Assisted Reproduction

Annual Report 2022

Department of Obstetrics and Gynaecology
Queen Mary Hospital, The University of Hong Kong

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Introduction

The year two thousand and twenty-two marks the thirty-sixth year of the Assisted Reproduction Program at Queen Mary Hospital.

A total of 727 assisted reproduction treatment (ART) cycles were initiated in 665 couples during this period. The numbers of treatment cycles and of patients were slightly less than those in previous years. The number of frozen embryo transfer cycles was similar as in 2021. The mean number of embryos replaced remained at 1.0 per transfer in both conventional IVF and ICSI cycles as we have continued to promote elective single embryo transfer. The mean number of embryos replaced in frozen embryo transfer cycles was also 1.0 per transfer because most of our patients agreed to replace a single frozen embryo. This year, we encountered no triplet after ART.

This year we continued to implement a strict single embryo transfer policy for all women unless for those older than or equal to 38 years old or not pregnant after 2 cycles of IVF. The ongoing pregnancy rate per fresh transfer cycle were 18.2% and 21.2% respectively in Day 2 and Day 5 elective single embryo transfer whereas the corresponding rate in Day 2 non-elective single embryo transfer was 12.8%. There was no Day 5 non-elective single embryo transfer.

In 2022, preimplantation genetic testing was performed in 110 stimulated cycles and 12 frozen embryo transfer cycles in 89 women at risk of having babies with serious chromosomal or genetic disorders.

Staff list

Gynaecologists

Professor NG Hung Yu Ernest, Clinical Professor, Department of Obstetrics and Gynaecology, The University of Hong Kong
Dr. LI Hang Wun Raymond, Clinical Associate Professor, **Person Responsible, Head** of Division of Reproductive Medicine, Department of Obstetrics and Gynaecology, The University of Hong Kong
Dr. KO Ka Yee Jennifer, Consultant, Department of Obstetrics and Gynaecology, Queen Mary Hospital
Dr. YUNG Shuk Fei Sofie, Clinical Assistant Professor, Department of Obstetrics and Gynaecology, The University of Hong Kong
Dr. CHENG Hiu Yee Heidi, Associate Consultant, Department of Obstetrics and Gynaecology, Queen Mary Hospital
Dr. WONG Evelyn, Associate Consultant, Department of Obstetrics and Gynaecology, Queen Mary Hospital
Dr. TONG Yu Wing Paul, Resident Specialist, Department of Obstetrics and Gynaecology, Queen Mary Hospital

Trainees

Dr. LEUNG Yin Fong Evon (15 Feb to 31 Mar 2022)
Dr. CHAN Tsoi Yan Dorothy (1 Jul to 30 Sep 2022)

Scientists

Dr. LAM Ka Wai Kevin, Scientific Officer (Medical), Department of Obstetrics and Gynaecology, Queen Mary Hospital
Professor YEUNG Shu Biu William, Professor, Department of Obstetrics and Gynaecology, University of Hong Kong

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Consultant Geneticists

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Consultant Urologist

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Ms. CHAN Po Ling Phoenix
Ms. CHAN Yuk Chun Jane
Ms. CHEUNG Long Yi Rosita
Ms. CHEUNG Wai Man
Ms. CHIANG Yuin Wei Loretta
Ms. CHIU Lok Pui Emily
Ms. DO Chui Pik
Ms. HO Pui Wai Ada
Ms. LEE Suet Kwan (till July 2022)
Ms. LEE Yee Na
Ms. LI Ka Yan (till Feb 2022)
Ms. WONG Yan Lok Wylie

Patient Care Assistants

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Ms. LIANG Yueming

Laboratory Staff

IVF Laboratory

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Ms. HO Wing Tak Sharon
Ms. JIN Zhanqun Jenny
Ms. LAU Hong Ting Sharon (till Sep 2022)
Mr. LEE Tak Sum Anson
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Ms. TAN Yick Siew
Ms. WONG Sze Wing Kitty
Ms. YANG Xuelian

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Dr. CHOW Fung Cheung Judy
Mr. LEUNG Ka Chun Tim
Mr. PE Chun Hin Anthony

Laboratory Assistant

Ms. YAM Wing Kei Vani

Clerical Staff

Ms. CHOW Fung Yee
Ms. DO Chui Mei May
Ms. LI Woon Man (from Mar 2022)
Ms. NG Hoi Suet (till Feb 2022)
Ms. WONG Yuk Ping Candy (till June 2022)

Front Row: (Left to Right)
Dr. Dorothy CHAN, Dr. Judy CHOW, Dr. Rebecca WAN, Ms. May DO, Professor Ernest NG, Dr. Raymond LI, Dr. Jennifer KO, Dr. Sofie YUNG, Ms. SH CHAN

Second Row: (Left to Right)
Ms. Woon Man LI, Ms. Fung Yee CHOW, Ms. Emily CHIU, Ms. Candy WONG, Mr. Anson LEE, Dr. Kevin LAM, Ms. Kitty WONG, Ms. Xuelian YANG, Mr. Tak Ming CHEUNG, Ms. Sharon HO, Dr. Paul TONG, Ms. Jasmine LEUNG, Ms. Jane CHAN, Ms. Wylie WONG, Ms. Wai Man CHEUNG, Ms. Yueming LIANG, Ms. Chui Pik DO, Ms. Chun Kin CHAN

Third Row: (Left to Right)
Mr. Tim LEUNG, Mr. Anthony PE, Ms. Loretta CHIANG

Work-Load Statistics

Table 1: Workload Statistics I

No. of Cycles	IVF	Oocyte Donation	Sperm donation	Vitrified oocyte	ICSI	MESA	TESE	PGT	**TOTAL**
Initiated	368	2	6 (1 VO)	4	207	8	10	110 Fresh OPU + 12 FET	**727**
Cancelled	13 (3.5%)	0 (0%)	0 (0%)	0 (0%)	1 (0.5%)	0 (0%)	0 (0%)	3 (2.7%)	**17 (2.3%)**
With Oocyte Retrieval	355 (96.5%)	2 (100%)	6 (100%)[#]	0 (0%)	206 (99.5%)	8 (100%)	10 (100%)	107 (97.3%)[#*]	**694 (97.1%)[#*]**
With Fresh Embryo transfer	73 (19.8%)	0 (0%)	3 (50.0%)	4 (100%)	33 (15.9%)	1 (12.5%)	0 (0%)	0 (0%)	**114 (15.7%)**

(" IVF" : Conventional IVF-ET;" ICSI" : ICSI with ejaculated sperm;" MESA" : MESA + ICSI;" TESE" : TESE + ICSI;
" PGT" : Preimplantation genetic testing;" FET" : frozen embryo transfer)

