

**‘More than half of the women  
referred to IVF Clinics would be  
better treated by alternatives’**

**-Professor Robert Winston**  
*The IVF Revolution pg 2*

A critique of infertility health-care  
in the NHS



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## METHODOLOGY

Two main problems encountered with my dissertation were, obtaining a clear direction, and factual information.

I wanted to investigate Professor Winston's claim regarding the proportion of women who, in his view, unnecessarily undergo IVF. I initially believed that the literature would provide some clear answers and ideas for further investigation. This turned out not to be the case and I had to re-evaluate my focus several times. Even with a change of focus, obtaining anything beyond anecdotal information proved difficult. However, this lack of information encouraged a deeper analysis and helped shape my dissertation's progression.

Personal correspondence with GPs and specialists, in addition to wide reading allowed me to obtain a much clearer insight into the infertility field. As my knowledge of the area increased, I found that sources of information providing hard, factual evidence became easier to locate.

My literature searches were conducted using PubMed to find abstracts, obtaining the desired papers either online, in the Science Library, or by contacting the authors. Following up references in papers also proved useful. Google searches were helpful and reviewing websites intended for the public helped familiarise me further with the field of infertility. I also examined infertility books from the Cambridge Medical Library and attended relevant medical talks, broadening my understanding of infertility health-care in practice.

## INTRODUCTION

The pangs of childbirth are some of the most intense physical feelings that a woman will experience. Psychologically, the distress of being unable to conceive can be just as painful, and certainly more prolonged. The emotional devastation of infertility has only recently been regarded as a medical problem rather than purely a social one, and this increase in publicity has helped reduce its stigma.

Given the value society places on children, one might expect that modern medicine would quickly develop an effective system of infertility treatment. It is therefore rather surprising to hear a public figure, especially one so heavily involved with infertility as Professor Winston, make the claim that, "More than half of the women referred to IVF Clinics would be better treated by alternatives"<sup>1</sup>.

'Alternatives' are defined as any means by which a woman is restored to full reproductive health and is able to conceive naturally. This includes behavior & lifestyle change, surgery, drug therapy etc. That is, any method which does not fall under the 'assisted reproductive technology' (ART) umbrella.

Professor Winston's statement seems to suggest that the current system places the emphasis of treatment in the wrong place. In vitro fertilisation (IVF), like other ARTs, treats the symptom, i.e. childlessness, rather than the underlying medical problem causing infertility. It appears to imply that the medical profession should focus more on tackling the cause of the symptom through alternatives to IVF.

After a discussion of infertility and IVF, this dissertation will explore the current provision of infertility healthcare in this country, and whether Professor Winston is justified in what he says. An alternative framework for the provision of infertility healthcare, which could significantly benefit women, will then be proposed.

## Infertility – An Overview

In 2004 the National Collaborating Centre for Women's and Children's Health defined infertility as the failure to conceive after regular sexual intercourse without contraception for 2 years.

The term 'infertility' is generally used interchangeably with the term 'subfertility' in the literature, but both refer to the subfertile condition, i.e. the couple still has the potential to achieve pregnancy but has a slower than average rate of conception. This is different from sterility where couples are unable to reproduce. There is even greater confusion amongst the general public concerning these terms, when the term 'infertile' is normally used to encompass the definitions of all three words. In this work, however, the focus will be on subfertility rather than sterility, using, as the literature does, both the words 'infertile' and 'subfertile' interchangeably.

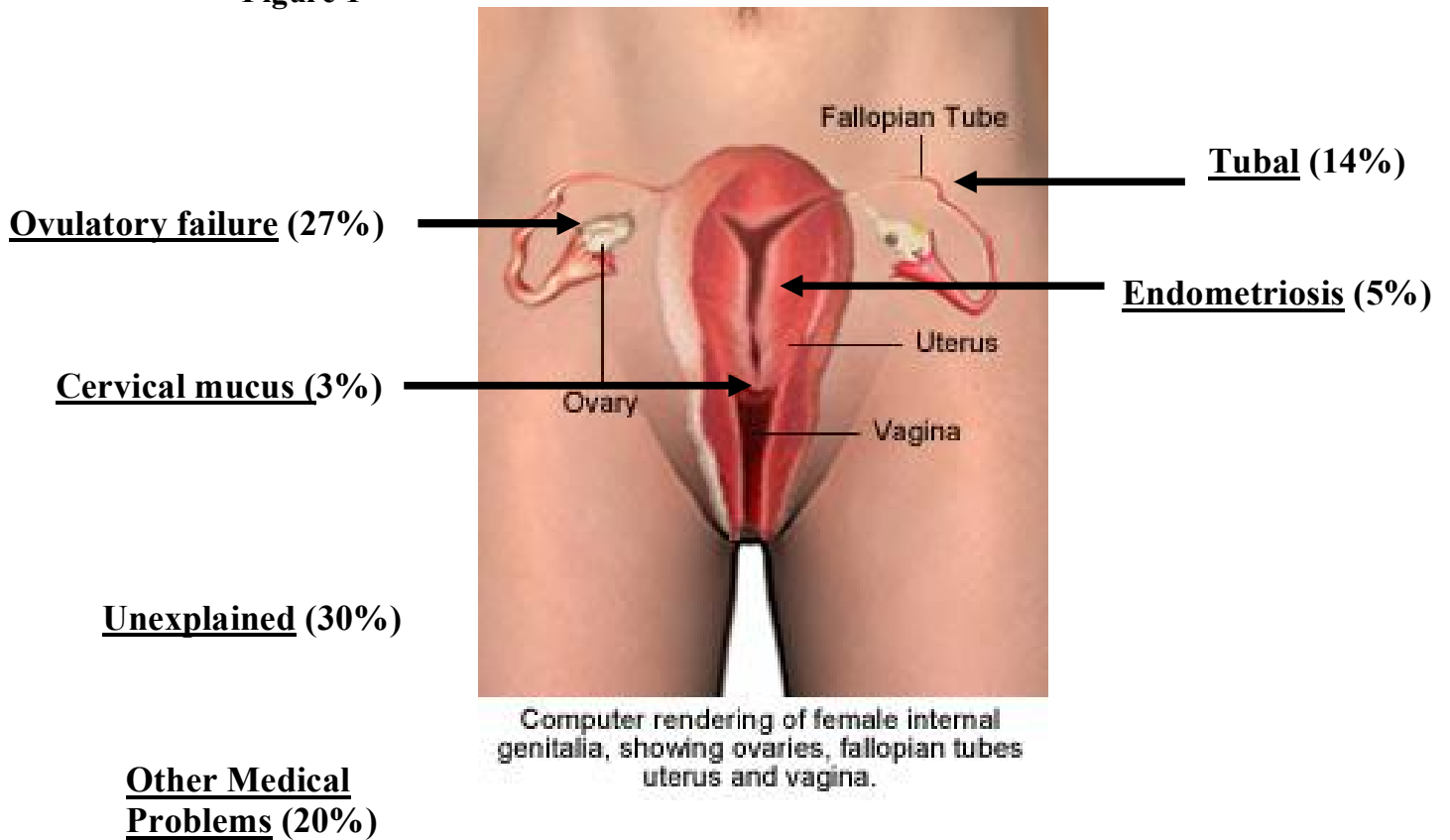
There are two types of infertility, primary (couples have never successfully conceived) and secondary (couples who have had existing successful conceptions). This work will not differentiate between these two types, focusing instead on the underlying cause of the infertility.

