

## VIEWS AND REVIEWS

### 831 Introduction: Obesity and reproduction

D. R. Meldrum  
*San Diego, California*

Women bear the predominant burden of our obesogenic environment. Fertility specialists and obstetricians/gynecologists have a unique opportunity to reduce that burden and its associated health care costs.

### 833 Obesity pandemic: causes, consequences, and solutions—but do we have the will?

D. R. Meldrum, M. A. Morris, and J. C. Gambone  
*San Diego and Los Angeles, California; and Durango, Colorado*

Women are disproportionately affected by the obesity pandemic and account for the large majority of the economic cost. The health consequences are extensive.

### 840 Obesity and female infertility: potential mediators of obesity's impact

D. E. Broughton and K. H. Moley  
*St. Louis, Missouri*

This article reviews the literature supporting a negative effect of obesity on female fertility and explores potential underlying biologic mechanisms.

### 848 Obesity, male infertility, and the sperm epigenome

J. R. Craig, T. G. Jenkins, D. T. Carrell,  
and J. M. Hotaling  
*Salt Lake City, Utah*

In men of reproductive age, obesity negatively affects fertility through changes in androgen processing and epigenetic changes in the male genome and sperm genome. These changes may also impact the progeny of affected men.

### 860 Effects of obesity treatment on female reproduction: results do not match expectations

R. S. Legro  
*Hershey, Pennsylvania*

This review examines the effects of obesity treatment before and during pregnancy and finds that treatment has had minimal impact on improving perinatal outcomes.

### 868 Adverse effects of female obesity and interaction with race on reproductive potential

B. Luke  
*East Lansing, Michigan*

Obesity is associated with greater risks for adverse health outcomes across the reproductive spectrum, including subfertility, infertility, early pregnancy loss, fetal deaths, stillbirths and neonatal deaths, and congenital anomalies.

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0015-0282(201704)107:4;1-T

## INKLINGS

- 878 Why should patients experience infertility or poor outcomes before using assisted reproductive technologies?**  
C. Simon  
*Valencia, Spain; and Houston, Texas*
- 880 Toward standardizing the embryo transfer procedure: from “how to” to “how many”**  
R. J. Paulson, R. H. Reindollar, and K. J. Doody  
*Birmingham, Alabama*

## ASRM PAGES

- 882 Performing the embryo transfer: a guideline**  
Practice Committee of the American Society for Reproductive Medicine  
*Birmingham, Alabama*  
For embryo transfer, pregnancy rates are improved by removal of cervical mucus, use of soft catheter, ultrasound guidance, correct location of the catheter tip, and immediate ambulation.
- 897 ASRM standard embryo transfer protocol template: a committee opinion**  
Practice Committee of the American Society for Reproductive Medicine  
*Birmingham, Alabama*  
An embryo transfer protocol template developed from a systematic review of the literature and survey of SART medical directors is presented.
- 901 Guidance on the limits to the number of embryos to transfer: a committee opinion**  
Practice Committee of the American Society for Reproductive Medicine, and the Practice Committee of the Society for Assisted Reproductive Technology  
*Birmingham, Alabama*  
ASRM/SART guidance for the limits on the number of embryos to be transferred in in vitro fertilization cycles is presented.


## REFLECTIONS

- 904 Microsurgical excision of testicular mass**  
M. Goldstein  
*New York, New York*
- 905 How good is good enough? Defining normal semen parameters after vasectomy reversal**  
S. L. Hecht and J. C. Hedges  
*Portland, Oregon*


- 906 Healthy diets and men’s contribution to fertility; is semen quality good enough?**  
J. E. Chavarro  
*Boston, Massachusetts*
- 908 Long-awaited long-term follow-up of reproductive parameters in female offspring conceived with the use of intracytoplasmic sperm injection**  
J. M. Franasiak  
*Marlton, New Jersey; and Philadelphia, Pennsylvania*
- 910 The most well kept secret, embryo culture media: a smart reveal from an expert**  
M. Meseguer and A. Pellicer  
*Valencia, Spain*