( ): % of initiated cycle, *: denominator does not include FET cycle; [#]: vitrified-oocyte (VO) cycles are excluded

Table 2: Workload Statistics II

No. of cycles	IVF	Oocyte donation	Sperm Donation	Vitrified oocyte	ICSI	MESA	TESE	Fresh-PGT	Total
Without Oocyte Retrieved	2 (0.6%)	0 (0%)	0 (0%)	0 (0%)	2 (1.0%)	0 (0%)	1 (10.0%)	0 (0%)	5 (0.7%)
Without insemination	0 (0%)	0 (0%)	0 (0%)	0 (0%)	8 (3.9%)	0 (0%)	4 (40.0%)	2 (1.9%)	14 (2.0%)
Without Normal Fertilization	25 (7.0%)	0 (0%)	0 (0%)	0 (0%)	15 (7.3%)	0 (0%)	0 (0%)	5 (4.7%)	45 (6.5%)
Without Normal Cleavage	3 (0.8%)	0 (0%)	0 (0%)	0 (0%)	1 (0.5%)	0 (0%)	0 (0%)	0 (0%)	4 (0.6%)
Without embryos suitable for transfer	4 (1.1%)	2 (100%)	0 (0%)	0 (0%)	9 (4.4%)	0 (0%)	1 (10.0%)	40 (37.4%)	56 (8.1%)
With ET Postponed	248 (69.9%)	0 (0%)	3 (50.0%)	0 (0%)	138 (67.0%)	7 (87.5%)	4 (40.0%)	60 (56.1%)	460 (66.3%)
Without Fresh Embryo Transfer	282 (79.4%)	2 (100%)	3 (50.0%)	0 (0%)	173 (84.0%)	7 (87.5%)	10 (100%)	107 (100%)	584 (84.1%)

( ): % of oocyte retrieval cycle (including vitrified-oocyte cycles)

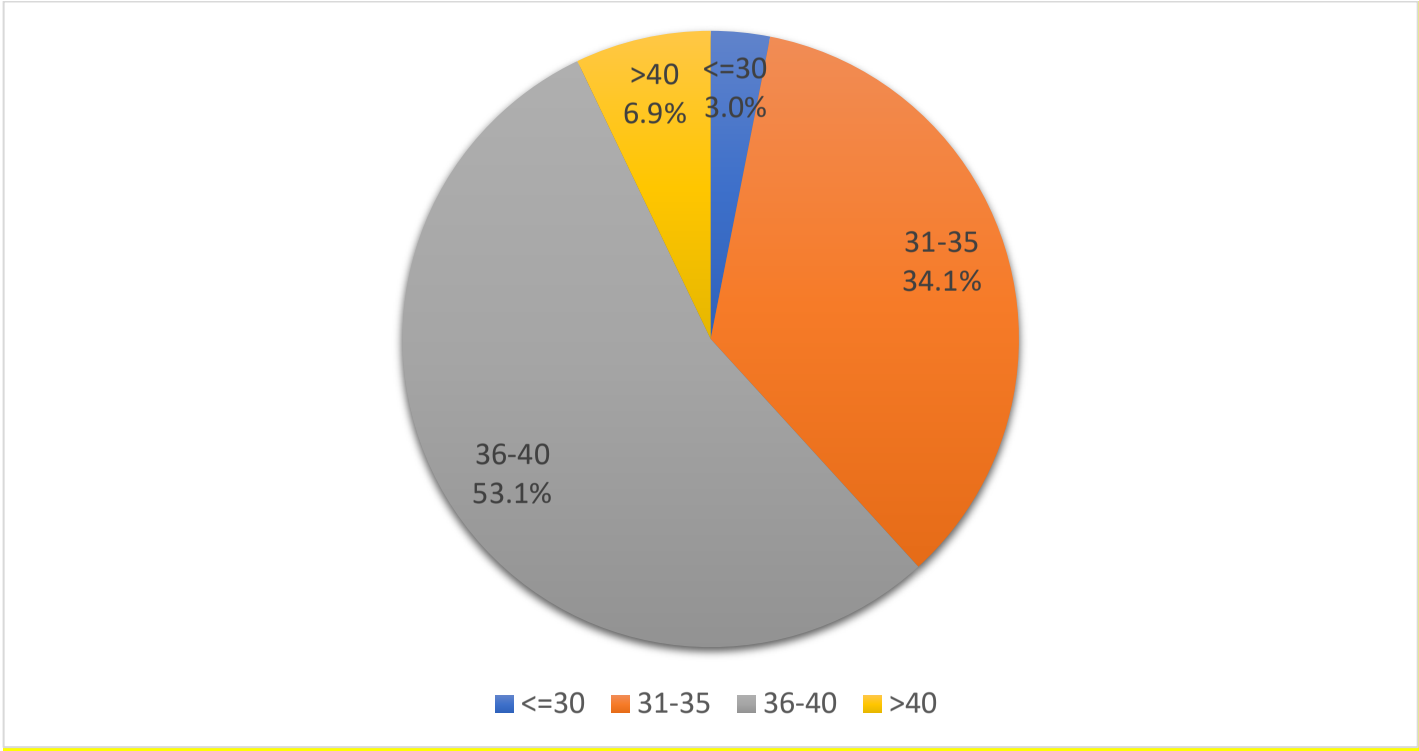

Figure 1: Age Distribution of Patients (years)

Work-Load Statistics

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Initiated	368	2	6 (1 VO)	4	207	8	10	110 Fresh OPU + 12 FET	**727**
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With Oocyte Retrieval	355 (96.5%)	2 (100%)	6 (100%)[#]	0 (0%)	206 (99.5%)	8 (100%)	10 (100%)	107 (97.3%)[#*]	**694 (97.1%)[#*]**
With Fresh Embryo transfer	73 (19.8%)	0 (0%)	3 (50.0%)	4 (100%)	33 (15.9%)	1 (12.5%)	0 (0%)	0 (0%)	**114 (15.7%)**

(" IVF" : Conventional IVF-ET;" ICSI" : ICSI with ejaculated sperm;" MESA" : MESA + ICSI;" TESE" : TESE + ICSI;
" PGT" : Preimplantation genetic testing;" FET" : frozen embryo transfer)

( ): % of initiated cycle, *: denominator does not include FET cycle; [#]: vitrified-oocyte (VO) cycles are excluded

