XXV meeting of Nordic Fertility Society

22-24 August 2019
Göteborg, Sweden

PROGRAM & ABSTRACT BOOK
From conception to birth...

A product portfolio that addresses the needs of the entire patient journey

Working to address unmet needs in reproductive health

Partners with leading international and local organisations to expand education and treatment access
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**CRYOS – INTERNATIONAL SPERM & EGG BANK**

Cryos is the world’s largest sperm bank with more than 1000 carefully screened donors of all ethnicities and the highest number of registered pregnancies in the world. We have 30+ years of experience with donor sperm, genetic evaluation from in-house professionals and digital product traceability for increased security.

Visit our stand for an informal conversation.
Welcome/Välkomna/Tervetuloa!

Dear colleagues and friends,
It is my very great pleasure to welcome you all to my beautiful hometown Göteborg for the XXVth NFS meeting. The congress will be held close by the harbour, reflecting the maritime history of Göteborg, and offers the perfect venue for this meeting with ample opportunity for both science and social interactions.

The scientific and organizing committee has worked hard over the past many months to ensure you a scientific program of the highest level with speakers from all Nordic countries as well as some from other parts of Europe. New for this year is that the board of NFS will give 15000 SEK to the best oral communication, in order to encourage everyone to send a paper to the congress.

As always, we will also find time to enjoy each other’s company after the sessions have ended in the hopefully warm Swedish summer evenings with a bit of entertainment, good food and a glass of wine.

On behalf of the local organizing committee I welcome you to NFS 2019 and I wish you all a great meeting!

Ann Thurin Kjellberg, Chairman of the local organizing committee, NFS 2019

Scientific Committee

• Ann Thurin Kjellberg (Sweden), Chair
• Stina Järvenholm (Sweden)
• Kersti Lundin (Sweden)
• Greta Edelstam (Sweden)
• Marjust Otala (Finland)
• Steinunn Thorsteinsdottir (Island)
• Sigrun Kjøtrød (Norway)
• Kathrine Brich Petersen (Denmark)
• Kirsten Tryde Macklon (Denmark)

With the assistance of the NFS board:
• Jon Wegner Hausken (Norway)
• Astid Sydtveit (Norway)
• Kirsten Simonsen (Denmark)
• Antti Perheentupa (Finland)
Organizing Committee

*Ann Thurin Kjellberg*
Chairman of the NFS 2019 congress, boardmember of SSRM and NFS
Doctor at Reproductive Medicine, Sahlgrenska University Hospital, Gothenborg, Sweden
E-mail: ann.thurin@vgregion.se

*Stina Järvholm*
Chairman of the Swedish Society of Reproductive Medicine (SSRM) and boardmember of the NFS
Psychologist at Reproductive Medicine, Sahlgrenska University Hospital, Gothenborg, Sweden
E-mail: stina.jarvholm@vgregion.se

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*Antonia Sazonova*
Doctor at Livio IVF clinic, Gothenborg, Sweden
E-mail: antonia.sazonova@livio.se

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Livio Fertilitetscentrum, Gothenburg:
*Kerstin Edvardsson, Eva Johannesson, Cecilia Westin, Carina Lindfors*

Nordic IVF, Gothenburg:
*Liza Bobek, Pernilla Hildeborn, Johanna Skotnes, Malin Wernås*

Reproductive Medicine Sahlgrenska University Hospital, Gothenburg:
*Sofie Asteberg, Helena Brodén, Marlene Güllich, Halina Tobiasson*
The foundations of the Nordic Fertility Society were laid at a meeting in Ebeltoft, Denmark in August 1995, when an interim board was instructed to construct bylaws ready for a constituting general assembly at the Nordic Conference in Kuusamo in January 1999. However Nordic cooperation in assisted reproduction goes back to the beginnings of IVF. Already in August of 1982, a few pioneering colleagues from Denmark, Norway and Sweden met at Helsingør in Denmark. IVF groups from all the Nordic countries met regularly after that at official Nordic meetings. The countries that make up the Nordic Fertility Society are the three Scandinavian countries Denmark, Norway and Sweden, together with Finland and Iceland. All professional groups involved in Assisted Reproduction are equally represented in the NFS board.

The professions are grouped into five categories:
- Doctors
- Embryologists and Biologists
- Laboratory technicians
- Nurses
- Secretaries and assistants

NFS board
About Göteborg

This is Gothenburg
Gothenburg is encircled by rocky shoreline, deep forests, tranquil lakes and the surging sea to the west. No other Swedish city gives such easy access to nature. Right on the doorstep are wide open spaces and magical islands. Four centuries ago, when the decision was taken to build a harbour city on the west coast, the ambition was to open up Sweden to the outside world. Building a city on Swedish marshland, wedged between Norway and Denmark, was no easy undertaking, but with the help of the Dutch, English, Scots and Germans the vision was realised. Today, Gothenburg is a flourishing green city with a vibrant cultural scene, world-class restaurants and a fascinating history. At the same time adventure is never far away. There is always an island waiting to be explored or a mountain to be conquered from the saddle of your bike. With its light summer evenings, colourful autumn days and snow-blanketed winter mornings, Gothenburg is where you can experience the real Sweden.

Today, Greater Gothenburg is home to 970,000 people from almost every country on the planet. It is they who give the city its soul, its pulse and its unique atmosphere. In Sweden, Gothenburgers have a reputation for their friendliness and hospitality, and many who visit the city for the first time can attest to just how welcoming it feels.

Gothenburg will celebrate its 400th anniversary in 2021.

For more information visit www.goteborg.com
Social Program

Thursday evening

On Thursday the boat leaves from the pier right in front of the congress hall, at 18:15, sharp, and takes us to the get-together reception. The reception will be held in Kajskjul 8 on the other side of the river. There we will be served an informal barbeque buffet. The boat will take us back from Stenpiren 00:20, sharp! Be there or you will have to find another transportation to Hotel 11 (bus or taxi to Eriksberg).

Friday evening

On Friday we start with mingle with our exhibitors at 17:15 in the exhibition hall and then a three courses dinner will take place in Eriksbergshallen at 19:00. The singing group Fröken Signe will entertain us with their show and harmonies during mingle and after dinner there will be dance if you want...
Practical information

Tourist information can be found in the following locations:
Main Office: Kungsportsplatsen 2
+46 (0) 31 61 25 00
www.gothenburg.com

Branch office: Nordstan Shopping Centre
+46 (0) 31 61 25 00

Currency
Credit cards are accepted almost everywhere. You can use the card on airport buses, taxi’s and in most stores. The chip and pin is the common method. Please note that many stores do not accept cash, only credit card.
Cash machines or ATM (Bankomat) take major credit and debit cards and they are found in the main shopping centers and at the airport.

Tipping
Ten percent of the bill or taxi fare is appreciated but not mandatory.

Opening hours
Attractions 09.00 or 10.00-17.00 or 18.00
Banks 10.00-15.00
Large city branches 09.30-18.00

Shops
10.00-18.00 or 19.00 Monday-Friday
10.00-16.00 Saturday
Malls 12-16 Sunday

Foreign exchange
Forex is the largest foreign exchange company located at the airport, the Central station and Nordstan shopping Centre.

Emergency number
To call ambulance, police or fire brigade, simply call 112.
Main police station, +46 (0) 31 114 14
(24 hours)

Medical services
Emergency healthcare
Alléjouren, Södra Allégatan 6
+46 (0) 31725 00 54
https://capio.se/narsjukvard/vastra-gotaland/allejouren
Weekdays 17-22 and weekends 10-16

Emergency dental care
Akuttandvården, Odinsgatan 10
+46 (0) 31 441 88 00
Weekdays 8-20 and weekends 8-16

Local transportation
Bus No.16 from Nordstan, bus sign E, to stop Eriksbergstorget or the ferry Älvsnabben from stop Lilla Bommen to Eriksberg.
Use the app Västtrafik To Go to buy your ticket or make your purchase at the kiosk Pressbyrån. No tickets are sold onboard.
Scientific Program

Thursday 22 August

09.00-11.30 Laboratory workshop. Room: Main hall & exhibition hall
12.00-13.00 Lunch and registration

13.00-13.15 Welcome. Room: Main hall
NFS president John Hausken, NO
Chair of NFS 2019 meeting Ann Thurin Kjellberg, SE

13.15-15.00 Plenary session I - Room: Main Hall
13.15-14.00 Jan Brosens, UK
It takes two to tango - the relationship between the embryo and endometrium - Why and why not?
14.15-15.00 Siobhan Quenby UK
Recurrent miscarriage - When and Why?

15.30-17.00 Parallel session I

| 15.30-16.00 | Session A | Preimplantation genetic testing (PGT) of embryos – current methods Helena Malmgren, SE | Session B | Time-lapse Thorir Hardarson, IS | Session C | Oocyte and embryo donation Viveca Söderström-Anttila, FI |
| 16.00-16.30 | Session A | The ethical challenge of autonomy Sofia Moberg Jämterud, SE | Session B | Automatic vitrification of oocytes and embryos – Will this be a routine practice in the IVF-labs? Shabana Sayed, NO | Session C | Female fertility and bariatric surgery Emma Nilsson-Condori, SE |
| 16.30-17.00 | Session A | Similar arguments, different conclusions PGT legislation in the Nordic countries Hans Ivar Hanevik, NO | Session B | Micro fluids - where are we? Arne Sunde, NO | Session C | The transgender experience of reproductive care Gabriella Armuand, SE |

17.00-17.30 Plenary session II - Room: Main hall
Susan Golombok UK
Surrogacy families; a psychological perspective

19.00 Get-together reception, seaside style at Kajskjul 8
Scientific Program (cont’d)

Friday 23 August

08.30-09.00 Poster promenade. Room: Exhibition hall
Led by: professor Anja Pinborg, DK

09.00-10.15 Plenary session III - Room: Main hall

09.00-09.30 Aisling Ahlström, SE
How many embryos are necessary to obtain a blastocyst?

09.45-10.15 Åsa Magnusson, SE
How many oocytes are optimal for IVF; why and for whom?

10.45-12.15 Parallel session II

<table>
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<tr>
<th>Time</th>
<th>Session A Andrology Room: Main hall</th>
<th>Session B Pro/con freeze-all Room: 34 Herrgårn</th>
<th>Session C The very young patients Room: 31 Torpet</th>
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<tr>
<td>10.45-11.15</td>
<td>Micro-TESE Antti Perheentupa, FI</td>
<td>Background of “Freeze all” concept Jan Holte, SE</td>
<td>Sperm preservation for young boys Dorte Forsell, SE</td>
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<tr>
<td>11.15-11.45</td>
<td>Hormonal treatment of male infertility Manuela Simoni, IT</td>
<td>The patient’s perspective Anja Pinborg, DK</td>
<td>Fertility aspects for young women after childhood cancer Kirsten Tryde Macklon, DK</td>
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<td>11.45-12.15</td>
<td>Fertility awareness among men Gritt Marie Hviid Malling, DK</td>
<td>Frozen embryo transfer – the child perspective Erica Ginström Ernstad, SE</td>
<td>The patient perspective of cancer in childhood or as young adult Representatives for Young cancer (Ung cancer) Erik Fransson and Isak Eliasson, SE</td>
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12.15-13.15 Lunch
Bemfola comes in a simple, adjustable and single use pre-filled pen

Convenient and simple handling that is preferred by patients 

Welcome to the future of fertility
### Scientific Program (cont’d Friday 23 August)

#### 13.15-14.45 Parallel session III

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<th>Time</th>
<th>Session A</th>
<th>Session B</th>
<th>Session C</th>
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<td>13.15-13.45</td>
<td><strong>Oral communications</strong>&lt;br&gt;6*15 min&lt;br&gt;Room: 31 Torpet</td>
<td><strong>Fertility assessment</strong>&lt;br&gt;Katrine Birch Petersen, DK</td>
<td><strong>Chemicals and female fertility</strong>&lt;br&gt;Pauliina Damdimopoulou, SE</td>
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<td><strong>O1 - Ditte Vassard, DK</strong>&lt;br&gt;Assisted reproductive technology and risk of breast cancer</td>
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<td><strong>O2 - Herborg Holter, SE</strong>&lt;br&gt;Women’s experiences of no embryo transfer due to non-fertilization or poor embryo quality - a qualitative study.</td>
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<td>13.45-14.15</td>
<td><strong>O3 - Jens Fedder, DK</strong>&lt;br&gt;Prevalence of congenital bilateral absence of VAS deferens (CBAVD) in azoospermic men with CFTR mutations.</td>
<td><strong>Pro-active oocyte freezing</strong>&lt;br&gt;Anna-Lena Wennberg SE</td>
<td><strong>Chemicals and male fertility</strong>&lt;br&gt;Jorma Toppari, FI</td>
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<td><strong>O4 - Marie Søfteland Sandvei, NO</strong>&lt;br&gt;Risk of ovarian cancer in mothers after assisted reproductive therapy (ART) - a registry-based cohort study from the Committee of Nordic Art and Safety.</td>
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<td>14.15-14.45</td>
<td><strong>O5 - Anne Lærke Spangmose, DK</strong>&lt;br&gt;Obstetric and perinatal risk in 8,368 singletons and 1,167 twins conceived after fresh and frozen blastocyst transfers in the Nordic countries - a CoNARTaS collaboration.</td>
<td><strong>Infertility – the disease we forgot to prevent</strong>&lt;br&gt;Søren Ziebe, DK</td>
<td><strong>Comparative reproductive toxicology of environmentally contaminants</strong>&lt;br&gt;Anders Goksøyr NO</td>
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<td><strong>O6 - Sacha Stormlund, DK</strong>&lt;br&gt;Freeze-all versus fresh embryo transfer in ART: a multicentre randomised controlled trial in normo-ovulatory women</td>
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#### 14.45-15.15 Coffe/exhibition
Scientific Program (cont’d Friday 23 August)

