

# Obstetrician–Gynecologists’ Beliefs About Assisted Reproductive Technologies

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**OBJECTIVE:** To characterize the prevalence of objections to assisted reproductive technologies among obstetrician–gynecologists.

**METHODS:** We conducted a national probability sample mail survey of 1,800 practicing U.S. ob–gyns. Criterion variables were whether physicians object to artificial insemination or in vitro fertilization. We also presented seven patient scenarios and asked respondents if they would discourage use of assisted reproductive technologies and if they would help patients access such technologies. Covariates included physician demographic and religious characteristics.

**RESULTS:** Of 1,760 eligible ob–gyns, 1,154 responded (66%). Few (less than 5%) object to artificial insemination or in vitro fertilization, and even fewer (less than 3%) would not help patients access these technologies. However, the majority of ob–gyns would discourage using assisted reproductive technologies if pregnancy has a 25% mortality risk (95%), if the patient is 56 years old (88%), or if the patient has human immunodeficiency virus (73%). Fewer would discourage use of assisted reproductive technologies if the patient already has five healthy biological children (24%), if she plans to be a single parent (17%), if she is not married to her male sexual partner (14%), or if her sexual partner is female (14%). Male (odds ratio, 2.2–2.8) and religious physicians (3.6–4.7) were more likely to discourage using assisted reproductive technologies if the patient was lesbian, single, or unmarried.

**CONCLUSION:** Few ob–gyns object to assisted reproductive technologies. Most discourage use of such technologies for patients with advanced age or medical comorbidities. Male and religious physicians are more likely to limit access for lesbian, single, or unmarried patients.

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**LEVEL OF EVIDENCE:** III

Assisted reproductive technologies have long been a source of controversy,<sup>1</sup> with recent discussions focusing particularly on patient access to reproductive services. For instance, the California Supreme Court recently ruled that physicians who provide reproductive assistance must be willing to provide those technologies to lesbian women, notwithstanding the physicians’ religious commitments.<sup>2</sup> However, widespread disapproval of the “Octomom” (an unemployed, single mother of six receiving public assistance who gave birth to octuplets after in vitro fertilization)<sup>3</sup> indicates that most Americans believe physicians should place some limits on what reproductive technologies they offer and to whom.<sup>4</sup>

Previous surveys addressing a range of populations such as directors of assisted reproductive technology clinics in the United States and gynecologists in Israel have shown strong support among clinicians for the idea that reproductive services should be restricted in some situations. However, these studies find disagreement about what those situations should be.<sup>5–7</sup> Several factors have been highlighted as important contributors to such debates: religious commitments;<sup>7,8</sup> regional variation in local mores;<sup>7</sup> gender inequalities;<sup>9–11</sup> potential for competition between the offspring’s welfare, the patient’s autonomy, and the clinician’s personal integrity;<sup>12</sup> and challenges to traditional definitions of marriage, family, and lineage.<sup>13,14</sup>

Although previous surveys have provided some indication of obstetrician–gynecologists’ beliefs about the ethics of assisted reproductive technologies, the studies are relatively small, focusing especially on

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clinic directors specializing in assisted reproductive technologies,<sup>6,7</sup> and others recruited non-U.S. physicians exclusively.<sup>5,15</sup> Thus, little is known about current sentiments among ob-gyns in the United States. Therefore, we conducted a nationwide survey of ob-gyns, asking whether they have objections to any of four common assisted reproductive technologies and whether they would help patients obtain each technology. We also presented seven patient scenarios, asking physicians whether they would attempt to dissuade the patient in each scenario from seeking assisted reproduction, and whether they would help her obtain it. In each case we looked for demographic and religious correlates of physicians' beliefs and practices. The religious component was important because our previous study found that religious physicians are more likely to have objections to a range of controversial clinical practices.<sup>16</sup>

## MATERIALS AND METHODS

From October 2008 until January 2009, we mailed a confidential self-administered questionnaire to a stratified random sample consisting of 1,800 U.S. general ob-gyns 65 years old or younger. The sample size was selected so that a 60% response would yield a margin of error of approximately 3%. The sample was generated from the American Medical Association Physician Masterfile, a database intended to include all practicing U.S. physicians. To increase minority representation (especially minority religious perspectives), we used validated surname lists to create four strata.<sup>17-19</sup> Within each stratum, names were arranged in random order and then systematically sampled using a random starting point. We sampled 180 physicians with typical South Asian surnames, 225 physicians with typical Arabic surnames, 180 physicians with typical Jewish surnames, and 1,215 other physicians (from all those whose surnames were not on one of these ethnic lists). Each stratum was sized, based on past results, to yield at least 100 responses, which would provide a maximum margin of error of plus or minus 10% at the 95% level of confidence per group. Physicians received up to three separate mailings of the questionnaire; the first included \$20, and the third offered an additional \$30 for participating. Physicians also received an advance letter and a postcard reminder after the first questionnaire mailing. All data were double-keyed, cross-compared, and corrected against the original questionnaire. The study was approved by the University of Chicago institutional review board.

Primary criterion variables were whether physicians have moral or ethical objections to four com-

mon assisted reproductive technologies: artificial insemination by husband sperm, artificial insemination by donor sperm, in vitro fertilization (IVF) with husband and wife gametes, and IVF with donor sperm or egg or both. We also asked physicians whether they would help the patient obtain each intervention. Response categories were yes or no.

