Impact of Sociodemographic Patient Characteristics on the Efficacy of Decision Aids
A Patient-Level Meta-Analysis of 7 Randomized Trials

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Background—Decision aids (DAs) increase patient knowledge, reduce decisional conflict, and promote shared decision making (SDM). The extent to which they do so across diverse sociodemographic patient groups is unknown.

Methods and Results—We conducted a patient-level meta-analysis of 7 randomized trials of DA versus usual care comprising 771 encounters between patients and clinicians discussing treatment options for chest pain, myocardial infarction, diabetes mellitus, and osteoporosis. Using a random effects model, we examined the impact of sociodemographic patient characteristics (age, sex, education, income, and insurance status) on the outcomes of knowledge transfer, decisional conflict, and patient involvement in SDM. Because of small numbers of people of color in the study population, we were not powered to investigate the role of race. Most patients were aged 265 years (61%), white (94%), and women (59%); two thirds had greater than a high school education. Compared with usual care, DA patients gained knowledge, were more likely to know their risk, and had less decisional conflict along with greater involvement in SDM. These gains were largely consistent across sociodemographic patient groups, with DAs demonstrating similar efficacy when used with vulnerable patients such as the elderly and those with less income and less formal education. Differences in efficacy were found only in knowledge of risk in 1 subgroup, with greater efficacy among those with higher education (35% versus 18%; P=0.02).

Conclusions—In this patient-level meta-analysis of 7 randomized trials, DAs were efficacious across diverse sociodemographic groups as measured by knowledge transfer, decisional conflict, and patient involvement in SDM. To the extent that DAs increase patient knowledge and participation in SDM, they have potential to impact health disparities related to these factors. (Circ Cardiovasc Qual Outcomes. 2014;7:360-367.)

Key Words: decision making • decision support techniques

Patients increasingly face treatment choices with comparable outcomes, and clinicians are confronting the challenge of how best to discuss alternative treatments while incorporating patients’ values and preferences. One method involves shared decision making (SDM), “the process of interacting with patients who wish to be involved in arriving at an informed, values-based choice among two or more medically reasonable alternatives.” Professional societies, including the most recent American Heart Association/American College of Cardiology guidelines, advocate the use of SDM within the clinical encounter.5

Decision aids (DAs) are tools used during the clinical encounter to assist clinicians in engaging their patients in SDM. The use of DAs to promote SDM addresses key quality goals for improving health care articulated by the Institute of Medicine (care that is evidence based and personalized). SDM with DAs is also prioritized in health policy initiatives, including specific provisions in the Affordable Care Act for SDM research, accreditation, and implementation. Although individual trials have suggested that DA use during the clinical encounter improves patient knowledge, reduces decisional conflict, and increases patient participation in choice, the direction and magnitude of these effects across diverse patient populations is unknown.
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WHAT IS KNOWN

• Shared decision making improves patient knowledge and reduces decisional conflict.
• Decision aids assist in engaging patients in shared decision making.
• Shared decision making is a key quality goal for improving patient-centered healthcare delivery.

WHAT THE STUDY ADDS

• Decision aids are effective among a diverse patient population, including the elderly and those with lower educational levels.

Our research group conducted 7 randomized trials of DA versus usual care (UC) delivered by clinicians in outpatient, inpatient, and emergency department settings in suburban and rural locations; this experience provides unique access to patient-level data, including key sociodemographic variables. We sought to explore the interaction between sociodemographic factors and the efficacy of DAs on patient knowledge, decisional conflict, and patient involvement in SDM.

Methods

Characteristics of Included Trials

All completed randomized controlled trials from 2005 to 2011 comparing DAs with UC designed and conducted by the Knowledge and Evaluation Unit at Mayo Clinic were included. We selected only trials performed by the Knowledge and Evaluation Unit at Mayo Clinic given several important advantages of this approach: our entire analysis was based on patient-level data, and there was consistency and rigor in DA development, delivery, measurement, and follow-up. Thus, the search strategy was limited to trials within Mayo Clinic, and a systematic literature search of other types of DA was not performed. Seven unique randomized, controlled trials of DA versus UC conducted between 2005 and 2011 were eligible for the meta-analysis, with 2 similar trials combined for ease of reporting (Osteoporosis I and Osteoporosis II; Table). Institutional review board approval was obtained for all trials.

