Colorectal Cancer: Public Health Intervention

James Zasadzinski
Special thanks to Dr. Stanley Weiss and Dr. Dan Rosenblum for their valuable input.
Colorectal Cancer

- Burden of Disease
  - National
  - Local
- Means of Intervention
  - Screening Tests
- Local Interventions
  - ACS Toolkit
  - FIT Testing
Colorectal Cancer

- The 3rd Most Common Type of Cancer in both Men and Women
  - 52.7 cases per 100,000 men
  - 39.7 cases per 100,000 women
- The 3rd Most Common Cause of Cancer Death in Men and Women
  - Caused ~25,000 Deaths in both men and women nationwide in 2011
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Age-Adjusted Cancer Mortality Rates in New Jersey
Colon and Rectum, 2004-2008
By County
Age-Adjusted to the 2000 U.S. Standard Million Population

New Jersey Rate: 18.7

Rate per 100,000
- 16.1 - 17.3
- 17.6 - 19.1
- 19.1 - 19.8
- 20.1 - 21.2

NJ Cancer Registry
# Distribution by Stage UMDNJ-UH vs. National Cancer Data Base

<table>
<thead>
<tr>
<th>Stage</th>
<th>Number</th>
<th>% of all cases</th>
<th>Estimated Number</th>
<th>% of all cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>University Hospital</td>
<td>National Cancer DB</td>
<td>University Hospital</td>
<td>National Cancer DB</td>
</tr>
<tr>
<td>0</td>
<td>13</td>
<td>7%</td>
<td>7,503</td>
<td>8%</td>
</tr>
<tr>
<td>I</td>
<td>22</td>
<td>12%</td>
<td>20,844</td>
<td>21%</td>
</tr>
<tr>
<td>II</td>
<td>51</td>
<td>28%</td>
<td>25,862</td>
<td>26%</td>
</tr>
<tr>
<td>III</td>
<td>47</td>
<td>26%</td>
<td>24,603</td>
<td>25%</td>
</tr>
<tr>
<td>IV</td>
<td>46</td>
<td>26%</td>
<td>19,442</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td>179</td>
<td>100%</td>
<td>88,254</td>
<td>100%</td>
</tr>
</tbody>
</table>

Difference in Stage Distribution: \( p = 0.01 \)

(Weiss, Rosenblum, Ortiz-Romero 2011, personal communication)
Increased CRC Mortality

- In New Jersey, colorectal cancer mortality rates are influenced significantly by racial and socioeconomic factors

- Niu et. al. (2010)
  - Black Men: HR 1.28 (1.17-1.40)
  - Black Women: HR 1.23 (1.13-1.34)
  - 10%-20% below PL: HR 1.13 (1.05-1.22)
  - >20% below PL: HR 1.43 (1.29-1.57)
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Cancer Screening and Prevention

- Potential to detect and prevent advanced-stage neoplasms through removal of precancerous lesions (polyps)
  - Flexible Sigmoidoscopy
    - Pros: cheaper than colonoscopy, can be performed by trained GPs
    - Cons: invasive, only partial screening of the colon, inconsistent data on efficacy
  - Colonoscopy
    - Pros: full colonic screening, 10 year screening interval
    - Cons: expensive, invasive, requires highly specialized technical training, no RCT established survival benefit
Cancer Detection:

- Less Sensitive for pre-cancerous lesions
- Non-therapeutic: positive tests require colonoscopy
  - Fecal Occult Blood Testing
    - Pros: cheap, more widely available, non-invasive, can be performed at home, established survival benefit in RCTs
    - Cons: Lower Specificity
  - Double Contrast Barium Enema
  - CT Colonoscopy
    - Non-invasive means of visualizing colonic tract
    - Expensive, radiation exposure, non-therapeutic
Screening Underutilization

- In 2006:
  - Only 24.2 percent of patients over 50 years old have had a stool blood test within previous 2 years
  - Only 57.1 percent had ever had a sigmoidoscopy or colonoscopy.

