Effective routine electronic symptom screening and use of evidence-informed guides to support symptom management in Ontario, Canada

August 28, 2012
Esther Green, Provincial Head, Nursing & PSO, Cancer Care Ontario
UICC World Cancer Congress
Overview

• What is Cancer Care Ontario?
• Symptom Management in Ontario
• Symptom Burden of Ontario Cancer Patients
• Addressing the problem
  • ISAAC/symptom screening
  • Improving symptom management – symptom management guides
• Results
• Lessons Learned
What is Cancer Care Ontario (CCO)?

• Provincial agency responsible for continually improving cancer services
• CCO works to reduce the number of people diagnosed with cancer, and make sure patients receive better care every step of the way

• Mission - *We will improve the performance of the cancer systems by driving quality, accountability and innovation in all cancer-related services*
Symptom Management in Ontario

Rationale

- **Cancer patients experience many symptoms across the illness trajectory** (Chang et al, *Cancer*, 2000)
- **Symptoms are under-reported unless standardized questionnaire is used** (White et al, *J Pall Med*, 2009)
- **Adequate symptom management is not consistently achieved for cancer patients** (Patrick et al, *J Natl Cancer Inst*, 2003)
- **Poor system outcomes**
  - 41% visit ED last 2 weeks; dyspnea/pain among chief complaints (Barbera et al, *J Can Med Assoc*, 2010)

Purpose

- **To improve the quality and consistency of patient’s physical and emotional symptom management across the cancer journey**
  - Earlier identification and communication of symptoms
  - Improved symptom management
  - Improved collaborative care planning
  (Temel et al, *NEJM*, 2010)
Cancer patients experience many symptoms across the illness trajectory

<table>
<thead>
<tr>
<th>Symptom Intensity &amp; Tumor Stage (Non-hematological cancers)</th>
<th>No evidence of disease</th>
<th>Local disease</th>
<th>Regional disease</th>
<th>Metastatic disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>N= 240</td>
<td>9 (0-24)</td>
<td>7 (0-17)</td>
<td>6 (0-15)</td>
<td>10 (0-25)</td>
</tr>
<tr>
<td>Median # of symptoms = 8 per patient</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of symptoms</td>
<td>9 (0-24)</td>
<td>7 (0-17)</td>
<td>6 (0-15)</td>
<td>10 (0-25)</td>
</tr>
<tr>
<td>Moderate to severe symptoms</td>
<td>4 (0-14)</td>
<td>3 (0-12)</td>
<td>3 (0-12)</td>
<td>6 (0-20)</td>
</tr>
</tbody>
</table>

Chang VT et al. Symptom and Quality of Life Survey of Medical Oncology Patients at a Veterans Affairs medical center: A Role for Symptom Assessment. *Cancer* 2000;88:1175-1183
Provincial Symptom Burden

High prevalence of numerous symptoms in ambulatory cancer population

- Study led by Dr. Lisa Barbera using data from CCO’s Symptom Management Database (*Cancer* 2010)
- 224,606 ESAS records for 45,118 patients (2007-2009)
- Some findings to date:
  - 75% fatigue
  - 57% anxiety
  - 53% pain
  - 49% shortness of breath
  - 44% depression
  - 25% nausea
ISAAC - Standardized tool for symptom screening

Edmonton Symptom Assessment System (ESAS)

Please circle the number that best describes:

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Number Options</th>
<th>Worst Possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>No pain</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td>Worst possible pain</td>
</tr>
<tr>
<td>Not tired</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td>Worst possible tiredness</td>
</tr>
<tr>
<td>Not nauseated</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td>Worst possible nausea</td>
</tr>
<tr>
<td>Not depressed</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td>Worst possible depression</td>
</tr>
<tr>
<td>Not anxious</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td>Worst possible anxiety</td>
</tr>
<tr>
<td>Not drowsy</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td>Worst possible drowsiness</td>
</tr>
<tr>
<td>Best appetite</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td>Worst possible appetite</td>
</tr>
<tr>
<td>Best feeling of wellbeing</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td>Worst possible feeling of wellbeing</td>
</tr>
<tr>
<td>No shortness of breath</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td>Worst possible shortness of breath</td>
</tr>
<tr>
<td>Other problem</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td>Other problem</td>
</tr>
</tbody>
</table>

Screening tool interface:

