

The National Maternity Hospital
ANNUAL REPORT 2023



Reproductive Medicine

The Department of Reproductive Medicine at The National Maternity Hospital continued its expansion in 2023. These services were provided at the National Maternity Hospital (NMH), St. Michael's Hospital (SMH) and Merrion Fertility Clinic (MFC).

The National Maternity Hospital Fertility Hub

The National Maternity Hospital Fertility Hub is one of six Regional Fertility Hubs in Ireland and provides advice, investigation and treatment for eligible couples with infertility within the Ireland East catchment area.

It was established in 2022 by Dr David Crosby, Consultant Obstetrician & Gynaecologist and Head of Department of Reproductive Medicine, Ms Michelle Barry, Fertility Nurse Specialist, Ms Catherine Dunne, Fertility Administrator and Dr Sorca O'Brien, Aspire Fellow.

In 2023, an expansion of the services resulted in the appointment of Dr Maebh Horan, Consultant Obstetrician & Gynaecologist, Ms Jenny O'Donnell CMM1 and Ms Jess Dowdell CNM1.

A general practitioner referral is required to access the HSE Fertility Hub. If the couple meet the Fertility Hub access criteria, and following initial baseline assessment and investigation, the couples are assessed and a tailored management plan is made.

Management plans can include conservative management, reproductive surgery, ovulation induction with follicle tracking or onward referral for assisted human reproduction (AHR) to include Intrauterine Insemination (IUI), In Vitro Fertilisation (IVF), or Intracytoplasmic Sperm Injection (ICSI).

Since September 2023, these assisted human reproduction (AHR) services have been publicly funded through private AHR providers if couples meet HSE access criteria for publicly funded AHR. In total, there were 722 referrals to the fertility hub in 2023, of which 477 met the HSE hub access criteria for fertility hub management.

Following the announcement of public funded AHR services commencing in August 2023, there was a significant increase in demand for the fertility hub services outlined in Figure 1.

Activity data for the hub is further outlined in Table 1. There were 48 clinical pregnancies reported from this service in 2023. Following the introduction of publically funded AHR services in September 2023, the fertility hub had referred 46 couples for assisted reproduction by the end of 2023. In response to the introduction of publically funded AHR services, the total number of referrals to the fertility hub increased by 171%. We will present detailed AHR outcome data in the 2024 annual report.

Outcome data for the 132 couples reviewed in the Fertility Hub in 2023 are presented in Table 2. There were 46 couples who were referred onward for public funded AHR services from between September and December 2023.

In addition to the fertility hub services, there were fertility-related gynaecology clinics which provided 219 first visits, 173 return appointments and 168 telephone consultations in 2023.

The number of reproductive surgery procedures performed by our service in 2023 is outlined in Table 3.

Merrion Fertility Clinic

Referrals to Merrion Fertility Clinic have increased significantly year on year. This increased referral level was maintained in 2023. In 2023, there were 1,123 new and 2,204 return consultations undertaken.

The number of IVF and ICSI treatment cycles continued to rise increasing by 7.5% last year, with 669 egg collections performed. Separately, the number of fertility preservation cycles, specifically egg freezing, increased by 40%, with 224 egg collections performed. Other services such as diagnostic semen analysis, grew by 13.7% to its highest ever level.

Introduction of Preimplantation Genetic Testing (PGT) services

In January 2023, Merrion Fertility Clinic obtained a licence to perform genetic testing on embryos prior to transfer. There are different types of testing available depending on patient need and include testing for aneuploidy, single gene disorders and structural rearrangements. The service is now operational with testing available for both newly created embryos and those that were previously created and frozen. The ongoing clinical pregnancy rate for patients who have achieved the transfer of tested embryos is 85.7%.

Fertility preservation in children, adolescent and young adult (CAYA) Fertility Project

The Childhood Cancer Fertility Project was launched jointly with the Irish Cancer Society (ICS) in August 2020. Merrion Fertility Clinic was successful in securing grant funding from the ICS for a threeyear project (2020-2023) to develop and provide fertility preservation for children, adolescents, and young adults. A sperm and egg freezing service for post-pubertal adolescents about to undergo gonadotoxic treatment is now well established and the post-treatment assessment and treatment clinic established for survivors of childhood cancer was extended to include young women up to the age of 26 years. This programme has been extended until the end of 2024.

