Can Streamlined Multicriteria Decision Analysis Be Used to Implement Shared Decision Making for Colorectal Cancer Screening?

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Background. *Current US colorectal cancer screening guidelines that call for shared decision making regarding the choice among several recommended screening options are difficult to implement. Multicriteria decision analysis (MCDA) is an established method well suited for supporting shared decision making. Our study goal was to determine whether a streamlined form of MCDA using rank-order–based judgments can accurately assess patients' colorectal cancer screening priorities.* ***Methods.*** *We converted priorities for 4 decision criteria and 3 subcriteria regarding colorectal cancer screening obtained from 484 average-risk patients using the analytic hierarchy process (AHP) in a prior study into rank-order–based priorities using rank order centroids. We compared the 2 sets of priorities using Spearman rank correlation and nonparametric Bland–Altman limits of agreement analysis. We assessed the differential impact of using the rank-order–based versus the AHP-based priorities on the results of a full MCDA comparing 3 currently recommended colorectal cancer screening strategies. Generalizability of the results was assessed using Monte Carlo simulation.* ***Results.*** *Correlations between the 2 sets of priorities for the 7 criteria ranged from 0.55 to 0.92. The proportions of differences between rank-order–based and AHP-based priorities that were more than ±0.15 ranged from 1% to 16%. Differences in the full MCDA results were minimal, and the relative rankings of the 3 screening options were identical more than 88% of the time. The Monte Carlo simulation results were similar.* ***Conclusions.*** *Rank-order–based MCDA could be a simple, practical way to guide individual decisions and assess population decision priorities regarding colorectal cancer screening strategies. Additional research is warranted to further explore the use of these methods for promoting shared decision making.* ***Keywords:*** *colorectal cancer screening; multicriteria decision analysis; shared decision making; analytic hierarchy process.* ***(Med Decis Making 2014;34:746–755)***

Current US guidelines call for screening patients at average risk for colorectal cancer with 1 of up to 6 options that differ across multiple dimensions. These guidelines recommend that screening decisions be made through a shared decision-making process that incorporates individual patient preferences and values.[1,2]

Shared decision making differs from conventional patient education and clinical decision making activities in its emphasis on engaging patients and integrating their preferences into clinical decisions. Evidence exists suggesting that shared decision making is associated with both improved health care quality and reduced health care costs.[3–5] Although the principles of shared decision making apply to many health care decisions, they are particularly important in preference-sensitive situations, like colorectal cancer screening for average-risk patients, where no clearly dominant strategy exists.[6]

Patient decision aids, developed to facilitate shared decision making, have been shown to increase patients' knowledge, reduce decisional conflict, and foster patient involvement in decisions about their care but are difficult to implement in a busy practice.[7] Commonly identified implementation barriers include lack of time, inadequate provider expertise, and care systems that discourage their adoption.[4,8] Successful dissemination of shared decision making

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therefore depends on the development of tools, processes, and systems of care that will make shared decision making feasible within the constraints imposed by clinical settings.

Tools that could effectively catalyze shared decision making already exist. Multicriteria decision analysis (MCDA) provides decision makers with a logical, structured, and transparent approach for eliciting decision-related preferences and integrating them into the decision-making process. We and others have shown that they can be applied to clinical decisions, are well accepted by patients, and can foster effective doctor–patient communication.[9–13] A variety of multicriteria methods are available that range from simple, atheoretical assessments to sophisticated, theory-based procedures.[14,15] Although methods in the latter category could be expected to provide more valid and reliable information, they typically are more complicated and require significantly more time and effort. Consequently, they are more difficult to implement and may result in higher rates of user errors that can limit or even negate their effectiveness.[16]

For these reasons, there has been increasing interest in the development of easier to use methods that still provide decision makers with the benefits of a multicriteria analysis. Rank ordering, which entails ranking decision criteria from most to least important, is the simplest assessment procedure. Methods based on rank ordering have received considerable attention and have been recommended for general use.[16–19]

The procedural simplicity of rank order MCDA combined with the close correspondence between the MCDA framework and the requirements of shared decision making suggests that it could be a useful way to implement shared decision making in busy practice settings. The first step in exploring this hypothesis is to determine whether rank order MCDA can accurately assess patient decision priorities. To date, studies examining the accuracy of rank order methods have relied on simulations to determine a ''correct'' decision that is then used as the reference standard for comparison.[20–22] The ability of these methods to accurately assess health care decision priorities of patients is unknown. To address this question, we compared patient rank-order–based decision priorities regarding the choice of a colorectal cancer screening program with priorities obtained using the analytic hierarchy process (AHP), a widely used, theoretically grounded MCDA method.

