Fertility & Reproductive Health Panel

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Fertility Preservation, Assessment, and Treatment for Girls & Women

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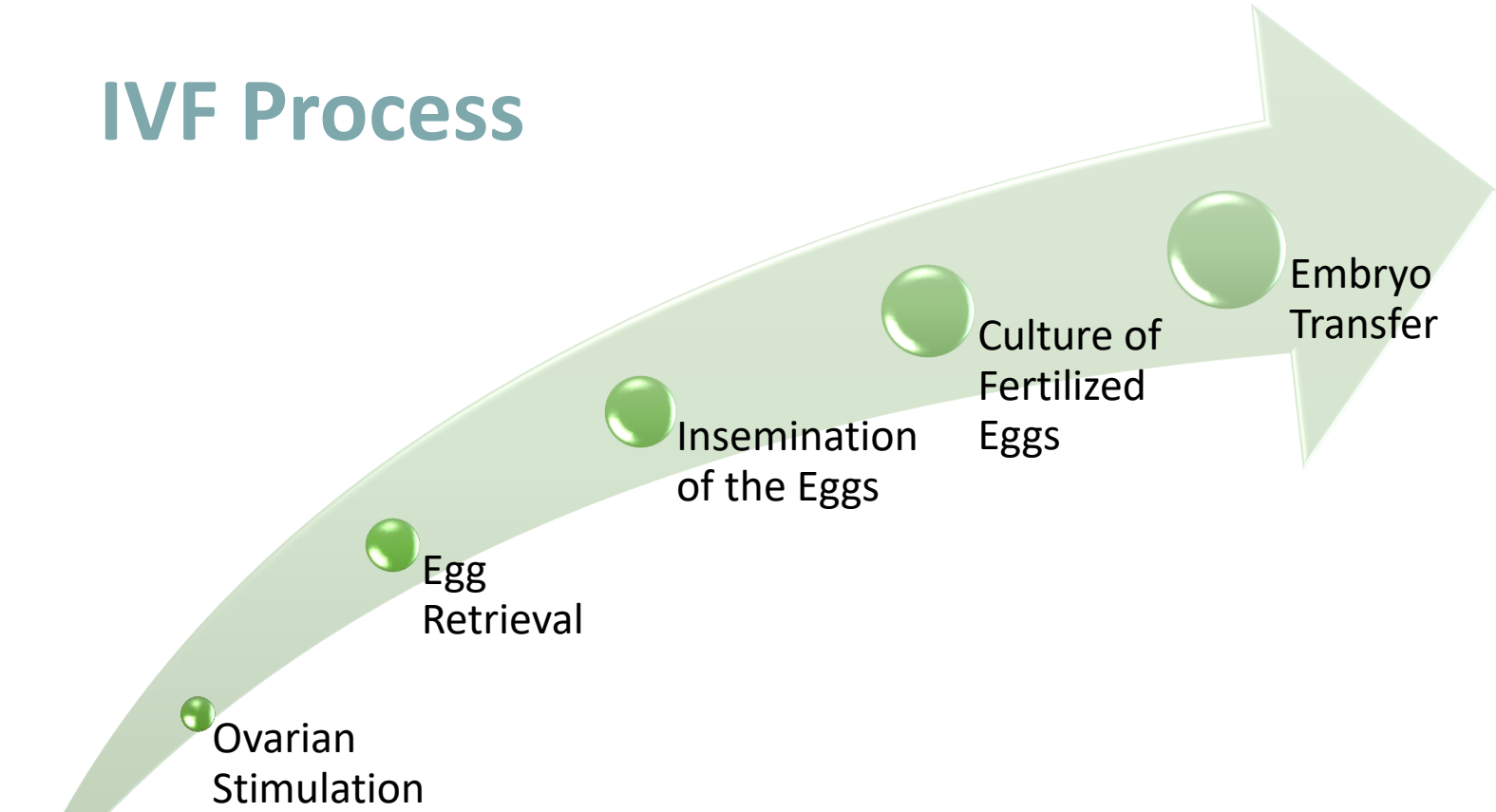
Options for Females

