



Family Planning in Huntington Disease

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Huntington's Disease Society of America

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Presenter Disclosures

T. Andrew Burrow M.D.

The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

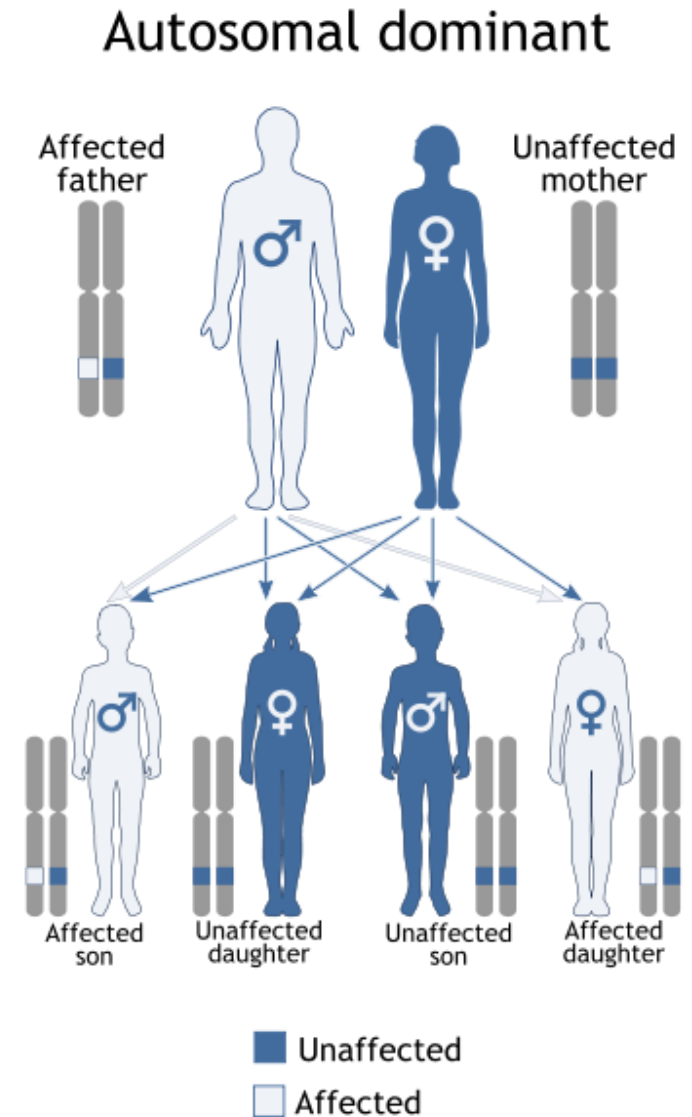
No relationships to disclose

Objectives

- Review genetics of HD
- Discuss family planning options & risks/benefits
- Discuss future financial and legal concerns
- Resources