- Pain: 0-10 scale
- Tiredness: 0-10 scale
- Nausea: 0-10 scale
- Depression: 0-10 scale
- Anxiety: 0-10 scale
- Appetite: 0-10 scale
- Wellbeing: 0-10 scale
Regional Cancer Centres
Regional partners with ISAAC Kiosks
Sites identified for expansion
Symptom Management Guides (SMGs) - Evidence based tools to guide care
Symptom management point of care decision support

- The CCO Symptom Management Guides App has been downloaded more than 4000 times since May 2011.
- Apps are available for iPhones and Window Phone 7 and can be downloaded at: https://www.cancercare.on.ca/cms/One.aspx?portalId=1377&pageId=58189

Named one of nine ‘Best Medical apps’ by The Medical Post (June 2011)
Patients who complete ESAS value this approach to symptom assessment

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>93%</td>
<td>Thought ESAS was important to complete as it helps health care providers know how they are feeling</td>
</tr>
<tr>
<td>92%</td>
<td>Agreed that their health care providers took into consideration ESAS symptom ratings in developing a care plan</td>
</tr>
<tr>
<td>91%</td>
<td>Agreed that their physical symptoms have been controlled to a comfortable level</td>
</tr>
<tr>
<td>87%</td>
<td>Agreed that their care team responded to their feelings of anxiety or depression</td>
</tr>
</tbody>
</table>

Survey of 3,320 patients from 14 Regional Cancer Centres in 2012
Continuing to grow

Over 54% of all Regional Cancer Centre (RCC) patients now being screened monthly (over 27,000 patients and 40,000 ESAS screens per month)

**Over 1.4 million ESAS screens** have been performed since the introduction of ISAAC

- All 14 RCCs offer electronic symptom assessment
- 20 partner hospitals now have ISAAC kiosks
- 10 hospitals have integrated ISAAC with their electronic health record (EHR)

Goal: Every Ontario cancer patient has the ability to electronically assess their symptoms
Lessons Learned

- **Physician engagement**
  - Oncologist toolkit: symptom screening performance will now be an accountability on each of the regional oncologists’ quality scorecards
  - Regional SMG KTE progress reports: Promoting sharing of educational products/presentations and approaches across the regions

- **Team-based approach to symptom management is important**

- **Decision support tools are available – symptom management guides**

- **Leadership is critical**

- **ISAAC Redesign – ISAAC 2.0 (February 2013)**
  - Increased usability at the regional level
  - New patient reported outcome screening tools (PROs)
  - Patient self reported functional status (based on ECOG)
Mean ESAS Symptom Distress Score and PPS Score in last 6 months of life

Cancer patients seen at Cancer outpatient clinics across Ontario

10772 ESAS
7,882 PPS
Mean age: 65 years
Functional decline gradual up to 70%
Rapid decline after 50%

Seow H et al. JCO 2011;29(9):1151-1158
The time has come for electronic patient interfaces that allow symptom reporting to become a part of standard clinical cancer care.

“… we expect that the Ontario vision will transition to being considered “just good care“.”

- Ethan Basch, MD and Amy Abernethy, MD, J Clinical Oncology, 2011
References


Seow, H. et al. (2011) Trajectory of Performance Status and Symptom Scores for Patients With Cancer During the Last Six Months of Life. *Journal of Clinical Oncology*, 29(9): 1151-1158
Contact: Esther Green

Esther.Green@cancercare.on.ca

www.cancercare.on.ca/ocs/qpi/ocsmc/
Electronic PRO Monitoring in Duke Oncology Clinics

World Cancer Congress Presentation

Bradford Hirsch, MD, MBA
August 28th, 2012
Medicine at Transition Point
Medicine at Transition Point

- Care Redesign
- Patient Centered Care
- Quality Metrics
- Personalized Medicine
- CER

Data Driven Care

Duke Clinical Research Institute
From Thought Leadership to Clinical Practice
Evidence Based Medicine: A Paradigm Shift

- Concerted international effort to close the gap between research and practice (CER, PM…)
- Systematic collection, synthesis, and use of evidence to guide decisions
- Potential to:
  - Show which interventions are most effective and efficient
  - Choose among alternatives
  - Identify knowledge gaps
Paradigm Shift

Basic Science → Clinical Research → Patient Care

Duke Clinical Research Institute
From Thought Leadership to Clinical Practice
Duke Center for Learning Health Care Experience

- ePRO = prototype system for PRO collection & analysis
- On-the-ground, real-time mechanism for CER, personalized medicine, care optimization, and quality improvement
- Research demonstrates system is:
  - Easy to use and navigate
  - Valid and reliable
  - Appropriate for clinical trials
Collection Methods
Validated Questionnaires Available

Press the red bar containing the survey name for each survey you want to issue to this patient. An “X” will appear in front of each survey you select. Use the scroll bar to the right of the survey list to view more choices.

