Health Behavior and Cancer

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Objectives

- Explain role of behaviors in etiology and treatment of cancer
- Explain theories of health behavior and behavior change
- Explain issues of measurement in health behavior

Relevance of Behavior

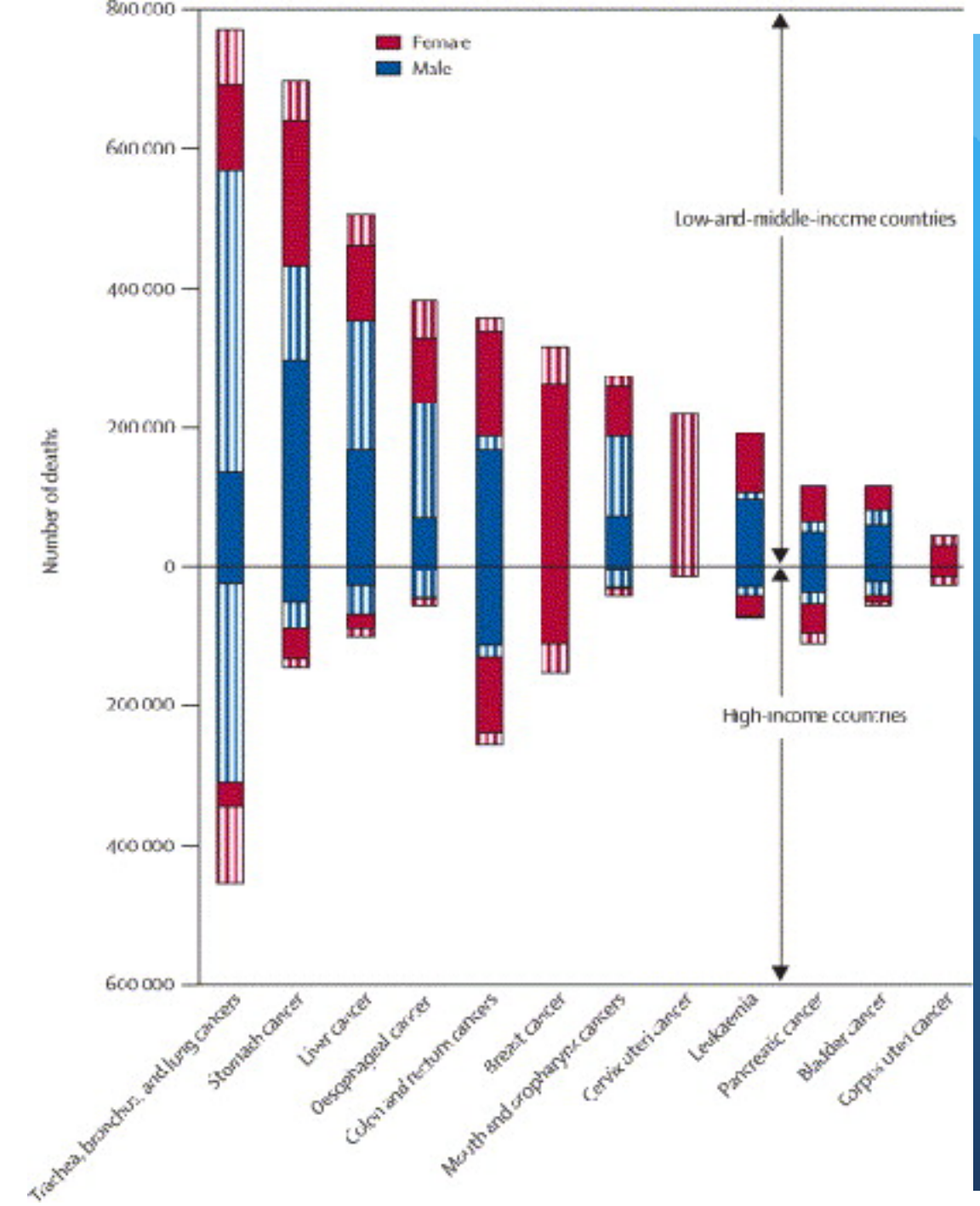
- Risk factors
- Protective/preventative factors
- Screening
- Compliance
- Information seeking

Role of Behaviors in Cancer

- Tobacco use accounts for about 1/3 of cancer deaths
- Physical inactivity and poor diet account for up to 30% of cancer deaths
- Compliance with screening recommendations, which can help prevent or mitigate cancer, is a behavioral issue
  - Mammography, colonoscopy, PSA/DRE

Behavioral Risk Factors

Smoking	Lung, oral, trachea, bladder, esophagus, kidney, pancreas, cervix, colon, leukemia, stomach
Smokeless tobacco use	Oral, pancreas
Physical inactivity	Colon, breast
Alcohol use	Oral, esophagus, liver
Sexual activity	Cervix, Oral
Low fruit and vegetable consumption	Breast, colorectal, oral, larynx, esophagus, stomach
Obesity	Breast, endometrium, kidney, esophagus, colon
Tanning/Excessive sun exposure	Melanoma



Worldwide deaths from site-specific cancers attributable to selected risk factors by sex.

For every cancer site, solid blocks of color represent deaths not attributable to risks assessed and broken blocks of color represent deaths attributable to selected risk factors

Danaei et al. Lancet 2005.

Purpose of a Theoretical Framework

- Focus attention on certain factors, allowing you to ignore others;
- Models force the investigator to make causal assumptions explicit.
- To make predictions (allows hypothesis testing)
- For practitioners models allow one to understand why interventions work or fail to work and help guide improvements in programs.