Table. Characteristics of Included Randomized Trials of Decision Aid vs Usual Care

<table>
<thead>
<tr>
<th>Trial</th>
<th>Disease State</th>
<th>No. of Patients</th>
<th>Clinical Context</th>
<th>Randomization Level</th>
<th>Date</th>
<th>Locale</th>
<th>Type of Decision Aid</th>
<th>Details of Choice</th>
<th>Personalized Risk Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMI</td>
<td>MI</td>
<td>106</td>
<td>Inpatient stay for MI, just before discharge</td>
<td>Patient</td>
<td>2009–2010</td>
<td>Suburban</td>
<td>Paper w/ pictographs</td>
<td>Dichotomous (take medications or not)</td>
<td>Yes</td>
</tr>
<tr>
<td>Chest Pain</td>
<td>Chest pain</td>
<td>204</td>
<td>Emergency department visit for chest pain</td>
<td>Patient</td>
<td>2010–2011</td>
<td>Suburban</td>
<td>Paper w/ pictographs</td>
<td>Dichotomous (admit for observation or discharge home with follow-up)</td>
<td>Yes</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Diabetes mellitus</td>
<td>85</td>
<td>Primary care clinic visit for diabetic management</td>
<td>Clinician</td>
<td>2007–2008</td>
<td>Suburban and rural</td>
<td>Plastic cards</td>
<td>Multiple drug options for diabetes mellitus: oral vs injectable medications</td>
<td>No</td>
</tr>
<tr>
<td>DAD</td>
<td>Diabetes mellitus/cardiovascular primary prevention</td>
<td>104</td>
<td>Primary care clinic visit for diabetic management</td>
<td>Clinician</td>
<td>2010–2011</td>
<td>Suburban and rural</td>
<td>Plastic cards or paper pictographs (2 tools)</td>
<td>Multiple drug options for diabetes mellitus: oral vs injectable medications/dichotomous (statin or not)</td>
<td>No/yes</td>
</tr>
<tr>
<td>Osteoporosis I and II</td>
<td>Osteoporosis</td>
<td>179</td>
<td>Primary care clinic visit for osteoporosis prevention</td>
<td>Patient</td>
<td>2007–2008</td>
<td>Suburban</td>
<td>Paper pictographs</td>
<td>Dichotomous (bisphosphonate or not)</td>
<td>Yes</td>
</tr>
<tr>
<td>Statin</td>
<td>Cardiovascular primary prevention</td>
<td>93</td>
<td>Diabetes mellitus clinic visit for prevention of CAD</td>
<td>Clinician</td>
<td>2005</td>
<td>Suburban</td>
<td>Paper pictographs</td>
<td>Dichotomous (statin or not)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Two trials were combined for ease of reporting within the table: Osteoporosis I and Osteoporosis II. AMI indicates acute myocardial infarction; CAD, coronary artery disease; DAD, The Impact of Decision Aids to Enhance Shared Decision Making for Diabetes; and MI, myocardial infarction.
in addition, all subjects (clinicians and patients) provided informed consent. A clinician within the healthcare team (physician, nurse practitioner, physician assistant, or registered nurse) delivered the DAs to eligible patients facing an actual clinical decision.

The interventions occurred in outpatient, inpatient, and emergency department settings in suburban and rural healthcare facilities in the upper Midwest; most trials were conducted in central and southeastern Minnesota. DAs displayed information about risks and benefits of pertinent options with most using risk prediction models to produce tailored estimates of risk (Figure I in the Data Supplement). Our DA format consists most often of a paper-based tool containing words, pictures, and pictographs that can be held by the clinician or patient during the shared conversation around treatment options. DAs were used during clinical encounters where there was a treatment decision to be made; the clinician agreed to participate along with their patient in the trial. Many of the encounters were videotaped, enabling measurement of patient engagement in SDM. Clinicians were provided a brief training on the data contained within the tool and suggestions for how to use the tool during the clinical visit.

