

# Reproductive Medicine



**T**wenty twenty was a challenging year because of the unprecedented COVID-19 pandemic. Nevertheless, reproductive medicine services, including assisted reproduction services, were facilitated and enhanced. Because of initial fears regarding a possible impact of the virus on early pregnancy and also the extra demands being placed on general health services, in March 2020 international bodies including ASRM (American Society for Reproductive Medicine) and ESHRE (European Society of Human Reproduction and Embryology) advised that fertility patients should avoid pregnancy until further evidence became available. In line with this, Merrion Fertility Clinic ceased assisted reproduction services in late March. Video consultations and patient support continued. Services recommenced in May 2020, again following international guidance.

Fertility treatment was declared an essential service, something we absolutely support. By the end of 2020 all services were back up and running, albeit with increased telemedicine, restricted access for partners and enhanced infection control measures.

## New Developments

### A. Designation of NMH as Fertility Hub for Ireland East Hospital Group (IEHG)

In June 2020 the NMH was designated as a HSE-funded fertility hub, with the intention of enhancing secondary level fertility care in the Ireland East Hospital Group. This is a really exciting development, demonstrating for the first time ever a commitment by NWIHP and the HSE to the development of national publicly-funded fertility services. The model of care developed by NWIHP envisages fertility services being provided across a continuum care pathway, commencing in primary care, through to secondary care and ultimately, if clinically required, through to specialised, tertiary services which will include the provision of IVF. Funding will be provided for clinical, nursing, andrology and administration staff to develop this new service.

### B. Aspire Fellowship awarded for Integration of Fertility Care to the Irish public hospital system

In 2020, MFC and the NMH were awarded a prestigious HSE-NDTP *Aspire* Post-CSCST Fellowship to develop comprehensive clinical care pathways for

*Jennifer Cullinane,  
Laboratory Manager and  
senior embryologist at  
Merrion Fertility Clinic,  
viewing embryo development  
under a high-power  
microscope.*

the management of infertility in the Irish public sector. The Aspire Fellow will commence in July 2021 and will work with the Reproductive Medicine team at the NMH to enhance public fertility care. This will provide an opportunity to engage with relevant stakeholders including primary care providers, hospital managers in the IEHG, NWHIP and the general public.

#### **C. Telehealth and patient e-learning digital platform**

As a result of the global COVID-19 pandemic and in line with international guidance, mitigation strategies were introduced to clinic procedures to enhance social distancing, to reduce staff and patient footfall, to increase the use of PPE and to upgrade hygiene procedure. MFC remained open for telemedicine consultations and continued to provide virtual psychological and clinical support to patients. To facilitate online patient education on fertility treatment (including lifestyle preparation, initial investigations and blood screens, treatment protocols etc), a multidisciplinary team of MFC clinicians, nurses and scientists generated an e-learning platform. These online tools have been very well received by patients and are routinely reviewed by the team at MFC.

#### **D. The Childhood Cancer Fertility Project (MFC and Irish Cancer Society)**

The Childhood Cancer Fertility Project was launched jointly with the Irish Cancer Society in August 2020, MFC having been successful in securing grant funding from the Irish Cancer Society for a three-year project (2020-2022) to develop and provide fertility preservation for children, adolescents and young adults. This service is provided in close collaboration with colleagues in Children's Health Ireland (CHI) at Crumlin. Clear referral pathways and staff and patient information resources have been developed. The project currently provides supports and services to male and female adolescents in the form of sperm and oocyte freezing. It is planned to develop ovarian tissue cryopreservation for children during the course of the grant. Oocyte vitrification in 14 to 17-year-old girls with newly diagnosed cancer is challenging and the expert assistance of our anaesthetic colleagues is an essential part of their care.

#### **E. Children and Family Relationships Act 2015**

The Children and Family Relationships Act of 2015, which governs donor assisted reproduction was commenced on 5<sup>th</sup> May 2020 – 5 years after its enactment. This is a very welcome milestone in terms of Ireland eventually beginning to legislate for the medically, socially and ethically complex field of

assisted reproduction. Several meetings were held with the Department of Health and a large body of work was required including the development of patient consent forms, information leaflets and careful treatment and reporting pathways.

