Assessment of Basic Numeracy Among a Sample of Appalachian Men and Women Participating in a Colorectal Cancer Screening Formative Research Study

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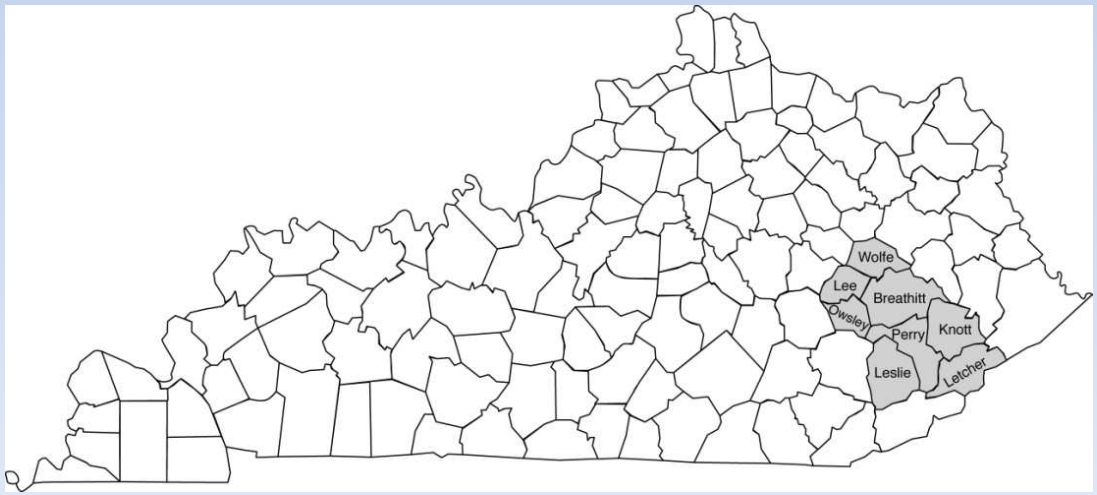
UK Rural Cancer Prevention Center

The Rural Cancer Prevention Center (RCPC) is a planned collaboration of community members, public health professionals, and researchers designed to reduce the health disparities associated with cervical, breast, and colorectal cancer among residents of the Kentucky River Health District in Appalachia Kentucky.

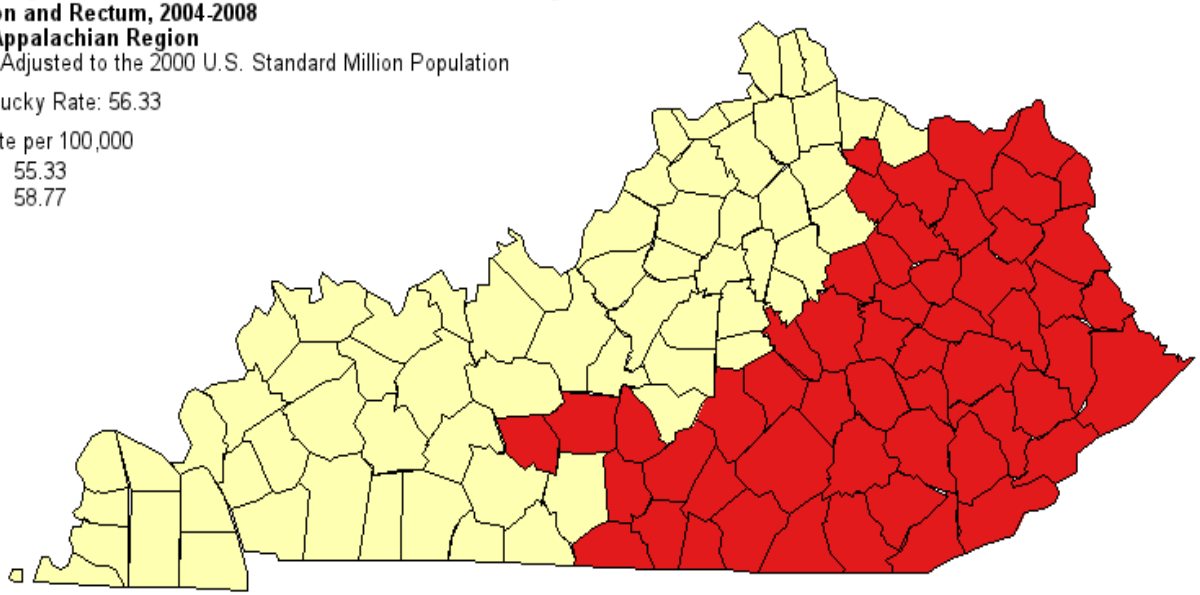


Rural Cancer Prevention Center
UK College of Public Health

Age-Adjusted Invasive Cancer Incidence Rates in Kentucky
Colon and Rectum, 2004-2008
By Appalachian Region
Age-Adjusted to the 2000 U.S. Standard Million Population