Additionally, we presented seven patient scenarios in which the patient has documented infertility and is able to pay for the treatment. We asked whether the physician would discourage the patient from using assisted reproductive technologies, and whether the physician would help the patient obtain an assisted reproductive technology if asked. The patient scenarios were: the patient is not married to her male sexual partner; the patient plans to be a single parent; the patient's sexual partner is female; the patient is 56 years old; the patient has human immunodeficiency (HIV) infection; the patient and her husband have five healthy biological children; and the patient has a cardiopulmonary abnormality with an associated 25% risk of death in carrying a pregnancy to term. Response options were yes or no.

Covariates included demographic characteristics (sex, race/ethnicity, age, and geographic region) and three religious measures. Religious affiliation was categorized as non-Evangelical Protestant, Evangelical Protestant, Catholic (includes Roman Catholic [n=237] and Eastern Orthodox [n=25]), Muslim, Jewish, Hindu, other religion (includes nine Buddhists), and none/no religious affiliation. The importance of religion was assessed by asking, "How important would you say your religion is in your own life?" Response options were dichotomized as not very important in my life/fairly important in my life and very important in my life/the most important part of my life. Attendance at religious services was categorized as twice per year or less, between three times per year and once per month, and twice per month or more.

Case weights were incorporated to account for the oversampling strategy (the design weight), and to correct for differences in response rates among the surname categories and between U.S. and foreign medical school graduates (the poststratification adjustment weight). Weights were the inverse probability of a person with the relevant characteristic being in the final data set. The final weight for each case or respondent was the product of the design weight and the poststratification adjustment weight. This method of case weighting—widely used in population-based research<sup>20</sup>—enabled us to adjust for sample stratification and variable response rates to generate estimates



for the population of U.S. ob-gyns. We used the  $\chi^2$  test to examine the associations between each background variable and physicians' beliefs about assisted reproductive technologies. We then conducted multivariable logistic regression using physicians' sex, race, region, and age as covariates. All analyses were conducted using the survey-design-adjusted commands of Stata SE statistical software 10.0 (Stata Corp, College Station, TX).

## RESULTS

The response rate was 66% (1,154/1,760) after excluding 40 potential respondents who were retired or who could not be located after two attempts to obtain a valid address. The response rate varied by stratum: 54% (120/221) among those with Arabic surnames, 61% (107/175) among those with South Asian surnames, 68% (120/176) among those with Jewish surnames, and 68% (807/1,188) in the primary sample. Graduates of foreign medical schools were less likely to respond than graduates of U.S. medical schools (58% compared with 68%;  $P=.001$ ). The response rate did not differ significantly by age, sex, region, or board certification. Respondents' demographic characteristics are reported in Table 1. The sampling method increased the number of Muslim, Jewish, and Hindu respondents. However, the application of the case weights to the analyses adjusted for this increase. Thus, our estimates of the percentages of U.S. ob-gyns in each racial category, and belonging to each religious affiliation, were similar to our previous national survey that did not oversample by ethnic surname.<sup>16,21</sup>

Moral or ethical objections, when they occurred, were most common for IVF with donor sperm or egg or both (4.6% object; 95% confidence interval [CI], 3.3–5.9); 2.7% would not help patients obtain it (95% CI 1.6–3.7). This was followed by: artificial insemination by donor sperm (4.2% object; 95% CI 3.0–5.5), 2.8% would not help (95% CI 1.7–3.8); IVF with husband and wife gametes (1.9% object; 95% CI 1.0–2.7), 1.0% would not help (95% CI 0.3–1.6); and artificial insemination by husband sperm (1.4% object; 95% CI 0.6–2.1), 1.2% would not help (95% CI 0.4–1.9).

Religious physicians were more likely to object when donor sperm or donor eggs were used. In particular, doctors were more likely to object to artificial insemination with donor sperm if they consider religion “very important/the most important part of their lives” (8% object compared with 1% who consider religion “not important/fairly important;” odds ratio [OR], 5.4; 95% CI 2.4–12). They were also

more likely to object to artificial insemination with donor sperm if they attend services twice per month or more (7% object compared with 2% who attend twice per year or less; OR 4.4; 95% CI 1.7–11). Similarly, physicians were more likely to object to IVF with donor sperm or egg or both if they consider religion “very important/the most important part of their lives” (8% compared with 2% who consider religion “not important/fairly important” OR 4.4; 95% CI 2.1–9.5) or attend services twice per month or more (8% compared with 2% of doctors who attend twice per year or less; OR 3.8; 95% CI 1.5–9.6). Among all affiliations, Muslim physicians were the most likely to object to artificial insemination using donor sperm (24% object compared with 4% of non-Evangelical Protestants; OR 8.9; 95% CI 3.1–26) and IVF using donor sperm (21% object compared with 4% of non-Evangelical Protestants; OR 7.3; 95% CI 2.5–21). Whereas Muslims were more likely to object than other religious groups (none exceeded a 6% objection rate), the wide CI limits our ability to estimate precisely how much more likely they were to object. (Table 2). Physicians' religious characteristics were not associated with objections to artificial insemination by husband sperm or IVF using husband/wife gametes ( $P>.4$ ).

Because religious teachings vary, we conducted subgroup analyses, looking separately at Protestants, Catholics, Muslims, Jews, and Hindus to determine whether increasing religious intensity (greater importance of religion, more frequent attendance) was always associated with more objections to using donor gametes. For Jewish physicians, greater religious intensity was not associated with more frequent objections ( $P=.3-.6$ ).