Table 2: Workload Statistics II

No. of cycles	IVF	Oocyte donation	Sperm Donation	Vitrified oocyte	ICSI	MESA	TESE	Fresh-PGT	Total
Without Oocyte Retrieved	2 (0.6%)	0 (0%)	0 (0%)	0 (0%)	2 (1.0%)	0 (0%)	1 (10.0%)	0 (0%)	5 (0.7%)
Without insemination	0 (0%)	0 (0%)	0 (0%)	0 (0%)	8 (3.9%)	0 (0%)	4 (40.0%)	2 (1.9%)	14 (2.0%)
Without Normal Fertilization	25 (7.0%)	0 (0%)	0 (0%)	0 (0%)	15 (7.3%)	0 (0%)	0 (0%)	5 (4.7%)	45 (6.5%)
Without Normal Cleavage	3 (0.8%)	0 (0%)	0 (0%)	0 (0%)	1 (0.5%)	0 (0%)	0 (0%)	0 (0%)	4 (0.6%)
Without embryos suitable for transfer	4 (1.1%)	2 (100%)	0 (0%)	0 (0%)	9 (4.4%)	0 (0%)	1 (10.0%)	40 (37.4%)	56 (8.1%)
With ET Postponed	248 (69.9%)	0 (0%)	3 (50.0%)	0 (0%)	138 (67.0%)	7 (87.5%)	4 (40.0%)	60 (56.1%)	460 (66.3%)
Without Fresh Embryo Transfer	282 (79.4%)	2 (100%)	3 (50.0%)	0 (0%)	173 (84.0%)	7 (87.5%)	10 (100%)	107 (100%)	584 (84.1%)

( ): % of oocyte retrieval cycle (including vitrified-oocyte cycles)

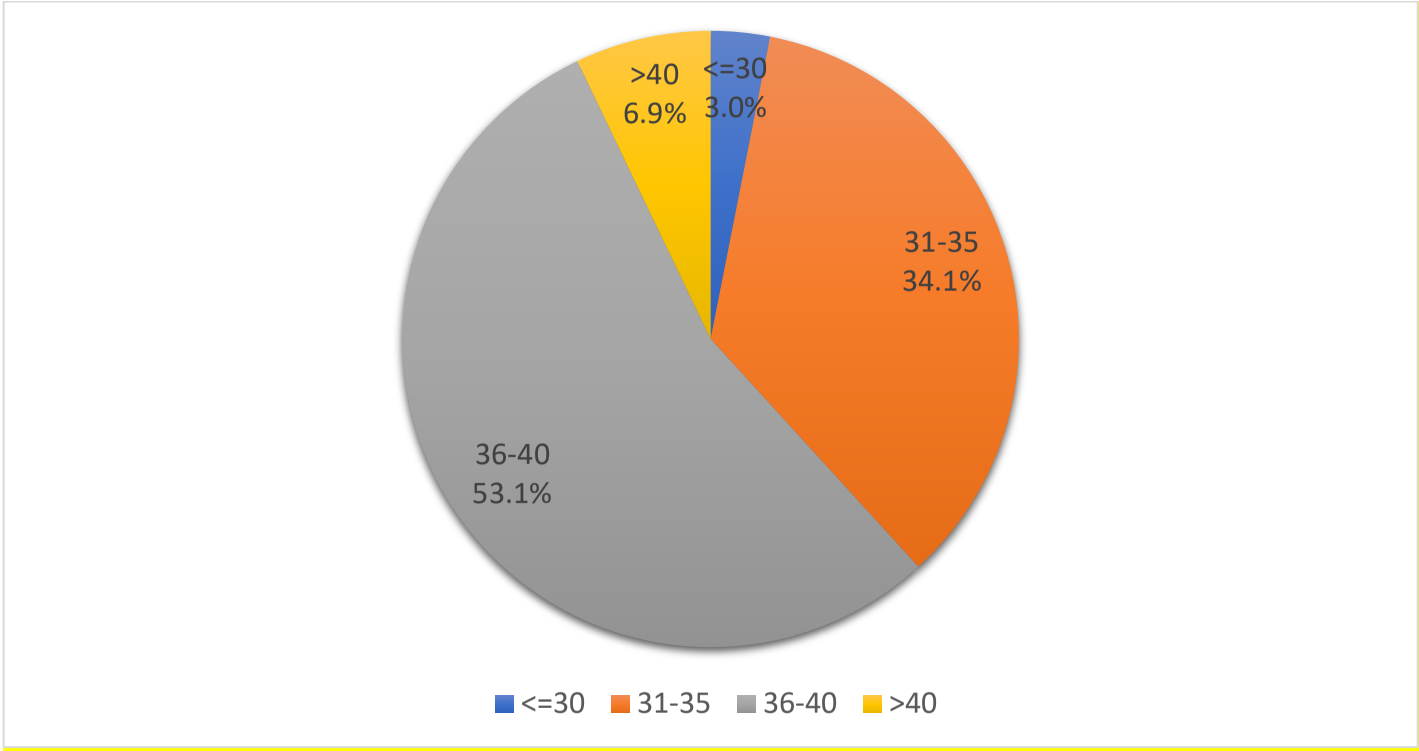

Figure 1: Age Distribution of Patients (years)

Table 3: Ongoing Pregnancy Rates in Different Age Groups

	No. of ongoing pregnancies/ No. of transfer cycles					
Age (yrs)	IVF	ICSI	Sperm donation	Vitrified oocyte	MESA	Total
<= 30	1/1 (100%)	0/0 (-)	0/0 (-)	0/0 (-)	0/0 (-)	1/1 (100%)
31 – 35	3/14 (21.4%)	3/9 (33.3%)	0/0 (-)	0/0 (-)	0/0 (-)	6/23 (26.1%)
36 - 40	6/53 (11.3%)	4/23 (17.4%)	0/3 (-)	0/3 (0%)	0/1 (0%)	10/83 (12/0%)
> 40	1/5 (20.0%)	0/1 (0%)	0/0 (-)	0/1 (0%)	0/0 (-)	1/7 (14.3%)
Total	11/73 (15.1%)	7/33 (16.8%)	0/3 (0%)	0/4 (0%)	0/1 (0%)	18/114 (15.8%)

( ): % of transfer cycles

Table 3: Ongoing Pregnancy Rates in Different Age Groups

	No. of ongoing pregnancies/ No. of transfer cycles					
Age (yrs)	IVF	ICSI	Sperm donation	Vitrified oocyte	MESA	Total
<= 30	1/1 (100%)	0/0 (-)	0/0 (-)	0/0 (-)	0/0 (-)	1/1 (100%)
31 – 35	3/14 (21.4%)	3/9 (33.3%)	0/0 (-)	0/0 (-)	0/0 (-)	6/23 (26.1%)
36 - 40	6/53 (11.3%)	4/23 (17.4%)	0/3 (-)	0/3 (0%)	0/1 (0%)	10/83 (12/0%)
> 40	1/5 (20.0%)	0/1 (0%)	0/0 (-)	0/1 (0%)	0/0 (-)	1/7 (14.3%)
Total	11/73 (15.1%)	7/33 (16.8%)	0/3 (0%)	0/4 (0%)	0/1 (0%)	18/114 (15.8%)