Social Ecological Model of Health Policy

Health Behavior Models

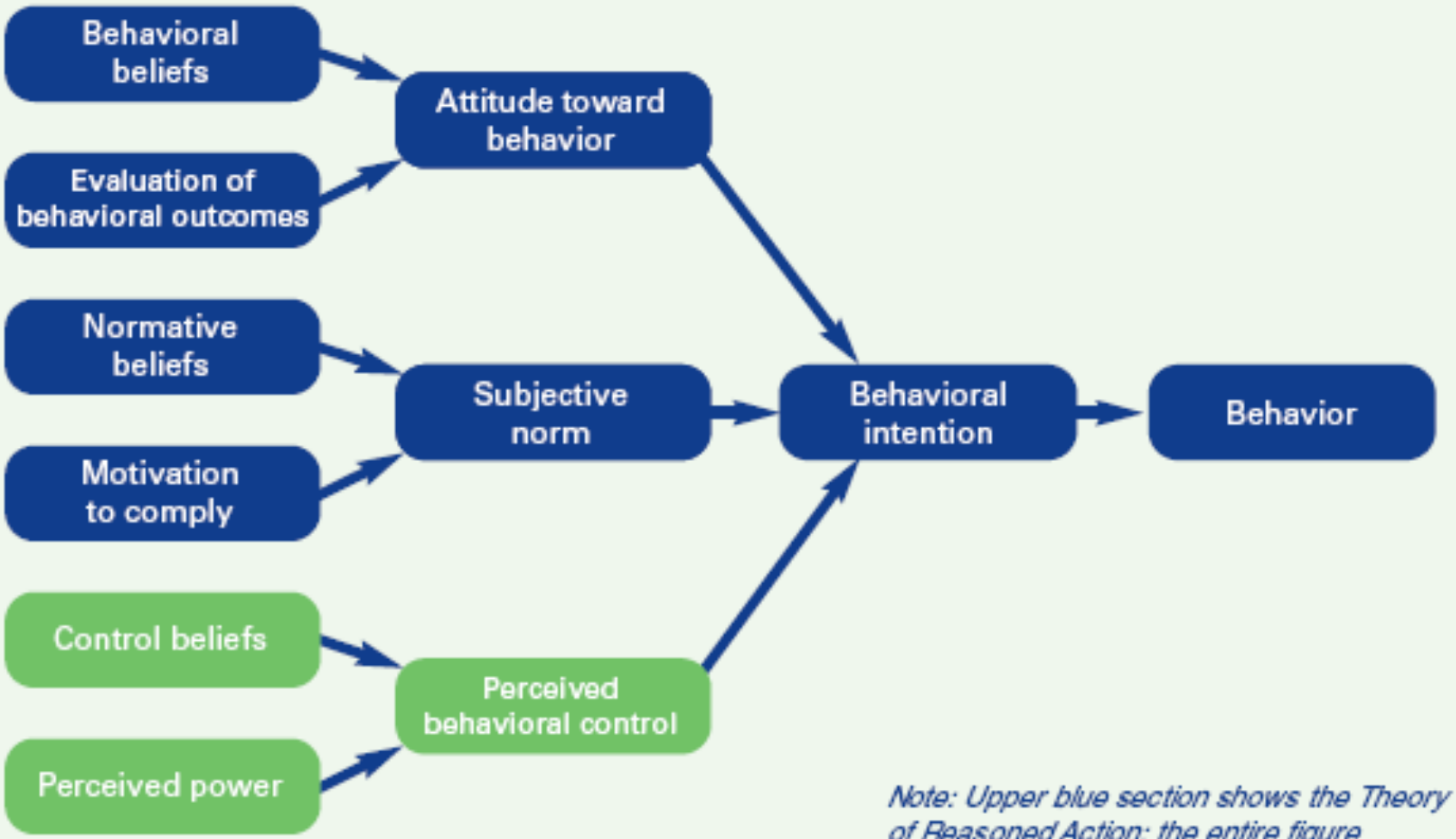
- Cognitive theories (*tell me what I need to know*)
  - Health belief model (HBM)
  - Fishbein's Behavioral Intention Model
  - Subjective Expected Utility Theory
- Stimulus response theory (*rewards & punishments*)
- Social Learning Theory (*social influences and expectations*)
- Diffusion of Innovations (*macro social influences*)

Theory of Reasoned Action

- Behavior is best predicted from a person's intention to perform the behavior.
- Intention to perform the behavior is the result of two factors:
  - Attitude about the behavior
  - Social norms related to the behavior

Theory of Planned Behavior

- Extends TRA to include perceived behavioral control
  - Belief that one has, and can exercise, control over performing the behavior
- People may try harder to perform a behavior if they feel they have a lot of control over it
  - Behavioral skills


Behavioral beliefs
Evaluation of behavioral outcomes
Attitude toward behavior
Normative beliefs
Motivation to comply
Subjective norm
Behavioral intention
Behavior
Control beliefs
Perceived power
Perceived behavioral control
Note: Upper blue section shows the Theory of Reasoned Action; the entire figure shows the Theory of Planned Behavior.

Attitude toward the behavior

- Attitude toward the behavior is a function of one's beliefs about the following:
  - Belief that doing the behavior will lead to a particular outcome;
  - The individual's evaluation of the outcome (rating of good or bad)

Social Norms

- behavioral expectations and cues within a society or group
- customary rules of behavior that coordinate our interactions with others
- Deference to the social norms maintains one's acceptance and popularity within a particular group
  - ignoring the social norms risks one becoming unacceptable, unpopular or even an outcast from a group

Social Norms

- Norms are a special category of beliefs
  - perceived to be socially shared regarding prevalent or prescribed behaviors
- behavioral (descriptive) norms refer to the most common actions or behaviors actually exhibited in a social group.
  - what most individuals of a social group actually do.
- attitudinal (injunctive) norms refer to the most widely shared beliefs or expectations in a social group about how people in general or members of the group *ought* to behave in various circumstances.

Denormalization vs. Stigma

- One of the successes of tobacco control has been the denormalizaiton of smoking
  - A proud accomplishment against the backdrop of widespread smokin across social classes and heavy promotion by the industry
- Denormalize behavior rather than demonize person

Denormalization vs. Stigma

- Bayer and Stuber (*Am J Public Health* 2006) raise the issue of stigmatization of tobacco users as potentially counterproductive
- Stigma imposes burdens on those labeled 'deviant' or 'abnormal'
  - Social subordination of those already marginalized
  - HIV: stigmatization leads to persons not seeking testing, treatment
    - in cases where sero-status becomes known, leads to prejudice and discrimination

Denormalization vs. Stigma

- Smoking is increasingly clustered among the socially disadvantaged
  - In Western world, more concentrated in lower SES groups
  - Grown markets for tobacco industry is the developing world
- Risk that as smoking becomes more and more a deviant behavior, it will be seen as a less important public health issue

Example: Screening Adherence

Cervical cancer screening

- Screening for cervical cancer and its precursors is primarily responsible for the decreased incidence and mortality of cervical cancer among women in the US
- Recommended screening: Pap smear starting age 21, every 3 years
- Disparities exist: incidence higher in Latinas
  - Latinas also much more likely to never have been screened
- The purpose of the paper you read was to examine the ability of the TPB to predict cervical cancer screening in Latinas.