METHODS

Brief Summary of the Original Study

To determine how people at average risk for colorectal cancer view the advantages and disadvantages of alternative screening strategies, we used the AHP to assess decision priorities of people at average risk for colorectal cancer in a multicenter study. The AHP is a widely used, theory-based, multicriteria method that derives decision priorities from a series of pairwise comparisons. A description of the AHP is beyond the scope of this report. Full details are available elsewhere.[15,23–27]

After a brief introduction, study participants performed a full AHP analysis using the 4 major decision criteria and 3 subcriteria shown in Figure 1 to compare colorectal cancer screening options. A standard AHP assessment procedure was used for the study that instructed participants to first rank order the criteria in order of importance and then perform the pairwise comparisons needed to calculate the AHP priorities.[28] Full details and study results have been published.[11]

Calculation of Rank-Order–Based Priorities

The use of rank order centroids to create priority weights for decision criteria was first proposed by Barron and Hutton and incorporated in an MCDA method called SMARTER (Simple Multiattribute

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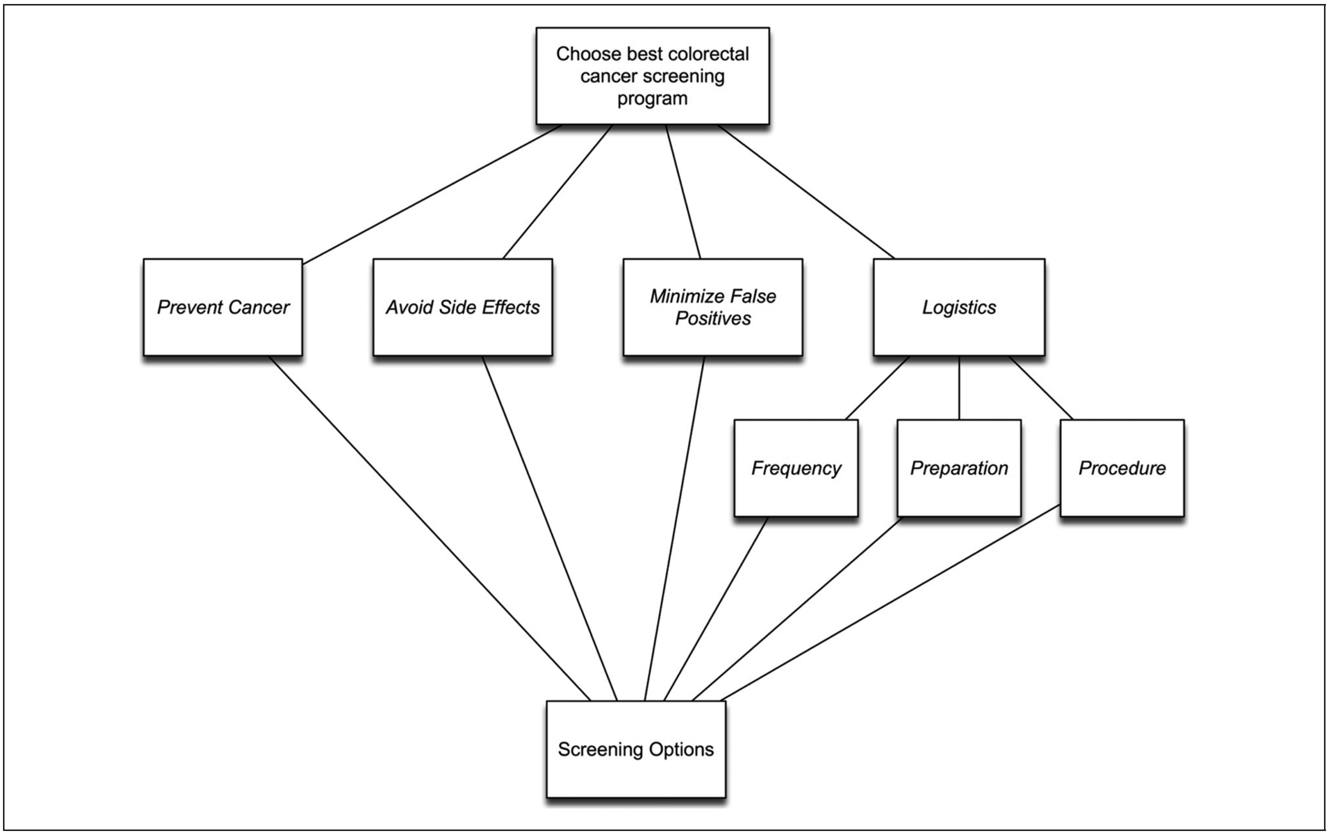