#### **F. ESHRE Accreditation**

Consultants at the NMH and MFC currently provide training in Reproductive Medicine for Specialist Registrars. In 2020, NMH/MFC applied to the European Society for Human Reproduction and Embryology (ESHRE) for recognition as an ESHRE / European Board and College of Obstetrics and Gynaecology (EBCOG)-affiliated subspecialist training centre. This application is currently pending – Stage one approved, Stage 2 currently on hold due to the COVID-19 pandemic. Establishment of this subspecialty program will formalise training at a senior level in Reproductive Medicine and will make trainees eligible to become European Fellows of Reproductive Medicine (EFRM).

#### **Clinical Activity (Tables at the end of section)**

Dedicated hospital clinics for reproductive medicine, encompassing infertility, endometriosis, Polycystic Ovarian Syndrome continued throughout 2020 with a total of 234 first visits, 250 return appointments and 92 telephone consultations. Eighty-seven women/couples were seen at the recurring miscarriage clinic and the new menopause clinic saw 42 women and did 19 telephone consultations.

At Merrion Fertility Clinic there were 728 new consultations and 1330 return consults.

Conscious sedation was provided by Consultant Anaesthetists for all oocyte retrievals and surgical sperm retrievals.

Nine cases of surgical sperm retrieval (SSR) were carried out in 2020.

46 cycles of oocyte vitrification were completed. The average number of oocytes frozen per patient was 8.

**The mean age of women** undergoing fresh IVF/ICSI cycles was 36.7 years. In 2020, 21% of all cycles started were in women aged 40 or more, consistent with the rates in previous years.

**Elective single embryo transfer eSET:** 67.8% of MFC patients had a single embryo transfer in 2020, reflecting the clinic's strong single embryo transfer



policy. Of this group, a subset of good prognosis patients had an elective single embryo transfer (eSET), meaning they had a good quality embryo to transfer and at least one other to freeze. This group comprised 36.8% of all embryo transfers and, across all age groups, had a clinical pregnancy rate of 52.5% on the fresh cycle. Of those eSET patients who did not conceive on their fresh cycle, 36.7% conceived on their first frozen embryo transfer (FET), bringing the cumulative pregnancy rate in this group to 72.3% (following one fresh transfer and a FET if the fresh was unsuccessful). Many of these patients have additional embryos still in storage.

**Multiple pregnancy:** The multiple pregnancy rate following a fresh embryo transfer was 7%, a rate which is very low by international standards. All of these multiple pregnancies were twins and occurred following double embryo transfer (25% multiples vs 0% in SET group). The multiple pregnancy rate for frozen embryo transfers was 3.9%, reflecting excellent decision making regarding the number of embryos electively transferred.

**Livebirth rates:** (LBR) are the best marker of ART success and are reported for 2019 as, at the time of

writing, not all 2020 pregnancies are complete. The livebirth rates per embryo transfer for fresh IVF and ICSI cycles performed in 2019 (delivering in 2019/2020) are excellent by international norms (Table 3, Chart 2). Approximately one third of all couples completing IVF/ICSI cycles had a livebirth. (Tables 3-5)

**Frozen embryo transfer (FET) cycles:** In 2020, 236 FET cycles were completed with a clinical pregnancy rate of 38% per transfer. The livebirth rate per embryo transfer for frozen embryo transfer (FET) cycles performed across all age groups in 2019 was 27.5%.

**Intrauterine Insemination (IUI):** The clinical pregnancy rate with intrauterine insemination in 2020 was 9.9%, a small decrease from the previous year (10.6%). However, the number of cycles is small (100) so this drop is not likely to be statistically significant. The livebirth rate per completed cycle IUI was 9.9% | 2019.

**Donor Sperm treatments:** Merrion Fertility Clinic commenced a donor sperm service in 2018. Sperm is sourced from 2 approved banks in Denmark. This is an essential treatment for single women, lesbian couples and heterosexual couples with severe male factor

infertility, not suitable for ICSI. This is a growing and successful service. (Tables 6+7)

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

**AYA Males:** Eight adolescent males between the ages of 13 and 15 years were referred to MFC in 2020 for sperm cryopreservation services before undergoing gonadotoxic treatment or surgery. Their oncology diagnoses were: Ewings Sarcoma, T-cell Acute Lymphoblastic Leukaemia, Hodgkin's Lymphoma, Osteosarcoma, Acute Myeloid Leukaemia and Rhabdomyosarcoma. Of these 8 boys, 62.5% (n=5) produced a semen sample and 80% (n=4) had sperm of suitable quality for freezing.