## ORIGINAL ARTICLES

### ANDROLOGY

- 911 Vasectomy reversal semen analysis: new reference ranges predict pregnancy**  
A. Majzoub, N. N. Tadros, A. S. Polackwich, R. Sharma, A. Agarwal, and E. Sabanegh Jr.  
*Cleveland, Ohio; and Miami, Florida*  
Normal semen parameter standards may not adequately predict post-vasectomy reversal fertility. Significantly lower semen parameters compared with the normal population may be sufficient in previously fertile patients after reversal.
- 916 Strong adherence to a healthy dietary pattern is associated with better semen quality, especially in men with poor semen quality**  
 E. C. Oostingh, R. P. M. Steegers-Theunissen, J. H. M. de Vries, J. S. E. Laven, and M. P. H. Koster  
*Rotterdam and Wageningen, the Netherlands*  
Strong adherence to a healthy dietary pattern is associated with better semen quality and may thus enhance fertility.

### ASSISTED REPRODUCTION

- 924 Progesterone luteal support after ovulation induction and intrauterine insemination: an updated systematic review and meta-analysis**  
 K. A. Green, J. R. Zolton, S. M. V. Schermerhorn, T. D. Lewis, M. W. Healy, N. Terry, A. H. DeCherney, and M. J. Hill  
*Bethesda, Maryland*  
Luteal phase support with exogenous P after ovulation induction and IUI was associated with increased clinical pregnancy and live birth rates in gonadotropin cycles.

**934 Serum reproductive hormone levels and ultrasound findings in female offspring after intracytoplasmic sperm injection: first results**

F. Belva, M. Roelants, V. Vloeberghs, J. Schiettecatte, J. Evenepoel, M. Bonduelle, and M. de Vos  
*Brussels and Leuven, Belgium*

Serum reproductive hormone levels and mean follicle count per ovary were similar between the oldest cohort worldwide of women born after intracytoplasmic sperm injection and spontaneously conceived peers.

**940 Perinatal outcomes in children born after fresh or frozen embryo transfer: a Catalan cohort study based on 14,262 newborns**

M. Vidal, K. Vellvé, M. González-Comadran, A. Robles, M. Prat, M. Torné, R. Carreras, and M. A. Checa  
*Barcelona, Spain*

Perinatal outcomes are not negatively affected by vitrification, and differences between fresh and frozen embryos are only observed after controlled ovarian hyperstimulation.

**948 Impact of oocyte donation on perinatal outcome in twin pregnancies**



L. Guilbaud, P. Santulli, E. Studer, V. Gayet, F. Goffinet, and C. Le Ray  
*Paris, France*

Twin pregnancies after oocyte donation are associated with a higher risk of preeclampsia and postpartum hemorrhage than twin pregnancies obtained with another mode of conception.

**954 Perinatal outcomes among singletons after assisted reproductive technology with single-embryo or double-embryo transfer versus no assisted reproductive technology**

A. S. Martin, J. Chang, Y. Zhang, J. F. Kawwass, S. L. Boulet, P. McKane, D. Bernson, D. M. Kissin, and D. J. Jamieson, for the States Monitoring Assisted Reproductive Technology (SMART) Collaborative  
*Atlanta, Georgia; Lansing, Michigan; and Boston, Massachusetts*

Compared to non-assisted reproductive singletons, single-embryo transfer singletons did not have increased odds of adverse perinatal outcomes. Double-embryo transfer singletons with  $\geq 2$  early fetal heartbeats established had the highest odds.

**961 Uterine contractility and elastography as prognostic factors for pregnancy after intrauterine insemination**



N. Swierkowski-Blanchard, F. Boitrelle, L. Alter, J. Selva, T. Quibel, and A. Torre  
*Montigny-le-Bretonneux and Poissy, France*

A low frequency and high intensity of uterine contractions on the day of intrauterine insemination appears to be associated with a higher pregnancy rate after intrauterine insemination.

## ENDOMETRIOSIS

**969 Spontaneous fertility after expectant or surgical management of rectovaginal endometriosis in women with or without ovarian endometrioma: a retrospective analysis**



U. Leone Roberti Maggiore, C. Scala, E. Tafi, A. Racca, E. Biscaldi, V. G. Vellone, P. L. Venturini, and S. Ferrero  
*Genoa, Italy*

Crude and cumulative spontaneous pregnancy rates (SPRs) are lower in women treated with the use of expectant rather than surgical management. The presence of ovarian endometrioma decreases SPRs independently from the treatment modality adopted.

