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Beginner's Guide to Colorectal Cancer Research

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Beginner's Guide to Colorectal Cancer Research

Kayla M. Walker

August 8th 2013

The 50/50 Experience

Part One

- Department of Pharmacology & Experimental Therapeutics
  - Division of Biostatistics

- Different Faces of Biostatistics
  - Computer Programming
  - Literature Review

Part Two

- Department of Medical Oncology
  - Division of Population Science

- Behind the Scenes glimpse of Health Care
  - Decision Counseling
  - Exploratory Analyses
  - Generating Hypotheses

Part One

Colorectal Cancer (CRC) Literature Review

Kayla M. Walker

August 8th, 2013

Terry Hyslop, Ph.D, Jocelyn Andrel-Sendecki, MSPH

Division of Biostatistics, Department of Pharmacology and Experimental Therapuetics

Thomas Jefferson University

Motivating Conflicts

- Global obesity epidemic
- Physical activity levels
- Metabolic equivalents (METs)
  - Body position and intensity
  - Scale 1.5-8.0
  - Feasible and inexpensive

Initial Aims

- Colon Cancer study
- Occupation data
- Cancer growth data
- Data cleaning
- Computer programming
- Assign MET values
- Look for trends

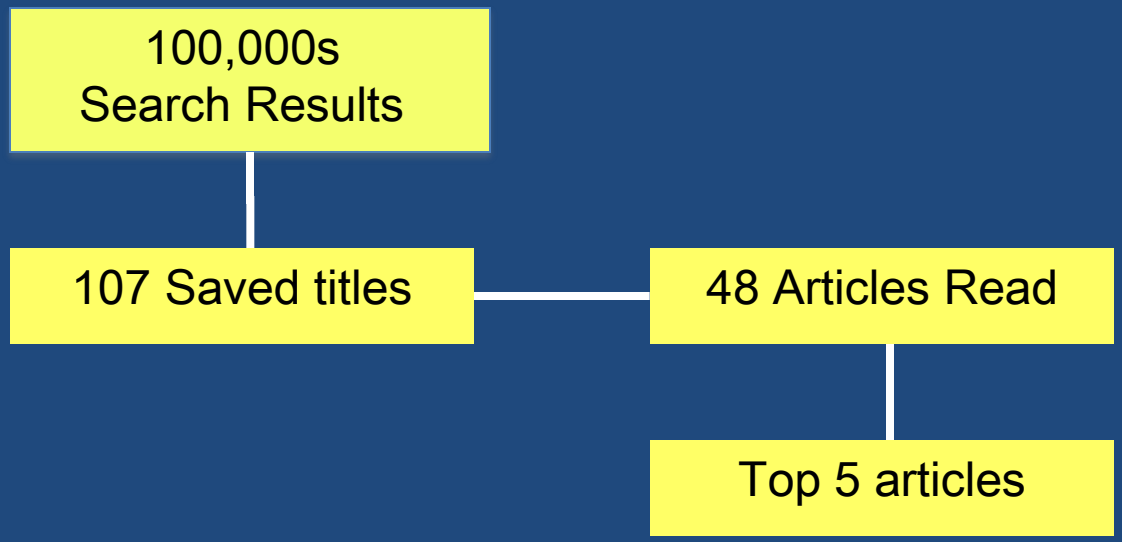
Change of Plans

New Aims

- Literature Review
- Obesity across Cultures
- Obesity and Cancer Risk
- Physical Activity and Cancer Risk
- Environmental Factors on Obesity

Process for Literature Review

- Keywords: colorectal cancer, obesity, environment, physical activity, gender, race



- 10 second elevator review – Focus, population and significant results

Obesity and Colorectal Cancer (CRC) Risk in Women (Terry et. al., 2001)

- Focus: Relationships between CRC risk and Body Mass Index (BMI) and Menopause State

- Women, 40-59 years old, Canada, 10.6 years of follow-up

- Results
  - Mean ages of colon and rectal cancer: 59 and 58
  - Obesity in pre-menopausal woman corresponds with a 2-fold increased risk of developing CRC
  - There is no association between obesity and CRC risk and post-menopausal women

Obesity in Youth and Middle Age and Risk of CRC in Men (Marchand, et. al., 1992)

- Focus: Relevance of exposure period to Western Lifestyle on CRC risk
- Assessed effect of body size on CRC risk at 2 different stages
  - Early adulthood
  - Pre-diagnostic years
- Men with CRC, Asian or Caucasian Descent, Hawaii
- Results
  - Obesity in either life period was found to have an increased risk for colon cancer.