Kentucky Rate: 56.33

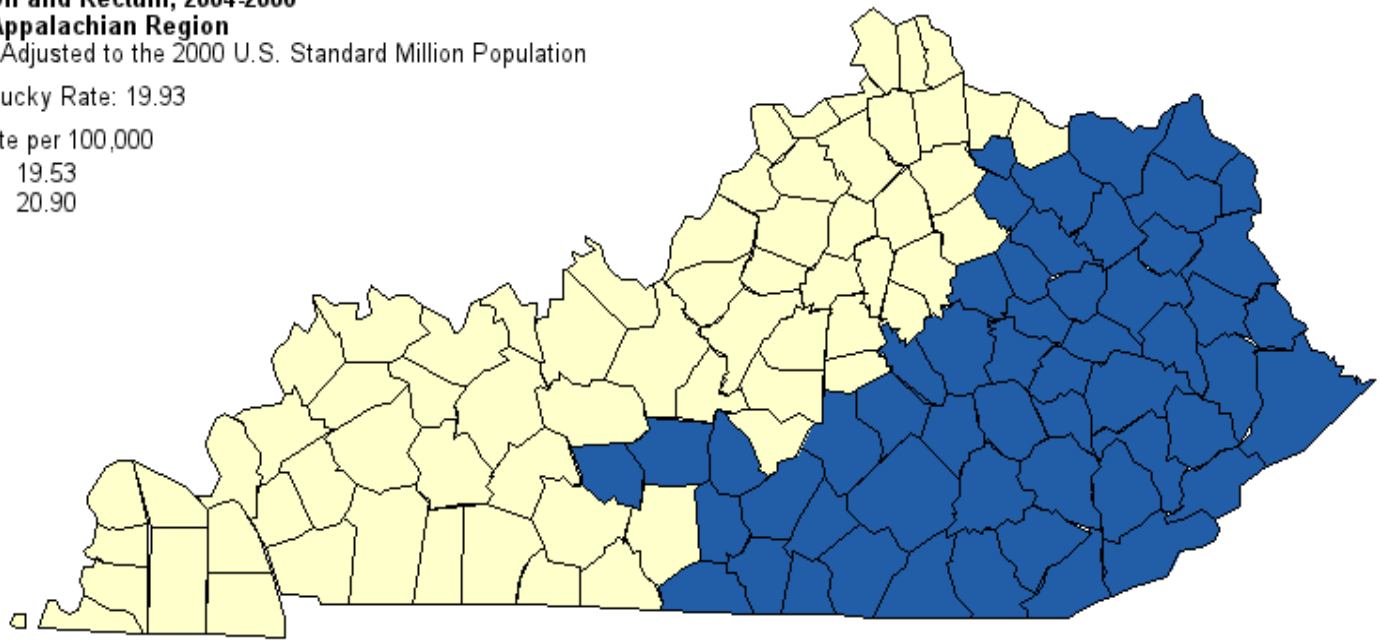
Rate per 100,000
55.33
58.77



Age-Adjusted Cancer Mortality Rates in Kentucky
Colon and Rectum, 2004-2008
By Appalachian Region
Age-Adjusted to the 2000 U.S. Standard Million Population