Methods

- Intervention trial examining the effectiveness of a lay health worker–delivered intervention to increase cervical cancer screening in Latino women (Byrd et al., 2013).
- Eligible participants:
  - women of Mexican origin ages 21 or older
  - no previous history of cancer, no hysterectomy
  - no cervical cancer screening within the past 3 years
- Participants were recruited at a variety of locations, including beauty salons, laundromats, jewelry stores, bakeries, schools, community centers, churches, and retail stores.

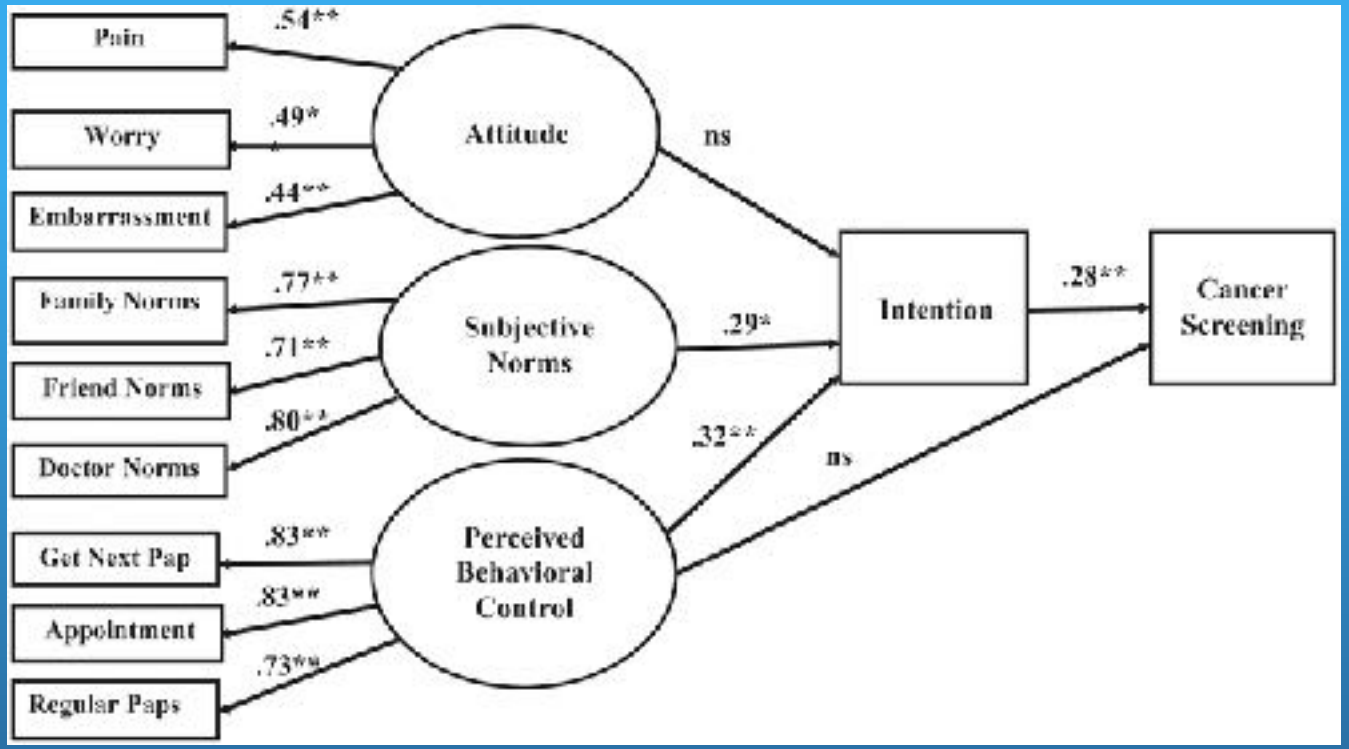
Table 1. Demographic Characteristics of the Sample ($N = 614$).

Variable	n (%)
Marital status	
Single, never married	74 (12.1)
Married or living with partner	421 (68.6)
Separated, divorced, or widowed	119 (19.5)
Education	
Less than high school completed	423 (84.6)
Completed high school	77 (15.4)
Nativity	
Foreign born	538 (87.7)
U.S. born	76 (12.4)
Health insurance	
Yes	111 (18.1)
No	499 (81.3)
Unsure	4 (0.7)
Language spoken	
Spanish	591 (96.3)
English	23 (3.7)

Note. Frequencies that do not sum to total represent missing data.

Table 1. Demographic Characteristics of the Sample ($N = 614$).

Published in: Angelica M. Roncancio; Kristy K. Ward; Ingrid A. Sanchez; Miguel A. Cano; Theresa L. Byrd; Sally W. Vernon; Maria Eugenia Fernandez-Esquer; Maria E. Fernandez; *Health Education & Behavior* 42, 621-626.
DOI: 10.1177/1090198115571364



*p < .05. **p ≤ .001. *ns* = nonsignificant path.

Note. Model fit indices: $x^2(48) = 54.32$, p value = .246; comparative fit index [CFI] = .992; root mean square error of approximation [RMSEA] = .015 (.000, .032); weighted root mean square residual [WRMR] = .069; Intention R^2 = .28; cancer screening R^2 = .13. The model also included Intervention group (i.e., control vs. intervention) as a covariate predicting cancer screening to control for its effects (.52, p < .001).

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Conclusions

- Findings suggest the need for interventions to increase Latinas' sense of control over undergoing screening.
- Interventions should include messages that strengthen Latinas' beliefs that people who are important to them expect them to undergo screening.
- Interventions that successfully increase intentions may positively affect screening behavior among Latinas.
- Findings provide support for the TPB's predictive ability of Latinas' behavior and its potential utility as an intervention to increase cervical cancer screening among Latinas.

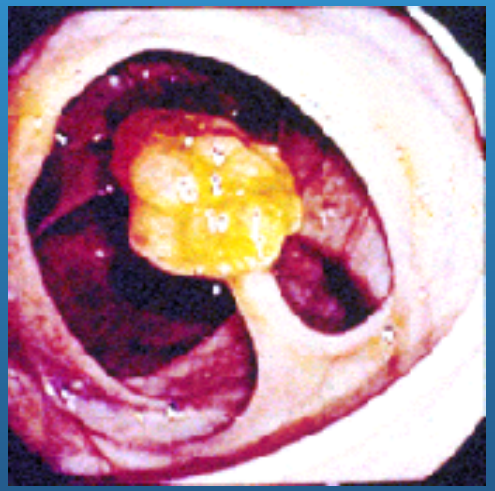
Understanding CRC

- Colorectal cancer (CRC) starts in the colon or rectum
- CRC is the 3rd most common form of cancer diagnosed in men and women in the US (148,000 new cases in 2010)
- CRC is the 2nd leading cause of cancer deaths in the US.