( ): % of transfer cycles

In Vitro Fertilization and Embryo Transfer ~ IVF-ET

Stimulated cycle IVF-ET

During 2022, 353 couples underwent a total of 368 conventional stimulated IVF cycles at our center. Unexplained cause (44.8%) was the commonest indication, which was followed by tuboperitoneal problem (18.2%), male factor (14.9%), endometriosis (7.3%) and anovulation (7.1%). (Table 4)

Table 4: Indications for IVF-ET

Indications	No of Initiated cycles	No of Pregnancies	Ongoing pregnancies	Pregnancy Rate*	Ongoing Pregnancy Rate*
Tuboperitoneal	67 (18.2%)	2	2	13.3%	13.3%
Endometriosis	27 (7.3%)	1	1	20.0%	20.0%
Male Factor	55 (14.9%)	3	3	21.4%	21.4%
Anovulation	26 (7.1%)	0	0	0.0%	0.0%
Unexplained	165 (44.8%)	10	4	30.3%	12.1%
Coital problem	9 (2.4%)	0	0	-	-
Fertility Preservation	3 (0.8%)	0	0	-	-
Others/Mixed	16 (4.3%)	1	1	50.0%	50.0%
Total	**368 (100%)**	**17**	**11**	**23.3%**	**15.1%**

*** Per transfer cycle**

A total of 13 cycles (3.5%) were cancelled: 9 due to poor ovarian response and 4 due to other reasons. Oocytes were not obtained in 2 planned retrieval cycles. There were 25 cycles without normal fertilization, 3 cycles without normal cleavage and 4 cycles with no embryos suitable for transfer. Therefore, no embryo was transferred in these 34 cycles. Embryo transfer was postponed in 248 cycles because of the risk of developing ovarian hyperstimulation syndrome (OHSS), high serum progesterone level or other reasons.

The **oocyte retrieval rate** was 65.0% with an average of 10.2 oocytes obtained per retrieval cycle. The **fertilization rate** was 66.4% and the **cleavage rate** was 96.5%. The oocyte retrieval rate, fertilization rate and cleavage rate were similar to the figures in previous years. The results are summarised in Table 5.

Table 5: Results of Conventional IVF-ET

		per Oocyte Retrieval Cycle	per Follicle Aspirated (Oocyte Retrieval Rate)	per Oocyte Retrieved (Fertilization Rate)	per Fertilized Oocyte (Cleavage Rate)
Number of Oocyte Retrieval Cycles	355				
Number of Follicles Aspirated	5545	15.6			
Number of Oocytes Retrieved	3604	10.2	65.0%		
Number of Oocytes Fertilized	2393	6.7		66.4%	
Number of Fertilized Oocytes Cleaved	2310	6.5			96.5%
Number of Embryos Transferred	73	0.2 (1.0 / ET)			
Number of Pregnancies	17				
Number of Embryos Frozen	1034	2.9			

Most of patients used either GnRH antagonist (48.9%) or Progestin primed ovarian stimulation (PPOS) protocol (50.3%). (Table 6)

Table 6: Ovarian Stimulation Protocols Used

Protocol	No. of Initiated Cycles	No. of Pregnancies	Pregnancy Rate*	Ongoing Pregnancy Rate*
GnRH antagonist	180 (48.9%)	17	23.3%	15.1%
PPOS	185 (50.3%)	0	-	-
GnRHa (long)	1 (0.3%)	0	-	-
Others	2 (0.5%)	0	-	-
Total	**368 (100%)**	**17**	**23.3%**	**15.1%**

*** Per transfer cycle**

All oocyte retrievals were successfully performed under transvaginal ultrasound guidance using intravenous sedation and analgesia. The degree of difficulty of embryo transfer and the corresponding pregnancy rate are shown in Table 7.

Table 7: Difficulty of Transfer

Difficulty	No. of ET Cycles	No. of Pregnancies	Ongoing pregnancies	Pregnancy Rate#	Ongoing Pregnancy Rate#
Easy	73 (100%)	17	11	23.3%	15.1%
Vulsellum, Sound or Dilatation	0 (0%)	0	0	-	-
Total	**73 (100%)**	**17**	**11**	**23.3%**	**15.1%**

 # Per transfer cycle

Among the 355 oocyte retrieval cycles, 1 had moderate to severe OHSS. (Table 8)

Table 8: Complications of Conventional IVF-ET Treatment

Complications	No of Retrieval* Cycles
Nil	354 (99.7%)
Infection	0 (0%)
Significant haemoperitoneum	0 (0%)
Moderate to severe OHSS	1 (0.3%)

There were 17 pregnancies resulting from stimulated IVF-ET cycles. The **pregnancy rate** was 4.6% per initiated cycle and 23.3% per transfer cycle (Table 9). The **miscarriage rate** was 29.4% (Table 10). The **ongoing pregnancy rate** was 3.0% per initiated cycle and 15.1% per transfer cycle. The average number of fresh embryos transferred was 1.0 per transfer cycle. The **multiple pregnancy rate** was 0%. The **implantation rate** was 21.9%.

Table 9: Pregnancy Rates of Conventional IVF-ET

	Pregnancy Rate	Ongoing pregnancy Rate
Per Cycle Initiated	17/368 (4.6%)	11/368 (3.0%)
Per Oocyte Retrieval Cycle	17/355 (4.8%)	11/355 (3.1%)
Per Transfer Cycle	17/73 (23.3%)	11/73 (15.1%)

Table 10: Outcome of Pregnancies

Outcome	Number of Cycles
Preclinical abortion	1 (5.9%)
Clinical abortion	4 (23.5%)
Ectopic Pregnancy	1 (5.9%)
Lost to follow up	0 (0%)
Ongoing Pregnancy	11 (64.7%)
Total Pregnancies	17
No. of Fetuses	11
No. of Multiple Pregnancies	0

The outcome in relation to the number of embryos transferred is shown in Tables 11 and 12.

