Male Contraception

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Special Programme of Research
Development and Research Training
in Human Reproduction

Why Men in Family Planning?

- International Conference on Population and Development, 1994
- Shared responsibility and gender equity

Male Involvement in Fertility Regulation

- Condom
- Vasectomy
- Withdrawal
- Calendar/Rhythm

Distribution of Contraceptive Use Prevalence

World wide contraceptive use (Married Women of Reproductive age)

Contraceptive	No. of users (Millions)	Users (%)	First year failure rate (%) - Typical use
Total users	648	61.9	
Modern methods		56	
Female sterilization	210	20.1	0.5
IUD	156	14.9	0.8
Oral contraceptives	82	7.8	5.0
Condom	53	5.1	14.0
Male sterilization	43	4.1	0.15
Injectables	27	2.6	0.3
Vaginal barriers	4.2	0.4	20.0
Traditional methods			
Withdrawal	32	3.1	19.0
Rhythm	27	2.6	25.0

UN Population Division, 2001

Male Contraception
Research and Development

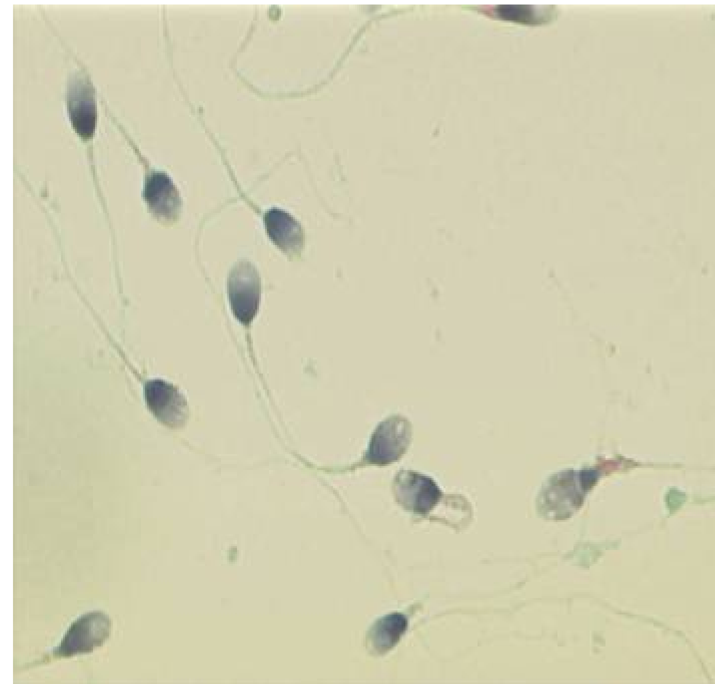
- Use of existing male methods is low, with regional and country differences
- Men are *aware* of family planning methods
- Men *approve* of the use of family planning
- Low levels of use may be related to the *negative characteristics of existing methods*
- Example: In a study conducted in Fiji, Iran, India and Korea, men considered a male pill or injection to be more acceptable than vasectomy

The Ideal Male Contraceptive

- **Safe** - ***no harmful side effects***
- **Effective** - ***it works!***
- **Acceptable** - ***to men and their partners***
- **Affordable** - ***to programs, potential users, and donors***

Approaches to Male Contraception: *Targeting the sperm*

- **Block deposition**
- **Interrupt transport**
- **Inhibit production**
- **Disrupt function**
- **Prevent fertilization**



Source: Image House Medical, Copenhagen

Blocking Sperm Deposition

Blocking Sperm Deposition

Male Condoms

- Condoms are effective at preventing pregnancy and STI/ HIV
- Condom use is low even in countries with high prevalence of HIV/AIDS
- How can we increase condom use?