A large majority of physicians would discourage a patient from pursuing assisted reproductive technologies if pregnancy has a 25% mortality risk (95.4% discourage; 95% CI 94.1–96.7), 61.9% would not help her obtain it (95% CI 58.8–65.1); if the patient is 56 years old (87.7% discourage; 95% CI 85.6–89.7), 50.2% would not help (95% CI 46.9–53.4); or if the patient has HIV (73.3% discourage; 95% CI 70.5–76.2), 47.0% would not help (95% CI 43.8–50.3). Fewer would discourage use of assisted reproductive technologies if the patient is not married to her male sexual partner (14.2% discourage; 95% CI 11.9–16.4), 9.6% would not help (95% CI 7.7–11.5); if she plans to be a single parent (16.5% discourage; 95% CI 14.2–18.9), 11.0% would not help (95% CI 9.0–13.0); if her sexual partner is female (14.0% discourage; 95% CI 11.7–16.3), 12.7% would not help (95% CI 10.5–14.9); or if she already has five healthy biological children



**Table 1. Respondent Demographics Listed by Strata**

|                             | Stratum 1:<br>Doctors With<br>South Asian<br>Surnames<br>(n=107) | Stratum 2:<br>Doctors With<br>Arabic Surnames<br>(n=120) | Stratum 3:<br>Doctors With<br>Jewish<br>Surnames<br>(n=120) | Stratum 4:<br>All Other<br>Physicians<br>(n=807) | Total<br>(N=1,154) |
|-----------------------------|--|--|---|--|--------------------|
| Sex                         |  |  |   |  |                    |
| Female                      | 64 (60)  | 48 (40)  | 41 (34)   | 384 (48)   | 537 (47)           |
| Male                        | 43 (40)  | 72 (60)  | 79 (66)   | 423 (52)   | 617 (53)           |
| Race/ethnicity              |  |  |   |  |                    |
| White                       | 5 (5)  | 78 (66)  | 109 (94)  | 582 (73)   | 774 (69)           |
| African American            | 0 (0)  | 0 (0)  | 2 (2)   | 65 (8)   | 67 (6)             |
| Asian                       | 95 (93)  | 28 (24)  | 0 (0)   | 79 (10)  | 202 (18)           |
| Hispanic/Latino             | 0 (0)  | 1 (1)  | 2 (2)   | 61 (8)   | 64 (6)             |
| Other                       | 2 (2)  | 11 (9)   | 3 (3)   | 6 (1)  | 22 (2)             |
| Age (y)                     |  |  |   |  |                    |
| 25–40                       | 31 (29)  | 43 (36)  | 24 (20)   | 193 (24)   | 291 (25)           |
| 41–47                       | 20 (19)  | 18 (15)  | 23 (19)   | 244 (30)   | 305 (26)           |
| 48–55                       | 18 (17)  | 25 (21)  | 37 (31)   | 201 (25)   | 281 (24)           |
| 56–65                       | 38 (36)  | 34 (28)  | 36 (30)   | 169 (21)   | 277 (24)           |
| Region                      |  |  |   |  |                    |
| South                       | 30 (28)  | 30 (25)  | 27 (23)   | 286 (36)   | 373 (32)           |
| Midwest                     | 19 (18)  | 27 (23)  | 21 (18)   | 182 (23)   | 249 (22)           |
| Northeast                   | 39 (36)  | 38 (32)  | 49 (41)   | 162 (20)   | 288 (25)           |
| West                        | 19 (18)  | 25 (21)  | 23 (19)   | 175 (22)   | 242 (21)           |
| Immigration history         |  |  |   |  |                    |
| Born in United States       | 17 (16)  | 28 (24)  | 105 (88)  | 667 (84)   | 817 (72)           |
| Immigrated to United States | 89 (84)  | 89 (76)  | 15 (13)   | 130 (16)   | 323 (28)           |
| Medical education           |  |  |   |  |                    |
| U.S. school                 | 32 (30)  | 56 (47)  | 106 (88)  | 738 (91)   | 932 (81)           |
| Foreign school              | 75 (70)  | 64 (53)  | 14 (12)   | 69 (9)   | 222 (19)           |
| Certification               |  |  |   |  |                    |
| Board-certified             | 86 (80)  | 90 (75)  | 102 (85)  | 685 (85)   | 963 (83)           |
| Not board-certified         | 21 (20)  | 30 (25)  | 18 (15)   | 122 (15)   | 191 (17)           |
| Religious affiliation       |  |  |   |  |                    |
| Non-Evangelical Protestant  | 3 (3)  | 5 (4)  | 12 (10)   | 280 (35)   | 300 (27)           |
| Evangelical Protestant      | 1 (1)  | 0 (0)  | 4 (3)   | 86 (11)  | 91 (8)             |
| Catholic                    | 4 (4)  | 31 (27)  | 6 (5)   | 221 (28)   | 262 (23)           |
| Muslim                      | 3 (3)  | 47 (41)  | 0 (0)   | 4 (1)  | 54 (5)             |
| Jewish                      | 3 (3)  | 10 (9)   | 89 (75)   | 58 (7)   | 160 (14)           |
| Hindu                       | 80 (78)  | 3 (3)  | 0 (0)   | 8 (1)  | 91 (8)             |
| Other religion              | 8 (8)  | 8 (7)  | 1 (1)   | 31 (4)   | 48 (4)             |
| No religion                 | 1 (1)  | 11 (10)  | 6 (5)   | 101 (13)   | 119 (11)           |
| Importance of religion      |  |  |   |  |                    |
| Not at all important        | 13 (13)  | 22 (18)  | 34 (28)   | 203 (26)   | 272 (24)           |
| Fairly important            | 33 (32)  | 41 (34)  | 38 (32)   | 209 (26)   | 321 (28)           |
| Very important              | 45 (43)  | 36 (30)  | 40 (33)   | 264 (33)   | 385 (34)           |
| Most important              | 13 (13)  | 20 (17)  | 8 (7)   | 116 (15)   | 157 (14)           |
| Attend religious services   |  |  |   |  |                    |
| 2 per y or less             | 30 (29)  | 51 (43)  | 43 (36)   | 256 (32)   | 380 (33)           |
| 3–12 times per y            | 36 (35)  | 37 (31)  | 43 (36)   | 174 (22)   | 290 (26)           |
| Twice per mo or more        | 37 (36)  | 31 (26)  | 34 (28)   | 364 (46)   | 466 (41)           |

Data are n (%).

