



# Fertility preservation in patients with cancer

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# Conflict of Interest Disclosure

I have no conflict of interest in the field  
covered by this presentation



## As a result of attending this session, participants will be able to:

- Reflect on initiating fertility preservation discussions with patients facing cancer.
- Update with best practice on this area.
- Access resources to communicate with patients about fertility preservation.
- Acquire information on current assisted reproductive techniques related to fertility preservation.



# Agenda

The effects of cancer treatment on female fertility

The effects of cancer treatments on male fertility

Rosy Cancer Network Quality Improvement initiative



# Impact of cancer treatment on male fertility

- Decreases sperm count and motility
- Increases DNA fragmentation
- Increases aneuploidy frequency

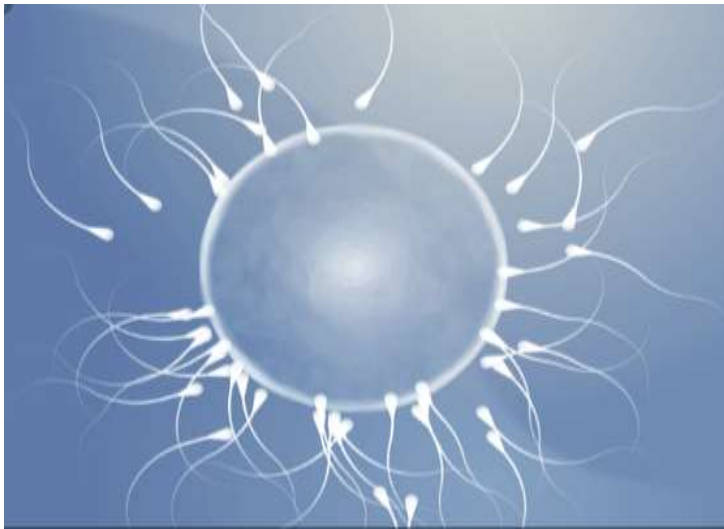
[http://images.livestrong.org/pdfs/livestrong-fertility/LF\\_FertilityRiskCharts\\_Men.pdf#\\_ga=2.238405504.1208121465.1573860479-1382780227.1573860479](http://images.livestrong.org/pdfs/livestrong-fertility/LF_FertilityRiskCharts_Men.pdf#_ga=2.238405504.1208121465.1573860479-1382780227.1573860479)



## Sperm cryopreservation

- A semen analysis is performed at the time of banking.
- Sperm are frozen in 0.5ml straws in the presence of a cryoprotectant.
- Straws are stored in tanks. Each patient has a unique identification number.
- Sperm can be frozen indefinitely at  $-196^{\circ}\text{C}$ .

# Fertilization methods



Natural: > 50 million  
IUI: >10 million  
IVF: > 1 milion



ICSI: 1 sperm!

# ICSI: INTRA-CYTOPLASMIC SPERM INJECTION

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## Assisted reproductive outcomes of male cancer survivors

Ainhoa García · María Belén Herrero · Hananel Holzer ·  
Togas Tulandi · Peter Chan

Received: 26 June 2014 / Accepted: 25 August 2014 / Published online: 2 October 2014  
© Springer Science+Business Media New York 2014

### Abstract

**Purpose** The objective of our study was to evaluate the reproductive outcome of male cancer survivors treated with intracytoplasmic sperm injection (ICSI) using cryopreserved sperm and compare it with the same treatment in non-cancer males.

**Methods** We retrospectively analyzed database derived from cancer and non-cancer patients undergoing sperm cryopreservation from August 2008 to August 2012 at a university-based center. We evaluated the reproductive outcome of those cancer and non-cancer patients that had frozen sperm and returned subsequently to the clinic for assisted reproduction.

**Results** We studied 272 males with cancer and 296 infertile males. The most prevalent types of cancer in our cohort were lymphoma (25.3 %), testicular cancer (19.2 %), leukemia (7.3 %), and other malignancies including sarcoma, gastrointestinal, and central nervous system malignancies (48.2 %). The use rate of cryopreserved sperm was 10.7 % for cancer patients and 30.7 % for non-cancer patients. The mean age of males with cancer who returned to the clinic for fertility treatment was 36.7±6 years, and the diagnoses were testis cancer (43.4 %), lymphoma (36.9 %), leukemia (13 %), and other malignancies (6.7 %). Live birth rate of the cancer

cohort was 62.1 %, which was higher than that of the normospermic non-cancer population ( $p<0.0047$ ).

**Conclusions** The use rate of cryopreserved sperm from oncofertility preservation cases is at around 10 %. The live birth rate using assisted reproductive technologies among these patients is at least comparable to that of the non-cancer population.