Blocking Sperm Deposition
Male Condoms

Condom studies

- Randomized comparative studies of "standard" and "new" condoms
  - Acceptability and preference
  - Contraceptive efficacy
  - Prevention of STI
- Reasons for use and non-use of condoms

Interrupting Sperm Transport

Vasectomy/Sterilization

World wide, nearly 43 million married couples rely on vasectomy

- United Kingdom - 18%
- New Zealand - 18%
- Canada - 15.2%
- Rep. of Korea - 13%
- United States - 13%
- The Netherlands - 11%
- Australia - 10%
- Switzerland - 8.3%
- Spain - 8.1%
- Bhutan - 8%
- China - 8%
- Belgium - 7.0%
- Nepal - 5.4%
- Thailand - 5.3%
- Denmark - 5%

UN Population Division, 2001

Interrupting Sperm Transport

Vasectomy/Sterilization

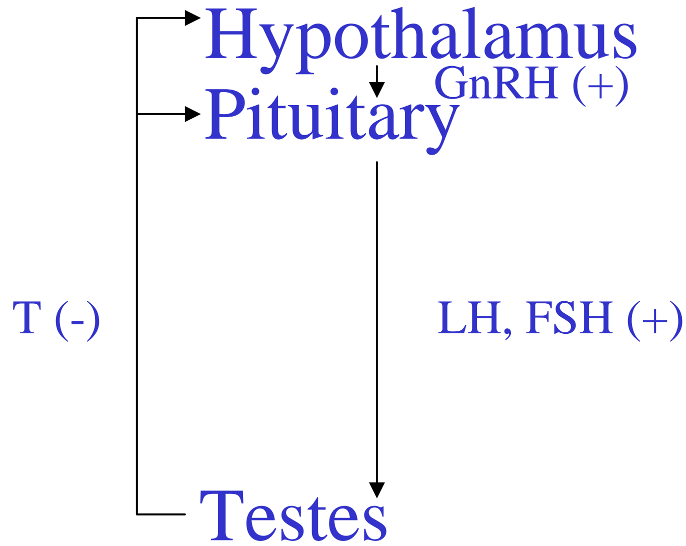
- **Conventional vasectomy**
  - highly effective and safe
  - incision required
  - permanent
- **Percutaneous vas occlusion**
  - many compounds evaluated
  - lower efficacy rates
  - some additional complications
- **No-scalpel vasectomy**
  - highly effective
  - Somewhat more acceptable
  - lower complication rates

Methods of Vasectomy
Success of Reversal

Method	Follow-up (no and %)	Sperm (no and %)	Normal (no and %)	Pregnancy (no and %)
No-scalpel Vasectomy	**19/23 (82.6)**	**16/19 (84.2)**	**13/19 (68.4)**	**15/19 (78.9)**
Chemical Vas occlusion	**26/31 (83.9)**	**18/26 (69.2)**	**12/26 (46.2)**	**13/26 (50.0)**
MPU Vas occlusion	**31/34 (91.2)**	**10/31 (32.3)**	**10/31 (32.3)**	**9/31 (29.0)**

Inhibiting Sperm Production

Hormonal Contraception



Inhibiting Sperm Production

Hormonal Contraception

Androgen alone	**T Enanthate**
	T Undecanoate
	T Buciclate
	Pellets
Progestin + Androgen	**Norplant**
	DMPA
	Norethisterone Enanthate
GnRH	**Agonists**
	Antagonists
	Vaccines
FSH	**Antagonists**
	Vaccines

