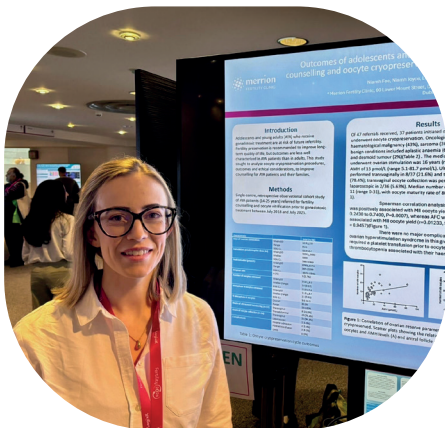




The National Maternity Hospital Annual Research Report 2025



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Reproductive Medicine

AI4Fertility: Patient perceptions on the use of artificial intelligence (AI) in fertility treatment

Team Members:	Prof David Crosby (PI), Dr Niamh Fee, Dr Louise Glover, Dr Renato Bauman
Source of funding	Merrion Fertility Clinic Research Fund
Key collaborations	UCD
Status:	Complete

Background: Infertility affects approximately 1 in 6 prospective parents. Assisted reproduction technologies (ART) such as in vitro fertilisation are routinely used to help patients with infertility to conceive. Within the ART field, artificial intelligence (AI) platforms are being developed to aid in embryo selection, semen analysis and clinical decision making. This study aimed to investigate patient trust, acceptance and concerns about AI integration into the fertility care pathway.

Methods: Cross-sectional survey study of patients who attended Merrion Fertility Clinic at The National Maternity Hospital for fertility assessment and assisted reproduction.

Results: Responses from 206 patients were collected. While 41% believed that AI could improve outcomes, most (56%) indicated that they 'did not know'. Overall, respondents were comfortable with AI being used to assist with clinical (67%) and embryology decisions (74%) but were not comfortable with AI alone performing embryo selection (93.1%), semen analysis (89.2%) or sperm selection in ICSI (90.2%). Dominant themes of patient concern included human replacement, loss of empathy, and the need for monitoring of AI.

Conclusion: Patients feel strongly that AI integration into the fertility treatment pathway must be done in an open and informative manner, and that transparency around AI-based decisions should always be present. Long term studies will be important to evaluate if patient perceptions and acceptance of AI in fertility care evolve over time, and to determine how experience with AI may shape these perceptions.

WLM OG: Ob-Gyn perspectives on use of weight loss medications

Team Members:	Prof David Crosby (PI), Dr Ciara Nolan, Dr Louise Glover, Dr Sarah Petch, Dr Niamh Joyce
Sources of funding	Merrion Fertility Clinic Research Fund
Key collaborations	UCD School of Medicine
Status:	Complete

Background: Obesity is associated with subfertility and poor reproductive outcomes. Injectable glucagon-like peptide-1 receptor agonists (GLP-1RA) such as Ozempic may provide an effective weight loss intervention for women struggling to conceive. This study sought to assess the knowledge and perspectives of Obstetricians and Gynaecologists on use of GLP-1RAs in women trying to conceive.



Dr Sarah Petch (Clinical Fellow, Merrion Fertility Clinic) presents her research studies at the NMH Fertility Study Day for healthcare professionals.

Methods: Qualified Obstetricians and Gynaecologists were invited via hospital networks, colleague groups, and clinical training bodies to complete an anonymous, online cross-sectional survey (May to September 2024).

Results: Responses from 62 clinicians were collected. Although most respondents (82.3%) were familiar with GLP-1RAs, only 12.9% had previously prescribed them. before. Most agreed that GLP-1RAs should be offered to patients with obesity-related comorbidities or subfertility, with 62.9% endorsing their use in women with subfertility and 71% supporting their use to meet body mass index (BMI) criteria for state-funded assisted reproduction technologies (ART). Most (79%) felt that prescribing responsibility should lie with either a bariatric team or endocrinologist. Only 29% were aware that GLP-1RAs should be discontinued before conception, and 75.8% were not confident discussing potential teratogenic risks. Most (96.7%) expressed a need for more education and guidance on safety data.

Conclusion: While GLP-1RAs are a promising weight management tool for women with subfertility, our findings show that targeted education, interdisciplinary collaboration and clear guidelines will be essential to bridge knowledge gaps and safely integrate their use into reproductive health care. Fertility consultations provide a unique opportunity for pre-pregnancy interventions, including weight loss, that can improve the long-term health of mothers and their children and reduce overall healthcare burdens.