**AYA Females:** Four adolescent females (aged 14 to 16 years) were referred to MFC in 2020 for oocyte vitrification *before* undergoing gonadotoxic cancer therapy. Their oncology diagnoses were: Rhabdomyosarcoma, Medulloblastoma, Hodgkin's Lymphoma and Osteosarcoma. Three of these young women (75%) had a successful cycle, with a mean of 12 oocytes cryopreserved for future use. The 4<sup>th</sup> young woman's attempt was cancelled due to her deteriorating medical condition.

Six female survivors of CAYA cancer, who had previously received gonadotoxic treatment as part of their cancer therapy, attended MFC in 2020 for an initial fertility consultation.

### Research

The Reproductive Medicine Department maintains an active and productive research portfolio, collaborating with scientists in Irish academic institutions such as UCD and TCD. MFC employs a full-time Research Officer and two Clinical Research Fellow posts exist for higher training in Reproductive Medicine & Surgery, with both fellows undertaking higher degrees. MFC also hosts PhD and MSc students.

Research at MFC 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 2020, researchers at MFC 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 (Funding: Grant for Fertility Innovation, Merck)
- Endometrial microbiome and infertility (Funding: Grant for Fertility Innovation, Merck)
- Glycome analysis in endometriosis (NIBRT collaboration. Funding: Horizon 2020, Marie Curie International Fellowship)
- Development of improved laboratory tests for sperm quality and function in male infertility (Funding: Irish Research Council)
- Knowledge and attitudes towards fertility preservation among patients and healthcare providers
- Ovarian Reserve in childhood cancer survivors

Publications, Posters, Presentations and Invited Lectures are listed in the Appendices.



## Assisted Reproduction, Merrion Fertility Clinic

Table 1: Five-year overall activity levels (numbers)

Year	Semen analyses	Surgical Sperm Retrievals	Ovulation induction and IUI (completed)	IVF/ICSI (Completed to oocyte retrieval)	Frozen embryo transfer cycles (Completed to embryo transfer)	Oocyte vitrification Completed to oocyte retrieval)
2016	1375	8	223	401	260	NA
2017	1398	8	157	454	263	3
2018	1459	2	151	407	301	40
2019	1412	6	161	399	334	49
2020	1172	9	152	413	236	46

Table 2: Activity and Clinical pregnancy rates (%) for IVF and ICSI cycles

	All Ages	Under 35	35-37	38-39	40-41	42-44
Cycles Started (n)	464	127	114	107	79	37
Oocyte Collections	413	115	103	95	67	33
Embryo Transfer	326	85	84	76	56	25
Average Eggs Collected	8.7	10.6	9.4	7.4	7.7	4.8
Clinical Pregnancies	126	40	33	31	18	4
CPR per Cycle Started	27.2	31.5	28.9	29.0	22.8	10.8
CPR per Oocyte Collection	30.5	34.8	32.0	32.6	26.9	12.1
CPR per ET	38.7	47.1	39.3	40.8	32.1	16.0

Clinical pregnancy rates as per ESHRE (European Society for Human Reproduction and Embryology) i.e. fetal heart, fetal pole or a clear pregnancy sac are seen on ultrasound at 6 to 8 weeks gestation. Biochemical pregnancies (positive pregnancy test only) are not included but ectopic pregnancies and miscarriages are.

