# Background

Symptoms are common among patients with cancer
- Disease is morbid, treatments are toxic
- Interfere with physical functioning and daily activities
- Frequently lead to emergency and hospital visits

Symptom management is a cornerstone of quality care in oncology practice (and other chronic conditions)

Standard Approach to Symptom Monitoring

Limited Time

Forget to discuss

Reluctance to Contact

Problems Connecting

REACTIVE APPROACH
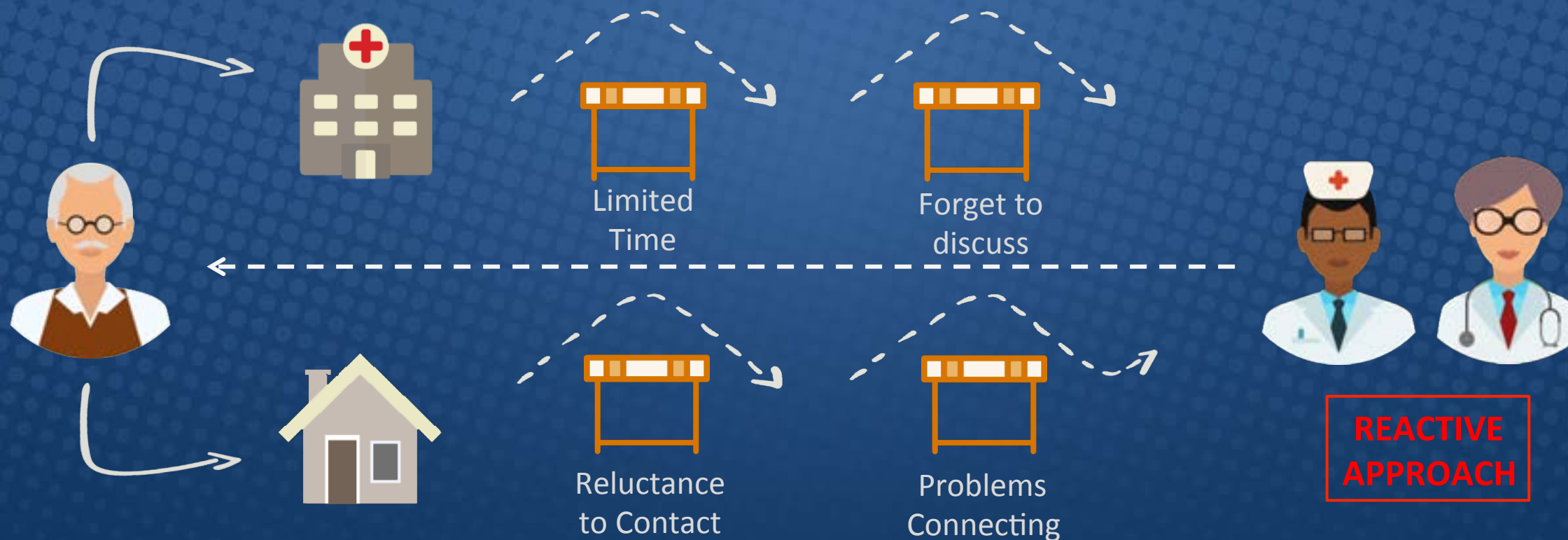
Alternative: Systematic Symptom Monitoring Using Electronic Patient-Reported Outcomes

Research Findings

- Clinicians unaware of up to half of patients' symptoms

- Systematic symptom monitoring with ePROs closes this gap

- Patients willing and able to self-report

- Clinicians trust patient-reported e-information

Basch: NEJM 2010;362:865; Snyder: Qual Life Res 2012:1305; Kotronoulas: JCO 2014;32:1480; Detmar: JAMA 2002;288;3027; Velikova: JCO 2004;22:714

JOURNAL OF CLINICAL ONCOLOGY

REVIEW ARTICLE

What Is the Value of the Routine Use of Patient-Reported Outcome Measures Toward Improvement of Patient Outcomes, Processes of Care, and Health Service Outcomes in Cancer Care? A Systematic Review of Controlled Trials

Grigorios Kotronoulas, Nora Kearney, Roma Maguire, Alison Harrow, David Di Domenico, Suzanne Croy, and Stephen MacGillivray

- Integration of electronic patient-reported outcomes systems in oncology care can alert clinicians about symptoms, improve communication, and symptom control

Kotounoulas: JCO, 2014

VOLUME 22 · NUMBER 4 · FEBRUARY 15 2004

JOURNAL OF CLINICAL ONCOLOGY

ORIGINAL REPORT

Measuring Quality of Life in Routine Oncology Practice Improves Communication and Patient Well-Being: A Randomized Controlled Trial

Galina Velikova, Laura Booth, Adam B. Smith, Paul M. Brown, Pamela Lynch, Julia M. Brown, and Peter J. Selby

- Usual care vs. computer-based symptom questionnaire at oncology visits

- Results: Symptoms discussed more often during visits; significantly improved quality of life in the group that self-reported symptoms

Velikova: JCO, 2004

Early Patient Self-Reporting System

U.S. National Cancer Institute CTCAE Scale - Example: Pain

○ **None**	I have not had pain.
● **Grade 1 (Mild)**	I have had mild pain, but it does not interfere with my normal functioning.
○ **Grade 2 (Moderate)**	I have had moderate pain, and my pain or my use of pain medications interferes with my normal functioning. But I am still able to carry out my normal daily activities.
○ **Grade 3 (Severe)**	I have had severe pain, and my pain or my use of pain medications severely interferes with my normal daily activities.
○ **Grade 4 (Disabling)**	My pain has been disabling.
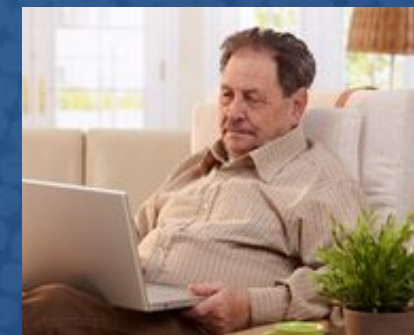
Early Patient Self-Reporting System

Example: Shortness of Breath (Dyspnea)

○ **None**	I have not had shortness of breath (with exercise or rest).
○ **Grade 1 (Mild)**	I have been short of breath with exercise, but I can walk up 1 flight of stairs without stopping.
○ **Grade 2 (Moderate)**	I have been short of breath with exercise but I am not able to walk up 1 flight of stairs or 1 city block without stopping.
◉ **Grade 3 (Severe)**	I have been short of breath during my normal daily activities (dressing, showering, cleaning, cooking, etc).
○ **Grade 4 (Disabling)**	I have been short of breath even when I am resting in bed or in a chair.