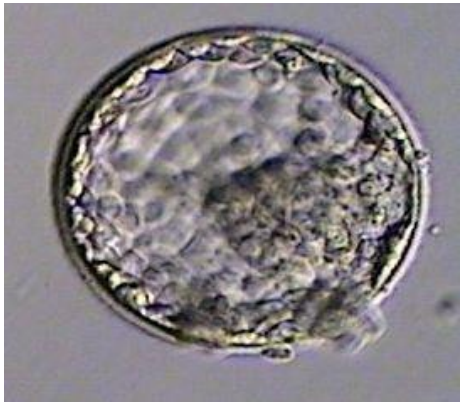
	Before Treatment	During Treatment	After Treatment	Status
Egg Freezing	X		X	Standard
Embryo Freezing	X		X	Standard
Ovarian Tissue Freezing	X		X	Experimental
In Vitro Maturation	X		X	Experimental
Ovarian Transposition	X			Standard
Conservative Surgery		X		Standard
GnRHa		X		Experimental
Natural Conception			X	Standard
In Vitro Fertilization			X	Standard
Donor eggs or embryos			X	Standard
Adoption			X	Standard
Gestational Surrogacy			X	Standard

Assisted Reproductive Technology (ART)

IVF Process



Before (or After) Treatment Egg and/or Embryo Freezing for Post-Pubertal Females



- Embryo freezing has been used routinely for storing surplus embryos after IVF for many years
- Egg freezing may be preferred for women who do not have a committed lifetime male partner
  - Avoid use of donor sperm
  - Fewer religious or ethical concerns
  - Lower up-front cost per cycle
  - Less information about future reproductive potential

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Before (or After) Treatment
Egg and/or Embryo Freezing

- Ovarian stimulation and retrieval takes about 2 weeks total
- Involves injectable stimulation medications each evening
- No longer cycle-dependent, could begin at any time
- Egg retrieval procedure is done under a light anesthesia, takes about 20 minutes, and there are no incisions, sutures, or scars
- For hormonally-sensitive tumors (e.g. breast cancer), goal is to minimize estrogen exposure during ovarian stimulation
  - Well established, reduces concern
    - Aromatase Inhibitors (Letrozole)
    - Selective Estrogen Receptor Modulators (Tamoxifen)

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Egg Freezing (Oocyte Vitrfication)

- **1999**

  First human pregnancy

- **2002-2007**

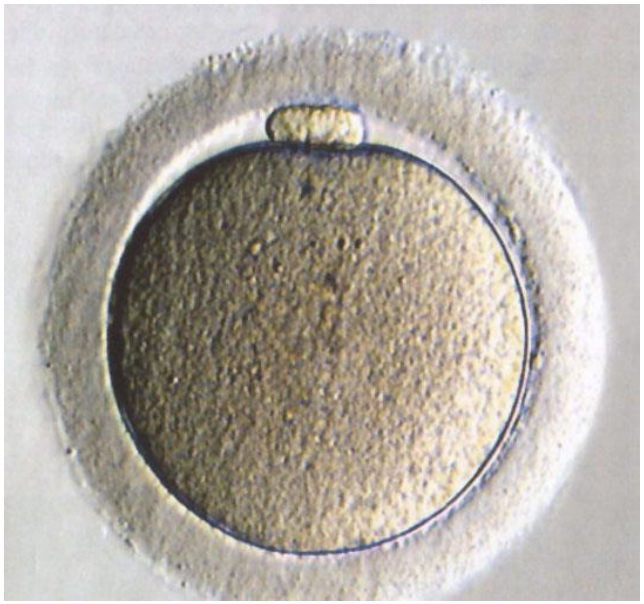
  Studies shows good survival, fertilization, cleavage rates

- **2006-present**

  Studies show pregnancy rates similar to that of fresh IVF

- **October 2012**

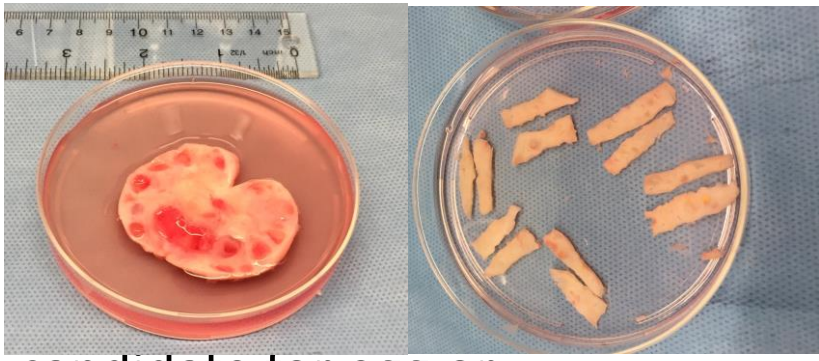
  ASRM deems egg freezing no longer experimental



120 microns

Metaphase II
(mature oocyte)