Laparoscopic egg collections

In the vast majority of cases, patients undergoing fertility treatment can have eggs retrieved through the transvaginal route, using ultrasound guidance. However, this is not always possible, for example in cases of gynaecological malignancy. In these cases, the ovaries can be accessed laparoscopically. This procedure is carried out in the operating theatre at the National Maternity Hospital and the follicular fluid that is drained from the follicles is transported to the IVF laboratory at Merrion Fertility Clinic, where the eggs can be identified. They can then be frozen directly or used to create embryos to be frozen,



Jenny O'Donnell, CMM1 Fertility Hub.

allowing the patient to preserve their fertility. The first case was completed in 2021, with four cases performed in 2022 and six cases in 2023. We are the only centre providing this service nationally.

Aspire Fellowship awarded for Fertility Preservation (FP) in CAYA patients. In 2023, The National Maternity Hospital (NMH) and Merrion Fertility Clinic were awarded a HSE-NDTP Aspire Post-CSCST Fellowship to develop and consolidate comprehensive

clinical care pathways for fertility preservation in children, adolescent and young adult (CAYA) patients. Dr Niamh Joyce was appointed into this role; Dr Joyce works with the Reproductive Medicine team at the NMH and collaborators at Children's Health Ireland to develop this regional service. This includes assessment and management of fertility in CAYA males and females with oncological (pre- and postcancer), genetic (e.g. Turner's syndrome) and benign disorders (e.g. endometrioma).

Assisted Reproduction Outcomes, Merrion Fertility Clinic

Fresh embryo transfer cycles Clinical pregnancy rates (defined by the European Society for Human Reproduction and Embryology (ESHRE 2019) per embryo transfer for patients under 35 years was 51% in 2023. This rate decreased as expected with advancing female age, giving an overall clinical pregnancy rate for all patients having a fresh embryo transferred in 2023 of 34% (Figure 2). The mean age of women undergoing fresh IVF or ICSI cycles at Merrion Fertility Clinic was similar to 2022 at 37.1 years.

Frozen embryo transfer (FET) cycles

A cryopreservation programme is an essential element of an AHR clinic. If possible, the transfer of a fresh embryo following IVF or ICSI treatment is performed. However, there are many clinical and personal factors which require embryos to be cryopreserved rather than transferred in a fresh cycle. The clinical pregnancy rate for patients having a frozen embryo transfer (FET) cycle during 2023 was 45%, with a multiple pregnancy rate of just under 3%. Survival rates for vitrified blastocysts thawed was 99%.

Live birth rates

Live birth rates are the best marker of success in AHR but are reported one year later than clinical pregnancy rates. The live birth rate for patients who had a fresh transfer in 2022 was 31% (Figure 3), an increase of 5% from 2021. Live birth rates for patients who had a FET was 41%, an increase of 5% from 2021. Live birth following IUI treatment was stable at 10% for 2022. These live birth rates are excellent compared with international standards (ESHRE 2019), where they report live birth rates following IVF and ICSI of approximately 25% per transfer.

Single embryo transfer

Merrion Fertility Clinic has continued to build on its policy of single embryo transfer to minimise the number of multiple pregnancies. In 2023, 76% of all fresh transfers were single embryo transfers, an increase of 6% since 2022. The rate of

multiple pregnancy for the same period was down to 5.4% in 2023 from 6.6% in 2022.

Donor sperm treatments

Merrion Fertility Clinic commenced a donor sperm service in 2018. The service has been growing since and now made up approximately 9% of IVF or ICSI treatment cycles in 2023, an increase of 3% from 2022.

Female fertility preservation

The number of oocyte vitrification cycles provided by Merrion Fertility Clinic has risen exponentially. The clinical pregnancy rate following utilization of previously cryopreserved oocytes in Merrion Fertility Clinic was 30% in 2023.

Child, Adolescent and Young Adult (CAYA) Fertility Preservation Services

AYA Males: Twenty adolescent males (<18 years) were referred in 2023 for sperm cryopreservation services before undergoing gonadotoxic treatment or surgery for cancer or autoimmune disease. Of these 20 males, 18 attended the clinic at least once, 15 produced a semen sample and all 15 had sperm of suitable quality for freezing (mean of 8 straws frozen per patient). Three adolescent males were also referred post-gonadotoxic treatment or post-hematopoietic stem cell transplant (HSCT) as survivors, for routine semen analysis and fertility consultation.