Printed Report to Oncologist at Clinic Visit

STAR SYMPTOM REPORT
Confidential PHI

Patient Name: ▇▇▇▇▇
Patient MRN: ▇▇▇▇▇
Primary Oncologist: ▇▇▇▇▇

Worsened symptoms since July 7:
- Cough: from grade 0 to grade 1

Improved symptoms since July 7:
- Dyspnea: from grade 3 to grade 1
- Fatigue: from grade 2 to grade 1
- Pain: from grade 1 to grade 0

Below is a summary of prior reported symptoms, with most recent reports on top:

| DATE	Anorex.	Constip.	Cough	Diarrhea	Dyspnea	Dysur.	Fatigue	Hot Fl.	Nausea	Neurop.	Pain	Vomiting
06/10/10	0	0	1	0	2	0	2	0	2	0	1	0
06/10/10					Clinic/Chemotherapy Visit							
06/20/10	0	0	2	0	1	0	2	0	0	0	1	0
07/01/10	0	0	1	0	1	0	1	0	0	0	1	0
07/01/10					Clinic/Chemotherapy Visit							
07/07/10	0	0	0	0	1	0	1	0	1	0	0	0
07/14/10	0	0	0	0	3	0	2	0	0	0	1	0
07/22/10	0	0	1	0	1	0	1	0	0	0	0	0
07/22/10					Clinic/Chemotherapy Visit							

Feasibility in Routine Cancer Care

Patients longitudinally reporting PRO symptoms (N~400):

- Most patients self-report at any given clinic visit

- Nurses respond with "clinical actions" to 75% of automated email alerts (counselling, supportive medications, referrals to ER, chemotherapy dose modifications, imaging)

Basch: J Clin Oncol: 2005, 2007, 2016
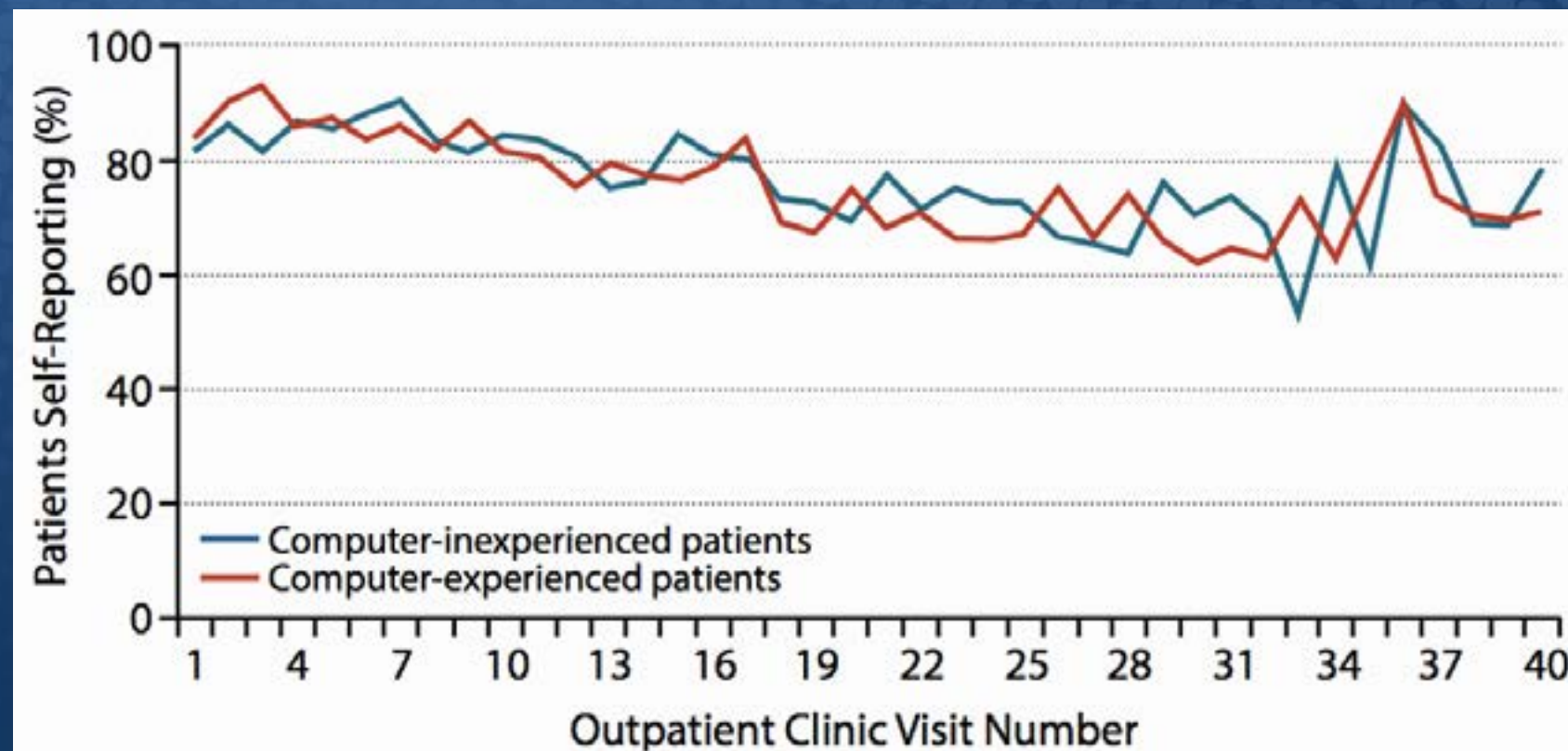
Patient Feedback on Using ePRO Systems

