

# Impact of COVID-19 on Assisted Reproductive Technology (ART) in Italy 2020

## 1. Introduction

Italy was the first European country in which Sars-CoV-2 infection occurred. The first case of evident transmission of Sars-CoV-2 was recorded February 20<sup>th</sup>, 2020 in Codogno (Lombardia). Since that date, the number of diagnosed cases of Covid-19 increased exponentially and Lombardia became the area most affected by the pandemic.

Following the increase in numbers and in territorial distribution of the cases detected, a national lockdown was imposed in March 11<sup>th</sup> with a Decree of the Presidency of the Council of Ministers. This Decree and the subsequent "Guidelines for the remodulation of deferrable programmed activity during Covid-19 emergencies" issued by the Ministry of Health on March 16<sup>th</sup>, the restrictions were also imposed on healthcare activities, suspending "deferrable" and "non-urgent" hospitalizations. In addition, they suspended the treatments of Assisted Reproductive Technology (ART) and outpatient services.

On March 17<sup>th</sup> the Italian ART National Registry, in collaboration with the National Transplant Center, issued a technical note addressed to the ART centers, regarding the "measures to prevent the transmission of Sars-CoV-2 infection in Italy for reproductive cells and in vitro fertilization treatments".

Recommendations referred to suspending new treatments, including induction of ovulation, intrauterine insemination (IUI) and in vitro fertilization, as well as cryopreservation of gametes, cancellation of embryo transfers, both in fresh cycles and in those from thawing. It also was recommended that gamete donations were temporarily suspended. The only exceptions concerned patients who were currently "in treatment" or requiring fertility preservation treatment before starting gonadotoxic therapies.

Beyond these suspensions, which took place between March and May 2020, there were further slowdowns in ART activities due to the subsequent pandemic waves that occurred between October and December 2020. The measures adopted to contain the spread of the virus were aimed at limiting movements and interactions of the population, access not strictly necessary to health facilities and above all to shift health personnel to Covid-19 assistance.

Consequentially the treatment cycles of ART in 2020 recorded a decrease of 17.6% compared to those carried out in 2019. As expected, the decrease was higher (-25.6%) for the cycles carried out by the National Health System (NHS) and for the treatments carried out in the centers that resided in the regions most affected by the virus, such as Lombardy (-32.2%).

The reduction in activity of the ART cycles was less than expected, because the Italian centers shown great ability in adapting promptly to new needs by efficiently reorganizing the care activities of couples, as well as their clinical and laboratory management.

## 2. ART procedures (II-III level treatments) decreased by 17.6% from 2019 to 2020.

In 2020, almost 68,000 ART total cycles (II-III level techniques) were recorded. Treatments decreased overall by 17.6% from 2019 to 2020 (-14,548 cycles). The greatest decrease of 23% of cycles was found in cycles with fresh embryo transfer. The ART cycles that utilized thawed embryos decreased by 11.4%, while the cycles that involved the use of donated gametes decreased only by 2.3%.

A decrease in activities in 2020 was also recorded in the cryopreservation cycles (-14.8%), with a lower impact in the cryopreservation of embryos (-12.9%) compared to the cryopreservation of oocytes (-30.8%). Intrauterine Insemination (IUI) treatment underwent a total reduction of 26.6%, showing no difference in cycles with or without donation (**Table 1**).

**Table 1. Number of initiated cycles according to the type of technique used, 2019 and 2020**

	2019	2020	difference (%)
<b>ART technique</b>			
Fresh cycle (IVF-ICSI)	50,324	38,728	-23.0
Frozen/thawed Embryo Transfer (FET)	21,796	19,314	-11.4
Frozen/thawed Oocyte (FO)	1,361	1,099	-19.3
Donor gametes	8,995	8,787	-2.3
<i>oocytes</i>	6,867	6,738	-1.9
<i>semen</i>	1,596	1,536	-3.8
<i>oocytes and semen</i>	532	513	-3.6
<b>ART Total</b>	<b>82,476</b>	<b>67,928</b>	<b>-17.6</b>
<b>Cryopreserved cycles</b>			
Cryopreserved embryos cycles	17,713	15,434	-12.9
Cryopreserved oocytes cycles	2,088	1,445	-30.8
<b>Cryopreserved cycles total</b>	<b>19,801</b>	<b>16,879</b>	<b>-14.8</b>
<b>IUI</b>			
IUI-H (husband semen)	15,895	11,679	-26.5
IUI-D (donor semen)	691	492	-28.8
<b>IUI Total</b>	<b>16,586</b>	<b>12,171</b>	<b>-26.6</b>