**977 Functional outcomes after disc excision in deep endometriosis of the rectum using transanal staplers: a series of 111 consecutive patients**



H. Roman, B. Darwish, V. Bridoux, R. Chati, S. Kermiche, J. Coget, E. Huet, and J.-J. Tuech  
*Rouen, France*

In a prospective series of 111 patients managed for rectal endometriosis, disc excision was performed instead of colorectal resection with the objective of avoiding low anterior rectal resection syndrome.

**987 Important role of collective cell migration and nerve fiber density in the development of deep nodular endometriosis**



R. Orellana, J. García-Solares, J. Donnez, O. van Kerk, M.-M. Dolmans, and O. Donnez  
*Brussels, Belgium; and Avignon, France*

Deep endometriotic lesions induced in a baboon model were significantly more invasive and innervated after 1 year rather than after 6 months.

**996 Laparoscopy vs. Robotic Surgery for Endometriosis (LAROSE): a multicenter, randomized, controlled trial**



E. Soto, T. H. Luu, X. Liu, J. F. Magrina, M. N. Wasson, J. I. Einarsson, S. L. Cohen, and T. Falcone  
*Cleveland, Ohio; Miami, Florida; Scottsdale, Arizona; and Boston, Massachusetts*

Robotic and laparoscopic surgery for endometriosis had comparable operative length, blood loss, complication rates, and quality of life improvements after surgical intervention.

**1003 Embryo transfer techniques: an American Society for Reproductive Medicine survey of current Society for Assisted Reproductive Technology practices**

T. L. Toth, M. S. Lee, K. A. Bendikson, and R. H. Reindollar, for the American Society for Reproductive Medicine Embryo Transfer Advisory Panel  
*Boston, Massachusetts; Los Angeles, California; and Birmingham, Alabama*

Presented here are results of an anonymous survey sent to Society for Assisted Reproductive Technology medical directors assessing policies, protocols, restrictions and specifics pertinent to the technique of embryo transfer.

## ENVIRONMENT AND EPIDEMIOLOGY

**1012 Demographic, lifestyle, and other factors in relation to antimüllerian hormone levels in mostly late premenopausal women**



S. Jung, N. Allen, A. A. Arslan, L. Baglietto, L. A. Brinton, B. L. Eggleston, R. Falk, R. T. Fortner, K. J. Helzlsouer, A. Idahl, R. Kaaks, E. Lundin, M. Merritt, C. Onland-Moret, S. Rinaldi, M.-J. Sánchez, S. Sieri, H. Schock, X.-O. Shu, P. M. Sluss, P. N. Staats, R. C. Travis, A. Tjønneland, A. Trichopoulou, S. Tworoger, K. Visvanathan, V. Krogh, E. Weiderpass, A. Zeleniuch-Jacquotte, W. Zheng, and J. F. Dorgan  
*Baltimore and Rockville, Maryland; Oxford and London, United Kingdom; New York, New York; Melbourne, Victoria, Australia; Philadelphia, Pennsylvania; Heidelberg, Germany; Umeå and Stockholm, Sweden; Utrecht, the Netherlands; Lyon, France; Granada and Madrid, Spain; Milan and Milano, Italy; Nashville, Tennessee; Boston, Massachusetts; Copenhagen, Denmark; Athens, Greece; Tromsø and Oslo, Norway; and Helsinki, Finland*

In this study examining correlates of antimüllerian hormone (AMH), lower AMH concentrations were associated with older age, a younger age at menarche, and current use of oral contraceptives.

**1023 Geographic access to assisted reproductive technology health care in the United States: a population-based cross-sectional study**

J. A. Harris, M. N. Menke, J. K. Haefner, M. H. Moniz, and C. R. Perumalswami  
*Pittsburgh, Pennsylvania; and Ann Arbor, Michigan*

Geographic access to nearby assisted reproductive technology is absent for an estimated 18 million reproductive-age women and limited for an additional 7 million reproductive-age women in the United States.

