EHR integration for pain management:
Lessons learned, gaps, and opportunities

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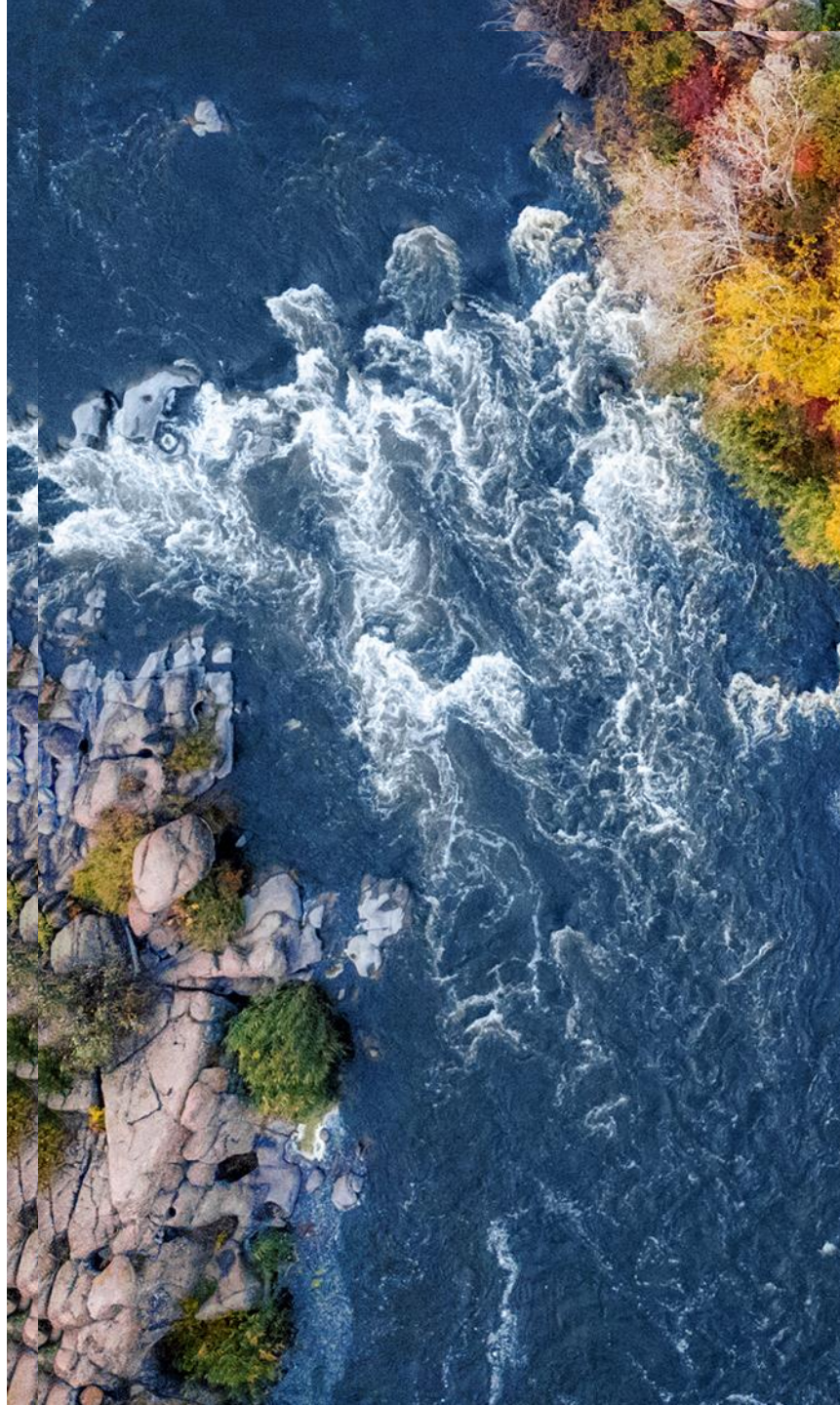