FERTI-MICRO: Endometrial microbiome and inflammation-mediated infertility

Team Members:	Dr Louise Glover (PI), Dr Federica Giangrazi, Prof David Crosby, Dr Maebh Horan, Prof Cliona O’Farrelly, Dr Jamie Sugrue.
Sources of funding	Grant for Fertility Innovation, Merck
Key collaborations	TCD School of Immunology and Biochemistry, Institut Pasteur
Status:	Complete

Background: Embryo implantation into the endometrium is a key step in early pregnancy, and unsuccessful implantation contributes to infertility, early miscarriage and failed assisted reproduction treatment. The

endometrium balances immune tolerance of the developing embryo while protecting from infection, and while studies have shown that uterine immune cells, inflammatory proteins and endometrial microbes are likely to influence embryo implantation, their roles and interactions are poorly understood. This study investigated whether endometrial microbes are altered in women who fail to get pregnant after ART and if microbe-derived metabolites can influence endometrial cell processes important for embryo implantation.

Methods: Case-cohort study of women undergoing assisted reproduction who had a positive or negative ART cycle outcome. Abundance of endometrial-associated microbes was measured in endometrial biopsies using high throughput DNA sequencing. Findings were compared between groups and correlated with endometrial markers of cell receptivity to an implanting embryo and remodelling in early pregnancy (decidualization). Cell models were developed to investigate the effects of microbial-derived metabolites on receptivity and decidualization.

Results: Negative ART outcomes were found to correlate with the presence of a wider, more diverse endometrial microbial community that includes Prevotella, a butyrate-producing bacteria. In cell models, butyrate exposure altered the expression of markers of epithelial receptivity and decidualization, activated defence mechanisms in cultured endometrial epithelial cells by inducing expression of antimicrobial peptides and inflammation markers, and impaired the barrier function of endometrial cell layers.

Conclusion: Our findings indicate that the endometrial microbiome is altered in women who have negative ART outcomes and show for the first time that a microbial-derived metabolite can induce inflammation, impair endometrial cell barrier function and dysregulate expression of endometrial receptivity and decidualization markers. These findings enhance our fundamental understanding of maternal immune-microbe interactions at the endometrium around the window of embryo implantation and may help identify novel therapeutic avenues to improve the success of ART in infertility.

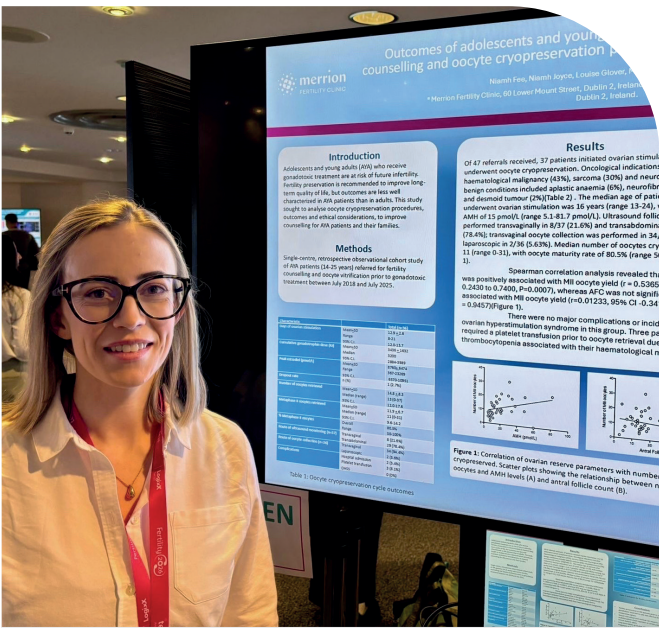
PICSI PGT-A: Impact of PICSI on embryo euploidy rates in PGT-A cycles

Team Members:	Prof David Crosby (PI), Dr Sarah Petch, Dr Louise Glover, Dr Niamh Fee, Dr Alex Sobota, Dr Hayley Jackson, Dr Aoife Campbell, Joyce Leyden, Jennifer Cullinane
Source(s) of funding	Merrion Fertility Clinic Research Fund
Key collaborations	UCD School of Medicine
Status:	Ongoing

Background: Intracytoplasmic Sperm Injection (ICSI) is a specialized form of assisted reproduction, developed for male factor infertility, that involves direct injection of an egg with a selected sperm. Advances in sperm selection methods for ICSI include hyaluronic acid (HA) binding, termed Physiological ICSI (PICSI). Sperm that display higher HA binding have better DNA integrity, and previous studies have shown reduced miscarriage rates after PICSI compared to ICSI. This study will assess whether PICSI improves rates of chromosomally normal (euploid) embryos in assisted reproduction cycles using pre-implantation genetic testing for aneuploidy (PGT-A).

