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Developing and deploying a symptom management program to improve quality of life and reduce acute care hospital visits among cancer patients across six healthcare systems

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Jason Wedge - Epic
Affiliations & Disclosures

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    • Researcher, Division of Population Sciences
    • Medical Director for Clinical Information Systems & The Cancer Registry
  • Associate Professor of Medicine, Harvard Medical School
  • No relevant relationships with commercial interests to disclose

• **Jason Wedge**
  • Implementation Lead, Epic
  • No relevant relationships with commercial interests to disclose
Official UGM Presentation

**Agenda**

- Overview of NCI Moonshot Program and SIMPRO *(Slide 4-7)*
- Background of PROs *(Slide 8-11)*
- eSyM Tool Overview *(Slide 12-37)*
- Role of Epic in Development *(Slide 37-39)*
- Foundation System Build *(Slide 41)*
- Successes and Challenges *(Slide 42-46)*
- Early eSyM Data *(Slide 47-55)*

**Key Contributors**

**UM1 Grant Leadership**
- Dr. Deborah Schrag, MD MPH *Co-Principal Investigator*
- Dr. Sandra Wong, MD MS *Co-Principal Investigator*
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- Dr. Michael Hassett MD, MPH *Co-Investigator, Technical Lead*
- Dr. Jessica Bian, MD *Site Investigator*
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- Dr. Hannah Hazard-Jenkins, MD *Site Investigator*

**Epic Collaborators**
- Jason Wedge *Implementation Lead, Project Manager*
- Toby Austin *MyChart Lead*
- Nick Kaiser *Healthy Planet Lead*
- Andrew Ellington *Healthy Planet Lead*
- Eric Varley *Clarity Lead*
Overview of NCI Moonshot Program & SIMPRO Research Center
SIMPRO Research Center

- SIMPRO is 1 of 3 research centers funded by the National Cancer Institute that together comprise the IMPACT Consortium (Improving the Management of symptoms during And following Cancer Treatment)

- SIMPRO includes 6 health systems that care for patients from at least 9 states
  - Tennessee
  - Mississippi
  - Arkansas
  - New Hampshire
  - Vermont
  - Maine
  - Massachusetts
  - West Virginia
  - Rhode Island

- SIMPRO implementation focus
  - Community and rural cancer centers
  - Work directly with Epic

- SIMPRO Collaboration Goal ➔ Develop, refine, and implement eSyM, a multi-component ePRO symptom management system based on the PRO-CTCAE and integrated directly into Epic/MyChart
**The Problem**

- Cancer patients, especially those receiving chemotherapy or recovering from surgery, are at high risk for experiencing severe symptoms that can impair quality-of-life and lead to costly ED visits/hospitalizations.
- Active symptom management can alleviate the burdens of severe symptoms, but doing so as part of routine clinical practice is challenging because of workflow, staffing and technical barriers.

**The Plan**

**Build eSyM**
- A multi-component, Epic/MyChart-integrated symptom management system that collects symptoms directly from patients and provides guidance to patients and care team members to help manage severe symptoms.

**Deploy eSyM**
- At 6 health systems as part of their routine clinical practice.

**Study eSyM**
- Assess its implementation as well as its impact on patient outcomes, patient experiences, and clinical workflows.
## Prior Go-Lives
- Baptist (Medical) - September 10, 2019
- WVU (Surgical) - October 25, 2019
- Maine (Medical) – March 16, 2020
- Dartmouth (Surgical) – April 28, 2020

## Upcoming Go-Lives
- DFCI (Medical) – September 22, 2020
- Lifespan (Surgical) – October 26, 2020
Background of Patient-Reported Outcomes (PROs)
What is Patient-Reported Data?

Patient Reported Data (PRD)

an umbrella term used to encompass a
diverse set of data reported DIRECTLY by patients
Compelling evidence shows that collecting PROs...

1. Helps accurately and completely assess symptom severity
2. Supports efficient clinical operations and regulatory requirements
3. Improves outcomes and reduces costs

For example, in a study of 766 patients with advanced cancer randomly assigned to report symptoms via a tablet in clinic or at home (vs. standard of care), those who reported symptoms experienced...