Figure 1 *The decision model.*

Rating Technique Exploiting Ranks).[16] Subsequent research has found this approach to be the most accurate of several alternative methods for converting rank order decision criteria priorities into priority weights.[20–22] Rank order centroids are calculated using the following formula:

$$w_i = \frac{1}{n}\sum\nolimits_k^n \left({}^{1}\!/_{k}\right),$$

where $i = 1, 2, \ldots n$; k is the rank order for each criterion; w is the rank order centroid priority weight of rank k; and n is the number of criteria. For example,

$$W_1 = (1 + 1/2 + 1/3 + \ldots + 1/k)/k$$

$$W_2 = (1/2 + 1/3 + \ldots + 1/k)/k$$

$$W_3 = (1/3 + \ldots + 1/k)/k.$$

Table 1 shows rank order centroid weights for sets of 3 and 4 items.

For this study we derived rank-order–based priorities for the decision criteria and subcriteria from the AHP-based priority scores generated by the participants in the previous study. We first ordered the AHP-based priority scores from best to worst and then assigned the rank order weight associated with each ranking. If ties existed, we averaged the rank order weights of the adjacent ranks.[18] An example of this conversion using one of the study participant's priorities is shown in Table 1.

Decision Priority Comparison Method

We compared the absolute differences between the original AHP-based decision criteria priority weights generated by the 484 participants in the previous study (the standard measure) with the derived rank-order–based priorities (the experimental measure) by subtracting the rank-order–based priority from the original AHP-based priority for each study participant. Both sets of priorities are measured on a 0–1 scale with 0 indicating no influence on the decision and 1 indicating absolute influence. Because the

Table 1 Description of Method Used to Derive Rank-Order–Based Decision Priorities from the Original AHP Priorities

		Major Decision Criteria				Logistical Subcriteria		
		Prevent Cancer	Avoid Side Effects	Minimize False Positives	Logistics	Frequency	Preparation	Procedure
I	Original AHP priority	0.66	0.21	0.09	0.04	0.67	0.07	0.26
II	Rank order priority	1	2	3	4	1	3	2
III	Rank-based priority weight	0.52	0.27	0.15	0.06	0.61	0.11	0.28

Note: This table shows the method used to derive one of the study participant's rank-order–based priority weights for the major decision criteria and subcriteria used in this study. The original AHP-based priorities, shown in row I, were first converted to ranks. The results are illustrated in row II. Standard rank-order–based weights were then assigned according to the priority ranks as shown in row III. Note that separate sets of priorities are assigned to the major decision criteria and logistical subcriteria.

measurement differences are not normally distributed, we examined the relationship between the 2 sets of priorities using Spearman rank order correlation analysis. To examine the extent to which the 2 measures differ, we used the nonparametric form of Bland–Altman limits of agreement analysis. The Bland–Altman method is currently the standard approach for comparing 2 measurement methods but assumes that the differences in measurement values being examined are normally distributed.[29,30] The nonparametric version involves calculating the proportion of measurements that fall within a defined interval, chosen based on clinically important differences, rather than calculated 95% confidence limits used in the standard Bland–Altman procedure.[31]