- No conflicts of interest

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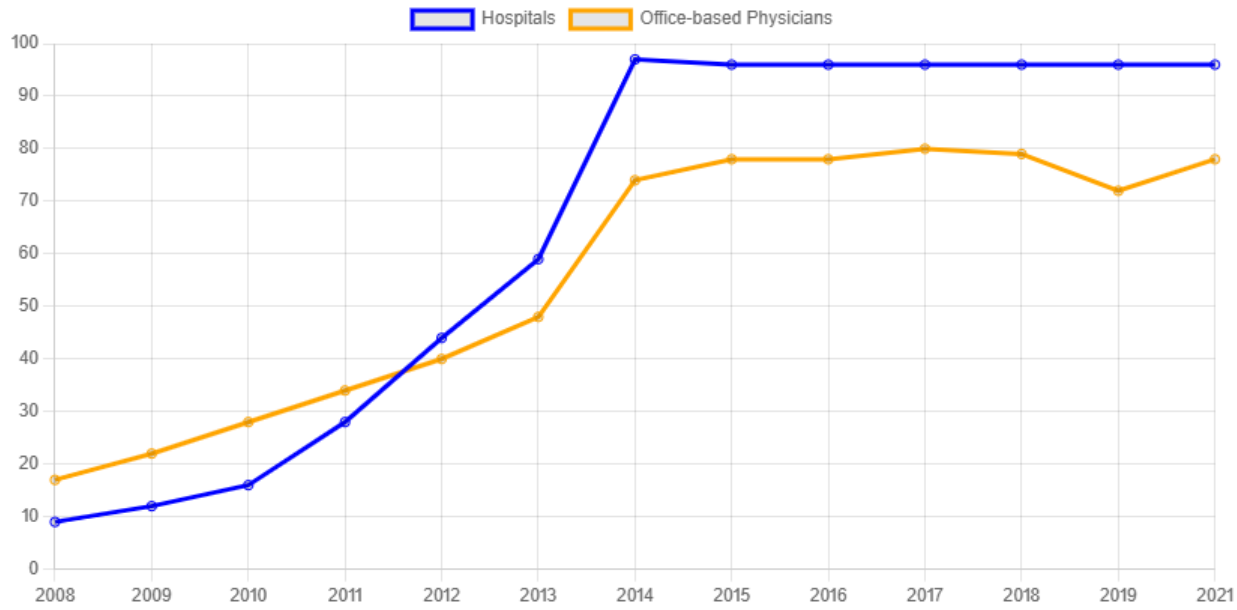
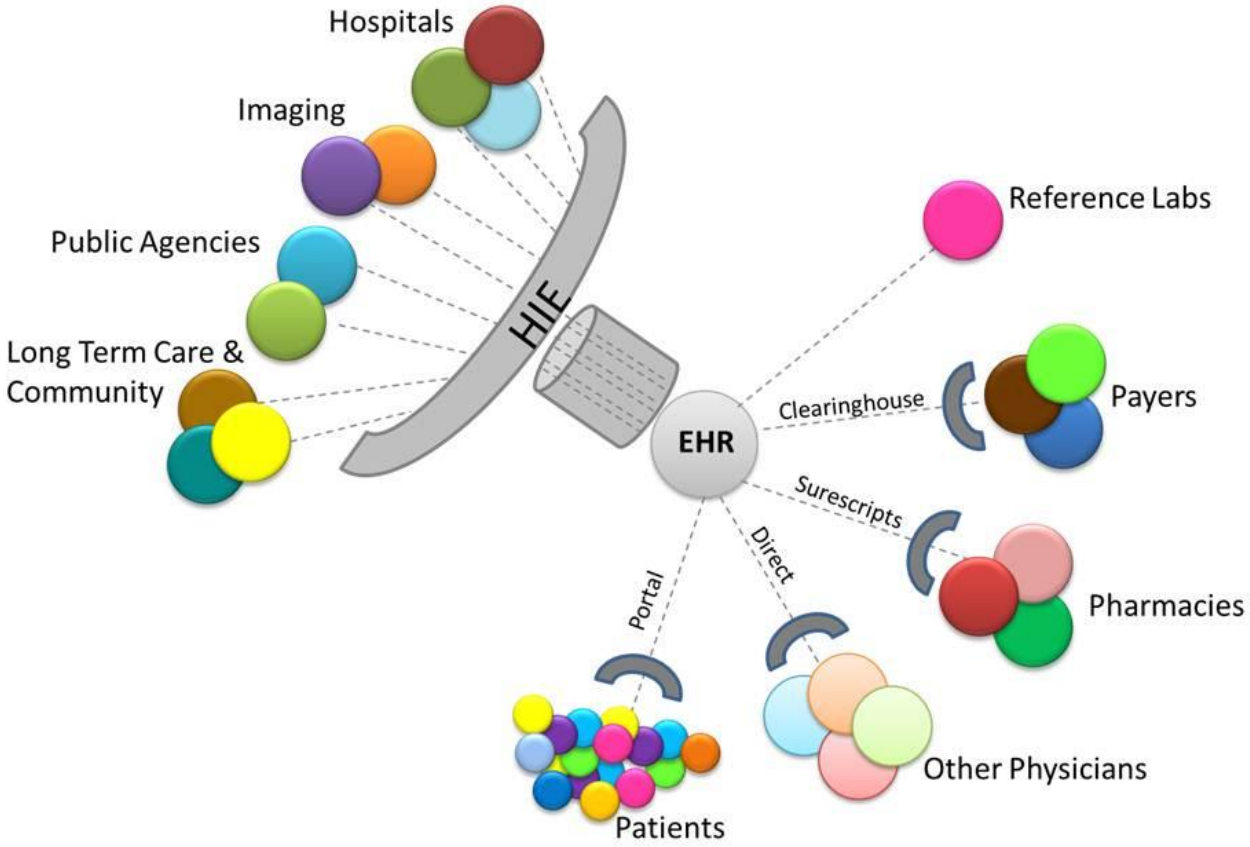
Why it is important to focus on EHRs?