AYA Females: Twelve adolescent females (<18 years) were referred in 2023 for consideration of oocyte vitrification before undergoing gonadotoxic cancer therapy. Eight young women started and completed a successful egg freezing cycle within a mean of 17 days (range 10-30 days) from first visit to the clinic, with a mean of 14 oocytes (range 8-24) per patient cryopreserved for future use.

Female survivors of CAYA cancer, who had previously received gonadotoxic treatment as part of their cancer therapy, are also eligible for fertility assessment and oocyte vitrification through the Childhood Cancer Fertility Project. Ten female survivors of

CAYA cancer attended in 2023 for an initial fertility consultation, while five young women attended for a follow-up fertility consultation and ovarian reserve testing. Seven female survivors (mean age 23 years, range 17-26) had a successful oocyte vitrification cycle, with a mean of 7 oocytes (range 2-11) cryopreserved for future use.

Research

The Reproductive Medicine Department maintains an active and productive research portfolio, collaborating with scientists in Irish academic institutions and other teaching hospitals, and is a member of the UCD Perinatal Research Centre. Merrion Fertility Clinic employs a full-time Head of Research, and Clinical Research Fellow posts exist for higher training in Reproductive Medicine & Surgery, with fellows undertaking higher degrees. Merrion Fertility Clinic also hosts and mentors a number of MSc students. Research is aimed at improving knowledge, expertise and care pathways in the field of reproductive medicine. Our studies span a range of topics, from basic mechanistic biology to clinical translational research. In 2023, our researchers also worked closely with collaborators at several of Ireland's leading academic research institutions, including University College Dublin and Trinity College Dublin, on the following research projects:

Innate immune factors, endometrial receptivity and infertility

Endometrial microbiome and infertility
Glycome analysis in endometriosis (NIBRT collaboration)
Follicular microenvironment in low ovarian reserve (Funding: Ferring)
Ovarian reserve in childhood cancer survivors (Funding: Irish Cancer Society)
Knowledge and attitudes among patients and healthcare providers towards proposed Irish assisted human reproduction (AHR) legislation

Assisted Human Reproduction Legislation

The Health (Assisted Human Reproduction) Bill 2022 is at the third, or committee stage in the Dail. The bill was delayed at the third stage to allow for the Committee on

International Surrogacy to complete its work and for its recommendations to be included in the bill. This process is now complete, and all proposed amendments are being debated by the Select Committee on Health.

In 2024, we look forward to the further expansion of fertility services at the National Maternity Hospital and Merrion Fertility Clinic. We are very grateful to all the wonderful staff and patients who continuously make this possible and we are very excited about the next steps in our journey as a leading Irish Reproductive Medicine Service.

Publications are listed in the Published Research section.

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Dr David Crosby, Consultant Obstetrician & Gynaecologist and Head of Department of Reproductive Medicine, NMH & Clinical Director, Merrion Fertility Clinic.

Tables and Charts

Table 1: Fertility Hub activity and outcome data 2023

Total Referrals to the hub	723
Increase in referrals from September	171%
Ultrasound scans performed by the hub	185
Ovarian reserve testing	144
Tubal patency testing	98
Semen Analyses performed	250
Clinical pregnancies 2023 (spontaneous and ovulation induction cycles)	48
Number of AHR referrals*	46

Figure 1: Total referrals to the Fertility Hub by month in 2023.