Percentages are not survey design-adjusted. Results may not sum to 100 because of rounding error.

Age for total sample: mean 47.8, standard deviation 9.2, range 26–65.

(23.8% discourage; 95% CI 21.1–26.5), 13.0% would not help (95% CI 10.9–15.2; Table 3).

Compared with those who said religion is “not important/fairly important,” doctors who consider religion “very important/the most important part of their lives” were more likely to discourage pursuit of

assisted reproductive technologies if the patient is not married to her male sexual partner (22% compared with 8%; OR 3.6; 95% CI 2.4–5.6), plans to be a single parent (26% compared with 8%; OR 4.0; 95% CI 2.7–6.1), has a female sexual partner (23% compared with 6%; OR 4.7; 95% CI 3.0–7.4), or has HIV



**Table 2. Moral or Ethical Objections of U.S. Obstetrician–Gynecologists Regarding Assisted Reproductive Technologies by Physicians’ Religious Characteristics**

|                            | Moral or Ethical Objection to Artificial Insemination by Donor Sperm |       |              | Moral or Ethical Objection to In Vitro Fertilization With Donor Sperm and/or Egg |       |               |
|----------------------------|--|-------|--------------|--|-------|---------------|
|                            | n (%)  | P*    | OR (95% CI)† | n (%)  | P*    | OR (95% CI)†  |
| Religious affiliation      |  |       |              |  |       |               |
| Non-Evangelical Protestant | 13 (4)   | <.001 | 1.0 referent | 13 (4)   | .004  | 1.0 referent  |
| Evangelical Protestant     | 4 (5)  |       | .8 (.2–3.1)  | 4 (5)  |       | .8 (.2–3.1)   |
| Catholic                   | 13 (5)   |       | 1.5 (.6–3.5) | 17 (6)   |       | 2.0 (.9–4.5)  |
| Muslim                     | 16 (24)  |       | 8.9 (3.1–26) | 14 (21)  |       | 7.3 (2.5–21)  |
| Jewish                     | 4 (2)  |       | .6 (.2–2.4)  | 4 (2)  |       | .5 (.1–2.1)   |
| Hindu                      | 4 (3)  |       | 1.1 (.2–5.5) | 3 (2)  |       | .9 (.2–5.1)   |
| Other religion             | 3 (6)  |       | 2.3 (.5–10)  | 3 (6)  |       | 2.2 (.5–9.5)  |
| No religion                | 1 (1)  |       | .3 (.03–2.5) | 1 (1)  |       | .3 (.04–2.5)  |
| Importance of religion     |  |       |              |  |       |               |
| Not/fairly important       | 9 (1)  | <.001 | 1.0 referent | 10 (2)   | <.001 | 1.0 referent  |
| Very/most important        | 50 (8)   |       | 5.4 (2.4–12) | 50 (8)   |       | 4.4 (2.1–9.5) |
| Attend religious services  |  |       |              |  |       |               |
| 2 per y or less            | 9 (2)  | <.001 | 1.0 referent | 9 (2)  | <.001 | 1.0 referent  |
| 3–12 times per y           | 10 (2)   |       | 1.2 (.4–4.0) | 11 (3)   |       | 1.5 (.5–4.5)  |
| 2 per mo or more           | 40 (7)   |       | 4.4 (1.7–11) | 40 (8)   |       | 3.8 (1.5–9.6) |

OR, odds ratio; CI, confidence interval.

\* *P* values reflect the bivariate associations between religious characteristics and objections to assisted reproductive technologies.

† Results of multivariable logistic regression; analysis includes sex, race, age, and region.

(79% compared with 70%; OR 1.5; 95% CI 1.1–2.0; Table 4). These physicians who considered religion very/most important were also more likely to decline requests to help a patient who is not married (14% compared with 6%; OR 2.6; 95% CI 1.6–4.3), who plans to be a single parent (16% compared with 7%; OR 2.8; 95% CI 1.8–4.4), or who has a female sexual partner (20% compared with 6%; OR 3.7; 95% CI 2.3–5.9; Table 5). In the other clinical scenarios, religion was not an important predictor of discouraging patients or declining to help them obtain assisted reproductive technologies.

Male physicians were more likely than female physicians to dissuade the patient if she is not married (18% compared with 9%; OR 2.2; 95% CI 1.4–3.4), plans to be a single parent (22% compared with 10%; OR 2.2; 95% CI 1.4–3.3), or has a female sexual partner (21% compared with 7%; OR 2.8; 95% CI 1.8–4.6; Table 4). Male physicians were also more likely to refrain from helping a patient who is not married (14% compared with 5%; OR 2.6; 95% CI 1.5–4.5), plans to be a single parent (15% compared with 7%; OR 1.9; 95% CI 1.2–3.1), or has a female sexual partner (18% compared with 7%; OR 2.0; 95% CI 1.2–3.3; Table 5).