Ovarian Tissue Freezing



- Only considered if a patient is not a candidate for egg or embryo freezing as the most mature technology is always recommended.
- May be the only method available for pre-pubertal children
- Can be performed immediately
- Requires surgery
- What to do with the tissue in the future??
  - Thaw and transplant
    - Orthotopic or heterotopic
    - 42 livebirths reported as of 2015
  - Or in vitro follicle maturation - IFM
    - National Physicians Cooperative of the Oncofertility Consortium
    - 3-D scaffold system

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Before Treatment
Ovarian Transposition

Protect the ovaries from radiation by surgically moving the ovaries up out of the pelvis (requires laparoscopy)

Because of radiation scatter, the ovaries are not always protected and this technique is not always successful

During Treatment
Ovarian Shielding

Protect the ovaries from radiation by shielding

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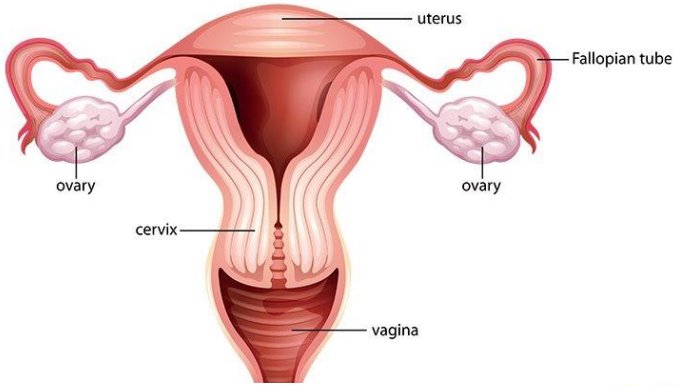
During Treatment
Conservative Surgery

Trend toward less aggressive surgery in young patients with cancer

- Can the uterus be preserved?
- Can the cervix be preserved?
- Can one ovary be preserved?
- Can cystectomy be performed instead of oophorectomy?



During Treatment
GnRH Analog Co-treatment

- Ovarian suppression during chemotherapy
- e.g. leuprorelin or leuprolide acetate, goserelin, buserelin
- Almost 1,000 publications in the literature, but few good studies
- GnRHa may be offered in hopes of reducing the likelihood of chemotherapy-induced ovarian insufficiency. However, GnRHa should not be used in place of proven fertility preservation methods.

After Treatment

* Do you have frozen eggs or embryos?
* Fertility Assessment

- Blood draw for anti-mullerian hormone (AMH)
- Blood draw for FSH, E2 (if menses, cycle days 2, 3, or 4)
- Ultrasound for antral follicle count (AFC)

- Growing eggs and sperm may be damaged by chemotherapy and radiation, but there may be a partial repair process during the first 6 to 24 months after treatment