**Implications for Cancer Survivors** To our knowledge, this was the first comparative study of male cancer survivors treated with ICSI using cryopreserved sperm, which were compared to non-cancer males undergoing the same treatment. Male fertility preservation is a highly valued service that should be strongly encouraged prior to beginning cytotoxic cancer treatment. These results can help healthcare professionals in oncology to improve the quality of counseling on fertility preservation when managing young men with newly diagnosed cancer that require gonadotoxic treatment.

**Keywords** Male cancer survivor · Fertility · Sperm cryopreservation · Assisted reproductive technologies · ICSI

### Introduction

Historically, the main concerns of both patients with cancer and their healthcare providers were the survival and recur-

# Assisted reproductive outcomes of male cancer survivors versus non-cancer patients

*Garcia et al. J Cancer Surviv, 2015*

Parameters	Cancer (n=27)	Non-cancer/infertile (n=29)	P
Number of attempts	1.7	1.1	0.003
Cumulative Pregnancy Rate (%)	68.9	52.6	ns
Cumulative live birth rate (%)	62.1	40	ns

## Key point:

Male cancer survivors have comparable reproductive outcomes to non-cancer infertile patients undergoing in vitro fertilization



# Fertility and cancer

What are the 3 most important needs depicted  
by young adults with cancer?

1. information on treatment, and risk of recurrence on their specific malignancy
2. effects of treatment on fertility
3. information on healthy diets and exercise during their cancer treatment

Zebrack et al. Cancer, 2013.

Gupta et al. Support Care Cancer, 2013.



## Fertility and cancer

- Many of the young cancer patients have not started or completed a family
- Having children is a very important part of quality of life for young cancer patients



# Quebec public funding facilitates fertility preservation for male cancer patients

M.B. Herrero PhD,\* A. García MSc,\* W. Buckett MD,\* T. Tulandi MD,\* and P. Chan MD\*†

## ABSTRACT

**Background** Sperm cryopreservation remains the only clinically feasible option to preserve male fertility. The quality of counselling provided by the treating physicians and the cost of sperm cryopreservation can both influence a patient's decision about whether to preserve sperm. On 5 August 2010, the Quebec government introduced provincial coverage of assisted reproductive technologies, with sperm cryopreservation included as a covered service. The aim of the present study was to evaluate whether and how such a program affects the behaviour of cancer patients with respect to sperm cryopreservation.

**Methods** We analyzed the database derived from male patients undergoing sperm cryopreservation from August 2008 to August 2012 at our centre. The retrieved data included patient age, male infertility or oncologic diagnosis, sperm quality parameters, and details about the number of visits for sperm cryopreservation.

**Results** The number of cancer patients who cryopreserved sperm before and after the policy change did not differ significantly, but a marked increase in the number of non-cancer patients was observed. Further analysis revealed that, after implementation of the public funding program, the total number of sperm cryopreservation sessions per patient increased significantly in cancer patients but not in non-cancer patients.

**Conclusions** It appears that cancer patients who are willing to freeze sperm are keen to return for more sessions of sperm banking when no fees are associated with the service. Those findings suggest that cost reduction is an important factor for improving delivery of fertility preservation services to male cancer patients.

**Key Words** Male fertility preservation, costs, assisted reproductive technologies

# Number of patients before and after provincially funding of assisted reproductive technologies (ART)

	24 months before provincially funding of ART	24 months after provincially funding of ART	P value
Median age of <b>cancer</b> patients (years)	30.9	30.0	NS
Number of cancer patients (%)	127 (46.7%)	145 (53.3%)	NS

## Different types of cancer and types of infertility among patients that cryopreserved sperm before and after provincially funding of ART

	24 months before provincially funding of ART	24 months after provincially funding of ART	P value
<b>Type of cancer patients:</b>			
Testicular	19.8%	18.6%	NS
Lymphoma	27.0%	24.1%	NS
Leukemia	7.1%	9.0%	NS
Other types	46.1%	48.3%	NS

# Number of visits per male cancer patient before and after provincially funding of fertility preservation

	24 months before provincially funding of ART	24 months after provincially funding of ART	P value
Number of cancer patients (%)	46.7%	53.3%	NS
Median number of sessions per cancer patient	1.30	1.70	0.0005