Trends in Hospital & Physician EHR Adoption

EHRs are a nexus for high-volume and –dimensional patient-level data



Why it is important to focus on EHRs?

- Unparalleled reach
- Precision sampling
- Automated patient interfaces
  - Recruitment
  - Monitoring
- Customization for providers and patients
- High dimensional, passively collected data
- Influence point-of-care delivery
- Passive fidelity monitoring

CANCER MOONSHOT℠

IMPACT

NATIONAL CANCER INSTITUTE

E2C2

- EHR-enabled Enhanced Cancer Symptom Control (E2C2), UM1CA233033
  - Promote timely detection and needs-matched treatment of six adverse symptoms in medical oncology
  - N=52,027K participants

HEAL
NIH · Helping to End Addiction Long-term

Eunice Kennedy Shriver NICHD
National Institute of Child Health & Human Development

NIH National Institute on Aging

NOHARM

- Non-pharmacological Options in postoperative Hospital-based And Rehabilitation pain Management (NOHARM), UG3AG067593
  - Encourage use of evidence-based rehabilitative and integrative approaches to manage post-operative pain in lieu of opioids
  - N=72,412K participants

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Precisely identify patient subgroups

ACCOMMODATE COMPLEX ELIGIBILITY CRITERIA

- Triangulate data elements – rule-based, Boolean logic, algorithmic, weighted
  - Sociodemographic characteristics
  - Clinical characteristics
  - Site & provider – zip code, Department, etc.
  - Encounter type
- Useful for sequencing “go lives” in trials
  - E2C2 – clusters defined by site, department, current and prior visit types, provider, & cancer type
  - NOHARM – surgery & site