	Agree	Disagree	Unsure
Easy to use	98%	2%	-
Useful	94%	6%	-
Easier to remember symptoms at clinic visits	94%	5%	-
Improved discussions with my doctor/nurse	90%	10%	-
Improves communication with doctor and nurse	75%	10%	15%
Would like to continue using	96%	4%	-
Would recommend to other patients	98%	2%	-
Improved quality of my care	65%	10%	25%

Clinician Feedback on ePRO Systems
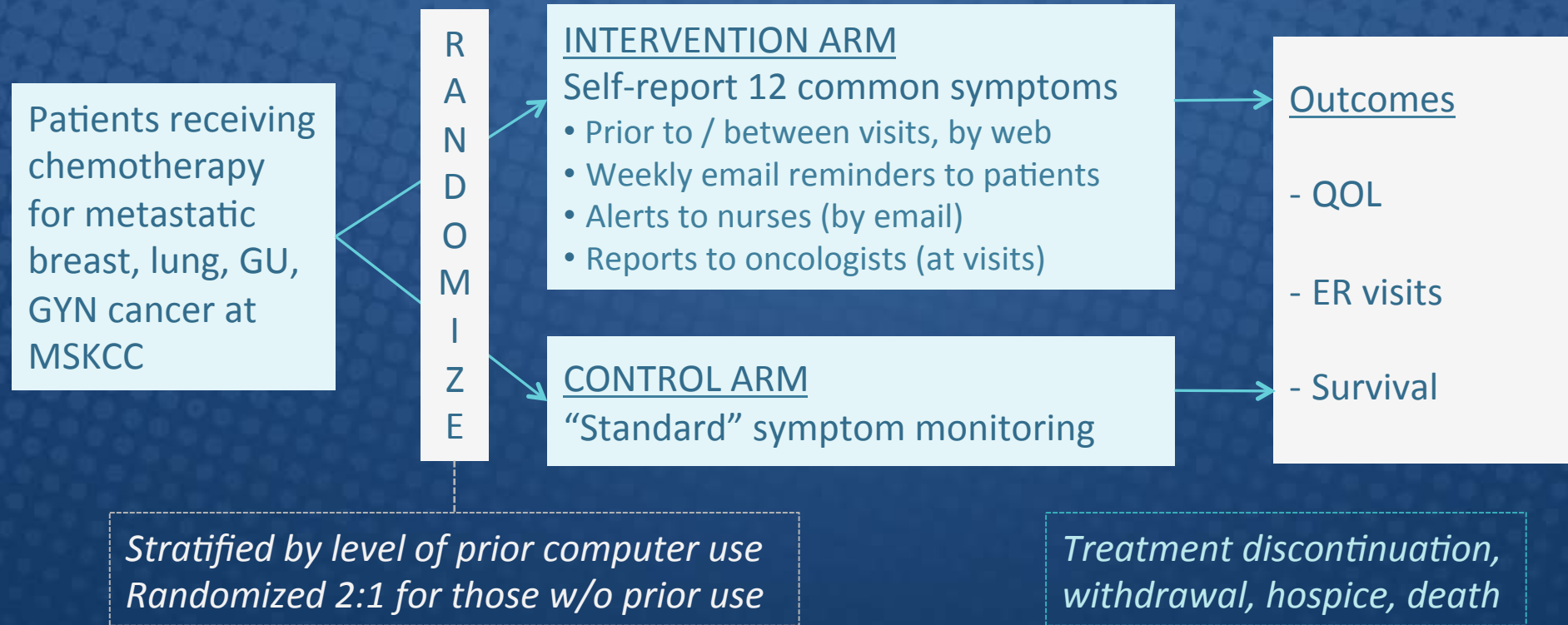## *Survey of MDs & RNs*

|	
Discuss PRO reports with patients	**90%**
PROs accurately reflect patient clinical status	**90%**
PROs are useful during treatment for adverse event monitoring	**95%**
PROs are a potential source of research-grade data	**90%**

"STAR" Study: ePRO Impact on Clinical Outcome

Patients receiving chemotherapy for metastatic breast, lung, GU, GYN cancer at MSKCC

RANDOMIZE

<u>INTERVENTION ARM</u>
Self-report 12 common symptoms
- Prior to / between visits, by web
- Weekly email reminders to patients
- Alerts to nurses (by email)
- Reports to oncologists (at visits)

<u>CONTROL ARM</u>
"Standard" symptom monitoring

<u>Outcomes</u>

- QOL

- ER visits

- Survival

*Stratified by level of prior computer use
Randomized 2:1 for those w/o prior use*

Treatment discontinuation, withdrawal, hospice, death

Basch: JAMA, 2017; JCO 2016; ASCO 2017

Results

766 patients enrolled between June 2007 and January 2011

Overall survival analysis June 2016
- Median follow-up 7 years
- 517/766 (67%) participants had died