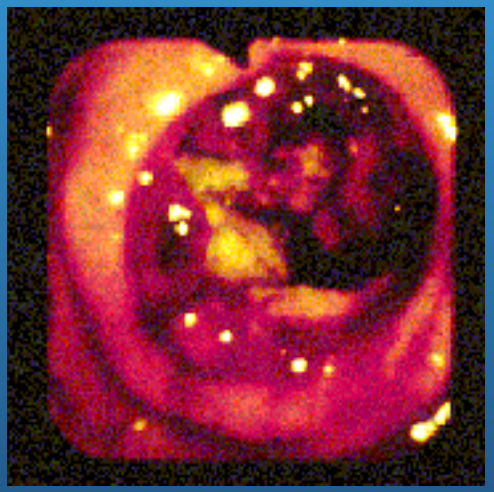
  (48,000 deaths in 2010)
- The number of people dying from CRC has declined over the past 20 years with better screening, diagnosis and treatments
- Screening for/removing polyps early is the best way to prevent and cure CRC

Natural History

Polyp



Advanced cancer



- **Age 50, 25% risk of developing polyps**
- **Age 75, 50-75% risk of developing polyps**

Screening = Prevention & Early Detection

Prevention

Polyp removal → **Decreased Incidence**

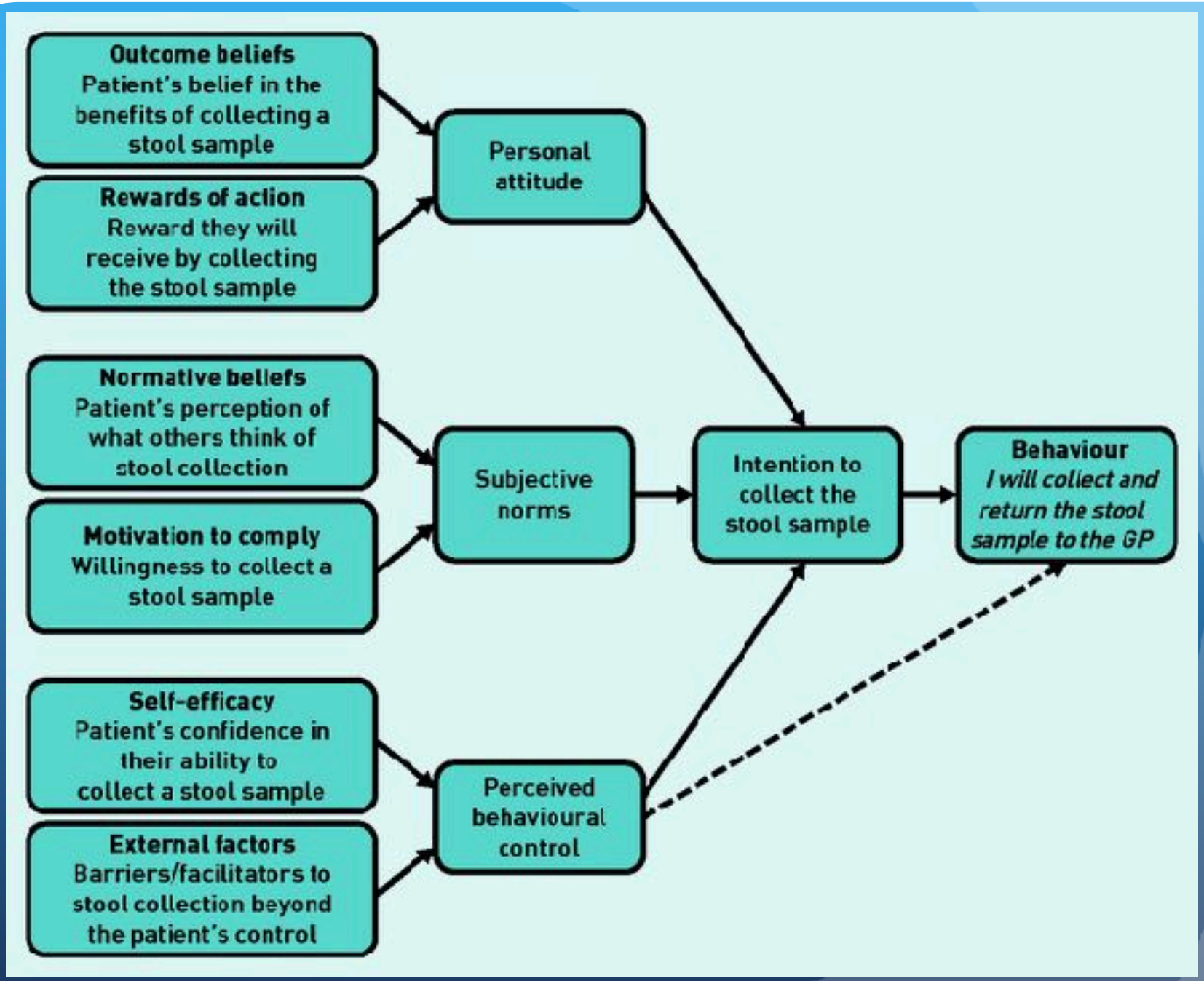
Early Detection → **Decreased Mortality**

Colorectal Cancer Screening

- USPSTF: “A” recommendation (2008)
  - Acceptable modalities
    - Colonoscopy
    - Fecal blood test
      - Fecal immunochemical test, high-sensitivity hemoccult
    - Flexible sigmoidoscopy
  - Insufficient evidence for CT colonography, fecal DNA

Issues Related to CRC Screening

- Practical barriers
  - System
  - Cost
  - Environment/area
  - Lack of access to healthcare provider
- Psychological barriers
  - Lower knowledge or awareness
  - Lower perceived risk of CRC
  - Negative attitudes towards screening
  - Higher worry or fear of CRC