Associations of Sedentary Lifestyle, Obesity, Smoking, Alcohol Use, and Diabetes with the Risk of CRC (Marchand, et. al., 1997)

- Focus: Western lifestyle
- Asian and Caucasian immigrants (male and female) with CRC, Hawaii
- Results
  - High caloric intake and little physical activity showed strongest association for increased CRC risk.
  - Tobacco and Alcohol use were both positively associated with CRC risk
  - Individuals with diabetes and frequent constipation were at an elevated risk of developing CRC
  - Time period of exposure to western lifestyle is insignificant

Environmental correlates of adiposity in 9-10 year old children (Harrison, et. al., 2011)

- Focus: Impact of environmental factors on childhood obesity, measured by Fat Mass Index (FMI)

- Children, 9-10 years old, United Kingdon

- Results varied among boys and girls and active and non-active travellers.
  - Better access to healthy food outlets in home environment resulted in lower FMI among active travellers. Better access to unhealthy food outlets resulted in higher FMIs.
  - In school environment, better access to unhealthy food and accessible land resulted in higher FMI
  - Boys with a major road in the home tended to have higher FMI.

Colorectal Cancer Screening Disparities Related to Obesity and Gender (Rosen et. al., 2004)

- Focus: To examine BMI-related disparities between men and women.

- Adults, age 50-80, US + Puerto Rico eligible for CRC screening

- Results
  - Higher BMI was associated with younger age, black race, lower education attainment
  - Individuals less than 65, female, Hispanic, not high school graduates were less likely to receive CRC screening
  - The difference in screening rates among women was entirely attributable to BMI. Morbidly obese women were less likely to be screened than normal weight women.

Summary: Part One

- Cancer is a multi-faceted disease with many different contributing factors
- Articles were all very different
- My research was not confined to one topic
  - Free rein

Questions? Comments?

Part Two

Race and Interest in Genetic and Environmental Risk Assessment

Kayla M. Walker

August 8th, 2013

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Outline

- Colorectal Cancer (CRC)
- Genetic & Environmental Risk Assessment (GERA)
  - Background information
  - Decision Counseling
  - Preference score computation and results
  - Exploratory analyses
  - Results
- Implications of Findings

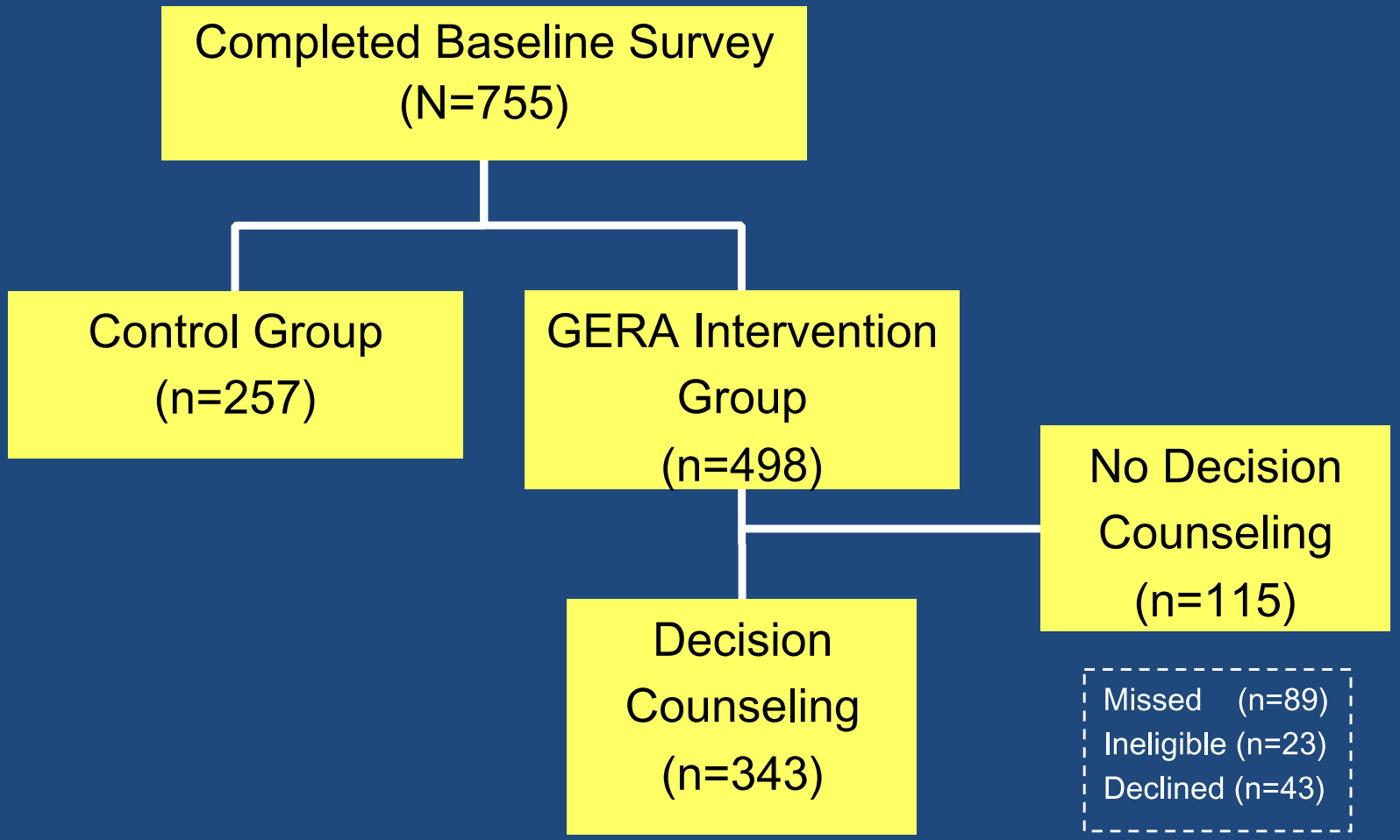
Colorectal Cancer (CRC)