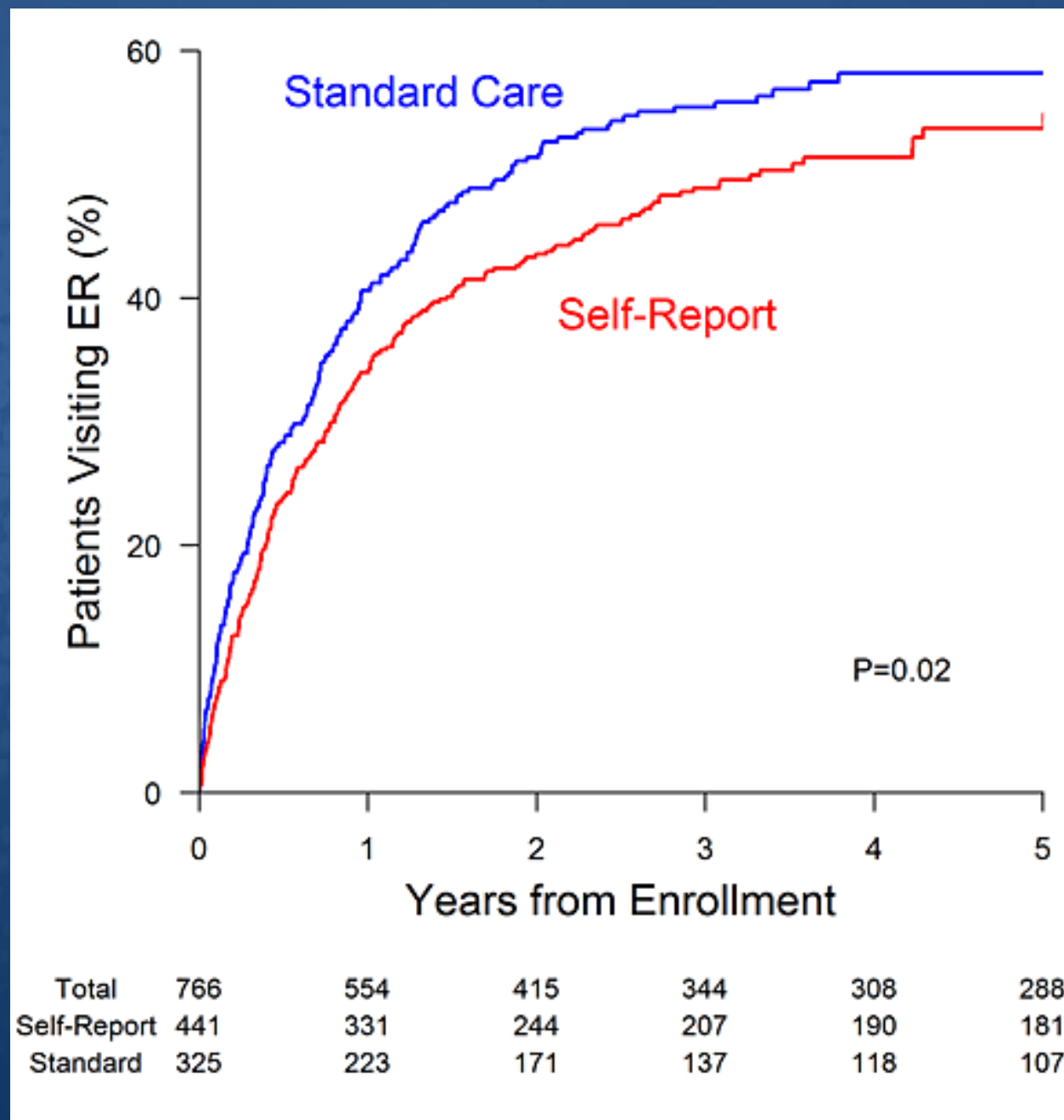*Basch: JAMA, 2017; JCO 2016; ASCO 2017*

Quality of Life

- Assessed at 6 months, compared to baseline

- Compared to standard care, 31% more patients in the self-reporting arm experienced QOL benefits (*P<0.001*)
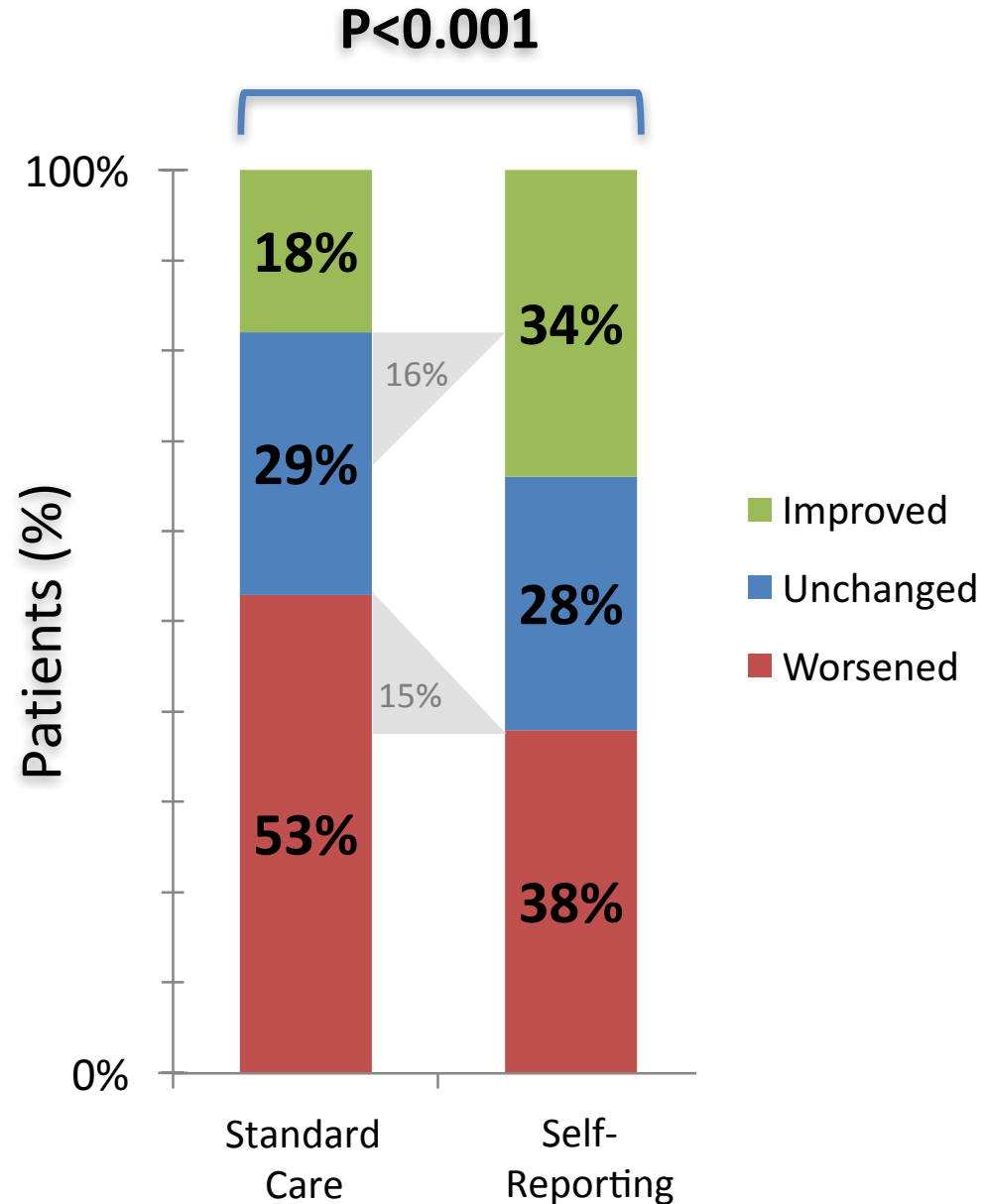
Emergency Room Visits