Precisely identify patient subgroups

REAL TIME DATA

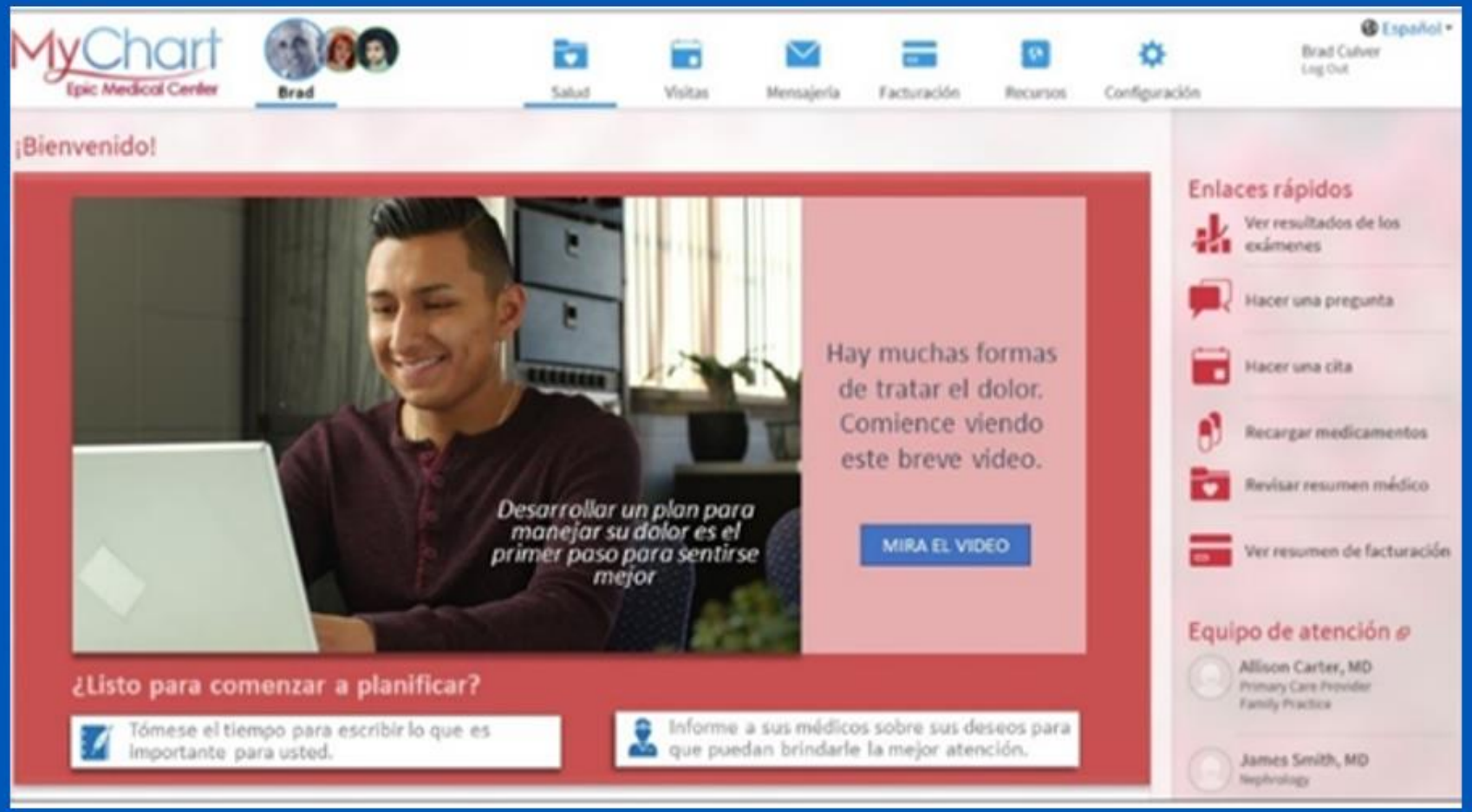
- Allows ~instant identification of patients with time-limited characteristics
- Examples: test result, treatment toxicity, detection of an impairment (dysphagia)
  - NOHARM
    - conversion to C-section
    - cadaveric transplant
    - order placement for qualifying surgery (limited interval between order placement and surgery
    - opioid refill request

“Precision” patient identification

CREATION OF NOVEL STRUCTURED DATA ELEMENTS

- Allows inclusion of more nuanced and complex characteristics that are often captured inconsistently
- Examples:
  - E2C2 – cancer phase (primary cure-directed treatment, recurrence, palliative, advanced disease, hospice etc.)
  - NOHARM – readiness (Stages of Change) & confidence to use non-drug therapies

Customization for providers and patients



Healing After Surgery Guide for patients who self-identify as Hispanic with Spanish as primary language