- Longer survival
- Fewer emergency department visits & hospitalizations
- Longer duration of active treatment

With minimal impact on clinic operations and high patient engagement (73% response rate)

Basch, Schrag, et al JAMA. 2017, 318(2); Basch JAMA 2016, 34(6)
Evolution of Patient-Reported Outcomes (PROs)

- **2000s**: Use tech for clinical data; Studies show clinicians miss some adverse events the PRO tools identify.
- **2003 - 2016**: Begin to collect PROs in clinical trials; Early efforts to collect PROs at home & point of care.
- **2017**: Development and validation of the NCI’s PRO-CTCAE; PROs improve clinical outcomes.
- **2017-present**: EHR systems and third-party applications begin to integrate PROs.
- **2018-2023**: Development & testing of eSym.

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Basch, Schrag et al 2003-Present: JCO, JNCI, JAMA, JAMA Onc, QoL Research; DFCI Patient Reported Data Program; Schrag/Wong/Osarogiagb 1UM1CA233080-01
What is eSyM?

- eSyM is a coordinated set of tools within Epic which allow patients to **report** and clinicians to efficiently **track and react** to patients’ symptoms during cancer treatment or after surgery
  - Clinicians access eSyM their Hyperspace
  - Patients can access eSyM through MyChart

- The primary aim of eSyM is to decrease patient hospitalizations and ED visits during cancer treatment or after surgery by...
  - Encouraging patients to track and manage their symptoms
  - Alerting and engaging clinicians about potentially serious symptoms
What are the goals of eSyM?

- To improve quality of life and recovery
- To decrease patient hospitalizations, ED visits and readmissions
- To improve symptom management
- To increase patient engagement
- To improve communication and efficiency
What are the functions of eSyM?

A system with tools designed to help three ‘clients’

<table>
<thead>
<tr>
<th>For patients:</th>
<th>For administrators:</th>
<th>For clinicians:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Automated access to eSyM questionnaires via MyChart (enhanced PRO-CTCAE) or tablet</td>
<td>1. <strong>Registry</strong> identifies eligible patients and assigns questionnaires automatically</td>
<td>1. <strong>InBasket messages</strong> for patients with severe symptom</td>
</tr>
<tr>
<td>2. Notifications to answer eSyM questionnaires</td>
<td>2. <strong>Dashboard</strong> displays applicable reporting workbench reports and KPIs</td>
<td>2. <strong>Reports of all past PRO responses</strong> in the EMR (via synopsis/flowsheets)</td>
</tr>
<tr>
<td>3. Alerts to call the care team for severe symptoms</td>
<td>3. <strong>Outreach report</strong> identifies patients who need to be signed up for MyChart or who should be reporting via eSyM</td>
<td>3. <strong>Smart phrases</strong> for easy charting</td>
</tr>
<tr>
<td>4. Self-management tip sheets to help manage symptoms</td>
<td>4. <strong>Assigned patients report</strong> identifies patients who have eSyM turned on</td>
<td>4. <strong>Weekly population management reports</strong> to support patients recently reporting severe symptoms</td>
</tr>
<tr>
<td>5. Views of symptom trends</td>
<td>5. <strong>Registry report</strong> shows the entire cohort and evaluates outcomes</td>
<td></td>
</tr>
</tbody>
</table>
What are the key EHR elements of eSyM?

1. EHR identifies eligible patients using the following data:
   - cancer diagnosis
   - chemotherapy treatment plan
   - surgical procedure
   - hospital discharge

2. EHR assigns questionnaire series. The questionnaire content, frequency and duration depend...
   - type of treatment: chemo vs. surgery
   - time since starting chemo or being discharged after surgery

3. Patient portal prompts patients to complete questionnaires.
   - respond to questionnaires
   - view past responses
   - view self management tip sheets

4. EHR generates a score for each reported symptom and identifies ‘severe’ symptoms.
   - For severe symptoms, EHR prompts patients and clinicians to connect.

5. EHR dashboard and reports help identify patients needing outreach, because they...
   - are not responding to questionnaires
   - have severe symptoms

6. EHR tools are used by clinicians
   - to view past symptom reports
   - to document outreach/training
   - to document actions taken in response to severe symptoms
What does eSyM ask patients to report?