**Key point:**  
Male cancer patients perform more banking sessions when cost is no longer a barrier





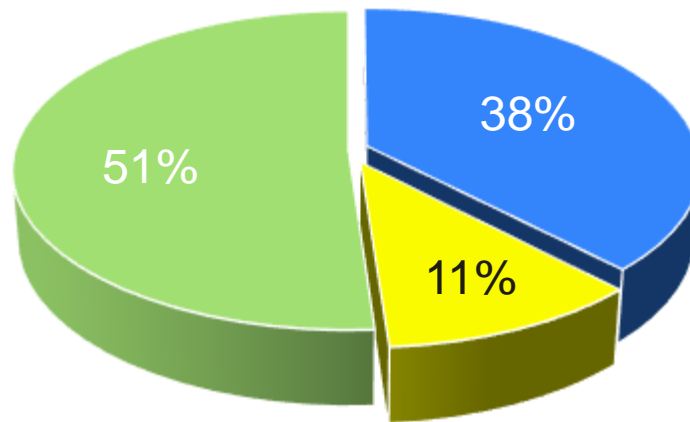
## Fertility and cancer

Less than 25% patients banked gametes

Most young cancer patients are unaware of the impact of their treatment on their fertility status

# Survey to cancer patients attending MUHC RC

**In your opinion, which way of learning about fertility preservation do you consider useful?**



- Discussion with HCP ONLY
- Learning via brochure, educational video, poster, peer support) ONLY
- Discussion with HCP+another channel of information

**Key point:**

**Cancer patients prefer to discuss fertility preservation options with a trusted source**

## Fertility Preservation for Patients With Cancer: American Society of Clinical Oncology Clinical Practice Guideline Update

Alison W. Loren, Pamela B. Mangu, Lindsay Nohr Beck, Lawrence Brennan, Anthony J. Magdalinski, Ann H. Partridge, Gwendolyn Quinn, W. Hamish Wallace, and Kutluk Oktay

Alison W. Loren, Perelman School of Medicine at the University of Pennsylvania, Philadelphia; Anthony J. Magdalinski, Private Practice, Sellersville, PA; Pamela B. Mangu, American Society of Clinical Oncology, Alexandria, VA; Lindsay Nohr Beck, LIVESTRONG Foundation's Fertile Hope Program, Austin, TX; Kutluk Oktay, Innovation Institute for Fertility Preservation, New York Medical College, Rye and New York, NY; Lawrence Brennan, Oncology Hematology Care, Crestview Hills, KY; Ann H. Partridge, Dana-Farber Cancer Institute, Boston, MA; Gwendolyn Quinn, Moffitt Cancer Center, Tampa, FL; and W. Hamish Wallace, Royal Hospital for Sick Children, Edinburgh, United Kingdom.

Published online ahead of print at [www.jco.org](http://www.jco.org) on May 28, 2013.

A.L. and K.O. were Update Panel Co-Chairs.

Authors' disclosures of potential conflicts of interest and author contributions are found at the end of this article.

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### A B S T R A C T

#### **Purpose**

To update guidance for health care providers about fertility preservation for adults and children with cancer.

#### **Methods**

A systematic review of the literature published from March 2006 through January 2013 was completed using MEDLINE and the Cochrane Collaboration Library. An Update Panel reviewed the evidence and updated the recommendation language.

#### **Results**

There were 222 new publications that met inclusion criteria. A majority were observational studies, cohort studies, and case series or reports, with few randomized clinical trials. After review of the new evidence, the Update Panel concluded that no major, substantive revisions to the 2006 American Society of Clinical Oncology recommendations were warranted, but clarifications were added.

#### **Recommendations**


As part of education and informed consent before cancer therapy, health care providers (including medical oncologists, radiation oncologists, gynecologic oncologists, urologists, hematologists, pediatric oncologists, and surgeons) should address the possibility of infertility with patients treated during their reproductive years (or with parents or guardians of children) and be prepared to discuss fertility preservation options and/or to refer all potential patients to appropriate reproductive specialists. Although patients may be focused initially on their cancer diagnosis, the Update Panel encourages providers to advise patients regarding potential threats to fertility as early as possible in the treatment process so as to allow for the widest array of options for fertility preservation. The discussion should be documented. Sperm and embryo cryopreservation as well as oocyte cryopreservation are considered standard practice and are widely available. Other fertility preservation methods should be considered investigational and should be performed by providers with the necessary expertise.

## **Fertility Preservation Practices Among Ontario Oncologists**

Samantha Yee • Esme Fuller-Thomson • Angela Lau •  
Ellen M. Greenblatt

### **Results:**

1. Majority of oncologists had positive attitudes but many did not have current knowledge of cryopreservation
2. Great majority did not have educational materials or patient resources to facilitate discussion
3. ~25% did not know where to refer male cancer patients for sperm banking; almost 50% rarely made a referral



Both health care professionals and patients need to be aware of the fertility preservation option and how to access it.

# Improving access to fertility preservation services to newly diagnosed cancer patients (Phase 1 & 2)

1

## Improving access to fertility preservation services to **male** cancer patients

Funding mechanism: 2015 QI Grant

Principal Applicant: Dr. Belén Herrero

Status: completed

2

## Improving access to fertility preservation services to **female** cancer patients

Funding mechanism: 2017 QI Grant

Principal Applicant: Dr. William Buckett

Status: started January 2018




## Strategy:

- To standardize the referral process across RCN hospitals.
- To offer educational sessions to oncologist health care providers about the cancer-treatment related fertility risks.
- To develop a suite of patient education tools to equip patients with knowledge regarding importance of timely fertility preservation care.