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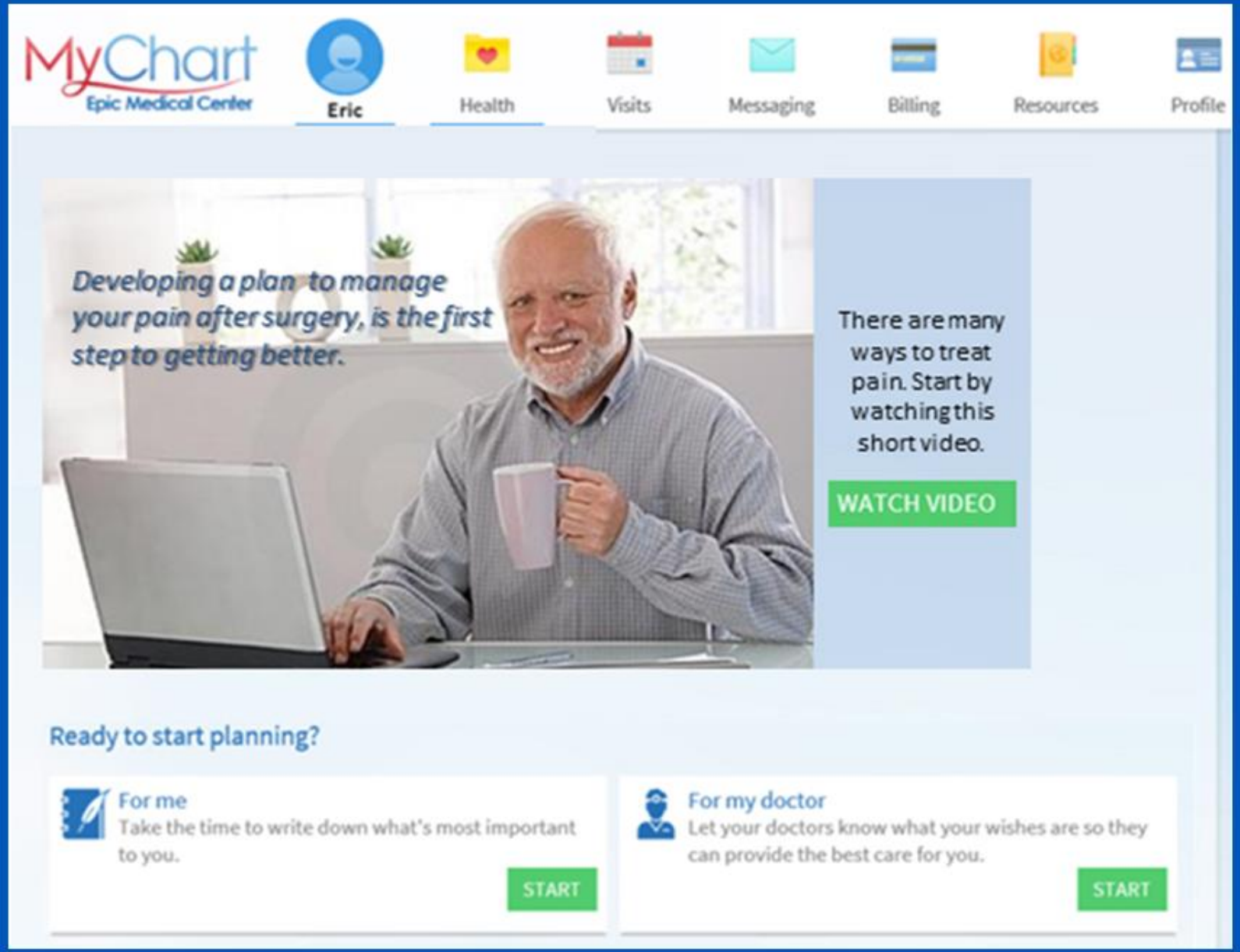
MAYO CLINIC



Healing After Surgery Guide for patients who self-identify as Caucasian with English as primary language