15.15-16.15 General assembly

Ordinary General Assembly of the Nordic Fertility Society

Agenda
1. Opening of the meeting – Jon Hausken
2. Election of chairman and secretary for the meeting
3. Election of two auditors
4. NFS President report from the NFS board
5. Presentation of the five national representatives (S, F, N, DK, Ic)
6. NFS economy 2017-2019 The treasurer’s report and budget – Astrid Helene Sydtveit
7. Discharge from liability to the board members and chairman for 2017-2019
8. Election of the new NFS president
9. The Board will inform the members about the ongoing Education Courses
10. The Board suggests changing the By-laws;
   1. the next and previous Chairman of the NFS congress will become full voting member of the NFS Board (this suggestion was first time approved in Nyborg Strand 2017)
   2. §11. Changes of the Articles of Association shall be adopted by a majority of at least 2/3 of the members of two successive General Assemblies.
      The new By-law suggested
      §11. Changes of the Articles of Association can be approved by the boards of the national societies at least 4 weeks before and then adopted at the subsequent General Assembly.
11. Matters arising

Plenary session IV

16.15 - 17.15 Malin Stenberg, Ewa Rosén, Henrietta Westman, SE
A patient’s perspective - Uterus transplantation
Learn the story about Malin Stenberg who become the first to give birth after a uterus transplantation and Ewa Rosén who had donated hers to make it possible. The talk is led by Henrietta Westman who wrote a book about it “The way to Vincent - A story about a boy who became a worldwide sensation”.

17.15-18.15 Mingle in the exhibition hall
19.00 Congress dinner
MERCK FERTILITY

Med vår läkemedelsportfölj inom Fertilitet, som spänner över hela IVF-cyklen, bidrar vi till behandlingar som hjälper till att uppfylla drömmen om föräldraskap.
Saturday 24 August

09.00-10.15 Plenary session V
“Too obese to do IVF?”
09.00-09.30 No - Snorri Einarsson, IS
09.30-10.00 Yes - Elizabeth Nedstrand, SE
10.00-10.15 Panel discussion

10.15-10.45 Coffee/exhibition

10.45-12.00 Plenary session VI

10.45-11.15 Christina Bergh, SE
ART children – Short and long term follow-up

11.15-12.00 Josephine Lemmen, DK
Results from the Nordic countries

12.00-12.10 Closing ceremony and news from NFS: education and future meeting. Ann Thurin Kjellberg, chairman of the NFS 2019 meeting and the new chairman of NFS

12.15 Lunch “grab and go”

Our Family Grew. Let’s Grow Yours.
Elevate the success of your laboratory with our product family of advanced IVF solutions.

Stop by our booth to speak to our experts and get started today.
Invited speakers in order of appearance

Thursday 22 August
Plenary session I

Jan Brosens
Professor of Obstetrics and Gynaecology at the University of Warwick, United Kingdom. He is currently also the Deputy Head of the Division of Biomedicine at Warwick Medical School, and the Scientific Director of the Tommy's National Centre for Miscarriage Research, a partnership between the Universities of Warwick, Birmingham, Imperial College London and their partner NHS trusts. He is a Wellcome Trust Investigator.

Siobhan Quenby
Professor of Obstetrics/Honorary Consultant at University Hospitals Coventry and Warwickshire/University of Warwick. She is director of the locally funded Biomedical Research Unit in Reproductive Health and TOMMY'S@UHCW part of the National Center for Miscarriage Research. Siobhan has over twenty years of experience in research into implantation and recurrent miscarriage and has published over 125 original articles and 22 chapters for academic books. Siobhan's research is funded by Tommy's, NIHR, MRC, UHCW and other medical charities.

Parallel session I
Session A - PGT/Genetics

Helena Malmgren
Associate professor at the Karolinska Institute, Stockholm since 2006. She has a PhD in Medical Science from Uppsala University 1995. Current employment is as Clinical molecular geneticist at the Department of Clinical genetics, Karolinska University Hospital, since 1998 and is part of the Stockholm PGD center, a collaboration between the Reproductive medicine unit and the Department of Clinical genetics at Karolinska University Hospital, Stockholm, Sweden.

Sofia Moberg Jänterud
She holds a PhD in ethics. She is currently working as a postdoc at the Linnaeus University where her research focusses on ethical aspects on serious illness conversations. In her thesis she examined the ethical principle of human dignity and how it can be understood by clinicians faced with difficult ethical situations in neonatal and palliative care. Other research interests revolve around relational autonomy and vulnerability.
**Hans Ivar Hanevik**  
Hans Ivar Hanevik is a gynecologist with a PhD in pharmacogenetics from the University of Oslo. He is medical director of the fertility clinic at Telemark Hospital, Norway. Hanevik headed the Norwegian society for Assisted Reproduction from 2017-2019, and has been involved in the ongoing evaluation of the Norwegian law on biotechnology.

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**Session B - Automation of the lab**

**Thorir Hardarson**  
He is the Scientific Director for Livio, Sweden. He received his training at the University of Iceland where he got his bachelor in biology and master’s degree in physiology. Moving to Sweden 1997, he did research at Gothenburg University and his PhD was on human embryology. In the research for his PhD he was one of the pioneers starting to use time-lapse technology to study the dynamic development of embryos already in 1999.

His research interests has focused on new methods in identifying the best embryo to transfer, ranging from static and dynamic (time-lapse) morphological evaluation as well as metabolomics and PGS. He is the past chair of the ALPHA, has published over 60 scientific papers, book chapters and abstracts on embryology and human IVF.

**Shabana Sayed**  
She is an ESHRE certified Senior Clinical Embryologist and Laboratory Director at Klinikk Hausken in Norway. She has been working at Klinikk Hausken since 2008. She has been the Head of Clinical and Research division of all branches of Klinikk Hausken; Bergen, Haugesund, Oslo and Stavanger. With academic degrees in Molecular Biology from Mahatma Gandhi University, in India, and Clinical Embryology from Australia’s Monash University, she is currently pursuing her doctoral degree in clinical embryology. Her main areas of interest are Time-lapse imaging in IVF as well as optimization of laboratory procedures for IVF.

She is the author of several peer-reviewed articles and has been contributing her knowledge and expertise through her presentations. She has also been instrumental in proposing guidelines for annotations in Time-lapse imaging in IVF.

Her doctoral thesis is looking at the early biomarkers in Time-lapse imaging of IVF embryos for predicting implantation and live births in IVF.
Arne Sunde
He has an MSc in biophysics and a PhD in molecular endocrinology from the Norwegian University of Science and Technology. He served as a laboratory director of the ART-laboratory at St. Olav's University hospital in Trondheim since 1984 and was appointed Head of the Fertility Clinic in 2006 and head of the Department of Obstetrics and Gynaecology at St. Olav's University Hospital. He is currently professor emeritus at the Department of Clinical and Molecular Medicine, Norwegian University of Science and Technology. He is formally one of the founders of ESHRE and served as its chairman 2003 to 2005. He has been an Associate Editor (2014-2017) and from 2019 Editor in Chief of Human Reproduction Update.

Session C - New patient groups in reproductive medicine

Viveca Söderström-Anttila
She is a specialist in obstetrics and gynecology and reproductive endocrinology. Since 2018 she is affiliated at the Helsinki University Central Hospital, Department of Obstetrics and Gynecology. In 1992-2017 she was affiliated at the Väestöliitto Fertility clinic in Helsinki; the Family Federation of Finland. Her main clinical and research interest is fertility treatment with donated gametes, follow-up of families with children born after use of donated oocytes and sperm, and follow-up of oocyte donors.

Emma Nilson-Condori
She is a MD and a Specialist in Obstetrics and Gynecology working with IVF at the Centre for Reproductive Medicine at Skåne University Hospital, Malmö Sweden. She is a PhD student at the Dept. of Translational Medicine, Molecular Reproductive Medicine at Lund University, Sweden, studying the effects of bariatric surgery on fertility.

Gabriella Armuand
She is RNRM and PhD. Her research focuses mainly on fertility and family building in connection with cancer and gender dysphoria. She took her PhD in 2015 at Karolinska Institutet. After that, she had post-doctoral positions at Karolinska Institutet and Linköping University. Presently she works as a midwife at Women’s Healthcare, Uppsala University Hospital, while finishing a research project for the Public Health Agency of Sweden focusing on self-harm and suicidality among transgender and non-binary individuals.
Plenary session II

Susan Golombok
She is Professor of Family Research and Director of the Centre for Family Research at the University of Cambridge. She has pioneered research on parenting and child development in families created by assisted reproductive technologies including in vitro fertilisation (IVF), donor insemination, egg donation and surrogacy, as well as research on non-traditional families formed by assisted reproduction such as lesbian mother families, gay father families and families headed by single mothers by choice. Her research has challenged commonly held assumptions about these families as well as widely held theories of child development. In addition to more than 300 academic papers she is the author of several books, the latest of which is award-winning Modern Families: Parents and Children in New Family Forms.

Friday 23rd August
Plenary session III

Aisling Ahlström
She is currently the Laboratory director at Livio Fertilitetsscentrum in Gothenburg. She completed her BSc in cell biology at the University of Adelaide (Australia) and her PhD at the University of Gothenburg. Her main research activities are focused on embryo selection methods to predict viability and she is an advocate of blastocyst culture.

Åsa Magnusson
She is currently working at Reproductive Medicine, Sahlgrenska University Hospital, Gothenburg, Sweden since 2009. She defended her thesis “Ovarian stimulation for IVF - a balance between efficacy and safety” in 2018. Her current field of research is the association between ovarian response and outcome after IVF and on the obstetric and perinatal outcomes.

Parallel session II
Session A - Andrology

Antti Perheentupa
Assistant professor Antti Perheentupa, MD, is a specialist in Obstetrics and Gynecology, Reproductive Medicine and Andrology. He is the current chairman of the Finnish Fertility Society, scientific committee chairman of the Nordic Ob and Gyn Society and Communications Director of the International Federation of Fertility Societies (IFFS). He completed his MD in 1992 and PhD with prof. Ilpo Huhtaniemi in 1994, both in Turku. He spent 1996-98 as a Marie Curie postdoctoral fellow at the MRC Centre for Reproductive Biology in Edinburgh with prof. Alan McNeilly. Ass. Professor Perheentupa is the head of department and leader of the Reproductive Medicine training program at the Turku University Hospital since 2006. His research interests are in male reproductive health and severe male infertility. He has also been running a translational research project on endometriosis for 15 years. He has authored and co-authored more than 60 peer reviewed articles (H-index 25).
Manuela Simoni  
MD, PhD, she trained as clinical endocrinologist at the Unit of Endocrinology of the University of Modena, Italy between 1982 and 1990 and, thereafter, as molecular endocrinologist at the Institute of Reproductive Medicine of the University of Münster, Germany, where she was Professor for Endocrinology and Molecular Biology of Reproduction from 1998 to 2008. Since 2008 she is full professor of Endocrinology at the University of Modena & Reggio Emilia, Italy. Currently she is Director of the Clinical Unit of Endocrinology at the University Hospital of Modena. Her research interests are gonadotropin and androgen action, testicular function, male infertility, endocrinology and pathophysiology of reproduction. She is member of several societies, including the European Academy of Andrology (EAA) and the European Society of Endocrinology (ESE, serving as the Secretary until April 2018) and is active in the editorial boards of several journals in the fields of endocrinology and reproduction. Since January 2017 she is co-Editor-in-Chief of ANDROLOGY, the official journal of the European Academy of Andrology and the American Society of Andrology.

Gritt Marie Hviid Malling  
She is a candidate in Public Health Science and a research fellow at Department of Public Health, University of Copenhagen (DK), and the Fertility Clinic at Rigshospitalet, the university hospital of Copenhagen (DK). Her research interest is within male and female infertility, together with fertility awareness. Her latest project was on fertility awareness among young childless men, co-funded by the European Regional Development Fund (ERDF), Interreg Öresund-Kattegat-Skagerrak as part of the ReproUnion project.