# Harmonizing referral process across RCN in accordance with 2013 ASCO guidelines


## Newly created fertility preservation referral form

- ❖ Created with input from oncology teams across RCN
- ❖ Male/Female
- ❖ Simple to use
- ❖ Allows all members of the oncology team to make a referral



Centre universitaire de santé McGill / McGill University Health Centre

Veuillez étamper la carte d'hôpital ou compléter  
Please stamp hospital card or complete



A F R U - 6 2 0 9 \*

**Centre de la reproduction du CUSM**  
**Référence pour préservation de la fertilité**

MUHC Reproductive Centre  
Referral for fertility preservation

Date: \_\_\_\_\_  
A A Y Y / M M / J D

**Questions? Composez le :**  
*Please call :*

514-843-1650

**Veillez télécopier ce formulaire au :**  
*Please fax this form to:*

514-843-1496

Urgent :  Oui / Yes  Non / No

Fertilité :  Masculin / Male  Féminin / Female

**Médecin traitant en oncologie**  
*Treating physician in oncology*

Nom en lettres moulées <i>Name in print</i>	Téléphone <i>Telephone</i>	Hôpital <i>Hospital</i>
Signature	No de permis <i>Licence No.</i>	Date (A A Y Y / M M / J D)

**Professionnel de la santé référent**  
*Referring health care provider*

Médecin / Physician   
  Infirmier(ère) / Nurse   
  Professionnel paramédical / Allied health professional


Nom en lettres moulées <i>Name in print</i>	Téléphone <i>Telephone</i>	Hôpital <i>Hospital</i>	Signature	Date (A A Y Y / M M / J D)
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**Diagnostic**  
*Diagnosis*


**Plan de traitement**  
*Treatment plan*

**Début de traitement prévu dans** \_\_\_  jours  semaines  
*Expected start of treatment in* \_\_\_  days  weeks

**Commentaires**  
*Comments*



Réseau de cancérologie Rossy



Rossy Cancer Network

DM-4077 (REV 2016/09/21) CUSM Repro MUHC

**PRÉSERVATION DE LA FERTILITÉ      FERTILITY PRESERVATION**





**Centre du Cancer des Cèdres**  
**Demande de chimiothérapie / biothérapie**

Page 1 de 2

Cedars Cancer Centre  
Request for chemotherapy / biotherapy

Taille / Height \_\_\_\_\_ Poids / Weight \_\_\_\_\_

**\*\*SOUMETTRE CETTE DEMANDE ACCOMPAGNÉE DE LA PRESCRIPTION SEULEMENT LORSQUE LES INVESTIGATIONS SONT COMPLÉTÉES**  
**SUBMIT THIS REQUEST WITH THE PRESCRIPTION ONLY WHEN ALL INVESTIGATIONS ARE COMPLETE\*\***

Diagnostic / Diagnosis \_\_\_\_\_  
Type de traitement / Treatment type \_\_\_\_\_  
Date de début ciblé / Target start date \_\_\_\_\_  
(AAYY/MM/JD)  
LES DEMANDES URGENTES (MOINS DE 7 JOURS) DOIVENT ÊTRE DISCUTÉES AVEC L'ASSISTANT(E) INFIRMIER (ÈRE) CHEF  
URGENT REQUESTS (LESS THAN 7 DAYS) MUST BE DISCUSSED WITH THE ASSISTANT NURSE MANAGER

Nombre de cycles prévus / Number of cycles planned \_\_\_\_\_ ou / or  Durée indéterminée / Undetermined period  
Intention / Intent

- Curatif / Curative  Induction / Remission induction  Néoadjuvant / Neoadjuvant  
 Adjuvant  Palliatif / Palliative  Autre / Other \_\_\_\_\_  
 Étude clinique / Clinical trial

Nom du/de la coordonnateur(trice) / Name of data manager \_\_\_\_\_ Extension \_\_\_\_\_

Autres considérations / Other considerations \_\_\_\_\_

- Radiothérapie / Radiotherapy  
 Non / No  Avec chimiothérapie / Concomitant with chemotherapy  
 Après / After \_\_\_\_\_ cycles de chimiothérapie / Cycles of chemotherapy  
 Autre / Other \_\_\_\_\_

- Cathéter central requis / Central venous access device required  
 Profil de coagulation prescrit / Coagulation profile ordered

- Analyses sanguines à répéter avant le début de la chimiothérapie  
Blood tests to be repeated prior to initiation of chemotherapy