Kentucky Rate: 19.93

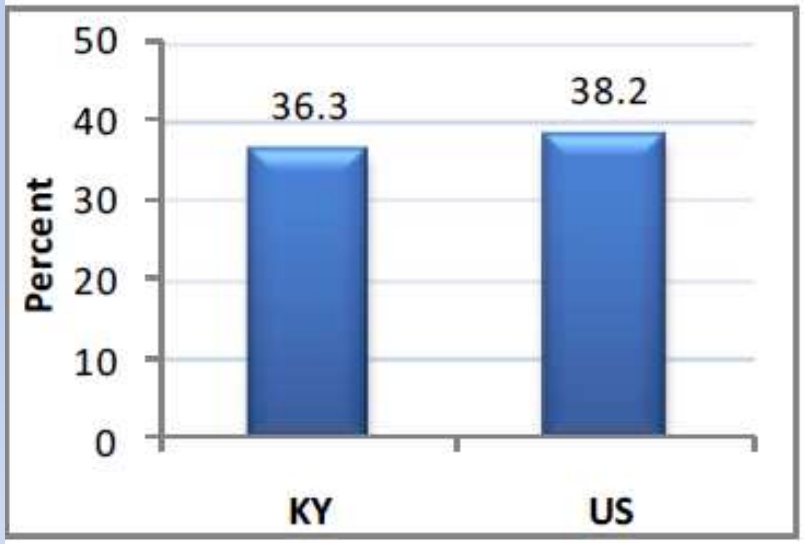
Rate per 100,000
19.53
20.90

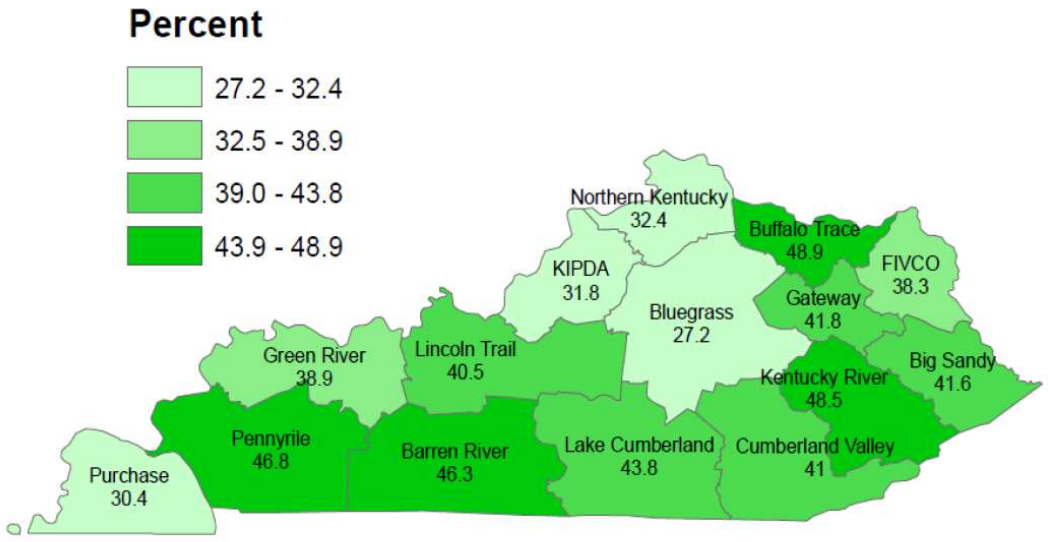


Data accessed April 2, 2012.
Based on data released April 21, 2011.

Colorectal Cancer Screening Rates

Percent of Adults aged 50+ years who have never had a Sigmoidoscopy or Colonoscopy: Kentucky vs Nationwide (States, DC, and Territories), 2008





Statewide Prevalence: 36.3

Health Literacy and Health Numeracy

Health Literacy = capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions

Health Numeracy = capacity to assess, process, interpret, communicate, and act on numerical, quantitative, graphical, biostatistical, and probabilistic health information needed to make effective health decisions

Public Health Impact

Those who are less numerate may struggle with:

- scheduling medical appointments
- adhering to medication regimens
- weighing short-term and long-term benefits
- understanding risks and benefits
- making treatment decisions
- understanding survival statistics
- navigating financial documents
- comprehending informed consent

Public Health Impact

2003 National Assessment of Adult Literacy

- 22% of Americans performed at a “below basic” quantitative literacy skill level
- 66% performed at a “basic or intermediate” skill level
- 13% performed at a “proficient” level

Public Health Impact

Kentucky:

- Only 10% of Kentuckians are quantitatively proficient
- 17% of Whites had below basic quantitative literacy
- 52% of African Americans had below basic quantitative literacy
- 40% of adults over 65 had below basic quantitative literacy
- Appalachian residents?

PURPOSE

- To assess basic numeracy skills among Appalachian men and women age 45 and older, as part of a larger colorectal cancer screening study.

- A total of 35 in-depth interviews were completed.