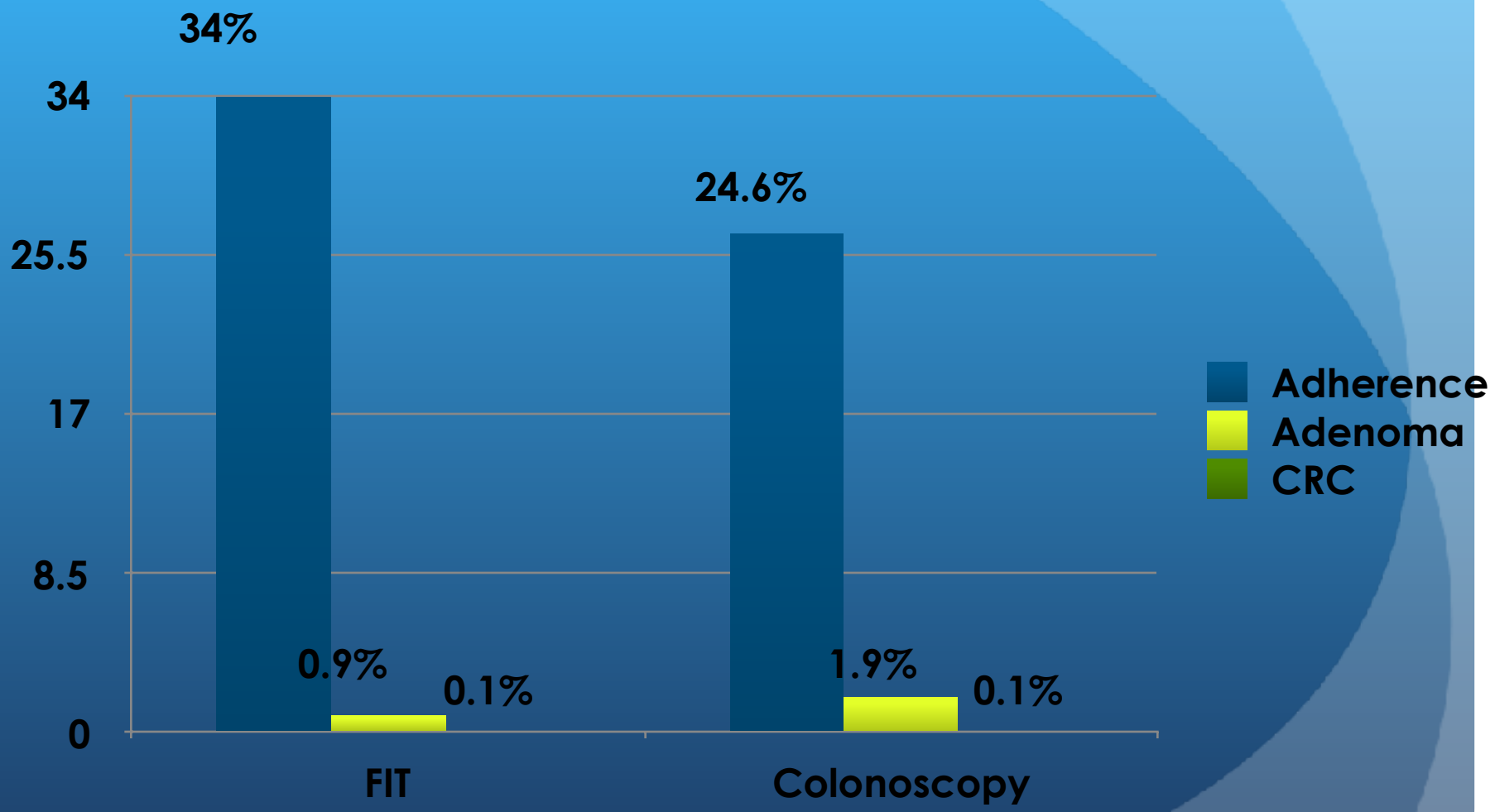

Outcome beliefs
Patient's belief in the benefits of collecting a stool sample
Rewards of action
Reward they will receive by collecting the stool sample
Personal attitude
Normative beliefs
Patient's perception of what others think of stool collection
Motivation to comply
Willingness to collect a stool sample
Subjective norms
Intention to collect the stool sample
Behaviour
I will collect and return the stool sample to the GP
Self-efficacy
Patient's confidence in their ability to collect a stool sample
External factors
Barriers/facilitators to stool collection beyond the patient's control
Perceived behavioural control

Colorectal Cancer Screening

- Fecal immunochemical test (FIT) more acceptable than colonoscopy

- Randomized screening trial in Spain of biennial FIT vs. one-time colonoscopy 53,302 subjects ages 50 to 69
- Primary outcome is CRC mortality after 10 years