Session B - Pro/con freeze-all

Jan Holte  
Dr Jan Holte graduated from the University of Uppsala, Sweden in 1978. In 1994 he defended his thesis for a PhD in Obstetrics and Gynaecology and his research is still carried on in collaboration with various institutions at the University of Uppsala. He was part of the team that introduced IVF at the University Hospital in Uppsala in 1988. Jan Holte’s research has mainly been in two fields: Polycystic Ovary Syndrome, specifically its association with metabolic aberrations and ovarian reserve, and prediction models in IVF. The basis for his research is his still ongoing clinical work in Carl von Linné Clinic, for which he was one of the founders in 1990. Dr Holte was also co-founder of Livet Centro per la fecondazione assistita in Torino, Italy, in 1997. Since 2012 he is Chairman of the board of Centre for Reproductive Biology in Uppsala, a joint body between Swedish University of Agricultural Sciences and Uppsala University. From the spring of 2019 he is engaged in a EU research project focused on toxicology and reproduction and in that role has a two year, ten percent employment at the Institution for Children’s and Women’s Health, Uppsala University.
Anja Pinborg
She is a medical doctor and expert in reproductive medicine and clinical professor at Rigshospitalet, University of Copenhagen, Denmark. She has published 150 original papers and authored seven book-chapters with an h-index of 37. She is executive committee member of ESHRE and is member of the International Committee of Medical Journal Editors (Vancouver group) and she was president for the Nordic Fertility Society (2011-2015). She is editor in chief for Danish Medical Journal (DMJ) and former editor of Human Reproduction Online and RBMOnline. Her main research areas are reproductive epidemiology including safety and quality aspects of ART with focus on child outcomes and clinical trials on optimizing ART and minimizing risks.

Erica Ginström Ernstad
She is a PhD-student at the Sahlgrenska Academy at the University of Gothenburg, with the title “Safety aspects of assisted reproductive technology - obstetric and pediatric outcome following new advanced techniques in IVF-treatment”, of her future thesis. Clinically she is working as an obstetrician at the Sahlgrenska University Hospital with main interest in the obstetric outcome following ART-pregnancies. Main expertise is in obstetric outcome following blastocyst transfer and frozen embryo transfer.

Session C - The very young patients

Dorthe Forsell
She has worked as a sex-counselor/RN for 11 years and loves her work. She is Danish and has two grown-up boys and two grandchildren. She has lived in Sweden for the last 25 years. Educated between 1983 and 1986 in Aalborg, Denmark and have worked as a nurse since that (neuro-intensive care unit, gynecology, internal medicine, heart surgery, primary care, spinal cord injuries) and is currently working at the department of neurology, Sahlgrenska University Hospital Gothenburg.

Kirsten Tryde Macklon
She works as a consultant at the Fertility Clinic in Rigshospitalet, Copenhagen University Hospital, in Denmark. In 2005 she obtained her Ph.D. degree in fertility preservation from the Faculty of Health, Copenhagen University. She has obtained an extensive knowledge and experience in fertility preservation especially in cancer patients throughout her many years working at the Fertility Clinic in Rigshospitalet. Her research has primarily been focused on this area. She has held numerous international lectures at scientific conferences primarily on fertility preservation and she has set up the SIG in fertility preservation in ESHRE and will be coordinator of this SIG from 2019.
Isak Eliasson
Member of Ung Cancer.
Has been regularly outspoken as an Ung Cancer member concerning sexual post-cancer challenges since 2015. Works as a psychologist, currently within the school setting.

Erik Fransson
Employee from Ung Cancer
Has five years experience of representing young adults diagnozed with cancer. Eriks everyday job at Ung Cancer is also to develop and improve the support for young adults with cancer from the organisation, healthcare system and society in general.

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Session B - Fertility awareness

Katrine Birch Petersen
She is specialist in Fertility and OB/GYN. Associate professor at the University of Copenhagen. She is daily leader and consultant of the Fertility Clinic, Zealand University Hospital. She has written a PhD about the Fertility Assessment and Counselling Clinic at Rigshospitalet - the first of its kind worldwide. Primary research areas are ovarian reserve, fertility awareness and female fertility. Has written several peer reviewed articles about fertility and early pregnancy and has performed more than 40 international and national presentations worldwide as invited speaker. Has a Master’s Degree in Public Governance at Copenhagen Business School.

Anna Lena Wennberg
MD, Ph D, is the Medical Director of Nordic IVF Gothenburg. Nordic IVF Gothenburg was the first center in Scandinavia to introduce elective egg freezing for non-medical reasons in 2011, after a structured learning process from the pioneers in Spain. Dr Wennberg has been engaged in producing national guidelines for proactive egg freezing in Sweden and has written several articles on the subject.

Søren Ziebe
Professor, dr.med., cand. scient. Head of the Department, The Fertility Clinic, Rigshospitalet, University Hospital of Copenhagen. Previous Chairman of the Danish Fertility Society, President of the Nordic Fertility Society and member of the executive committee of ESHRE.
Session C - Environment and fertility

Pauliina Damdimopoulou
Assc. Prof Pauliina Damdimopoulou is a principal investigator at the Unit of Obstetrics and Pauliina Damdimopoulou Gynecology of the Department of Clinical Science, Intervention and Technology (CLINTEC) at Karolinska Institutet. She obtained her PhD in Cell Biology from the University of Turku in Finland in 2008, and is a Docent (Assc Prof) in Endocrine Physiology at the Medical Faculty of the University of Turku since 2015. She studied mechanisms of endocrine modulation by natural and anthropogenic environmental chemicals during her PhD and postdoc education, and switched fields to human ovarian biology in 2012. In her current research, she combines her knowledge of endocrine modulation to human reproductive biology with a focus on the ovary. Damdimopoulou works with different cohort studies and in vitro ovarian models to study the effects of chemicals on fertility in women.

Jorma Toppari
He is Professor of Physiology in University of Turku and the Chief Physician of Pediatrics in Turku University Hospital, Turku, Finland. He is also an adjunct Professor in the Department of Growth and Reproduction in University of Copenhagen, Denmark. Dr. Toppari has served in editorial boards of several endocrinological journals, including Endocrinology, and Journal of Clinical Endocrinology and Metabolism. He is the past president of the European Academy of Andrology. His contributions to the studies on endocrine disruption are numerous - he has published over 400 articles on endocrinology, including as an author on the 2013 WHO-UNEP State of the Science of Endocrine Disruptors document and Endocrine Society’s 2015 Scientific Statement on Endocrine Disruptors.

Anders Goksøyr
Cand. scient. 1984 (biochemistry), University of Bergen. Dr. scient. 1987 (biochemistry/toxicology), University of Bergen; FELASA certificate, 1998/2017; EUROTOX reg. toxicologist, 2002. 1992-1996: Associate Professor, Department of Fisheries and Marine Biology, UoB; 1996-2009: Professor and Group leader, Department of Molecular Biology, UoB.; 1996-2007: Founder and R&D Director of Biosense Laboratories AS; 1998: Visiting scientist (sabbatical) at The Scripps Research Institute, La Jolla, California; 1999-2001: Managing Director, Biosense Laboratories AS; 2006-2009: Chair, Molecular and Computational Biology Research School, University of Bergen. Jan 2010-June 30 2016: Head of Department, Department of Biology, UoB. Current positions: Professor, Dept. of Biology, UoB (since Jan 2010). Senior scientist (20% adjunct position), Institute of Marine Research (since Aug 2016). Interests in environmental toxicology, food safety, ocean and human health (OHH) issues, applied biotechnology and biomarker development, especially on the cytochrome P450 system, endocrine disruption, nuclear receptor regulation and reproductive toxicology of aquatic species; recently focusing on toxicogenomics and environmental genomics, incl. proteomics, mechanism-oriented studies, and systems toxicology. 167 peer-reviewed scientific publications and more than 300 conference abstracts. Member of the Norwegian Academy of Sciences and Letters (DNVA), the Norwegian Academy of Technological Sciences (NTVA), the Norwegian Society of Pharmacology and Toxicology, the Norwegian Society of Biochemistry, the Norwegian Biologists Association (BIO), the Norwegian Non-fiction Writers and Translators Association (NFF).
Plenary session IV
A patient’s perspective - Uterus transplantation

Malin Stenberg, Ewa Rosén, Henrietta Westman

Learn the story about Malin Stenberg who became the first to give birth after a uterus transplantation and Ewa Rosén who had donated hers to make it possible. The talk is led by Henrietta Westman who wrote a book about it “The way to Vincent - A story about a boy who became a worldwide sensation”.

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Saturday 24th August

Plenary session V

Snorri Einarsson
He is an obstetrician and a gynecologist and acquired a subspeciality in reproductive medicine in 2012. Together with a team from the Sahlgrenska University Hospital, he conducted in 2010-2016 a large randomized multicenter study on the effect of weight reduction of obese women on IVF. Currently he is the medical director of Livio Reykjavik and is affiliated as a lecturer to the Medical Department of the University of Iceland.

Elizabeth Nedstrand
She is senior consultant, MD and associated professor. Specialist in obstetrics and gynecology since 2005 and was medical manager at Reproductive Medicine 2012-2017. Since 2017 Medical manager for all gynecologists at the Division of gynecology, Linköping University Hospital, Sweden. She has written 30 papers and her dissertation 2005, was on vasomotor symptoms and alternative treatments. Since 2014 her research is with focus on reproductive medicine and fertility treatment.
Plenary session VI

Christina Bergh
She is specialist in obstetrics and gynecology since 1985 and from 2009 professor in Obstetrics and Gynecology with focus on Evidence Based Medicine, Inst of Clinical Sciences, Sahlgrenska Academy, Göteborg University, Sweden. From 2007 she is also Head of the Health Technology Assessment unit, Vastra Götaland, Sweden and Head of the National Quality Registry of Assisted Reproduction in Sweden. Her main research area: is Quality and safety in assisted reproduction technology, Single embryo transfer, Children follow up after ART, Embryo selection, Obesity in ART, Quality of care. Research publications: 142 original publications, 25 reviews and 50 debates, book chapters or others.

Josephine (Fieneke) Lemmen
Head of of the IVF-Laboratory at Vitanova Fertility Clinic. She has been working as an embryologist since 2006 where she started at the Rigs hospital in Copenhagen. She is now for a third period member of the board of the Danish Fertility Society. She is former deputy in the SIG-embryology of ESHRE and the current Danish representative in the EIM European IVF Monitoring Consortium.

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Abstracts Oral

Thursday 22nd August
Plenary session I

**It takes two to tango - the relationship between the embryo and the endometrium in the session Implantation- why and why not? - Jan Brosens**

Recurrent implantation failure and recurrent pregnancy loss are devastating disorders for which there are few treatment options. Two opposing paradigms have emerged to explain persistent reproductive failure. The prevailing clinical viewpoint is that these disorders are caused by a spectrum of subclinical disorders, ranging from thrombophilia to anatomical, endocrine, and immunological disorders, that somehow converge on a ‘fragile’ early pregnancy state, leading to failed implantation or miscarriage. A new paradigm, based on emerging concepts around early implantation events, challenges this conventional thinking. It purports that the high incidence of embryonic aneuploidies and mosaicism coupled with a cycling endometrium necessitates the introduction of multiple ‘quality control’ checkpoints in the first trimester of pregnancy to limit maternal investment in a failing pregnancy. Clinically, the most important ‘checkpoint’ occurs at implantation, coinciding with differentiation of endometrial stromal cells into stress-resistant decidual cells that first act as biosensors of embryo quality and then form an immune-privileged matrix around the conceptus. Here, I will discuss the nature of the interactions between the embryo and surrounding decidual cells, highlight the changes in decidual subpopulations upon transition of a cycling endometrium into the decidua of pregnancy, and demonstrate the role of endometrial stem-like/progenitor cell deficiency in aberrant decidualization.

Parallel session I
Session A  PGT/Genetics

**Preimplantation genetic testing (PGT) of embryos - current methods - Helena Malmgren**

Preimplantation genetic testing (PGT) of embryos has been performed clinically since the 1990th. PGT for structural chromosomal aberrations (PGT-SR) is currently performed mainly by MPS/NGS based methods generating a whole genome analysis regarding deletions/duplications as well as aneuploidies. The advantage of this method is that is general - the same analysis can be used for almost all patients regardless of translocation, minimizing the time for workup. However, as the MPS method is sensitive, mosaicism for aneuploidies may be detected. This is not merely an advantage, as the biological and clinical consequence of mosaic embryos still is not fully understood.

PGT regarding monogenic disorders (PGT-M) is mainly performed with linkage analysis in combination with mutation analysis. Individual design of the analysis must be established, which is time and cost inefficiently. Today, a universal linkage analysis can be applied, facilitating the analysis of multiple disorders in the same analysis and reduce the time for workup.

