appropriate

[Life Expectancy Algorithm](#)

# EHR Nudges, 2nd attempt

*Optimizing a Clinical Decision Support System for Evidence-Based Statin Medication Prescribing to Reduce the Risk of Cardiovascular Disease*

GOAL

To increase guideline-concordant statin prescribing among patients in primary care using a clinical decision support system (EHR Nudges)

ACTIVITIES



## Leverage EHR Audit Log data to identify workflows

- Review EHR audit log to identify common steps clinicians take prior to prescribing a statin
- Identify areas of the chart and information clinicians are accessing



## Target nudges for various focuses

- High risk patients vs. Moderate risk ASCVD patients
- Chart placement (labs, orders, communication)
- Patient vs. Clinician-facing nudges



## Create and test "nudges"

- Develop nudge prototypes
- Perform usability testing with patients and clinicians
- Deploy nudges and conduct RCT to find most effective combination

# EHR Nudges

*Optimizing a Clinical Decision Support System for Evidence-Based Statin Medication Prescribing to Reduce the Risk of Cardiovascular Disease*

Back Test Details Close

**HDL CHOLESTEROL** [View trends](#)  
Normal value: >39 mg/dL  
Value 41 mg/dL

**TRIGLYCERIDES** [View trends](#)  
Normal value: <150 mg/dL  
Value 165 mg/dL

**LDL CHOLESTEROL** [View trends](#)  
Normal value: <100 mg/dL  
Value 118 mg/dL

**CHOLESTEROL/HDL RATIO** [View trends](#)  
Normal range: 0.0 - 4.9  
5.3

Performed by NYU Langone Hospitals, Tisch Labs, 560 First Avenue, NY, NY

**Additional Information V**

Your risk of heart attack or stroke is **high** (10-year risk = 20%).  
You can lower your risk by taking a statin

[Click HERE to learn more about statins](#)  
[Click HERE to book a visit with a provider to discuss your risk](#)

Back Conversation Close

Your Upcoming Appointment at NYU Langone

Christina Xu  
Nov 20 at 8:30am

Based on last year's lab results, a statin medication could reduce your risk of heart attack or stroke. Side effects of statins are rare. Learn more about statins before your appt here: <https://nyulangone.app/3dxdns87ld>

**4-9 nudges are currently in development to increase guideline-concordant statin prescribing targeting both patients and clinicians**

**OurPractice Advisories**

\* High ASCVD Risk - Lipid Lowering Therapy Recommended  
[Patient age 40-75 with Type 2 DM \(1231865\)](#)

**LIPID PANEL** Order: 909823451

Status: Final result Visible to patient: Yes (seen) Dx: Annual physical exam

0 Result Notes

| Component                          | 2 d ago    | 11 mo ago |
|------------------------------------|------------|-----------|
| <b>CHOLESTEROL, TOTAL</b>          | <b>182</b> | 180       |
| <200 mg/dL                         |            |           |
| <b>TRIGLYCERIDES</b>               | <b>86</b>  | 114       |
| <150 mg/dL                         |            |           |
| <b>HDL CHOLESTEROL</b>             | <b>91</b>  | 77        |
| >39 mg/dL                          |            |           |
| <b>LDL CHOLESTEROL, CALCULATED</b> | <b>74</b>  | 80        |
| <100 mg/dL                         |            |           |
| <b>CHOLESTEROL/HDL Ratio</b>       | <b>2.0</b> | 2.5       |
| 0.0 - 4.9                          |            |           |

Comment: Performed by NYU Langone Hospitals, Tisch Labs, 560 First Avenue, NY, NY 10016, CLIA:33D0653355, PFI: 3159, Director: Jeffrey S. Jhang, MD, MBA

Resulting Agency NYU JV LAB NYU JV LAB

Order Search

Statin  Browse Preference List Facility List Database

Panels (No results found)