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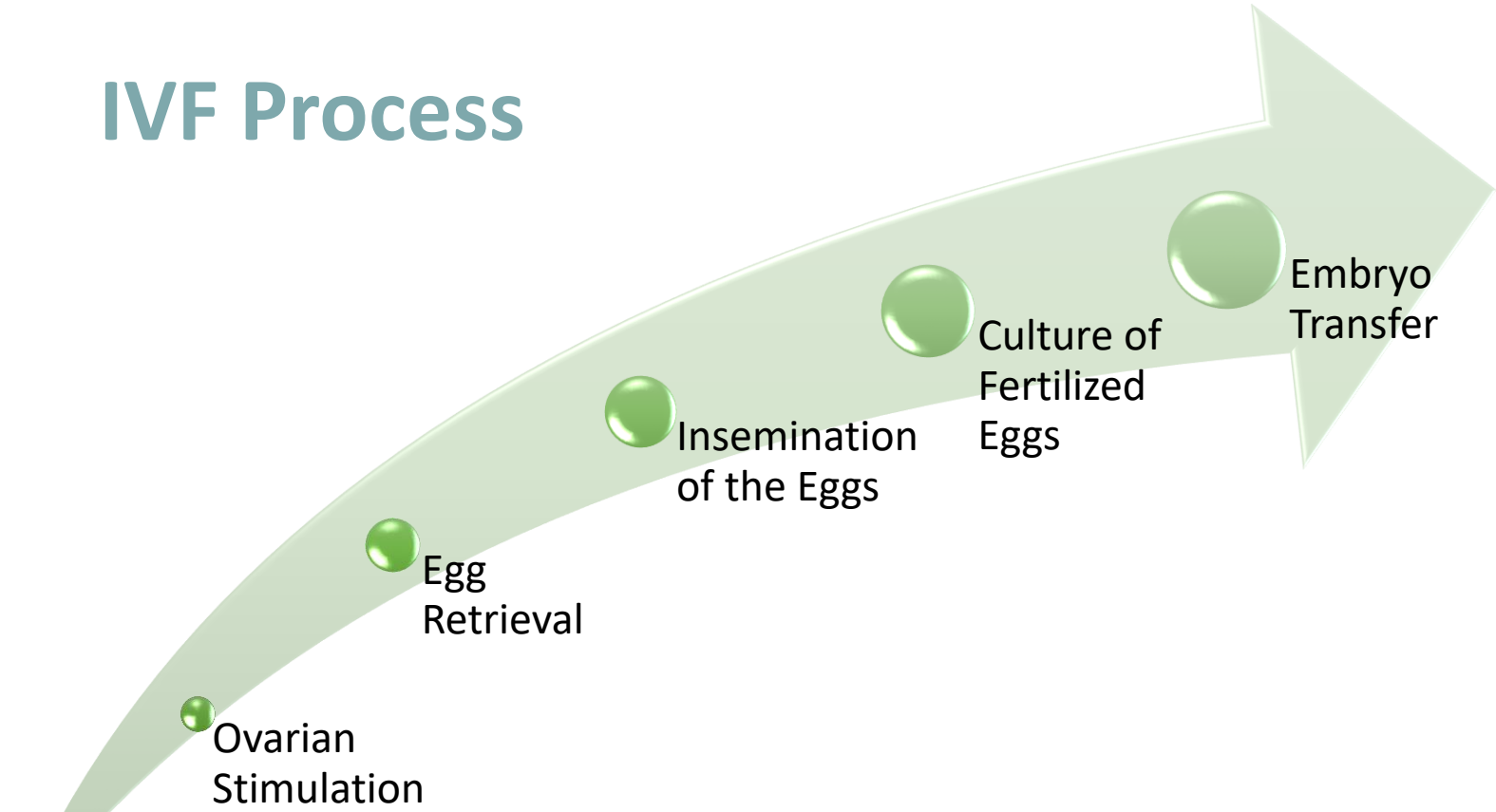
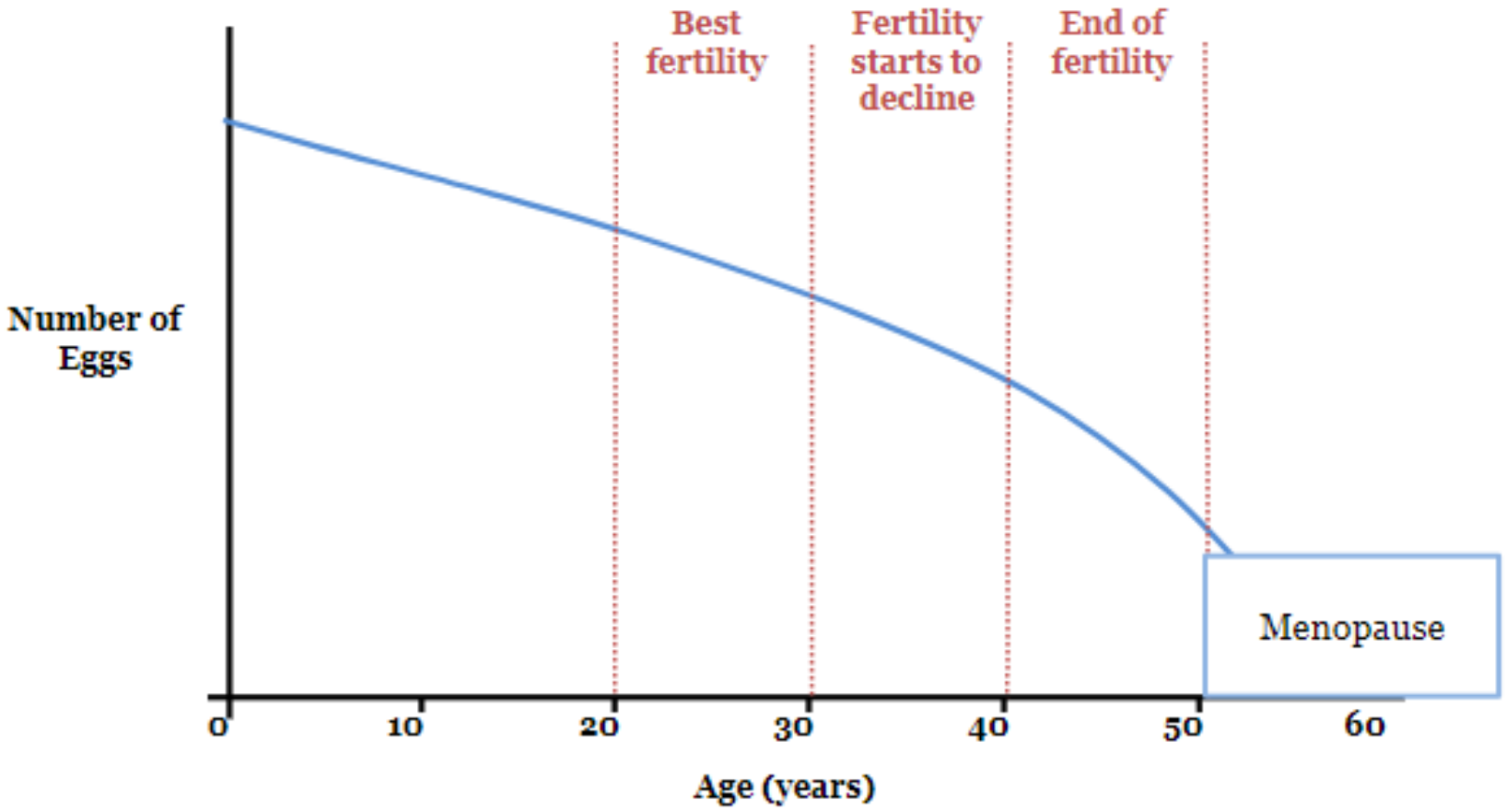
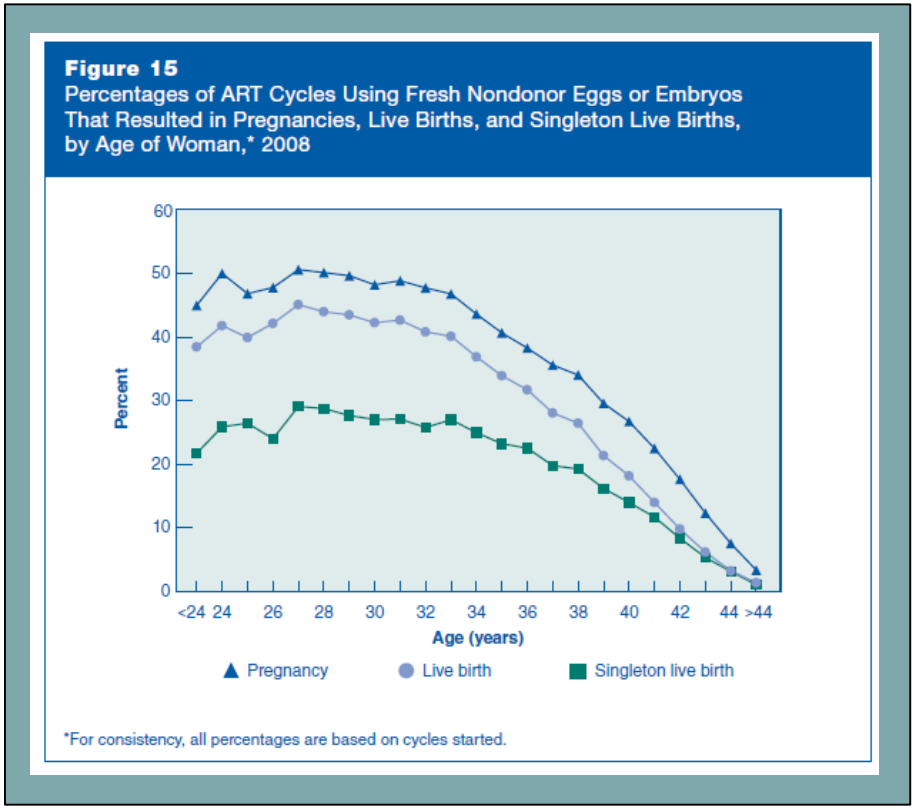


Ovarian Reserve



After Treatment
Menstruation ≠ Fertility



- Average age of menopause ~51
- **Average age of last birth ~41**
- In the natural reproductive lifespan there is expected to be about *one decade* of regular menstrual periods without fertility
- Periods are neither necessary nor sufficient for family building
- Amenorrhea is an extremely late finding

If you are sexually active and do not wish to conceive, you must use birth control

Fertility and Survivorship

- No increased risk of birth defect rates for children born to cancer survivors (similar to general population, ~3%)
- No increased risk for genetic diseases (e.g. Down syndrome, Turner syndrome) identified in offspring of cancer survivors
- No increased risk of cancer identified in offspring of cancer survivors - except for genetic cancer syndromes
- Pregnancy after cancer does not appear to trigger recurrence, even after breast cancer

Next...