Preimplantation genetic screening for aneuploidies (PGT-A), with aim of improving IVF (not allowed in Sweden), is mainly performed with MPS/NGS.
The ethical challenge of autonomy? - Sofia Moberg Jämterud

One of the main ethical principles in health care is respect for patient’s autonomy. In the presentation the aim is to broaden and problematize the perspective on the meaning of respect for patient’s autonomy in relation to situations in reproduction medicine such as decisions on genetic testing (for example PGD). Autonomy is often understood in terms of respecting the individual patient’s preferences and fulfillment of a person’s wishes and is often linked to concepts such as independence and individuality. However, ethicists have pointed to certain difficulties with what respect for a patient’s autonomy can mean, especially when it has been connected to provide treatment only on the grounds that the patient desires it. (Randall; 2006) It has also been shown that patients’ wishes are sometimes contradictory to medical expertise with regards to a specific treatment, which raises ethical challenges for clinicians in reproductive medicine. (Muggli et al; 2019) Furthermore, many ethicists have pointed out that autonomous decision making should be understood as relational, since this is more congruent with how people in fact make decisions. (Zeiler; 2005, Mackenzie; 2014) autonomy and vulnerability.

Similar arguments, different conclusions PGT legislation in the Nordic countries - Hans Ivar Hanevik

The Nordic countries are, at least seen from a distance, quite similar to each other in terms of societal norms and national institutions. It is therefore remarkable how the laws concerning the use of biotechnology on humans vary considerably between countries in the region. This lecture will highlight some of the main differences in legislation regarding PGT and related procedures between the Nordic countries. Further, it aims to describe how the legislative bodies in our countries have reached such different conclusions in such similar societies.

Automated vitrification of oocytes and embryos: will this be a routine practice in the IVF labs? - Shabana Sayed

Automated vitrification has been promoted as the next big step in the realisation of robotic IVF labs and is ultimately aimed at standardizing clinical vitrification from being a manual process to a fully robotic one. Automatization aims to minimize the intra and inter operator errors and inconsistencies that may arise due to handling of extremely complex and fragile gametes and embryos, which in turn can affect survival and success rates. To provide consistent and reproducible success rates, automation aims at locating the embryo safely in specially designed “pods” while bringing all the required solutions to the embryo for vitrifying them. Achieving success with this highly specialized technology requires full and precise control of six variables; temperature, timing, volume, media concentrations, speed of fluidics and vitrification rate. Utilising microfluidic channel pods as embryo carriers and introducing customized dispensing system to minimize osmotic effects may help improve clinical outcomes. The ultimate success in implementing this promising technology in routine practice depends on their clinical efficacy and cost effectiveness.

Microfluidics – where are we? - Arne Sunde

Microfluidics deals with the control and manipulation of fluids in the μl to pl scale. Practical use currently varies from inkjet printer heads, to DNA-chips and so-called lab-on—chip technology. Transport of liquids in microfluidics system is very different from “macrofluidics” systems. In microfluidics, surface tension, capillary forces, energy dissipation and fluidic resistance dominate the system. Transport of liquids in micro-systems is characterised by a low Reynolds number i.e. the flow is predominantly laminar contrary to “microfluidics systems where turbulent flow dominates. Microfluidics systems can be used for sperm sorting, oocyte and embryo culture, time-lapse, continuous flow replenishment of culture media or analysis of substances secreted by gametes.
of embryos and for cryopreservation of gametes and embryos. These systems are still experimental and most of the data available are from animal models.

Session C - New patient groups in reproductive medicine

Oocyte and embryo donation - Viveca Söderström-Anttila

An increasing number of women aged 40 years or above has wishes for pregnancy and experience unsuccessful fertility treatments because of low ovarian reserve. By using oocytes donated from young women, the chances for pregnancy are excellent in different patient and age groups. In Europe, the number of oocyte donation (OD) treatments was more than 56,000 in 2014, and 65 % of the treatments was carried out to women aged ≥40 years. In women ≥40 years, the clinical pregnancy rate was 45 % and delivery rate 29% per ET, similar to recipients aged <34 years.

Following OD, there are increased risks of hypertensive disorders in pregnancy and pre-eclampsia. The risk of premature birth and low birth weight is also slightly increased compared with IVF using autologous oocytes. Factors affecting the adverse obstetric outcome are related to infertility per se, primiparity, age of the recipient, and immunological aspects.

Embryo donation is a useful family-building option for patients with otherwise untreatable infertility, often in both partners. The literature on outcome after embryo donation is scarce and will be discussed in the presentation.

Female Fertility and Bariatric Surgery - Emma Nilsson-Condori

Obesity, BMI > 30 kg/m2, is an increasing health burden with negative effects also on fertility and IVF outcomes. Previous studies on conservative weight loss programs have shown improved fertility outcomes. Laparoscopic Roux-en-Y Gastric Bypass and Sleeve Gastrectomy are the two most commonly used surgical treatments for morbid obesity, and both give a loss of around 80 per cent of excess body weight, in 12-18 months. There is currently no consensus whether bariatric surgery could be a treatment for obesity related infertility, mainly because of an increased risk of SGA infants and preterm birth. Lifestyle modifications are recommended as first line treatment, but obese childless young women might choose bariatric surgery also for fertility reasons.

The transgender experience of reproductive care - Gabriella Armuand

Until July 2013, Swedish law mandated sterilization for anyone who wanted to change their legal gender. After the law was amended, cryopreservation of sperm and oocytes became available to patients diagnosed with transsexualism. In Sweden, the reproductive options have hitherto been limited, as embryo donation, until January 2019, has not been allowed. Also surrogacy is not allowed. Transgender men (female-to-male) who want a genetically related child, have been constrained to either access surrogacy/embryo donation abroad or to undergo pregnancy themselves. With this development we can foresee a new patient group entering the fertility and maternity clinics. Transgender individuals often suffers gender dysphoria, shown as dissatisfaction and distress over assigned sex-specific body features. There is a risk that their experiences of fertility preservation procedures as well as pregnancy and childbirth will be affected. Also, transgender individuals more often suffers from depression and other psychiatric disorders, which may render them especially vulnerable. This lecture presents conclusions drawn from interview studies among transgender men in Sweden concerning experiences on fertility preservation, thoughts about family building options and experiences of pregnancy and childbirth.
Surrogacy families: A psychological perspective - Susan Golombok

The presentation will summarise the findings of an in-depth longitudinal study of parenting and child development in families created by surrogacy in the United Kingdom. The study began in 2000 and the families have been visited at home on 6 occasions from infancy to adolescence when the children were aged 1, 2, 3, 7, 10 and 14 years. Forty-two surrogacy families were recruited to the study and compared with 51 egg donation families, 50 donor insemination families and 80 natural conception families. Data on parent-child relationships and children’s psychological wellbeing were obtained from mothers, fathers, children and teachers using standardized interviews, questionnaires and observational assessments of parent-child interaction. In addition, the parents were interviewed about their experiences of, and feelings about, surrogacy as well as their relationship with the surrogate as the child grew up. The children themselves were interviewed about their feelings towards their surrogate and about being born through surrogacy. Findings will also be reported from a parallel study of surrogates 10 years after their involvement in a surrogacy arrangement. Finally, the findings from an in-depth study of parenting and child development in 40 gay father families formed through surrogacy will be discussed.
**Friday 23rd August**

**Plenary session III**

**How many embryos are necessary to obtain a blastocyst? - Aisling Ahlström**

Blastocyst culture has greatly improved a number of key elements of IVF treatment and success, including embryo selection, endometrial synchronicity, impact of cell biopsy during aneuploidy screening and survival of embryos after cryopreservation. Most importantly, embryos that reach blastocyst stage have been shown to have a higher implantation potential and both fresh and frozen transfers result in higher pregnancy rates than at cleavage stages. There are of course a great number of embryos that fail to reach blastocyst stage of development and the clinical decision to extend embryo culture and delay transfer can also risk cancellation of the cycle if no blastocyst is formed. In these cycles, a transfer would most likely have been possible during cleavage stages and the chance of pregnancy not improbable. As a consequence, many IVF clinics prefer to restrict blastocyst culture for patients with an ‘optimal’ number of zygotes and/or good quality cleavage stage embryos in the hope of avoiding cancelling embryo transfer. Is this the best strategy? Or should we be looking at the quality of the entire cohort, the good, the bad and the ugly?

**How many oocytes are optimal for IVF, why and for whom? - Åsa Magnusson**

The lecture will focus on the balance between efficient and safe ovarian stimulation with emphasis on cumulative live birth rate, ovarian hyperstimulation syndrome and the advantages and disadvantages of the freeze all concept. Furthermore, the impact of the ovarian response, on obstetric complications and perinatal outcomes will be adressed.

**Parallel session II**
**Session A Andrology**

**Hormonal Treatment of Male Fertility - Manuela Simoni**

FSH and LH are fundamental for spermatogenesis, testosterone production and fertility. Given their central role, several studies evaluated whether gonadotropin supplementation to idiopathic infertile men are able to improve sperm output and fertility. FSH action is mediated by the FSHR, which exist in polymorphic variants affecting FSH activity in vitro and in vivo. In addition, a polymorphism in the FSHB gene promoter influences serum FSH levels. The scope of this presentation is to review the most recent data on the potential for FSH therapy in male idiopathic infertility.

The following evidence data will be discussed: pharmacogenetics of FSH action; interindividual variability of response to FSH (responders vs. non-responders), effects of FSH on pregnancy rate (from meta-analyses), pharmacodynamics markers of FSH action, pharmacogenetic trials. The combination of FSHB and FSHR polymorphisms gives rise to haplotypes related to better/worst response to FSH. However, the pharmacogenetic trials conducted so far did not consider the FSHB-FSHR haplotype in a prospective, controlled design. Infertile men carriers of the FSHR p.A680S homozygous A genotype responded to FSH treatment with a significant improvement of sperm DNA fragmentation index (DFI). Existing meta-analyses show that FSH treatment of unselected patients improves significantly pregnancy rate. In addition, DFI is significantly higher in infertile vs. control men and improves after FSH treatment. The dosage of FSH and the duration of treatment employed so far are largely empirical and, most probably, insufficient in most men to stimulate spermatogenesis.

FSH treatment of idiopathic infertile men is variably effective. There is urgent need to standardize treatment, and stratify the patients, identifying the responders beforehand. New gonadotropin preparations recently available on the market should be tested in future trials.
Fertility awareness among men - Gritt Marie Hviid Malling

In most high-income countries, including Denmark and Sweden, parental age of childbearing has increased in the last decades. Postponing family formation to the mid 30s and beyond increases the risk of infertility and involuntary childlessness or having fewer children than desired. Further, the risk of obstetric and perinatal complications increases. Many previous studies regarding family formation and fertility awareness have focused on university-educated women. In this lecture I will provide a brief overview of the existing literature concerning fertility awareness and men. Also I will present the results based on a qualitative study exploring fatherhood intentions among childless young men in Denmark and Sweden with diverse educational backgrounds. Specifically, I will go into depth with the impact of individual and societal factors on fertility decision-making and preferred timing of family formation, and the men’s reflections on barriers and enablers for earlier family formation. Further, I will present these young men’s reflections on their own fertility and fertility treatment, and their fertility awareness regarding risk factors for infertility.

Session B - Pro/con freeze-all

Freeze-all strategy, the background - Jan Holte

There are several contributing factors behind the increasingly popular strategy of postponing embryo transfer after freezing/vitrifying all available embryos. However, two of them are crucial factors: GnRH-agonist trigger and vitrification of blastocysts. As Ovarian Hyperstimulation Syndrome (OHSS) is the most common and the potentially most dangerous complication of controlled ovarian hyperstimulation (COH) in IVF/ICSI, the finding of an almost complete luteolysis but unaffected oocyte and embryo quality after GnRH-agonist trigger in a GnRH-antagonist cycle was good news. The agonist bolus results in both LH and FSH peaks, resembling, but not completely mimicking, the normal peaks in a natural cycle. Although the initial findings showed an almost complete abolishing of OHSS, thus a very positive novelty in ART, it was also found that the luteolysis was too complete for supporting an early pregnancy, resulting in poor pregnancy rates and very high early pregnancy losses. Although there are several proposals for “rescue protocols”, which would still make fresh transfers a feasible option, most clinics prefer freeze-all, as especially late OHSS are difficult to prevent also with low-dose hCG rescue regimens. Hence, a high quality freeze-thaw program, which modern vitrification/warming has proven to be, is a crucial requirement. With this improvement compared with slow-freeze technology, there are essentially no reductions in pregnancy rates and live birth rates compared with fresh transfer. Issues of discussion and studies are whether only expected high-responders should be offered the freeze-all strategy, how to optimise protocols for warming and embryo transfer, dealing with the prolonged time-to-pregnancy problem and carefully evaluate obstetric, perinatal and off-spring data with strategies radically increasing freeze/thaw cycles at the expense of fresh cycles.