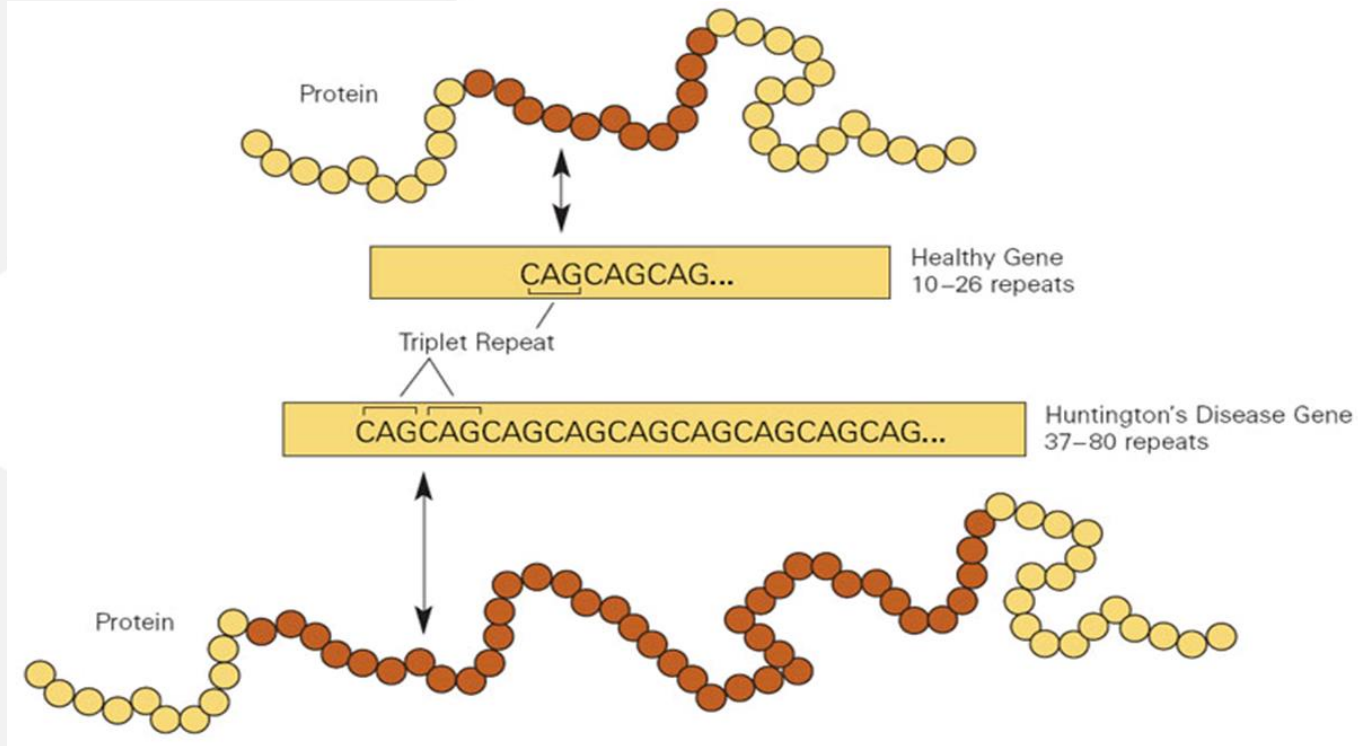
Huntington Disease

- Autosomal dominant Disorder
 - Gene: *HD (HTT)*
 - Caused by ***abnormal Trinucleotide repeats***



http://en.wikipedia.org/wiki/File:Autosomal_dominant_-_en.svg

Abnormal Trinucleotide repeats → Huntington Disease



<http://www.newswise.com/images/uploads/2011/04/14/retrieve.cfm.jpg>

Number of CAG repeats	Expected Phenotype
26 or less	Not at risk of disease or allele expansion
27 to 35	Not at risk of HD however, expansion may occur
36 to 39	Reduced penetrance -- later age of onset, may not show symptoms
40 or more	Full penetrance – symptoms will occur at some time

HD in families

- Most often individuals inherit the exact same number of repeats as parent
- **Expansion** may occur in future generations:
ANTICIPATION
 - Large expansions (greater than 7 repeats) almost exclusively **paternal** transmission
 - The larger the CAG repeat size, the greater likelihood of expansion
 - New “mutation” rate 10%
- **Contraction** of allele size can occur, less common

Important Considerations

- Presymptomatic testing
- Reproductive options / Considerations
- Financial concerns
- Legal issues

Advantages of Predictive Testing

- Uncertainty of gene status removed
- If positive
 - Prepare for future
 - Arrange surveillance/treatment
 - Inform children/family planning
- If negative
 - Concerns about self and offspring reduced

Disadvantages of predictive testing

- If positive
 - Introduces uncertainty (if and when)
 - Known risk to offspring
 - Impact on self/partner/family/friends
 - Potential problems with insurance/employment
- If negative
 - Survivor guilt

Considerations of Family planning

- What are your goals/values?
- What are your partner's goals/values?
- Are you psychologically ready?
- Do you have a support system in place?
- Are you financially ready?
- Do you have appropriate insurance coverage?

Options for Having children

- Natural Conception (with or without prenatal testing)
- Egg Donation
- Sperm Donation
- Embryo Donation
- Preimplantation Genetic Diagnosis with IVF
- Adoption