Patient eligibility criteria varied across trials. Eligible patients were adults expected to make a choice about a healthcare treatment or management strategy and who could provide written informed consent (ie, were able to read the consent form in English and did not have, in their clinician’s judgment, sensorial or cognitive limitations to do so). Outcome assessment was ascertained immediately after each visit by means of patient questionnaires.

**Sociodemographic Variables**

Sociodemographic variables were collected from detailed chart reviews and patient questionnaires. Most variables (sex, education, income, and insurance status) were analyzed as categorical variables. Age, which followed a normal distribution based on the Kolmogorov–Smirnov test, was dichotomized to <65 versus ≥65 years. Total household income was patient reported and collected as a categorical variable ($20 000–$29 999; $30 000–$39 999; $40 000–$59 999; $60 000–$79 999; $80 000–$99 999; ≥$100 000); this was dichotomized to income <$40 000 and ≥$40 000. Highest education level completed was collected via self-report and categorized as follows: eighth grade or less, some high school (HS), HS or graduate equivalent degree (GED), some college, college graduate, graduate degree and dichotomized in the final analysis into 2 categories: HS education or less and more than HS education. Insurance was categorized as private, Medicare, or other. The latter category included Medicaid and other means-tested government programs, worker’s compensation, and self-pay (including no insurance and international patients). Demographic and clinical factors were presented as counts and percentages overall.

**Outcomes**

All studies assessed knowledge transfer (general knowledge and knowledge of risk), decisional conflict related to the process of decision making, and the degree of patient participation in SDM.

**Outcomes: Knowledge Transfer**

Knowledge transfer was measured by assessing both general knowledge and knowledge of risk. General knowledge questions were based on the Ottawa Decision Support Framework22; answers used the format of true, false, or do not know. General knowledge was then reported as a mean percentage of correct answers at the patient level. In addition, 6 trials assessed patients’ knowledge of their individual risk of having an event (ie, of 100 patients like you who do not take a statin, how many do you think will have a heart attack in the next 10 years?). Knowledge of risk was reported as correct versus incorrect, where a correct response was defined as a patient-reported estimate of risk within 10% of the actual value given in the DA. This variable was assessed at the patient level. Knowledge of risk was a binary variable (correct or incorrect), and a logistics model clustering by study was conducted.

**Outcomes: Decisional Conflict**

The Decisional Conflict Scale was used to evaluate decisional conflict, which is a state of uncertainty about a course of action attributable in part to factors that can be modified, including knowledge regarding the options, identification of values and preferences, and support in decision making.14 The Decisional Conflict Scale, based on the Ottawa Shared Decision Making Framework, is the most commonly used, validated, and psychometrically evaluated scale in DA trials and one we have used in all of our investigations.13 The scale consists of 5 subscales (Informed, Values, Effectiveness, Support, and Certainty). The score is on a 0 to 100 scale, with lower scores suggesting greater comfort with the decision made and higher scores indicating a greater degree of decisional conflict. We selected the Effectiveness subscale to be highlighted because of its broad relevance, because it describes the extent to which the decision was informed and the degree of patient satisfaction with the decision; additional subscales are displayed in Figures II to V in the Data Supplement.

**Outcomes: SDM**

We used the Observing Patient Involvement (OPTION) scale to evaluate the effort clinicians made to obtain patient participation in SDM during the clinical encounter.16 Two trained investigators working independently and in duplicate reproducibly (intraclass correlation coefficient >0.7) reviewed video recordings of clinical encounters and rated patient participation using the 12-item OPTION scale.18 A high score indicated successful behaviors by the clinician to involve their patient in SDM (0: behavior not observed; 4: behavior executed to highest standard). The mean score for each item is an average of the 2 reviewers’ scores, and the sum of all items (total score) is converted into a percentage for ease of interpretation.