“Patient’s perspective” in the session Freeze all? - Pros & Cons - Anja Pinborg

Vitrification and blastocyst transfer have considerably improved success rates after frozen embryo transfer (FET) with ongoing pregnancy rates in FET approaching those seen in fresh embryo transfer cycles. Furthermore, the risk of ovarian hyperstimulation syndrome (OHSS) is essentially eliminated in FET, and FET may be beneficial to the endometrial and foetal development because a hormonal environment mirroring the natural cycle is enabled. However, the freeze-all strategy is not yet implemented as standard care. One reason is the presumption of negative patient attitudes towards a freeze-all embryo strategy. So far, only very limited data regarding patients’ attitudes on a freeze-all strategy have been published, but results from a Danish survey showed that though patients were concerned about the treatment delay
associated with eFET compared with fresh embryo transfer, nearly 60% of the participants were in favour of eFET assuming that the clinical pregnancy rate was equivalent. The women showed significantly increased risk-willingness on own health to achieve pregnancy compared to what the men would accept of risk for their female partner and the women were significantly more likely to consider it difficult to have to postpone embryo transfer compared to the male respondents.

The child perspective in the session Freeze all - Pros & Cons - Erica Ginström Ernstad

Frozen embryo transfer (FET) and the freeze-all strategy has gained popularity in recent years, limiting the risk of ovarian hyperstimulation syndrome and multiple pregnancies. Singleton born following FET have better neonatal outcomes compared to singletons born after fresh embryo transfer regarding low birth weight, small for gestational age and preterm birth but worse neonatal outcomes compared to singletons born after spontaneous conception. However, children born after FET are at a greater risk of being born as large for gestational age (LGA) and macrosomic (>4500 g) compared to both fresh cycles and spontaneous conception. A recent Swedish registry-based study showed that pregnancies after FET in natural vs. stimulated cycles have a more favorable outcome with lower rates of macrosomia. The reasons behind the increased risk for LGA and macrosomia among FET children are not known. However, the findings are of great importance since an increasing number of IVF-cycles are performed as FET.

Session C The very young patients

The very young male patient - Dorthe Forsell

When a young man receives a cancer diagnosis the time from diagnosis to treatment can be very brief. This makes it important to discuss and take immediate decisions about sperm preservation, since the treatment is likely to be spermicidal. It’s also of great importance that he can leave the sample in “a safe environment”, receive information about the procedures concerning the sample submission and have the opportunity to talk to a staff member with knowledge about sexual matters. During the time the young man is giving a sample - in private - it’s also meaningful that the parent(s), who often are in deep crisis, also receive a possibility to discuss and ask questions about the situation.

Fertility aspects for young women after cancer - Kirsten Tryde Macklon

Young women who have had cancer during childhood or young adulthood may face some serious adverse effects to the cancer treatment they have received. Chemotherapy, particularly with alkylating agents, is known to influence the ovarian reserve negatively thus potentially causing a diminished ovarian reserve or even POI. This is also the case of abdominal radiation therapy. Fortunately, not all childhood cancer survivors lose their fertility as a direct consequence to their treatment, but a lot will experience a reduced ovarian reserve which could cause difficulties in conceiving later in life or even an early menopause. Ovarian tissue cryopreservation or oocyte vitrification can be offered as a means of preserving the fertility. During this talk we will go through the consequences of a successful cancer treatment on the ovaries, the fertility and the hormone production of these young patients. The chances of having a child after cancer and what to be aware of when treating these young cancer survivors.
Isak was 24 years old when he was diagnosed with testicular cancer. He reflects about the big questions in his life that now has become more real than ever; such as fearing death and pending between grieving, doubting and longing after one day becoming a dad. Together with Erik Fransson from the Swedish Organization Ung Cancer the lecture presents testimonies from young adults affected by cancer and then Isak dives into his story dealing with existential anxiety and the importance of healthcare providing not only fertility options, but psychological support as well.
Study question: Is the risk of breast cancer (BC) increased among women after undergoing assisted reproductive technology (ART) treatment?
Summary answer: An increased risk of breast cancer after assisted reproductive technology treatment was apparent among women initiating ART treatment when aged 40+ years.

What is known already: The majority of BC cases are sensitive to estrogen. Ovarian stimulation in ART treatment has been suggested to increase the risk of BC by influencing endogenous estrogen levels. The level of ovarian response to hormone stimulation is dependent on age, and thus, age is an important factor in the choice of ART treatment protocol. Nulliparity is a risk factor for BC. Previous studies on ART treatment and BC have varied in their findings. Several previous studies suffer from lack of power and short follow-up time. The latency time for development of BC has been estimated at 10+ years.

Study design, size, duration: The Danish National ART-Couple II (DANAC II) cohort includes all women treated with ART at Danish fertility clinics in 1994-2015. Each woman in ART treatment was age-matched with ten women from the background population without a history of ART treatment. The women were followed until first cancer diagnosis, death, migration or end of study December 31st 2015. The cohort consisted of 58,534 women treated with ART and 567,178 women without a history of ART treatment.

Participants/materials, setting, methods: Multivariable analyses were conducted using cox proportional hazards regression. Having a primary cancer diagnosis other than BC was incorporated as a competing risk. Adjustment for confounders included baseline nulliparity, educational level, partnership status, treatment year, endometriosis and PCOS and time-dependent adjustment for age. Stratified analyses were conducted to assess effect modification by age at treatment initiation. Also, the risk of being diagnosed with BC was observed over time in order to detect potential patterns.

Main results and the role of chance: During follow-up 3894 women were diagnosed with BC, 464 (0.8 %) among ART-treated women and 3430 (0.6 %) among untreated women. Overall, women undergoing ART treatment had a higher risk of BC than non-ART women (HR 1.10, 95% CI 1.07-1.13). Female cause of infertility was not associated with an increased risk of BC (HR 1.03, 95 % CI 1.00-1.06). Among women initiating ART treatment when aged 40+ years the risk of BC gradually increased during 12 years after ART treatment initiation compared to untreated women (12-year HR 1.53, 95% CI 1.24-1.90). Considering that a higher prevalence of nulliparity among ART treated women could explain this finding, ART treated and untreated women with a first birth at age 40+ were subsequently compared. The increased risk was also apparent when restricting analyses to women with a first birth after ART treatment at 40+ years of age compared with untreated women with a first birth at similar age (HR 1.65, 95 % CI 1.40-1.94).

Limitations, reasons for caution: Although hormone dosages and number of ART treatments are relevant risk factors for development of BC, the selection of individuals to be exposed to more treatments is not random. It depends on both achieved pregnancies and who chooses to terminate treatment, and such results would be difficult to interpret.

Wider implications of the findings: It is possible that ovarian stimulation increases the risk of BC among women who initiate ART treatment when aged 40+. An increased risk could be due to age-related vulnerability to hormone exposure or to higher doses of hormones during ART treatment.

Study funding/competing interest(s): None
O2 - Women's experiences of no embryo transfer due to non-fertilization or poor embryo quality - a qualitative study
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Study question: To investigate women’s experience of not receiving embryo transfer and the need of support related to this experience.

Summary answer: The experience of not receiving embryo transfer intensify the overall experience of infertility. The need of support requests for individual solutions.

What is known already: Several studies have investigated the experience of treatment failure in terms of no pregnancy or “baby home” but little is known about the experience of treatment failure in terms of no embryo transfer due to no fertilization or poor embryo quality. The patient reported questionnaire “QPP-IVF”, used by all IVF clinics in Sweden, measures the patient’s experience of quality of care. Results have revealed that a vast majority of women with the experience of no embryo transfer due to no fertilization or poor embryo quality reports lack of information and support from the IVF clinic related to this event.

Study design, size, duration: A qualitative research model was adopted using semi-structured interviews. Twenty women recruited from two IVF clinics in Gothenburg, one public and one private clinic, took part in the interviews between January 2018 and April 2019.

Participants/materials, setting, methods: The interviews conducted by one out of the two midwives responsible for the study took place one month after the event of treatment failure and lasted for about one hour. All interviews were tape-recorded and transcribed verbatim followed by an ongoing analysis with a thematic approach.

Main results and the role of chance: Preliminary results reveal narratives of emotional suffering connected to the experience of not receiving an embryo transfer and a requested need for individual care. ‘Aspects of the event’ as not being prepared and informed, followed by chock and catastrophe for some. The event increased and intensified the infertility crisis.

‘Aspects of coping’ as the need of new possibilities and new treatments. The option of donation was the terminal alternative for several, however emotionally complicated. Some tried to get a sense of control by seeking information or by own activity to better the odds such as diets and changing life style, others laid their destiny in the hands of the professionals. ‘Aspects of support’ as a common wish to be offered an early appointment with a doctor for follow up after failed treatment without taking the initiative themselves. There was a need of information about what went wrong, new alternatives and information about counselling. Some patients had contacted the available psychologist, a contact they felt as a lifeline. The majority of the women interviewed had not received information from fertility staff about the possibility of contact with a psychologist after this event.

Limitations, reasons for caution: One third of the women invited to the study declined participation mainly because of emotional strain related to the event of not receiving embryo transfer. These narratives might have added other aspects of the experience.

Wider implications of the findings: The study addresses the need for development of routines promoting individualized care for patients with the experience of no embryo transfer.

Study funding/competing interest(s): The study was supported by the ALF agreement at Sahlgrensk University Hospital, Gothenburg, Sweden, The Local Research and Development Board for Gothenburg and Södra Bohuslän and by Hjalmar Svensson’s Research Foundation. No conflict of interest are declared.

Trial registration number/Ethical approval: Ethical approval was obtained from the Ethics Committee of the University of Gothenburg (Dnr. 257-17)
**Study question:** What is the frequency of Congenital Bilateral Absence of Vas deferens (CBAVD) in azoospermic men with Cystic Fibrosis Transmembrane Conductance Regulator (CFTR) gene mutation?

**Summary answer:** Half of an unselected population of azoospermic men carrying a ΔF508 or R117H mutation shows CBAVD. Testicular function was decreased in CFTR carriers without CBAVD.

**What is known already?** Men carrying at least one CFTR mutations may have obstructive azoospermia (OA) due to missing development of the genital tract. Clinically Congenital Absence of Vas deferens (CAVD) may easily be diagnosed by palpation of the scrotal content. At autopsy of men with the disease Cystic Fibrosis (CF) the retroperitoneal segment of the Vas deferens tended to be the most deficient. The seminal vesicles are usually absent or rudimentary, and the ejaculatory ducts absent or without a lumen in men with CF. In addition, it is suggested that CFTR mutations decrease spermatogenesis and affect epididymal microenvironment through abnormal electrolyte concentrations.

**Study design, size, duration:** Non-vasectomized, azoospermic men referred to our andrological center are included in our cohort of unselected, azoospermic men. Since we have an increasing number of men referred for micro-TESE from all regions of Denmark, the proportion of men with Klinefelter’s syndrome increased from 9.7% in the period 1997-2011 to 19.1% in the period 2011-2018. From the period 1997-2018, 639 men have been included.

**Participants/materials, setting, methods:** The included men all had a clinical examination including ultrasonography of the testicles and hormonal and genetic analyses, including screening for CFTR mutations.

For the DNA analyses genomic DNA was extracted from blood lymphocytes, and examination for a panel of 32 of the most important CFTR mutations was applied. Either a multiplex PCR analysis was followed by an oligonucleotide ligation analysis on the amplified DNA, or alternatively a next-generation sequencing technique was applied.

**Main results and the role of chance:** Among the 639 azoospermic men included, 69 (10.8%) had at least one CFTR mutation. In 42 with at least one of the two most common CFTR mutations, ΔF508 and R117H, 19 (45.2%) showed CBAVD, 1 (2.4%) Congenital Unilateral Absence of Vas deferens (CUAVD), and 22 (52.4%) presence of the scrotal parts of the Vasa deferentia. Conversely, only 1 of 21 men (4.8%) with an isolated IVS8-5T variant showed CBAVD. Among the 570 men without CFTR mutations, CBAVD were found in only 2 men and CUAVD in 1 man.

Decreased testicular function and presence of seminal vesicles may be suggested in CFTR carriers with present Vasa deferentia, since FSH levels were higher, testicular volumes lower, and ejaculate volumes higher compared to those with CBAVD (p<0.001; Students t-test). Among 31 men with ΔF508 or R117H mutations isolated or in combination, CBAVD was found in 16 cases and presence of the scrotal parts of the Vasa deferentia in 15. Motile sperm were found in all 16 cases with CBAVD but in only 6 of 15 cases with present Vasa deferentia (p<0.01; Fisher’s exact test).

The majority (84%) of the 69 men with CFTR mutations were of Danish origin.

**Limitations, reasons for caution:** The study has not sufficient power to evaluate the importance of CFTR mutations or variants other than ΔF508, R117H, or IVS8-5T, according to the presence of the Vasa deferentia and fertility. Data on the presence of the seminal vesicles are incomplete, since rectal ultrasonography was not in all cases performed.