Behavior Risk Factor Surveillance System of the CDC
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American Cancer Society Toolkit

1. Physician Recommendation
2. Office Policy
   • Screening Administration
3. Office Reminder System
   • Improving Follow-Up
4. Communication System
   • Improving Dialogue
   • Visual Cues Around the Office
ASC Toolkit Example

- Physician Recommendation
  - 90% of patients will receive CRC screening upon recommendation vs. 17% without rec.
  - 57% of primary physicians have no system to remind them when a patient is due for screening
  - Many did not have in place systems to track who had already had screening, what the results were, or if proper follow-up had been obtained.
## Checklist for Follow Through: From Screening to Complete Diagnostic Evaluation

<table>
<thead>
<tr>
<th>gFOBT/FIT Screening</th>
<th>FS, DCBE, CTC, or CS Screening (circle one)</th>
</tr>
</thead>
<tbody>
<tr>
<td>data</td>
<td>data</td>
</tr>
<tr>
<td>1. gFOBT/FIT given</td>
<td>1. FS/DCBE/CTC/CS ordered (circle)</td>
</tr>
<tr>
<td>2. Provider notified</td>
<td>2. FS/DCBE/CTC/CS scheduled</td>
</tr>
<tr>
<td>re: gFOBT/FIT result</td>
<td></td>
</tr>
<tr>
<td>3. Non-responder</td>
<td>3. No-show identified</td>
</tr>
<tr>
<td>contacted</td>
<td></td>
</tr>
<tr>
<td>4. If gFOBT/FIT +, referral given</td>
<td>4. Rescheduled</td>
</tr>
<tr>
<td>Colonscopy</td>
<td>5. Results reviewed</td>
</tr>
<tr>
<td>scheduled</td>
<td></td>
</tr>
<tr>
<td>6. Show/No-show</td>
<td>6. Results on chart for endoscopy/pathology</td>
</tr>
<tr>
<td>7. No-show rescheduled</td>
<td>7. If FS/DCBE/CTC +, referral for colonoscopy</td>
</tr>
<tr>
<td>Results reviewed</td>
<td>8. Show/No-show</td>
</tr>
<tr>
<td>9. Results on chart</td>
<td>9. No-show rescheduled</td>
</tr>
<tr>
<td>10. Results reviewed for endoscopy/pathology</td>
<td></td>
</tr>
<tr>
<td>11. Results on chart</td>
<td></td>
</tr>
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Fecal Occult Blood Test

- Comparatively Cheap and Non-Invasive
  - Potential for greater participation
- Can aid in diagnosis of earlier-staged disease:
  - Le Voyer (2003): 5 year survival
    - T3N0 (w/ 11-20 nodes analyzed): 79%
    - T3N1: 49%
    - T3N2: 15%
- Demonstrated Reduction in Colon Cancer Mortality
  - Mandel (1993): Colorectal mortality rate, survival time, and stage of disease at diagnosis all significantly reduced with annual FOBT screening vs. no screening modality.
- Potentially the most cost-effective means of preventing cancer death (Lieberman 1995)
Improving the FOBT

- Drawbacks to Guaiac FOBTs
  - Dietary Restrictions:
    - Red Meat: Animal Heme => False Positive
    - Fruits and Vegetables: Plant Peroxidase => False Positive
    - Vitamin C: Inhibits Test Reactions => False Negative
  - Medication Restrictions: NSAIDS
Fecal Immunochemical Test

- Fecal Immunochemical Tests (FITs)
- Uses antibodies to human hemoglobin
  - Removes Dietary Restriction
  - Enhances Sensitivity and Specificity
  - FIT screening demonstrates higher population participation compared to guaiac FOBT (Cole 2003)
- While test is more expensive, reduced need for colonoscopy may make more cost effective.
Thank you very much
Works Cited

- Trout, D., Schulte, P. Medical Surveillance, Exposure Registries, and epidemiological Research for Workers Exposed to Nanomaterials. Toxicology. 10 March 2010; 269(2-3): 128-135