- Traitement hors formulaire / Non formulary treatment  
 Approuvé / Approved  Formulaire soumis, approbation en attente / Form submitted, approval pending

- Rendez-vous médical avant le début de la chimiothérapie  
Medical appointment prior to initiation of chemotherapy

- Référence pour préservation de la fertilité requise / Referral for fertility preservation required  
Référence envoyée? / Consult sent?  Oui / Yes  Non / No

Commentaires / Comments \_\_\_\_\_

	Nom en lettres moulées / Name in print	Signature	N° Permis License No.	Date AAYY/MM/JD
Médecin Physician				
	Nom en lettres moulées / Name in print		Signature	
Rempli par l'agent(e) administratif(ve) Processed by the administrative agent				
Premier traitement planifié Booked first treatment	Date (AAYY/MM/JD)			

# Generating awareness to oncologist HCPs: Educational talks across RCN

Venue	Event type	Date	Presenters
MUHC	Hematology Ground Rounds	30-5-2018	Drs. Buckett & Herrero
MUHC	Oncology Nurses Rounds	4-6-2018	MC. Brabant (RN) & Dr. Herrero
MUHC	Oncology Ground Rounds	26-11-2018	Drs. Buckett & Herrero
SMHC	Oncology Nurses Rounds	25-3-2019	Dr. Herrero
JGH	General Practitioners (GP) Ground Rounds	26-2-2019	Drs. Buckett & Herrero
JGH	Oncology Nurses Ground Rounds	02-4-2019	MC. Brabant (RN) & Dr. Herrero
	Quebec Breast Cancer Foundation	11-5-2019	Drs. Buckett & Herrero

# Generating awareness to oncologist HCPs: Educational talks to *Tumor Boards* across RCN

Venue	Event type	Date	Presenters
JGH	Tumor Board Hematology	08-4-2019	Dr. Herrero
JGH	Tumor Board Breast	8-5-2019	Dr. Herrero
JGH	Tumor Board Gynecology	12-9-2019	Dr. Herrero
MUHC	Tumor Board Breast	29-5-2019	Dr. Herrero
MUHC	Tumor Board Gynecology	06-09-2019	Dr. Herrero

# Fertility preservation

## WHEN?

- Before cancer treatment


## WHERE?

- Fertility Centers (5 in Montreal area)
- MUHC Reproductive Center-hosted initiative:

**888, Blvd. de Maisonneuve East, Suite 200  
Montreal, QC H2L 4S8  
Metro Berri-UQAM**

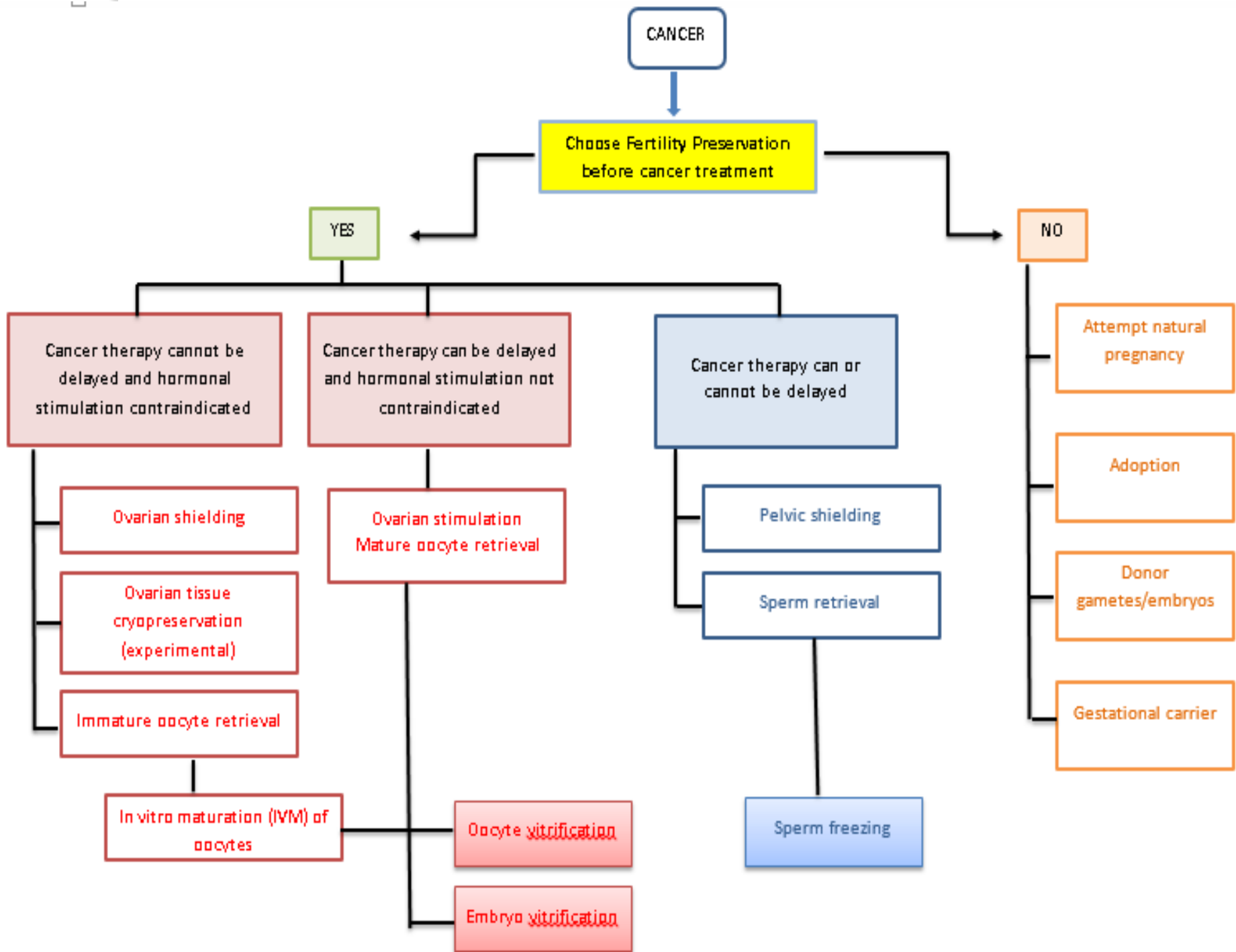
# Fertility preservation

## HOW?

- Referral form filled out by Oncology Health Care provider, Primary Care Physician, Geneticist, or Patient (auto referral).
-  MUHC reproductive center: 514-843-1650 or 42000 (nurse manager assistant).

## WHAT could be discussed with patients?

- Educational material
- Cost (covered by Medicare in Quebec)
- Consultation with fertility specialist



# GENERATING AWARENESS TO PATIENTS: BROCHURE

- Validated with HCPs
- Validated with patients
- Bilingual
- Literacy level: grade 4-6

Specific to Quebec HC context (i.e. Bill 20)

- At Glen: Cedars Can Support Library
- JGH: Hope & Cope Library



## Des enfants après le cancer?

Pensez à préserver votre fertilité **avant le début** de votre traitement oncologique



Soins de préservation de la fertilité pour les femmes qui reçoivent un diagnostic de cancer



## Kids After Cancer?

Consider fertility preservation **before starting** your oncology treatment



Fertility preservation care for women diagnosed with cancer



# Patient Education Tools – Brochure



Réseau de  
cancérologie  
Rossy

Rossy  
Cancer  
Network

## Kids After Cancer?

Consider fertility preservation  
before starting your  
oncology treatment



Fertility preservation care for male  
patients diagnosed with cancer

"I didn't know if I was going to be fertile or not after my treatments. Fortunately, I was. But if I wasn't, I see making the choice to freeze my sperm as a younger man was the best insurance policy for happiness there is."

— Gregory, 33, testicular cancer survivor

### Can cancer treatments affect my ability to have a child?

Cancer treatments such as surgery, chemotherapy and radiation can damage your fertility (ability to have a child). This effect can be temporary or permanent. Your risk depends on the type of cancer you have, the treatments you receive, your age, and your fertility status before cancer treatment.

### What can I do to preserve my fertility?

The most effective way to protect your fertility is by freezing your sperm before you start cancer treatments.

### What does the sperm freezing procedure involve?

You will be asked to produce one or more sperm samples before the start of your cancer treatment. You can produce a sperm sample either at home or in a private room at the MUHC Reproductive Centre. Your sperm will be analyzed, frozen and stored at our centre.

If you are not able (or do not wish) to produce a sperm sample by ejaculation, alternative ways of collecting sperm will be considered.

### How long can sperm stay frozen?

Your sperm can stay frozen until the day you are ready to use it to have a baby.



### How will my frozen sperm be used when I'm ready to have a child?

Your frozen sperm will be used to conceive a child through assisted reproduction such as intrauterine insemination (IUI) or in vitro fertilization (IVF).

### How much does it cost to freeze sperm?

Sperm freezing for adolescents and adults diagnosed with cancer is covered under the Quebec Health Insurance Plan (RAMQ) as per Bill 20 (chapter 25-34.3).

### How long do I have to wait for an appointment?

There are no wait times for appointments.

### How do I book a sperm freezing appointment?

Ask your oncology provider for a referral or call the MUHC Reproductive Centre at 514-843-1650.