The Human Fertilisation and Embryology Authority (HFEA) estimates that infertility affects 1 in 7 couples<sup>2</sup> per year. Thus, of all the couples trying to conceive, 16% will be unable to become pregnant after 1 year. After 2 years 8% will still be unsuccessful, while after 3 years 7% will still not have conceived<sup>3,4</sup>. A marked natural decline in female fertility is seen from approximately age 35 onwards<sup>5,6</sup>, and health care professionals take this age as significant when determining what treatment a patient receives.

In the general population, causes of infertility break down into male factor (19-30%), female factor (40-50%), and combined/unexplained (30-39%)<sup>8</sup>.

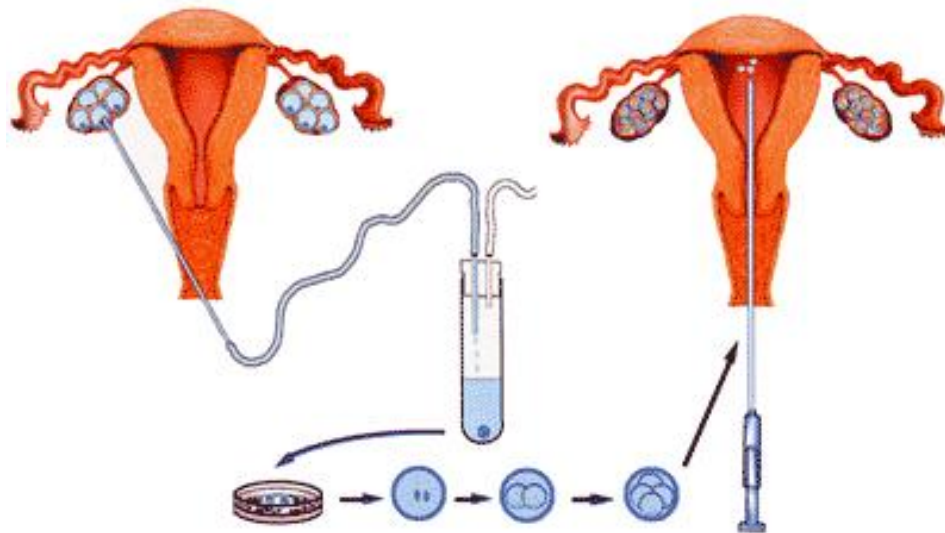
This work will focus exclusively on female factor infertility. Within this broad diagnosis, there are a large variety of medical problems that can be the root cause of the infertility. These and their frequency of occurrence are illustrated in figure 1<sup>9</sup>. If, despite normal test results for all tests of fertility-impairing reproductive processes<sup>10</sup>, the woman is still unable to conceive, she is diagnosed as having ‘unexplained infertility’.

**Figure 1**



## IN-VITRO FERTILISATION – An Overview

IVF means ‘fertilisation in glass’ (or nowadays a plastic dish) outside the female body and of the 89 HFEA-licensed UK treatment centres, 75 offer IVF<sup>11</sup>. Figure 2 illustrates the process of IVF:



[http://klc.ne.jp/page/ivf\\_et.html](http://klc.ne.jp/page/ivf_et.html)

**Figure 2**

### **THE PROCESS**

- Phase 1: Super-ovulation**
- Phase 2: Oocyte Retrieval**
- Phase 3: Insemination & Fertilisation**
- Phase 5: Embryo Replacement**

A stimulated IVF cycle begins with drug administration to suppress the woman’s menstrual cycle, and injections to stimulate oocyte (egg) development and maturation. At ovulation<sup>a</sup> a transvaginal ultrasound is used to guide a needle to the ovary and collect the eggs, which are subsequently mixed with the man’s sperm. In the UK after three to five days either two (women under 40) or three (over 40)<sup>12</sup> developing embryos are put into the uterus, with the goal of implantation and ultimately birth.

<sup>a</sup> Ovulation: when an egg is released from the ovary

In 2000 – 2001, 23,737 patients in the UK underwent IVF<sup>13</sup>, and per cycle initiated, IVF has a 20% live birth rate<sup>b</sup> with fresh embryos, and 12% with frozen embryos<sup>2</sup>. These success rates are dependent on the female’s age (if she uses her own eggs), decreasing significantly from a woman’s mid-30s. It is estimated that after five IVF cycles, approximately half the women under 34 will have conceived, but only 30% of those aged 35-39<sup>14</sup>.

