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# Physicians underestimate the importance of patient-centredness to patients: a discrete choice experiment in fertility care

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**BACKGROUND:** High-quality healthcare should be effective, safe and patient-centred. How important patient-centredness is in relation to effectiveness of fertility care has never been investigated. This study aimed to determine and compare the importance of patient-centredness, relative to pregnancy rates, to patients and physicians.

**METHODS:** A discrete choice experiment (DCE) was designed. Participants had to choose between hypothetical fertility clinics differing in following attributes: travel time; pregnancy rate (effectiveness); physicians' attitude; information on treatment; and continuity of physicians (the latter three represent patient-centredness). A total of 1378 patients and 268 physicians from eight Dutch and Belgian fertility clinics received the DCE-questionnaire. The attributes' relative importance was analysed using multinomial logistic regression. Additionally, patients' actual choice behaviour was investigated.

**RESULTS:** In total, 925 patients and 227 physicians participated. Pregnancy rates were relatively more important to physicians. Patients assigned more value to patient-centredness ($P < 0.001$) and were willing to trade-off a higher pregnancy rate for patient-centredness than physicians recommended them to do ($P < 0.05$). For example, patients considered pregnancy rates 1.5 times as important as an interested physician's attitude, whereas physicians considered this 2.4 times as important ($P < 0.001$). The willingness to trade-off pregnancy rate for this attitude was 9.8% for patients and 6.3% for physicians ($P < 0.001$). A lack of patient-centredness was the most cited non-medical reason for changing fertility clinics.

**CONCLUSIONS:** Patients and physicians put considerable value on pregnancy rates. However, physicians significantly undervalue the importance of patient-centredness to patients. Clinics aiming to optimize the quality of their services should be aware of the substantial importance their patients assign to patient-centredness.

**Key words:** patient-centredness / pregnancy rates / fertility care / discrete choice experiment / patient preferences

## Introduction

Delivering high-quality care is the ultimate but challenging goal of healthcare. In all fields of healthcare, effectiveness and safety are the most acknowledged quality dimensions. Although crucial, true high-quality care goes beyond this scope, and is also patient-centred (Institute of Medicine, 2001; Bengoa *et al.*, 2006; Berwick, 2009; Keirns and Goold, 2009). Patient-centred healthcare, defined as care responsive to individual patient needs and guided by patient values, is gaining ground as an important quality dimension (Institute of Medicine, 2001; Bengoa *et al.*, 2006; Shaller, 2007; Frampton *et al.*, 2008). Governments of Western countries increasingly

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acknowledge the importance of incorporating patients' views in the organization of healthcare (Wensing and Elwyn, 2003; Greener, 2009; Ham, 2010). Healthcare professionals, however, still have a hard time ensuring that healthcare is patient-centred (Kizer, 2002; Berwick, 2009; van Empel *et al.*, 2010a). While definitely being hindered by organizational issues, such as time constraints, numerous professionals still apply a doctor-centred approach (habits and rules of doctors and nurses come first) rather than a patient-centred approach (needs of the patient come first) in every day care (Laine and Davidoff, 1996; Bensing, 2000).

Although patients do attach importance to patient-centredness, it is unknown whether they are willing to trade-off critical healthcare outcomes, such as effectiveness of treatment, for more patient-centred care. Therefore, it is unknown whether physicians sufficiently value the importance of patient-centredness to patients. Clearly, it would be interesting and relevant to investigate the importance of patient-centredness in relation to effectiveness of treatment, and to compare the points of view of patients and physicians. For several reasons, it is especially interesting to study this in reproductive medicine. First, effectiveness is evidently important to both fertility patients and physicians and can unambiguously be translated into 'pregnancy rate' (Min *et al.*, 2004; Marcus *et al.*, 2005; Castilla *et al.*, 2008). Second, several studies document that patient-centredness is important to fertility patients (Marcus *et al.*, 2005; van Empel *et al.*, 2010b; Dancet *et al.*, 2010), but how important exactly is unknown. Third, although most patients report to be satisfied with fertility care (Schmidt *et al.*, 2003a,b), studies measuring patients' experiences with specific aspects of fertility care indicate there is still much room to improve the patient-centredness of care (Mourad *et al.*, 2009; van Empel *et al.*, 2010a,b). Fourth, fertility patients are likely to travel significant distances for better quality of care, because of: (i) their generally good physical condition (ii) the non-urgent nature of fertility problems (iii) the significant variation in pregnancy rates and patient-centredness among fertility clinics (Lass and Brinsden, 2001; Bundorf *et al.*, 2009; van Empel *et al.*, 2010b).

A discrete choice experiment (DCE) is the best available method to investigate the relative importance of outcome and process attributes of multi-dimensional concepts (e.g. quality of care) and allows the calculation of respondents trade-offs between attributes (Ryan and Farrar, 2000; Bryan and Parry, 2001; Sculpher *et al.*, 2004; Telser and Zweifel, 2007; Albada and Triemstra, 2009). In a DCE, respondents have to choose repeatedly between scenarios, described by attributes with varying levels.

Therefore, we aimed to determine and compare the importance of patient-centredness in relation to pregnancy rates to fertility patients and physicians by using DCE.

# Materials and Methods

## Study design

A DCE was used to elicit patients' and physicians' preferences regarding fertility care. Participants were sent a questionnaire with choice sets developed to represent hypothetical but realistic fertility clinics. Patients were asked which fertility clinic they would choose. Physicians were asked which clinic they would recommend to their patients, assuming that physicians would recommend what they believe is the best care for their patients, based on their (professional) point of view.

In Belgium, multicentre ethics committee approval was acquired for this study (S51861; ML5954). In the Netherlands, approval was proposed but not required.

## Development of a DCE-questionnaire

*Attributes and levels*

As recommended, the attributes and levels were based on a literature review, qualitative research and an expert panel (Louviere *et al.*, 2000; Hundley *et al.*, 2001; Phillips *et al.*, 2002; Ubach *et al.*, 2003). The literature review focused on factors influencing the choice for a fertility clinic (Ryan, 1999; Lass and Brinsden, 2001; Marcus *et al.*, 2005; Bundorf *et al.*, 2009; Dancet *et al.*, 2010; Shenfield *et al.*, 2010). Qualitative research comprised 11 focus groups including 82 Dutch and Belgian fertility patients (Dancet *et al.*, 2011). The expert panel included five fertility experts (physicians, a nurse practitioner and a psychologist).