### For more information:

MUHC Reproductive Centre  
Royal Victoria Hospital (Legacy Site)  
F6.58 - 687 Pine Ave West, Montreal, QC H3A 1A1  
Telephone: 514-843-1650 Fax: 514-843-1495  
Email: [info@mcgillivf.com](mailto:info@mcgillivf.com)  
[www.mcgillivf.com](http://www.mcgillivf.com)



Centre universitaire  
de santé McGill McGill University  
Health Centre



Centre hospitalier de St. Mary  
St. Mary's Hospital Center



Centre universitaire  
de santé McGill



Reproductive  
Centre

McGill University  
Health Centre



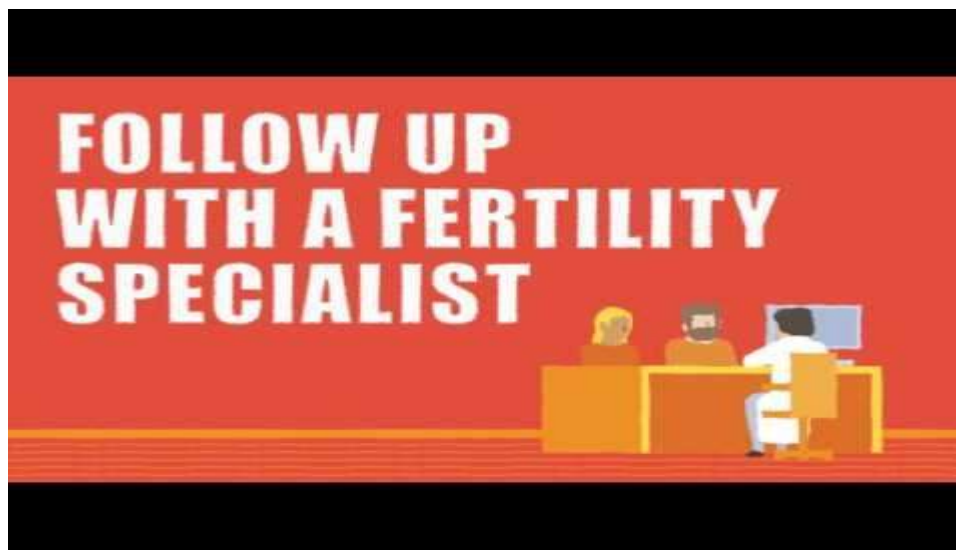
# Generating awareness to patients: Video



You tube

[muhc.ca/reproductivecentre](https://muhc.ca/reproductivecentre)

[www.mcgill.ca/rcr-rcn/](http://www.mcgill.ca/rcr-rcn/)



OPAL app

# Opal (patient electronic portal)



MANAGE MONITOR LEARN ENGAGE TEAM SUPPORT FRANÇAIS

## Your Medical Information with You

Opal is a patient portal designed to empower you with your medical information at the McGill University Health Centre.

Now available:



DONATE TO OPAL

Join the Opal mailing list!

SUBMIT






Check out our YouTube channel.

**Opal app** was created as a patient waiting time monitoring **app**, but it also provides patients with access to their medical records, test results. It also enables secure messaging with healthcare workers and gives access to **education material**, questionnaires, and other useful information.