- Compared to standard care, 7% fewer patients in the self-reporting arm visited the Emergency Room, with durable effects throughout the study (*P=0.02*)

Overall Survival

- Compared to standard care, median survival was 5 months longer among patients in the self-reporting arm (31.2 vs. 26.0 months) (*P=0.03*)

- Remained significant in multivariable analysis: Adjusted hazard ratio 0.832 (*95% CI; 0.696, 0.995*)

- 5-year absolute survival benefit of 8%

ASCO 2018
Abstract #6500
Fabrice Denis et al.

N = 133

- NSCLC and SCLC
- Stages II (N+ only) - IV
- SCLC and NSCLC
- TKI or maintenance therapy allowed

PRIMARY OUTCOME: OVERALL SURVIVAL

INTERVENTION: Weekly web-based symptom reporting w less frequent imaging surveillance

Stage	3 mo	6 mo	9 mo	12 mo	15 mo	18 mo	21 mo	24 mo
II-IIIA		CT		CT				CT
IIIB-IV				CT				CT

CONTROL: No symptom reporting and more frequent imaging surveillance

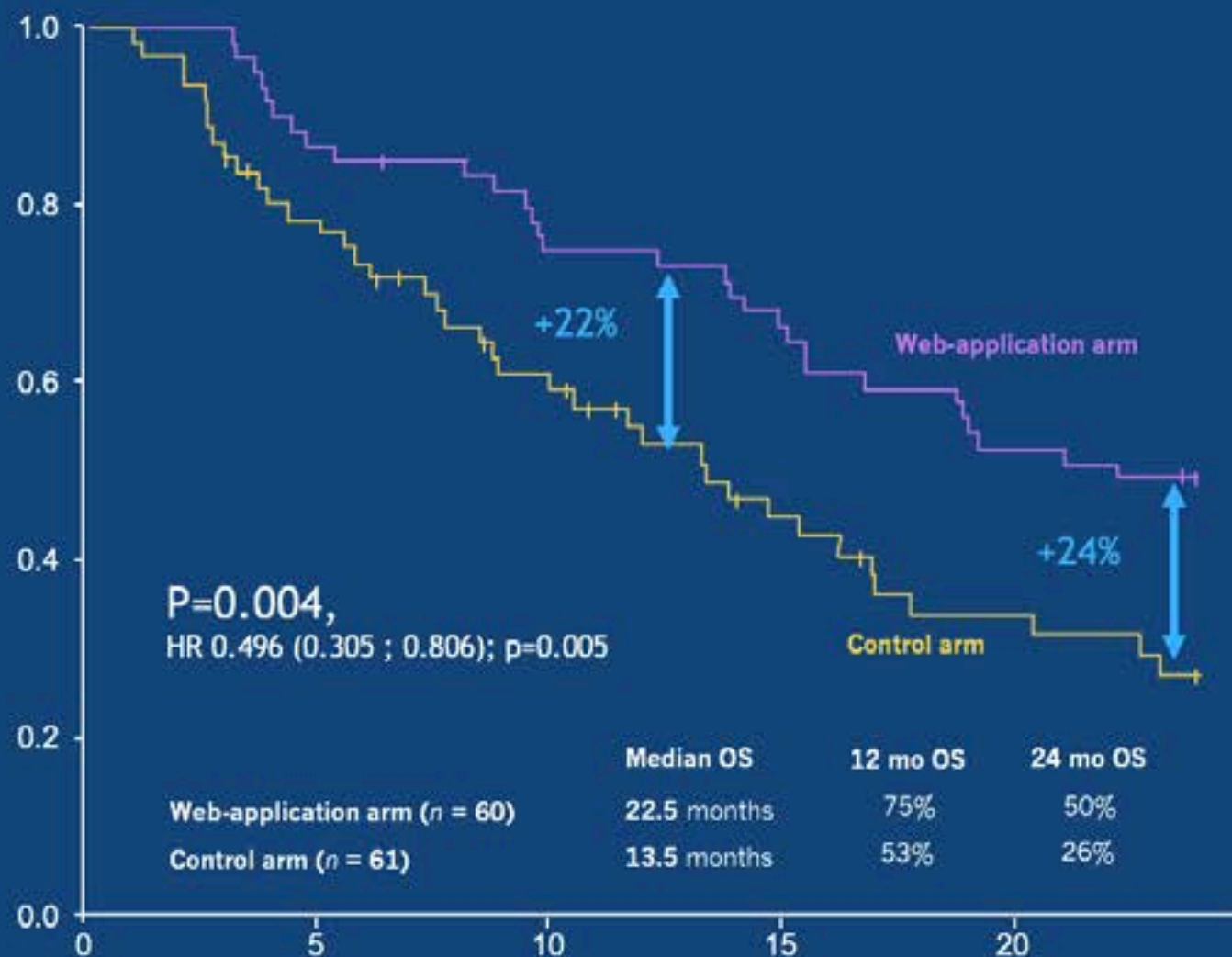| Stage	3 mo	6 mo	9 mo	12 mo	15 mo	18 mo	21 mo	24 mo
II-IIIA		CT		CT		CT		CT
IIIB-IV	CT	CT	CT	CT	CT	CT	CT	CT

