Computer-Tailored Interventions to Increase Cancer Screening: Building a Program of Research

Susan M. Rawl, PhD, RN, FAAHB, FAAN
Professor & Director, Training in Behavioral Nursing Research, Indiana University School of Nursing
Co-Leader, Cancer Prevention and Control, Indiana University Simon Cancer Center
Today’s Goals

- Define tailoring and evidence supporting tailored interventions
- Describe the problem of colorectal cancer
- Describe development of a program of research focused on promote screening behaviors
Health Communication Continuum

Tailored Health Communications

- Information about an individual is used to determine what specific content s/he will receive, by whom it will be presented, and even through which channels it will be delivered.

- Tailoring aims to enhance the relevance of information presented to produce a desired behavior change

Theoretical Rationale

• Elaboration Likelihood Model (ELM) of Persuasion
  ◦ assumes people are active information processors
  ◦ People think about messages, relate them to what they already know, process them in the context of their own life experiences
  ◦ People more likely to process information thoughtfully if it is personally relevant

Petty and Cacioppo, 1986
Primary Goals of Tailoring

- **Processing Goals:**
  - Attention
  - Effortful processing
  - Self-reference
  - Peripheral processing

- **Impact Goals:**
  - Being informed
  - Decision-making
  - Behavioral intention
  - Skills
  - Self-efficacy
  - Attitudes/outcome expectancies
  - Normative perceptions

Tailored Health Information

- Eliminates superfluous information
- Is more personally relevant
- Is more carefully attended to
- Is more likely to lead to thoughtful consideration of behavior change
- Is more effective in helping people change

Compared to non-tailored messages, tailored messages are more likely to:

- Catch reader’s attention
- Be read and remembered
- Be saved
- Be discussed with others
- Be perceived as interesting, personally relevant, and written especially for them
Colorectal Cancer

- Third most commonly diagnosed cancer
- Third leading cause of cancer death
- 2017 U.S. estimates: 135,430 new cases 50,260 deaths

**Curable**
- 5-year survival is over 90% for early stage disease
- But only 4 of 10 cases are diagnosed in early stages

**Preventable**
- By removing precancerous polyp
- But screening rates are suboptimal
Countries with the Highest CRC Incidence Rates

**Males**
- Czech Republic
- Japan (Miyagi)
- Slovak Republic
- Germany (Saarland)
- Australia (Capital Territory)
- Italy (Ferrara)
- New Zealand
- France (Bas-Rhin)
- Spain (Basque Country)
- Slovenia
- Germany (Brandenburg)
- Ireland
- UK (Scotland)
- Canada
- Croatia
- Israel
- Austria
- Portugal (South)
- Norway
- Belgium (Flanders)
- Portugal (Porto)
- USA (NPCR)
- Singapore
- The Netherlands
- Denmark

**Females**
- New Zealand
- Australia (Tasmania)
- Israel
- Germany (Saarland)
- Japan (Hiroshima)
- Norway
- Italy (Ferrara)
- Czech Republic
- Denmark
- Canada
- Singapore
- USA (NPCR)
- The Netherlands
- China (Hong Kong)
- UK (Northern Ireland)
- Russia (St Petersburg)
- France (Haut-Rhin)
- Slovakia
- Belgium (Flanders)
- Ireland
- Spain (Girona)
- Brazil (Sao Paulo)
- Portugal (Porto)
- Switzerland (Geneva)
- Australia (Northern Territory)

http://onlinelibrary.wiley.com/doi/10.3322/caac.20038/full#fig1
Countries with the Lowest CRC Incidence Rates
Worldwide Trends in CRC Mortality Rates
Trends in Colorectal Cancer Screening* by Gender, Adults 50 Years and Older, US, 2000-2013

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*Either a fecal occult blood test within the past year or sigmoidoscopy within the past 5 years or colonoscopy within the past 10 years. Note: Estimates are age adjusted to the 2000 US standard population.

Source: National Health Interview Surveys, National Center for Health Statistics, Centers for Disease Control and Prevention.
Key Predictors Of Screening

- Regular source of health care
- Primary care provider recommendation
- Health insurance
- Access to colonoscopy
- Navigation
## Colorectal Cancer Screening Guidelines
For People with Average Risk

<table>
<thead>
<tr>
<th>Population</th>
<th>Test or Procedure</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 years +</td>
<td>FOBT* or FIT*</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>sDNA†</td>
<td>Every 3 years</td>
</tr>
<tr>
<td></td>
<td>Sigmoidoscopy†</td>
<td>Every 5 years</td>
</tr>
<tr>
<td></td>
<td>Double-contrast barium enema†</td>
<td>Every 5 years</td>
</tr>
<tr>
<td></td>
<td>Colonoscopy†</td>
<td>Every 10 years</td>
</tr>
<tr>
<td></td>
<td>CT Colonography†</td>
<td>Every 5 years</td>
</tr>
</tbody>
</table>