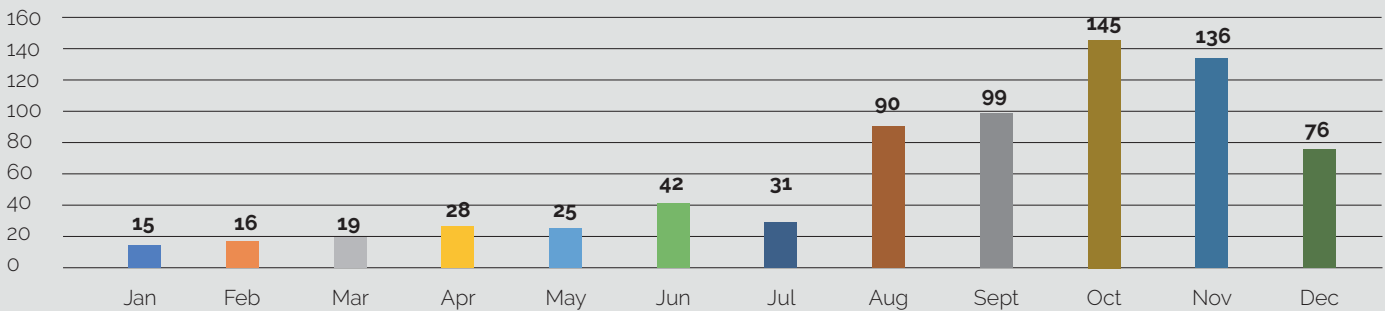


Table 2: Initial outcome management for couples attending Fertility Hub

	Couples	Reported to Hub in 2023**
Conservative management +/- further work up	49	12
Reproductive surgery	6	1
Ovulation induction and follicle tracking	8	5
Assisted Human Reproduction (not eligible/prior to public funding)	23	3
Assisted Human Reproduction (publicly provided)*	46	1

Table 3: Reproductive surgery under General Anaesthesia

	2023	2022
Hysteroscopy – operative and diagnostic	318	240
Operative laparoscopy	60	62
Diagnostic laparoscopy	82	107
Myomectomy	8	6

Figure 2: 2023 Clinical Pregnancy Rates by Maternal Age for Fresh IVF and ICSI Cycles

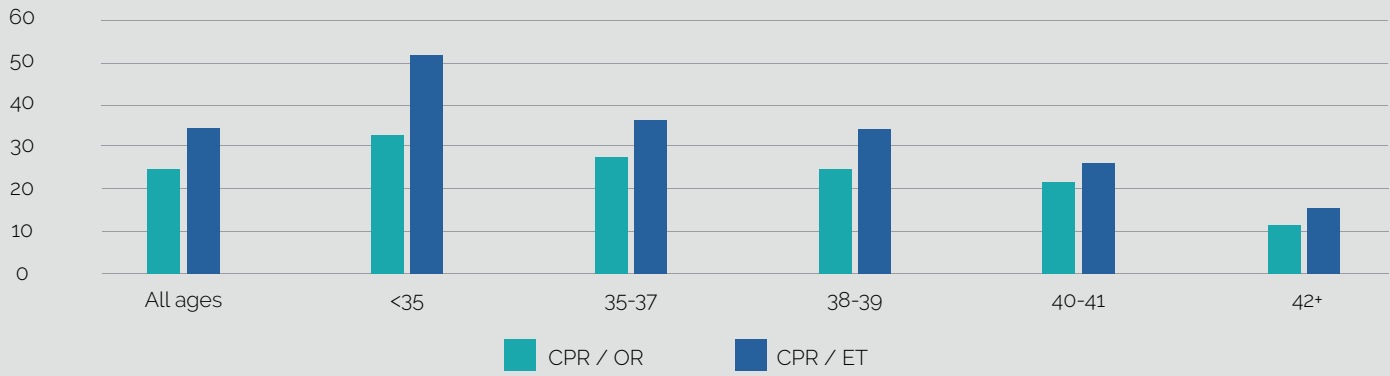
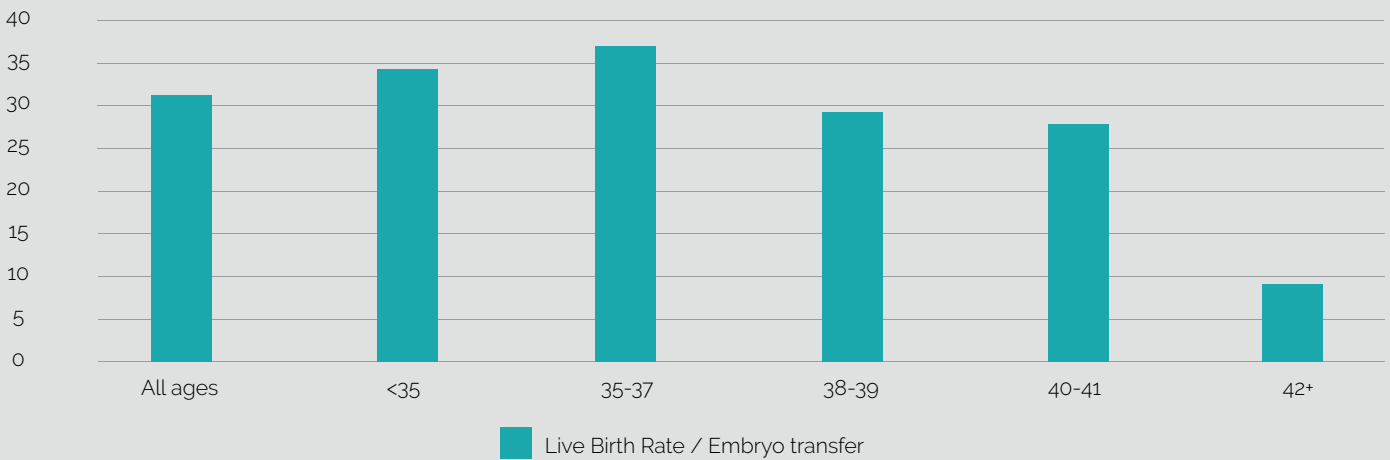