We calculated the differences between the 2 sets of priorities using the following formula: AHP-based priority minus rank-order–based priority. Then we tallied the frequency of differences that were greater than ±0.10 and ±0.15 of the AHP-based value, which we tentatively defined as possible and probable clinically important discrepancies, respectively. We then summarized the results using a discordance proportion plot, which illustrates the percentage of measurements that fall within various limits using a modified Kaplan–Meier survival analysis with the absolute difference between the 2 measures used in place of the more usual survival time.[32]

Decision Comparison Method

To further determine the significance of differences between the 2 sets of decision priorities, we compared the results of using them in a full multicriteria decision analysis comparing the 3 screening options currently recommended by the US Preventive Service Task Force for average-risk patients aged 50 to 75 years: colonoscopy every 10 years, annual immunochemical fecal occult blood tests, and immunochemical fecal occult blood tests every 3 years combined with flexible sigmoidoscopy every 5 years.[1]

The results of a multicriteria analysis are a function of both the criteria decision priorities and assessments regarding how well the decision options meet the criteria. We therefore used a standard set of option assessments to isolate the effects of the differences between the AHP-based and rank-order–based priorities on the results. We used the estimated outcomes for 50-year-old patients used in the original study to compare the 3 screening options with regard to preventing cancer, minimizing serious side effects, and avoiding false-positive screening tests. (These data are included in an online supplemental file: ''Information about the screening options used for analysis for 50 year old patients.'') To assess cancer prevention, we created a normalized score by dividing each option's estimated number of prevented cancers by the sum of all 3 options. We followed the same procedure for minimizing side effects and avoiding false positives except we used the reciprocals of the outcome estimates because better programs minimize rather than maximize these criteria. Because there is no objective way to measure how well the screening options meet the 3 logistical subcriteria, we used the mean responses obtained from the participants in the original study. The resulting standard set of screening option assessments is shown in Table 2.

We then calculated AHP-based and rank-order–based overall scores for the 3 screening options for each study participant by multiplying the option assessments by the priorities assigned to each criterion and summing the results using the following formula:

Table 2 Standard Set of Screening Option Assessments

	Decision Criteria					
	Prevent Cancer	Avoid Side Effects	Minimize False Positives	Frequency	Preparation	Procedure
Colonoscopy	0.371	0.124	0.996	0.182	0.335	0.459
iFOBT and Flex Sig	0.351	0.433	0.002	0.410	0.438	0.140
iFOBT	0.278	0.443	0.002	0.408	0.227	0.401

Note: Flex Sig = flexible sigmoidoscopy; iFOBT = immunochemical fecal occult blood test. This table shows the scores summarizing the abilities of 3 recommended colorectal cancer screening strategies to meet the criteria included in the decision model that were used in the full multicriteria decision analysis comparing AHP-based and rank-order–based decision priorities. Assessments regarding preventing cancer, avoiding side effects, and minimizing false positives were based on data used in the original study for 50-year-old patients. (These data are included in supplemental file ''Information about the screening options used for analysis for 50 year old patients.'') Assessment scores regarding screening frequency, preparation, and procedure are the mean values obtained from the prior study.

$$Option\ score = \sum_{k=1}^{n} (p_k)(o_k),$$

where p_k represents the priority assigned to criterion k, o_k represents the score describing how well option o meets criterion k, and n equals the number of criteria.

We measured the differential effects of the 2 sets of priorities by comparing the rank order of the decision options and the differences between the overall option scores generated using the 2 sets of priorities.

Generalizability Analysis

To estimate the generalizability of the findings from the study data, we conducted a Monte Carlo simulation. We first created AHP comparison matrices consisting of 3 and 4 rank-ordered criteria. For each matrix, each pairwise comparison entry consisted of a variable constrained to maintain the original rank order of the 2 criteria involved in the comparison. For example, in the 4-criteria matrix, the variable representing the comparison between the third- and fourth-ranked criteria, *3vs4*, was input into the simulation with a uniform distribution ranging from 0.1 (indicating that the third criterion was minimally preferable to the fourth) to 8.8. The variable representing the comparison between the second- and fourth-ranked criteria, *2vs4*, was then input with a uniform distribution ranging from (*3vs4* + 0.1) to 8.9. The variable representing the comparison between the first- and fourth-ranked criteria, *1vs4*, was then input with a uniform distribution ranging from (*2vs4* + 0.1) to 9. (The reductions in the full 1–9 conventional AHP pairwise comparison scale were made to simplify the simulation and are very unlikely to affect the results significantly.) The rest of the comparisons needed to complete the comparison matrix were created similarly. We chose to use uniform distributions for all variables to simulate the entire range of possible pairwise comparison matrices.