Screening Outcomes



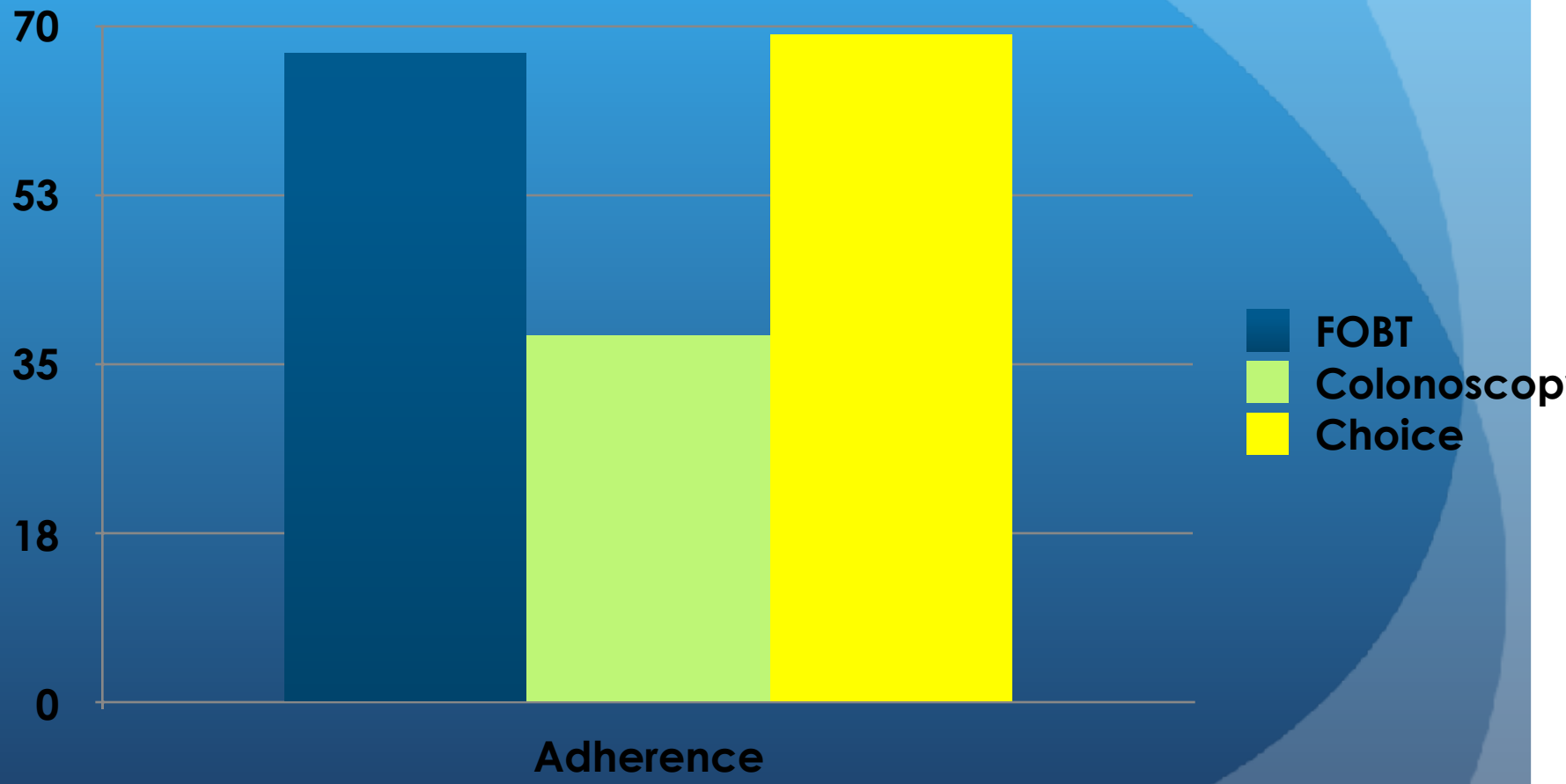
Quintero E. NEJM 2012;366:697

Colorectal Cancer Screening

- Recommending only colonoscopy resulted in lower adherence

- Randomized trial offering colonoscopy, FOBT, or choice of colonoscopy/FOBT
- 997 subjects ages 50 to 79
- 12-month follow up

Screening Completion



Inadomi JM. Arch Intern Med 2012;172:575

Implications for Practice

- Offer screening

- Testing modalities
  - Fecal immunochemical tests more acceptable and accurate than Hemoccult II
  - Flex sig no longer routinely performed
  - Colonoscopy RCT ongoing
  - CT colonography not reimbursed by Medicare

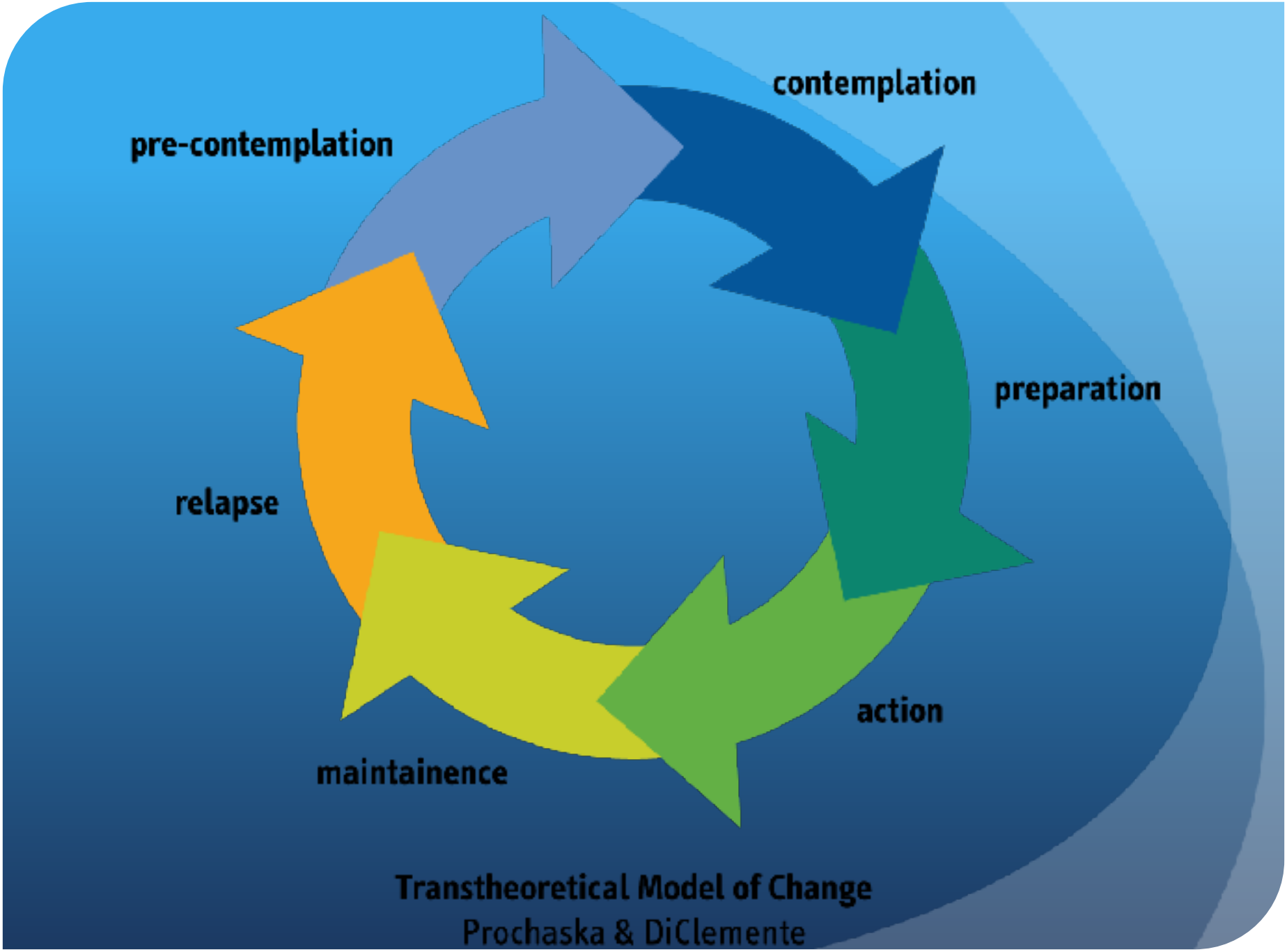
Implications for Practice

- Recognize importance of patient preferences
  - "The best test is the one that gets done"
- Positive fecal blood tests must be evaluated with diagnostic colonoscopy

Behavior Change

Transtheoretical Model

- Behavior change as process, not event
- 5(6) distinct stages (Stages of Change)
  - Precontemplation, contemplation, preparation, action, maintenance, (termination)
- Circular rather than linear (people can move between stages readily in any sequence)