Figure 3: 2023 Live Birth Rates by Maternal Age



Paediatric and Adolescent Gynaecology

The Paediatric and Adolescent Gynaecology (PAG) service at The National Maternity Hospital is led by Dr Orla Sheil and Dr Venita Broderick, Consultant Obstetrician & Gynaecologists. Two clinics are held per week where girls aged 12+ are seen. The service represents one of the three specialist PAG clinics in Ireland.

The majority of referrals are for adolescent menstrual problems. Other common reasons for referral include pelvic pain and ovarian cysts. We also see girls with rare conditions such as congenital anomalies of the reproductive tract and premature ovarian insufficiency.

An audit of our service demonstrated high levels of obesity amongst patients attending the clinic. As a result of this, we have a nutrition and dietetics clinic running alongside our PAG where a one stop service is provided.

Many of the young girls attending the Adolescent Gynaecology clinics, and especially those with congenital anomalies have complex needs. The impact of these diagnoses both on the adolescent and their families is significant. These patients require frequent attendance and multidisciplinary care. We provide continuity of specialist care for women diagnosed with complex congenital conditions in childhood and in adolescence. We are working closely with colleagues at The Merrion Fertility Clinic to develop a fertility preservation service for young people at risk of premature ovarian insufficiency. We are delighted to work with

Dr Niamh Joyce, Aspire Fellow in fertility preservation. Patients are seen by both a PAG and fertility specialist.

Young women up to age 25 who present with a variety of gynaecological issues such as abnormal uterine bleeding, pelvic pain and symptoms suggestive of PCOS, also attend this service.

We plan to continue to develop our service in 2024.

Dr Venita Broderick, Consultant Obstetrician & Gynaecologist.

Clinic attendances aged <18 yrs

Clinic attendances	New Patients	Return Patients	Virtual Appointments	Total
2023	119	87	114	330
2022	196	130	112	438
2021	171	89	95	309
2019	100	81	-	181
2018	77	81	-	159
2017	88	87	-	175

Total Clinic Numbers

Clinic attendances	New Patients	Return Patients	Virtual Appointments	Total
2023	320	295	246	861
2022	358	299	198	855
2021	427	316	236	979
2020	374	173	137	823
2018	77	81	-	159
2017	88	87	-	175

Publications and Presentations

Reproductive Medicine

Mitchell JM, Cullen S, McEvoy A, Crosby D, Allen C. Can Anti-Müllerian Hormone levels predict future pregnancy outcomes in recurrent pregnancy loss? *Eur J Obstet Gynecol Reprod Biol.* 2023 Mar 11;284:20-23. doi: 10.1016/j.ejogrb.2023.03.006. Online ahead of print. PMID: 36924658

Fee N, McEvoy A, Cullen S, Doyle S, Crosby D, Allen C. Pregnancy outcomes following recurrent miscarriage. *Ir J Med Sci.* 2023 Feb 9. doi: 10.1007/s11845-023-03305-w. Online ahead of print. PMID: 36757518

Cullen S, Sobczyk K, Elebert R, Tarleton D, Casey B, Doyle S, Crosby D, Allen C. Second-trimester miscarriage: a review of postnatal investigations and subsequent pregnancy outcomes. *Ir J Med Sci.* 2022 Nov 17. doi: 10.1007/s11845-022-03227-z. Online ahead of print. PMID: 36396810

O'Brien S, Schaler L, Giblin A, Glover LE, Wingfield M. Assisted human reproduction legislation: Listening to the voice of patients. *Eur J Obstet Gynecol Reprod Biol.* 2023 May;284:169-174. doi: 10.1016/j.ejogrb.2023.03.020. Epub 2023 Mar 21. PMID: 37003241.