Five attributes were finally selected: (i) travel time from home to clinic; (ii) ongoing pregnancy rate per IVF-cycle; (iii) physicians' attitude towards patients; (iv) information on treatment; and (v) continuity of physicians. The last three attributes represent patient-centred fertility care (Dancet *et al.*, 2010; van Empel *et al.*, 2010b). Each attribute was divided into three meaningful levels that covered the 'realistic range' (Hall *et al.*, 2004). For example, the levels of 'pregnancy rate' ranged from 20 to 35%, which is consistent with the range of the mean ongoing pregnancy rate per IVF-cycle in Dutch and Belgian fertility clinics (College of Physicians for Assisted Reproduction Therapy, 2006; Kremer, 2008; De Mouzon *et al.*, 2010).

*Questionnaire design*

The combination of attributes and levels resulted in 243 ($3^5$) possible scenarios which, for obvious practical reasons, could not all be included in a questionnaire. Therefore, a fractional factorial design, both orthogonal and balanced, was created according to published principles (Street and Burgess, 2007). Our design was based on an 81 array orthogonal main effects plan (Street and Burgess, 2010a). To realize 'choice sets' with maximum differentiation between scenarios, a fold-over technique (22222) was applied to each of the 81 scenarios, resulting in 'mirror' scenarios. Hence, in Fig. 1 the choice sets left scenario (coding 22110) led to its right scenario (code 11002). Consequently, 162 of the 243 different scenarios were included.

The design's efficiency, calculated according to Street and Burgess (2010b), was 100%, ensuring the informative value of an optimal design.

Previous studies indicate that respondents can handle up to 17 choice sets (Sculpher *et al.*, 2004; Christofides *et al.*, 2006; Bech *et al.*, 2010). Therefore, the final 81 choice sets were randomly divided over five questionnaire versions (four with 16 and one with 17 choice sets) and controlled for level balance.

*Questionnaire addenda*

To clarify the method, the choice sets were preceded by detailed instructions. Physicians were asked to select the clinic they would recommend to their patients. Physicians choices are specified as 'physicians' preferences' in the manuscript. The instructions also included an example choice set, where respondents had to select their preferred airline ticket for a holiday.

Furthermore, the patient questionnaire included 10 questions on demographic and medical characteristics, and five questions on the respondents' actual choice behaviour (e.g. 'Have you ever changed clinics?') of which three were open-ended (e.g. What was the reason for changing clinic?).

Questionnaires for physicians included three demographic questions.

*Pilot testing*

The preliminary DCE questionnaire was tested with a total of eight couples during four consecutive test rounds of cognitive interviewing.

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**Question: Which clinic would you prefer**

| Attribute | Clinic A | Clinic B |
|---|---|---|
| Travel time to clinic | 15 minutes | 45 minutes |
| Physician's attitude to patients | Friendly and interested | Friendly, but distant |
| Information on treatments | Only general information | Contradictory information |
| Continuity of physicians | Physicians often change, but having one lead physician | Seeing a different physician almost every visit |
| Clinic's mean ongoing pregnancy rate | 20% | 35% |
| *On the basis of this information I choose* | ☐ A | ☐ B |

**Figure 1** Example of a choice set from the patients' questionnaire.

During the interviews, the questionnaire's comprehensibility, amount of choice sets and content validity of the attributes and levels were discussed. After each test round, changes were implemented. Patients' remarks resulted in changes in the order of the questionnaire, the exact formulation of the levels and the DCE instructions.

## Data collection

*Setting*

Four IVF centres and four 'transport clinics' from Belgium and The Netherlands contributed to patient recruitment. Transport clinics offer non-assisted reproduction techniques (ART) treatments, IVF stimulations and oocyte retrievals and transfer patients (and their oocytes) to a collaborating IVF centre for fertilization and embryo transfer. In The Netherlands, access to fertility care is guaranteed by the reimbursement of workup and treatment costs of up to three ART cycles per live birth. The Belgian government reimburses couples' IVF laboratory expenses for six treatment cycles in a lifetime (Ombelet *et al*., 2005).

*Patients*

The five questionnaire versions were spread randomly over 689 sampled couples who were treated with medically assisted reproduction in one of the eight participating fertility clinics in the summer of 2009. Patients undergoing ART (e.g. IVF) as well as non-ART were included, during any stage of their fertility treatment (Zegers-Hochschild *et al*., 2009). Both partners were addressed independently. Hence, 1378 coded questionnaires were distributed by mail. Questionnaires were accompanied by an invitation letter, an informed consent form (only for Belgian participants), a refusal form and a stamped returning envelope. Non-responders received two reminders. Participation was voluntary. Participants' names and addresses were stored separately from incoming questionnaire data to ensure an anonymous analysis.

*Physicians*

A letter (or email) was sent to invite 268 Dutch and Belgian physicians with expertise in reproductive medicine to participate in the study. The five questionnaire versions were randomly assigned and mailed to the physicians. Each questionnaire was accompanied by a refusal form and a stamped returning envelope. Non-responders received one reminder.

## Statistical analysis

After entering data of incoming questionnaires in the Statistical Package for the Social Sciences (SPSS; version 16.0 for Windows®, Chicago, IL, USA) descriptive analyses on the demographic and medical questions were performed. Characteristics of Dutch and Belgian patients were compared using independent *t*-tests.

The DCE-analysis was performed with STATA Software (version 11.1.). The attributes' relative importance was estimated using multinomial logistic regression. Respondents' propensity to opt for a scenario (the benefit) is the model's dependent variable; coefficient weights of attribute levels were the independent variables. An attribute's coefficient shows the change in benefit for a one-unit change in the attribute. The 'attribute levels' were the units in the—categorical—attributes of patient-centredness, while 'minutes' and 'percent' were the units for the—continuous—variables 'travel time' and 'pregnancy rate', respectively. A statistically significant coefficient indicates that respondents considered that attribute important. Absolute values of the dependent variable and coefficients, however, have no direct interpretation (Louviere *et al*., 2000).

Trade-offs that respondents are willing to make between attributes can be calculated by dividing one coefficient (Coeff) by another. For example, $Coeff_{attitude}/Coeff_{traveltime}$ reflects willingness to incur additional travel time (in minutes) for a better physician's attitude (a higher level).

Given its key position, effectiveness (pregnancy rate) was considered the 'gold standard' to benchmark the other attributes. Therefore, the willingness to trade-off pregnancy rate ($WT_{preg}$) for other attributes was calculated ($Coeff_{attributeX}/Coeff_{pregnancy\_rate}$). Confidence intervals (95%) for the $WT_{preg}$ were computed using a non-parametric bootstrap approach (2000 replications).

To investigate heterogeneity in preferences between subgroups of patients, we included interaction terms in the model (i.e. confounders' tests). *P*-values of $<0.05$ were considered statistically significant.