**Wider implications of the findings:** In the future more complete data on the development of e.g. the seminal vesicles in different CFTR mutations will be included on our cohort of azoospermic men. Our findings will be the basis of further studies on the mechanisms by which the different CFTR mutations show their effects.

**Study funding/competing interests:** The study is not founded, and the author has no conflict of interests.

**Trial registration number / Ethical approval:** Approved by the Danish Patient Safety Authority (journalnr. 3-3013-2503/1) and the Danish Data Protection Agency (journalnr. 18/18147).
Study question: Is giving birth after assisted reproductive therapy (ART) associated with higher risk of ovarian cancer, and does cause of infertility matter?

Summary answer: Delivery after ART was associated with higher risk of ovarian cancer than delivery after spontaneous conception, primarily when a female infertility component was present.

What is known already: The hormonal aetiology of ovarian cancer has led to concerns about whether ART increases risk in women treated for infertility, as ART usually involves exposure to supraphysiological levels estradiol, exogenous gonadotropins, and in addition multiple ovarian punctures. So far, results have been inconclusive, partly due to few cases and heterogeneity between studies.

Study design, size, duration: We performed a large, population-based study including 3,304,784 women from four Nordic countries (Denmark, Finland, Norway and Sweden). Participants were followed from the start of their first pregnancy (1984-2014) until the date of first cancer, emigration, death, or December 31, 2014 (Denmark and Finland) or 2015 (Norway and Sweden), whichever occurred first. We excluded participants who had a cancer diagnosis before the first childbirth.

Participants/materials, setting, methods: Using the personal identification number of Nordic citizens and residents, we linked data from nationwide registries (for cancer, ART, births, hospital discharges, cause of death, and emigration). Cox proportional hazards models were used to estimate associations (hazard ratios, HRs, with confidence intervals, CIs). We treated ART delivery as a time-dependent exposure considering women as ever ART exposed from their first ART conception. We adjusted for age at first birth and parity (time-dependent).

Main results and the role of chance: Among 119,531 women (3.6% of the cohort) who had ever given birth after ART and were followed for a mean of 10.8 (standard deviation, SD, 6.8) person-years, 147 developed ovarian cancer (12.6/100,000 person-years). Corresponding numbers for the 3,185,253 women with spontaneously conceived children only were 2,596 ovarian cancers during a mean of 14.4 (SD 8.6) person-years (5.5/100,000 person-years). Overall, risk was higher for ever-ART mothers (adjusted HR 1.47, 95% CI 1.24-1.75).

Causes of infertility were characterized as female factors (endometriosis, polycystic ovary syndrome/anovulation, tubal, cervical or uterine factors) in 21,211 (21%), male factor alone in 15,846 (16%), mixed female and male factors in 12,855 (13%), unexplained infertility in 11,347 (11%) and “other factors” (unknown or “other”) in 37,441 (38%). Ever-ART mothers treated due to female factors were at higher risk (HR 1.77, 95% CI 1.17-2.67), as were ever-ART mother treated due to “other factors” (HR 1.79, 95% CI 1.35-2.38), whereas results were inconclusive for mixed factors (HR 1.38, 95% CI 0.72-2.66) and unexplained infertility (HR 1.18, 95% CI 0.53-2.63). There was no clear association in women treated due to male factor infertility only (HR 0.98, 95% CI 0.51-1.90).

Limitations, reasons for caution: We had no information about women who did not give birth or on number of ART cycles per woman, which may differ according to cause of infertility. Residual confounding cannot be excluded. Precision was limited despite the inclusion of nationwide data from four countries.

Wider implications of the findings: Our results suggest that the higher risk of ovarian cancer in women treated with ART may be due to underlying infertility, particularly female reproductive conditions, rather than the ART procedures. These results emphasize the importance of considering the underlying infertility when analysing risk of cancer after ART.
Study question: Are obstetric and perinatal outcomes similar in children conceived after blastocyst (BT) and cleavage stage transfers (CT)?

Summary answer: Extended embryo culture to the blastocyst stage has the potential to compromise perinatal outcomes of the infants and to increase the risk of monozygotic twins.

What is known already: Blastocyst transfer optimizes the selection of top-quality embryos and increases pregnancy and live birth rates per transfer. However, concerns have been raised as extended culture may increase obstetric complications and impair perinatal outcomes. Studies show higher risks of preterm birth (PTB) and large for gestational age (LGA) among infants conceived after BT compared with CT. Children conceived after BT are also prone to have a higher risk of monozygotic twins.

Study design, size, duration: Nordic registry-based cohort study including two cohorts: 69,751 singletons and 18,154 twins conceived after assisted reproductive technology (ART) in the Nordic countries. Herein 8,368 singletons conceived after BT and 61,383 singletons conceived after CT; Denmark including singletons born 1997-2014 (BT: n=1,152; CT: n=23,344), Norway 2010-2015 (BT: n=397; CT: n=6,686) and Sweden 2002-2015 (BT: n=6,819; CT: n=31,353). The twin cohort consisted of 1,167 children conceived after BT and 16,987 children conceived after CT.

Participants/material, setting, methods: Data were obtained from the large Nordic cohort (Committee of Nordic ART and Safety - CoNARTaS) containing information from the national ART and Medical Birth Registries. Obstetric and perinatal outcomes, and risk of same-sex twinning after fresh and frozen BT and CT were compared using linear mixed model regression analyses to account for the correlation of outcomes amongst siblings. Adjustments were made for fertilization method (IVF/ICSI), sex, country, birth year, parity (first/later) and maternal age.

Main results and the role of chance: In the adjusted multiple regression analyses, singletons conceived after fresh BT had a higher risk of being LGA (adjusted odds ratio (aOR) 1.23 (95%CI 1.05; 1.44)) compared with fresh CT-singletons. Singletons conceived after frozen BT had a higher risk of PTB both when calculated based on the second-trimester ultrasonography (aOR 1.39 (95%CI 1.18; 1.65)) and from the day of embryo transfer (aOR 1.23 (95%CI 1.07; 1.40)) compared with frozen CT singletons. In singleton pregnancies a higher risk of placenta previa both after fresh (aOR 2.04 (95%CI 1.73; 2.41)) and frozen (aOR 1.68 (95%CI 1.16; 2.44)) BT compared with CT was observed. We found no excess risks of perinatal (aOR 1.08 (95%CI 0.65; 1.82)) nor neonatal deaths (aOR 1.20 (95%CI 0.74; 1.96)) comparing singletons conceived after BT and CT, fresh or frozen. The rate of male infants was significantly higher after fresh (aOR 1.13 (95%CI 1.04; 1.23)) than after CT. Furthermore, adjusted analyses showed a higher risk of twin births after single embryo BT compared with single embryo CT; for fresh cycles aOR was 1.79 (95% CI (1.48; 2.15) and for frozen cycles aOR was 1.30 (95% CI (1.05; 1.62), compared with single fresh or frozen CT.

Limitations, reasons for caution: Retrospective cohort studies may have inadequate adjustment for potential confounding factors, however with this large controlled cohort we assume that residual confounding is limited. Though we were not able to adjust for years of infertility or type of cryopreservation in FET children (vitrification or slow freeze technique).

Wider implications of the findings: Blastocyst transfer is associated with a higher risk of PTB, LGA and placental complications. These results are important since an increasing number of all ART treatments are performed with BT.

Study funding/competing interest(s): The study is part of the Reprounion Collaborative study, co-financed by the European Union, Interreg V ÖKS. No competing interests exist.

Trial registration number: ISRCTN11780826

Keywords: blastocyst transfer, perinatal outcomes, obstetric outcome, frozen embryo transfer, monozygotic twin
O6 - Freeze-all versus fresh embryo transfer in ART: A multicentre randomised controlled trial in normo-ovulatory women

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Study question: Is the ongoing pregnancy rate in a freeze-all strategy involving GnRH agonist trigger superior to the ongoing pregnancy rate in conventional fresh embryo transfer strategy?

Summary answer: The ongoing pregnancy rate per randomised patient after the first single blastocyst transfer is comparable between freeze-all and fresh embryo transfer.

What is known already: Growing clinical evidence suggesting similar or even better pregnancy rates following elective frozen embryo transfer cycles compared to conventional fresh transfer has recently emerged, encouraging a further implementation of a freeze-all strategy as part of standard ART care in patients at risk of ovarian hyperstimulation syndrome (OHSS) or where impaired endometrial receptivity is suspected. Importantly, a freeze-all strategy including the use of GnRH agonist trigger has the potential to virtually eliminate the risk of late onset severe OHSS, but such a strategy has not previously been investigated as the large published RCT's have employed hCG trigger for final oocyte maturation.

Study design, size, duration: Multicenter, randomised, double-blind trial including 460 women allocated 1:1 to either (1) GnRH-agonist trigger and single vitrified-warmed blastocyst transfer in a subsequent modified-natural cycle or (2) hCG trigger and single blastocyst transfer in the fresh cycle. In case of OHSS risk (>18 follicles >11 mm on trigger day) embryo transfer was postponed to a subsequent cycle. A computerized randomization program was used.

Participants/materials, setting methods: 460 normo-ovulatory women aged 18 to 39 referred to their first, second or third ART treatment in 8 participating clinics in Denmark, Sweden and Spain were included. Randomisation was performed before start of stimulation and unblinding of the randomisation result was done on the day of ovulation trigger. Following randomisation, 23 patients were excluded from analyses on criteria of baseline AMH and TSH. Ongoing pregnancy was determined by transvaginal ultrasonography at gestational weeks 8–10.

Main results and the role of chance: In the primary endpoint, the ongoing pregnancy (OPR) per randomised patient after the first potential blastocyst transfer was 26.1% (57/218) in the freeze-all group compared with 29.1% (64/220) in the fresh transfer group (RR 0.96, 95% CI 0.86-1.08; p =0.56). OPR per transfer (only including patients who had a transfer) was 36.1% (57/158) in the freeze-all group compared with 37.2% (64/172) in the fresh embryo transfer group (RR 0.98, 95% CI 0.83-1.16; p = 0.92). Positive hCG rate per randomised was 33.0% (72/218) vs. 38.6% (85/220) in freeze-all and fresh group, respectively (NS) and positive hCG per transfer was 45.6% (72/158) vs. 49.0% (85/172) in the freeze-all vs. the fresh group (NS). All analyses were based on the ITT principle. In the fresh embryo transfer group, 23 participants were converted to freeze-all due to risk of OHSS. These patients were all included in the ITT analysis as part of the fresh embryo transfer group. One patient in the fresh embryo transfer group had an OHSS related hospital admission. Cancellation of transfer due to lack of blastocyst development occurred in 18.3% (n=40) and 15.0% (n=33) of patients per randomised in the freeze-all and fresh embryo transfer group, respectively.

Limitations, reasons for caution: In this design the effect of GnRH-agonist trigger and freeze-all cannot be separated, however aimed to compare an OHSS-free strategy with a conventional fresh embryo transfer strategy. The study is powered to detect a 12 % difference in OPR between the two groups, thus smaller differences may be overlooked.

Wider implications of the findings: Our findings give no support for a general freeze-all strategy in normo-ovulatory women but encourage further adaptation of a freeze-all strategy including GnRH agonist trigger in patients where this may be beneficial as part of individualised patient care. The results are in agreement with the latest meta-analysis on the area.

Study funding/competing interest(s): The study is part of the Reprounion Collaborative study, co-financed by the European Union, Interreg V ÖKS. No competing interests exist.

Trial registration number: Clinicaltrials.gov identifier: NCT02746562
Fertility awareness - Katrine Birch Petersen

Female reproduction is challenged, and pro-fertility concepts have been established to address this development. The notable changes in reproductive patterns within the past decades may be influenced by the increased female educational level and subsequently higher maternal age at first birth. In line with this, broader interpretations of “family planning,” counseling opportunities and new treatments have emerged. Oocyte vitrification for nonmedical reasons and the option of single motherhood by donor insemination have been accepted as appropriate solutions in some parts of the world. The tendency to postpone family formation has resulted in decreased fertility rates, smaller families than desired and an increase in the demand for fertility treatment. The Fertility Assessment and Counseling Clinic (FAC Clinic) at Rigshospitalet in Copenhagen was initiated to offer reproductive advice to women and men. The purpose is to provide individual assessment of fertility risk factors and ovarian reserve to help women with no known history of infertility to fulfill their reproductive life-plan. The FAC Clinic is the first of its kind worldwide and clinics based on the same concept have been initiated in other countries.