Compared with younger physicians (age 25–40), older physicians (age 56–65) were more likely to dissuade a patient who plans to be a single parent

(25% compared with 10%; OR 2.0; 95% CI 1.1–3.8), who has a female sexual partner (28% compared with 6%; OR 5.0; 95% CI 2.4–10), who has HIV (80% compared with 61%; OR 2.5; 95% CI 1.6–4.2), or who has five healthy biological children (33% compared with 16%; OR 3.0; 95% CI 1.8–5.1; Table 4). Data for five healthy children are not shown. Older physicians (age 56–65) were also more likely than young physicians (age 25–40) to decline to help if the patient has a female sexual partner (25% compared with 6%; OR 4.5; 95% CI 2.2–9.1), has HIV (54% compared with 34%; OR 1.9; 95% CI 1.2–3.0), is 56 years old (58% compared with 43%; OR 1.7; 95% CI 1.1–2.6), or has five healthy biological children (22% compared with 7%; OR 4.6; 95% CI 2.4–8.9; Table 5). Data for 56-year-old and five-children scenarios are not shown.

## DISCUSSION

In this national survey of U.S. ob–gyns we found that few (less than 5%) have moral or ethical objections to artificial insemination or IVF. Some religious physicians, including one in four Muslims, object to using donor gametes. Many physicians would dissuade a patient from seeking assisted reproduction (and would not help her obtain it) if pregnancy imposed a high mortality risk, if the patient were older (56 years), or if the patient had HIV. Some physicians, particu-



**Table 3. Beliefs and Practices of U.S. Obstetrician–Gynecologists Regarding Artificial Reproductive Technologies**

|  | Physician Has a Moral or Ethical Objection |         | Physician Would Not Help the Patient Obtain the Treatment |         | Physician Would Discourage Patient From Using Assisted Reproductive Technologies |           | Physician Would Not Help the Patient Obtain Assisted Reproductive Technologies |           |
|--|--|---------|---|---------|--|-----------|--|-----------|
|  | n (%)                                      | 95% CI  | n (%)   | 95% CI  | n (%)  | 95% CI    | n (%)  | 95% CI    |
| Method   |  |         |   |         |  |           |  |           |
| Artificial insemination by husband sperm   | 19 (1.4)                                   | 0.6–2.1 | 10 (1.2)  | 0.4–1.9 |  |           |  |           |
| Artificial insemination by donor sperm   | 59 (4.2)                                   | 3.0–5.5 | 33 (2.8)  | 1.7–3.8 |  |           |  |           |
| In vitro fertilization with husband and wife gametes   | 24 (1.9)                                   | 1.0–2.7 | 9 (1.0)   | 0.3–1.6 |  |           |  |           |
| In vitro fertilization with donor sperm, egg, or both  | 60 (4.6)                                   | 3.3–5.9 | 31 (2.7)  | 1.6–3.7 |  |           |  |           |
| Patient scenarios*   |  |         |   |         |  |           |  |           |
| The patient is not married to her male sexual partner  |  |         |   |         | 154 (14.2)   | 11.9–16.4 | 104 (9.6)  | 7.7–11.5  |
| The patient plans to be a single parent  |  |         |   |         | 185 (16.5)   | 14.2–18.9 | 120 (11.0)   | 9.0–13.0  |
| The patient's sexual partner is female   |  |         |   |         | 150 (14.0)   | 11.7–16.3 | 140 (12.7)   | 10.5–14.9 |
| The patient is 56  |  |         |   |         | 980 (87.7)   | 85.6–89.7 | 549 (50.2)   | 46.9–53.4 |
| The patient has human immunodeficiency virus   |  |         |   |         | 803 (73.3)   | 70.5–76.2 | 522 (47.0)   | 43.8–50.3 |
| The patient and her husband have five or more healthy biological children  |  |         |   |         | 282 (23.8)   | 21.1–26.5 | 152 (13.0)   | 10.9–15.2 |
| The patient has a cardiopulmonary abnormality with an associated 25% risk of death in carrying a pregnancy to term |  |         |   |         | 1077 (95.4)  | 94.1–96.7 | 689 (61.9)   | 58.8–65.1 |

CI, confidence interval.

Percentages are survey design-adjusted and reflect estimates of the population of all U.S. obstetrician–gynecologists.

\* Assuming the patient has documented infertility and is able to pay for the treatment.

larly men and more religious physicians, would seek to dissuade a patient and would not assist her if she were unmarried, planned to be a single parent, or had a female sexual partner.

Physicians' overall beliefs in our study are fairly consistent with what has been reported before. In their 2001 survey of assisted reproductive technology clinic directors (n=210), Gurmankin, Caplan, and Braverman<sup>7</sup> found that 59% were “very or extremely likely to turn away” a woman who is HIV positive, 55% would decline a woman with a 10% mortality risk, 20% would decline a single woman, 17% would decline a lesbian couple, and 18% would decline a woman 43 years old.

Although our results are similar to those in this 2001 survey, they differ from a 1985 British survey of patients, sperm donors, and physicians in which 54% thought artificial insemination by donor sperm should not be offered to homosexual women,<sup>15</sup> suggesting that society has become more accepting of reproductive assistance for homosexual couples. Of note, the Ethics Committee of the American Society for Reproductive Medicine recognizes “no sound ethical basis” for a physician to deny reproductive services to unmarried, gay, or lesbian patients.<sup>23</sup>

Religious physicians were more likely to have objections to reproductive treatments using donor