The age distribution of women who underwent IVF in 2000 in the UK can be seen below<sup>15</sup>. It is not surprising that the peak age of IVF usage correlates with the age at which female fertility rapidly declines.

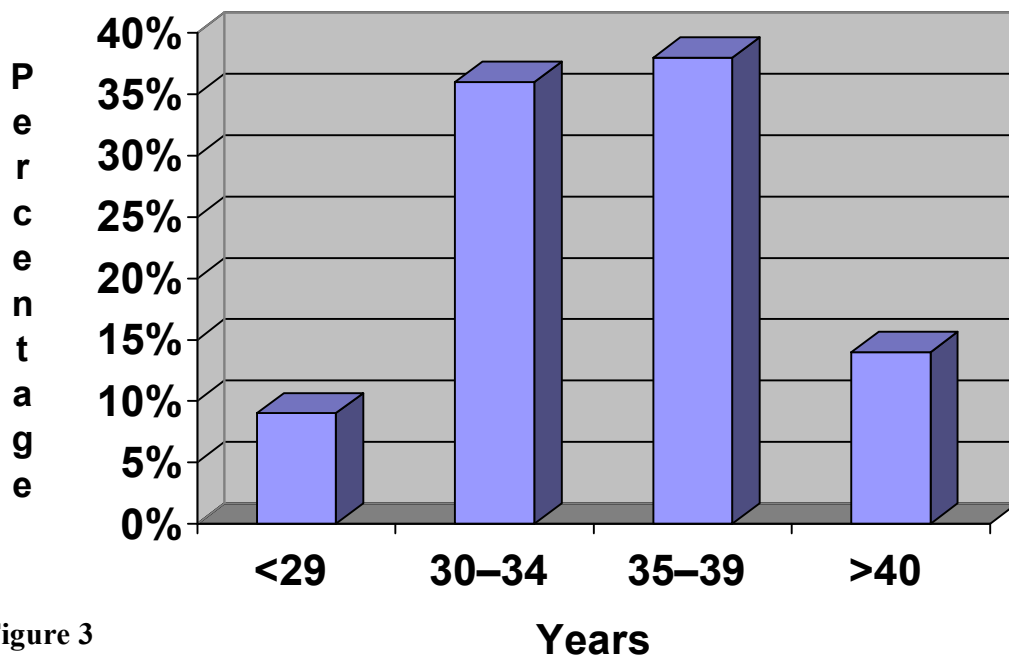


Figure 3

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<sup>b</sup> Live birth rate: birth of a living baby

Table 1 shows the distribution of different diagnoses of infertility<sup>16</sup> and the proportion of IVF cycles due to these pathologies.

**Table 1**

<b>Diagnosis</b>	<b>% of all treatment cycles *</b>	<b>Clinical pregnancy rate (%)</b>	<b>Live Birth rate (%)</b>
<b>Tubal Disease</b>	30.9	19.5	15.9
<b>Endometriosis</b>	9.0	21.9	18.2
<b>Unexplained</b>	46.7	23.0	19.4
<b>Other</b>	23.1	22.8	18.5

\* The first column sums to a figure greater than 100% because some women had more than one diagnosis of infertility

Per diagnosis, the 'clinical pregnancy rate' refers to the percentage of cycles resulting in a detectable pregnancy, after embryo-replacement. However, not all of these will have resulted in a live birth (for example, due to miscarriages etc).

## DOES IT MATTER?

Before investigating Professor Winston's claims, the question should be posed whether it actually matters if more women than necessary are referred for IVF. We can start by addressing the potential health risks to the mother undergoing IVF.

At the outset of an IVF cycle, the effects of down-regulating the menstrual cycle can be unpleasant, for example severe head-aches and pain. A commonly used ovarian stimulation drug (clomiphene citrate) has some rare, but potentially serious, side effects, including neurological problems (such as dizziness and abnormal vision) and epilepsy.

The condition ovarian hyper-stimulation syndrome (OHSS) can develop if a woman has an excessive response to an ovulation induction drug, and per IVF cycle women have a 1% - 10%<sup>17</sup> chance of developing it. Mild and moderate cases of OHSS are associated with abdominal discomfort, nausea and vomiting amongst others, while the most severe cases involve massive enlargement of the ovaries, loss of intravascular fluid, and, in rare cases, death. Such severe cases of OHSS occur in 0.5 - 5% of patients undergoing ovulation-induction therapy<sup>18</sup>.

The egg collection procedure in IVF is done under anaesthetic and has associated health risks, as well as the risk of piercing a blood vessel or the bowel and the risk of pelvic infection (estimated at 0.1%<sup>19</sup>).

Successful IVF pregnancies appear to be associated with a greater frequency of certain problems than non-IVF pregnancies. There is evidence of increased risk of miscarriage (25%-30%) compared to natural pregnancies (15-20%)<sup>20</sup>, and also an increased risk of ectopic pregnancy (2-11% versus 1%<sup>21</sup>). However, characteristics of women undergoing IVF, as well as features of IVF pregnancies could contribute adversely to these outcomes (for example, advanced female age, reproductive pathologies and multiple pregnancies).

Finally, IVF pregnancies are much more likely to result in multiple pregnancies than natural pregnancies; approximately 47%<sup>16</sup> of IVF babies are from a multiple pregnancy compared with 1% of natural pregnancies. Multiple pregnancies are associated with increased maternal pregnancy complications<sup>22</sup>.

Multiple pregnancies also pose a risk to the babies themselves with a higher risk of premature delivery, low birth weight, stillbirth, neonatal death and cerebral palsy<sup>23</sup>. IVF singletons born are also more likely to be born prematurely or with a clinically low birth weight for their gestational age<sup>24</sup>. They may also face long-term difficulties affecting susceptibility to diabetes and heart disease<sup>25</sup>.