**Outcome Meta-Analysis**

We used the Higgins $I^2$ statistic to quantify the proportion of observed inconsistency not explained by chance (ie, reflecting true differences in trial results) in interventional effects across trials.19 Inconsistency was negligible for the end points of general knowledge ($I^2=0\%$) and the Support ($I^2=24\%$) and Effectiveness ($I^2=32\%$) subscales of the Decisional Conflict Scale and substantial for the Uncertainty ($I^2=69\%$), Informed ($I^2=64\%$), and Values ($I^2=60\%$) subscales of Decisional Conflict Scale, as well as for the OPTION scale ($I^2=92\%$) and for the knowledge of risk end point ($I^2=90\%$). Thus, the Higgins statistic, which is calculated for the outcomes of interest on the meta-analysis level, describes the degree of inconsistency regarding end points across the 7 trials included.

To account for the differences in effect between studies, an analysis was performed using a random effects model, providing an average treatment effect. Continuous outcomes were modeled using a normal distribution. The results of the meta-analysis are reported using adjusted mean differences (DA–UC), with 95% confidence intervals for continuous outcomes. For the outcome of knowledge of risk, a logistic model was conducted clustering for study, and the mean predicted percentage difference in accurately knowing one’s risk is presented with 95% confidence interval. The interaction between arm and the sociodemographic factor was tested within each model using a likelihood ratio 2-sided hypothesis test, with significance reported at $P$ values <0.05. We estimated the minimally detectable difference following the guidance of Norman et al20 by considering the minimally detectable difference as equivalent to half of the SD in the estimate of the difference between sociodemographic subgroups in the efficacy of the DA as compared with UC. This value informed our assessment of the precision of the estimate of an interaction effect between sociodemographic subgroup and DA. An intention-to-treat analysis was then conducted: all patients were assessed under the arm to which they were assigned regardless of intervention received. The Statin Choice trial was excluded from analyses involving income given that this trial did not collect data on income.

Clinical variables, including diabetes mellitus, hypertension, and hyperlipidemia, were assessed and found to have no interaction; thus, the analysis is not reported here. The overall effect of treatment (DA
versus UC) for each outcome (general knowledge, knowledge of risk, decisional conflict subscales, and patient engagement in SDM) was adjusted by age, sex, education, and insurance. All analyses were conducted using SAS 9.2 and STATA 12.1.

We conducted a sensitivity analysis excluding the Osteoporosis Choice trial, in which only women participated, to evaluate the impact of sex. This analysis did not change our results and is therefore not reported separately.

**Results**

**Patient Characteristics**

The patients included in this meta-analysis had a mean age of 61 years, more than half were women (59%), and 67% had more than HS education. The high percentage of women is attributable in part to the 2 trials studying treatment decision making in postmenopausal osteoporosis. Ninety-four percent of participants were white. Median income was $40000 to $59999; 54% of participants had private insurance, 40% had Medicare, 5.7% had Medicaid, and 0.3% had no insurance. Patient characteristics are shown in the Table I in the Data Supplement.

**Outcome Analysis**

**Knowledge Transfer: General Knowledge**

Participants receiving care with the DAs had greater gains in general knowledge compared with UC (62% versus 45%; \( P < 0.0001 \)), with no evidence of a treatment interaction with any of the sociodemographic characteristics analyzed (Figure 1).

**Knowledge Transfer: Knowledge of Risk**

Patients who used the DAs were found to know their personalized risk (knowledge of risk) more often than those receiving UC (50% versus 20%; \( P < 0.0001 \)) when adjusted for sociodemographic characteristics. The treatment arm (DAs) was found to significantly interact only with education level (Figure 2). Patients with an education level of more than HS had a greater gain in specific knowledge of risk with DAs compared with UC than those with less education (35% versus 18% increase over UC; \( P \) value for interaction=0.02). There was no significant interaction with any of the remaining sociodemographic variables.

**Decisional Conflict**

Decisional conflict is measured by 5 subscales (Informed, Values, Effectiveness, Support, and Certainty). For clarity, we have included 1 subscale within the text, Effectiveness, and the remainder is included in Figures II to V in the Data Supplement. Decisional conflict was lower for patients in the DA arm as compared with UC across all sociodemographic groups (Effectiveness subscale, 13 versus 18 points; \( P < 0.0001 \)). There were no significant treatment interactions between sociodemographics and DA within any of the subscales (range, 5–10 points lower with DAs as compared with UC; shown in Figures II–V in the Data Supplement and Effectiveness subscale modeled in Figure 3). A nonsignificant improvement in decisional conflict was found for women compared with men in the Informed subscale (12 versus 6 points lower with DA compared with UC; \( P = 0.06 \)).