Key Result

7.6 month OS benefit in web symptom-reporting arm vs. control

Likely mechanisms:
- Better symptom management
- Catching relapse earlier

Conclusion: Compelling evidence for web-based symptom monitoring during cancer care - reinforces data from ASCO 2017

+22%

+24%

Web-application arm

Control arm

P=0.004,
HR 0.496 (0.305 ; 0.806); p=0.005

	Median OS	12 mo OS	24 mo OS
Web-application arm (n = 60)	22.5 months	75%	50%
Control arm (n = 61)	13.5 months	53%	26%

New Generation of Systems

Web
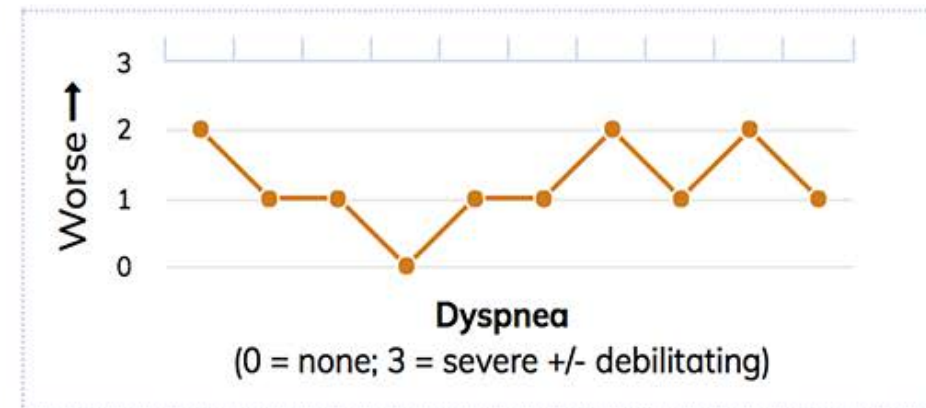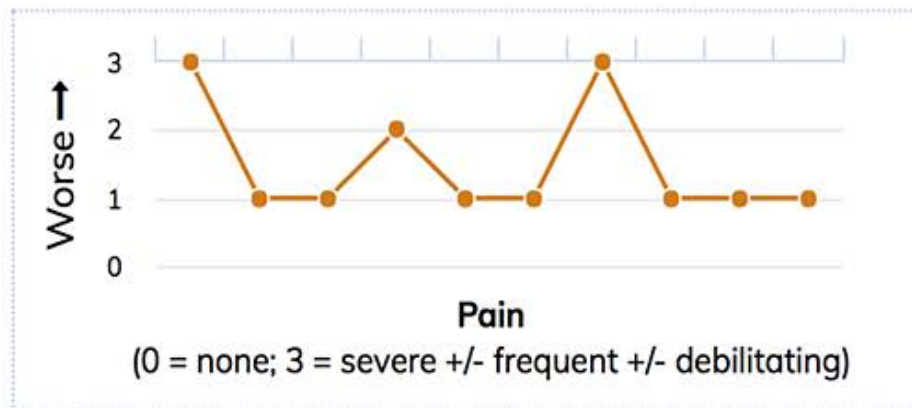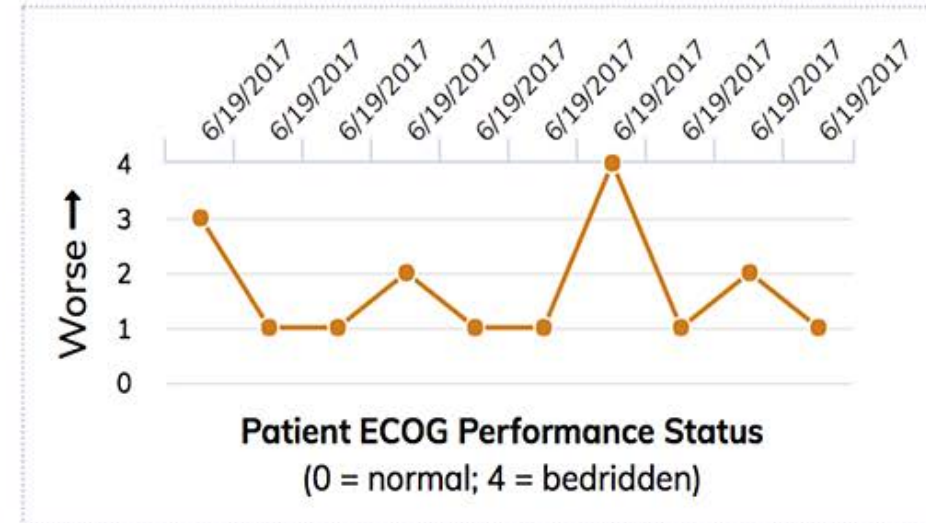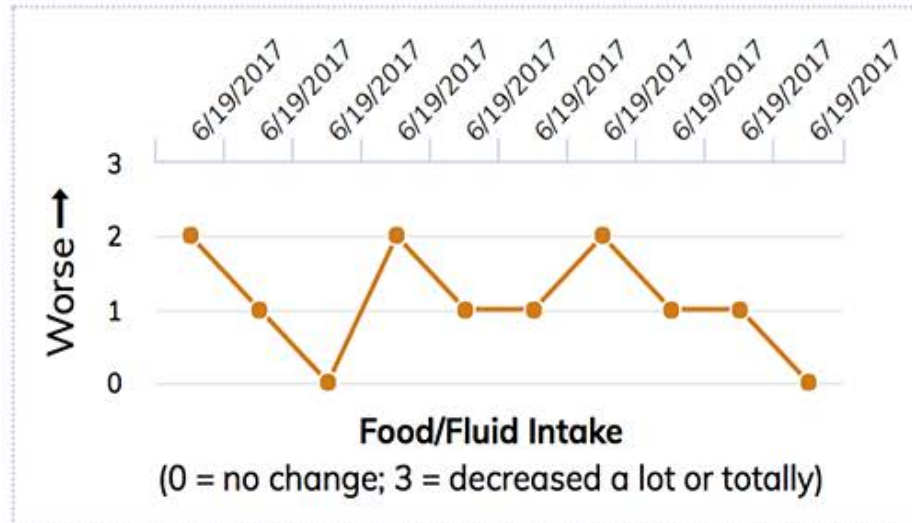