- Patients answer validated symptom reporting questionnaires using the validated PRO-CTCAE instrument
  - Ask the most common symptoms during post-op recovery or after chemotherapy
  - Report on severity, frequency, and intensity of symptoms as well as their interference with daily activities
  - Summary scores are generated: 0=none, 1=mild, 2=moderate, 3=severe
- Two pictogram questions ask about overall wellbeing and functional status
- Patients are asked to report 2x/week via a short (<5min) questionnaire
- Patients may choose other symptoms to report if they wish, no free text option
<table>
<thead>
<tr>
<th>CTCAE</th>
<th>Grade</th>
<th>PRO-CTCAE</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0</td>
<td>None</td>
</tr>
<tr>
<td>Mild</td>
<td>1</td>
<td>Mild</td>
</tr>
<tr>
<td>Moderate</td>
<td>2</td>
<td>Moderate</td>
</tr>
<tr>
<td>Severe</td>
<td>3</td>
<td>Severe</td>
</tr>
<tr>
<td>Hospitalized/life-threatening</td>
<td>4</td>
<td>NA</td>
</tr>
<tr>
<td>Deceased</td>
<td>5</td>
<td>NA</td>
</tr>
</tbody>
</table>

CTCAE = Common Terminology Criteria for Adverse Events


PRO-CTCAE = Patient Reported Outcomes version of the CTCAE

[https://healthcaredelivery.cancer.gov/pro-ctcae/overview.html](https://healthcaredelivery.cancer.gov/pro-ctcae/overview.html)
# eSyM Core Symptoms

<table>
<thead>
<tr>
<th><strong>Chemotherapy Symptoms</strong></th>
<th><strong>Surgery Symptoms</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 15</td>
<td>N = 15</td>
</tr>
<tr>
<td><strong>Pain</strong></td>
<td><strong>Pain</strong></td>
</tr>
<tr>
<td><strong>Nausea</strong></td>
<td><strong>Nausea</strong></td>
</tr>
<tr>
<td><strong>Vomiting</strong></td>
<td><strong>Vomiting</strong></td>
</tr>
<tr>
<td><strong>Constipation</strong></td>
<td><strong>Constipation</strong></td>
</tr>
<tr>
<td><strong>Shortness of breath</strong></td>
<td><strong>Shortness of breath</strong></td>
</tr>
<tr>
<td><strong>Fatigue</strong></td>
<td><strong>Fatigue</strong></td>
</tr>
<tr>
<td><strong>Anxiety</strong></td>
<td><strong>Anxiety</strong></td>
</tr>
<tr>
<td><strong>Trouble drinking fluids</strong></td>
<td><strong>Trouble drinking fluids</strong></td>
</tr>
<tr>
<td><strong>Poor appetite</strong></td>
<td><strong>Poor appetite</strong></td>
</tr>
<tr>
<td><strong>Overall well being</strong></td>
<td><strong>Overall well being</strong></td>
</tr>
<tr>
<td><strong>Physical function</strong></td>
<td><strong>Physical function</strong></td>
</tr>
<tr>
<td><strong>Other (link to list of other symptoms)</strong></td>
<td><strong>Other (link to list of other symptoms)</strong></td>
</tr>
<tr>
<td><strong>Rash</strong></td>
<td><strong>Wound redness</strong></td>
</tr>
<tr>
<td><strong>Numbness and tingling</strong></td>
<td><strong>Wound discharge</strong></td>
</tr>
<tr>
<td><strong>Diarrhea</strong></td>
<td><strong>Painful urination</strong></td>
</tr>
</tbody>
</table>
In the last 7 days,

How did you feel overall?

[Smiley faces representing different levels of happiness]

Please remember that this system is not monitored 24 hours a day. Please call your care team if your symptoms are severe.

In the last 7 days,

Which best describes your activity level?

[Activity levels from 'Normal with no limitations' to 'Rarely out of bed']

Please remember that this system is not monitored 24 hours a day. Please call your care team if your symptoms are severe.
<table>
<thead>
<tr>
<th>eSyM ‘Other’ Symptoms</th>
<th>Oral and Gastrointestinal Symptoms</th>
<th>Skin symptoms</th>
<th>Neurological</th>
<th>Heart and Lung Symptoms</th>
<th>Specific Types of Pain</th>
<th>Mood</th>
<th>Miscellaneous</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Difficulty swallowing</td>
<td>Itching</td>
<td>Dizziness</td>
<td>Cough</td>
<td>Joint Pain</td>
<td>Feeling discouraged</td>
<td>Difficulty sleeping</td>
</tr>
<tr>
<td></td>
<td>Mouth or throat sores</td>
<td>Hand foot syndrome</td>
<td>Difficulty concentrating</td>
<td>Wheezing</td>
<td>Muscle Pain</td>
<td>Feeling sad</td>
<td>Fever</td>
</tr>
<tr>
<td></td>
<td>Heartburn</td>
<td></td>
<td></td>
<td>Heart palpitations</td>
<td>Headache</td>
<td></td>
<td>Bleeding</td>
</tr>
</tbody>
</table>
Reporting Timeline