Chart 1: 2020 Clinical Pregnancy Rates by Maternal Age

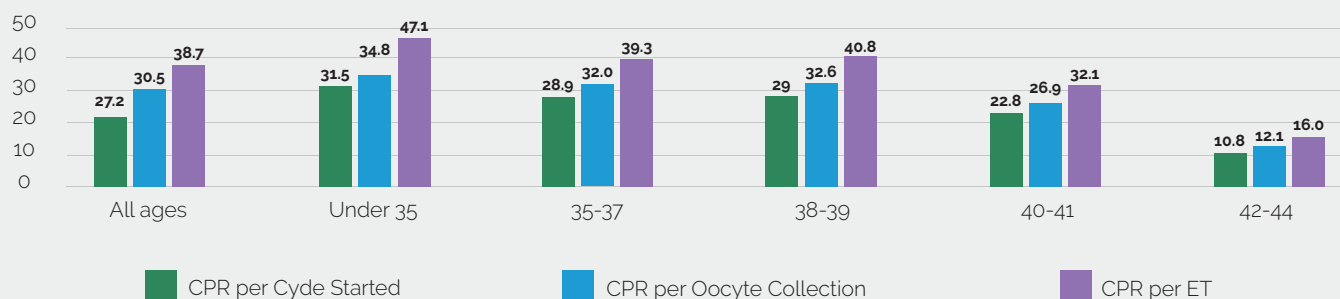
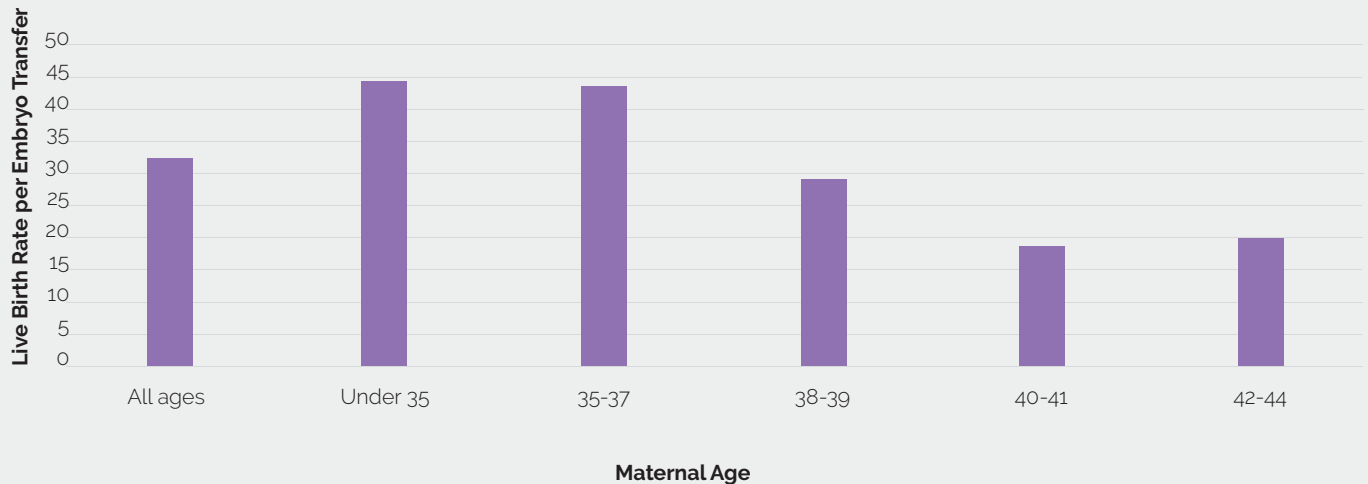


Table 3: Live Birth Rate fresh IVF/ICSI 2019

	All Ages	Under 35	35-37	38-39	40-41	42-44
LBs	128	38	47	29	11	3
LBR per OCR	27.5%	31.9%	34.6%	25.4%	15.5%	11.5%
LBR per ET	33.8%	43.2%	42.7%	28.7%	17.5%	17.6%



**Table 4: Live Birth Rates Frozen Embryo Transfer 2019**

	All Ages
Thaws	349
Embryo Transfer	346
Live Births	95
LBR per Thaw	27.2
LBR per Embryo Transfer	27.5

**Table 5: Live Birth Rates following IUI 2019**

2019	All Ages
Cycles started	100
Inseminations	91
Live Births	9
LBR per cycle started	9.0
LBR per insemination	9.9

**Table 6: Clinical pregnancy rates (%) for IVF and ICSI cycles using Donor Sperm**

	All Ages	Under 35	35-37	38-39	40-41	42-44
Cycles Started	14	5	4	5	NA	NA
Oocyte Collections	14	5	4	5	NA	NA
Embryo Transfer	11	3	4	4	NA	NA
Clinical Pregnancies	5	2	1	2	NA	NA
Multiple Pregnancies	1	0	0	1	NA	NA
Average Eggs Collected	8.6	9	9	8	NA	NA
CPR per Cycle Started	35.7	40.0	25.0	40.0	NA	NA
CPR per Oocyte Collection	35.7	40.0	25.0	40.0	NA	NA
CPR per ET	45.5	66.7	25.0	50.0	NA	NA
Multiple Rate	20%			20%		

**Table 7: Clinical Pregnancy Rates (%) for IUI cycles using Donor Sperm 2020**

	All Ages
Cycles started	13
Inseminations	9
Clinical Pregnancy	1
CPR per cycle started	7.7
CPR per insemination	11.1
Multiple rate	0