There is evidence for genetic damage to some of the children born; one study<sup>26</sup> found that children conceived by IVF were nine times more likely to suffer from a rare syndrome (Beckwith-Wiedemann Syndrome). Although the absolute risk is extremely low (1 in 4000), it is a risk that could have been avoided if treatment had allowed the mother to conceive naturally. In addition, there is evidence for an increased relative risk in a childhood cancer, retinoblastoma, in children conceived after assisted reproduction (4.9 - 7.2 / 100,000) compared with those naturally conceived (0.9 - 2.6 per 100,000)<sup>27</sup>, but again this risk is small in absolute terms.

Apart from health risks to mothers and babies, there is a significant financial issue. The cost of IVF ranges from £2,000 - £4,000 per cycle, with additional drugs costs of around £1,000<sup>8</sup>. To date most couples undergo an average of 1.7 cycles<sup>28</sup>.

Finally, there are ethical issues associated with IVF. By omitting the conjugal act from conception, and with the destruction of a large number of human embryos, IVF is ethically unacceptable to many couples. It is unfortunate for these couples if the health care system is inclined towards IVF rather than alternative treatment, as they may be unnecessarily under-treated.

There are positive aspects to IVF (many previously infertile women do conceive). However, the treatment does carry certain risks to both the mother and the baby, and there are also financial and ethical considerations. The medical profession must consider whether these are justified if, as Professor Winston maintains, efficacious alternatives exist in a significant number of cases.

## THE CURRENT PATH COUPLES TAKE

In order to assess the validity of Professor Winston's statement, it is essential to start by examining the current recommended path of referral to IVF clinics, which can be seen in appendix A<sup>29</sup>.

These guidelines advise GPs on the sexual and medical history that they should take from patients, as well as life-style advice that should be given. (See Box 1)

GPs are advised to enquire/advise about the following:

- maternal age
- previous children
- length of time trying to conceive
- length of time since stopping contraception
- menstrual cycle details
- cervical smear details
- symptoms of pelvic inflammatory disease or endometriosis
- past history of sexually transmitted diseases
- systemic or debilitating diseases
- drugs history
- details of occupation
- lifestyle factors (both assessment and advise):
  - smoking
  - alcohol consumption
  - weight
  - drugs
  - well-balanced diet
  - stress
  - timing of intercourse 2-3 times per week, every week.

**Box 1**

GPs are also advised to carry out a number of investigations, including serum hormone sampling of progesterone in all women. This is done in the mid-luteal phase, 7 days after ovulation and 7 days before next period (commonly referred to as “day 21 of a 28 day cycle”).

GPs are not involved in the treatment of these patients beyond these initial actions, and results of the tests are faxed to the local Reproductive Medicine Unit (see appendix B for copy of Addenbrooke’s referral form) when patients are referred. Investigation and referral to a fertility clinic should follow local protocols and for Cambridge this is normally after 24 months of unsuccessful intercourse for women under 35 years or after 12 months for those over 35<sup>30</sup>. This is shorter if there are obvious reasons for concern. In addition, patients may refer themselves privately to a local HFEA-licensed clinic taking with them the results of the tests performed by the GP.

At the Addenbrooke’s Reproductive Medicine Unit, a woman undergoes a test of tubal patency<sup>31</sup>, recommended by NICE Guidelines. It is hoped that this test will elucidate any problems in her fallopian tubes

The choice of treatment is dependent upon diagnosis. Medical and surgical treatment will attempt to restore to woman to biochemical and/or anatomical normality, and couples may also be offered some assisted conception (such as IVF).

## **ARE WOMEN REFERRED FOR IVF TOO SOON?**

This work will now explore evidence for Professor Winston's claim. It will examine the extent to which alternative treatments are employed in the UK, and whether the system of infertility health-care provision outlined above is prone to excessive IVF referral. To help reach a conclusion, various evidence will be discussed including a comparison with the outcome of infertility-investigations in the USA.

In order to establish whether infertile women having IVF could have been better treated by alternatives, the original intention was to study data of typical medical histories and alternative treatment attempts. This would reveal the extent to which alternatives were employed before IVF was advised. An email was sent to the Department of Health requesting the following data:

- Total number of infertility diagnoses per year.
- Total number of infertility-specific interventions per year (medical and surgical).
- Relevant characteristics of infertile women, or of women undergoing IVF for infertility (e.g. BMI, smoker, mean number of years trying, etc).

A reply from the Department of Health's Customer Service Call Centre referred me to the HFEA, whose data had already been closely examined and found not to contain this information.

Subsequently, an identical request was sent to five clinics in the Cambridge area: The Rosie Hospital, Bourn Hall Clinic, Essex Fertility Centre, Brentwood Fertility Centre and Isis Fertility Centre. The Rosie Hospital and Bourn Hall Clinic stated that they did not have such clinic-specific data, while no reply was received from the other three.

This lack of data seems to indicate a general belief that there is no need to collate national, or even clinic-specific, data on non-ART treatment attempts of infertile women

before IVF is initiated. The Department of Health may be confident that gynaecologists fully implement the NICE Guidelines, or it may not regard the provision of unnecessary IVF treatment as being a cause for concern.

It is not possible with statistics to determine whether women referred to IVF Clinics have had alternative treatments exhaustively employed prior to their referral. However, some anecdotal evidence exists, for example, regarding the practice of tubal surgery.

Professor Winston<sup>32</sup> states that approximately half the women with tubal disease could benefit from microsurgery, but that it is rarely offered under the NHS. Personal correspondence with a gynaecologist from Addenbrooke's hospital confirmed that the hospital does not carry out significant amounts of tubal surgery, but rather such patients would have IVF as a first-line therapy. So whether a patient is offered tubal surgery may largely depend on the personal preference of the clinician, and this could be one factor accounting for a possible excess of IVF.