- Third most common cancer
- Third leading cause of cancer death
- Prevention recommendations
  - Age 50-75 at average risk
  - Screening fecal occult blood test (FOBT)
  - Screening endoscopy
- A major public health priority is boosting CRC screening.
- Personalized feedback regarding cancer risk may be the key.

Genetic & Environmental Risk Assessment (GERA)

- Folate is a vitamin that seems to protect some people against colon cancer
- Methylene TetraHydroFolate Reductase (MTHFR)
  - Tell how the body uses folate
- This blood test is one way to determine risk of developing CRC
- GERA vs. screening

Study Design



Study Population and Procedures

- Eligible patients: 50 to 75 years of age and eligible for CRC screening, consented, and completed a baseline survey.

- Control Group:
  - Usual care

  Intervention Group: Decision Counseling with Nurse Specialist
  - Review GERA brochure
  - Identify top decision factors (pros and cons)
  - Rank top 3 factors and determine factor weights
  - Compute preference score (0.000-1.000)
  - Assess agreement with preference measure
  - Patients who preferred GERA had blood test to assess their risk

Computing a Decision Preference Score

Decision Factor Direction and Level of Factor Influence		Score Range	Preference	N (%)
Con				
– Overwhelming	1.9	0.000 – 0.333	High	1 (.3)
– Very Much	1.7	0.334 - 0.356		--- (----)
– Much	1.5	0.357 - 0.383	Moderate	--- (----)
– Somewhat	1.3	0.384 - 0.416		--- (----)
– A little	1.1	0.417 - 0.454	Low	--- (----)
Neutral	1.0	0.455 - 0.545	Neutral	4 (1.2)
Pro				
– A little	1.1	0.546 - 0.583	Low	18 (5.3)
– Somewhat	1.3	0.584 - 0.616		19 (5.6)
– Much	1.5	0.617 - 0.643	Moderate	60 (17.5)
– Very Much	1.7	0.644 - 0.666		158 (46.1)
– Overwhelming	1.9	0.667 - 1.000	High	83 (24.2)

Methods: Analysis of GERA Preference

- GERA preference scores for participants in the intervention group were determined (N=343)
- Preference scores were dichotomized as low to moderate (0.000-0.666) versus high (0.667-1.00)

Univariable Analysis of Preference for GERA

	Low/Mod (n=260)		High (n=83)		
Variable	n	%	n	%	P-value
Race					0.0001
White	165	63.95	33	40.24	
non-White	93	36.05	49	59.76	

Big Question

Why were non-whites more likely to have a strong preference for GERA as compared to whites?

Methods

- Identified independent variables
- Generated frequencies of these variables
- Cross-tabulated each variable with race

Independent Variables

- Sociodemographics
  - Age
  - Gender
  - Marital Status
  - Education
- Decision Counseling Variables
  - Distribution of Decision Factors
  - Influence and Intensity of Primary Pro Decision Factor
- Perceptions/Attitudes*
  - Worries and Concerns
  - Susceptibility
  - Worries/Concerns about susceptibility
  - Social Support and Influence
  - Response Efficacy
  - Salience

*Scales using Likert-type response items (Strongly Disagree=1, Mildly Disagree=2, Not sure=3, Mildly agree=4, Strongly agree=5)

Differences Between Whites and Non-Whites

	White (n=197)		Non-White (n=142)		
Variable	n	%	n	%	P-value
Age					0.0243
50-59	125	63.45	107	75.35	
60-79	72	36.55	35	24.65	
Education					< 0.0001
≤ High school	39	19.80	54	38.03	
> High school	158	80.20	88	61.97	