## 3. Greatest reduction in activity recorded in public centers and private accredited by NHS centers.

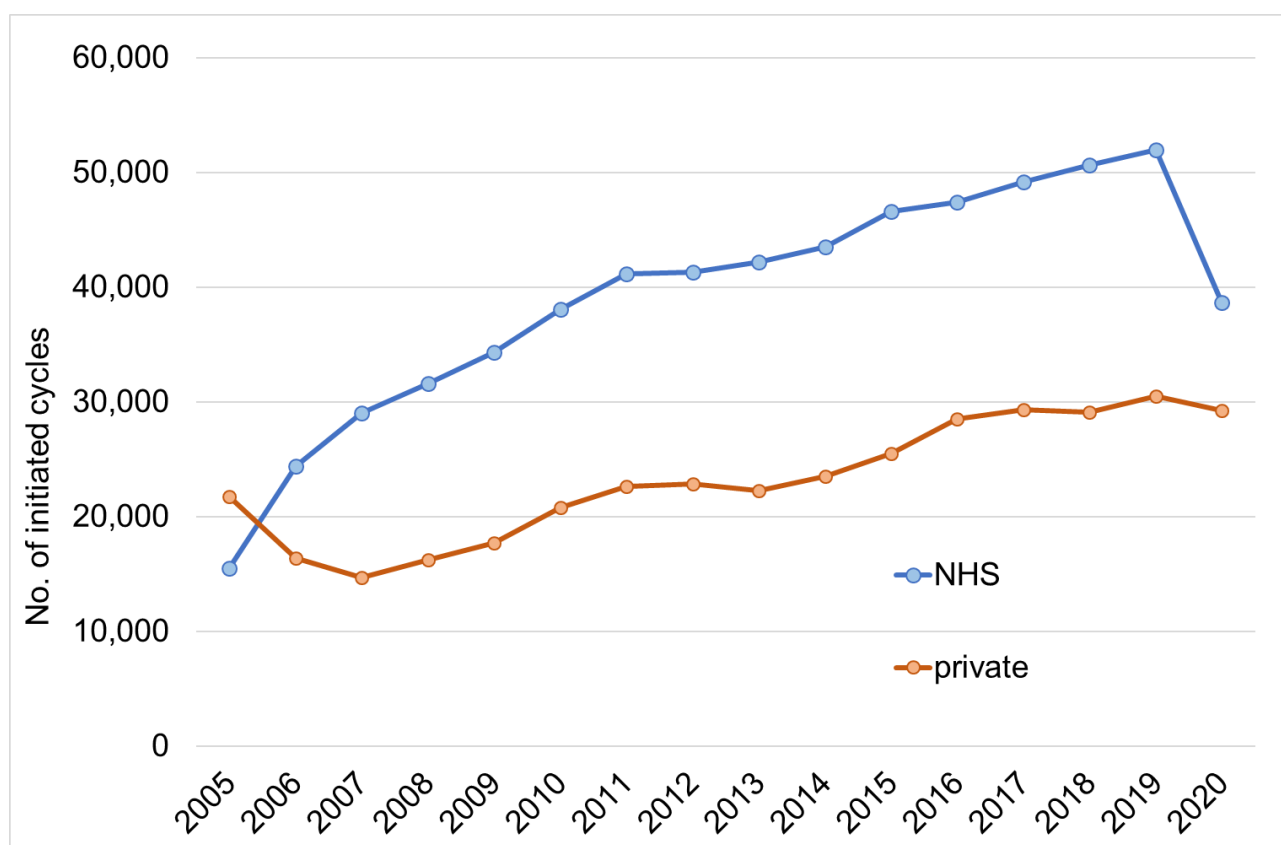
ART treatments performed by the NHS showed a total reduction, from 51,974 cycles in 2019 to 38,669 cycles in 2020 (equals -25.6%) compared to the decrease of only 4.1% for treatments performed in private centers (**Table 2**). The large reduction observed in the treatments carried out by the NHS could be explained both by the impact that the pandemic had on the entire NHS, and by the

slower resumption of activities after the suspension of treatments in public facilities. In addition, in these structures there was a greater use of staff for Covid-19 assistance and a greater limitation of access to the public health structures.