O'Brien S, Schaler L, Giblin A, Glover LE, Wingfield M. Assisted human reproduction legislation: Listening to the voice of patients. *Eur J Obstet Gynecol Reprod Biol.* 2023 May;284:169-174. doi: 10.1016/j.ejogrb.2023.03.020. Epub 2023 Mar 21. PMID: 37003241.

Schaler L, Giblin A, Glover LE, Wingfield M. Assisted human reproduction legislation: Acknowledging the voice of health care professionals. *Eur J Obstet Gynecol Reprod Biol.* 2023 Jan;280:28-33. doi: 10.1016/j.ejogrb.2022.11.007. Epub 2022 Nov 9. PMID: 36379181.

Horan M, Hartigan L, Elebert R, Groarke H, Glover L, Owens C, Wingfield M. A 2-year follow-up study of ovarian reserve in female survivors of childhood cancer. *Ir Med J.* 2023 Jun 29;116(6):785. PMID: 37552544.

European IVF Monitoring Consortium (EIM) for the European Society of Human Reproduction and Embryology (ESHRE); Smeenk J, Wyns C, De Geyter C, Kupka M, Bergh C, Cuevas Saiz I, De Neubourg D, Rezabek K, TandlerSchneider A, Rugescu I, Goossens V.

ART in Europe, 2019: results generated from European registries by ESHRE. *Hum Reprod.* 2023 Dec 4;38(12):2321-2338. doi: 10.1093/humrep/dead197. PMID: 37847771; PMCID: PMC10694409.

Posters/Presentations at National and International Conferences

Sorca O'Brien (Oral Presentation) 'Irish AHR Legislation - Fertility Patient Opinions and Attitudes' RISE 2023 (Research & Innovation Symposium Exhibition), National Maternity Hospital 24 Feb 2023

Laurentina Schaler (Poster), Impact of COVID-19 Vaccination on Seminal and Systemic Inflammation in Men, RISE 2023 (Research & Innovation Symposium Exhibition), National Maternity Hospital 24 Feb 2023

Dr Sorca O'Brien (Oral Presentation), Draft AHR Legislation: listening to the voice of patients (BFS Early Career Clinician Award: shortlisted) Fertility 2023 Conference, ICC Belfast 10-13 January 2023
Dr Laurentina Schaler (Oral Presentation), Male Fertility - Impact of SARS-CoV-2 vaccines (BFS Early Career Clinician Award: shortlisted) Fertility 2023 Conference, ICC Belfast 10-13 January 2023

Dr Federica Giangrazi (Oral Presentation), The uterine microbiome and the microbial metabolite butyrate stimulate pro-inflammatory responses in endometrial epithelial cells, suggesting a possible impact on female fertility (BFS Young Scientist Award: shortlisted) Fertility 2023 Conference, ICC Belfast 10-13 January 2023

Dr Andrew Downey (Oral Presentation), Benefit of Endometrial Receptivity Array in a highly selected patient population (rapid-fire poster), Fertility 2023 Conference, ICC Belfast 10-13 January 2023

Dr Andrew Downey (Oral Presentation), Benefit of Endometrial Receptivity Array in a highly selected patient population (rapid-fire poster), Fertility 2023 Conference, ICC Belfast 10-13 January 2023

Dr Rachel Elebert (Poster), A retrospective review of oocytes containing Smooth Endoplasmic Reticulum (SER) aggregates. Fertility 2023 Conference, ICC Belfast 10-13 January 2023

Dr Maebh Horan (Poster), A 2-year follow-up study of ovarian reserve in female survivors of childhood cancer. Fertility 2023 Conference, ICC Belfast 10-13 January 2023

Dr Maebh Horan (Poster), RNA sequencing studies evaluating oocyte quality in women with endometriosis: a meta-analysis. 39th Annual Meeting ESHRE, Copenhagen, Denmark 25-28 June 2023.

Dr Rachel Elebert (Poster), Analysis, including morphokinetic data, of IVF/ICSI cycles with oocytes containing aggregates of smooth endoplasmic reticulum (SER). 39th Annual Meeting ESHRE, Copenhagen, Denmark 25-28 June 2023.

Dr Laurentina Schaler (Poster), SARS CoV2 antibody isotypes in seminal fluid of vaccinated men 39th Annual Meeting ESHRE, Copenhagen, Denmark 25-28 June 2023.

Dr Sorca O'Brien (Poster walk), Review of draft Assisted Human Reproduction Bill and development of suggested quality amendments, 16th European Public Health Conference, Dublin, 8-11 November 2023.