Chemo Start or Surgery Discharge

Day 0

Day 1

Day 2

Day 3

Day 4

Day 5

Day 6

Day 7

Day 8

Day 9

Day 10

Day 11

Day 12

Day 13

Day 14

eSyM questionnaire 1 available

Day 2

eSyM questionnaire 2 available

Day 4

eSyM questionnaire 3 available

Day 6

eSyM questionnaire 4 available

eSyM Welcome Message sent via MyChart

eSyM questionnaire reminder sent via MyChart

eSyM questionnaire reminder sent via MyChart

eSyM questionnaire reminder sent via MyChart

eSyM questionnaire reminder sent via MyChart
<table>
<thead>
<tr>
<th>Patient reports</th>
<th>Patient-Facing (in MyChart)</th>
<th>Clinician-Facing (in Hyperspace)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient does not report</strong></td>
<td>Automated MyChart reminder on day questionnaire is due</td>
<td>Dashboard report identifies non-responders and prompts direct outreach</td>
</tr>
<tr>
<td><strong>Patient reports mild/moderate symptoms only</strong></td>
<td>Prompted to view symptom-specific self-management tip sheets</td>
<td>Responses saved and viewable in the EMR; no alerts or InBasket messages</td>
</tr>
<tr>
<td><strong>Patient reports severe symptom(s)</strong></td>
<td>Alerted to contact care team for guidance</td>
<td>InBasket message that includes reported severe symptoms and list of all responses</td>
</tr>
<tr>
<td></td>
<td>Prompted to view symptom-specific self-management tip sheets</td>
<td>Dashboard report identifies patients reporting severe symptoms in the past week</td>
</tr>
</tbody>
</table>
Download MyChart app

Receive notifications

Login to MyChart

Click on the eSyM icon
Welcome to eSyM

eSyM is a program to help you feel better. We will ask you every few days to report how you feel. Your responses will be sent to your care team. By using eSyM, we can help you feel better.

Begin eSyM questionnaire

Report symptoms

Must Submit responses

Get an alert if a severe symptom is reported
Tips for Managing Diarrhea

Things you can do on your own:
- Keep track of your diarrhea:
  - Write down how many bowel movements you have each day
- Stay hydrated and change your diet to lessen your symptoms:
  - Drink at least 6-8 cups of clear liquids, such as water, daily to prevent dehydration
  - Avoid caffeine, alcohol, milk, and artificial sweeteners
  - Avoid greasy, fatty, and fried foods
  - Eat small, frequent meals throughout the day instead of 3 big meals
  - Eat foods that help diarrhea like bananas, melon, rice, applesauce, and/or toast
  - Drink sports drinks such as Gatorade to replenish your potassium
- Keep the skin around your anus healthy:
  - If your skin is getting irritated, after bowel movements gently wipe yourself with baby wipes and then apply barrier creams such as zinc oxide, Vaseline®, or diaper ointments
  - Add 1-2 tablespoons of baking soda to a warm tub of water and soak your bottom

See the Other Resources page for more information

With over-the-counter medications:
- Ask your care team about taking 1-2 Imodium® tablets every 4 hours or after every loose bowel movement. You can buy this at your local pharmacy.

REMINDER - Always keep your care team updated about over-the-counter medicines you are taking. If your care team tells you they are not safe for you, do not take them.
Staff eSyM Experience
eSyM Dashboard can be accessed by any clinicians by searching for the dashboard and adding to their favorite list.

eSyM Reports can be used by clinicians and staff to see symptom results, track patient approaches, and monitor outcomes.

eSyM Outcome Events display admission, ED, and urgent care visit rates for registry patients.

eSyM Population Overview displays relevant eSyM metrics by site, department, and provider.
• **Report #1 – Patients Requiring Outreach**
  - Outlines patients who with an upcoming D1C1 or scheduled surgery in the next 30 days (i.e. patients who need initial eSyM training)
  - Outlines patients who have not completed an eSyM questionnaire for >14 days (i.e. patients who need re-training)
  - Distinguishes patients who are admitted (bold red display)