Table 11: Number of Embryos Transferred & the Outcome

No. of Embryos	No. of ET Cycles	No. of Pregnancies	No. of Ongoing pregnancies (multiple)	Pregnancy Rate[#]	Ongoing Pregnancy Rate[#]	Multiple Pregnancy Rate[+]
1	73 (100%)	17	11 (0)	23.3%	15.1%	0%
2	0 (0%)	0	0 (0)	-	-	-
Total	73 (100%)	17	11 (0)	23.3%	15.1%	0%

 # Per transfer cycle
+ Per pregnancy cycle

Table 12: Outcome of Single Embryo Transfer

Elective	Day of ET	Average Age of Women (years)	No. of ET cycles	Pregnancy Rate[#]	Ongoing Pregnancy Rate[#]	Multiple Pregnancy Rate[+]
Yes	2	36.1	21	7 (33.3%)	3 (14.3%)	0 (0%)
	5	37.0	26	7 (26.9%)	5 (19.2%)	0 (0%)
No	2	38.3	26	3 (11.5%)	3 (11.5%)	0 (0%)
	5	-	-	-	-	-

 # Per transfer cycle
+ Per pregnant cycle

Intracytoplasmic Sperm Injection ~ ICSI (with ejaculated sperm)

Two hundred and seven treatment cycles were initiated in one hundred and ninety-five couples (excluding preimplantation genetics testing). ICSI was decided in 174 treatment cycles because of severe male factor infertility. It was also performed in those who had either failed fertilization or poor fertilization rate (less than 30%) in a previous conventional IVF cycle. This latter group accounted for 27 of the cycles initiated (Table 13).

Table 13: Indications for ICSI

Indications	No. of Initiated Cycles	No. of Pregnancies	Pregnancy Rate*	Ongoing Pregnancy Rate*
Severe Male Factor	174 (84.1%)	10	34.5%	24.1%
Fertilization problem	27 (13.0%)	1	25.0%	0%
Others	6 (2.9%)	0	-	-
Total	**207 (100%)**	**11**	**33.3%**	**21.2%**

***Per transfer cycle**

GnRHa antagonist protocol was used in 99 cycles (47.9%) and Progestin primed ovarian stimulation was used in 106 cycles (51.2%) (Table 14).

Table 14: Ovarian Stimulation Protocols Used

Protocol	No. of Initiated Cycles	No. of Pregnancies	Pregnancy Rate*	Ongoing Pregnancy Rate*
GnRH antagonist	99 (47.8%)	11	33.3%	21.2%
PPOS	106 (51.2%)	0	-	-
GnRHa (long)	0 (0%)	0	-	-
Others	2 (1.0%)	0	-	-
Total	**207 (100%)**	**11**	**33.3%**	**21.2%**

*** Per transfer cycle**

The results are summarized in Table 15.

Table 15: Results of ICSI

		per Oocyte Retrieval Cycle	per Follicle Aspirated (Oocyte Retrieval Rate)	per Oocyte Retrieved (Fertilization Rate)	per Fertilized Oocyte (Cleavage Rate)
Number of Oocyte Retrieval Cycles	206				
Number of Follicles Aspirated	3362	16.3			
Number of Oocytes Retrieved	2256	11.0	67.1%		
Number of Oocytes Fertilized	1120	5.4		49.6% (63.9% per oocyte injected)	
Number of Fertilized Oocytes Cleaved	1093	5.3			97.6%
Number of Embryos Transferred	33	0.2 (1.0 / ET)			
Number of Pregnancies	11				
Number of Embryos Frozen	570	2.8			

Oocytes were not obtained in 2 planned retrieval cycles. Insemination was not performed in 8 cycles. Normal fertilization was not achieved in 15 cycles, 1 did not have normal cleavage and 9 did not have embryos suitable for transfer. Therefore, no embryo was transferred in these 35 cycles. Embryo transfer was postponed in another 138 cycles because of the risk of developing OHSS, high serum progesterone concentration or other reasons. The fertilization rate was 67.1% per oocyte injected this year and was similar to that of last year. The mean number of embryos transferred was only 1.0 per transfer and was comparable to that of conventional stimulated IVF cycles. The degree of difficulty of embryo transfer is shown in Table 16.

Table 16: Difficulty of Transfer

Difficulty	No. of ET Cycles	No. of Pregnancies	Pregnancy Rate#	Ongoing Pregnancy Rate#
Easy	33 (100%)	11	33.3%	21.2%
Vulsellum	0 (0%)	0	-	-
Vulsellum + Sound	0 (0%)	0	-	-
Total	**33 (100%)**	**11**	**33.3%**	**21.2%**

 # Per transfer cycle

There were 11 pregnancies and 7 were ongoing (Tables 17 & 18). The **multiple pregnancy rate** was 0%. The **implantation rate** was 30.3%. One had moderate or severe OHSS.

Table 17: Pregnancy Rates of ICSI

	Pregnancy Rate	Ongoing pregnancy Rate
Per Cycle Initiated	11/207 (5.3%)	7/207 (3.4%)
Per Oocyte Retrieval Cycle	11/206 (5.3%)	7/206 (3.4%)
Per Transfer Cycle	11/33 (33.3%)	7/33 (21.2%)

Table 18: Outcome of Pregnancies

Outcome	Number of Cycles
Preclinical abortion	1 (9.1%)
Clinical abortion	3 (27.3%)
Ectopic Pregnancy	0 (0%)
Lost to follow up	0 (0%)
Ongoing Pregnancy	7 (63.6%)
Total Pregnancies	11
No. of Fetuses	7
No. of Multiple Pregnancies	0

The outcome in relation to the number of embryos transferred in shown in Table 19 and Table 20.

Table 19: Number of Embryos Transferred & the Outcome

No. of Embryos	No. of ET Cycles	No. of Pregnancies	No. of Ongoing pregnancies (multiple)	Pregnancy Rate[#]	Ongoing Pregnancy Rate[#]	Multiple Pregnancy Rate[+]
1	33 (100%)	11	7 (0)	33.3%	21.2%	0%
2	0 (0%)	0	0 (0)	-	-	-
Total	33 (100%)	11	7 (0)	33.3%	21.2%	0%

 # Per transfer cycle
+ Per pregnant cycle

Table 20: Outcome of Single Embryo Transfer

Elective	Day of ET	Average Age of Women (years)	No. of ET cycles	Pregnancy Rate[#]	Ongoing Pregnancy Rate[#]	Multiple Pregnancy Rate[+]
Yes	2	36.0	12	3 (25.0%)	3 (25.0%)	0 (0%)
	5	36.0	7	4 (57.1%)	2 (28.6%)	0 (0%)
No	2	37.9	13	4 (30.8%)	2 (15.4%)	0 (0%)
	5	42.0	1	0 (0%)	0 (0%)	0 (0%)

 # Per transfer cycle
+ Per pregnant cycle

Microsurgical Epididymal Sperm Aspiration ~ MESA

Eight couples underwent eight treatment cycles in 2022. The urological team at Queen Mary Hospital performed a total of 10 MESA procedures, which were arranged before ovarian stimulation or the oocyte retrieval. Indications for MESA cycles are given in Table 21.