**Patient Involvement in SDM (OPTION Score)**

OPTION scores were only available when both patients and clinicians consented, and investigators were able to obtain a complete video recording of the clinical encounter (n=507/771, or 66% of patients). Reasons for missing recordings included lack of consent, technical, or logistical issues. Clinician promotion of patient engagement in SDM in the DA arm was nearly twice that of the UC arm when measured by

**Figure 1.** General knowledge: mean difference between decision aid and usual care for general knowledge by sociodemographic factor; \( P \) value for interaction. CI indicates confidence interval.
the OPTION score (39 versus 21; $P<0.0001$). This favorable impact was consistent across diverse patient groups without significant treatment interactions by patient sociodemographic factors (Figure 4).

In summary, the results of the interaction analysis indicate that there is no difference between sociodemographic subgroups with regards to efficacy of the DA. Examination of the confidence intervals demonstrates the limited precision of this estimate; we also communicate the boundaries of our estimate of subgroup effect by reporting the minimal detectable difference in each of the figures.

**Discussion**

In this patient-level meta-analysis, we found that DAs delivered during the clinical encounter demonstrate similar efficacy among patients with diverse socioeconomic characteristics in
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raising the level of patient knowledge and reducing decisional conflict when compared with UC. Furthermore, DAs assisted clinicians in engaging patients in SDM to a similarly favorable extent, regardless of age, sex, education, income, and insurance type. To our knowledge, this is the first study in the literature examining the efficacy of DAs across sociodemographic groups.

Although DAs are proven to be efficacious, critiques continue regarding their application to vulnerable groups, including the elderly as well as patients with less formal education and lower income. We found minimal interaction between diverse and traditionally vulnerable groups and the efficacy of these tools.

There are limitations to our conclusions. Our analysis includes only trials conducted by our group, and thus to place the data in the context of the SDM literature, it is important to highlight the specific type of DA used (paper based with use of pictographs) and the manner in which they were used (delivered by a clinician within a clinical encounter). Discerning the impact of the clinician delivering, the tool versus the tool itself can be challenging and may have an effect on the results shown here. The unique design process of the DAs used in this meta-analysis, during which they are tested within real clinical encounters and undergo successive iterations until a conversation is consistently obtained from multiple clinicians and their patients, provides methodological consistency and intends for a reliable result across a variety of clinicians. However, the role of the individual clinician and patient, and the barriers and facilitators they bring to the encounter, is complex. This interaction between clinician and patient, therefore, remains a variable that we work to address by including a large number of encounters and limiting the analysis to randomized trials.

A second limitation involves our patient sample: although using only trials conducted by our group provided us with the unique ability to perform a meta-analysis with sociodemographic data at the patient level, >90% of our sample was white. However, the patient population included in the trials varied with respect to social class: both income and education were measured and provided diversity within the sample. The use of English-language only tools limits our ability to comment on the use of DAs among vulnerable groups such as those with English as a second language. In addition, our sample was relatively small in size for the analysis, reducing our statistical ability to show differences in the efficacy of DAs within sociodemographic subgroups. By reporting the minimally detectable difference (half of the SD of the difference among sociodemographic subgroups for DA impact), we communicate that even with >700 patient encounters, there is some degree of imprecision in estimates of effect size. Given the consistent lack of interaction by sociodemographic characteristics, however, it is likely that the differences we may be underpowered to detect are modest compared with the overall effect of the DAs. This work remains the first look at the role of sociodemographic characteristics in DAs efficacy, and we show there is no evidence of significant differences between groups.