Finally, descriptive analyses were performed on the questions concerning patients' actual choice behaviour in SPSS. Answers to open-ended

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**Table I** Demographic characteristics of patients and physicians who completed the DCE questionnaire.

| Characteristic | Patients ($n$ = 925), % or median (range) | Physicians ($n$ = 227), % or median (range) |
|---|---|---|
| Age, in years | 34 (21–73) | 48 (25–75) |
| Gender (male/female) | 48/52 | 59/41 |
| Ethnic background[a] (Native/Western/ non-Western) | 94/3/3 | |
| Country[b] (The Netherlands/Belgium) | 53/47 | 48/52 |
| Level of education[c] (Low-median/High) | 48/52 | 0/100 |
| Experience in reproductive medicine, in years | n/a | 13 (0–44) |
| Duration of infertility, in years | 2.8 (0–16.8) | |
| Treatment type (ART/ non-ART[d]) | 75/25 | |

[a]Respondents were asked for their nationality by an open-ended question. According to the 'Statistics Netherlands' classification, answers were categorized into: (i) Native (Dutch or Belgian), (ii) Western (Europe, USA, Canada, Australia, New Zealand, Japan and Israel) and (ii) Non-Western (immigrants from remaining countries, including Morocco and Turkey).
[b]A respondent's 'country' was determined by the location of the clinic which was attended or worked in.
[c]Low-medium = primary and secondary vocational education; High = higher professional education or university.
[d]ART encompassed IVF and ICSI. Non-ART included ovulation induction and intrauterine insemination.

questions were analysed qualitatively using content analysis. Data were categorized and frequencies calculated.

# Results

## Respondents

In total, 925 patients (67%) and 227 physicians (85%) completed the DCE-questionnaire. Characteristics of all participants are shown in Table I. Patients and physicians had a median age of 34 and 48 years, respectively. The proportion of men was higher among physicians (59%) than among patients (48%, $P < 0.001$). Both patients and physicians were evenly spread between The Netherlands and Belgium. Physicians' median work experience in reproductive medicine was 13 years (range: 0–44) and patients' median duration of infertility was 2.8 years (range: 0–16.8). Most patients (75%) received ART-treatment. Dutch patients were older (35 versus 33 years, $P > 0.001$) and had a longer duration of infertility when compared with Belgian patients (3.2 versus 2.3 years, $P > 0.001$).

Only 140 choice sets (0.8%) were not completed by the 1152 respondents, resulting in 18 399 choice sets for analysis.

## Attributes defining the choice for a fertility clinic

Results from the DCE regression analysis for patients and physicians are shown in Table II. All five attributes were important for patients' and physicians' choice of a fertility clinic ($P < 0.001$, i.e. all attributes contributed significantly to respondents' stated choices for a fertility clinic). The negative coefficient of travel time (−0.021) indicates that respondents preferred a clinic with shorter travel time from home. The positive coefficients of patient-centredness and pregnancy rate show that participants would sacrifice something else (e.g. they

**Table II** Multinomial regression results: relative importance per attribute level, patients compared with physicians.

| Attribute | Level | Coefficient patients (95% CI) | Coefficient physicians (95% CI) | Physicians compared with patients[a] (95% CI) |
|---|---|---|---|---|
| Travel time to clinic[b] | Per minute | −0.02 | −0.02 | 0.00 (−0,00; 0.00) |
| Physician's attitude to patient | Unfriendly and uninterested | 0 | 0 | 0 |
| | Friendly, but distant | 2.29 (2.19; 2.38) | 1.87 (1.61; 2.13) | −0.42 (−0.59; −0.25)[‡] |
| | Friendly and interested | 2.83 (2.74; 2.92) | 2.07 (1.81; 2.32) | −0.76 (−0.93; −0.59)[‡] |
| Information on treatment | Contradictory information | 0 | 0 | 0 |
| | Only general information | 1.61 (1.52; 1.67) | 1.12 (0.86; 1.38) | −0.49 (−0.67; −0.32)[‡] |
| | Clear and customized information | 2.77 (2.68; 2.87) | 1.83 (1.57; 2.09) | −0.94 (−1.11; −0.77)[‡] |
| Continuity of physician | Seeing a different physician almost every visit | 0 | 0 | 0 |
| | Having one lead physician | 0.93 (0.84; 1.02) | 0.69 (0.43; 0.95) | −0.24 (−0.42; −0.07)[†] |
| | Always seeing your own physician | 1.15 (1.07; 1.24) | 0.87 (0.62; 1.13) | −0.28 (−0.45; −0.11)[‡] |
| Mean ongoing pregnancy rate | Per percent | 0.29 (0.29; 0.30) | 0.33 (0.32; 0.34) | 0.04 (0.03; 0.04)[‡] |

Patients ($n$ = 925) and physicians ($n$ = 227). Model parameters: Number of obs. = 36 740; LR $\chi^2$(df = 16) = 20850.06; Prob. > $\chi^2$ = 0.0000; Log likelihood = − 14775.16; Pseudo $R^2$ = 0.4137; CI, confidence interval.
[a]Results are achieved by subtracting patients' data (third column) from physicians' data (fourth column). Attributes with a negative value are more important to patients.
[b]To patients, travelling 15 instead of 90 min (coeff.(−0.02 * (15 − 90)) = 1.50) is about equally important as receiving general instead of contradictory information (coeff. 1.61).
[†]$P < 0.01$ difference physicians versus patients, [‡]$P < 0.001$ difference physicians versus patients.

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**Table III** Willingness to trade off pregnancy rate for decreased travel time and increased patient-centredness.

| Attribute | Level | Patients' trade-off percentage[a] (95% CI)[b] | Physicians' trade-off percentage[a] (95% CI)[b] |
|---|---|---|---|
| Travel time to clinic | 90 min | 0 | 0 |
| | 45 min | 3.1% (2.8; 3.6) | 2.7%[c] (2.5; 3.5) |
| | 15 min | 5.2% (4.7; 6.0) | 4.5% (4.1; 5.8) |
| Physician's attitude to patient | Unfriendly and uninterested | 0 | 0 |
| | Friendly, but distant | 7.9% (7.4; 8.8) | 5.7% (4.8; 6.5)† |
| | Friendly and interested | 9.8% (9.2; 10.9) | 6.3% (4.9; 6.7)‡ |
| Information on treatment | Contradictory information | 0 | 0 |
| | Only general information | 5.6% (5.1; 6.3) | 3.4% (2.5; 4.0)† |
| | Clear and customized information | 9.6%[d] (9.0; 10.8) | 5.5% (4.1; 5.8)‡ |
| Continuity of physician | Seeing a different physician almost every visit | 0 | 0 |
| | Having one lead physician | 3.2% (2.8; 3.7) | 2.1% (1.5; 2.8)* |
| | Always seeing your own physician | 4.0% (3.5; 4.7) | 2.6% (2.0; 3.2)† |