• **Report #2 – All Assigned Patients**
  - Outlines patients who currently have an eSyM questionnaire assigned to them
  - Can be filtered by provider, MyChart status, etc.
  - Used to track KPIs

• **Report #3 – All Registry Patients**
  - Outlines patients currently on the eSyM registry
  - Can be filtered by provider, next appt dept, MyChart status, etc.
  - Used to track KPIs
Clinician eSyM Experience
eSyM Population Symptom Management Report

- Easily manage a panel of patients
- View the full list of patient eSyM responses by clicking on a name in the report and viewing the eSyM snapshot print group underneath
- Sort by disease group or provider to prioritize outreach
- Track outreach dates and responses directly on this report
- Access full patient chart by double-clicking on name
eSyM InBasket Alerts for Severe Symptoms

- After a patient submits an eSyM questionnaire, their responses are sent to Epic Hyperspace

- If a patient reports a severe (level 3) symptom:
  - The patient receives a prompt to contact their care team
  - An InBasket message is sent to the provider’s eSyM Severe Symptom folder

- Ongoing studies demonstrate 5-7% of ePRO reports are severe
If a patient reports using eSyM, clinicians can use eSyM smartphrases to pull their symptom responses into a clinical note.

- **.eSyMmed** = final scores for all symptoms in most recent patient report
- **.eSyMmedall** = component responses for all symptoms in most recent patient report
- **.eSyMpain** = component responses for patient’s most recent PAIN report
- **.eSyMxxx** = components reports for patient’s most recent XXX symptom report

This fulfills a complete ROS and counts as a level 4 encounter.
• Individual patient eSyM responses can be integrated into the Synopsis, Snapshot, or Flowsheets view in Epic Hyperspace.

• Sites can customize this display to meet provider needs.
Role of Epic in Development
Epic Involvement

• Dedicated Epic support from:
  • Project Manager
  • Healthy Planet Lead
  • MyChart Lead
  • Clarity Lead

• Collaborative team dynamic with weekly meetings

• Robust use of Sherlock to track/manage project tasks

• Developed central eSyM build and assisted site technical teams with migration, validation, and launch

• Available for regular support in the peri and post-go-live timeframes
Epic Technical Components

• Major components of build
  • Registries (2)
  • Questions (64)
  • Questionnaire series (2)
  • One dashboard with KPIs (8) and an outcomes report
  • Reporting workbench reports (4)
  • Smart phrases (6+)
  • Print groups (5+)
  • BPAs
  • And others

• Tools moved to production
Foundation System Build
eSyM is NOW Included in Foundation System!

**Current Build Includes:**
- eSyM symptom questionnaire for medical oncology patients (14-items)
- Symptom management tip sheets
- BPAs for reported severe symptoms
- EHR display build (can be incorporated in synopsis)

**Future Build Plans:**
- Incorporating patient registries, dashboard, reporting workbench reports
- Incorporating Care Companion
- May consider standard releases in the future

Talk to your Beacon & MyChart TS for more information

Please visit the following links for more information:
- eSyM Explained: Track and Manage Chemotherapy Symptoms Remotely
- eSyM Explained: COVID-19 Chemotherapy Symptom Management Questionnaire
- eSyM Training Information: Oncology Clinician – Electronic Symptom Monitoring (eSyM)
- Oncology Starter Set: Build Considerations (scroll down to bottom of questionnaires portion)
Successes & Challenges
# Implementation Challenges

<table>
<thead>
<tr>
<th>eSyM platform</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Build constraints due to EHR-integrated design</td>
</tr>
<tr>
<td>• Enabling default text message notifications in MyChart for eSyM Questionnaires</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Workflow</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Customizing workflows for each cancer center and/or disease group</td>
</tr>
<tr>
<td>• Identifying eSyM champions at each site</td>
</tr>
<tr>
<td>• Continuous staff and patient engagement</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Increasing usage rates in patients with MyChart who are not interested in eSyM.</td>
</tr>
<tr>
<td>• Increasing eSyM outreach to patients who have stopped answering questionnaires.</td>
</tr>
</tbody>
</table>
Technical Challenges - Overview

- Building an ePRO-reporting tool integrated with 6 unique EHRs is challenging.
- Epic and individual sites have unique configuration limitations, which greatly affect the eSyM build.