A further issue in the current system that could contribute to inadequate diagnosis and maltreatment with IVF regards timing. The decision to start investigations is based on allowing enough time to elapse, ensuring a low chance of spontaneous conception. However, this could result in both the over- and under-treatment of female infertility.

For women of advanced age (35 and over) basic investigation and monitoring could be started immediately they present. For them, time is of the essence and delaying investigation could further reduce their chances of natural conception, thus increasing referral for IVF. Certainly, treatment should not be started so early that the chances of natural conception are greater than the success rate of treatment. The changes proposed later allow the doctor to assess the probability of a natural conception after just 2-3 menstrual cycles and thus allows him to better gauge whether immediate treatment, or time and good advice, is more beneficial.

Conversely, a long duration of infertility *per se* is often seen as being justification enough for proceeding to IVF, without even routine investigations of the female infertility<sup>33</sup>. This could represent over-treatment as a thorough work-up might have revealed simple underlying pathology that, once corrected, would restore the woman's fertility.

A second timing issue regards the timing of sampling serum progesterone levels. A woman is required to come in for a sample 7 days after ovulation, and 7 days before her next expected menstruation: the standard "day 21 of a 28 day cycle", assuming that women ovulate two weeks before menstruation. However, even with women who have regular 28-day menstrual cycles, only 15% ovulate on day 14<sup>34</sup>. Furthermore, regardless of cycle length, the same research, which is based on thousands of menstrual cycles, demonstrates that the majority of women do not ovulate exactly 14 days prior to menstruation. In addition, it can be difficult for women with infrequent and irregular cycles (which many infertile women have) to know when they are 7 days after ovulating in order to come in for a blood sample. A mistimed, and thus potentially unrepresentative sample could result in the need for numerous repeat samplings (adding further monthly time delays), or in a misdiagnosis and thus maltreatment. The new care structure proposed later suggests a method to accurately determine the day of cycle and thus the day of ovulation, ensuring all serum hormones are taken on the correct day and diagnosis is accurate.

Another tool useful in assessing whether women are unnecessarily referred for IVF in the UK is to compare the situation in the UK with that in the USA, which has the same infertility prevalence rates<sup>35</sup>.

In the USA, 85 - 90% of infertile women are treated with conventional therapies, such as drug treatment or surgical repair of reproductive organs<sup>35</sup>. As corresponding statistics for the UK are not available, a comparison cannot be made here.

The figure for the proportion of infertile couples undergoing IVF in the UK is also not available and thus it was necessary to estimate it from the number of live births per year,

adjusting for the number of live births due to IVF and multiple pregnancies (see appendix D). This estimate gives a figure of approximately 30% for the proportion of infertile women undergoing IVF in the UK (suggested by a former HFEA member as seeming accurate<sup>c</sup>). This compares with 3% in the USA<sup>35</sup>.

Unexplained infertility prevalence rates may be one way of explaining this discrepancy in overall usage of IVF treatment between the two countries. The unexplained infertility prevalence rate in the UK is approximately 30%, compared with 10-15% in the USA. Fewer diagnoses of unexplained infertility means more definite diagnoses, thus allowing greater use of alternative treatments, with less need to resort to IVF. This is supported by the fact that unexplained infertility accounts for approximately 11% of ART<sup>d</sup> cycles in the USA<sup>36</sup> but almost half (46.7%) of IVF in the UK.

It could be argued that the difference in IVF usage could be due to variations in economic climates in the USA and the UK. Possibly because most private health insurers in the USA do not cover IVF<sup>37</sup>, patients are more likely to attempt medical and surgical treatments first. Perhaps the 3% of infertile patients who undergo IVF are merely a wealthy subsection of those desiring it. However, before April 2005<sup>e</sup>, the majority of IVF in the UK was mostly privately funded as well (75%<sup>8</sup>). Therefore, it is possible that these international differences are due to a lack of rigorous investigation and thus misdiagnosis on the part of UK doctors leading to excessive IVF treatment in the UK.

A final method of examining whether patients currently undergoing IVF may have been able to conceive without IVF, is to examine conception rates for patients on IVF waiting lists. Estimates of treatment-independent pregnancy for a period of 12 months on IVF waiting lists vary from 5%<sup>38</sup> - 14.3%<sup>39</sup>. These rates depend on a number of factors including the duration of infertility, female characteristics (especially age) and infertility diagnosis.

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<sup>c</sup> Professor M. Johnson

<sup>d</sup> IVF accounts for 46% of all ART in the USA [www.cdc.gov](http://www.cdc.gov)

<sup>e</sup> National Institute of Clinical Excellence: Clinical Guideline 11 implemented from April 2005 allows more IVF on the NHS. Discussed in depth later.

Personal correspondence with a gynaecologist from Addenbrooke's informed me that women with infrequent (oligomenorrhoea) or absent (amenorrhoea) menstruation may be experiencing over-treatment with IVF rather than receiving appropriate ovulation-induction drug therapy<sup>40</sup>. If one considers that in the studies above, women with either oligo- or a-menorrhoea were not treated with ovulation-inducing drugs, then the pregnancy rates would have been even higher if they had been. To quantify this, in clinical trials for unexplained infertility, the effects of clomiphene citrate<sup>f</sup> treatment increased pregnancy rate by approximately 2-3 times in comparison with no treatment<sup>41</sup>,  
<sup>42</sup>, <sup>43</sup>.

From the above evidence it is possible to conclude that the current system does over-refer to IVF. Without statistical data it is impossible to quantify this, but a definite case exists for a restructuring of infertility health-care provision within the NHS.