Patients ($n = 925$) and physicians ($n = 227$).
[a]Willingness to trade-off ongoing pregnancy rate ($WT_{preg}$) is calculated by dividing the attribute's coefficients (Table II) by the continuous coefficient of pregnancy rate.
[b]Non-parametric 95% CI is based on bootstrapping with 2000 replications.
[c]For a 45-min decrease in travel time, physicians recommend to trade-off 2.7% in pregnancy rate ($45 \times 0.02/0.33$).
[d]Patients are willing to sacrifice 9.6% in pregnancy rate for receiving clear and customized instead of contradictory information ($2.77/0.29 = 9.6$).
*$P < 0.05$ difference physicians versus patients; †$P < 0.01$ difference physicians versus patients; ‡$P < 0.001$ difference physicians versus patients.

accept a longer travel time) to move up a unit of patient-centredness or pregnancy rate (e.g. to receive clear and customized information instead of general information only, see Table II). This supports theoretical validity of the model.

Table II allows comparison of the attribute's importance to that of any other attribute. The higher a coefficient, the more important was an attribute level compared with its worst level. For example, physicians considered a friendly and interested attitude three times as important for patients than one lead physician (2.07/0.69). Another example: patients were willing to incur 139 min of travel time for receiving clear and customized information instead of contradictory information ($2.77/-0.02$). Comparison also shows that having a pregnancy rate of 30% instead of 20% (coeff. $0.29 * (30 - 20) = 2.90$) was about equally important to patients as seeing a friendly, interested physicians instead of an uninterested, unfriendly physician (2.83).

## Willingness to trade-off ongoing pregnancy rate ($WT_{preg}$)

Both patients and physicians were willing to trade-off mean ongoing pregnancy rate for a decrease in travel time or for more patient-centred care (Table III). For example, patients were willing to sacrifice 9.8% of pregnancy rate for seeing a friendly, interested physician instead of an unfriendly, uninterested physician (2.83/0.29). Another example: for a 45-min decrease in travel time, physicians recommend to trade-off 2.7% in pregnancy rate ($-45 \times -0.02/0.33$).

## Differences between patients and physicians

Within the range of the levels presented, the attributes' order of importance is the same for patients and physicians: (i) pregnancy rate; (ii) physician's attitude; (iii) information on treatment; (iv) travel time; and (v) continuity of physicians. However, the relative importance of all attributes except travel time differed significantly between patients and physicians ($P < 0.001$): attributes of patient-centredness were more important to patients, whereas pregnancy rates were more important to physicians (Table II). For example, when compared with a friendly and interested attitude, physicians considered a pregnancy rate of 35% instead of 20% 2.4 times ($0.33 \times (35-20)/2.07$) as important, while patients felt this was 'only' 1.5 times ($0.29 \times (35-20)/2.83$) as important (Table II). Considering the mean pregnancy rate presented, being 28.3% ($(20 + 30 + 35)/3$), patients were willing to sacrifice a third (9.6%/28.3%) in pregnancy rate for receiving clear and customized instead of contradictory information, whereas physicians recommended to trade-off only a fifth (5.5%/28.3%, $P < 0.001$, Table III).

## Differences among patients

Subgroup analyses according to the demographic variables (Table I) revealed that all attributes were important to each subgroup of patients ($P < 0.05$). However, the following significant differences between patients were found.

Men and women differed ($P \leq 0.001$) in their $WT_{preg}$ for attitude and information. Women were willing to sacrifice a higher percentage of pregnancy rate for a more pleasant physician's attitude and for customized information. Dutch and Belgian patients also differed in their $WT_{preg}$ for information and continuity of care ($P < 0.001$): Belgians were willing to trade-off a higher percentage of pregnancy rate for receiving customized information and seeing the same physician. The older the patient, the lower was the $WT_{preg}$ for patient-centred care ($P < 0.001$). For example, under the age of 23 years, patients preferred a clinic with clear and customized (instead of contradictory) information over a clinic with pregnancy rates of 35% (instead of 20%). Patients with a low level of education had a higher $WT_{preg}$ for the patient-centredness attributes, whereas travel time and pregnancy rates were more important to patients with a high level of education ($P < 0.001$). For example, $WT_{preg}$ for a friendly, interested physician was 12.6 and 8.1% for patients with a low- and high level of education, respectively ($P < 0.001$). The $WT_{preg}$ for patient-centred care was

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also higher in patients with non-ART treatment than for ART-treated patients ($P < 0.001$). The $WT_{preg}$ for a positive physician's attitude increased with an increase in patient's duration of infertility ($P < 0.001$).

## Patients' actual choice behaviour

Data on patients' actual choice behaviour could be analysed for 838 of the 925 patients. Half of these 838 patients ($n = 430$, 51%) went to the nearest fertility clinic, and had never changed clinics during treatment.

A quarter ($n = 209$, 25%) started at a fertility clinic nearby, but changed clinics during treatment. Of these patients, 95 (45%) changed for medical reasons (e.g. IVF required yet no IVF facilities). The other 114 patients (55%) cited the following non-medical reasons for changing clinics: 70 (61%) experienced a lack of patient-centredness in the first clinic (e.g. disrespectful staff or contradictory information); 27 patients (24%) changed owing to a lack of success or disagreement with treatment policy, and are hoping to achieve pregnancy elsewhere; the remaining 15% ($n = 17$) changed clinics for practical reasons (e.g. moving to another city).

The last quarter ($n = 199$, 24%) chose to travel immediately to a clinic further away from their home: 43% ($n = 85$) travelled further on medical grounds (e.g. complicated medical history already known in academic hospital) and 57% ($n = 114$) on non-medical grounds. Various specific non-medical reasons were cited: 38% ($n = 43$) relied on positive stories of other patients about the clinic's patient-centredness; 27% ($n = 31$) had practical reasons (e.g. close to work); 25% ($n = 29$) was attracted by the clinic's reputation (high-standard care in its entirety); and 10% ($n = 11$) chose specifically for the clinic's high pregnancy rates.

Ninety-four percent of the patients stated that, in case of disagreement with their partner on which fertility clinic to attend, the women's preference would be decisive.

# Discussion

This study demonstrates that both patients and physicians attach significant importance to pregnancy rates, patient-centredness (in terms of physician's attitude, information on treatments and continuity of care) and travel time of fertility care. Although all five attributes were valued by both, notable differences were found between patients' choices and physicians' recommendations.

