

# Discordant Views of Experts and Laypersons on the Adoption of New Fertility Technology

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**Background:** Healthcare costs are increased by the adoption of novel technologies before solid evidence on efficacy and risks. Oocyte cryopreservation for preserving fertility raises special ethical challenges. We compared opinions of professionals for assisted reproductive technology (ART), bioethicists, medical students and the general population toward the questions: do you support access to oocyte cryopreservation to preserve fertility for personal reasons and who should bear the costs?

**Methods:** The surveys conducted for this study were carried out in Israel included the following: (1) survey of 21 ART unit directors; (2) interviews with 23 bioethics experts; (3) survey of 196 medical students from 2 universities; (4) random digit-dial population-based survey of the public (N=600).

**Results:** Nearly 80% of ART and bioethics experts and 56% of students thought that oocyte cryopreservation should be allowed even for personal reasons. While expressing concerns about social consequences, bioethicists emphasized individuals' rights. In contrast, among the public, only 40% supported the use of this technology for personal reasons (ranging from 24% among Ultra-orthodox Jews and Arabs, to 51% among seculars or with academic education). Of note, 15% were undecided (vs. <2% among students,  $P<0.001$ ). Most experts suggested private financing of the procedure for personal reasons, whereas the public preferred national or private insurance coverage.

**Conclusions:** Nonexperts present a greater level of ambivalence than experts toward the use of a novel fertility technology for nonmedical reasons. Experts' preferences and interests may facilitate adoption of novel technologies with yet unclear effectiveness and safety, potentially contributing to increased healthcare costs.

**Key Words:** expert bias, assisted reproductive technology, bioethics, fertility, oocyte cryopreservation, wisdom of crowds, health care policy

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Healthcare costs appear to be increasing because of the widespread adoption of emerging technologies, often before high-level evidence on efficacy and risks is available with adequate policy analytic consideration.<sup>1</sup> Oocyte cryopreservation is a new modality that raises challenging ethical, social, and economic questions.<sup>2</sup> For instance, should women who wish to postpone parenting to achieve a professional career be treated as those undergoing chemotherapy and who should cover the costs of this procedure? It is likely that the answer implicates values, knowledge of costs and benefits, and individual roles and interests. We compared opinions toward the provision and financing of this technology for nonmedical reasons, as expressed by professionals of assisted reproductive technology (ART), bioethics experts, medical students, and the general public, reflecting on the possible sources of differences, and suggesting improvements in public decision-making.

## METHODS

We surveyed ART unit directors, bioethics experts, medical students, and the Israeli public. The main questions were do you support access to oocyte cryopreservation to preserve fertility for personal reasons and who should bear the costs? The purpose of the current study was to compare healthcare policy recommendations by experts and nonexperts.

Selection criteria and instrument administration for the 3 groups are as follows:

The experts group included all ART unit directors in Israel (21/24 responded) and bioethics experts in Israel, using snowball sampling and semi-open interviews (23/29 agreed). A detailed report on the considerations expressed by these experts is in press elsewhere.<sup>3</sup>

The medical students group was a convenience sample of 196 students from 3 different preclinical and clinical years, attending lectures at 2 major universities in Israel. They were polled using an electronic voting system (Classroom Performance System, eInstruction, Denton, TX). The response rate was more than 95% of those attending the lecture. The students had not been exposed to any systematic

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learning about ART and were therefore naive to the questions of the survey.

The survey of the Israeli public used random digit-dial sampling administered by the Cohen Institute for Public Opinion Research at Tel Aviv University. After exclusions due to incorrect or disconnected phone numbers, busy signals or answering machines in 3 attempts, refusals, and other nonsuitable respondents (such as below age 18 y), 600 adults were selected (response rate, 30%). The questionnaire included questions about demographic and socio-economic variables (gender, age, familial status, education, income, ethnicity, and religiosity) on which distribution of answers were found close to Israel Census Data, confirming the representativeness of the sample (Supplemental Digital Content 1, online only, available at: Supplemental Digital Content 1, <http://links.lww.com/MLR/A194>).

The questions were validated using at face criterion during pretesting, and translated into Arabic and Russian for the general population survey.

In the population survey, the questions were introduced by a short explanation about the procedure, as follows:

Oocyte cryopreservation is a new technique making possible successful pregnancy and delivery of healthy babies, using frozen eggs obtained for instance from a woman with cancer before chemotherapy (which impairs fertility). In your opinion, should egg freezing be made available?

- A. Not before there is more long-term experience.
- B. Only if there is an immediate threat to the woman's fertility.
- C. Yes, to every woman interested.

If egg freezing is indeed made available to every woman interested, who should cover the cost?