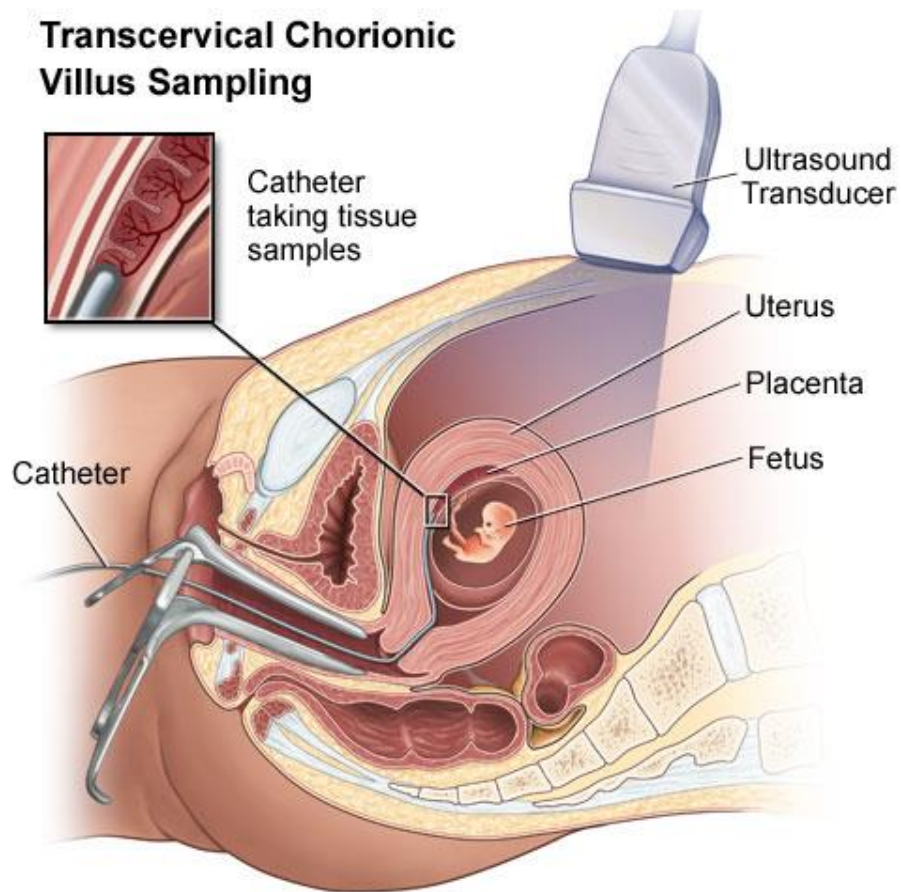
Natural Conception

- Benefits:
 - Less costly than other methods
 - The child will be biologically related to both parents
 - Does not require knowing genetic status of parent
- Limitations:
 - Risk that child could have HD at some point in life
 - Anxiety/guilt from uncertainty about child's genetic status
- **NOTE: Prenatal testing is an option but not required**

CVS

- ~10-12 weeks gestation
- Sample of chorionic villi removed from placenta for testing
- Procedure-related risk for miscarriage of approximately 1%