**Medications**

| Name                    | Dose  | Frequ... | Disp... | End Date | Copay | Drug Type | Pref List |
|-------------------------|-------|----------|---------|----------|-------|-----------|-----------|
| Atorvastatin (Lipitor)  | 40 mg | Daily    |         |          |       | GenericFX | AMB NYU   |
| Rosuvastatin (Crestor)  | 20 mg | Daily    |         |          |       | GenericFX | AMB NYU   |
| Simvastatin (Zocor)     | 40 mg | Daily    |         |          |       | GenericFX | AMB NYU   |
| Pravastatin (Pravachol) | 40 mg | Daily    |         |          |       | GenericFX | AMB NYU   |
| Lovastatin              | 20 mg | Daily    |         |          |       | GenericFX | AMB NYU   |
| Pitavastatin            | 1 mg  | Daily    |         |          |       | GenericFX | AMB NYU   |

Select and Stay  Accept  Cancel

**Add ASCVD risk score and recommended statin with lipid panel results**

**Message patient to learn more statins and discuss at upcoming visit**

**Recommend guideline-concordant statin to provider through OurPractice Advisory**

**Default guideline-concordant statin in order search**

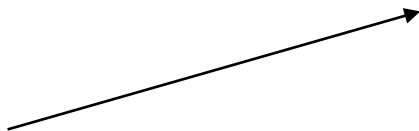
## But nudging is really an umbrella term



The EHR is part of a **digital care ecosystem** of opportunities to influence choices and behaviors

# Nudge: Making CDS for Orders -- EASY

Updated BPA



## Old way

### Multiple Care Gap BPAs

**HEALTH MAINTENANCE DUE: COLORECTAL CANCER SCREENING**

This patient may be due for Colon Cancer Screening based on the following recommendation:

- Female, Age 50-75: Colonoscopy every 10 years (preferred), 3D/4D Yearly Fecal Occult Blood Testing, 3D CT Colonography every 5 years

Please open the SmartSet below to order screening.

If the patient should be assigned to have Yearly Fecal Occult Blood/FIT testing please add the modifier below. Colonoscopy last satisfied: DGM/YYYYYY

|                 |             |  |
|-----------------|-------------|--|
| Open Order Set  | Do Not Open | COLORECTAL CANCER SCREENING SMARTSET Preview |
| Add HM Modifier | Do Not Add  | Colon Cancer Screening, FOBT/FT QTY          |

[NYU Colon Cancer Screening Guidelines](#)

**HEALTH MAINTENANCE DUE: CERVICAL CANCER SCREENING**

This patient may be due for cervical cancer screening based on the following recommendation:

- Female, Age 21-65: Pap smear every 3 years OR Pap smear with HPV co-testing every 5 years

Update the patient's screening status by performing one of the following:

- Open the SmartSet to perform screening
- Update the patient's screening status by selecting Override
- Postpone screening
- Add HM Modifier to exclude the patient from screening indefinitely

|                 |                 |  |
|-----------------|-----------------|--|
| Open Order Set  | Do Not Open     | CERVICAL CANCER SCREENING SMARTSET Preview               |
| Override        | Do Not Override | Cervical Cancer Screening <a href="#">/ Edit details</a> |
| Postpone        | Do Not Postpone | Cervical Cancer Screening <a href="#">/ Edit details</a> |
| Add HM Modifier | Do Not Add      | Cervical Cancer Screening, Exclude Patient               |

**DIABETES MANAGEMENT DUE: A1C TESTING**

This patient may be due for A1C testing based on the following recommendation:

- Diabetic, Age 18-75: A1C testing yearly

Update the patient's screening status by performing one of the following:

- Open the SmartSet to order A1C testing
- Update the patient's testing status by selecting Override
- Postpone testing

Last HGBA1C collected/result: DGM/YYYYYY = Result value

|                |                 |   |
|----------------|-----------------|---|
| Open Order Set | Do Not Open     | HBA1C SMARTSET Preview  |
| Override       | Do Not Override | Diabetes Annual HGBA1C Testing <a href="#">/ Edit details</a> |
| Postpone       | Do Not Postpone | Diabetes Annual HGBA1C Testing <a href="#">/ Edit details</a> |

**HEALTH MAINTENANCE DUE: BREAST CANCER SCREENING**

This patient may be due for breast cancer screening based on the following recommendation:

- Female, Age 40-74: Breast cancer screening every 1 year

Update the patient's screening status by performing one of the following:

- Open the SmartSet to perform screening
- Update the patient's screening status by selecting Override
- Postpone screening
- Add HM Modifier to exclude the patient from screening indefinitely

Breast Cancer Screening last satisfied: DGM/YYYYYY

|                 |                 |  |
|-----------------|-----------------|--|
| Open Order Set  | Do Not Open     | MAMMOGRAPHY SCREENING SMARTSET Preview                 |
| Override        | Do Not Override | Breast Cancer Screening <a href="#">/ Edit details</a> |
| Postpone        | Do Not Postpone | Breast Cancer Screening <a href="#">/ Edit details</a> |
| Add HM Modifier | Do Not Add      | Breast Cancer Screening, Exclude Patient               |

- Retiring old alerts: Breast Cancer, Cervical Cancer, Colon Cancer, HgbA1c, etc
- Open each BPA one by one
- Sign orders one by one
- Single BPA
- Open and sign in a single step

## New way - Dynamic Order sets

Single Care Gap BPAs

OurPractice Advisories Med Management SmartSets

OurPractice Advisories

Preventive Care (3)

Patient is overdue for at least 1 high priority FGP quality measure. Please Open SmartSet to address care gaps.

**Overdue Care Gaps:**

- Cancer Screening
  - Breast Cancer Screening
  - Colon Cancer Screening
- Chronic Diabetes Management
  - Urine Microalbumin
- Other Screening
  - Hepatitis C Screening

Open SmartSet Do Not Open FGP Dynamic SmartSet Preview

Accept (1)

FGP Dynamic SmartSet a

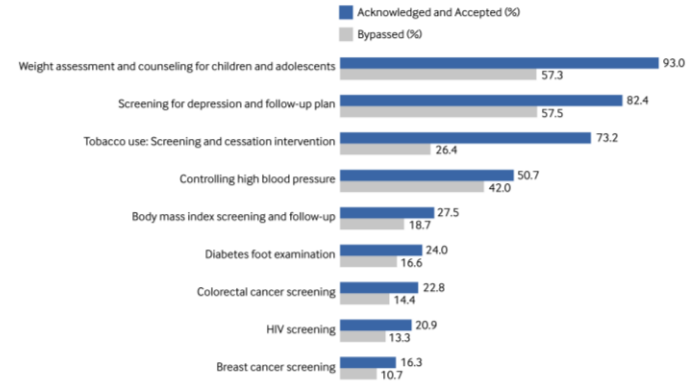
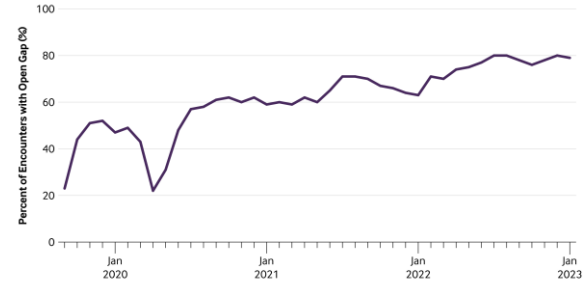
- Cancer Screening
  - Colon Cancer Screening
    - COLONOSCOPY WITH QR WITHOUT BIOPSY [/ Edit details](#)
      - Receive Ancillary Perform, Expires: 7/16/2025, Resulting Agency - NYU PROWATON
  - Breast Cancer
    - MAMMO SCREENING BILATERAL [/ Edit details](#)
      - Expected: 7/17/2024, Approximate, Expires: 6/16/2025, Ancillary Perform, Resulting Agency - NYU RADIOLOGY SWF
- Other
  - Hepatitis C Screening
    - Per USPSTF guidelines patients age 18-79 should be offered screening for Hepatitis C once
    - HEPATITIS C VIRUS ANTIBODY, REFLEX TO RNA QUANT [/ Edit details](#)
      - Expected: 7/16/2024, Expires: 1/16/2025, Routine, Clinic Collect, Resulting Agency - NYU Z/LAB
- Diagnosis
  - Associated diagnosis
    - Encounter for screening mammogram for breast cancer [Z12.31]
    - Cervical cancer screening [Z12.4]
    - Screen for colon cancer [Z12.11]
    - Need for hepatitis C screening test [Z11.59]
    - Routine screening for STI (sexually transmitted infection) [Z11.3]
    - Type 1 diabetes mellitus [E10.9]
    - Type 2 diabetes mellitus [E11.9]
    - Pre-existing type 1 diabetes mellitus in pregnancy [O24.019]
    - Pre-existing type 2 diabetes mellitus in pregnancy [O24.119]
- Additional SmartSet Orders