The fact that both patients and physicians attach great importance to pregnancy rates is not surprising. However, the value patients attached to the patient-centredness of care is remarkable and significantly higher than physicians would recommend: patients were willing to trade-off up to a third (9.8%) of pregnancy rate for more patient-centred care, whereas physicians recommended to trade-off up to 6.3%. Although infertile couples' wish for a child is very strong, many are overwhelmed by the physical and emotional burden of fertility treatments (Verhaak *et al.*, 2007), which accounts for the high drop-out rates (Brandes *et al.*, 2009; Domar *et al.*, 2010) and might explain couples' need for patient-centred care as well. Studying patients' actual choice behaviour revealed that lack of patient-centredness was the most common reason for patients to change clinics. This finding validates patients' stated preferences in the DCE and supports the importance of patient-centredness to patients. However, physicians underestimate the percentage of pregnancy rate that patients are willing to sacrifice for more patient-centredness (physicians 6%, patients 10%). This difference might appear small, but is clinically relevant for three reasons: (i) 10% comes down to a one-third reduction in the chance to get pregnant, whereas 6% means 'only' a one-fifth reduction; (ii) actual differences in pregnancy (or live birth) rates among fertility clinics are often restricted to a few percent (Kremer, 2008; HFEA, 2010); and (iii) patients really change clinics because of a lack of patient-centredness.

A number of studies within reproductive medicine were designed to investigate patients' preferences for fertility care (Ryan, 1999; Marcus *et al.*, 2005; Dancet *et al.*, 2010), but these did not compare results with physicians' preferences.

Our study is the first DCE-study to compare patients' and physicians' preferences in reproductive medicine. In other fields of medicine, only five other DCE-studies directly compared patients' and physicians' healthcare preferences (Mantovani *et al.*, 2005; Gidman *et al.*, 2007; De Bekker-Grob *et al.*, 2009; Fiebig *et al.*, 2009; Muhlbacher and Nubling, 2010). Owing to differences in study context, error terms and attributes, results of DCE-studies can be compared qualitatively, but not quantitatively. Our findings corroborate earlier findings indicating that physicians are more focused on effectiveness of treatment than patients (De Bekker-Grob *et al.*, 2009; Muhlbacher and Nubling, 2010) and that patients assign relatively more value to process attributes (e.g. treatment burden; Mantovani *et al.*, 2005). One DCE-study found considerable commonality in general practitioners' and patients' preferences regarding cervical screening (Fiebig *et al.*, 2009). Another study found many differences in preferences of stakeholders of pediatric day-case surgery (Gidman *et al.*, 2007). As in our study, the physicians (anaesthesiologists) underestimated the value of a friendly staff attitude to patients.

Non-DCE studies comparing patients' and physicians' perspectives (Laine *et al.*, 1996; Rothwell *et al.*, 1997; Mack *et al.*, 2005; Wessels *et al.*, 2010) support the fact that physicians overestimate the importance of biomedical outcomes (e.g. survival time) and underestimate the importance of 'softer' dimensions of healthcare (e.g. respectful attitude) to patients.

This difference may be explained by the fact that evidence-based medicine is disease-oriented and doctor-centred, as it focuses on doctors' interpretation of scientific research rather than on patients' individual needs and preferences (Maynard, 1997; Sweeney *et al.*, 1998; Berwick, 2009). Additionally, patients and physicians have different healthcare concerns (Bodenheimer, 1999). For example, to patients, discontinuity of care results in the need to explain the same personal story repeatedly to different physicians, whereas to physicians, ensuring continuity implies extra organizational efforts. Furthermore, despite increased attention for the patients' perspective in quality assessments (Cleary, 1999; Davis *et al.*, 2010; Giordano *et al.*, 2010), physicians' stature and respect from peers is still mainly derived from traditional measures of success (Nash *et al.*, 1993; Laine and Davidoff, 1996).

Subgroup analyses can provide extra information that facilitates tailoring care to individual patients' needs. Although the two previous DCE-studies that conducted subgroup analyses (Fiebig *et al.*, 2009; Muhlbacher and Nubling, 2010) did not identify significant determinants of patient preferences, except for income (Fiebig *et al.*, 2009),

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we did find several differences between subgroups of patients. For example, women considered patient-centredness in relation to pregnancy rates more important than men. This may be explained by the fact that fertility treatment entails more physical and emotional discomfort for women (Halman et al., 1994; Whiteford and Gonzalez, 1995). Another interesting subgroup finding is that pregnancy rates were relatively more important to Dutch than to Belgian patients. This between-country difference may be explained by the fact that Dutch patients were older. The difference might also be explained by dissimilarities in the countries' healthcare policy. For example, the reimbursement system differs and single embryo transfer is, unlike in the Netherlands, obligatory in Belgium for all patients under 36 years (Gordts et al., 2005). Furthermore, cultural differences could have contributed to the between-country difference. However, a qualitative study with Dutch and Belgian patients (Dancet et al., 2011) indicated considerable similarities in their perspective on fertility care. Differences in fertility clinic organization are less likely to have caused the between-country difference since the huge organizational differences among clinics within each country (e.g. in waiting times) are expected to outshine the between-country differences.

There is much literature on reasons for drop-out from fertility treatment, whereas reasons for patients to drop-out from a fertility clinic (i.e. change fertility clinics) are underinvestigated. The current study shows these reasons are not the same. Psychological distress, the most common reason for treatment discontinuation (Olivius et al., 2004; Brandes et al., 2009; Van den Broeck et al., 2009; Domar et al., 2010), was not identified by this study as a reason for drop-out from a clinic. In contrast, lack of patient-centredness has been reported as a reason for drop-out from both clinic and treatment (e.g. a lack of staff empathy, Van den Broeck et al., 2009; lack of continuity of care, Olivius et al., 2004). Questioning actual choice behaviour reveals that, in total, 13.4% of our sample chose their current fertility clinic (8.3% changed clinics, 5.1% initially travelled further) based on 'patient-centredness'. Clinics striving to enlarge their share of the competitive ART-market should therefore be encouraged to improve the patient-centredness of their care. Improving patient-centredness, (e.g. by assigning one lead physician to each infertile couple) might be more feasible than preventing patients changing clinics for medical reasons (e.g. by ensuring that all transport clinics also have their own IVF laboratory).

A key strength of this study is the direct comparison of physicians' preferences with those of patients using the same DCE. For establishing patient-centred care, it is not only essential to study and document patients' preferences, but also to document and—if necessary—improve physicians' knowledge of patients' preferences. A second strength is our methodologically strong DCE-design, which was both orthogonal and balanced, without correlation between attributes or overlap between scenarios, and with the informative value of an optimal design. Furthermore, we involved two countries, had a robust sample of participants, and satisfying response rates. A fourth strength is that we complemented the stated preferences (intention) with data on actual choice behaviour.