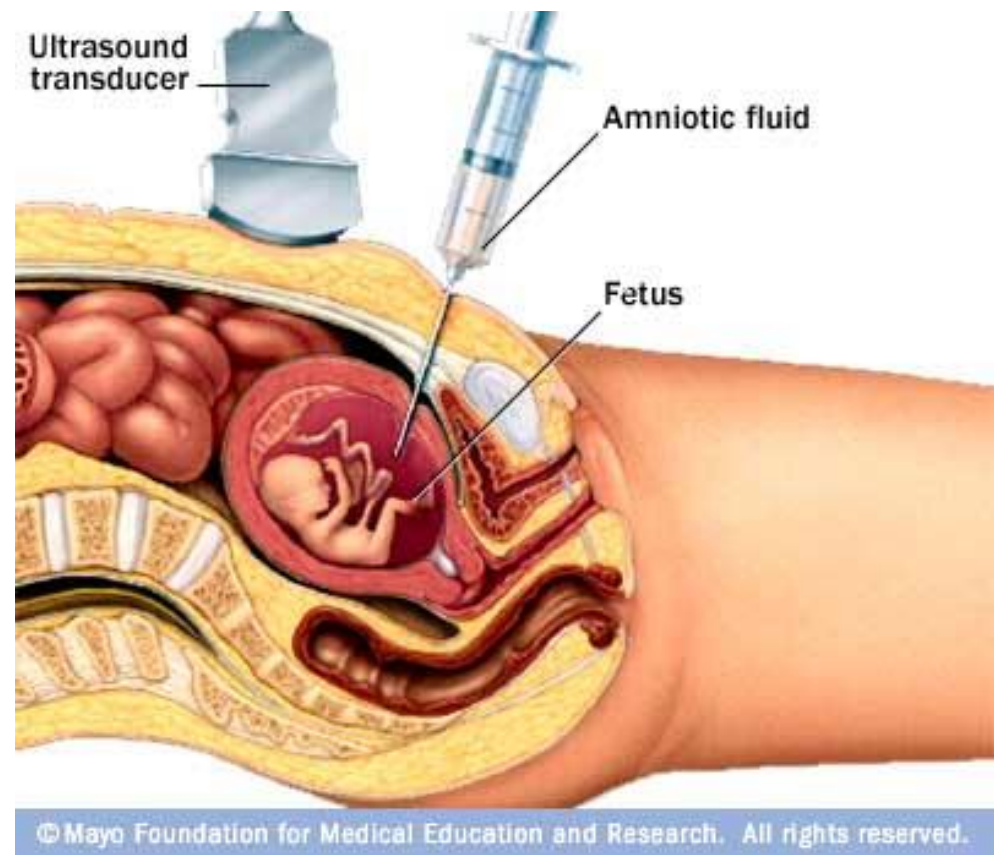
Transcervical Chorionic Villus Sampling



<http://www.stanfordchildrens.org/en/topic/default?id=chorionic-villus-sampling-90-P02442>

Amniocentesis

- After 15 weeks gestation
- Amniotic fluid removed and analyzed
- Less than 1 in 400 risk for major complications

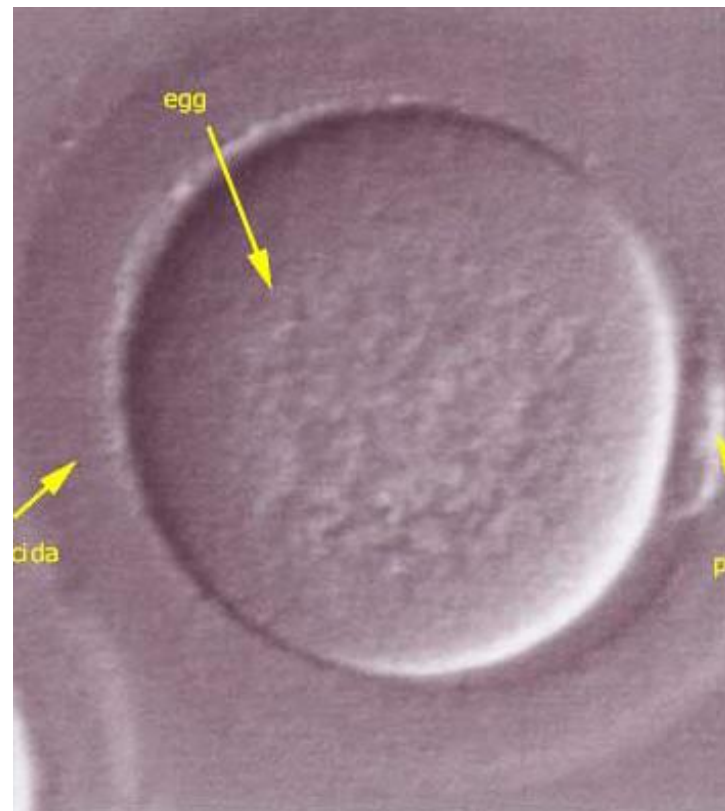


Consideration of Prenatal testing

- May identify parent's HD status
 - If baby has an expansion, parent likely does as well
 - If baby does not have expansion, parent may or may not
- Consequences of determining baby has expansion
 - Continue pregnancy
 - Effects on the Child's autonomy?
 - Effects on parental relationship with child
 - Termination
 - Socially/morally sensitive
 - Significant psychological implications for parents