Proactive oocyte freezing - Anna Lena Wennberg

In many countries of the developed world we form families at a late stage in life. When oocyte vitrification was introduced the medical motives to cryopreserve eggs, such as malignancy causes, were obvious, but the method also presented a way to save the female fertility potential from ageing, also called "social freezing". The possibility to freeze eggs proactively caused much debate in the society and among clinicians. Many questioned whether it was ethical to freeze oocytes for elective purposes and what the results would be. Eight years after the introduction in Sweden, European and national guidelines have been formed and the first results after warming and replacement are starting to appear. Pregnancy results after elective oocyte freezing are encouraging if the eggs are frozen at a young age, but the utilization rate has so far been low. Women considering elective egg freezing ought to be informed about the procedure, the possibility to achieve a pregnancy and the preferable age to freeze the eggs but also about the likelihood of ever using them.
Infertility – a disease we forgot to prevent! - Sören Ziebe

The background for bringing up prevention of reproductive diseases as a focus area is the embarrassing fact that ever since the birth of our specialty we - as the experts in reproduction – have never really been addressing the topic of how to prevent reproductive diseases. This contrasts with our colleagues in almost all other areas within medicine (cancer, diabetes, cardiovascular diseases etc.) who spend a significant proportion of their science, communication and discussions on preventing people being affected of their respective diseases. Reproductive disease is now the most prevalent chronic disease in people aged 25-44. Nine percent of Danish children are now conceived in a fertility clinic. One in five Swedish, Norwegian and Danish men never becomes a father and one in ten women either never have children or have fewer children than wished for. We need to change this. Further, we should change our perspective from treating childlessness to “building families”. Infertility affects whole families. Nine percent of all children being conceived at fertility clinics in Denmark mean that 9% of all grandchildren, nieces and nephews are conceived at fertility clinics and we have no reason to believe that the situation is any different in other parts of Europe. And it is about time. Both in the sense that we as reproductive specialists should have addressed this a long time ago. But also, in the sense that having children takes time. And the more children you want the earlier in life you need to start. There are significant knowledge gabs in young people concerning their fertility and biology. We need to start filling these gabs and education is essential in preventing reproductive diseases. This includes also things like lifestyle factors and sexually transmitted diseases. And on a society level we need to start addressing myths and believes that causes young people to postpone childbearing. We need to educate young men of the consequences of not committing to relationship and parenthood while their girlfriends are still fertile. We must inform parents that they may never become grandparents if they keep suggesting their children to postpone family building – and many, many other things. And we need to inform politicians and policy makers that children is important and that they have a pivotal role in organizing societies in a way that is compatible with young couples having children when and if they wish so. We need to convince employers that children is a part of life and that they need to embrace this in the companies, universities and all other places where people work both before and after having children. But most of all we need to have the courage to address this in the open. To challenge ways, we do things and how we think when it comes to having children both among friends and family but also in our own heads and hearts. Children are important – for most of us the most important thing in our life.

Session C - Environment and fertility

Chemicals and female fertility - Pauliina Damdimopoulou

There are approximately 150,000 different chemicals in production worldwide. The growth of the chemical industry has far exceeded the speed of development of tools for assessment of chemical safety. This has led to the current situation where humans are exposed to extensive mixtures of poorly characterized chemicals. Our studies show that cocktails of industrial chemicals can be measured in serum of women living in Sweden. Out of the 28 studied chemicals, half could be detected in every woman. The chemicals pass the follicle basement membrane and are present in follicular fluid in the same concentration as in serum, and they also pass the placenta and deposit to fetal tissues. In this talk, I will discuss the implications of chemical exposures to fertility in women, the experimental models that can be used to study fertility disrupting effects of chemicals, and introduce new international efforts that aim to improve regulatory guideline tests for reproductive toxicity testing.
Chemicals and male fertility - Jorma Toppari

Male sex differentiation is driven by testicular hormones secreted by Leydig cells and Sertoli cells. Impairment of hormone production or action leads to disorders of sex differentiation and problems in reproduction. Sertoli cells in the seminiferous tubules nurture and support germ cell development. Sperm production capacity depends on the number of Sertoli cells. They proliferate perinatally and before the onset of puberty when spermatogenesis starts and Sertoli cells stop dividing. Thus, the maximal sperm production capacity is achieved at puberty, and thereafter it cannot be improved. Developmental disruption of hormone production has life-long consequences that may appear as poor fertility, birth defects of reproductive organs, or testicular tumorigenesis. Spermatogenesis can also be impaired at any later phase of life, but these impairments are often temporary. Androgens are essential for male reproductive development and function. Chemicals that inhibit androgen production, such as perfluoro octanoate and many phthalates, or block androgen action, such as many fungicides and DDE, cause a threat to fertility. The number of recognized anti-androgens is increasing and their combined effects are of concern, since they show clearly additive effects in animal experiments. Sperm production capacity of young men is suboptimal all over the world raising the question as to how big part of this problem may be caused by exposure to small amounts of hundreds of anti-androgenic chemicals acting together.

Comparative reproductive toxicology of environmental contaminants - Anders Goksøyr

Endocrine disrupting compounds as causes of reproductive disturbances in wildlife came into focus after discoveries of feminized fish and alligators in the 1990s. Male fish from several UK and European rivers were shown to contain ovotestes or elevated levels of egg yolk proteins, normally only produced by females, in their plasma. Other findings included reduced fecundity and alterations in the timing of sexual maturity and reproduction, and was associated with sewage treatment effluents to the river systems. Estrogens in contraceptive pills, as well as other xenoestrogens, were later shown to be involved. In Florida, alligators inhabiting the pesticide-contaminated lake Apopka had reduced penile lengths or abnormal ovarian morphology, resulting in declined juvenile recruitment. In Baltic grey seals, population declines starting from the 1950s were associated with organochlorine contaminants, and similar associations with reproductive disruption have been found in a range of bird species. Another example of reproductive disturbances was the observed masculinization of female snails by tributyltin used in antifoulants, causing a blockage of the oviduct. Studies over the last few decades have provided insights into the mechanisms behind many of these observations, and have identified hormonal imbalances and several hormone receptors (and other members of the nuclear receptor superfamily) as primary targets for endocrine disrupting compounds. However, although various wildlife species share many of the same receptor systems, there are also variations in ligand specificity and ligand affinity between orthologous receptor types, causing differences in the reproductive endocrine disruption observed in different species.
Saturday 24th August

Plenary session V

“Too obese to do IVF?” - Snorri Einarsson
Snorri represents “No”

Obesity is known to affect fertility, pregnancy and birth in a negative way. This has been shown clearly in epidemiologic studies and on these grounds weight loss interventions have been advocated and weight limits for treatment been set.

How large is the negative effect of obesity on the above mentioned outcomes and what effect can be expected from weight intervention?

In recent years large randomized weight intervention studies have been published that show that weight loss is hard to achieve and does not better the outcome in infertility and prior to IVF. What limits, if any, can be set for weight in regards to IVF treatment and how should health professionals in reproductive medicine help obese infertile patients? On what do we base our decisions? Fact or prejudice?

“Too obese to do IVF?” - Elizabeth Nedstrand
Elizabeth represents “Yes”

Why do we need BMI limits in IVF treatments?

More than every third pregnant woman in Sweden is overweight or obese (38%).

During pregnancy, obesity, but also an excessively large weight gain, regardless of BMIn level, represents increased risk of complications.

About every two women with BMI> 30 menstruate regularly

Only every third woman with BMI> 35, ie those with morbid obesity, menstruates regularly

Weight loss by 10% rarely causes anovulatory women to start ovulating and having children

So why should we at all care about BMI when we plan for IVF?

Because, the risk of a variety of complications often increases dramatically from obesity class I to obesity class III.

• Increased risk of malformation of the fetus
• Fewer malformations detected during routine ultrasound
• Increased risk of diabetes in the mother
• Risk of premature birth
• More often preeclampsia and IUFD
• The uterus contracts worse, longer delivery time and more atonic bleeding
• Newborn children have more serious complications during the first week of life
• Increased risk of postpartum infection
• Fewer breastfeeding

Are you willing to expose your patients to the risks?
Plenary session VI

**ART children-short and longterm follow up - Christina Bergh**

Children follow-up studies have so far showed that a majority of children born after ART are healthy even though some adverse outcomes are found in comparison to children born after spontaneous conception. While international registries, such as EIM and ICMART on ART only monitor pregnancy and delivery rates, child morbidity is best assessed by large national/international registry studies where possibilities exist to crosslink registries on ART children with other health- and quality registries in order to compare ART children with children born after spontaneous conception.

The main risk for adverse perinatal outcomes in ART, which includes ICSI and conventional IVF techniques, are associated the higher rates of multiple pregnancies in ART. Also in ART singletons, the rate of very preterm birth and very low birth weight is increased and about two to three times higher than in the general population. These increased risks exist for conventional IVF as well as for ICSI, even though it seems some lower for the ICSI techniques. For children born after cryo preservation, a technique which is increasing worldwide, due to better freezing methods, more recent studies have found a lower risk for low birth weight and preterm deliveries compared to fresh IVF while higher rates of large for gestational age and macrosomia have been detected, both in comparison to fresh IVF and compared to singletons born after spontaneous conception. Another important neonatal outcome that has been in focus for studies are birth defects where a higher overall risk has been detected for ART, being between 30-70%.

Concerning long-term effects of ART on children outcomes, much fewer studies of high quality exist. Studies of growth and physical health are few and limited to childhood where general physical health including hospitalizations, childhood illnesses, surgical interventions and medical therapies, are similar for age and gender-matched controls in the general population. For childhood cancer, the two largest studies, one from UK and one from the Nordic countries, both including around 100 000 ART children do not show any increase in childhood cancer in ART children after adjustment for relevant confounders.

Most studies on neurocognitive development, autism and autistic disorders show no increased risks if adjusted for multiple birth. School performances of 15-16 year old adolescents have been investigated in two large registry studies from Denmark and Sweden. Both studies showed better school performance for ART children in crude analyses but after adjustment for relevant confounders, particularly parental education, no differences of clinical importance were observed. There are some recent concern regarding cardiovascular parameters. Case-control studies have detected altered blood vessel structure and increased blood pressure, both systolic and diastolic in ART singletons compared to matched controls and further that these differences remain in adolescence. For diabetes type 1, very limited data exist but large studies are ongoing.

A few longitudinal reports on reproductive health in adolescents and young adults have been published. While onset of puberty and pubertal development were similar for ICSI and spontaneously conceived boys and girls, ICSI-conceived men seemed to have lower sperm concentrations and total sperm counts than age-matched, spontaneously conceived control.

**Results from the Nordic countries - Josephine Lemmen**

The presentation will be an update with the latest results from the Nordic Countries provided by representatives from all countries.
P1 - Preparing of the endometrium and timing of blastocyst transfer in modified natural cycle frozen-thawed embryo transfers (mNC-FET) – a randomised controlled multicenter trial

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Study question: 1. Does luteal phase support and blastocyst warming and transfer 6 vs 7 days after hCG trigger increase live birth rates in mNC-FET?

Summary answer: Inclusion is ongoing; therefore, results will not be presented.

What is known already: Frozen embryo transfer (FET) is often made in a modified natural cycle (mNC) where ovulation is triggered with hCG. In mNC-FET the timing of blastocyst warming and transfer is determined according to the time of implantation in a natural cycle, aiming to reach optimal blastocyst-endometrial synchronicity. However, the optimal day of blastocyst warming and transfer is not fully decided. Additionally, the value of luteal phase support to maintain the endometrium, remains uncertain. Retrospective studies show promising results, but the only RCT (n=102) showed no difference in clinical pregnancy rate between the groups receiving and not receiving luteal progesterone support.

Study design, size, duration: Multicentre, randomised, controlled, single-blinded trial. 604 women undergoing mNC-FET will be recruited at seven public hospitals across Denmark in a 2-year period starting 01.01.2019. The study aims to explore the optimal timing of blastocyst warming and transfer and the effect of luteal phase support in a randomised controlled trial design.

Participants/materials, setting, methods: 604 normo-ovulatory women aged 18-41 years who have at least one vitrified blastocyst graded ≥ 3BB according to Gardner score and originating from their 1-3. oocyte retrieval undergoing mNC-FET will be recruited. Participants are randomised (1:1:1:1) to either luteal phase progesterone or no luteal phase progesterone and to blastocyst warming and transfer on day 6 or 7 after hCG trigger. The primary endpoint is live birth rate per transfer.

Main results and the role of chance: A summary of the results from the existing studies on mNC-FET will be presented and the rationale for this multicentre RCT. Further limitations and advantages of this specific protocol will be discussed. As the inclusion is ongoing no original data will be presented.

Limitations/reasons for caution: The study may be limited by its power calculation and study design. The study is powered to detect a 10% difference in live birth rates; thus, smaller, but clinically relevant differences, may be overlooked. As for design, a double blinded design would have been optimal.

Wider implications of the finding: This study may provide the possibility to make improved guidelines on mNC-FET for use on a national as well as international basis, the aim being to increase success rates of FET cycles, reduce the time from start of treatment to pregnancy and reduce the expenses and inconvenience following ART.

Study funding/competing interests: This work was supported by a research grant (Forward Grant) from Gedeon Richter and Rigshospitalet’s Research Foundation. No competing interests are declared.