# Nudge: Making CDS for Orders -- EASY

- Unified CDS alert to queue up all the relevant orders for quality gap closure
- Embed nudges into these "dynamic" order sets
- Consistent leadership messaging on its value
- Leads to adoption and quality improvements

## Use of the Clinical Decision Support (CDS) Tool by Month of Encounter

Increased use of the CDS tool has been tracked from 2019 through 2023, except in 2020 during the Covid-19 pandemic. Although only about 23% of providers acknowledged the alert or accepted the recommendations in September 2019, that percentage had risen to about 79% in January 2023.





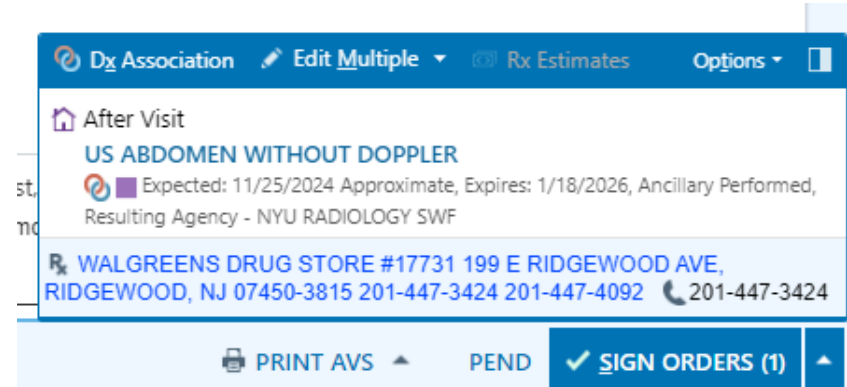
# Nudge: Automations as nudges

## Goal

To improve hepatocellular carcinoma screening for patients with cirrhosis while reducing provider workload  
>20% patients not screened according to guideline recommendations

## Intervention

Bot pends appropriate US order for providers prior to their office visits



The screenshot displays a software interface for managing medical orders. At the top, there is a blue navigation bar with the following elements: a circular icon, the text "Dx Association", a pencil icon followed by "Edit Multiple", a circular icon with a plus sign followed by "Rx Estimates", and "Options" with a dropdown arrow. Below the navigation bar, the main content area shows an "After Visit" section with a house icon. The primary order is "US ABDOMEN WITHOUT DOPPLER". Below this, there is a status bar with a circular icon, a purple square, and the text "Expected: 11/25/2024 Approximate, Expires: 1/18/2026, Ancillary Performed, Resulting Agency - NYU RADIOLOGY SWF". A light blue box below the status bar contains pharmacy information: "WALGREENS DRUG STORE #17731 199 E RIDGEWOOD AVE, RIDGEWOOD, NJ 07450-3815 201-447-3424 201-447-4092" and a phone icon followed by "201-447-3424". At the bottom of the interface, there is a light blue bar with three buttons: "PRINT AVS" with a printer icon and an upward arrow, "PEND", and "SIGN ORDERS (1)" with a checkmark icon and an upward arrow.

# Nudge: nudging teamwork

## Team based decision support

Engage medical assistants to screen for adherence issues

Use secure chat to e-simulate verbal "heads up"

The screenshot displays an EHR interface with several key components:

- Medication Adherence Alert:** A yellow banner at the top states, "Patient has high blood pressure and may have low medication adherence. Please ask the patient the question below." Below this are buttons for "Document", "Do Not Document", "Flowsheets", and "Collapse".
- Barriers Survey-Calculator:** A section titled "Barriers Survey-Calculator" contains the text: "Sometimes people miss doses of their medications. This may happen for a variety of reasons. In the past 7 days, which of these situations, if any, contributed most to you missing a dose of your blood pressure medication?" Below this text are several selectable options: "I forgot", "I take too many medications a day", "They caused some side effects", "I was worried about taking them for the rest of my life", "They cost a lot of money", "I do not think high blood pressure is dangerous", and "None".
- BestPractice Advisories Panel:** A red-bordered box highlights a "BestPractice Advisories" panel. It contains a "Positive Medication Adherence Screener" alert with the text: "Patient has uncontrolled hypertension and forgets to take their medications." Below the alert are instructions: "Copy and paste the results into secure chat to PCP." and "Consider discussing ways to help patient remember to take their medications like setting an alarm or using a pillbox. Related patient materials available in the Medication Adherence section." There are buttons for "Secure Chat", "Previous", and "Next".
- Medication Adherence Summary Table:** A table below the advisories shows a list of conditions with their status and dates:

| Condition                                      | Status             | Next Due           |
|--|--------------------|--------------------|
| Diabetes Annual Foot Exam (Yearly)             | Overdue - never dc |                    |
| Annual Physical Examination (Yearly)           | Overdue - never dc |                    |
| Covid-19 Vaccine (1)                           | Overdue - never dc |                    |
| Diabetes Annual Retinopathy Screening (Yearly) | Overdue - never dc |                    |
| Tetanus Vaccination (Every 10 Years)           | Overdue - never dc |                    |
| HIV Screening (Once)                           | Overdue - never dc |                    |
| Hepatitis C Screening (Once)                   | Overdue - never dc |                    |
| Diabetes Annual LDL Testing (Yearly)           | Overdue - never dc | Next due on 6/6/20 |
| Diabetes Annual Nephropathy Screening (Yearly) | Overdue - never dc | Next due on 6/6/20 |
| Diabetes Annual HGBA1c Testing (Yearly)        | Overdue - never dc | Next due on 7/23/2 |
- Diagnosis List:** A table below the summary shows a list of diagnoses with their status and dates:

| Diagnosis         | Status        | Update |
|-------------------|---------------|--------|
| Unprioritized     | Unprioritized | 09/06  |
| Hyperlipidemia    | Unprioritized | 09/06  |
| Diabetes mellitus | Unprioritized | 09/06  |
| Hypertension      | Unprioritized | 09/06  |
| Cough             | Unprioritized | 07/28  |
- Visit Diagnoses:** A section at the bottom shows "Visit Diagnoses" with a table of ICD-10-CM codes.

# Nudge: Priming patients to nudge physicians

Eligible patients offered a MyChart education tool (MyLungHealth) via a pre-visit questionnaire

40.5% of potentially eligible patients choose to engage with MyLungHealth

Prepare for Your Visit

Personal Info Insurance Allergies Medications Health Issues **Questionnaires** Sign Documents

## Find Lung Cancer Early

For an upcoming appointment with **Patrick M Cocks** on 1/25/2024

**This information will not be reviewed if your appointment is cancelled.**

\* Indicates a required field.

We can now find lung cancer earlier than ever with a new test. Catching it early is important so that we can treat it more easily and maybe even cure it. Please click below to learn more.

[Please click here to learn more](#)

\* Were you able to learn about Lung Cancer Screening?

Yes  No - but maybe later  No - don't show again

# MyLungHealth

**MyLungHealth:** A new AHRQ sponsored effort to improve lung cancer screening through MyChart-based patient engagement and education  
Eligible patients will be offered a MyChart education tool (MyLungHealth) via a pre-visit questionnaire



# MyLungHealth

When patients use the **MyLungHealth** tool, providers will be notified in Epic as shown below:

Preventive Care (1) ⤴

**ⓘ Patient** recently used the MyLungHealth lung cancer screening education app and **may be interested in discussing lung cancer screening.**