Egg donation

- Option for a female who has HD or is at risk of HD
- Egg donation can be anonymous or from a friend/relative (not at risk of having HD)



http://www.thenewjerseyovulationcenter.com/egg_meiosis02.php

Sperm Donation

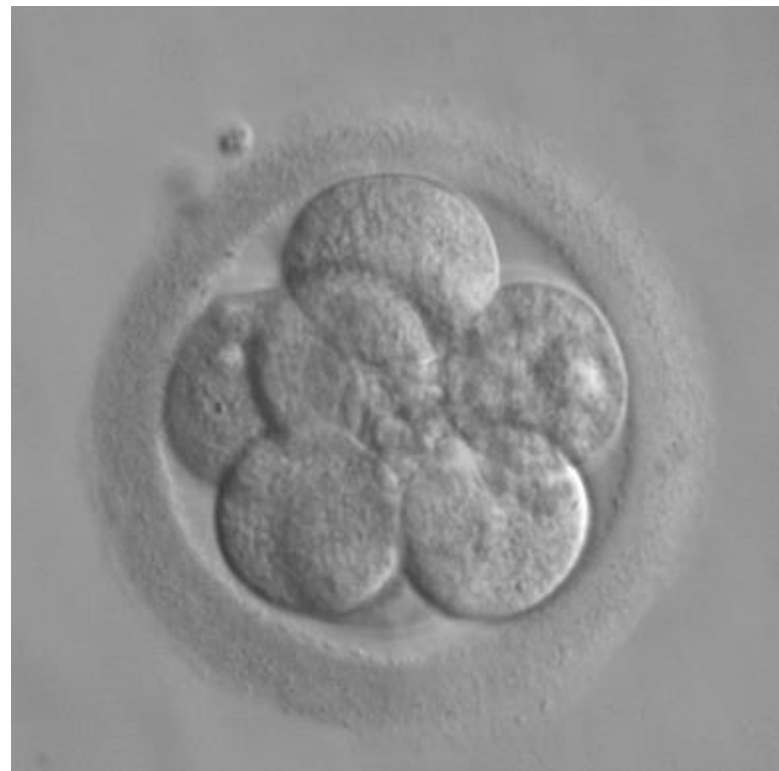
- Option for a male who has HD or it at risk of HD
- Sperm donation can be anonymous or from a friend/relative (not at risk of having HD)



<http://www.advancedfertility.com/sperm-morphology-pictures.htm>

Embryo donation

- Option if either partner has HD or it at risk of HD
- Donation of embryos remaining after IVF from a different individual to another for implantation



Benefits / Limitations

- Benefits
 - Potentially select an embryo not possessing expanded repeats
 - Emotional reassurance of having child not at risk of HD
- Limitations
 - Costly
 - Potentially lengthy process
 - No guarantee of success
 - May result in multiples
 - Physical impact on individuals (side effects of medications)
 - Emotional burden
 - No guarantee that child will not have another condition