Mobile

Automated Telephone Systems

- ⊘ **Severe symptoms on 6/19/2017:** Activity Level, Appetite, Nausea, Vomiting, Dyspnea, Diarrhea, Constipation, Pain, Insomnia, Depression.

- ⊘ **Worsened symptoms between 6/12/2017 and 6/19/2017:** Activity Level, Appetite, Nausea, Vomiting, Dyspnea, Diarrhea, Constipation, Pain, Insomnia, Depression.

- ⊘ **Falls:** 6/12/2017

- ⊘ **Improved symptoms between 6/12/2017 and 6/19/2017:** Activity Level, Appetite, Nausea, Vomiting, Dyspnea, Diarrhea, Constipation, Pain, Insomnia, Depression.

Food/Fluid Intake
(0 = no change; 3 = decreased a lot or totally)

Patient ECOG Performance Status
(0 = normal; 4 = bedridden)

Pain
(0 = none; 3 = severe +/- frequent +/- debilitating)

Dyspnea
(0 = none; 3 = severe +/- debilitating)

What can I do to manage my **sleep problems**?

Tips to help you sleep:

- **Tell your cancer care team about problems that are getting in the way of your sleep.** Getting treatment to lower side effects such as pain or bladder or bowel problems may help you sleep better.

- **Set good bedtime habits.**
  - Go to bed only when sleepy, in a quiet and dark room, and in a comfortable bed.
  - Go to bed and wake up at the same time.
  - Avoid napping if possible.
  - Make sure your bedroom is not overly hot or cold.
  - Stop watching television or using devices with screens a couple of hours before going to bed.
    - Devices like: iPads, laptops, and smart phones.
  - Don't drink or eat a lot starting about 2-3 hours before bedtime.
  - Exercising too close to bedtime may make sleep more difficult.
    - Exercise before 2:00pm promotes sleep.
  - Don't watch the clock at night.
  - Keep out pets who wake you up.
- **Don't stay awake in bed** for more than 5-10 minutes. If you do not fall asleep, get out of bed, sit in a chair in the dark until you are sleepy. It's okay if this happens several times a night.
- **Avoid caffeine after midday.** Also cigarettes, alcohol and some 'over-the-counter' medications may interfere with sleep.
- **Sleep medicine may be prescribed** by your cancer care team for a short period if other strategies don't work.
- **Cognitive behavioral therapy (CBT) and/or relaxation therapy may help.** For example, a CBT therapist can help you learn to change negative thoughts and beliefs about sleep into positive ones.
  - Muscle relaxation, guided imagery, and self-hypnosis may help.

PRO-TECT Cancer Symptom Study — Clinician Symptom Management Pathway — Developed with: **Carevive** | **ALLIANCE FOUNDATION TRIALS, LLC**

PAIN

Pain is common in patients with cancer and impacts patients' functional status and quality of life.
- Cancer patients often have multiple sites of pain.
- Cancer pain is associated with increased emotional distress and risk of developing depression.

Sources of pain in cancer patients include:
- Direct effects of cancer (bone pain, pressure on internal organs, ascites).
- Surgery pain.
- Radiation therapy (mucositis, dermatologic changes, brachytherapy pain, mucosal inflammation).
- Chemotherapy or targeted therapy (arthralgia, myalgia, neuropathy, bowel function changes, mucositis, rash).
- Diagnostic procedures.
- Other health conditions (arthritis, osteoporosis)

Assessment

- Assess pain medication history.
  - What is prescribed, what is the patient actually taking, how it is working?
  - Is the patient taking opioids, and are they long acting, short acting, or both?
  - How long has the patient been on their pain regimen?
- Conduct comprehensive pain assessment:
  - Location of pain (Where does pain originate? Does it radiate to another area of the body?).
  - Intensity of pain (use pain scale of 0-10 with 10 being the worst pain imaginable).
  - Quality of pain (sharp, stabbing, burning, aching).
  - Using scale of 1-10 with 10 being the worst pain imaginable: What is your pain at its best? What is it at its peak? What is your pain after taking your pain medications?
  - Assess for breakthrough pain (Does the pain return or increase in intensity before the next dose?).
  - Onset, duration and aggravating/alleviating factors (When does it start? What makes it worse/better? How often does it occur? How long does it last?)
- Assess for changes in activity level, sleep, general activities of daily living, depression.
- If taking opioids, assess for constipation.

Severity

Grade 1 *Mild*	Grade 2 *Moderate*	Grade 3 *Severe*	Grade 4 *Life Threatening*
Mild pain	Moderate pain; limiting instrumental ADL	Severe pain; limiting self-care, ADL	

Interventions Based on Severity

Management of Pain:
1. Non-opioids (acetaminophen, COX-2 inhibitor, NSAID). Note that COX-2 inhibitor (celecoxib, meloxicam) does not inhibit platelet aggregation; NSAID toxic effects can include acute renal failure, gastrointestinal toxicity, cardiovascular toxicity, and CNS toxicity such as memory loss and confusion. NSAIDs should be avoided or used with caution if patient has: stomach or intestinal ulcers; cardiovascular disease and/or hypertension; kidney disease; bleeding disorders; pregnancy; taking other prescription anti-coagulants such as warfarin (Coumadin) or heparin, phenytoin (Dilantin), and/or cyclosporine; use of acetaminophen may cause hepatic injury; use caution with liver disease.
2. Opioids such as morphine when pain persists or increases and cannot be controlled by non-opioids.
3. Non-medication treatments should be offered for all patients with pain. These include emotional support, distraction (music, social engagement), appropriate physical activity (positioning, cushioning, supportive devices, exercise. Physical therapy), and topical application of heat or cold.