## GENETICS

**1028 Comparison of cytogenetics and molecular karyotyping for chromosome testing of miscarriage specimens**

M. S. Shah, C. Cinnioglu, M. Maisenbacher, I. Comstock, J. Kort, and R. B. Lathi  
*Palo Alto and San Carlos, California; and Miami, Florida*

Cytogenetics, single-nucleotide polymorphisms, and array comparative genomic hybridization/short-tandem repeat markers are all acceptable options for detecting chromosome imbalances in miscarriage specimens. We detected an unexpectedly high rate of mosaicism.

**1034 Maternal common variant rs2305957 spanning *PLK4* is associated with blastocyst formation and early recurrent miscarriage**



Q. Zhang, G. Li, L. Zhang, X. Sun, D. Zhang, J. Lu, J. Ma, J. Yan, and Z.-J. Chen  
*Jinan and Shanghai, People's Republic of China*

Maternal common variant rs2305957 spanning *PLK4* is associated with blastocyst formation and early recurrent miscarriage in a Northern Chinese Han population.

## MENTAL HEALTH

**1041 Male factor infertility and lack of openness about infertility as risk factors for depressive symptoms in males undergoing assisted reproductive technology treatment in Italy**

A. Babore, L. Stuppia, C. Trumello, C. Candelori, and I. Antonucci  
*Chieti, Italy*

The current research found that the association of male factor infertility with lack of openness about infertility was a risk factor for depression among Italian males undergoing assisted reproductive technology treatment.

## REPRODUCTIVE ENDOCRINOLOGY

- 1048** Prevalence of polycystic ovary syndrome in Chinese obese women of reproductive age with or without metabolic syndrome

P. Liang, L. Xi, J. Shi, W. Li, S. Zhao, Y. Deng, R. Wang, Y. Sun, B. Gu, L. Yuan, Y. Zhang, W. Gu, W. Wang, and J. Hong

*Shanghai, Peoples Republic of China*

Polycystic ovary syndrome is no more frequent in metabolically unhealthy obese women than in metabolically healthy obese women.

## REPRODUCTIVE SCIENCE

- 1055** Composition of single-step media used for human embryo culture



D. E. Morbeck, N. A. Baumann, and D. Oglesbee  
*Rochester, Minnesota*

Introduction of time-lapse monitoring of embryo culture yielded new culture media that lacked detailed composition. This study provides compositions of four common single-step culture media.

- 1061** In vitro effects of phthalate esters in human myometrial and leiomyoma cells and increased urinary level of phthalate metabolite in women with uterine leiomyoma



J. H. Kim, S. H. Kim, Y. S. Oh, H. J. Ihm, H. D. Chae, C.-H. Kim, and B. M. Kang  
*Seoul, South Korea*

The present study showed in vitro effects of phthalate in human myometrial and leiomyoma cells and also found that the urinary level of phthalate metabolite is increased in women with leiomyoma.

- 1070** Mu opioid receptor in the human endometrium: dynamics of its expression and localization during the menstrual cycle



L. Totorikaguena, E. Olabarrieta, R. Matorras, E. Alonso, E. Agirregoitia, and N. Agirregoitia  
*Bizkaia, Spain*

Mu opioid receptor (MOR) mRNA and protein levels in the human endometrium change during the menstrual cycle, showing the highest levels in the late-proliferative phase. These findings suggest a role for MOR in reproduction.

## REPRODUCTIVE SURGERY

- 1078** Uterine viability in the baboon after ligation of uterine vasculature: a pilot study to assess alternative perfusion and venous return for uterine transplantation

M. Shockley, K. Arnolds, B. Beran, K. Rivas, P. Escobar, A. Tzakis, T. Falcone, M. L. Sprague, and S. Zimberg  
*Weston and Homestead, Florida; and Cleveland, Ohio*

The uterus remains viable after disruption of the bilateral uterine arteries and veins in a primate model.

## VIDEO

- e15** Ovarian transposition: a surgical option for fertility preservation



S. E. Arian, L. Goodman, R. L. Flyckt, and T. Falcone  
*Cleveland, Ohio*

In this video, we present laparoscopic ovarian transposition as a surgical option for fertility preservation in reproductive-aged women before they undergo cancer treatment.

- e16** Microsurgical identification and excision of an intratesticular mass



L. F. Sávio, N. S. Prakash, R. Clavijo, O. N. Kryvenko, and R. Ramasamy  
*Miami, Florida*

Partial orchiectomy is feasible using an operating microscope and may lead to a more precise resection.



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