**Table 4. Scenarios in Which Obstetrician–Gynecologists Would Discourage Artificial Reproductive Technologies, by Physicians’ Sex, Age, and Religious Characteristics**

|                            | Patient Is Not Married to Her Male Sexual Partner |       |               | Patient Plans to Be a Single Parent |       |               | Patient’s Sexual Partner Is Female |       |               | Patient Has HIV |       |               |
|----------------------------|---|-------|---------------|-------------------------------------|-------|---------------|------------------------------------|-------|---------------|-----------------|-------|---------------|
|                            | n (%)   | P*    | OR (95% CI)†  | n (%)                               | P*    | OR (95% CI)†  | n (%)                              | P*    | OR (95% CI)†  | n (%)           | P*    | OR (95% CI)†  |
| Sex                        |   |       |               |                                     |       |               |                                    |       |               |                 |       |               |
| Female                     | 53 (9)  | <.001 | 1.0 referent  | 59 (10)                             | <.001 | 1.0 referent  | 36 (7)                             | <.001 | 1.0 referent  | 362 (70)        | .07   | 1.0 referent  |
| Male                       | 101 (18)  |       | 2.2 (1.4–3.4) | 126 (22)                            |       | 2.2 (1.4–3.3) | 114 (21)                           |       | 2.8 (1.8–4.6) | 441 (76)        |       | .9 (0.7–1.3)  |
| Age (y)                    |   |       |               |                                     |       |               |                                    |       |               |                 |       |               |
| 25–40                      | 28 (11)   | .003  | 1.0 referent  | 28 (10)                             | <.001 | 1.0 referent  | 14 (6)                             | <.001 | 1.0 referent  | 169 (61)        | <.001 | 1.0 referent  |
| 41–47                      | 45 (16)   |       | 1.4 (.8–2.5)  | 52 (19)                             |       | 1.7 (.9–3.1)  | 39 (14)                            |       | 2.2 (1.1–4.6) | 212 (71)        |       | 1.6 (1.1–2.4) |
| 48–55                      | 24 (9)  |       | .6 (.3–1.2)   | 36 (13)                             |       | 1.0 (.5–2.0)  | 29 (11)                            |       | 1.4 (.6–3.1)  | 213 (82)        |       | 3.2 (2.0–5.2) |
| 56–65                      | 57 (21)   |       | 1.5 (.8–2.8)  | 69 (25)                             |       | 2.0 (1.1–3.8) | 68 (28)                            |       | 5.0 (2.4–10)  | 209 (80)        |       | 2.5 (1.6–4.2) |
| Religious affiliation      |   |       |               |                                     |       |               |                                    |       |               |                 |       |               |
| Non-Evangelical Protestant | 41 (15)   | <.001 | 1.0 referent  | 48 (16)                             | <.001 | 1.0 referent  | 44 (15)                            | <.001 | 1.0 referent  | 222 (77)        | .1    | 1.0 referent  |
| Evangelical Protestant     | 36 (41)   |       | 3.7 (2.1–6.5) | 41 (46)                             |       | 3.8 (2.2–6.6) | 36 (41)                            |       | 3.4 (1.9–6.1) | 75 (83)         |       | 1.3 (.7–2.5)  |
| Catholic                   | 27 (10)   |       | .7 (.4–1.1)   | 39 (14)                             |       | .8 (.5–1.4)   | 28 (11)                            |       | .6 (.3–1.0)   | 181 (72)        |       | .8 (.5–1.2)   |
| Muslim                     | 12 (24)   |       | 1.9 (.7–5.1)  | 16 (29)                             |       | 2.1 (.8–5.5)  | 13 (25)                            |       | 2.1 (.8–5.6)  | 39 (80)         |       | 1.2 (.5–2.6)  |
| Jewish                     | 6 (3)   |       | .2 (.1–.5)    | 8 (5)                               |       | .3 (.1–.7)    | 5 (3)                              |       | .1 (.1–.5)    | 101 (70)        |       | .7 (.4–1.2)   |
| Hindu                      | 15 (21)   |       | 1.7 (.6–5.2)  | 14 (16)                             |       | 1.1 (.3–3.3)  | 10 (13)                            |       | 1.0 (.3–3.7)  | 61 (77)         |       | 1.1 (.5–2.4)  |
| Other religion             | 8 (19)  |       | 1.7 (.7–4.2)  | 8 (19)                              |       | 1.4 (.6–3.3)  | 6 (13)                             |       | 1.0 (.4–2.9)  | 33 (66)         |       | .6 (.3–1.4)   |
| No religion                | 7 (6)   |       | .3 (.1–.8)    | 8 (6)                               |       | .3 (.1–.7)    | 6 (5)                              |       | .3 (.1–.7)    | 78 (68)         |       | .6 (.4–1.1)   |
| Importance of religion     |   |       |               |                                     |       |               |                                    |       |               |                 |       |               |
| Not/fairly important       | 43 (8)  | <.001 | 1.0 referent  | 49 (8)                              | <.001 | 1.0 referent  | 38 (6)                             | <.001 | 1.0 referent  | 393 (70)        | .003  | 1.0 referent  |
| Very/most important        | 110 (22)  |       | 3.6 (2.4–5.6) | 135 (26)                            |       | 4.0 (2.7–6.1) | 112 (23)                           |       | 4.7 (3.0–7.4) | 404 (79)        |       | 1.5 (1.1–2.0) |
| Attend religious services  |   |       |               |                                     |       |               |                                    |       |               |                 |       |               |
| 2 per y or less            | 27 (7)  | <.001 | 1.0 referent  | 31 (7)                              | <.001 | 1.0 referent  | 23 (6)                             | <.001 | 1.0 referent  | 248 (69)        | .02   | 1.0 referent  |
| 3–12 times per y           | 23 (7)  |       | 1.2 (.6–2.3)  | 30 (11)                             |       | 1.7 (.9–3.2)  | 24 (9)                             |       | 1.4 (.7–2.9)  | 199 (72)        |       | 1.2 (.8–1.7)  |
| 2 per mo or more           | 102 (23)  |       | 4.5 (2.7–7.6) | 122 (26)                            |       | 4.9 (3.0–8.1) | 103 (23)                           |       | 5.2 (2.9–9.2) | 349 (78)        |       | 1.5 (1.0–2.1) |

HIV, human immunodeficiency virus; OR, odds ratio; CI, confidence interval.