Ethics approval: The Scientific Ethical Committee of the Capital Region of Denmark (H-18025839), the Danish Medicines Agency (2018061319) and Data Protection Agency have approved the study.
Study question: Can ovarian biopsying per se and/or autotransplantation of cortical tissue fragments activate and increase the number of recruitable follicles for IVF/ICSI in women with DOR?

Summary answer: Neither ovarian biopsying nor autotransplantation of the cortical tissue fragments increased the number of recruitable follicles after ovarian stimulation for IVF/ICSI after 10 weeks follow-up.

What is known already: Infertile women with DOR constitute a group of patients with poor reproductive outcome mainly due to the low number of mature oocytes available after ovarian stimulation for IVF/ICSI. Recent studies have shown, that in vitro activation of residual follicles by both chemical drug treatment and ovarian tissue fragmentation followed by autotransplantation resulted in return of menstrual cycles and pregnancies in a fraction of women with premature ovarian insufficiency.

Study design, size, duration: A prospective clinical cohort study including 20 women with DOR treated at the Fertility clinic at Rigshospitalet, Denmark during April 2016 – December 2017. Follow-up of non-pregnant women ended in September 2018 and were on average 280 days (range 118-408). Women who conceived are followed until delivery.

Participants/materials, setting, methods: Infertile, menstruating women aged 30-39 years with IVF/ICSI indication and repeated AMH measurements < 5 pmol/L (0.7 ng/ml) were included. By laparoscopy four biopsies were taken from one ovary randomized between the left or right ovary. The other ovary served as control. Cortical tissue was fragmented and autotransplanted to peritoneum. Recordings of hormones, antral follicle count (AFC) and assessment of ectopic follicle growth were done weekly. After 10 weeks ovarian stimulation for IVF/ICSI was initiated.

Main results and the role of chance: In term of our primary out-come, no difference was observed in the number of mature follicles in the biopsied ovary versus the control ovary after ovarian stimulation (1.0 versus 0.7 follicles, p=0.35). In only three women, growth of four follicles were detected at the graft site 24-268 days after the procedure. One ectopic oocyte was retrieved and fertilized, but embryonic development failed. Overall AMH levels did not change significantly (p=0.2). Mean AFC increased by 0.14 (95%CI: 0.06;0.21) per week (p<0.005) and the biopsied ovary had on average 0.6 (95%CI: 0.36;0.88) follicles less than the control ovary (p = 0.01). Serum levels of androstenedione and testosterone increased significantly by 0.63 nmol/L (95%CI: 0.21;1.04) and 0.11 nmol/L (95%CI: 0.01;0.21) one week after the procedure, respectively. Testosterone increased continuously by 0.0095 nmol/L (95%CI: 0.0002;0.0188) per week (p=0.045). In 7 of the 20 women mean AMH increased from 2.08 pmol/L (range 1.74-2.34) to 3.94 pmol/L (range 3.66-4.29) from week 1-4 to week 5-8. Clinical pregnancies were obtained in 12 of the 20 women (60%) women, either naturally (n=3) or after a total of 55 IVF/ICSI/insemination treatments (n=9). We expect a cumulated live birth rate per started IVF/ICSI cycle of 18.4% (including one ongoing pregnancy).

Limitations, reasons for caution: Limitations of the study were the low number of included women and the lack of a control group. Moreover, 45% of the women had no male partner at inclusion. However, these women had an average of 6.5 (range 4-9) unsuccessful medically assisted reproduction treatments with donor sperm prior to inclusion.

Wider implications of the findings: These findings suggest that biopsying and autotransplanting of ovarian fragments do not augment the number of recruitable follicles for IVF/ICSI after 10 weeks. However, a high pregnancy rate and that some women had an AMH increase after 5-8 weeks warrant a larger study on the possible effects of biopsying alone.
Study funding/competing interest(s): This study was funded by EU Interreg V through ReproUnion, a cross border collaboration between Sweden and Denmark within the area of reproductive medicine in the Oresund Region. The funders had no role in the study. None of the authors have a conflict of interest.

Trial registration number: NCT02792569

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**Study question:** Are perinatal outcomes different for singletons born after varying FET stimulation regimes?

**Summery answer:** Perinatal outcomes were similar after different FET-protocols, however, the tNC-FET group had significantly higher risk of very preterm birth (VPTB) compared with the mNC-FET group.

**What is known already:** Children conceived after assisted reproductive technology (ART) treatment have increased risk of being born preterm and small for gestational age (SGA) compared with spontaneously conceived (SC) children. Furthermore, children conceived after FET have increased risk of being born large for gestational age (LGA) compared with children conceived after fresh embryo transfer and SC. Whether this altered risk profile is due to the ART hormone treatment or the embryo freezing/thawing is unclear. Studies suggest that pregnancy and live birth rates are similar after tNC-FET, mNC-FET and AC-FET in ovulating women. Perinatal outcomes for these three FET stimulation regimes are scarcely explored.

**Study design, size, duration:** A national register-based cohort study including all singletons conceived after FET (n=1,134) with information on the FET stimulation regimes; tNC-FET (n=167), mNC-FET (n=496) and AC-FET (n=471), in Denmark from 2006-2014. Data were extracted from the national ART and medical birth register and were cross-linked based on the maternal and child unique personal identification numbers.

**Participants/materials, setting, methods:** Perinatal outcomes were compared using regression analyses with tNC-FET as reference group. The multiple regression analyses were adjusted for the following confounders; fertilization method of the frozen embryos (IVF/ICSI), sex, parity (0 or > 1), maternal age (continuous variable), year of childbirth (categorical variable), blastocyst or cleavage stage transfer, single embryo transfer (sET), and for FET treatment group (tNC-FET, mNC-FET or AC-FET).

**Main results and the role of chance:** Most children were conceived after either mNC-FET (43.7%) or AC-FET (41.5%) treatment, while only 14.7% of the children were conceived after tNC-FET treatment. Crude analyses on background characteristics showed that sET was less used in the tNC-FET treatment group compared with both the mNC-FET and the AC-FET treatment groups. In addition, more tNC-FET children were conceived after ICSI-treatment and more tNC-FET children were born of nullipara women compared with children conceived after mNC-FET. In the adjusted multiple regression analyses children conceived after tNC-FET had a significant higher risk of VPTB (before week 32) (aOR 3.30 (95% CI 1.06; 10.30)) compared with children conceived after mNC-FET. No altered risks were found when investigating preterm birth (before week 37), mean birth weight, SGA, LGA, stillbirth after week 28, perinatal or neonatal death.

**Limitations, reasons for caution:** Due to the retrospective design residual confounding may occur. Adjusting for BMI, smoking, cryopreservation technique and cause of infertility were not possible. The group of tNC-FET is small.
Wider implications of the findings: Hormonal treatment (mNC-FET or AC-FET) was not associated with poor perinatal outcomes. This is important knowledge, as the effect of hormone substitution, for women with regular menstrual cycle, during ART treatment is frequently debated. mNC-FET and AC-FET are often logistically preferred, although tNC-FET may be clinically advantageous.

Study funding/competing interest(s): The study was funded by Nordforsk. There were no competing interests.

Trial registration number: N/A

P4 - The potential of sperm retrieved by micro-TESE in fertilizing vitrified and warmed oocytes

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Study question: Do sperm retrieved by micro-TESE from men with reduced spermatogenesis have a potential to fertilize vitrified/warmed oocytes equally to donor sperm?

Summary answer: A trend for increased fertilization, cleavage and pregnancy rates were obtained using donor sperm compared to sperm retrieved by micro-TESE from men with reduced spermatogenesis.

What is known already? It is well documented that fertilization, cleavage, implantation and pregnancy rates using vitrified/warmed oocytes are equal to results obtained using fresh oocytes not exposed to cryopreservation. Testicular sperm retrieved by micro-TESE can be used fresh for fertilization of fresh, aspirated oocytes. However, such sperm often are cryopreserved and later on thawed for fertilization of fresh oocytes since it may be difficult to coordinate oocyte aspiration and micro-TESE. By micro-TESE testicular sperm are often obtained in a low number, and their potential to give rise to pregnancy might be reduced.

Study design, size, duration: Historical prospective study comparing fertilization, cleavage and pregnancy rates using testicular sperm obtained by micro-TESE or (when it was not possible to find testicular sperm) donor sperm. Forty consecutive couples undergoing micro-TESE during 2016-2018 due to Klinefelter’s syndrome, maturation stop in the spermatogenesis, or failed sperm retrieval by conventional techniques with needle or TruCut were included. Results obtained with cryopreserved, excess testicular sperm from the included patients were not analyzed.

Participants/materials, setting, methods: Three hundred and sixty two oocytes from 30 women were vitrified, and after warming 283 oocytes survived. The women were stimulated with FSH in GnRH-agonist protocols and the aspirated oocytes vitrified using the Cryotech or Vitrolife techniques. The oocytes were warmed at the day of micro-TESE. Fertilization and cleavage rates using sperm from the patients versus donor sperm were compared using the χ²-test, and pregnancy rates were compared using Fishers exact test.

Main results and the role of chance: Seventeen couples having 184 oocytes warmed and injected with own sperm obtained a fertilization rate (FR) of 64% and a cleavage rate (CR) of 53%. In comparison 13 couples having 99 oocytes warmed and exposed to donor sperm (control group) obtained a fertilization rate of 71% (NS) and a cleavage rate of 68% (p=0.019). No significant differences could be detected for subgroups with Klinefelter’s syndrome (N=3; FR=62%, CR=57%), a history of cryptorchidism (N=4; FR=68%, CR=53%), or other reasons of non-obstructive azoospermia (N=10; FR=62%, CR=53%) compared to the control group. A non-significant trend for an increased pregnancy rate was observed with donor sperm compared to own sperm [positive hCG in 69% (9 of 13) versus 35% (6 of 17) and clinical pregnancy in 46% (6 of 13) versus 35% (6 of 17)]. No differences could be observed by using the “vitrolife technique” for vitrification of oocytes compared to using the “cryotech technique”. Excess blastocysts (10 fertilized with donor sperm and 7 fertilized with own semen) are still cryopreserved.

Limitations, reasons for caution: The study has not sufficient power for comparison of biochemical and clinical pregnancy rates between the groups. Furthermore, the subgroups with Klinefelter’s syndrome, a history of cryptorchidism, or other pathologies are yet too small to make clear conclusions about differences between the respective subgroups and the control group.
Wider implications of the findings: The study will be extended, and a new prospective study analyzing fertilization, cleavage and pregnancy rates using different combinations of cryopreserved and fresh testicular sperm, retrieved by micro-TESE, and fresh and cryopreserved oocytes will be designed.

Study funding/competing interests: The study is not founded, and the authors have no conflict of interests.

Trial registration number: NCT 03809026

Study question: What is the prevalence and what kind of complementary and alternative medicine (CAM) is in use among patients prior to and during fertility treatment?

Summary answer: More than half of men and women initiating and undergoing fertility treatment used CAM. However, low adherence to the recommended folic acid calls for caution.

What is known already: A few studies have reported the use of CAM in general or in relation to surgery. In other countries only a few studies have investigated the use of CAM among infertile patients. This is to our knowledge the largest study to investigate the use of CAM in both men and women patients attending a fertility clinic in Denmark. In general the use of CAM is increasing and it is increased among specific groups of patients with multifactorial motives.

Study design, size, duration: A cross-sectional survey concerning information on CAM, fertility treatment and demography was completed by 277 men and women. Types of CAM included vitamins, minerals, herbs and alternative treatment such as acupuncture and zone therapy. Participants were randomly selected at the second largest fertility clinic in Denmark in the period from April – June 2018.

Participants/materials, setting, methods: In total 277 men and women participated in this study. Of these 142 participants had never received fertility treatment previously, whereas 135 participants had at least once. The participants answered a questionnaire either at the clinic or by a link send by e-mail. The chi2-test was used for comparison of the prevalence in use of CAM between two groups of patients: prior to or during fertility treatment. P-value < 0.05 was considered as statistically significant.

Main results and the role of chance: In this study, we found that 52.5 % of patients initiating and undergoing fertility treatment were using a variety of different CAM. The use of CAM increased with higher education and women used CAM more often compared to men (p < 0.0003). Furthermore, previous fertility treatment resulted in a higher use. There was no difference in prevalence in use of the investigated CAM, when exploring age, civil status or occupational status. Only approximately half of women consumed the recommended folic acid, and the prevalence was not significantly higher among women who previously had received fertility treatment compared to women initiating fertility treatment. The response rate in this study was 67.4 %.

Limitations, reasons for caution: The limitation of this study comprises the risk of recall bias. Furthermore, as the frequency and pattern of CAM may vary due to culture differences, it is difficult to generalize the found frequencies directly to other countries.

Wider implications of the findings: The frequency in use of CAM vary in different culture, both in frequency and content and each fertility clinic should be aware of their local pattern to optimize the treatment and guide the patients. Especially the low adherence to folic acid call for caution.

Study funding/competing interests: The authors declare that they have no competing interests.

Trial registration number: N/A
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