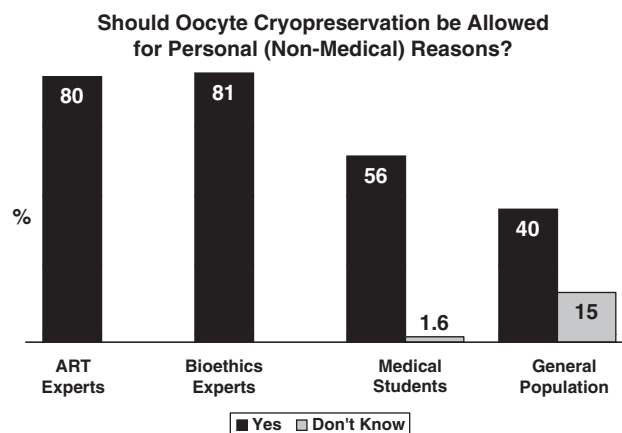
- A. The national health insurance.
- B. A supplemental insurance.
- C. Out of the pocket (of the woman interested).

## RESULTS

Nearly 80% of ART and bioethics experts thought that oocyte cryopreservation should be allowed to preserve fertility for personal reasons (Fig. 1). They saw no reason to oppose extending use of this technology to nonmedical reasons. While bioethicists expressed concerns about social consequences of this technology, they emphasized individuals' rights for autonomy and gender equity<sup>3</sup>.

Among medical students, 56% expressed support ( $P < 0.01$  vs. experts). Among the public, 40% supported use of this technology for personal reasons ( $P < 0.001$  vs. experts)—ranging from 24% among Ultra-orthodox Jews and Arabs, to 51% among secular individuals or with academic education ( $P < 0.01$ )—and 15% were undecided. There were no significant differences of attitudes by gender (43% vs. 37%, female vs. male), age (44% vs. 37%, below vs. over 44-year-old), marital status (45% vs. 40%, single vs. married), and parental status (45% vs. 40%, with vs. without children).

Most experts suggested private financing of the procedure for personal reasons (90% of ART units directors; 5% supported financing by the national insurance plan, and



**FIGURE 1.** Comparison of responses between experts and nonexperts on the provision of oocyte cryopreservation for personal reasons.

another 5% supported financing by a voluntary supplemental insurance). Two-third of bioethics experts supported private financing of the procedure (33% of them favored financing by the national insurance plan; none of them supported financing by a supplemental insurance). A majority of the public preferred coverage by national (42%) or private insurance (29%); the remainder favored coverage by a supplemental insurance ( $P < 0.001$  for comparison between groups).

## DISCUSSION

The general public expressed greater ambivalence toward the use of oocyte cryopreservation for nonmedical reasons than both ART professionals and bioethicists—who, it is assumed, hold professional beliefs and/or interests not shared by other groups. Expertise was a more significant predictor of opinion than culture, education, or personal-familial status.

Expertise, of course, may be imperfect, and given the state of the art of this technology, we were surprised at the high levels of support for use of oocyte cryopreservation among ART professionals and bioethicists. There are still uncertainties related to safety.<sup>2,4,5</sup> New cryopreservation protocols (especially “vitrification”) avoid freezing injury and improve efficiency,<sup>4</sup> but use high cryoprotectant concentrations that may be toxic to oocytes.<sup>5</sup> Scholars have stressed that much more data are needed to confirm the safety of this technique for the child-to-be.<sup>2,5</sup> The Practice Committee of the American Society for Reproductive Medicine continues to consider this procedure as experimental, requiring a proper informed consent.<sup>6–8</sup> Clinical evidence is limited to small series, usually in patients who had a medical indication for oocytes storage of several months.<sup>2,4,5</sup> We could not find any reported cases of pregnancy after years of storage with the current technique in use. Recent reviews state that there is a need for larger, long-term studies to assess the safety and efficacy of this technology, which should continue to be used under oversight of an institutional review board with an investigational protocol.<sup>2,4,6</sup>

In the present study, it appears that ART experts may have overstated scientific evidence and downplayed warnings. On the other hand, bioethicists did not question the scientific evidence on efficacy and safety; this led to an overwhelming support by experts for the new technology. This support was not shared by the general public who expressed more ambivalence, perhaps in part reflecting risk aversion for unknowns and trust in traditional young motherhood. Public intuitions may be more prudent than expert opinion; the diversity of independent and decentralized opinions might result in “market judgment” being faster and more reliable than experts.<sup>9</sup> The “wisdom of crowds” may be paradoxically more poised than expert opinions, indicating potential usefulness of public discourse in healthcare policy decisions.