1. Knowledge, comprehension, and understanding of colorectal cancer terminology, anatomy, and screening procedures
2. Health literacy and numeracy skills
3. Demographic survey

METHODS

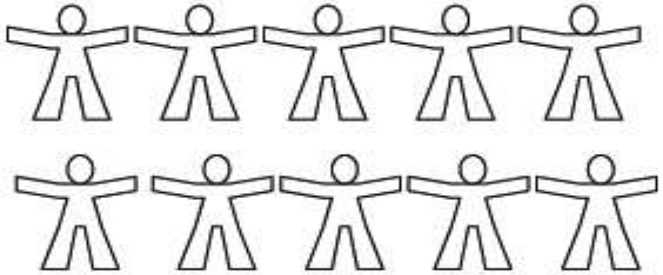
- Health literacy was assessed using the Rapid Estimate of Adult Literacy in Medicine (REALM)
  - Published methodology was used for scoring; then scores were dichotomized into ≤8th grade and ≥9th grade.
- Subjective Numeracy Scale (SNS) was used to assess participants:
  - Perceived mathematical ability (first four questions)
  - Preference of information, described in words or numerically (last four questions)
  - Written and verbal assessments
  - Published methodology used for scoring
- Objective Numeracy Skills were assessed with gingerbread stick men

Subjective Numeracy Scale

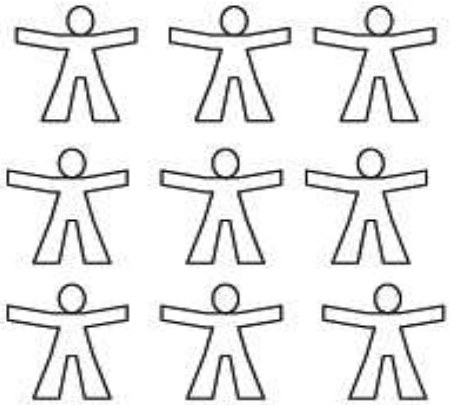
1. How good are you at working with fractions?
   1=not good at all 6= extremely good
2. How good are you at working with percentages?
   1=not good at all 6= extremely good
3. How good are you at calculating a 15% tip?
   1=not good at all 6= extremely good
4. How good are you at figuring out how much a shirt will cost if it is 25% off?
   1=not good at all 6= extremely good
5. When reading the newspaper, how helpful do you find tables and graphs that are parts of a story?
   1 = not helpful at all 6 = extremely helpful
6. When people tell you the chance of something happening, do you prefer that they use words (like "it rarely happens") or numbers (like "there's a 1% chance")?
   1 = always prefer words 6 = always prefer numbers
7. When you hear a weather forecast, do you prefer predictions using percentages (for example: "there will be a 20% chance of rain today") or predictions using only words (for example: "there is a small chance of rain today")?
   1 = always prefer percentages 6 = always prefer words
8. How often do you find numerical information to be useful?
   1 = never 6 = always

Gingerbread Numeracy

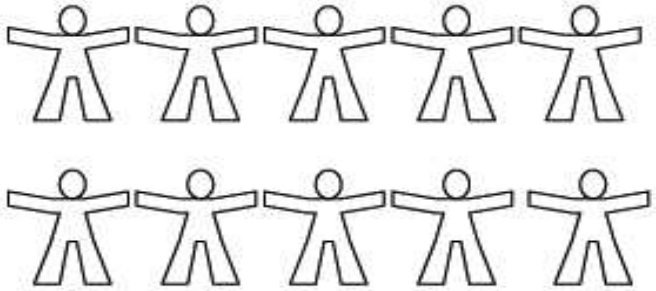
1. Put an X through two of the ten men below.



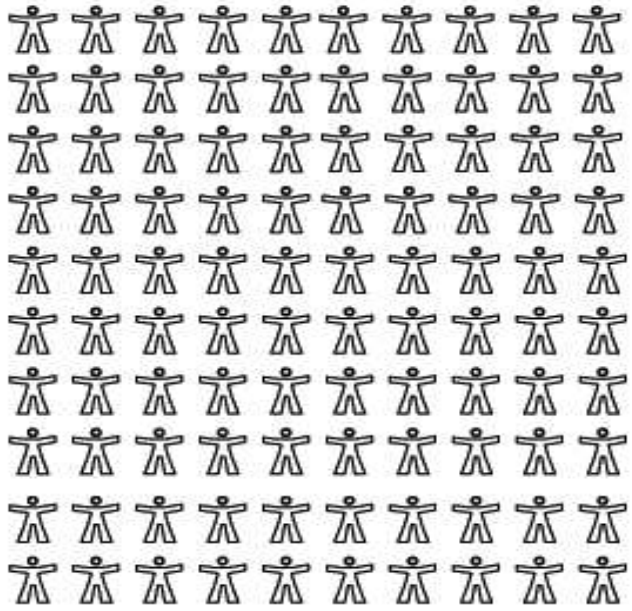
2. Put an X through two thirds of the men below.