\* *P* values reflect the bivariate associations between background characteristics and beliefs about assisted reproductive technologies.

† Results of multivariable logistic regression; analysis includes sex, race, age, and region. For sex and age, the analysis also includes religious affiliation, importance of religion, and attendance at religious services as covariates.

gametes and were more likely to limit reproductive services for unmarried, single, or lesbian women. This finding contrasts with a 2001 national survey of clinic directors (n=184) that found no association between beliefs about access and religious affiliation, attendance at services, or self reports of religion’s influence on respondents’ lives.<sup>6</sup> Comments by several religious bioethicists shed light on some of the objections that may underlie religious physicians’ reservations. Ford<sup>24</sup> notes that Roman Catholic teaching forbids deliberately separating sexual intercourse from procreation. Nikolaos,<sup>25</sup> a Greek Orthodox Christian, suggests sterile couples should humbly accept God’s will and pursue other areas of productivity. Serour<sup>13</sup> comments that “authenticity of lineage” is a central feature of Muslim identity and family structure, and it is challenged when donor gametes are utilized. Schenker<sup>26</sup> states that in some branches of Judaism, the father is the one who provided sperm, and the mother is the one who birthed the child, so the use of donor sperm raises questions

about adultery and the legitimacy of the child. These reservations help to explain the tendency for religious physicians to view assisted reproductive technologies unfavorably; however, these are only a few of the possible religious concerns. It seems that the profession of medicine would benefit from a deeper understanding of and greater attention to the moral and theological concerns that inform many patients’ and clinicians’ ideas about assisted reproductive technologies.

The observation that male ob–gyns are more likely to limit access for unmarried, single, or homosexual women contributes to ongoing explorations of when physician sex does and does not influence clinical practices. A 2002 survey of Israeli gynecologists (n=181) reported that sex did not affect opinions about IVF and adoption.<sup>5</sup> Limited evidence for gender differences was seen in a survey of the Japanese general public (conducted 1999 and 2003; n=6,215), which found women less supportive of gestational surrogacy.<sup>27</sup> Such gender differences indicate that



**Table 5. Scenarios in Which Obstetrician-Gynecologists Would Not Help the Patient Obtain Assisted Reproductive Technologies, by Physicians' Sex, Age, and Religious Characteristics**