Table 21: Indications for MESA

Indications	No. of Initiated Cycles	No. of Pregnancies	Pregnancy Rate*	Ongoing Pregnancy Rate*
Congenital Absence of Vas Deferens	0 (0%)	0	-	-
Obstructive Azoospermia / Post Vasectomy	8 (100%)	0	0%	0%
Severe Male Factor	0 (0%)	0	-	-
Ejaculatory problem	0 (0%)	0	-	-
Total	**8 (100%)**	**0**	**0%**	**0%**

*** Per transfer cycle**

The GnRH antagonist protocol was used in 2 cycles (25.0%), while Progestin primed ovarian stimulation was used in the rest of 6 cycles (75.0%). Oocyte retrieval was performed under transvaginal ultrasound guidance in all 8 cycles and oocytes were obtained in the retrieval cycles. An average of 11.1 oocytes was retrieved in these 8 cycles. The fertilization rate was 64.0% per oocyte injected (Table 22). Embryo transfer was performed in one cycle and embryo transfer was postponed in 7 cycles.

Table 22: Results of MESA+ ICSI

		per Oocyte Retrieval Cycle	per Follicle Aspirated (Oocyte Retrieval Rate)	per Oocyte Retrieved (Fertilization Rate)	per Fertilized Oocyte (Cleavage Rate)
Number of Oocyte Retrieval Cycles	8				
Number of Follicles Aspirated	125	15.6			
Number of Oocytes Retrieved	89	11.1	71.2%		
Number of Oocytes Fertilized	57	7.1		76.0% (64.0% per oocyte injected)	
Number of Fertilized Oocytes Cleaved	55	6.9			96.5%
Number of Embryos Transferred	1	0.1 (1 / ET)			
Number of Pregnancies	0				
Number of Embryos Frozen	29	3.6			

No patient developed complications. There was no difficulty in embryo transfer and there was no pregnancy resulting from MESA + ISCI procedure (Table 23 and 24).

Table 23: Pregnancy Rates of MESA + ICSI

	Pregnancy Rate	Ongoing pregnancy Rate
Per Cycle Initiated	0/8 (0%)	0/8 (0%)
Per Oocyte Retrieval Cycle	0/8 (0%)	0/8 (0%)
Per Transfer Cycle	0/1 (0%)	0/1 (0%)

Table 24: Outcomes of Pregnancies

Outcome	Number of Cycles
Miscarriage	0 (0%)
Ectopic Pregnancy	0 (0%)
Ongoing Pregnancy	0 (0%)
Total Pregnancies	0
No. of Fetuses	0
No. of Multiple Pregnancies	0

The pregnancy rate in relation to the number of embryos transferred is shown in Table 25.

Table 25: Number of Embryos Transferred & the Outcome

No. of Embryos	No. of ET Cycles	No. of Pregnancies	No. of Ongoing pregnancies (multiple)	Pregnancy Rate[#]	Ongoing Pregnancy Rate[#]	Multiple Pregnancy Rate[+]
1	1 (100%)	0	0 (0)	0%	0%	-
2	0 (0%)	0	0 (0)	-	-	-
Total	1 (100%)	0	0 (0)	0%	0%	-

 # Per transfer cycle
+ Per pregnant cycle

Testicular Sperm Extraction ~ TESE

During 2022, ten treatment cycles were initiated in six couples (Table 26). The urological team at Queen Mary Hospital carried out 10 testicular sperm biopsies. Motile sperms were found in 7 testicular biopsies.

Table 26: Indications for TESE

Indications	No. of Initiated Cycles	No. of Pregnancies	Pregnancy Rate*	Ongoing Pregnancy Rate*
Testicular Failure / Arrest	4 (40.0%)	0	-	-
Hypospermatogenesis	3 (30.0%)	0	-	-
Severe Male Factor	0 (0%)	0	-	-
Ejaculatory problem	0 (0%)	0	-	-
Congenital Absence of Vas Deferens	1 (10.0%)	0	-	-
Obstructive Azoospermia / Post Vasectomy	2 (20.0%)	0	-	-
Total	**10 (100%)**	**0**	**-**	**0%**

*** Per transfer cycle**

Ten IVF-TESE cycles were initiated. The antagonist protocol was used in 4 cycles (40.0%) and Progestin primed ovarian stimulation was used in 6 cycles (60.0%). No cycle was cancelled before oocyte retrieval. Oocyte retrieval was performed in 10 cycles under transvaginal ultrasound guidance and no oocyte was obtained in one cycle. An average of 4.2 oocytes were retrieved. The overall fertilization rate was 45.2% per oocyte injected (Table 27). Embryo transfer was postponed in 4 cycles.

Table 27: Results of TESE+ ICSI

		per Oocyte Retrieval Cycle	per Follicle Aspirated (Oocyte Retrieval Rate)	per Oocyte Retrieved (Fertilization Rate)	per Fertilized Oocyte (Cleavage Rate)
Number of Oocyte Retrieval Cycles	10				
Number of Follicles Aspirated	85	8.5			
Number of Oocytes Retrieved	42	4.2	49.4%		
Number of Oocytes Fertilized	19	1.9		61.3% (45.2% per oocyte injected)	
Number of Fertilized Oocytes Cleaved	19	1.9			100%
Number of Embryos Transferred	0	0 (0 / ET)			
Number of Pregnancies	0				
Number of Embryos Frozen	13	1.3			

There were no complications.

Preimplantation Genetic Testing ~ PGT

We continue to provide preimplantation genetic testing (PGT) to women at risk of having babies with serious chromosomal or genetic disorders. In 2022, PGT was performed in 110 stimulated cycles and 12 frozen cycles for 80 couples and indications for PGT were shown in Table 28.

Table 28: Summary of PGT cycles

Indication	No. of patients	No. of cycles	No. of embryos	
			PGT	Normal
Numerical chromosomal abnormalities	2	2	9	6 (66.7%)
Reciprocal translocation	19	25	55	16 (29.1%)
Robertsonian translocation	2	2	10	4 (40.0%)
α-Thalassaemia trait	13	20	45	24 (53.3%)
β-Thalassaemia trait	6	5	10	4 (40.0%)
Other single gene defect	29	34	85	39 (45.9%)
Single gene defect + HLA typing	1	1	0	0 (-)
PGT-A[#]	16	17	31	14 (45.2%)
Others	1	1	0	0 (-)
Total	**89**	**107**	**245**	**107 (43.7%)**

#PGT for aneuploidy (PGT-A) is done for advanced maternal age, repeated implantation failure or recurrent miscarriage. PGT-A was also performed in suitable blastocysts following PGT-M (monogenic diseases).