A number of limitations should be taken into account when interpreting our findings. First, although DCE is the best available method to elicit stated preferences, it remains unclear whether patients would trade-off as much pregnancy rate for patient-centredness in real life as they intended to in the DCE. However, we found that 'positive stories about a clinic's patient-centredness' was an important reason to travel to a fertility clinic further away and that 'lack of patient-centredness' was patients' most cited non-medical reason to change fertility clinics. This actual choice behaviour adds external validity to the estimated importance of patient-centredness to patients. Second, although the response rates were high, some response bias may have occurred. Non-native, lower-educated and non-ART patients seem underrepresented in this study, probably because of language problems, complexity of DCE and clinic selection, respectively. Since patients with lower education and a non-ART treatment were willing to trade-off a higher percentage of pregnancy rates for receiving patient-centred care, the relative importance of patient-centredness to the entire Belgian and Dutch infertile population may be even underestimated in this study. Third, the DCE-technique allows the uncovering of subgroup differences but does not allow adjustment for these differences. A fourth limitation is that we did not include all aspects of patient-centred fertility care. Additional aspects, such as accessibility and emotional support, need to be taken into account too for clinic's patient-centredness (Dancet et al., 2011; van Empel et al., 2010a). Additionally, other outcome attributes, such as complication rates, could have influenced patients' and physicians' choices. However, the study aim was to compare patients' and physicians' preferences on patient-centredness and effectiveness of fertility care with a feasible number (Ryan and Gerard, 2003) of basic and recognizable attributes. Moreover, as outlined in the methods, the included attributes were those identified by the focus groups, literature review and expert panel. Finally, unfortunately we did not collect data on how many treatment attempts and treatment failures a patient had had. Therefore, we were not able to perform subgroup analyses with these patient characteristics.

## Implications for practice and future research

Our study shows that fertility physicians considerably underestimate the value of patient-centredness to their patients. Why should physicians care about this? Delivering care that is not only effective, but also patient-centred has a number of benefits: (i) it comes up to patients' preferences and needs; (ii) it can prevent patients dropping out of treatment because of distress (Verberg et al., 2008; Brandes et al., 2009; Domar et al., 2010); and (iii) it enlarges a clinic's market share, since: (a) more patients (from far away) come to the clinic; and (b) fewer patients leave for non-medical reasons.

Fertility treatments are (largely) reimbursed in the countries studied. Pregnancy rates may be more important to patients who are paying a considerable amount of money for every single treatment. Countries without reimbursement of treatment might need to take this into account.

To allow patients to make an informed decision about clinic choice, information on all quality aspects of clinics should be publicly available. A number of countries already publish centre-specific pregnancy rates (e.g. in Europe and USA) (Kremer, 2008; Centers for Disease Control and Prevention, 2010; HFEA, 2010). In contrast, comparative and reliable data on the patient-centredness of fertility clinics was never available. From now on, however, such information can be generated by a new benchmark-instrument for patient-centredness (van Empel et al., 2010b).

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Further research is required to investigate how fertility care professionals can best improve the patient-centredness of their care. Future studies should focus on interventions to increase physicians' knowledge of their patients' preferences, and on the implementation of structural benchmarking of fertility clinics on patient-centredness. Studies to estimate the economic impact of improving patient-centredness in fertility care are also recommended. Last, it would be valuable to explore whether patients with recurrent treatment failure or ART-related miscarriage differ in any respect in their preferences and needs regarding fertility care. This would allow providing care that meets the needs of this vulnerable patient group even better.

In conclusion, effectiveness of fertility care is particularly valued by both patients and physicians. However, patients also attach considerable value to patient-centredness of care, and physicians significantly undervalue the importance of this to patients. For delivering high-quality care, it is essential to take into account the preferences of the most important stakeholder in healthcare: the patient.

# Authors' roles

I.W.H.E. and E.A.F.D. designed the study, developed and managed the main database, interpreted the analysis, and drafted the paper. I.W.H.E. is guarantor. X.H.E.K. designed the DCE, analysed and interpreted the data, and drafted the paper. W.L.D.M.N. designed the study, interpreted the data and drafted the paper. W.S. interpreted the data and drafted the paper. E.A.S. checked the DCE analysis, interpreted the calculations and drafted the paper. T.M.D., J.A.M.K. led the Belgian research team, was principal investigator, and drafted the paper. All authors reviewed successive drafts of the paper.

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# References


Albada A, Triemstra M. Patients' priorities for ambulatory hospital care centres. A survey and discrete choice experiment among elderly and chronically ill patients of a Dutch hospital. *Health Expect* 2009; **12**:92–105.

Bech M, Kjaer T, Lauridsen J. Does the number of choice sets matter? Results from a web survey applying a discrete choice experiment. *Health Econ* 2010; Feb. 8, [Epub ahead of print].

Bengoa R, Kawar R, Key P, Leatherman S, Massoud R, Saturno P. *Quality of Care: A Process for Making Strategic Choices in Health Systems*. Geneva: WHO press, 2006.

Bensing J. Bridging the gap. The separate worlds of evidence-based medicine and patient-centered medicine. *Patient Educ Couns* 2000; **39**:17–25.

Berwick DM. What 'patient-centered' should mean: confessions of an extremist. *Health Aff (Millwood)* 2009;**28**:w555–w565.

Bodenheimer T. The American health care system—the movement for improved quality in health care. *N Engl J Med* 1999;**340**:488–492.

Brandes M, van der Steen JO, Bokdam SB, Hamilton CJ, de Bruin JP, Nelen WL, Kremer JA. When and why do subfertile couples discontinue their fertility care? A longitudinal cohort study in a secondary care subfertility population. *Hum Reprod* 2009; **24**:3127–3135.

Bryan S, Parry D. Structural reliability of conjoint measurement in health care: an empirical investigation. *Appl Econ* 2001;**34**:561–567.

Bundorf MK, Chun N, Goda GS, Kessler DP. Do markets respond to quality information? The case of fertility clinics. *J Health Econ* 2009; **28**:718–727.

Castilla JA, Hernandez J, Cabello Y, Lafuente A, Pajuelo N, Marqueta J, Coroleu B. Defining poor and optimum performance in an IVF programme. *Hum Reprod* 2008;**23**:85–90.