|                            | Patient Is Not Married to Her Male Sexual Partner |       |               | Patient Plans to be a Single Parent |       |               | Patient's Sexual Partner is Female |       |               | Patient Has HIV |       |               |
|----------------------------|---|-------|---------------|-------------------------------------|-------|---------------|------------------------------------|-------|---------------|-----------------|-------|---------------|
|                            | n (%)   | P*    | OR (95% CI)†  | n (%)                               | P*    | OR (95% CI)†  | n (%)                              | P*    | OR (95% CI)†  | n (%)           | P*    | OR (95% CI)†  |
| Sex                        |   |       |               |                                     |       |               |                                    |       |               |                 |       |               |
| Female                     | 29 (5)  | <.001 | 1.0 referent  | 36 (7)                              | <.001 | 1.0 referent  | 40 (7)                             | <.001 | 1.0 referent  | 218 (42)        | .004  | 1.0 referent  |
| Male                       | 75 (14)   |       | 2.6 (1.5–4.5) | 84 (15)                             |       | 1.9 (1.2–3.1) | 100 (18)                           |       | 2.0 (1.2–3.3) | 304 (51)        |       | 1.1 (.8–1.5)  |
| Age (y)                    |   |       |               |                                     |       |               |                                    |       |               |                 |       |               |
| 25–40                      | 17 (6)  | .03   | 1.0 referent  | 19 (7)                              | .01   | 1.0 referent  | 16 (6)                             | <.001 | 1.0 referent  | 98 (34)         | <.001 | 1.0 referent  |
| 41–47                      | 26 (10)   |       | 1.4 (.6–2.8)  | 30 (11)                             |       | 1.4 (.7–2.7)  | 29 (10)                            |       | 1.7 (.8–3.5)  | 137 (45)        |       | 1.4 (1.0–2.1) |
| 48–55                      | 22 (8)  |       | 1.0 (.5–2.3)  | 24 (10)                             |       | 1.1 (.5–2.3)  | 30 (11)                            |       | 1.9 (.9–4.0)  | 141 (56)        |       | 2.5 (1.6–3.7) |
| 56–65                      | 39 (15)   |       | 1.7 (.8–3.5)  | 47 (17)                             |       | 1.9 (1.0–3.7) | 65 (25)                            |       | 4.5 (2.2–9.1) | 146 (54)        |       | 1.9 (1.2–3.0) |
| Religious affiliation      |   |       |               |                                     |       |               |                                    |       |               |                 |       |               |
| Non-Evangelical Protestant | 26 (9)  | <.001 | 1.0 referent  | 31 (11)                             | <.001 | 1.0 referent  | 36 (12)                            | <.001 | 1.0 referent  | 139 (48)        | .001  | 1.0 referent  |
| Evangelical Protestant     | 22 (26)   |       | 3.2 (1.6–6.3) | 22 (25)                             |       | 2.6 (1.3–4.9) | 30 (34)                            |       | 3.5 (1.8–6.7) | 56 (65)         |       | 1.9 (1.2–3.3) |
| Catholic                   | 23 (9)  |       | 1.0 (.5–1.8)  | 28 (11)                             |       | 1.0 (.6–1.9)  | 30 (12)                            |       | 1.0 (.6–1.8)  | 120 (47)        |       | .9 (.6–1.3)   |
| Muslim                     | 10 (21)   |       | 2.4 (.9–7.0)  | 11 (23)                             |       | 2.5 (.9–6.6)  | 14 (28)                            |       | 3.4 (1.3–8.7) | 28 (57)         |       | 1.6 (.7–3.5)  |
| Jewish                     | 3 (3)   |       | .3 (.1–1.1)   | 5 (4)                               |       | .4 (.1–1.1)   | 6 (4)                              |       | .3 (.1–1.0)   | 69 (46)         |       | .9 (.5–1.4)   |
| Hindu                      | 11 (13)   |       | 1.0 (.3–3.6)  | 9 (12)                              |       | .9 (.2–3.3)   | 11 (14)                            |       | 1.1 (.3–4.1)  | 47 (56)         |       | 1.2 (.6–2.6)  |
| Other religion             | 6 (11)  |       | 1.2 (.4–3.6)  | 5 (10)                              |       | 1.0 (.3–3.2)  | 5 (11)                             |       | 1.0 (.3–3.4)  | 17 (32)         |       | .5 (.2–1.1)   |
| No religion                | 3 (2)   |       | .2 (1.–.8)    | 7 (6)                               |       | .5 (.2–1.3)   | 6 (5)                              |       | .4 (.2–1.2)   | 40 (37)         |       | .7 (.4–1.1)   |
| Importance of religion     |   |       |               |                                     |       |               |                                    |       |               |                 |       |               |
| Not/fairly important       | 33 (6)  | <.001 | 1.0 referent  | 37 (7)                              | <.001 | 1.0 referent  | 38 (6)                             | <.001 | 1.0 referent  | 246 (44)        | .02   | 1.0 referent  |
| Very/most important        | 71 (14)   |       | 2.6 (1.6–4.3) | 83 (16)                             |       | 2.8 (1.8–4.4) | 102 (20)                           |       | 3.7 (2.3–5.9) | 273 (52)        |       | 1.3 (1.0–1.7) |
| Attend religious services  |   |       |               |                                     |       |               |                                    |       |               |                 |       |               |
| 2 per y or less            | 17 (4)  | <.001 | 1.0 referent  | 22 (5)                              | <.001 | 1.0 referent  | 20 (5)                             | <.001 | 1.0 referent  | 148 (40)        | .002  | 1.0 referent  |
| 3–12 times per y           | 19 (7)  |       | 1.8 (.8–3.8)  | 22 (9)                              |       | 1.9 (.9–3.7)  | 30 (12)                            |       | 2.2 (1.1–4.5) | 128 (47)        |       | 1.3 (.9–1.8)  |
| 2 per mo or more           | 67 (15)   |       | 3.8 (2.0–7.4) | 75 (16)                             |       | 3.4 (1.9–6.1) | 90 (19)                            |       | 4.0 (2.2–7.5) | 243 (53)        |       | 1.5 (1.1–2.1) |

HIV, human immunodeficiency virus; OR, odds ratio; CI, confidence interval.

\* P values reflect the bivariate associations between background characteristics and beliefs about assisted reproductive technologies.

† Results of multivariable logistic regression; analysis includes sex, race, age, and region. For sex and age, the analysis also includes religious affiliation, importance of religion, and attendance at religious services as covariates.

male physicians must exert extra effort if they are to appreciate women's concerns fully.

Several patient scenarios gave physicians pause about offering assisted reproductive technologies, irrespective of physicians' sex or religious commitments. These data suggest that postmenopausal women, those with HIV, patients who already have a large biological family, and those at high risk for death are all likely to encounter resistance from physicians. It is worth noting that the Ethics Committee of the American Society for Reproductive Medicine has commented on some, but not all, of these situations. They wrote that oocyte donation to postmenopausal women should be discouraged but should not be considered unethical in every case.<sup>28</sup> They also wrote that unless the physician lacks the training or facilities to treat HIV-positive patients, he or she "may be legally as well as ethically obligated to provide [them with] requested reproductive assistance."<sup>29</sup> However, no guidelines have been issued

regarding patient age, family size, or mortality risks, thereby leaving these scenarios controversial according to our data and unresolved according to the literature.

This study has strengths and limitations. The response rate was high, possibly because of the use of a financial incentive and physicians' interest in the topic. Some limitations of this study warrant mention. In several situations objections were infrequent, and few physicians would decline to assist patients. These small cell counts limited the statistical tests we could perform in some instances, and in others led to unstable estimates (indicated by wide CI). We surveyed ob-gyns, but beliefs may differ in other specialties. We focused on general ob-gyns rather than those specializing in infertility. Physicians' self reports may not match their clinical practices. We used broad racial categories that may overlook important differences that exist within single racial categories. Also,



nonresponders may differ from responders in ways that bias some findings.

We found that fewer than 5% of practicing U.S. ob-gyns have moral or ethical objections to artificial insemination or IVF, and equally few would refuse to help patients obtain these treatments. Nevertheless, most physicians restrict access to assisted reproductive technologies in some situations, particularly if the patient has a high mortality risk, is 56 years old, or has HIV. Religious and male physicians were more likely to limit access to unmarried, single, and homosexual women. Our findings indicate ways that sex, culture, and religion all shape individual physicians' practices as gatekeepers to assisted reproductive technologies.

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