Ten thousand iterations were run. Simulation outputs included the criteria priorities derived from the AHP comparison matrix calculated using the geometric mean method,[28,33] differences between the simulated AHP-based priorities and the fixed rank-order–based-priorities, and the number of times the AHP-based and rank-order–based criteria priorities resulted in differences in the rankings assigned to the 3 recommended colorectal cancer screening strategies described earlier using the most common rank ordering of criteria in the data set: Prevent Cancer > Avoid Side Effects > Minimize False Positives > Logistics and Procedure > Preparation > Frequency.

All statistical analyses were performed using MEDCALC.[34] The Monte Carlo simulation was performed using @Risk 6.0.[35]

RESULTS

Description of the Study Population

The study sample consists of 484 patients at average risk for colorectal cancer. Their demographic characteristics are summarized in Table 3. Their mean age was approximately 62 years, 65% were female, 49% were black, and 42% were white.

Comparisons between AHP and Rank Order Priorities

The relationship between the 2 sets of priorities is illustrated in Figure 2. The biggest difference is the fixed nature of the values associated with the rank-order–based priorities versus the more continuous

Table 3 Description of the Study Population ($N = 484$)

Parameter	No. (%)
Gender	
Male	166 (34%)
Female	315 (65%)
Missing	3 (1%)
Age	
50–54	87 (18%)
55–59	86 (18%)
60–64	88 (18%)
65–69	88 (18%)
70–74	54 (11%)
75–79	44 (9%)
80–84	37 (8%)
Missing	0
Race	
African-American	238 (49%)
American Indian	1 (0.2%)
Asian	2 (0.4%)
White	202 (42%)
Missing or other	41 (9%)
Ethnicity	
Non-Hispanic	405 (91%)
Hispanic	3 (0.7%)
Missing or other	76 (8%)
Education	
<7 years	2 (0.4%)
Junior high school	24 (5%)
Partial high school	54 (11%)
High school	152 (31%)
Partial college	121 (25%)
College	64 (13%)
Graduate	60 (12%)
Missing	7 (1%)

AHP-based priorities. It is also apparent that the differences between the 2 are more pronounced at higher priorities.

The differences between the AHP-based colorectal cancer decision priorities and the derived rank-order–based priorities are summarized in Table 4. Absolute differences in mean priorities range from 0.01 to 0.07. The differences in individual priorities are illustrated in Figures 3 and 4 and summarized in a supplemental file ''Nonparametric analysis results.'' The percentage of differences within ±0.10 ranged from 70% to 95%, and the percentage of differences within ±0.15 ranged from 84% to 99%. Based on our proposed classification system, these results indicate that at least some of the differences in criteria decision priorities are probably clinically significant. Spearman's coefficients of rank correlation are 0.86 or higher except for Prevent Cancer, which has a correlation coefficient of 0.55

Comparisons between AHP-Based and Rank-Order–Based Decision Analyses

The results of the decision analyses using the 2 sets of decision criteria priorities are summarized in Table 5. The relative rankings of the 3 screening options were the same more than 88% of the time, and there were only minimal differences between the AHP-based and rank-order–based scores.