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<sup>f</sup> Drug which causes ovulation

## **NEW SUGGESTIONS FOR INFERTILITY HEALTH-CARE DELIVERY**

Current infertility treatment protocols are not as individual-centered as they could be, and are not tailored to ensure a thorough investigation and comprehensive treatment before referral to IVF. These proposed changes are intended to make infertility care as complete as possible to maximize a woman's chances of conceiving and of being restored to full reproductive health. The suggestions are based on 'Natural Procreative Technology' (NPT), a new disease-based approach to investigating, diagnosing and treating infertility<sup>44</sup>.

Two main personnel changes would be needed; firstly the GP. Expertise would be focused so that each local health authority area had (at least) one GP specialising in infertility care. Patients would be seen directly by this GP from the outset of their presentation with an infertility dilemma, either by self-referral, or by referral from their regular GP. This 'Infertility GP' would be in charge of all aspects of patients' diagnosis and treatment, bar surgical evaluation or treatment, referring instead to a specialist gynaecologist.

Secondly, a specialist nurse ('Fertility-Care Nurse') would aid couples with fertility tracking and continuing education related to fertility and conception, contacting patients either by phone or personal visit every two weeks over at least a two month period. The work-load involved should not be too great, and it is estimated that there are enough couples struggling with infertility to warrant such care.

The initial 30-45 minute GP consultation would require both man and woman to be present. The doctor would start by taking a detailed medical, sexual and fertility history of both partners including a pelvic exam, addressing the same issues that GPs are currently advised to. The second part of the consultation would involve explaining how investigations and treatment will proceed.

An outline of the female investigations is as follows:

1. Begin to record the woman's biological signs of fertility and accurately identify 'peak day'

2. Take timed serum hormone tests

3. Conduct medical ultrasound

4. Establish a diagnosis

Correct hormone abnormalities and ovarian function if needed.

5. Monitor 'peak + 7' serum hormone levels

6. Enhance cervical mucus flow if needed once 'peak + 7' hormone levels are optimal

7. Confirm ovulation with ultrasound follicle tracking

8. Aim for 12 fully effective cycles

9. If no conception after 5-6 fully effective cycles, then surgical evaluation & correction may be needed → referral

10. Continue for 12 fully effective cycles

11. Discuss options: ART/Adoption/Acceptance

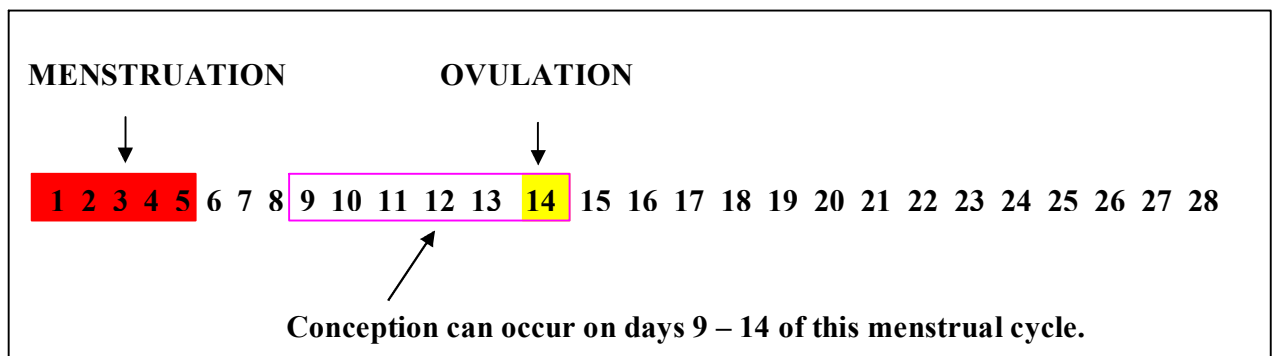
These stages will now be elaborated.

In order to thoroughly investigate the female's fertility, the couple must start tracking and noting the biological markers of the woman's menstrual cycle<sup>§</sup> and learning how to correctly identify the day of ovulation. This will continue for the entire duration of her care.

One system available for clinical recording is the Creighton model FertilityCare<sup>TM</sup> system, which is used by all NPT practitioners. The NHS could design their own chart but the FertilityCare<sup>TM</sup> chart will be used here to discuss the concept and utility of fertility monitoring.

The Infertility GP must explain that a woman is not equally fertile each day during her menstrual cycle. There is a 'window of fertility' and only intercourse during this window will result in conception<sup>45</sup>. Studies have shown this fertile window to be about 6 days long, ending on the day of ovulation<sup>45,46</sup>. Women ovulate only once per menstrual cycle and cases of conception on the days after ovulation have never been documented<sup>47</sup>.

**Figure 4** illustrates this concept:



**Figure 4**

There are a number of biological indicators that can be tracked in order to assess when the woman is in her fertile window, and the day of ovulation. These include monitoring urine hormones, basal body temperature and cervical mucus.

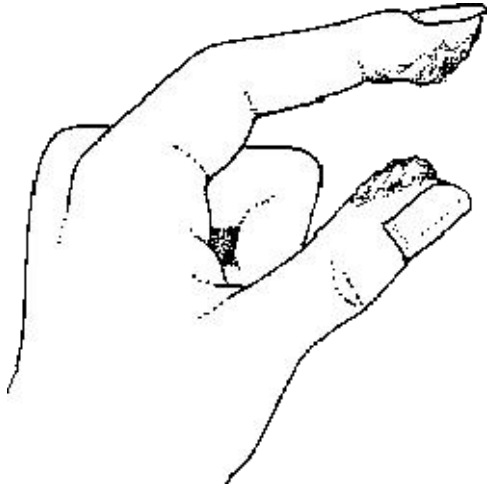
<sup>§</sup> A 'menstrual cycle' is from the first day of a woman's period to the day before her next period