Press the **Continue** bar below to proceed with the first survey.

Patient AMY E ABERNETHY, born on 08-26-1967 (ID = AAE670826)

- PCM Screener
- FACT-G-4
- FACT-B-4
- FACIT-F-4
- FACT-C-4
- FACT/GOG-NTX-4
- MDASI-1999
- Self Efficacy
- Duke Private Diagnostic Clinic
- NCCN Distress Management
- PCM Patient Satisfaction
Select the circle below that best describes how bad, if at all, this has been a problem for you during the past week, including today.

Sore throat

Not a problem | Mild | Moderate | Severe | Bad as possible
0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10
# Output for clinicians

## Patient Care Monitor Report

**Survey Date/Time:** April 26, 2000 (Wed) / 9:11AM  
**Doctor:** (Name)  
**Version:** English  
**MR #:** (Number)

### Review of Systems

<table>
<thead>
<tr>
<th>System</th>
<th>Current</th>
<th>Past</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Allergy/Immunologic</td>
<td>(Details)</td>
<td>(Details)</td>
</tr>
<tr>
<td>2. Constitutional</td>
<td>(Details)</td>
<td>(Details)</td>
</tr>
<tr>
<td>3. Fever</td>
<td>(Details)</td>
<td>(Details)</td>
</tr>
<tr>
<td>4. Headache</td>
<td>(Details)</td>
<td>(Details)</td>
</tr>
<tr>
<td>5. Cardiovascular</td>
<td>(Details)</td>
<td>(Details)</td>
</tr>
<tr>
<td>6. Respiratory</td>
<td>(Details)</td>
<td>(Details)</td>
</tr>
<tr>
<td>7. Gastrointestinal</td>
<td>(Details)</td>
<td>(Details)</td>
</tr>
<tr>
<td>8. Musculoskeletal</td>
<td>(Details)</td>
<td>(Details)</td>
</tr>
<tr>
<td>9. Skin</td>
<td>(Details)</td>
<td>(Details)</td>
</tr>
</tbody>
</table>

**Notes:** (Additional comments or observations)

---

This chart represents a comprehensive review of a patient's systems, noting any changes or new occurrences. It is designed to provide clinicians with a clear and systematic overview of the patient's current status compared to previous notes.
Output for clinicians

<table>
<thead>
<tr>
<th>15. Psychiatric</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Crying/feeling like crying</td>
<td>6</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Nervous, tense, anxious</td>
<td>6</td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Wary</td>
<td>6</td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Feeling hopeless</td>
<td>3</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Sad (depressed)</td>
<td>5</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Feeling helpless</td>
<td>6</td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Lost interest in people</td>
<td>4</td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>I would be better off dead</td>
<td>2</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Absence of pleasure</td>
<td>3</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Feeling worthless</td>
<td>2</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Feeling guilty</td>
<td>0</td>
<td></td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>16. T-Scores</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Distress</td>
<td>67.1</td>
<td></td>
<td></td>
<td>68.7</td>
</tr>
<tr>
<td>Despair/Depression</td>
<td>85.1</td>
<td></td>
<td></td>
<td>88.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>17. Physical Functioning</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard work or activity</td>
<td>8</td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Attend paid job</td>
<td>8</td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Household work</td>
<td>7</td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Run or walks</td>
<td>7</td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Run</td>
<td>7</td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Function normally</td>
<td>6</td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Light work or activity</td>
<td>6</td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Walk</td>
<td>5</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Attend social activities</td>
<td>5</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Bath or cheer</td>
<td>4</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Driving</td>
<td>4</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Cook for self</td>
<td>4</td>
<td></td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>
Utilization

Number of (new and established) patients that have completed a PCM Survey

- **Total**
- **New**
- **Established**

Data for each month from August 2009 to March 2011 is shown in the graph.
In Practice

- Sexual Distress
  - >30% of breast, GI, and lung pts in mod-severe distress
  - Correlates to QOL, functional status, and symptoms
  - Clinicians not addressing the issue
  - Reorganized education and care → ACS funded RCT

DOI 10.1007/s00520-010-0738-8

Coping with sexual concerns after cancer: the use of flexible coping
Jennifer Barsky Reese - Rebecca A. Shelby - Francis J. Keefe - Laura S. Porter - Amy P. Abernethy