Generalizability Analysis

The differences between the simulated AHP priority values and the fixed rank order values for

Table 4 AHP-Based versus Rank-Order–Based Decision Priorities

	AHP Priority		Rank-Based Priority		AHP-Rank Priority Difference		Spearman's Correlation Coefficient	
	Mean	95% CI	Mean	95% CI	Mean	95% CI	rho	95% CI
Major criteria								
Prevent cancer	0.55	0.53 to 0.56	0.48	0.48 to 0.49	0.061	0.05 to 0.07	0.55	0.49 to 0.61
Minimize side effects	0.17	0.16 to 0.18	0.20	0.19 to 0.21	–0.028	–0.03 to −0.02	0.89	0.87 to 0.91
Avoid false positives	0.15	0.14 to 0.16	0.17	0.16 to 0.18	–0.019	–0.023 to −0.015	0.91	0.89 to 0.93
Logistical considerations	0.14	0.13 to 0.15	0.15	0.14 to 0.16	–0.013	–0.017 to −0.01	0.88	0.86 to 0.90
Subcriteria								
Screening frequency	0.32	0.30 to 0.34	0.35	0.33 to 0.37	0.076	0.069 to 0.083	0.92	0.91 to 0.94
Preparation for screening	0.25	0.23 to 0.26	0.27	0.25 to 0.28	0.056	0.052 to 0.06	0.87	0.85 to 0.89
Screening procedure	0.43	0.41 to 0.45	0.39	0.37 to 0.41	0.08	0.075 to 0.086	0.86	0.84 to 0.88

Note: AHP = analytic hierarchy process; CI = confidence interval. $N = 484$.

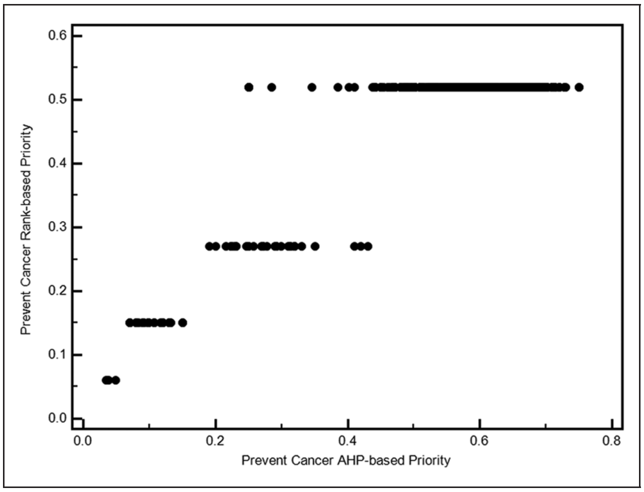

Figure 2 *Example of the relationship between analytic hierarchy process (AHP)–based and rank-order–based decision priorities.*

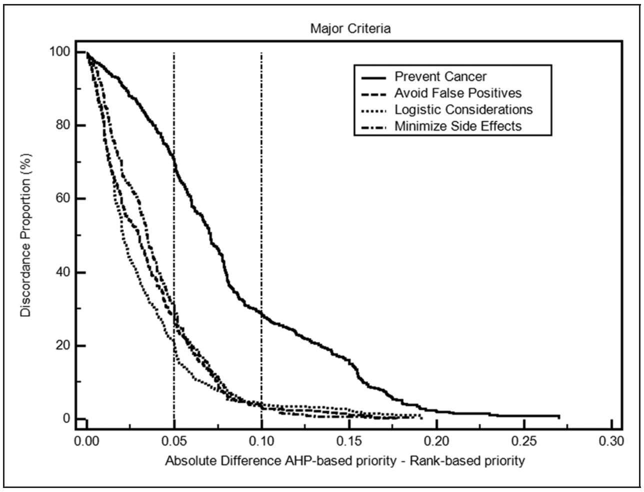

Figure 3 *Discordance proportion plot, major decision criteria priorities. The discordance proportion refers to the proportion of differences that equal or exceed the value on the x-axis. More concordant measurements will have curves farther to the left of this graph. More discordant measures will have curves farther to the right.*

comparisons involving 3 and 4 criteria are shown in Table 6. For both sets of comparisons, the rank order priority weights tend to underestimate the AHP-based weight of the top-ranked priority and overestimate the AHP-based weights of all others. Despite these differences, as shown in Table 5, the full multicriteria analysis of the 3 standard colorectal cancer screening options using the AHP-based and rank-order–based criteria priorities yielded identical