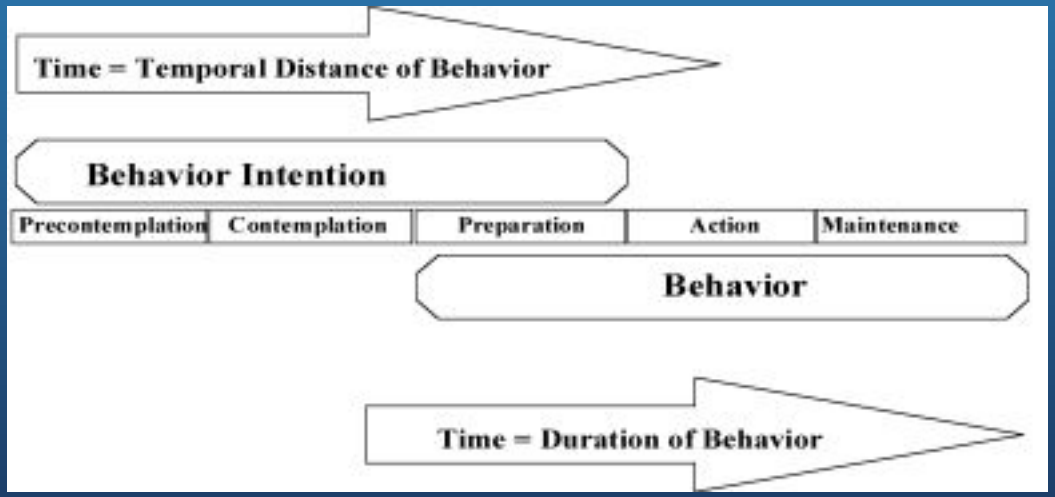


Transtheoretical Model of Change

Prochaska & DiClemente

Transtheoretical Model

- Extended TTM includes decisional balance and self efficacy
- TTM originally developed out of smoking cessation, but is now widely applied to hard-to-change behaviors, particularly relapsing behaviors.

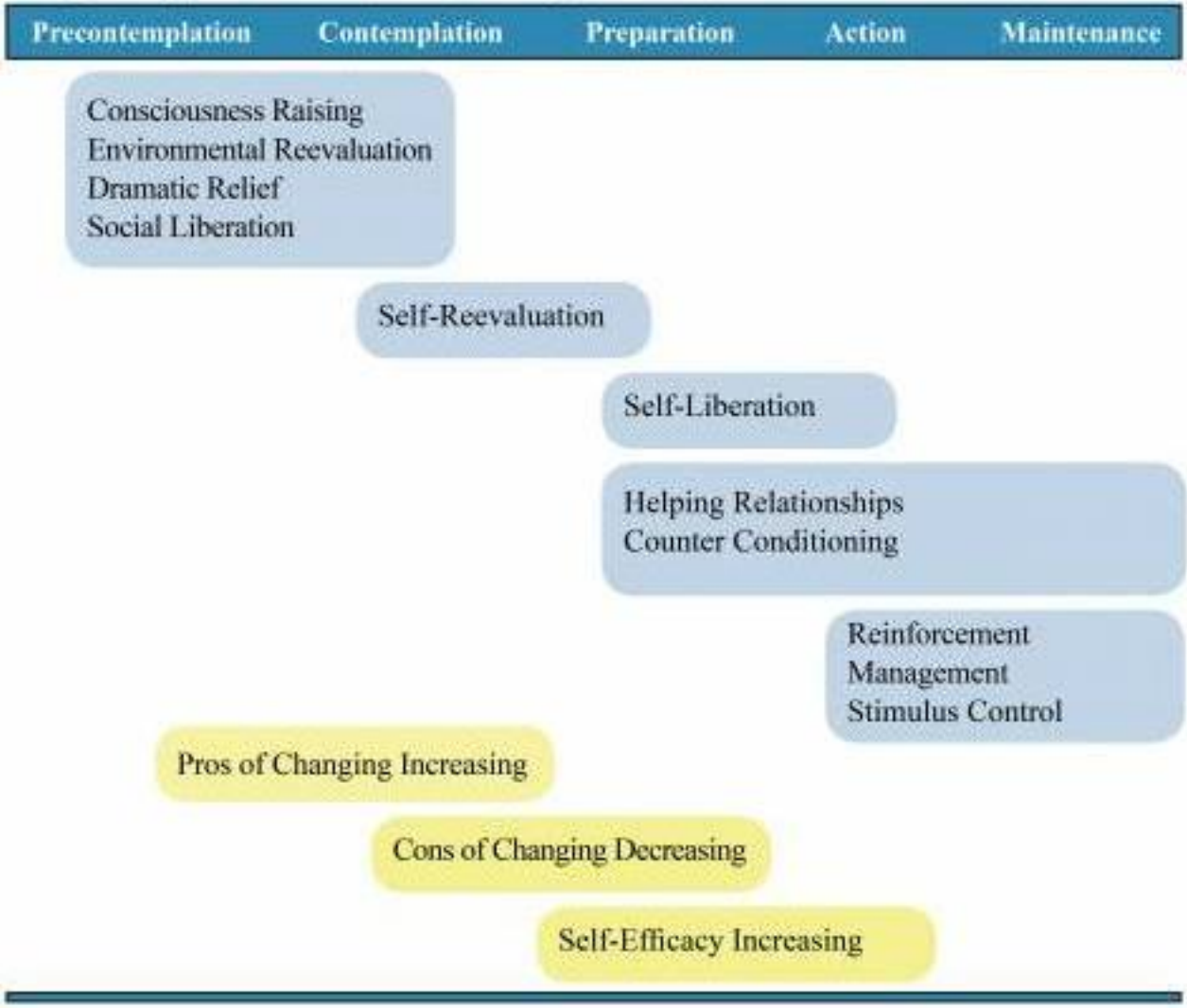


Processes of Change

- Transitions between the stages of change are effected by processes of change.
  - *consciousness raising, counterconditioning, dramatic relief, environmental reevaluation, helping relationships, reinforcement management, self-liberation, self-reevaluation, social liberation,* and *stimulus control.*