In operational fields, decision bias is defined as a “common tendency to acquire and process information by filtering it through one’s own likes, dislikes, and experiences.”<sup>10</sup> In the current study, several groups appeared to have stronger views than others against or in favor of adopting the new fertility technology. Only 24% of Ultra-orthodox Jews and Arabs supported use of oocyte cryopreservation for personal reasons. Strong religiosity and traditional cultural beliefs are known to influence gender role preferences.<sup>11,12</sup> Reservation toward the adoption of a new fertility technology for personal reasons is notable because the Israeli public assigns a high priority to in vitro fertilization modality compared with other cultures such as the United States.<sup>13–15</sup> In contrast, 80% of both ART and bioethics experts favored adoption of the new fertility technology for personal reasons. The grounds for this perspective included a commitment to the value of autonomy and the promotion of gender equity. Experts seemed to welcome biotechnical solutions over the need to develop creative social arrangements to support parenting and career advancement. ART experts, often exposed to suffering of infertile women, indicated the attractiveness of a technically feasible solution.<sup>3</sup> These and other considerations such as professional pride or financial gain (suggested by 2 experts as playing a major role<sup>3</sup>) appeared to prevail over the scarcity of clinical evidence about the effectiveness and the safety of the procedure.

Our results suggest that professional orientations and religious affiliation have divergent influences; experts strongly favor adopting the technology, whereas Arab and other religious minorities are strongly against it. Somewhere in between these extremes is a large, ambivalent majority. These divergent views have critically different implications; decisions on adoption of a new technology are not made by ethnic minorities but by policy makers who rely heavily on experts, supposedly representing the public’s best interest.

Sackett suggests that expertise may hinder the advancement of science when respect and prestige preclude others from challenging expert opinions and when reviewers of grant applications judge the merit of new ideas according to the extent of conformity with expert opinions.<sup>16</sup> Our present observation suggests that expert’s predisposition and interests may also contribute to unduly fast adoption of emerging technologies.

The responses by medical students are interesting: on one hand, they showed assertiveness as only a few chose to answer “I don’t know”; on the other hand, at the collective level, they echo the ambivalence shown by the general public as about half supported the use of ART for nonmedical reasons. Overconfidence is recognized as dangerous bias that jeopardizes diagnostic processes,<sup>17</sup> and is already apparent during preclinical training.<sup>18</sup> Overconfidence among undergraduate students,<sup>19</sup> perhaps exacerbated by highly competitive selection of medical students, may diffuse from areas of knowledge to the field of opinions—in a way that later challenges physician’s communication about values with patients, families, and peers.

Expert preferences regarding funding may appear at variance with their attitudes toward the procedure as one might have expected that they would favor public funding. However, adoption of a new technology by the Israeli National Health Insurance Basket of Services follows a stringent and arduous competitive procedure, often giving priority to life preserving medications (such as a new chemotherapy for cancer) over modalities that improve quality of life.<sup>14</sup> Providers of a new service related to quality of life might prefer private over public financing in order not to postpone the activity.

Experts and citizens hold discordant perceptions and preferences because of differences in professional orientations and interests, filtering of or access to information, and social values. This suggests that the divergence of attitudes could be elucidated and brought to bear on decision-making.

Engaging citizens in public deliberations on health policy issues raises both theoretical and pragmatic challenges.<sup>20</sup> In recent years, government and civic organizations in several countries have been implementing various initiatives to involve the public in healthcare policy.<sup>21</sup> Such “health parliaments” have provided a learning experience for all stakeholders but demand special skills and resources.<sup>20,22</sup> Our observation suggests that engaging the public in deliberations might be worth exploring for the development of policy in sensitive issues such as fertility technology. For instance, there may be long-term societal benefits if some women can postpone parenting to achieve a professional career. Alternatively, capitalistic societies give low value to child care (maternity leave is often unpaid in the United States, in contrast to a full year of salary in Denmark) and because early attachment is critical for later interpersonal relationships, missed primitive mother–infant bonding might have long-lasting consequences for social welfare.<sup>23,24</sup> Rewarding childcare through innovative social programs<sup>25,26</sup> might be a prudent policy that could support parenting and career advancement while providing an alternative to fertility preservation. These issues were not raised by the experts and might have arisen in a broader public discourse.

Our study has important limitations: the different setting of the survey questions to experts and nonexperts could have biased their answers and observations in the Israeli context might not be applied elsewhere or to other healthcare policy issues. The response rate in the public survey was low, as observed in phone polls,<sup>27</sup> but socioeconomic characteristics of the respondents suggested representativeness of the sample.

We did not present respondents' data on efficacy, safety, costs, and cost effectiveness of oocyte preservation. Awareness of evidence and macro-societal modeling could have altered the responses. Finally, we were not able to explore in the public survey what aspects of the technology affected the views of the respondents.

Our report should be regarded as preliminary research to encourage a more systematic evaluation of our hypothesis about expert bias in health policy, and especially for the adoption of emerging technologies.

In conclusion, experts' preferences and interests may facilitate rapid adoption of novel technologies before solid evidence on effectiveness and safety is available, potentially contributing to increased healthcare costs.

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