<table>
<thead>
<tr>
<th></th>
<th>EHR-integrated tools (eSyM)</th>
</tr>
</thead>
</table>
| **Advantages**         | **Integrated in EHR** promoting clinician training, acceptance and sustained use  
                          | **Integrated in MyChart** patient portal promoting patient acceptance and sustained use |
| **Disadvantages**      | EHR-build environment **constraints**  
                          | **Less control** over releasing build updates to sites |
# Technical Challenges

<table>
<thead>
<tr>
<th>Area</th>
<th>Challenge</th>
<th>Implication</th>
<th>Comments/ Possible Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Text reminders</strong></td>
<td>Most sites do NOT have text messages set up for MyChart messages</td>
<td>Patients only receive emails alerting them that they have a new MyChart message</td>
<td>Engage site leadership to turn on text reminders for questionnaire series and set as the default communication setting</td>
</tr>
<tr>
<td><strong>Internet infrastructure</strong></td>
<td>Internet strength in clinic and infusion rooms is too weak to download MyChart app</td>
<td>Staff cannot set up/train patients to use eSyM on their own device or help patients enable text notifications</td>
<td>Project could consider funding internet enhancements</td>
</tr>
<tr>
<td><strong>Updating eSyM build</strong></td>
<td>After Epic (Verona) pushes build updates to individual sites, site Epic teams must push the update to their site systems</td>
<td>Every site has its own technical update schedule; not all eSyM builds can be updated simultaneously</td>
<td>Limitation of integration eSyM in the Epic EHR system</td>
</tr>
<tr>
<td><strong>User-Centered Design</strong></td>
<td>One cannot design a user-centered digital health tool without user feedback and testing</td>
<td>Significant improvements had to be made after sites had access to the original live version (eSyM 1.0)</td>
<td>Schedule a “user feedback/pilot testing” period before officially announcing an eSyM go-live</td>
</tr>
</tbody>
</table>
Build Successes

• On-time eSyM deployment at 4 health systems to date (2 launches during the COVID-19 pandemic)

• Created the first fully Epic-integrated ePRO tool

• eSyM allows for PRO collection AND real-time symptom management feedback (for both patients and clinicians)

• The build is scalable and sustainable; can be expanded to other cancers and/or chronic disease patients
Early eSyM Data
## eSyM Totals (as of 7/31/2020)

### Lifetime #’s (as of 7/31/2020)

<table>
<thead>
<tr>
<th></th>
<th>Baptist (Med Onc)</th>
<th>WVU (Surg)</th>
<th>Maine (Med Onc)</th>
<th>DHMC (Surg)</th>
<th>GRAND TOTAL (ALL SITES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unique # patients on registry ever</td>
<td>2928</td>
<td>1386</td>
<td>503</td>
<td>1520</td>
<td>6337</td>
</tr>
<tr>
<td>Unique # patients who have answered an eSyM questionnaire ever</td>
<td>480</td>
<td>383</td>
<td>86</td>
<td>165</td>
<td>1114</td>
</tr>
<tr>
<td>Total # of eSyM questionnaires answered</td>
<td>3814</td>
<td>2891</td>
<td>488</td>
<td>649</td>
<td>7842</td>
</tr>
</tbody>
</table>
MyChart Rates – All Sites

MyChart Rate

MyChart Rate = \frac{\text{# of patients on the registry active on MyChart}}{\text{# of patients on the eSyM registry}}
eSyM Ever Usage Rate (w/ MyChart) = \[
\frac{\text{Number of patients who have completed } \geq 1 \text{ questionnaire}}{\text{Total # of patients with an assigned questionnaire (w/ MyChart)}}
\]
Weekly Usage Rates – All Sites

**eSyM Weekly Usage Rate (w/ MyChart)**

\[
eSyM \text{ Weekly Usage Rate (w/ MyChart)} = \frac{\# \text{ of patients who responded to any eSyM Questionnaire this week}}{\# \text{ of patients with an assigned questionnaire (w/ MyChart)}}
\]
## Early Demographics
*(data as of 1/22/2020)*