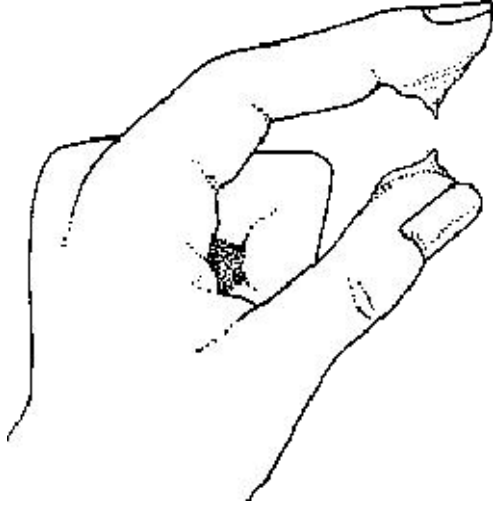
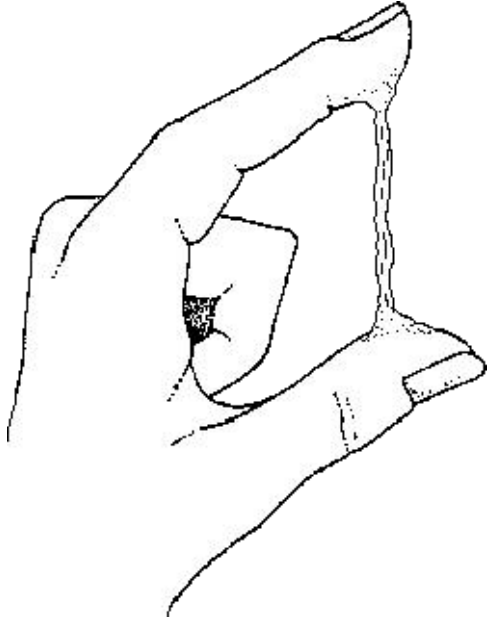
The simplest indicator and the one most often recommended in the literature<sup>33, 48, 49, 50</sup>, is assessing cervical mucus. Numerous studies have shown that the type of mucus produced by the cervix changes as ovulation approaches due to changing hormone profiles:

1. Before and after ovulation, the cervix produces white, thick and minimal.<sup>51, 52, 53</sup> mucus which blocks the cervix and prevents the passage of sperm.

2. Five-six days prior to ovulation, the cervix produces clear, stretchy and slippery<sup>51, 52, 53</sup> mucus, which allows the transport and survival of sperm. On the day of ovulation a woman's mucus will be reach a maximum in these three characteristics<sup>47</sup>.

This is illustrated in figure 5 a, b & c<sup>54</sup>.

<b>Sensation at Vulva</b>	<b>Finger Test</b>	<b>Appearance</b>
<b>Moist or Sticky</b>		<b>Early Mucus</b> Scanty Thick White Sticky Holds its shape

<p><b>Wetter</b></p>		<p><b>Transitional Mucus</b>  Increasing  Amounts  Thinner  Cloudy  Slightly  Stretchy</p>
<p><b>Slippery</b></p>		<p><b>Highly Fertile Mucus</b>  Profuse  Thin  Transparent  Stretchy  (like raw egg  white)</p>

**Figure 5**

The peak day of the fertile cervical mucus identified by women correlates well with the timing of ovulation<sup>55, 51</sup> as measured by serum hormones<sup>56, 57, 58</sup>, urinary hormones<sup>56</sup>, and follicular ultrasound<sup>59</sup>. The peak day has also been found to have reasonable inter-rater reliability<sup>60</sup>. Charting these changes in cervical mucus, will allow women to know when they are in their fertile window and when they ovulate.

A prospective trial conducted by the WHO<sup>61</sup> demonstrated the ease with which women were able to recognise their fertile period by tracking cervical mucus changes. After just one cycle (and one teaching session), 93% of women had recorded an interpretable ovulatory mucus pattern and 91% of subjects were assessed as having a “good” or “excellent” understanding of the method. While in this study the women were all of normal fertility, subfertile women may not have as easily interpretable mucus patterns. But the Fertility-Care Nurse can aid with interpreting fertility signs in cases of uncertainty.

The FertilityCare<sup>TM</sup> chart is used to record the mucus changes as well as the characteristics of menstrual flow.

Therefore, one month after the initial consultation, patients will return to the GP with their FertilityCare<sup>TM</sup> Chart and immediately a number of abnormal features will be evident, including:

- Dry Cycles
- Limited Mucus
- Abnormal bleeding patterns:
  - Premenstrual Spotting
  - Intermenstrual Spotting
  - Tail-end brown bleeding
- Abnormal luteal phases
- Long cycles
- Anovulation

Identifying these at this early stage will thus allow for earlier diagnosis and treatment.

In addition, couples will be instructed to have frequent intercourse during the woman’s fertile days. Days identified as fertile according to the charting of vaginal mucus have the

highest chances of conception<sup>62, 63</sup> compared with days identified as ‘infertile’. Such fertility-oriented intercourse may have a major impact in reducing the time to pregnancy<sup>33</sup>. This is advantageous over the current advice that couples must have intercourse every 2-3 days for the entire duration of the menstrual cycle. Rather than forcing a feeling of having to have sex every 2-3 days in case conception ‘might’ happen (even though on the majority of days it is biologically impossible), couples are empowered with knowledge of their own fertility and so feel more in control.

The fertility charting in the second cycle will be used to have timed hormone blood tests. As the charting allows confident identification of the day of ovulation, blood samples can be taken without doubting that they are from the desired day of the menstrual cycle. The current procedure of taking progesterone on ‘day 21 of a 28 day cycle’ becomes ‘Peak + 7<sup>h</sup>’ making no assumption regarding the day of ovulation. The Fertility-Care Nurse would take the blood samples on visits to the couple’s home or in the surgery.

Following analysis of the blood test results, an ultrasound investigation of the woman would be carried out. This will help establish whether she is ovulating and allows for a structural assessment of her reproductive organs.