Use of Tablet Personal Computers for Sensitive Patient-Reported Information
Alexandra Dupont, Jane Wheeler, MS, James E. Herndon II, PhD, April Coan, MPH, S. Yousuf Zafar, MD, Linda Hood, RN, MSN, Meenal Patwardhan, MD, Heather S. Shaw, MD, H. Kim Lyerly, MD, and Amy P. Abernethy, MD
New datasets sequentially added, starting at the patient level, using warehousing or federated models. The key element is patient-level linkage.
Vision

Patient reports standardized data

Clinical uses
- Longitudinal reporting
- Decision making
- Patient education
- Triggered interventions

Clinical Decision Support & Guidelines

Research Uses
- Quality reporting
- CER
- Hypothesis generation

ITERATIVE LEARNING CYCLES
Evolution

- Improve visualization
- Trigger interventions & education
- Provide scorecards that include PROs as a core component
- Enable rapid learning clinic
- Embed randomization

**Rapid Learning Breast Cancer Clinic “Scorecard”**

<table>
<thead>
<tr>
<th>Patient Concerns</th>
<th>Disease Management</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ASCO/NCCN Quality Metrics</td>
</tr>
<tr>
<td>Patient Concern</td>
<td>% Scores ≥5 out of 10 in last 4Q</td>
</tr>
<tr>
<td>1. Fatigue</td>
<td>20%</td>
</tr>
<tr>
<td>2. Distress</td>
<td>15%</td>
</tr>
<tr>
<td>3. Depression</td>
<td>15%</td>
</tr>
<tr>
<td>4. Pain</td>
<td>5%</td>
</tr>
<tr>
<td>5. Sexual dysfunction</td>
<td>25%</td>
</tr>
</tbody>
</table>

**Practice Efficiency**

- Clinic wait time (minutes to see provider by appointment)
- Time to see patient (days)
- Likelihood to recommend

**New Research**

- Access to advanced care by referral status
- Tissue samples collected

Duke Clinical Research Institute
From Thought Leadership to Clinical Practice
Returning Patient

Hello and welcome back to Duke Cancer Institute. The DCI is one of only 40 centers in the country designated by the National Cancer Institute as a "comprehensive cancer center," combining cutting-edge research with compassionate care. After watching this log you'll know more about the vast array of educational materials that are available to you here. You'll also get to meet some of the caring individuals that are here to help you. Thank you for trusting us with your care, we will be here for you every step of the way.
Evolution

- Improve visualization
- Trigger interventions & education
- Provide scorecards that include PROs as a core component
- Enable rapid learning clinic
- Embed randomization

**RAPID LEARNING BREAST CANCER CLINIC “SCORECARD”**

<table>
<thead>
<tr>
<th><strong>PATIENT CONCERNS</strong></th>
<th><strong>DISEASE MANAGEMENT</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Concerns</td>
<td>Disease Management</td>
</tr>
<tr>
<td>%</td>
<td>Metrics</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Fatigue</td>
<td>Tumor stage of breast cancer</td>
</tr>
<tr>
<td>20%</td>
<td>Tumor size &gt; 5 cm and &lt;10 cm</td>
</tr>
<tr>
<td>2. Disease</td>
<td>Tumors in the axilla</td>
</tr>
<tr>
<td>15%</td>
<td>Tumors in the axilla</td>
</tr>
<tr>
<td>3. Breast</td>
<td>Chest wall involvement</td>
</tr>
<tr>
<td>15%</td>
<td>Chest wall involvement</td>
</tr>
<tr>
<td>4. Pain</td>
<td>Lymph node involvement</td>
</tr>
<tr>
<td>5%</td>
<td>Lymph node involvement</td>
</tr>
<tr>
<td>5. Sexual dysfunction</td>
<td>Local recurrence</td>
</tr>
<tr>
<td>25%</td>
<td>Local recurrence</td>
</tr>
</tbody>
</table>

**PRACTICE EFFICIENCY**

- Clinic wait time
- Time to new patient appointment

**NEW RESEARCH**

- Access to advanced care
- Team Question 1
- Team Question 2

**DISEASE MANAGEMENT**

- Tumor stage of breast cancer%
- Tumor size > 5 cm and <10 cm%
- Tumors in the axilla%
- Chest wall involvement%
- Local recurrence%
Contact Information

Bradford Hirsch, MD, MBA
Bradford.Hirsch@duke.edu
(214) 707-2790
“Improving the patient experience using patient reported symptoms”

Using remote monitoring for haematological cancer patients undergoing chemotherapy

Sanchia Aranda, Sibilah Breen, David Ritchie, Sarah Koefed
Peter MacCallum Cancer Centre, Victoria, Australia.