Considerations:
- Pain medication scheduled "around the clock" when pain is constant. Consider long-acting agent.
- Use the simplest route of administration possible.
- Consider additional supportive drugs to address anxiety, depression, or neuropathic pain symptoms.
- Provide patient/family/caregiver education about treatment approaches and safe medication use.
- Consider suggesting a pain diary to monitor characteristics of pain, medication regimen, and response to medication.
- No driving when using opioids.

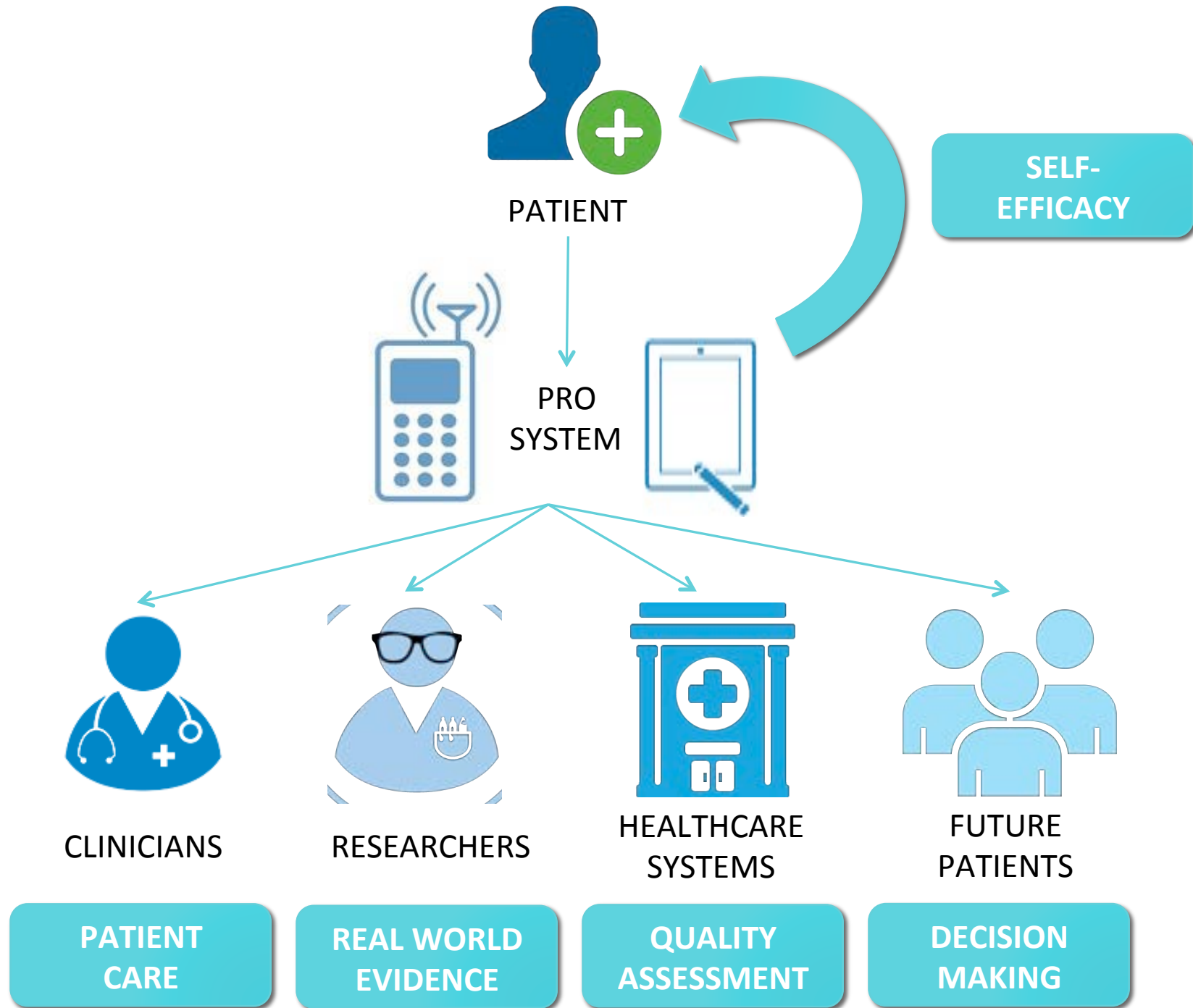# Ongoing ePRO Trial in Routine Cancer Care

PRO-TECT U.S. national trial – currently enrolling patients

- 1000 patients receiving cancer treatment across U.S. community oncology sites
- Evaluating processes for integrating PROs into workflow

PATIENT

SELF-EFFICACY

PRO SYSTEM

CLINICIANS

RESEARCHERS

HEALTHCARE SYSTEMS

FUTURE PATIENTS

PATIENT CARE

REAL WORLD EVIDENCE

QUALITY ASSESSMENT

DECISION MAKING

Resources for Health Systems/Clinics

User's Guide to Implementing Patient-Reported Outcomes Assessment in Clinical Practice (2015)

http://www.isoqol.org/UserFiles/2015UsersGuide-Version2.pdf

User's Guide to Integrating Patient-Reported Outcomes in Electronic Health Records (2017)

https://www.pcori.org/sites/default/files/PCORI-JHU-Users-Guide-To-Integrating-Patient-Reported-Outcomes-in-Electronic-Health-Records.pdf

Summary of ePRO Use in Routine Care

Integration of patient-reported symptoms into cancer care is feasible and is associated with clinical benefits

This approach may be considered for inclusion as a part of standard symptom management to improve and measure quality of care

Future efforts should focus on strategies for implementing self-reporting into clinical workflow and electronic health records