Methods: This is a five-year, single-centre prospective randomized sibling oocyte study (clinical trial: NCT06602687). Participants are fertility patients scheduled to undergo an ICSI cycle with PGT-A. Following egg retrieval, mature (metaphase II) eggs from an individual patient are randomized and injected with sperm selected by either standard ICSI (embryologist-selected) or PICSI (HA-binding). Embryo biopsy and PGT-A is performed on suitable embryos. Primary outcome is embryo ploidy status and secondary outcomes include fertilisation and embryo (blastocyst) development rates.

Current Status: Recruitment to date has reached 37% of the target sample size (n=141 PGT-A cycles), comprising 53 PGT-A cycles with 439 metaphase II oocytes randomized and injected (n=223 PICSI and n=216 ICSI). Interim analysis of cycles to date shows a small, non-significant increase in fertilisation rates with PICSI (77% PICSI vs 71% ICSI, p=0.13). Primary outcome analysis was carried out for 129 biopsied blastocysts (n=68 in the PICSI group and n=61 in the ICSI group). Euploidy rates at interim analysis are directionally higher in the PICSI group (37% PICSI vs 33% ICSI; p=0.63), while aneuploidy rates are directionally lower in PICSI compared to ICSI (50% PICSI vs 57% ICSI; p=0.49).



Dr Niamh Fee, Aspire Clinical Fellow, presents her research findings at Fertility 2026, the annual conference of the British Fertility Society and Society for Reproduction and Fertility.

Potential Impact: To our knowledge, this is the first sibling oocyte study to prospectively investigate whether sperm selection by PICSI can impact the ploidy status of an embryo. Increased embryo euploidy rates after PGT-A would increase the number of embryos available for transfer and could reduce miscarriage rates and improve livebirth outcomes for patients undergoing assisted reproduction.

Environmental influences on male fertility and reproductive health

Team Members:	Prof David Crosby (PI), Dr Ciara Nolan, Dr Louise Glover, Dr Clare Reynolds, Dr Niamh Fee, Dr Sarah Petch
Source(s) of funding	Merrion Fertility Clinic
Key collaborations	UCD School of Public Health
Status:	Ongoing

Background: Male fertility rates are declining worldwide, even in young men, such that male factor now contributes to half of infertility cases. This study aims to investigate how diet, hormone profiles and inflammatory markers relate to semen analysis and if dietary pre-conception supplements can improve sperm quality.

Methods: Longitudinal cohort study of male patients attending Merrion Fertility Clinic for fertility assessment

and/or treatment. Participants will complete a dietary questionnaire and provide a blood sample at time of semen analysis. Participants with subnormal semen analysis results are invited to take part in an intervention trial comprising a 12-week course of dietary micronutrient supplements formulated to support pre-conception male health. Repeat semen analysis and blood tests after 12 weeks will examine associations between dietary patterns and inflammation, hormones, and sperm parameters.

Current Status: To date, 46 patients have been enrolled in the study, with 16 participants assigned to the intervention trial. Recruitment is ongoing.

Potential Impact: This research will contribute to our understanding of how environmental factors such as diet, systemic inflammation and pre-conception micronutrient supplementation can impact upon sperm parameters and assisted reproduction outcomes.

ReproWork: Patient perspectives on balancing work and fertility treatment

Team Members:	Prof Cathy Allen (PI), Prof David Crosby, Dr Roisin McConnell, Dr Louise Glover, Prof Marian Crowley-Henry, Dr Valentina Paolucci
Source of funding	Research Ireland New Foundations
Key collaborations	Maynooth University School of Business
Status:	Ongoing

Background: Infertility affects approximately 17.5% of adults globally, with many couples requiring more than one cycle of assisted reproduction to achieve a pregnancy. Balancing fertility treatment with work obligations can be a significant source of stress. Currently, in Ireland, there is no national data on the number of fertility patients currently in employment, and no legislation mandating paid leave for couples to attend fertility treatment.

The aim of this study is to assess the prevalence of workplace policies supporting fertility patients who are in employment, and the impact that fertility treatment has on employees.