Differences cont'd

	White (n=197)		Non-White (n=142)		
Variable	n	%	n	%	P-value
Social Support and Influence					0.0240
≤3	34	17.26	12	8.51	
>3	163	82.74	129	91.49	
Primary Pro Factor Influence Score					0.0035
Overwhelming	33	16.75	49	34.51	
Very Much	129	65.48	68	47.89	
Much	21	10.66	15	10.56	
Some	10	5.08	7	4.93	
A Little	4	2.03	3	2.11	

Differences cont'd

Variable	Mean	Standard Deviation	P-value
Worry about Susceptibility			0.0434
Whites	2.70	0.86	
Non-Whites	2.89	0.88	

Summary

- Non-whites were younger than whites.
- Non-whites had less formal education than whites.
- Non-whites had higher social support and influence favoring colorectal screening.
- Non-whites had stronger primary pro factor influence scores than whites.
- Non-whites were more worried about their susceptibility to colorectal cancer than whites.

Bridge to Colon Cancer Vaccine (CCV) Trial

	White (n=27)		Non-White (n=23)	
Variable	n	%	n	%
Interest in Participation				
Yes	9	33.33	12	52.17
No/Unsure	18	66.67	11	47.82

- Decision Counseling
- Hypotheses generated can be tested

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Thank you!
Questions? Comments?

Participants and Decision Factors

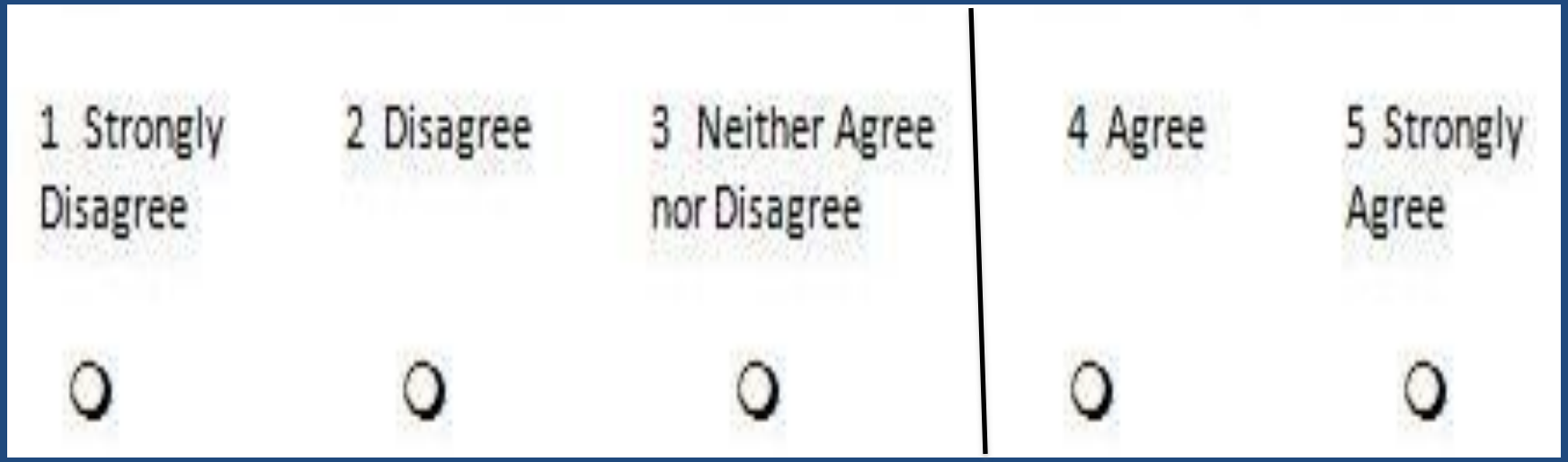
- Pros (Altruism, Knowledge, Worry, Convenience)
  - "The test will help make find out what I can do to prevent colon cancer."
  - "I want to contribute to science."
  - "A blood test is a quick, and painless, safe ."
  - "It makes sense. I'm concerned about my health."

Decision Factors (n=557)

96% Pros
4% Cons

- Cons (Fear, Worry, Trust, Discomfort)
  - "I'm afraid of finding out I'm at higher risk."
  - "I don't like blood tests."
  - "I'm worried about ulterior motives of research institutions."
  - "I'm concerned about my privacy."

Likert Scale



Decision Counseling

- Health care provider-patient relationship
- Encourages patients to identify their personal feelings toward the decision at hand
- Includes various factors that affect one's decision and weighs their importance
  - Demographic background
  - Medical history
  - Social support
- Preference Clarification