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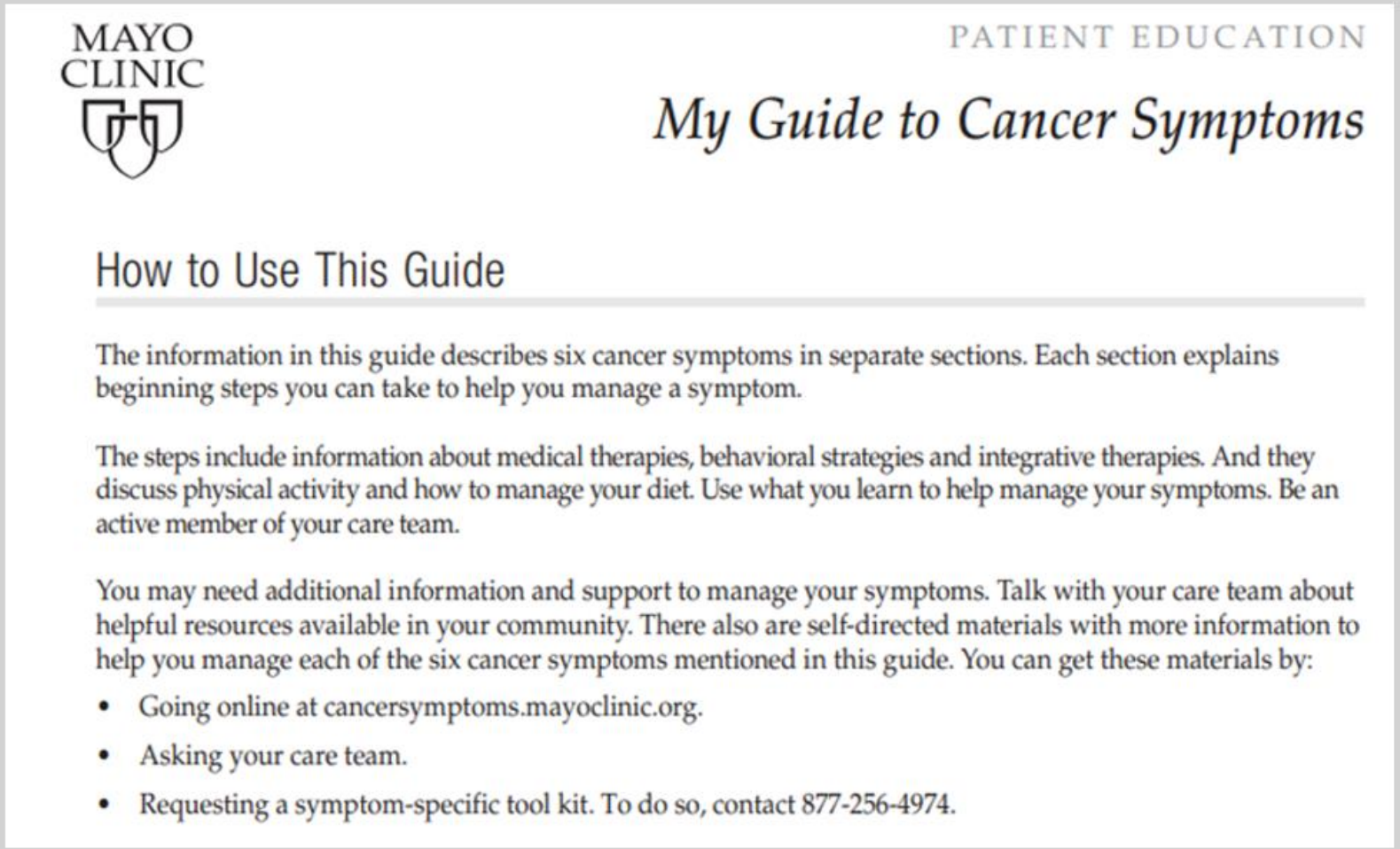
Individualized outreach

- Automated preference concordant mode
  - Portal
  - Tablet at point of care
  - Interactive voice response
  - Mailed print
  - Text

Registry-specified delivery



MAYO CLINIC

PATIENT EDUCATION

My Guide to Cancer Symptoms

How to Use This Guide

The information in this guide describes six cancer symptoms in separate sections. Each section explains beginning steps you can take to help you manage a symptom.

The steps include information about medical therapies, behavioral strategies and integrative therapies. And they discuss physical activity and how to manage your diet. Use what you learn to help manage your symptoms. Be an active member of your care team.

You may need additional information and support to manage your symptoms. Talk with your care team about helpful resources available in your community. There also are self-directed materials with more information to help you manage each of the six cancer symptoms mentioned in this guide. You can get these materials by:

- Going online at cancersymptoms.mayoclinic.org.
- Asking your care team.
- Requesting a symptom-specific tool kit. To do so, contact 877-256-4974.