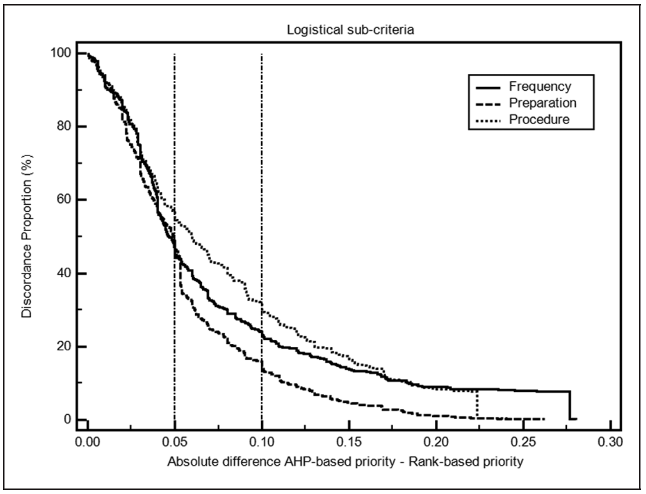

Figure 4 *Discordance proportion plot, logistical subcriteria. The discordance proportion refers to the proportion of differences that equal or exceed the value on the x-axis. More concordant measurements will have curves farther to the left of this graph. More discordant measures will have curves farther to the right.*

rank orderings 90.1% of the time for 2 screening options (colonoscopy every 10 years and annual immunochemical fecal occult blood tests every 3 years combined with flexible sigmoidoscopy every 5 years) and 99% of the time for the third option (annual immunochemical fecal occult blood tests).

DISCUSSION

In absolute terms, the extent of agreement between the rank-order–based and AHP-based decision priorities in this study varied from excellent to fair. The mean priorities were almost identical for all the decision criteria, but the congruence between participants' individual priorities was more variable. The biggest difference in individual priorities occurred relative to the criterion Prevent Cancer, where the correlation between the 2 sets of priorities was 0.55, 28% of the differences were greater than ±0.10, and 15% were greater than ±0.15. Discrepancies were also found among priorities assigned to the 2 of the 3 logistical subcriteria. Although highly correlated, 14% of the measurements for Screening Frequency and 16% of the measurements for Screening Procedure disagreed by more than ±0.15. These results indicate that, in this data set, the rank-order–based priorities are good approximations of group mean decision criteria priorities regarding colorectal cancer screening but are less accurate at the individual level.

Table 5 Comparisons between AHP-Based and Rank-Order–Based Decision Analyses

	AHP-Based Rank = Rank-Order–Based Rank		AHP-Based Rank and Rank-Order–Based Rank Differ by 1		AHP-Based Rank and Rank-Order–Based Rank Differ by 2	
	Study Participants	Simulation	Study Participants	Simulation	Study Participants	Simulation
Colonoscopy	446 (92.1%)	9007 (90.1%)	33 (6.8%)	894 (8.9%)	5 (1.0%)	99 (1%)
iFOBT and Flex Sig	428 (88.4%)	9007 (90.1%)	55 (11.4%)	993 (9.9%)	1 (0.2%)	0
iFOBT	452 (93.4%)	9901 (99.0%)	30 (6.2%)	99 (1%)	2 (0.4%)	0

Note: Flex Sig = flexible sigmoidoscopy; iFOBT = immunochemical fecal occult blood test. ''Study participants'' are the 484 participants in the colorectal cancer screening priorities study. ''Simulation'' refers to the Monte Carlo simulation consisting of 10,000 iterations.

Table 6 Monte Carlo Simulation: AHP-Based versus Rank-Order–Based Decision Priorities (N = 10,000 Iterations)

	AHP Priority		Rank-Based Priority	AHP-Rank Priority Difference	
	Mean	95% CI	Value	Mean	95% CI
Four ranked criteria					
Criterion Rank 1	0.608	0.606 to 0.609	0.52	0.0875	0.0864 to 0.0887
Criterion Rank 2	0.253	0.252 to 0.254	0.27	–0.0174	–0.0184 to −0.0163
Criterion Rank 3	0.099	0.0984 to 0.0996	0.15	–0.051	–0.0516 to −0.0504
Criterion Rank 4	0.0408	0.0405 to 0.0410	0.06	–0.0192	–0.0195 to 0.0190
Three ranked criteria					
Criterion Rank 1	0.693	0.692 to 0.695	0.61	0.0831	0.0817 to 0.846
Criterion Rank 2	0.231	0.229 to 0.232	0.28	–0.0495	–0.0509 to −0.0481
Criterion Rank 3	0.0764	0.0757 to 0.0770	0.11	–0.0336	–0.0343 to −0.0330

Note: AHP = analytic hierarchy process; CI = confidence interval.