Preimplantation genetic diagnosis with IVF

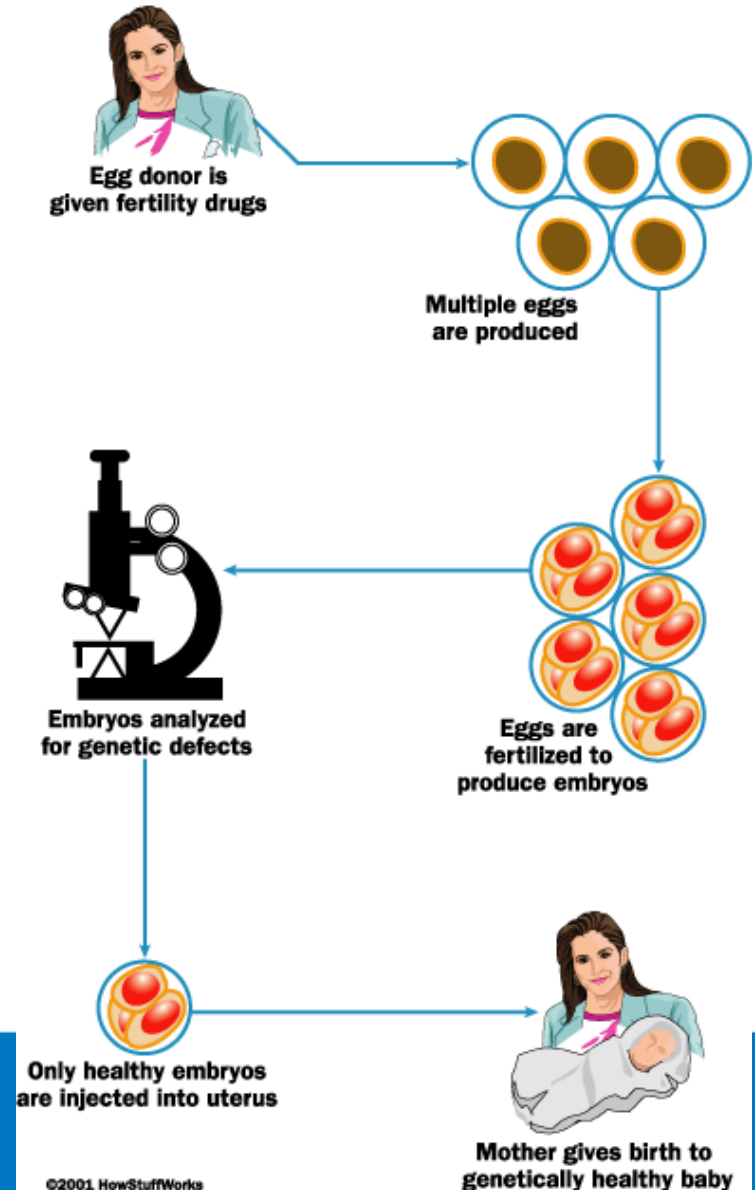
- Options

- Parent with unknown status

- PGD with disclosure of parental genetic status
 - At risk parent will find out their CAG repeat status in process

- PGD with nondisclosure of parental genetic status

- At risk parent will not find out their CAG repeat status in process



Benefits of PGD

- Reduced decisions surrounding termination allows religious & moral accommodation
- Extra embryos may be cryopreserved for a future pregnancy attempt

Important Considerations for PGD with IVF

Process from pre-IVF, to IVF, to PGD, to transfer of embryos, to implantation, to gestation, to birth → a long journey

Risks/complications to mother/baby

Prenatal diagnosis with CVS or amniocentesis is still recommended

Cost: significant, increasing with multiple attempts

- often not covered by 3rd party payer
- Cost per cycle: ~\$10,000

Important Considerations for PGD with IVF, Cont

Expectations/emotional stress: is perfect baby guaranteed?

Limited availability of technology

Ethical considerations/decisions:

- is this eugenics, or just wise planning?
- creation of embryos which may be destroyed

Percentage of live birth per non-donor embryo transfer

Fresh embryo

- Age <35: 46%
- Age 35-37: 38.4%
- Age 38-40: 27.3%
- Age 41-42: 16.5%
- Age 43-44: 7.6%
- Age >44: 2.1%

Frozen embryo

- Age <35: 39%
- Age 35-37: 35.5%
- Age 38-40: 29.7%
- Age 41-42: 24%
- Age 43-44: 17%
- Age >44: 14.8%

Data from CDC

http://nccd.cdc.gov/DRH_ART/Apps/NationalSummaryReport.aspx

Adoption

- Benefits
 - Have a family with (assumed) decreased risk of child having HD
 - Allows you to take care of a child who needs a home
- Limitations:
 - Limited health information may be available on child
 - The child may have medical issues that you did not expect
 - Greater difficulty adopting internationally
 - Can be quite costly—especially international adoptions
 - Lengthy process

Financial Considerations

- Are you financially secure to support yourself and your family once you are symptomatic and unable to work?
- Do you have enough life insurance to support your family and pay debts after you die?
- Do you have funds to provide for skilled nursing should you need it?

Financial Recommendations

- Consider meeting with a financial planner, certified public accountant, and attorney to assist with planning your finances for the future.
- Consider meeting with an insurance advisor and consider obtaining insurance policies covering (If possible prior to genetic testing).
 - Life
 - Disability
 - Long term Care

Power of attorney (financial)

- Why is this important?
 - An agreement allowing a person you select to manage your finances.
 - Can be immediately effective and/or effective if you are unable to make decisions for yourself.
 - Be careful—some power of attorneys end after you are unable to make decisions for yourself—consider a durable power of attorney.
- How to develop a Will
 - Attorney
 - Websites
 - Do it yourself (with witnesses)
- Who should have a copy:
 - Your Attorney (if applicable)
 - The executor of your estate
 - Family
- **NOTE: BE SURE YOU TRUST THE PERSON YOU DESIGNATE TO CARRY OUT YOUR WISHES WITH YOUR BEST INTEREST IN MIND!**

Financial Considerations

- Insurance
 - Life
 - Make sure you have designated beneficiaries
 - Long term disability
 - Long term Care
 - Health

Laws related to Insurance

- **HIPPA (Health Insurance Portability and Accountability Act):**
 - Prohibits group health plans from using health status-related factors (including genetic information) to deny/limit eligibility or increase premiums.
 - Limits on non-payment of claims based upon pre-existing conditions
- **GINA (Genetic Information Non-Discrimination Act):**
 - Prohibits group health plans and insurance carriers from
 - Collecting genetic information (including family history) in order determine eligibility for enrolling in plan
 - Requiring/requesting an individual undergo genetic testing
 - Adjusting premiums/contribution amounts based upon genetic information of one or a number of members of health plan
- **ACA (Affordable Care Act):**
 - Prohibits non-payment of health insurance claims based upon pre-existing condition.