<table>
<thead>
<tr>
<th></th>
<th>Baptist Cohort</th>
<th></th>
<th>WVU Cohort</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>%</td>
<td>#</td>
<td>%</td>
</tr>
<tr>
<td>All patients (n)</td>
<td>166</td>
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<td>97</td>
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<tr>
<td>Age</td>
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<tr>
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<td>3</td>
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<tr>
<td>Eight+</td>
<td>43</td>
<td>26</td>
<td>23</td>
<td>24</td>
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## Early eSyM Responses
(data as of 1/22/2020)

<table>
<thead>
<tr>
<th>Cancer/Procedure Type</th>
<th>Baptist Cohort</th>
<th>WVU Cohort</th>
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<tr>
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<tr>
<td>All patients</td>
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<tr>
<td>Cancer/Procedure Type</td>
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<td>GI (medical dx or surgical procedure)</td>
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<td>Response based on time following the anchoring event</td>
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<td>Any responses in 2nd week</td>
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<tr>
<td>Any responses in 3rd weeks</td>
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<td>Any responses in 4th week</td>
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<tr>
<td>Any response in 5th week or after</td>
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<td>Three</td>
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<td>Four</td>
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<td>Five</td>
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<td>Seven</td>
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<td>5</td>
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<tr>
<td>Eight+</td>
<td>43</td>
<td>26</td>
</tr>
</tbody>
</table>
Proportion of responses that were grade 3

**Medicine**
- Anxiety: 6.1%
- Bleeding: 3.45%
- Constipation: 5.19%
- Cough: 6.76%
- Decreased appetite: 3.87%
- Diarrhea: 2.21%
- Difficulty concentrating: 10%
- Difficulty sleeping: 16.17%
- Difficulty swallowing: 20.69%
- Dizziness: 3.53%
- Fatigue: 14.6%
- Feeling discouraged: 10.56%
- Feeling sad: 11.39%
- Fever: 1.22%
- General pain: 14.92%
- Hand foot syndrome: 5.33%
- Headache: 12.90%
- Heart palpitations: 11.34%
- Heartburn: 0%
- Itching: 13.51%
- Mouth/throat sores: 5.41%
- Nausea: 2.98%
- Numbness or tingling: 3.32%
- Painful urination: 23.58%
- Rash: 0%
- Shortness of breath: 3.43%
- Swelling: 19.05%
- Trouble drinking: 0%
- Vomiting: 0.22%
- Wheezing: 6.58%

**Surgery**
- Anxiety: 3.51%
- Bleeding: 0%
- Constipation: 5.24%
- Cough: 6.82%
- Decreased appetite: 2.22%
- Diarrhea: 12.5%
- Difficulty concentrating: 8.7%
- Difficulty sleeping: 30.23%
- Difficulty swallowing: 0%
- Dizziness: 9.38%
- Fatigue: 12.61%
- Feeling discouraged: 7.41%
- Feeling sad: 42.66%
- Fever: 0.84%
- General pain: 17.02%
- Hand foot syndrome: 16.67%
- Headache: 20.83%
- Heart palpitations: 0%
- Heartburn: 0%
- Itching: 8.7%
- Mouth/throat sores: 0%
- Nausea: 1.26%
- Numbness or tingling: n/a
- Painful urination: 2.94%
- Rash: 0%
- Shortness of breath: 3.15%
- Swelling: 25%
- Trouble drinking: 0%
- Vomiting: 0.21%
- Wheezing: 0%
- Wound discharge: 0%
- Wound redness: 0%
Contributions to Scientific Literature

• Self-Reported Overall Wellbeing (OWb), Physical Function (PFn), and PRO-CTCAE Symptom Scores in Post-Operative and Chemotherapy Patients [Abstract]
  • Accepted for a virtual poster session at the ASCO 2020 Annual Meeting

• Design of eSyM: an ePRO-based symptom management tool fully integrated in the electronic health record (Epic) to foster patient/clinician engagement, sustainability and clinical impact [Abstract]
  • Accepted for online publication at the ASCO 2020 Annual Meeting

• Factors that facilitate or impede use of an integrated EHR Symptom Management System (eSyM) [Abstract]
  • Accepted for a virtual poster presentation at the 2020 Council for the Advancement of Nursing Science State of the Science Congress

~Additional abstracts and manuscripts are forthcoming~
Thank you!!!

If you have any questions, please contact:

**eSyM Research Project** – Michael_Hassett@dfci.Harvard.edu

**eSyM Foundation System Build** – jwedge@epic.com

For more information about this project, please visit:

[www.esymcancermoonshot.org](http://www.esymcancermoonshot.org)