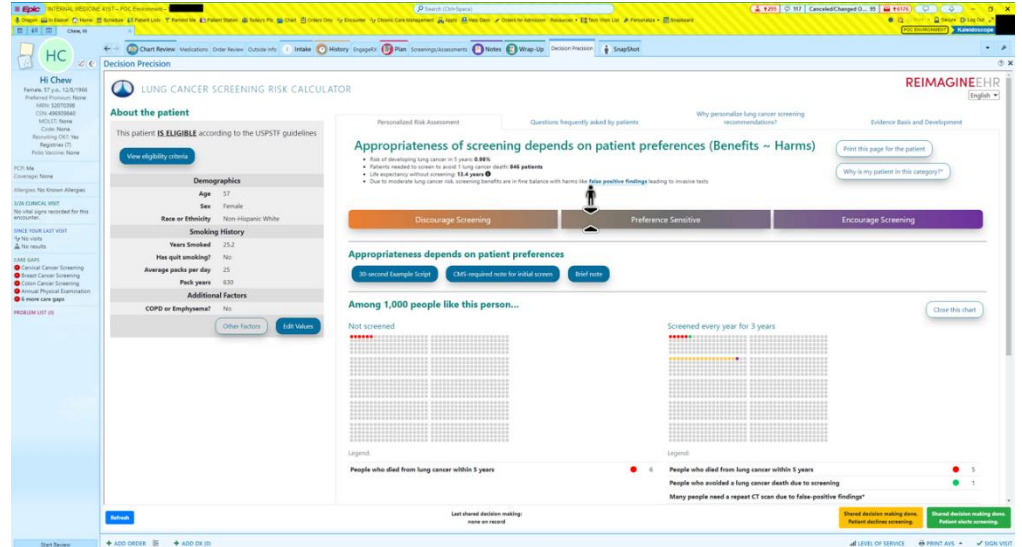
[↗ Launch Decision Precision Plus](#)

Acknowledge Reason \_\_\_\_\_

# MyLungHealth

## Decision Precision+:

- EHR-Integrated app for lung cancer screening shared decision making
- Clicking on the prompt will provide a link to an app that facilitates shared decision making prior to initiating screening

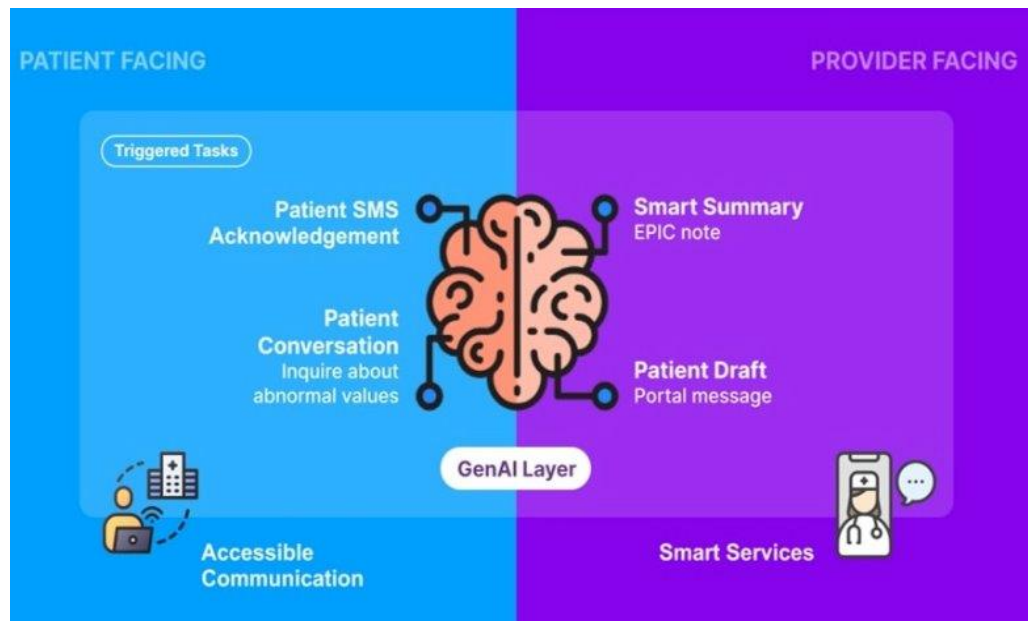


# AI nudges: shifting towards digitally enabled care

Nudging benefits from shift to more connected clinician and patient interactions

Use AI to engage and support patients outside of visits

Use AI to support clinician work needed to engage patients more





Thank you

Devin.mann@nyulangone.org

NYU Langone Health

<https://linktr.ee/hybridlab>