Centers for Disease Control and Prevention. Assisted Reproductive Technology Success Rates. National Summary and Fertility Clinic Reports 2010. http://www.cdc.gov/art/ART2007/PDF/COMPLETE_2007_ART.pdf.

Christofides NJ, Muirhead D, Jewkes RK, Penn-Kekana L, Conco DN. Women's experiences of and preferences for services after rape in South Africa: interview study. *Br Med J* 2006;**332**:209–213.

Cleary PD. The increasing importance of patient surveys. Now that sound methods exist, patient surveys can facilitate improvement. *Br Med J* 1999;**319**:720–721.

College of Physicians for Assisted Reproduction Therapy. ART Belgium 2006. In Belgian Register for Assisted Procreation (BELRAP). http://www.belrap.be/Documents/Reports/Global/Report_IVF06_REVISED04MAY09.pdf (13 September 2010, date last accessed).

Dancet EA, Nelen WL, Sermeus W, De Leeuw L, Kremer JA, D'Hooghe TM. The patients' perspective on fertility care: a systematic review. *Hum Reprod Update* 2010;**16**:467–487.

Dancet EA, van Empel IW, Rober P, Nelen WL, Kremer JA, D'Hooghe TM. Patient-centred fertility care: a qualitative study to listen to the patient's voice in Dutch speaking Europe. *Hum Reprod* 2011, in press.

Davis K, Schoen C, Stremikis K. *How the Performance of the U.S. Health Care System Compares Internationally*. New York, USA: The Commonwealth Fund, 2010.

De Bekker-Grob EW, Essink-Bot ML, Meerding WJ, Koes BW, Steyerberg EW. Preferences of GPs and patients for preventive osteoporosis drug treatment: a discrete-choice experiment. *Pharmacoeconomics* 2009;**27**:211–219.

De Mouzon J, Goossens V, Bhattacharya S, Castilla JA, Ferraretti AP, Korsak V, Kupka M, Nygren KG, Nyboe AA. Assisted reproductive technology in Europe, 2006: results generated from European registers by ESHRE. *Hum Reprod* 2010;**25**:1851–1862.

Domar AD, Smith K, Conboy L, Iannone M, Alper M. A prospective investigation into the reasons why insured United States patients drop out of in vitro fertilization treatment. *Fertil Steril* 2010;**94**:1457–1459.

Fiebig DG, Haas M, Hossain I, Street DJ, Viney R. Decisions about Pap tests: what influences women and providers? *Soc Sci Med* 2009; **68**:1766–1774.

Frampton S, Guastello S, Brady C, Hale M, Horowitz S, Bennett Smith S, Stone S. *Patient-centered Care Improvement Guide*. Camden: Picker Institute, 2008.

Gidman W, Elliott R, Payne K, Meakin GH, Moore J. A comparison of parents and pediatric anesthesiologists' preferences for attributes of child daycase surgery: a discrete choice experiment. *Paediatr Anaesth* 2007;**17**:1043–1052.


Downloaded from http://humrep.oxfordjournals.org/ at Pennsylvania State University on September 16, 2016

Giordano LA, Elliott MN, Goldstein E, Lehrman WG, Spencer PA. Development, implementation, and public reporting of the HCAHPS survey. *Med Care Res Rev* 2010;**67**:27–37.

Gordts S, Campo R, Puttemans P, Brosens I, Valkenburg M, Norre J, Renier M, Coeman D, Gordts S. Belgian legislation and the effect of elective single embryo transfer on IVF outcome. *Reprod Biomed Online* 2005;**10**:336–341.

Greener I. Towards a history of choice in UK health policy. *Sociol Health Illn* 2009;**31**:309–324.

Hall J, Viney R, Haas M, Louviere J. Using stated preference discrete choice modeling to evaluate health care programs. *J Bus Res* 2004; **57**:1026–1032.

Halman LJ, Andrews FM, Abbey A. Gender differences and perceptions about childbearing among infertile couples. *J Obstet Gynecol Neonatal Nurs* 1994;**23**:593–600.

Ham C. The coalition government's plans for the NHS in England. *Br Med J* 2010;**341**:c3790.

Human Fertilization and Embryology Authority (HFEA). Understand fertility clinic success rates. http://www.hfea.gov.uk/fertility-clinics-success-rates.html (10 November 2010, date last accessed).

Hundley V, Ryan M, Graham W. Assessing women's preferences for intrapartum care. *Birth* 2001;**28**:254–263.

Institute of Medicine. *Crossing the Quality Chasm. A New Health System for the 21st Century*. Washington DC: National Academy Press, 2001.

Keirns CC, Goold SD. Patient-centered care and preference-sensitive decision making. *J Am Med Assoc* 2009;**302**:1805–1806.

Kizer KW. Patient centred care: essential but probably not sufficient. *Qual Saf Health Care* 2002;**11**:117–118.

Kremer J. IVF rates per centre, 2007. The National Infertility Registration (LIR), 2008. http://www.nvog.nl/Sites/Files/0000000222_IVF%20cijfers%202007%20per%20kliniek.pdf.

Laine C, Davidoff F. Patient-centered medicine. A professional evolution. *J Am Med Assoc* 1996;**275**:152–156.

Laine C, Davidoff F, Lewis CE, Nelson EC, Nelson E, Kessler RC, Delbanco TL. Important elements of outpatient care: a comparison of patients' and physicians' opinions. *Ann Intern Med* 1996;**125**:640–645.

Lass A, Brinsden P. How do patients choose private in vitro fertilization treatment? A customer survey in a tertiary fertility center in the United Kingdom. *Fertil Steril* 2001;**75**:893–897.

Louviere J, Hensher D, Swait J. *Stated Choice Methods—Analysis and Application*, 1st edn. Cambridge, UK: Cambridge University Press, 2000.

Mack JW, Hilden JM, Watterson J, Moore C, Turner B, Grier HE, Weeks JC, Wolfe J. Parent and physician perspectives on quality of care at the end of life in children with cancer. *J Clin Oncol* 2005; **23**:9155–9161.

Mantovani LG, Monzini MS, Mannucci PM, Scalone L, Villa M, Gringeri A. Differences between patients', physicians' and pharmacists' preferences for treatment products in haemophilia: a discrete choice experiment. *Haemophilia* 2005;**11**:589–597.

Marcus HJ, Marcus DM, Marcus SF. How do infertile couples choose their IVF centers? An Internet-based survey. *Fertil Steril* 2005;**83**:779–781.

Maynard A. Evidence-based medicine: an incomplete method for informing treatment choices. *Lancet* 1997;**349**:126–128.

Min JK, Breheny SA, MacLachlan V, Healy DL. What is the most relevant standard of success in assisted reproduction? The singleton, term gestation, live birth rate per cycle initiated: the BESST endpoint for assisted reproduction. *Hum Reprod* 2004;**19**:3–7.