If corrective medication is administered to aid with hormonal regulation and ovulation, the fertility chart permits the GP to assess the woman’s response to treatment cycle by cycle, as her markers move from an abnormal to normal pattern. Mucus-enhancing medication can be administered if mucus flow is still poor despite normal hormone levels.

The aim for the next twelve menstrual cycles would be to make them as effective as possible to maximize the chances of conception. In each cycle women must have:

- Optimum ‘peak + 7’ progesterone (& other hormone) levels
- Satisfactory cervical mucus quality

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<sup>h</sup> Peak = peak day of fertile mucus = day of ovulation

- Frequent intercourse during fertile mucus days
- Adequate stress management (counseling if required).

If couples have failed to conceive after 5-6 fully effective cycles and structural abnormalities were picked up on the previous ultrasound scan, then referral to a gynaecologist may be necessary for surgical evaluation and treatment. Once any structural abnormalities have been corrected, this system would aim for another 12 fully effective cycles as defined by the criteria above.

If couples have been unable to conceive after medical and surgical aids after 12 fully effective cycles, the Infertility GP would discuss future options with patients including continuing current therapy, ARTs, adoption and acceptance.

This system allows comprehensive care using alternatives to restore patients' fertility. While the investigation and treatment period may seem lengthy (up to 2 years), this is comparable with the timing of the current system (i.e. investigations are only commenced after 2 years for women under 35years). Furthermore, couples are not left on their own for this time, rather they are constantly and actively investigated and cared for.

The charting of fertility signs has the advantage that the doctor can start assessing a patient's fertility potential within a cycle of presenting, regardless of how long the couple has been trying to conceive. In fact, the sooner patients come in, the better, as they can immediately start charting their fertility signs and simple measures can be taken ensuring that each cycle is as effective as possible (according to the four criteria above).

Furthermore, fertility-oriented intercourse will ensure maximum chances of conception per cycle, which is especially important when the woman is on drug therapy so as to reduce the amount of time spent on such medication.

These suggestions will hopefully ensure reproductive medicine is practised as comprehensively as possible.

## Discussion

It is not possible to say conclusively how justified Professor Winston is in claiming “more than half” of women referred to IVF Clinics in the UK would have been better treated by alternatives. This is partly due to the unavailability of certain critical data, but research indicates that there is certainly some truth in the underlying sentiments of his statement.

One indicator is comparison of data from the UK and the USA. Some of these differences might be due to differing economic climates between the countries, but as the infertility prevalence rates are identical, it could be argued that a different attitude towards diagnosis and restorative treatment plays a significant role.

An article in *The Sunday Times* entitled “The Hidden Costs of Conception”<sup>64</sup> had the opening sentence: “It is estimated that a third of couples attending fertility clinics are not actually infertile. For them, a combination of time, patience and frequent sex is likely to give them the baby they long for”. When the author was contacted regarding any references she may have for her statistic, she replied that she had always assumed it was an actuarial extrapolation. This may be an indication that although there are no systematic studies supporting this and Professor Winston’s claims, it is a ‘fact’ accepted by many health care professionals.

Furthermore, the authors of “Infertility in Practice”<sup>65</sup> state that in their opinion “IVF is sometimes embarked upon before all other treatment modalities have been exhausted and...the notion that IVF is the high-tech modern answer to every couple’s infertility is erroneous.”

It is important to address this situation as NHS-availability of IVF increases; new guidelines<sup>22</sup> recommend primary care trusts now provide at least one full cycle of IVF (progressing eventually to 3 cycles) if the woman is aged 23-39 and has an identified cause of infertility or unexplained infertility for at least 3 years

This is likely to result in an increased number of patients undergoing IVF, as those currently unable to afford private treatment and/or whose local health authority does not pay for IVF will now request it and will be offered it. Restorative surgical and medical treatments may increasingly, and needlessly, be overlooked as patients are under-investigated due to the widespread availability of IVF and in order to follow an accelerated route to get onto IVF waiting lists<sup>66</sup>.

IVF is a very costly procedure, and if a significant proportion of women are undergoing it when a more thorough investigation and cheaper alternative treatments may be equally, if not more, effective, the need to maximize the usage of these alternatives becomes all the more urgent.

The proposals for change outlined here would not be too difficult to implement in practice. They would require a re-structuring of infertility health-care provision, and more in-depth infertility training for GPs. The invaluable nurses would likewise require increased training to be effective 'Fertility-Care' Nurses.

One possible hurdle in implementing these changes is that they appear to fly in the face of the current attitude of the health-care system. However, the suggested changes aim to improve the existing investigation and treatment *before* women arrive at the door of an IVF Clinic. While there would still be provisions for women desiring IVF, this number should not include any that could have benefited from efficacious alternatives.

There are intense social and personal pressures on women to have children, and the pain and distress of being unable to conceive must never be underestimated. The medical profession has a duty to aid such women, but in their desire to employ new treatments, they must not neglect thorough investigations of their patient, making certain that they always consider simpler alternatives first. Implementation of the changes proposed in this work should address this problem. However, before such a scheme could be employed throughout the country, further investigation of statistics and economic factors would be

required. If after this investigation the scheme were still found to be favourable, a small-scale trial would be a sensible step to bring about changes in the structure of national infertility health-care provision.

The need for further investigation highlights some of the shortcomings in the initially proposed methodology. Whilst literature work provided a solid scientific background to female infertility, a lack of statistics meant that correspondence with health-care professionals was essential in reaching a conclusion. Extending this research would require a continuation of this dual-strand methodology. Further “book work” is necessary to pin down statistics and confirm the efficacy of alternative treatments. More contact with the medical profession is also needed to appreciate to what extent current guidelines are followed and why such a high proportion of people are being referred for IVF treatment. This further research might well lead to the overhauling of infertility care in this country which this work has concluded is necessary for truly effective treatment of infertility.

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