# Fertility Preservation-Tools developed

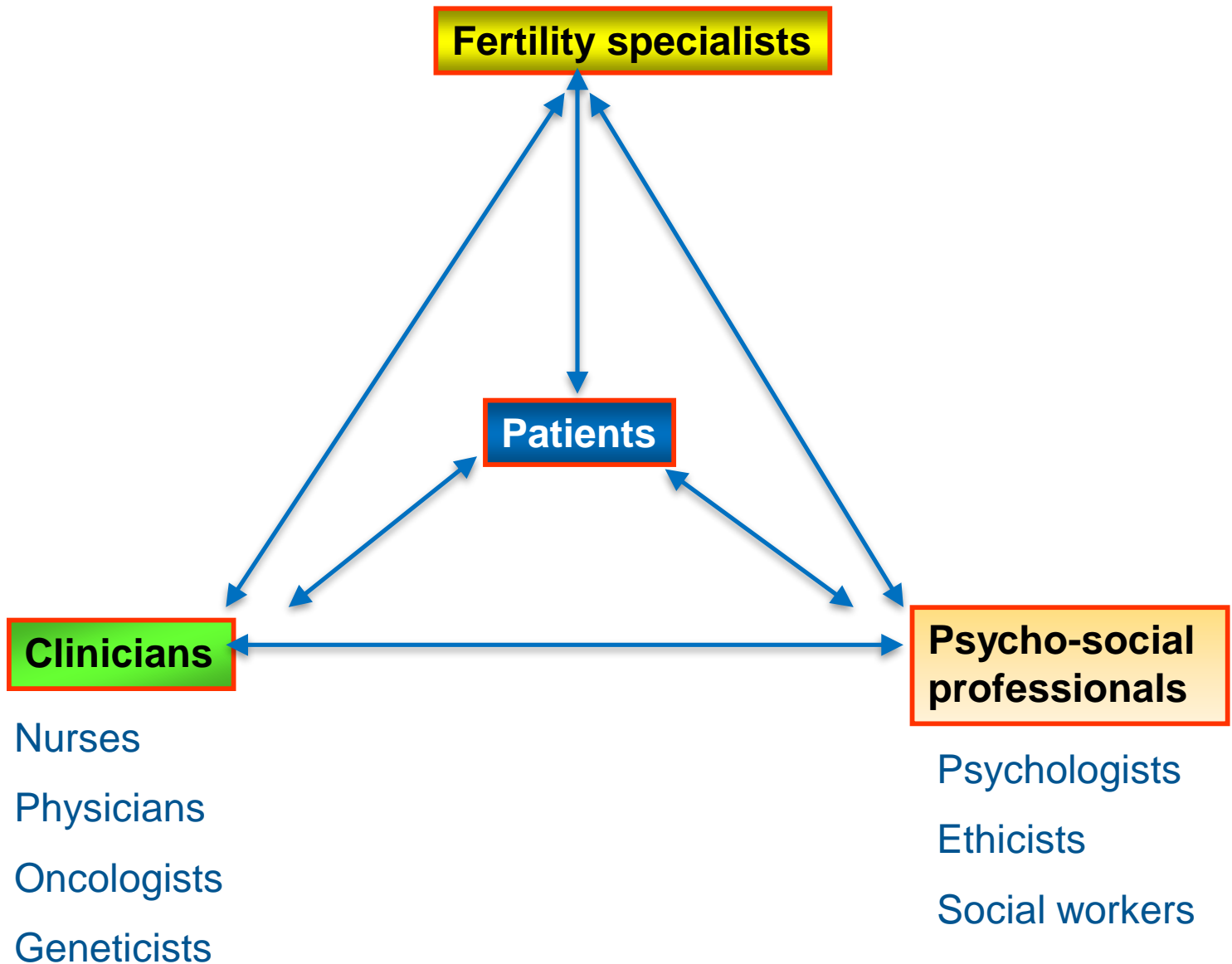
## *Checklist*

-  Referral form
-  Brochure
-  Poster
-  Video
-  FAQs

[muhc.ca/reproductivecentre](http://muhc.ca/reproductivecentre)

OPAL app

# FERTILITY PRESERVATION MULTI-DISCIPLINARY MODEL

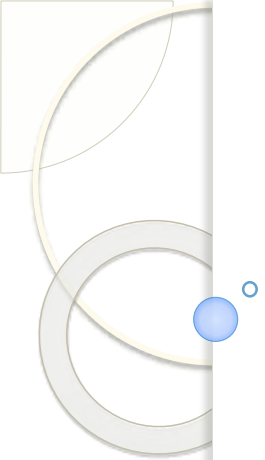




# Conclusions

The material created through this initiative:

- Addresses patients concerns/needs
- Enhances communication on reproductive health and family planning between patients with cancer and HCP
- Empowers HCP & patients
- Leads towards a patient-centred care approach



# Nothing about me, without me.

Valerie Billingham



## References

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Loren et al. *J. Clin. Oncol.* (2013) **31**: 2500.

Yee et al. *J. Can. Educ.* (2012) **27**: 362.

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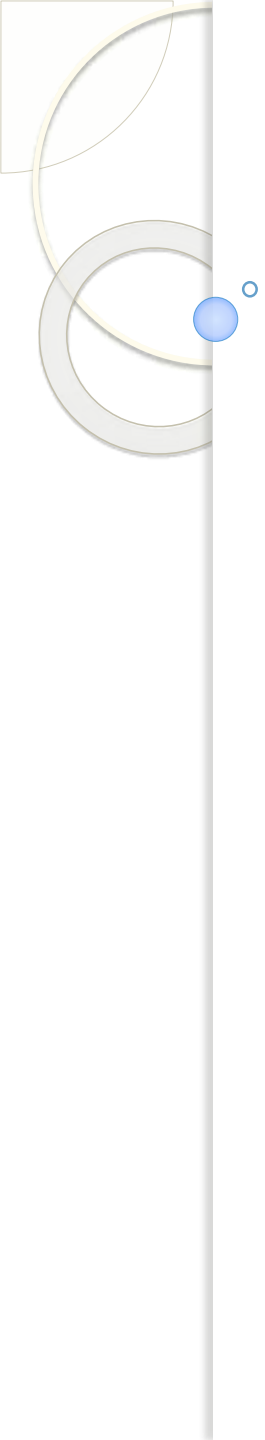
Dr. Ashley Davidson

Dr. Kavan

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John Kildea, PhD





Thank you