Results: This is a cross-sectional, anonymous self-reported survey study delivered via online platform. Eligible participants who have completed or are currently undergoing fertility assessments and/or fertility treatment will be recruited from Merrion Fertility Clinic and The National Maternity Hospital. The survey questionnaire consists of 18 questions (14 close-ended, 4 open-ended) addressing demographics, employment type and workplace/employer fertility treatment supports and policies.

Current Status: To date, 327 responses have been received (NMH n=161, MFC n=166). Of current respondents, only 17% indicate that their employer/workplace has a fertility treatment policy in place, and 53% agree or strongly agree that trying to take time off work for fertility procedures added significantly to the stress of treatment.

Potential Impact: Findings from this study will provide the first Irish data on current workplace supports for people going through fertility treatment. Project ReproWork, a civic-academic partnership between Merrion Fertility Clinic and Maynooth University, will build on this data to assess workplace barriers such as stigma, limited accommodations, and lack of manager awareness that can heighten stress and disrupt fertility treatment. ReproWork will co-develop evidence-based research priorities on workplace support, employer guidance, and employee advocacy, producing actionable recommendations for employers, healthcare providers, and policymakers to support fertility patients in the workplace.

Reproductive Medicine

Publications

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- Stokes J, Petch S, O'Reilly S, Glover L, Crosby D. An Investigation into Fertility Awareness and Attitudes amongst Midwives and Nurses. *Ir Med J.* 2025 Jun 17;118(6):93
- Nolan, C., Petch, S., Joyce, N., Glover, L.E. and Crosby, D. (2025), Perspectives of Obstetricians and Gynaecologists on the Use of Weight Loss Medications. *Reproductive, Female and Child Health*, 4: e70034.
- Petch S, Stokes J, Glover L, Crosby D. In the era of direct-to-consumer ovarian reserve tests, General Practitioners desire more education on these tests. *Ir Med J.* 2025 Dec 10;118(10):180
- Fee N, Glover LE, Bauman R, Crosby DA. Patient perceptions on the use of artificial intelligence

(AI) in fertility treatment. *Hum Fertil (Camb)*. 2025 Dec;28(1):2591161

Oral Presentations

- Ciara Nolan, Sarah Petch, Jennifer Cullinane, Aoife Campbell, Joyce Leyden, Louise Glover, David Crosby. PGT-A results led to change in order of embryo transfer compared to embryo morphology alone. Fertility (Joint conference of the Association of Reproductive & Clinical Scientists, British Fertility Society, and the Society for Reproduction & Fertility); Liverpool U.K., 2025
- Andrew Downey, Louise Glover, David Crosby. Female Fertility and Fertility Preservation: The Male Perspective. Fertility; Liverpool U.K., 2025
- Ciara Nolan, Louise Glover, David Crosby. Perspectives of obstetricians and gynaecologists on the use of weight loss medications. Fertility; Liverpool U.K., 2025
- Sarah Petch, Niamh Fee, Alex Sobota, Hayley Jackson, Aoife Campbell, Joyce Leyden, Jennifer Cullinane, Louise Glover, David Crosby. Does PICSi improve embryo euploidy in PGT-A cycles? Research and Innovation Symposium Exhibition (RISE); Dublin, 2025
- Leyden, Aoife Campbell, Louise Glover, David Crosby. PGT-A results compared to embryo morphology as a decision tool for the order of embryos to transfer. 22nd International Conference on Preimplantation Genetics; Leuven, Belgium, 2025.
- Sarah Petch, Ciara Nolan, Louise Glover, David Crosby. The impact of e-cigarette use on ovarian reserve and outcomes of assisted reproductive technology: A systematic review. Research and Innovation Symposium Exhibition (RISE); Dublin, 2025
- Niamh Fee, Louise Glover, Renato Bauman, David Crosby. Patient perceptions on the use of artificial intelligence (AI) in fertility treatment. Research and Innovation Symposium Exhibition (RISE); Dublin, 2025
- Niamh Fee, Natasha Byce, Louise Glover, Ricardo Segurado, David Crosby. Antimullerian Hormone (AMH) level is a marker of successful biopsy in patients intending to perform preimplantation genetic testing. Research and Innovation Symposium Exhibition (RISE); Dublin, 2025
- Hayley Jackson, Sarah Petch, Louise Glover, David Crosby. Knowledge of and attitudes towards ovarian reserve testing amongst consultant obstetricians and gynaecologists. Research and Innovation Symposium Exhibition (RISE); Dublin, 2025
- Niamh Joyce, Joyce Leyden, Ricardo Segurado, Aoife Campbell, Jennifer Cullinane, Aisling Looney, David Crosby, Louise Glover, Maebh Horan. Do semen parameters in adolescent and young adult (AYA) patients remain stable post-thaw, and can threshold semen parameters be established for cryopreservation? Research and Innovation Symposium Exhibition (RISE); Dublin, 2025
- Niamh Joyce, Joyce Leyden, Ricardo Segurado, Aoife Campbell, Jennifer Cullinane, Aisling Looney, David Crosby, Louise Glover, Maebh Horan. Post-thaw sperm parameter changes in adolescent and young adults: implications for cryopreservation and fertility preservation. 41st Annual Meeting of the European Society of Human Reproduction and Embryology (ESHRE); Paris, France, 2025