FOBT: fecal occult blood test. FIT: fecal immunochemical test. CT: computed tomography.
*Primarily detects cancer. †Included in recommendation based on approval of the Food and Drug Administration and study results of performance characteristics of the newest test available. The American Cancer Society will conduct a full evaluation of this test when the Society’s colorectal cancer screening guidelines are updated. ‡Detects both cancer and precancerous polyps.
Screening Guidelines Emphasize Options Because:

- Evidence does not yet support any single test as “best”
- Uptake of screening is increasing but remains low
- Individuals differ in their preferences for one test or another
- Primary care physicians differ in their ability to offer, explain, or refer patients to all options equally
- Access is uneven geographically, in terms of test charges and insurance coverage
- Uncertainty exists about performance of different screening methods with regard to benefits, harms, and costs (especially on programmatic basis)
Patient-reported Reasons for Not Screening

- Low awareness of:
  - CRC prevalence, risk factors, personal risk, screening benefits & harms

- Fear of:
  - cancer, medical tests, sedation, complications, burden

- Embarrassment, discomfort

- Time, competing demands

- Cost

- Access

- #1 Reason: “My doctor never told me to….”
Descriptive, Instrumentation & Pilot Studies

- First Degree Relatives of Colorectal Cancer Patients: Participation in Cancer Risk Assessment and Education 1997-2000

- Predictors to Adherence to Colorectal Cancer Screening & Dietary Recommendations in Individuals with Adenomatous Polyps 1999-2000


- Colorectal Cancer Screening: Knowledge, Attitudes and Practices of Indiana Primary Care Providers 2000-2001

- Development and Testing of the CRISP: The Colorectal Interactive Screening Program 2002-05

Studies supported by the Walther Cancer Foundation
Tailored Interventions to Promote Colon Cancer Screening

- Tailored print (R21)
- Tailored telephone counseling (R15)
- Interactive tablet-based computer program delivered in clinic (R01)
- Interactive DVD +/- patient navigation (PCORI)
Tailoring Variables

- Age
- Gender
- Stage of adoption
- Perceived risk
- Objective risk
- Screening recommendations
- Self-efficacy
- Perceived barriers
Increasing Screening in Families at Risk
National Cancer Institute (R21 CA934454-01)

Aim: Develop & test readership, relevance, satisfaction, and estimate efficacy of a theory-based tailored print intervention designed to increase CRC screening among 140 FDRs of colon cancer survivors
Results

No sig group differences in screening rates at 3 months

<table>
<thead>
<tr>
<th>Received HCP recommendation for…</th>
<th>Total Sample (n=152)</th>
<th>AA FDRs (n=28)</th>
<th>White FDRs (n=124)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOBT</td>
<td>52 (34.2)</td>
<td>10 (35.7)</td>
<td>42 (33.9)</td>
</tr>
<tr>
<td>Colonoscopy*</td>
<td>59 (38.8)</td>
<td>6 (21.4)</td>
<td>53 (42.7)</td>
</tr>
<tr>
<td>Sigmoidoscopy</td>
<td>10 (6.6)</td>
<td>1 (3.6)</td>
<td>9 (7.3)</td>
</tr>
</tbody>
</table>

Colonoscopy recommended sig less often to African Americans

* p = .04
Aim: Develop and test a tailored telephone counseling intervention designed to motivate CRC screening among 156 FDRs of persons with adenomatous polyps.

RESULTS: Sig group differences in screening rates at 3 months.

Phone counseling more effective for those who were less educated, not married, and not employed.

Colonoscopy completion was associated with sig increases in perceived benefits & reductions in perceived barriers.
CRC Incidence and Mortality Rates by Sex and Race: Indiana, 2008–2012

Incidence

Mortality

African Americans disproportionately bear the burden of CRC with the highest incidence & mortality rates of all racial/ethnic groups

Delays in diagnosis and lower participation in CRC screening result in advanced-stage disease at diagnosis. 60% of whites are up-to-date with CRC screening vs. 55% of blacks
Aim: Compare the effects of a computer-tailored interactive program with a non-tailored CRC screening brochure among 693 African American primary care patients in 11 urban clinics in Indianapolis and Louisville
Dear Ms. Barker,

Thank you for using this program. This summary has been prepared especially for you based on the answers you gave the computer. Now you know how regular colon tests can keep you healthy. Be sure to talk with your doctor TODAY about the colon test that's right for you.