TTM content	Definition
Decisional Balance	Pros and cons of behavior and behavior change
Counter-Conditioning	Substituting healthy alternative behaviors and thoughts for old behaviors
Consciousness Raising	Learning new facts, ideas, and tips that support the behavior change
Dramatic Relief	Experiencing negative emotions that go along with old behaviors and positive emotions that go along with new behaviors
Environmental Reevaluation	Realizing the negative impact of one's behavior and the positive impact of change on others
Helping Relationships	Seeking and using social support to make and sustain change
Reinforcement Management	Increasing rewards for healthy behavior change and decreasing the rewards for old behaviors
Stimulus Control	Removing reminds/cues to engage in old behavior, and using cues to engage in the new healthy behavior
Self-Liberation	Making a firm commitment to change
Social Liberation	Realizing that social norms are changing to support new behavior
Self-Reevaluation	Realizing that the behavior change is an important part of one's identity

Stages by Processes of Change



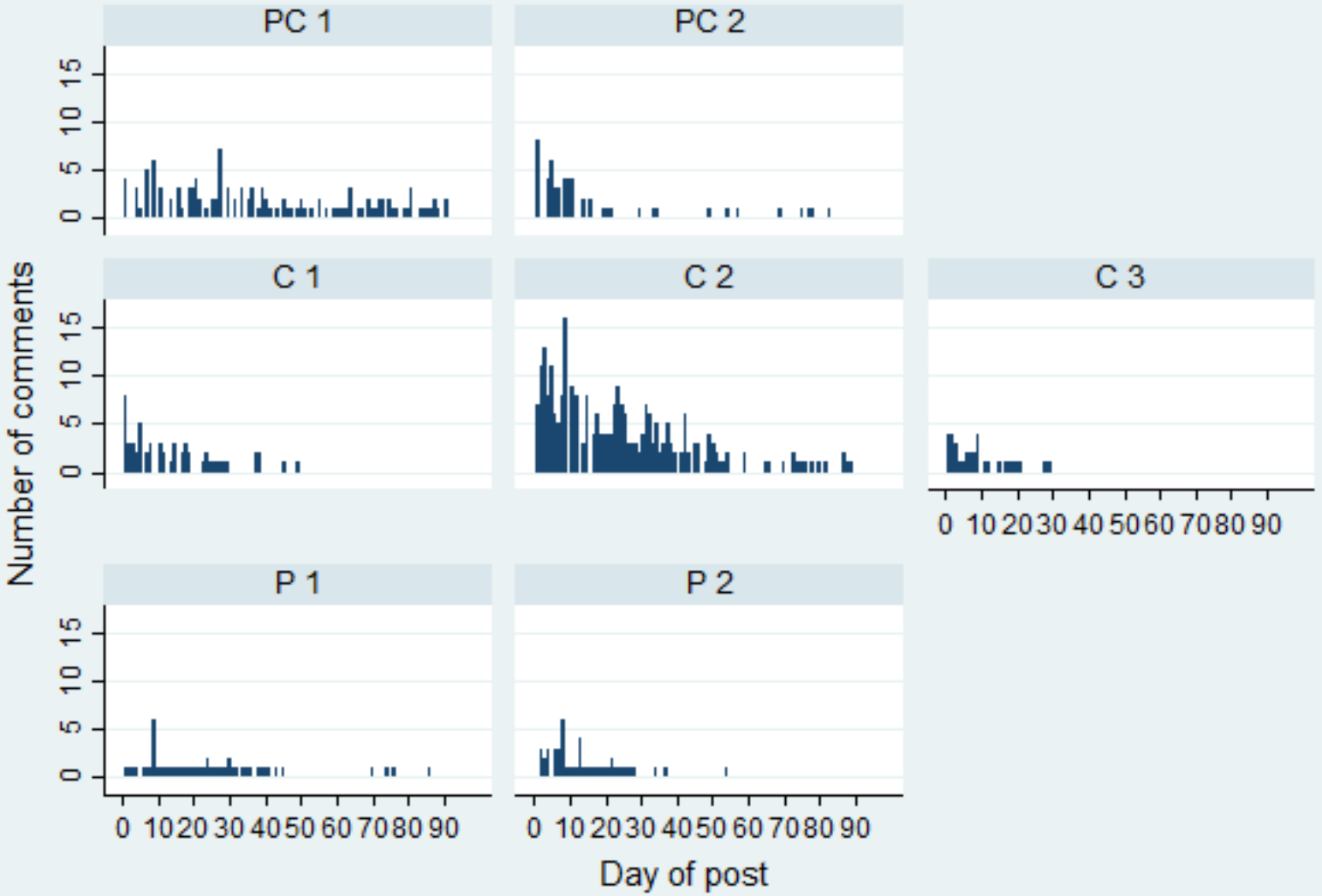
Example: Facebook intervention for smoking cessation

- Thrul J, Klein AB, Ramo DE. Smoking Cessation Intervention on Facebook: Which Content Generates the Best Engagement? J Med Internet Res 2015;17(11):e244

- identify which intervention content based on the TTM generated the highest engagement among participants in pre-action stages of change (Precontemplation, Contemplation, Preparation)

- All participants were invited to a secret Facebook group tailored to their stage of change:
  - Precontemplation (ie, Not Ready to Quit);
  - Contemplation (ie, Thinking About Quitting);
  - Preparation (ie, Getting Ready to Quit).
- Research staff made one daily Facebook post for 90 days tailored to their readiness to quit to each group.

- 586 respondents, 230 signed online consent, and 79 were assigned to one of seven Facebook groups (number of participants mean 13, SD 5, range 7-22).
- Participants had a mean age of 21 (SD 2), 20% (16/79) were female


PC 1
PC 2
C 1
C 2
C 3
P 1
P 2
Number of comments
0 5 10 15
0 10 20 30 40 50 60 70 80 90
Day of post
Graphs by group

- Participants in Precontemplation and Contemplation showed more than average engagement when posts were based on Decisional Balance.
- For participants in Contemplation, we found that posts utilizing Dramatic Relief and Self-Liberation generated below-average engagement.
  - Dramatic Relief posts were primarily focused on eliciting negative emotions related to smoking
  - Findings suggest that posts focused on associating positive emotions with quitting may have been a more effective strategy.

Behavioral Science at RPCI

- Andrew Hyland, PhD – Tobacco control policy; Survey Research resource director; Dept. chair
- Richard O'Connor, PhD – biobehavioral interactions; measurement
- Martin Mahoney, MD, PhD – smoking cessation; cancer screening; vaccination
- Christine Sheffer, PhD – smoking cessation; reward dysregulation
- Maansi Bansal-Travers, PhD – health communication
- Deborah Erwin, PhD – health disparities; community outreach; cancer screening
- Elisa Rodriguez, PhD, MPH – health disparities; community engagement in research
- Rodney Haring, PhD, MSW – behavioral interventions