SDM has been proposed as a potential mechanism to reduce disparities in care. We are limited in our conclusions regarding the ability of DAs to mitigate disparities given that this is not a direct comparison of sociodemographic groups, nor did we measure disparities in healthcare provision or outcomes. Further research is needed in this regard, and organizations such as the Patient-Centered Outcomes Research Institute may be interested in supporting randomized trials of DAs powered for these outcomes. Additional work is also needed
in the essential next step: dissemination and implementation research for SDM to impact practices and population health. Dissemination and implementation research would evaluate the reach, effectiveness, adoption, implementation, and maintenance of DAs in routine clinical practice. Work such as this meta-analysis identifying strengths and weaknesses of DAs among vulnerable populations will inform future work on their applicability among varying racial, ethnic, and geographic backgrounds. The routine use of these tools in clinical care remains elusive, but the body of evidence suggests that SDM is a “path toward improved patient-centered outcomes,” thus necessitating further work on the barriers and facilitators to translate SDM into routine clinical care.

Trends did emerge from our data that generate interesting hypotheses. The consistent improvement in general knowledge with the DAs across varying levels of education suggests that the DA use during the clinical encounters might help address disparities attributable to inadequate health literacy; the need for a focus on patients with lower health literacy, and the potential effectiveness of DAs in this population, is described in the DA literature. There was a significant interaction between education level and treatment arm in the outcome of knowledge of risk, suggesting that DA may be more efficacious among patients with higher levels of education with certain types of information, such as communication of specific risk values. Still, with a significant impact in knowledge transfer regardless across varying education levels, DA may be a potential tool to address differences in health literacy that may be linked to poor health outcomes. In previous work, patients with low health literacy benefit equally with well-designed interventions to promote SDM. Furthermore, to the extent to which disparities exist because of a lack of patient involvement in SDM, DAs might be powerful tools to improve equity.

Arora and McHorney have reported that vulnerable patient groups were initially less likely to report a desire to participate in SDM, and other reviews demonstrated hesitancy of clinicians to use DA based on assumptions about patient preferences for participation in SDM. After use of DAs, however, patients may be less likely to defer future decision making to their clinician. DAs thus might empower vulnerable patient groups and activate them to participate in SDM, particularly when tools are delivered by clinicians. Indeed, our study suggests that DAs promote SDM among diverse sociodemographic groups.

Randomized studies evaluating the impact of specific DA exist and span across disease entities. In combination, these trials provide important information about how DAs are implemented and the effects they have on patient knowledge and decision making. This study contributes to the existing literature by demonstrating that use of DAs during the consultation is efficacious across diverse patient groups, including traditionally vulnerable patient populations such as the elderly and those with lower income and less formal education. Information on the efficacy of DAs among diverse populations may help clinicians select and use tools that enable them to successfully navigate clinical decisions informed by comparative effectiveness research. Future studies will be needed to determine the extent to which DAs represent an effective and feasible strategy to address socioeconomic disparities by increasing patient knowledge and participation in SDM.

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**Disclosures**

None.