3. Put an X through thirty percent of the men below.



4. There are 10 rows of 10 men below, 100 men altogether. Put an X through thirty percent of the men below.



RESULTS

Average age: 58 yrs
(SD=10.03, range 46-83)

Demographics	N§	Frequency	Percent (%)
Gender	35		
Female		27	77.14
Education	35		
Some High School or less		5	14.29
High School or GED		8	22.86
Some College (AA degree) or more		22	62.66
Income	33		
Less than $15,000		4	12.1
$15,000 - $30,000		12	36.4
$30,000 - $60,000		12	36.4
$60,000 - $100,000		5	15.2
Employment	35		
Full time		17	48.6
Not working		17	48.6
Health Insurance	35		
Yes		27	77.1

§ sample sizes vary based on missing responses

Results: REALM Scores

Score Range	Grade level	Frequency	Percent (%)
0 - 18	3rd grade and below	2	5.7
19 - 44	4th - 6th grade	0	0
45 - 60	7th - 8th	8	22.9
61 - 66	High school	25	71.4

The average score of the REALM for all participants was 59.66 (SD=11.97, range 13-66, median 64).

RESULTS
Subjective Numeracy

Variable	N	Verbal		Written		p-Value
		Median	50% Quantile Range	Median	50% Quantile Range	
Ability Subscale	35	4.00	(3-5)	4.25	(3.00-5.00)	0.7496
Preference Subscale	35	4.75	(4-5.25)	4.5	(3.75-5.5)	0.9288
Overall Score	35	4.5	(3.25-5)	4.375	(3.25-5.00)	0.9407

RESULTS
Subjective Numeracy

Variable	N	≤ 8th grade N=10		≥ 9th grade N=25		p-Value
		Median	50% Quantile Range	Median	50% Quantile Range	
Written SNS Ability Subscale	35	2.5	(1.25-4.00)	4.5	(3.75-5.25)	0.01*
Written SNS Preference Subscale	35	3.75	3.25-4.75	4.5	(4.00-5.5)	0.09*
Written SNS Overall Score	35	3.125	(2.25-4.375)	4.375	(3.875-5.25)	0.006*

*Statistically significant at alpha 0.1

RESULTS
Objective Numeracy

Objective Numeracy	N	Frequency	Percent (%)
Incorrectly answered 2/3 of 9	35	8	22.9
Incorrectly answered 30% of 10	35	11	31.4
Incorrectly answered 30% of 100	35	13	37.1

All of the participants (N=35, 100%) were able to cross out two of ten stick men.

RESULTS
Objective Numeracy

Variable Objective Numeracy	N	≤ 8th grade N=10		≥ 9th grade N=25		Value
		Frequency	Percent (%)	Frequency	Percent (%)	
Incorrectly answered 2/3 of 9	35	4	40	4	16	0.19
Incorrectly answered 30% of 10	35	4	40	7	28	0.69
Incorrectly answered 30% of 100	35	5	50	8	32	0.44

Limitations

- Small sample size (N=35)
  - Although there were statistically significant results reported these should be interpreted with caution.
  - Limited generalizability
- No predictive regression models could be used; therefore, the quantitative results of this study are simply descriptive.

CONCLUSION

- Take away message: health literacy, particularly health numeracy, is often taken for granted by public health and health communication researchers and practitioners

- Need to consider using more visual, graphic data to make cancer information such as incidence and mortality rates, risks and benefits of screening and treatment, and survival statistics, more accessible to less numerate populations.

Semi Colon Cancer

As told to one of our cancer registry staff by an 85 year old, African American female colon cancer patient from eastern Kentucky:

"I have me that 'semi colon cancer' and they took out some of my 'intesticals' and 'stapled' them to my side. You know, honey, one of them 'colossal' bags. They took some of them 'pops' out too."

Questions?

Thank you!

UK Rural Cancer Prevention Center

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