Frozen embryo transfer after PGT

All blastocysts for PGT were frozen after biopsy and transfer of the frozen blastocysts was arranged after the results were available for counselling. Next generation sequencing was used in PGT-A (aneuploidy) and PGT-SR (structural rearrangement). Each blastocyst was frozen in one straw after biopsy and patients were allowed to replace one blastocyst each time following PGT.

A total of 74 thaw cycles after PGT were initiated, 74 frozen blastocysts were thawed and 74 frozen blastocysts were replaced.

There were altogether 40 **pregnancies** (54.1% per transfer) and 35 **ongoing pregnancies** (47.3% per transfer) resulting from transfer of frozen blastocysts. The overall **miscarriage rate** was 12.5%. The **multiple pregnancy rate** was 0%. The **implantation rate** was 54.1%.

Embryo Cryopreservation and Frozen Embryo Transfer

The results of embryo cryopreservation are summarized in Table 29. As was our experience from previous years, there were excess embryos suitable for cryopreservation in 541* / 698 (77.5%) of the retrieval cycles in 2022.

Table 29: Results of Embryo Cryopreservation

Method of Treatment	IVF	ICSI	MESA	TESE	Others	PGT	Total
No. of Oocyte Retrieval Cycles	355	206	8	10	12	107	698
No. of Cycles with Embryo Cryopreservation	295	164* (7)	8	8* (4)	6	60	541* (11 oocyte-freezing cycles)
Total No. of Embryos Cryopreserved	1034	570*	29	13*	14	110	1770*
Average No. of Embryos Cryopreserved	3.5	3.5*	3.6	1.6*	2.3	1.8	3.3*
Range of Embryos Cryopreserved	1-18	1-35*	2-9	1-3*	1-5	1-10	1-35*

*** with oocyte freezing**

Six hundred and seventy-one women planned to have replacement of frozen embryos (FET). A total of 952 thaw cycles were initiated. Embryo transfer was not done in 1 cycle because of lysis of all frozen embryo(s) or blastocysts during thawing. Six hundred and thirteen frozen embryo replacements were performed in natural (spontaneous ovulatory) cycles, one hundred and forty-nine were in letrozole-induced cycles, one hundred eighty-eight were in total hormone replacement artificial cycles and one was in a stimulated cycle.

The pregnancy rates of these different types of transfer cycles are shown in Table 30.

Table 30: Outcome of FET Cycles

Cycle Type	No. of Cycles	No. of Pregnancies	Pregnant Rate	Ongoing pregnancy rate
Natural	613 (64.5%)	275	44.9%	33.8%
Letrozole	149 (15.7%)	62	41.6%	36.2%
Artificial	188 (19.8%)	67	35.6%	21.3%
Stimulated	1 (0.1%)	1	100%	100%
Total	951 (100%)	405	42.6%	31.8%

The average number of embryos/blastocysts transferred per FET cycles was 1.0. There were altogether 405 pregnancies resulting from transfer of frozen embryos/blastocysts. The overall **miscarriage rate** was 25.5%. The **multiple pregnancy rate** was 1.2% (Table 31). The **implantation rate** was 41.0%.

Table 31: Outcome of Pregnancies in FET

Outcome	No. of Pregnancies	Natural	Artificial	Letrozole	Stimulated
Miscarriage	103 (25.5%)	68	27	8	0
Ectopic Pregnancy	0 (0%)	0	0	0	0
Lost to follow up	0 (0%)	0	0	0	0
Ongoing Pregnancy	302 (74.6%)	207 (75.3%)	40 (59.7%)	54 (87.1%)	1 (100%)
Total Pregnancies	**405**	**275**	**67**	**62**	**1**
No. of Fetuses	307	210	40	56	1
No. of Multiple Pregnancies	5 (1.2%) All twins	3	0	2	0

Table 32: Number of Embryos Transferred & the Outcome

No. of Embryos	No. of FET Cycles	No. of Pregnancies	Pregnancy Rate[#]	Ongoing Pregnancy rate[#]	Multiple Pregnancy Rate[+]
1	946 (99.5%)	405	42.8%	31.9%	1.2%
2	5 (0.5%)	0	0%	0%	0%
Total	**951 (100%)**	**405**	**42.6%**	**31.8%**	**1.2%**

 # Per transfer cycle
+ Per pregnant cycle

Ovulation Induction and Ovarian Stimulation & Intrauterine Insemination

Ovulation Induction

Four patients underwent eleven cycles of ovulation induction by gonadotrophin therapy. One cycle was cancelled. The mean age of patients was 35.1 years. The cycle characteristics are detailed in Table 33. None of the patients was pregnant.

Table 33: Characteristics of Ovulation Induction Cycles

Parameters	Mean ± Standard Deviation
Amount of gonadotrophin used (IU)	2146 ± 1693
Number of follicles ≥ 14mm	1.0 ± 0.0
Number of follicles ≥ 16mm	1.0 ± 0.0
Number of follicles ≥ 18mm	1.0 ± 0.0
Oestradiol on the day of hCG (pmol/l)	1441 ± 1057

Ovarian Stimulation & Intrauterine Insemination

Sixty-one women underwent one hundred and twenty-eight cycles of ovarian stimulation by letrozole or clomiphene citrate in conjunction with intrauterine insemination. Nine cycles were cancelled with seven cycles due to excessive response and one due to failure to submit semen sample and one due to premature luteinization.

The mean age of patients was 33.7 years. The indications and cycle characteristics are shown in Tables 34 and 35 respectively. Eight pregnancies were achieved and the **pregnancy rate** was 6.3% per cycle initiated. There were 7 ongoing singleton pregnancies.

Table 34: Indications for Ovarian Stimulation & Intrauterine Insemination

Indications	Number of Cycles	Cancelled
Male Factors	34	0
Unexplained	51	4
Endometriosis	3	4
Tuboperitoneal Factors	2	0
Coital	14	1
Anovulation	15	0
Others	0	0

Table 35: Cycle Characteristics of Ovarian Stimulation & Intrauterine Insemination

Parameters	Mean ± Standard Deviation
Number of follicles ≥ 12mm	1.6 ± 0.8
Number of follicles ≥ 14mm	1.4 ± 0.6
Number of follicles ≥ 16mm	1.2 ± 0.5
Number of follicles ≥ 18mm	1.1 ± 0.5
Number of follicles ≥ 20mm	0.9 ± 0.5
Oestradiol on the day of hCG (pmol/l)	2285 ± 3847

Natural Cycle Intrauterine Insemination

Sixteen patients underwent thirty-two cycles of intrauterine insemination with natural cycles because of coital problems (n=29) or unexplained factor (n=3). There were 3 cancelled cycles; one due to premature luteinization, one due to absence of follicle growth and one due to other reason.