Poster Presentations

- Ciara Nolan, Aisling Looney, Hayley Jackson, David Crosby, Cathy Allen. Temporal trends in sperm concentration: a contrasting perspective from a single-centre review. Fertility; Liverpool U.K., 2025
- Sarah Petch, Andrew Downey, Rachel Elebert, Conor O'Ceallaigh, David Crosby, Louise Glover. Tumour necrosis factor alpha in follicular fluid in women with diminished ovarian reserve. Fertility; Liverpool U.K., 2025
- Ciara Nolan, David Crosby. Replacing baseline ultrasound with estradiol testing prior to controlled ovarian stimulation: our experience. Fertility; Liverpool U.K., 2025
- Jenny Stokes, Sarah Petch, Sharleen O' Reilly, Louise Glover, David Crosby. Investigating fertility awareness and attitudes amongst midwives and nurses in Ireland. Fertility; Liverpool U.K., 2025
- Sarah Petch, Ciara Nolan, Jennifer Cullinane, Joyce

- Niamh Fee, Louise Glover, David Crosby. Fertility preservation in adolescent and young adult (AYA) females prior to gonadotoxic treatment: An Irish experience. BFS Fertility Preservation Conference 2025 'Clinical Frontiers in Fertility Preservation'; London U.K. 2025
- Niamh Fee, Rachel Elebert, Andrew Downey, David Crosby, Maebh Horan, Mary Wingfield, Louise Glover. Oncofertility preservation in Adolescents and Young Adults (AYA): Parent and patient perspectives. BFS Fertility Preservation Conference 2025 'Clinical Frontiers in Fertility Preservation'; London U.K. 2025
- Niamh Fee, Charlotte O'Sullivan, Lucia Hartigan, David Crosby, Louise Glover. Knowledge of fertility preservation for cancer patients in obstetricians and gynaecologists; how are we doing? BFS Fertility Preservation Conference 2025 'Clinical Frontiers in Fertility Preservation'; London U.K. 2025
- Niamh Fee, Louise Glover, David Crosby. Outcomes of adolescents and young adults attending for fertility counselling and oocyte cryopreservation prior to gonadotoxic treatment. Junior Obstetrics & Gynaecology Society (JOGS) Annual Scientific Meeting; Dublin, 2025
- Sarah Petch, Ciara Nolan, Louise Glover, David Crosby. The impact of vaping on ovarian reserve and fertility treatment outcomes – a systematic review. Junior Obstetrics & Gynaecology Society (JOGS) Annual Scientific Meeting; Dublin, 2025
- Hayley Jackson, Sarah Petch, Louise Glover, David Crosby. Knowledge of and attitudes towards ovarian reserve testing amongst consultant obstetrician & gynaecologists. Junior Obstetrics & Gynaecology Society (JOGS) Annual Scientific Meeting; Dublin, 2025
- Sarah Petch, Andrew Downey, Rachel Elebert, David Crosby, Louise Glover. Single cell RNA sequencing reveals reduced expression of mitochondrial-related genes in granulosa cells of women with diminished ovarian reserve. Junior Obstetrics & Gynaecology Society (JOGS) Annual Scientific Meeting; Dublin, 2025
- Roisin McConnell, Jacqui Clifford, Louise Glover, David Crosby. Fertility – Are Doctors taught enough? Junior Obstetrics & Gynaecology Society (JOGS) Annual Scientific Meeting; Dublin, 2025
- H. Shahid, M O'Dea. TPN in Neonates: Are parents getting the information and support they need? A Clinical Audit. Oral poster presentation. EAPS Lisbon October 2025.

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