**References**


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<table>
<thead>
<tr>
<th>Arm</th>
<th>AMI (N=106)</th>
<th>Chest Pa (N=204)</th>
<th>DAD (N=104)</th>
<th>Diabetes (N=85)</th>
<th>Osteo (N=179)</th>
<th>Statin (N=93)</th>
<th>Total (N=771)</th>
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<tbody>
<tr>
<td>Usual Care</td>
<td>53 (50.0%)</td>
<td>103 (50.5%)</td>
<td>51 (49.0%)</td>
<td>37 (43.5%)</td>
<td>95 (53.1%)</td>
<td>43 (46.2%)</td>
<td>382 (49.5%)</td>
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<td>Decision Aid</td>
<td>53 (50.0%)</td>
<td>101 (49.5%)</td>
<td>53 (51.0%)</td>
<td>48 (56.5%)</td>
<td>84 (46.9%)</td>
<td>50 (53.8%)</td>
<td>389 (50.5%)</td>
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<td>Age</td>
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<td></td>
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<td>Mean (SD)</td>
<td>63.9 (9.9)</td>
<td>54.7 (11.9)</td>
<td>57.8 (11.0)</td>
<td>62.1 (11.5)</td>
<td>66.3 (8.8)</td>
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<td>&lt;65</td>
<td>46 (43.4%)</td>
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<td>49 (47.1%)</td>
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<td>93 (52.0%)</td>
<td>46 (49.5%)</td>
<td>301 (39.0%)</td>
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<td>&gt;=65</td>
<td>60 (56.6%)</td>
<td>169 (82.8%)</td>
<td>55 (52.9%)</td>
<td>53 (62.4%)</td>
<td>86 (48.0%)</td>
<td>47 (50.5%)</td>
<td>470 (61.0%)</td>
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<td></td>
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<tr>
<td>Female</td>
<td>32 (30.2%)</td>
<td>120 (58.8%)</td>
<td>40 (38.5%)</td>
<td>40 (47.1%)</td>
<td>179 (100.0%)</td>
<td>42 (45.2%)</td>
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<td>Male</td>
<td>74 (69.8%)</td>
<td>84 (41.2%)</td>
<td>64 (61.5%)</td>
<td>45 (52.9%)</td>
<td>0 (0.0%)</td>
<td>51 (54.8%)</td>
<td>318 (41.2%)</td>
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<td>Education</td>
<td></td>
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<tr>
<td>HS or Less</td>
<td>38 (40.9%)</td>
<td>51 (25.5%)</td>
<td>33 (34.0%)</td>
<td>33 (39.3%)</td>
<td>49 (28.5%)</td>
<td>38 (41.3%)</td>
<td>242 (32.8%)</td>
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<td>55 (59.1%)</td>
<td>149 (74.5%)</td>
<td>64 (66.0%)</td>
<td>51 (60.7%)</td>
<td>123 (71.5%)</td>
<td>54 (58.7%)</td>
<td>496 (67.2%)</td>
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<td>DAD (N=104)</td>
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<td>Osteo (N=179)</td>
<td>Statin (N=93)</td>
<td>Total (N=771)</td>
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eFigure 1. Chest Pain Choice Decision Aid

Deciding If, When and Where to Have a Stress Test

Prepared for:

1 Your Chest Pain Diagnosis
   Our initial evaluation has NOT shown any evidence of a heart attack. This conclusion is based on a blood test (to look for troponins — enzymes that are released when the heart muscle is damaged) and an electrocardiogram (to check that your heart is getting enough oxygen and blood). Over the next five hours, two additional blood tests (troponins) will be taken to definitively rule out a heart attack. However, even if those tests do confirm our diagnosis, your chest pain may indicate possible warning signs of a FUTURE heart attack.

2 Further Tests
   A STRESS TEST EVALUATION may more precisely determine if your heart is functioning correctly by viewing blood flow to your heart while at rest and under stress. Examing your risk will help you to determine how soon you would like to have a stress test.

3 Your Personal Risk Evaluation
   Your risk of having a heart attack or of having a pre-heart attack diagnosis within the next 45 days can be determined by comparing you to people with similar factors who also came to the Emergency Department with chest pain.

4 Would You Like to Have a Stress Test Now or Make an Appointment?
   - I would like to be admitted to the observation unit to have an urgent cardiac stress test. I realize that this could add to the cost of my evaluation and lengthen my emergency stay.
   - I would like to be seen by a Mayo Clinic heart doctor within 24-48 hours and would like assistance in scheduling this appointment.
   - I would like to schedule an appointment on my own to consult with my primary care physician.
   - I would like my emergency department doctor to make this decision for me.

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1 Stress test options include nuclear stress testing, ultrasound stress testing, and exercise ECG (electrocardiogram) stress testing. Nuclear stress testing includes exposure to radiation which has been shown to be related to increased cancer risk over a lifetime. Your doctor can help you explore which option may be best.

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* Age
* Gender
* Race
* If chest pain is made worse when manual pressure is applied to the chest area
* If there is a history of coronary artery disease
* If the chest pain causes perspiration
* Findings on electrocardiograms (electrocardiograms of the heart)
eFigure2. Decisional Conflict
(Informed subscale)
eFigure3. Decisional Conflict (Uncertainty subscale)
eFigure 4. Decisional Conflict (Values subscale)
eFigure 5. Decisional Conflict (Support subscale)