The mean age of patients was 36.6 years. Four pregnancies were achieved and the **pregnancy rate** was 12.5% per cycle initiated. There were four ongoing singleton pregnancies.

Miscellaneous Statistics

	Number
Diagnostic laparoscopy +/- chromotubation	10
Laparoscopic ovarian cystectomy	5
Laparoscopic salpingostomy	4
Laparoscopic adhesiolysis	10
Laparoscopic salpingectomy	3
Laparoscopic segmental resection	3
Laparoscopic ovarian drilling	0
Laparoscopic ablation of endometriosis	0
Myomectomy	1
Diagnostic hysteroscopy	29
Hysteroscopic polypectomy	29
Hysteroscopic adhesiolysis	5
Hysteroscopic lysis of uterine septum	0
Hysteroscopic myomectomy	5
Hysteroscopic proximal tubal cannulation	0
Uterine curettage and insertion of Mirena	4

Outpatient Clinics

	New	**Follow-up**
Infertility Clinic	650	445
Nurse Triage Clinic	236	0
Male Infertility Clinic*	7	7
Reproductive Genetic Clinic	44	35
Recurrent Miscarriage Clinic	53	56
Sexuality Counselling	49	75
Private Clinic – Reproductive Medicine	212	100
Fertility Preservation Clinic	41	0

*Only those cases seen under Department of Obstetrics and Gynaecology were counted here (mainly cases requiring counselling or treatment on male endocrine problems). Those requiring assessment and management by urologists were seen in the Department of Surgery and were not counted here.

Publications and Conference Reports

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Conference abstract

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Cumulative Statistics

Table 36: Comparative Results of Conventional IVF-ET

	2022	2021	2020	2019	2018
Number of Patients	353	410	357	415	419
Number of Cycles Initiated	368	443	383	448	444
Number of Cycles Cancelled	13	15	8	14	11
Number of Cycles with Oocyte Retrieval	355	424	375	434	433
Number of Oocyte Retrieved	3604	4411	4171	3872	4572
Mean No. of Oocytes / Oocyte Retrieval	10.2	10.4	11.1	8.9	10.6
Number of Oocyte Fertilized	2393	2975	2646	2600	3282
Fertilization Rate	66.4%	67.4%	63.4%	72.4%	71.8%
Number of Cleaving Embryos	2310	2864	2530	2476	3150
Mean No. of Cleaving Embryos/ Retrieval	6.5	6.8	6.7	5.7	7.3
Number of Cycles with Transfer	73	187	178	230	250
Number of Embryos Transferred	73	188	180	231	287
Mean No. of Embryos / Transfer	1.0	1.0	1.0	1.0	1.1
Range	1	1-2	1-2	1-2	1-2
Number of Pregnancies	17	62	62	91	97
Pregnancy Rate / Transfer	23.3%	33.2%	34.8%	39.6%	38.8%
Ongoing Pregnancy Rate / Transfer	15.1%	23.0%	27.0%	30.4%	30.4%
Number of Embryos Frozen	1034	1060	961	1050	1303

Table 37: Comparative Results of ICSI (Ejaculated sperm), excluding PGT

	2022	2021	2020	2019	2018
Number of Patients	195	245	198	236	236
Number of Cycles Initiated	207	278	209	255	264
Number of Cycles Cancelled	1	2	0	1	0
Number of Cycles with Oocyte Retrieval	206	276	209	254	264
Number of Oocytes Retrieved	2256	2941	2203	2643	3714
Mean No. of Oocytes / Retrieval	11.0	10.7	10.5	10.4	10.0
Number of Oocyte Fertilized	1120	1467	1157	1504	1541
Fertilization Rate	63.9%	67.0%	68.3%	70.4%	74.3%
Number of Cleaving Embryos	1093	1430	1129	1472	1503
Mean No. of Cleaving embryos/ Retrieval	5.3	5.2	5.4	5.8	5.7
Number of Cycles with Transfer	33	107	96	126	153
Number of Embryos Transferred	33	108	97	129	187
Mean No. of Embryos / Transfer	1.0	1.0	1.0	1.0	1.2
Number of Pregnancies	11	27	32	40	47
Pregnancy Rate / Transfer	33.3%	25.2%	33.3%	31.7%	30.7%
Ongoing Pregnancy Rate / Transfer	21.2%	16.8%	28.1%	26.2%	21.6%
Number of Embryos Frozen	570	757	476	656	719

Table 38: Comparative Results of Frozen Embryo Transfer (FET)

	2022	2021	2020	2019	2018
Number of Patients	671	796	558	693	636
Number of Thaw Cycles	952	997	736	936	885
Number of Transfer Cycles	951	996	732	925	874
Total Number of Embryos Thawed	985	1036	791	1015	1090
Number of Embryos Replaced	956	998	739	936	992
Mean Number Replaced	1.0	1.0	1.0	1.0	1.1
Type of Transfer Cycle:					
Natural	613	730	539	685	602
Clomid-/ Letrozole-Induced	149	218	164	1	1
Hormone Replacement	188	47	28	152	266
Stimulated	1	1	1	2	2
Number of Pregnancies	405	452	319	383	364
Pregnancy Rate / Transfer	42.6%	45.4%	43.6%	41.4%	41.6%
Ongoing Pregnancy Rate / Transfer	31.8%	35.3%	33.2%	33.3%	29.2%

Quality Assurance

Accreditation by the Reproductive Technology Accreditation Committee (RTAC) of the Fertility Society of Australia was obtained in 2022. The initial audit visit was conducted via Zoom. A screenshot of the visit and the accreditation certificate are attached below.

RTAC
REPRODUCTIVE TECHNOLOGY ACCREDITATION COMMITTEE

Certificate of Compliance

with the

RTAC International Code of Practice

This is to certify that the Reproductive Technology Accreditation Committee of the Fertility Society of Australia recognises that

CENTRE OF ASSISTED REPRODUCTION AND EMBRYOLOGY, THE UNIVERSITY OF HONG KONG QUEEN MARY HOSPITAL (HKU-QMH CARE)

has been found to be compliant with the RTAC International Code of Practice by

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Dr Chris Copeland
RTAC Chairman

Certification Period ends: 31 March 2023

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