Laws related to Insurance

- What they don't cover (*but some state laws do*):
 - Life
 - Long term disability Insurance
 - Long term care insurance
- Insurance companies may:
 - Collect genetic information (including family history, genetic testing results) in order to determine eligibility for enrollment in a plan
 - Adjust premiums based upon genetic information (family history, genetic testing results).

Legal Considerations

- Will
- Living Will
- Durable Power of Attorney for Healthcare
- Durable Financial Power of Attorney

Will

- Why is this important?
 - Define who is executor of your estate when you die
 - Define who will inherit your assets In a way that you desire.
 - Establish guardianship of minor children
- How to develop a Will
 - Attorney
 - Websites
 - Do it yourself (with witnesses)
- Who should have a copy:
 - Your Attorney (if applicable)
 - The executor of your estate
 - Family

Living Will

- AKA advanced directive
 - This document states your wishes for or against life-sustaining care if you are terminally ill or permanently unconscious and can no longer make your own health care decisions
 - Can be stopped or changed at any time
 - Does not guarantee that your wishes will be followed
- **How to develop a living will (forms differ by state)**
 - Obtain forms from your hospital or physician
 - Download state specific living will from resources provided
 - Attorney
- **Who should have a copy:**
 - Your primary care doctor and other medical providers
 - Your family
 - The hospital(s) you use
 - Your Attorney

Durable Power of Attorney for Healthcare

- AKA healthcare Proxy
 - A legal document authorizing a person you designate to make medical decisions for you
 - you determine what authority the person will have
 - You determine when the power of attorney goes into effect
 - Can be changed or stopped at any time
- NOTE: Choose your power of attorney carefully. The person will have a lot of power. Make sure the person:
 - Knows your wishes
 - Is willing and able to follow your wishes and make tough decisions
 - Will keep your best interest in mind when making tough decisions.

Durable Power of Attorney for Healthcare

- How to develop a healthcare Proxy (forms vary by state).
 - Obtain copy from your hospital or physician
 - Download state specific living will from resources provided
 - Attorney
- Who should have a copy of your Proxy:
 - Your primary care doctor and other medical providers
 - Your family
 - The hospital you use
 - Your Attorney

Summary

- Take your time in deciding when and if to test
- There are many options for having children if you desire—take time to decide which option is right for you
- Consider Insurance, legal, and financial implications for yourself and your family
- Consider developing a financial power of attorney
- Consider developing a Will, Living Will, Power of Attorney for Healthcare
- Know where to find or ask for help.

Resources

- **Adoption**
 - www.adoptionsupport.com
 - www.adoptioncouncil.org
- **General information HD**
 - Huntington Disease Association of America: www.hdsa.org
 - International Huntington Association: www.huntington-assoc.com

Resources

- **Reproductive Options**

- <http://www.stanford.edu/group/hopes/cgi-bin/wordpress/2011/07/family-planning/>
- <http://www.cdc.gov/art/>
- <http://www.nichd.nih.gov/health/topics/infertility/conditioninfo/pages/art.aspx>
- http://www.sart.org/SART_Assisted_Reproductive_Technologies/
- https://www.asrm.org/BOOKLET_Assisted_Reproductive_Technologies/
- <http://www.hfea.gov.uk/preimplantation-genetic-diagnosis.html#7>

Resources

- **Genetic discrimination:**
 - <https://www.genome.gov/10002077>
- **Living Wills, Advance Directives:**
 - http://www.americanbar.org/groups/law_aging.html
 - http://www.americanbar.org/groups/real_property_trust_estate/resources/estate_planning/living_wills_health_care_proxies_advance_health_care_directives.html
 - www.caringinfo.org
 - <http://www.nhpco.org>