**Table 2. Number of cycles initiated with ART techniques according to centers setting, 2019 and 2020**

Centers setting	2019	2020	difference (%)
public and private accreditate by the NHS	51,974	38,669	-25.6
private	30,502	29,259	-4.1
<b>ART total</b>	<b>82,476</b>	<b>67,928</b>	<b>-17.6</b>

Since 2006, ART cycles performed by the NHS have always been the majority, and up to 2019 these cycles represented 64% of all cycles carried out in Italy, while in 2020 this share dropped to 57 % (Figure 1).



**Figure 1. Number of ART initiated cycles according to the centers setting, 2005-2020**

#### 4. Greater reduction of ART cycles in patients less than 40 years old

Following the recommendations made in 2020 there was a greater reduction in ART activities among patients less than 40 years old (-20.3%) compared to those over 40 years old (-17.3%). In particular, there was the greatest reduction (-21.6%) in patients aged between 35 and 39 years, and the least reduction (-12.1%) in patients older than 42 years (Table 3).

**Tabella 3. Number of ART initiated cycles using own gametes, according to the age groups of the patients, 2019 and 2020**

Female age group in non-donor ART treatment	2019	2020	difference (%)
≤ 34	22,511	18,333	-18.6
35-39	28,788	22,562	-21.6
40-42	16,016	12,824	-19.9
≥ 43	6,166	5,421	-12.1
<b>Non-donor ART total</b>	<b>73,481</b>	<b>59,140</b>	<b>-19.5</b>

Looking at the reductions by age and centers setting, we observe a greater reduction in activities for all age groups for treatments charged to the NHS compared to those carried out privately (Table 4). The cycles offered privately on younger patients in 2020 increased about 1%, showing that in this age group a part of the demand not provided by public centers was accepted by private centers.

**Tabella 4. Difference in activities (2019-2020) of ART techniques with own gametes according to the age groups of the patients and centers settings.**

Female age group in non-donor ART treatment	difference (%)	
	Public and private accreditate by the NHS centers	Private centers
≤ 34	-27.8	+0.9
35-39	-27.8	-8.0
40-42	-27.7	-1.7
≥ 43	-19.7	-2.9
<b>Cicli con gameti propri</b>	<b>-27.2</b>	<b>-3.4</b>

## 5. Impact of Covid-19 on ART activities changed at regional level.

The impact of Covid-19 on ART activities in Italy in 2020 compared to 2019 varies greatly depending on Italian regions and geographical areas. As expected, the greatest decrease in activities was observed in the centers located in the North-West regions (-30.0%), followed by those located in the North-East regions (-15.0%), i.e. the areas which were most affected by the spread of the virus. The region with the greatest reduction in activities was Lombardia, whose centers performed 7,337 fewer cycles than in 2019, equal to a 32.2% reduction in activities (**Table 5**).

**Table 5. Number of ART initiated cycles according to the region and geographical area in which the centers reside, 2019 and 2020**

Regions and geographic area	2019	2020	difference (%)
Piemonte	4,750	3,843	-19.1
Valle d'Aosta	458	316	-31.0
Lombardia	22,758	15,421	-32.2
Liguria	974	691	-29.1
<b>North West</b>	<b>28,940</b>	<b>20,271</b>	<b>-30.0</b>
P.A. Bolzano	2,010	1,517	-24.5
P.A. Trento	796	611	-23.2
Veneto	4,722	4,328	-8.3
Friuli Venezia Giulia	1,557	1,450	-6.9
Emilia Romagna	6,963	5,741	-17.5
<b>North East</b>	<b>16,048</b>	<b>13,647</b>	<b>-15.0</b>
Toscana	9,826	9,273	-5.6
Umbria	509	453	-11.0
Marche	189	168	-11.1
Lazio	8,770	8,117	-7.4
<b>Center</b>	<b>19,294</b>	<b>18,011</b>	<b>-6.6</b>
Abruzzo	1,050	648	-38.3
Molise	79	73	-7.6
Campania	7,150	6,573	-8.1
Puglia	3,155	2,734	-13.3
Basilicata	444	254	-42.8
Calabria	924	1,192	29.0
Sicilia	4,397	3,963	-9.9
Sardegna	995	562	-43.5
<b>South and islands</b>	<b>18,194</b>	<b>15,999</b>	<b>-12.1</b>
<b>Italy</b>	<b>82,476</b>	<b>67,928</b>	<b>-17.6</b>