Mourad SM, Hermens RP, Cox-Witbraad T, Grol RP, Nelen WL, Kremer JA. Information provision in fertility care: a call for improvement. *Hum Reprod* 2009;**24**:1420–1426.

Muhlbacher AC, Nubling M. Analysis of physicians' perspectives versus patients' preferences: direct assessment and discrete choice experiments in the therapy of multiple myeloma. *Eur J Health Econ* 2010; Jan. 28, [Epub ahead of print].

Nash DB, Markson LE, Howell S, Hildreth EA. Evaluating the competence of physicians in practice: from peer review to performance assessment. *Acad Med* 1993;**68**:S19–S22.

Olivius C, Friden B, Borg G, Bergh C. Why do couples discontinue in vitro fertilization treatment? A cohort study. *Fertil Steril* 2004;**81**:258–261.

Ombelet W, De Sutter P, Van der Elst J, Martens G. Multiple gestation and infertility treatment: registration, reflection and reaction—the Belgian project. *Hum Rep Update* 2005;**11**:3–14.

Phillips KA, Maddala T, Johnson FR. Measuring preferences for health care interventions using conjoint analysis: an application to HIV testing. *Health Serv Res* 2002;**37**:1681–1705.

Rothwell PM, McDowell Z, Wong CK, Dorman PJ. Doctors and patients don't agree: cross sectional study of patients' and doctors' perceptions and assessments of disability in multiple sclerosis. *Br Med J* 1997; **314**:1580–1583.

Ryan M. Using conjoint analysis to take account of patient preferences and go beyond health outcomes: an application to in vitro fertilisation. *Soc Sci Med* 1999;**48**:535–546.

Ryan M, Farrar S. Using conjoint analysis to elicit preferences for health care. *Br Med J* 2000;**320**:1530–1533.

Ryan M, Gerard K. Using discrete choice experiments to value health care programmes: current practice and future research reflections. *Appl Health Econ Health Policy* 2003;**2**:55–64.

Schmidt L, Holstein BE, Boivin J, Sangren H, Tjørnhøj-Thomsen T, Blaabjerg J, Hald F, Andersen A, Rasmussen P. Patients' attitudes to medical and psychosocial aspects of care in fertility clinics: findings from the Copenhagen Multi-centre Psychosocial Infertility (COMPI) research programme. *Hum Reprod* 2003a;**18**:628–637.

Schmidt L, Holstein BE, Boivin J, Tjørnhøj-Thomsen T, Blaabjerg J, Hald F, Rasmussen P, Nyboe Andersen A. High ratings of satisfaction with fertility treatment are common: findings from the Copenhagen Multi-centre Psychosocial Infertility (COMPI) Research Programme. *Hum Reprod* 2003b;**18**:2638–2646.

Sculpher M, Bryan S, Fry P, de Winter P, Payne H, Emberton M. Patients' preferences for the management of non-metastatic prostate cancer: discrete choice experiment. *Br Med J* 2004;**328**:382–386.

Shaller D. *Patient-Centered Care: What Does It Take?* New York, USA: The Commonwealth Fund, 2007.

Shenfield F, De Mouzon J, Pennings G, Ferraretti AP, Andersen AN, De Wert G, Goossens V. Cross border reproductive care in six European countries. *Hum Reprod* 2010;**25**:1361–1368.

Street D, Burgess L. *The Construction of Optimal Stated Choice Experiments: Theory and Methods*, 1st edn. Jersey City: Wiley-Interscience, 2007.

Street D, Burgess L. 2010a http://maths.science.uts.edu.au/maths/wiki/3^5in81 (16 September 2010, date last accessed).

Street D, Burgess L. 2010b http://crsu.science.uts.edu.au/choice/choice.html (16 September 2010, date last accessed).

Sweeney KG, MacAuley D, Gray DP. Personal significance: the third dimension. *Lancet* 1998;**351**:134–136.

Telser H, Zweifel P. Validity of discrete-choice experiments—evidence for health risk reduction. *Appl Econ* 2007;**39**:69–78.

Ubach C, Scott A, French F, Awramenko M, Needham G. What do hospital consultants value about their jobs? A discrete choice experiment. *Br Med J* 2003;**326**:1432.

Van den Broeck U, Holvoet L, Enzlin P, Bakelants E, Demyttenaere K, D'Hooghe T. Reasons for dropout in infertility treatment. *Gynecol Obstet Invest* 2009;**68**:58–64.

Downloaded from http://humrep.oxfordjournals.org/ at Pennsylvania State University on September 16, 2016

Van Empel IW, Nelen WL, Tepe ET, van Laarhoven EA, Verhaak CM, Kremer JA. Weaknesses, strengths and needs in fertility care according to patients. *Hum Reprod* 2010a;**25**:142–149.
Van Empel IW, Aarts JW, Cohlen BJ, Huppelschoten DA, Laven JS, Nelen WL, Kremer JA. Measuring patient-centredness, the neglected outcome in fertility care: a random multicentre validation study. *Hum Reprod* 2010b;**25**:16–26.
Verberg MF, Eijkemans MJ, Heijnen EM, Broekmans FJ, De Klerk C, Fauser BC, Macklon NS. Why do couples drop-out from IVF treatment? A prospective cohort study. *Hum Reprod* 2008;**23**:2050–2055.
Verhaak CM, Smeenk JM, Evers AW, Kremer JA, Kraaimaat FW, Braat DD. Women's emotional adjustment to IVF: a systematic review of 25 years of research. *Hum Reprod Update* 2007;**13**:27–36.
Wensing M, Elwyn G. Methods for incorporating patients' views in health care. *Br Med J* 2003;**326**:877–879.
Wessels H, de Graeff A, Wynia K, de Heus M, Kruitwagen CL, Teunissen SC, Voest EE. Are health care professionals able to judge cancer patients' health care preferences correctly? A cross-sectional study. *BMC Health Serv Res* 2010;**10**:198.
Whiteford LM, Gonzalez L. Stigma: the hidden burden of infertility. *Soc Sci Med* 1995;**40**:27–36.
Zegers-Hochschild F, Adamson GD, de Mouzon J, Ishihara O, Mansour R, Nygren K, Sullivan E, van der Poel S. The International Committee for Monitoring Assisted Reproductive Technology (ICMART) and the World Health Organization (WHO) Revised Glossary on ART Terminology, 2009. *Hum Reprod* 2009;**24**:2683–2687.

Downloaded from http://humrep.oxfordjournals.org/ at Pennsylvania State University on September 16, 2016