1. **Your personal colon cancer risk profile:**
   
   You are now in your 50s and your chances of getting colon cancer will increase as you get older.

2. **Your colon test options:**
   
   **Stool Blood Test**
   - **HOW IT WORKS**: Finds hidden blood in your bowel movement
   - **HOW OFTEN**: Every Year
   - **HOW TO GET ONE**: Ask your doctor for a stool blood test kit

   **OR Colonoscopy**
   - **HOW IT WORKS**: Allows a doctor to look inside the entire length of your colon to find and remove polyps
   - **HOW OFTEN**: Every 10 years or as suggested by your doctor
   - **HOW TO GET ONE**: Ask your doctor to help you get scheduled for a colonoscopy

3. It's great you are considering a stool blood test. If you have any concerns about being tested that weren't answered in the computer program, please discuss them with your doctor. Now is the time to get tested so you can CELEBRATE LIFE FOR YEARS TO COME.

TALK WITH YOUR DOCTOR TODAY!

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Dear Mr. Franklin,

Thank you for using this program. This summary has been prepared especially for you based on the answers you gave the computer. Now you know how regular colon tests can keep you healthy. Be sure to talk with your doctor TODAY about the colon test that's right for you.

1. **Your personal colon cancer risk profile:**
   
   You are now in your 60s and your chances of getting colon cancer will increase as you get older.

2. **Because of your risk, the best colon test for you to have is a colonoscopy.**

   **Colonoscopy**
   - **HOW IT WORKS**: Allows a doctor to look inside the entire length of your colon to find and remove polyps
   - **HOW OFTEN**: Every 10 years or as suggested by your doctor
   - **HOW TO GET ONE**: Ask your doctor to help you get scheduled for a colonoscopy

3. It's great you are considering a colonoscopy. If you have any concerns about being tested that weren't answered in the computer program, please discuss them with your doctor. Now is the time to get tested so you can CELEBRATE LIFE FOR YEARS TO COME.

TALK WITH YOUR DOCTOR TODAY!
**RESULTS**

Sig group differences in patient-provider discussions about CRC screening

Sig group differences in CRC screening rates with FOBT or any test

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**Test Completed** | **Computer Group (n=335)** | **Brochure Group (n=358)** | **X²** | **p**
--- | --- | --- | --- | ---
**n** | **(%)** | **n** | **(%)** | **X²** | **p**
FOBT | 42 (12.5) | 26 (7.3) | 5.44 | .0197
Colonoscopy | 62 (18.5) | 50 (14.0) | 2.63 | .1046
Either Test | 88 (26.3) | 66 (18.4) | 6.14 | .0132

**Graph:**
- **FOBT:**
  - Computer Group: 56
  - Brochure Group: 44
  - p = .016
- **COL:**
  - Computer Group: 54
  - Brochure Group: 46
  - p = .006
- **ANY:**
  - Computer Group: 55
  - Brochure Group: 44
  - p < .001
Comparing Interventions to Increase Colorectal Cancer Screening in Low Income and Minority Patients
PCORI # IHS-1507-31333 (2016-20)

Aims: 1) Compare effectiveness of two interventions to promote CRC screening among people at average risk – a mailed tailored DVD versus the DVD plus phone-based patient navigation - to each other and to usual care.

2) Examine age, race/ethnicity, sex, and income as moderators of intervention effects.

3) Examine changes in knowledge and health beliefs as mediators of intervention effects.

Design: 3-group RCT; n=750 (250 each arm)

Community Advisory Board (n=8) active members of research team
Screening, Symptom Management, QOL, Cancer Control Studies & Collaborators

- Advanced practice nursing intervention to improve symptom management and QOL for cancer patients receiving chemotherapy and their caregivers (Given & Given)
- Advanced practice nursing intervention to improve QOL and bowel, sexual and urinary function in prostate cancer patients (Giesler, Given & Given)
- Computerized assessment of symptoms (fatigue, pain, depression) in cancer patients (Carpenter)
- Case-control study to examine quality of life in veterans with intestinal ostomies (Krouse)
- Facilitating genetic counseling, testing and risk-appropriate screening (Sugg Skinner)
- Tailored interventions to promote CRC and breast cancer screening in women (Champion)
- Effects of Quantitative Information about Risk in Decision Aid for CRC (Schwartz)
- Tailored and interpersonal interventions to increase colon, breast and cervical cancer screening in rural women in IN & OH (Champion & Paskett)
- Lung cancer screening: modeling, instrumentation, intervention (Carter-Harris)
To Your Colon Health!

That's not quite the stool sample we had in mind.