Roma Maguire, Nora Kearney.
University of Dundee, Scotland, UK.
Background

• Real-time remote monitoring systems are a cost-effective mechanism for improved patient care/outcomes in chronic disease

• Early studies of real time remote monitoring systems in patients receiving cancer treatment show:
  – Improved symptom reporting/control and psychological status
  – Decreased hospital admissions and BDOC

• A focus on high-risk/clinically challenging groups is warranted
  – haematological cancers
  – high toxicity chemotherapy protocols
  – Most likely to benefit clinically
Previous Work

• Self Care Information Review

• ChemoEd Trial
Limitations

• Reliance on retrospective recall
• No ability to tailor information to patient experience
• Absence of real time connectivity at the time patients experience of side effects and symptoms
• Salience of chemotherapy preparation information before side effects and symptoms occur
1. Patient Completes Symptom Questionnaire
   - Twice daily/feels unwell
   - Key symptoms + temperature

2a. Mobile phone provides tailored self-care advice in response to reported symptoms

2b. Data sent in ‘real-time’ via GPRS to secure server
   - encrypted
   - no identifying information

3. Patient can also view symptom graphs and additional self care information tailored to side effects

3. Problematic symptoms generate alerts via pager or emergency SMS text to dedicated pager/phone
   - amber/red
   - individual/combination concerns

4. Nurses view symptom data on a secure website

5. Clinicians contact patient to provide advice where appropriate

Advanced Symptom Management System (ASyMS)
Screen Shots
From Patient Mobile
Phone Handset
Screen Shots
From Nursing Website
Pilot testing with Smart Phone

• Aimed to:
  – Assess end-user acceptability/feasibility of system
  – Assess frequency and reasons for system alerts
  – Assess rates of user compliance
  – Assess changes required for system refinement
Results (patients)

- System used by patients for total of 365 days
- Thirty two medical alerts generated (red – 11; amber – 21)
  - Nausea
  - Mucositis
  - Temp >38 degrees
- 12 missing alerts generated (system not used >24 hours)
  - 6 alerts from 1 patient
- Compliance with daily use – 97%
1. acceptability/feasibility

- Easy to use & fits with routine
- One patient lacked confidence to fully utilize all functionality

“I didn’t want to play outside the area [symptom questionnaires] just in case I upset the phone or anything” P1

“It’s so easy to use. I think small children could be taught to use that..” P4

It wasn’t a burden at all after you became accustomed to the routine of doing it each day…I found I adapted automatically to doing it like brushing my teeth
2. positive impacts on care

- Security, reassurance & shared management
- Understanding and planning
- Empowered and pro-active
- Communication & early intervention
- Benefits of Real time reporting
- Future benefits: predictive modelling
3. Appropriateness of content

- **Symptom Questionnaire**
  
  “[The] questions were pretty thorough so I am not sure you can really add that much…it covered all bases.’ P

- **Self Care Information**
  
  “It had everything in one spot rather than having to go somewhere and pick up a folder…summarized it nicely…” P9
4. Limitations

- Mobile coverage
- Manipulating answers and guilt
- More useful for symptomatic patients
- Application on own phone or the internet
- More useful for symptomatic patients
Nursing Views

Acceptability/Feasability

• Easy to use/easier than expected
• Fit with routine and current roles

Effect on Process of Care

• Decrease inappropriate calls/controlling workload
• Consistency of assessment and advice
• Repeated alerting and repeated contacts appropriate
• Potential to allow patients to leave hospital sooner
Conclusions

• Highly acceptable/feasible to patients and nurses
• Numerous benefits for patients/cancer nurses
• High compliance
• Need to adapt symptoms monitored; some wording; reformat website and address performance issues
• Need to ensure that patients are supported to use system effectively:
  – Use handset functionality
  – Keep reporting accurately and not feel guilty about taking up nurses time (normalise follow up)
Next Steps

• System has been re-programmed into an Android app

• Phase 3 RCT in progress incorporating structured nursing support at set intervals in addition to responding to alerts
Acknowledgments

• The Victorian Cancer Agency for funding the development of the prototype system and the current phase 2 trial

• Hematology patients who gave their valuable time to participate in this project

• The hard working nurses in the Chemotherapy Day Unit and the Patient Service Managers who have given, and continue to provide, amazing support for new research initiatives

• The authors have no conflicts of interest to declare