The importance of the differences in individual priorities depends on the clinical context and the adequacy of alternative methods for implementing shared decision making in practice. Despite the variance in criteria priorities, the results of full multicriteria analyses using individual rank-order–based and AHP-based priorities using both the study data and simulation data were the same at least 88% of the time. Moreover, since the purpose of the rank-based MCDA is to promote shared decision making rather than prescribe a specific course of action, the primary objective is to assess patient and provider decision priorities and identify differences in need of further discussion. The relative magnitude of the differences therefore becomes less important than being able to assess them quickly, easily, and transparently. Multiple studies have found that patient and provider preferences for colorectal cancer screening frequently differ, and we currently do not have the tools needed to adequately implement shared decision making in practice.[36–44] From this perspective, our findings suggest that simple rank-order–based methods could provide a clinically feasible method for eliciting patient preferences regarding colorectal cancer screening options and incorporating them into a shared clinical decision-making process.

Our results are consistent with several prior studies that have found good agreement between rank-order–based priorities and decision quality. These studies have all defined quality decisions using ''hit rates'' of different weighting methods, that is, the proportion of correct decisions identified using simulated cases as the reference standard. Reported hit rates for rank-order–based priorities are approximately 85%, quite consistent with our results.[20–22] To our knowledge, this is the first study to assess both the accuracy of rank-order–based decision priorities obtained from a sample of real decision stakeholders compared with those obtained using a more conventional MCDA priority assessment method and the impact of using them in a multicriteria decision analysis of a clinical decision.

A key assumption in our analysis is the appropriateness of using the AHP-derived weights to define the study participants' ''true'' decision priorities. We believe that this approach is well supported by previous research. Decision priorities generated using the AHP pairwise comparison process have been extensively validated and determined to be quite accurate when compared with measurable physical properties and forecasted future events.[45] They have also been shown to accurately reflect subjective preferences and enhance the decision-making process.[46]

This study is subject to several limitations. The first is that the results were obtained from a single study sample using 1 particular implementation of a sole MCDA method. Therefore, the results may not be generalizable to other populations or decision-making situations. They do, however, adequately represent differences in priorities within the context of the original study and are consistent with the results of our simulated generalizability analysis. It is also possible that variations in how the study participants performed their AHP analyses could have affected the results. To explore this possibility, we repeated the analysis using only the 379 participants who met a common standard for a technically adequate AHP analysis as described in our earlier paper, and we found similar results (data not reported). Another possible limitation concerns the definitions used to identify possible and probable clinically important discrepancies in the Bland–Altman analysis. These tentative definitions were needed because standard measures are not available. Although they worked well in the current study, they may not be as applicable in other contexts. We also used only 1 set of decision option assessments to compare the impact of the 2 sets of priorities on a full multicriteria decision analysis. As noted above, we used a standard set of option assessments in order to focus our analysis on the impact of the different priorities. Because of the interrelationship between criteria priorities and option assessments in MCDA, it is possible that the differences between the 2 sets of criteria priorities would have a greater impact on the results if they were combined with different sets of option assessments. Finally, because they were beyond the scope of the current analysis, we did not determine whether the use of either of these 2 priority assessment methods would result in better colorectal cancer screening decisions than those that are currently made or examine whether they facilitate and foster use of shared decision making in practice.

Despite these limitations, the results of this study suggest that the use of rank-order–based decision priorities in lieu of more precisely determined priorities obtained using the AHP or an alternative MCDA method could be a simple, practical way to both guide individual decisions and assess population criteria priorities regarding colorectal cancer screening. Additional research is warranted to determine whether rank-order–based methods can be used to facilitate shared decision making regarding colorectal cancer screening in practice and to further explore the advantages and disadvantages of simpler versus more rigorous MCDA methods for assessing individual and aggregate patient preferences and incorporating them into additional preference-sensitive health care decisions.

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