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Influence point-of-care delivery

- NOHARM
  - Report of moderate or worse pain, ≥ 4/10
    - Prompt RN to offer patients' preferred non-medication options
  - Painful physical therapy sessions
    - Prompt RN to offer patients' preferred non-medication options
  - Opioid refill request
    - Prompt providers to suggest patients' preferred non-medication options

Challenges in EHR-facilitated research

- Institutionally expensive
  - Installations cost millions
  - Training ~$1200/user
  - Annual maintenance runs 15-20% of the initial implementation cost
- Institutional governance and oversight
  - Time intensive to navigate
- EHRs reflect institutional priorities
  - “green light” or accelerated paths for well reimbursed services
- High cross institution and EHR variability

Challenges in EHR-facilitated research

- Siloization

"When departments or teams within an organization are isolated from each other caused by structural or cultural factors"

- EHR build & maintenance teams are defined by function
  - e.g., orders, documentation, scheduling, etc.
- EHR build that involves 1-2 teams may be feasible
- Effectively advancing practice change may require ≥4 teams

Foundation system capabilities

- Available in all iterations of a vended EHR
- Many EHRs include some research-specific functionality
  - Inconsistently appropriate for clinically-embedded research
- Bespoke options maybe more:
  - Effective
  - Costly
  - Challenging to implement , especially in multiple healthcare systems
  - Challenging to sustain

Pre-Op Visit

Pre-Op Classes & Assessments

Day of Surgery Check-In

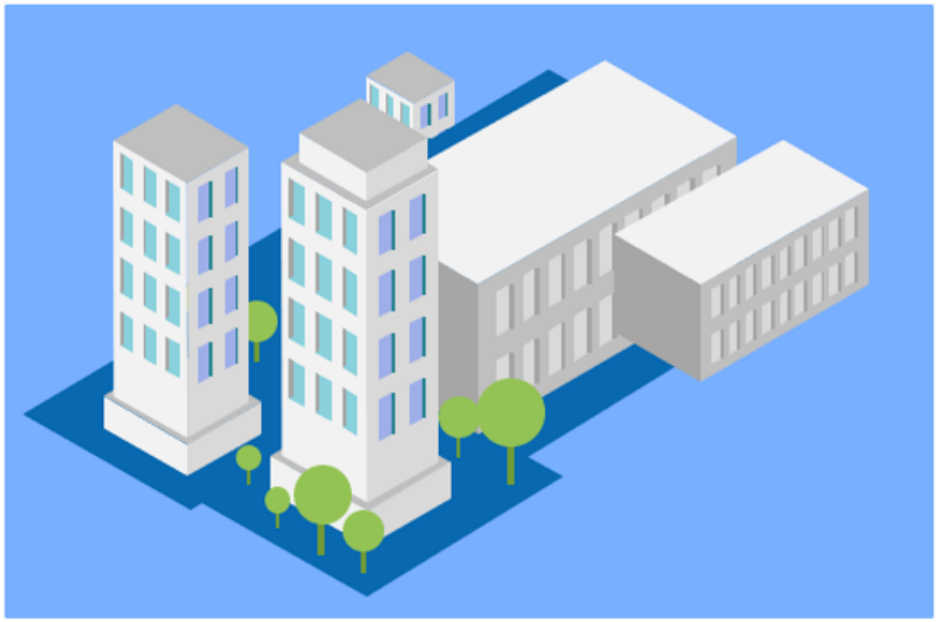
Hospitalization

Hospital Dismissal

Outpatient Follow-Up

First Opioid Refill

Second Opioid Refill



- NOHARM
  - Touchpoints
  - Settings
  - Services
  - Providers

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Informatics implementation

- May not be adequately represented by current models & frameworks
- “Implementation of ePROMs in ambulatory clinics benefit from common understanding of the concepts, lexicon, and incentives between clinical informatics implementers and implementation science researchers…”

Metrics on EHR-enabled component use

	N (%)
Our practice advisory (OPA) for severe symptoms on ePROM	
OPAs triggered	23959
OPAs acknowledged	88 (0.367%)
OPAs hyperlinked to Synopsis	15 (0.063%)
OPAs opened Smartsets	13 (0.054%)
OPAs sent Inbasket message	6 (0.025%)
Smartsets	
Number of orders initiated from E2C2 SmartSets	3
# providers placing SmartSet orders	3
Mean E2C2 SmartSet orders placed per provider	1
Smartphrases	
Number of non-SCM notes with Smartphrase	1401
# non-SCM providers including Smartphrase in notes	48
Mean frequency of Smartphrase use by provider	29

Thank you