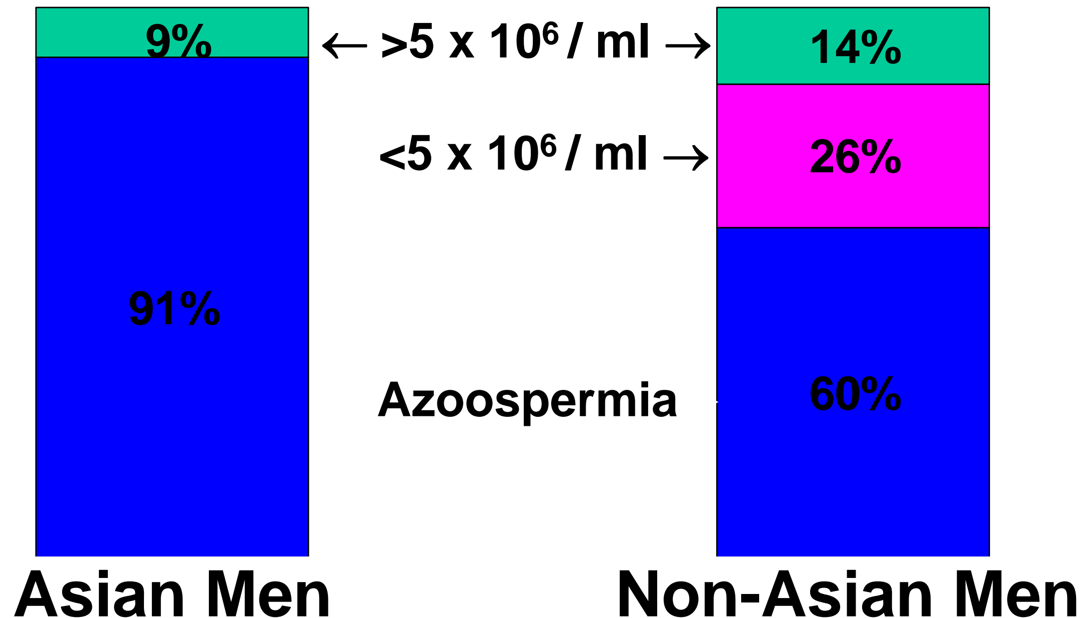
Hormonal Approaches to Male Contraception

Androgen alone

- 1990: 200 mg testosterone enanthate/week will reduce sperm production in some men
- Sperm concentrations consistently below 1 million/ml result in few or zero pregnancies
- All men do not fully suppress
- Requirement for weekly injections and high T concentrations

Hormonal Approaches to Male Contraception

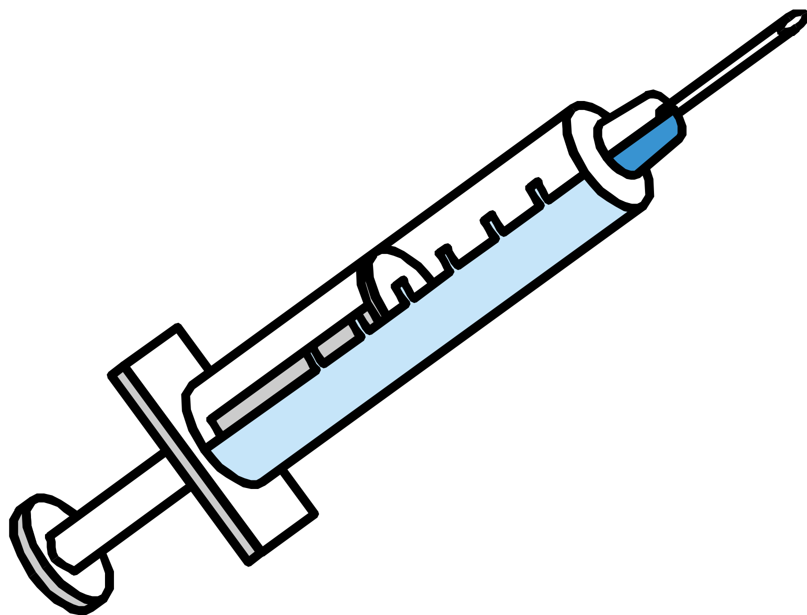
Androgen alone



Sperm concentrations following weekly inj. 200 mg T-enanthate

Hormonal Approaches to Male Contraception

Androgen alone



Testosterone Enanthate

- Extensive clinical experience
- “Burst” effect
- Short acting
- Weekly injections
- High levels testosterone

Hormonal Approaches to Male Contraception

Androgen alone

Testosterone Undecanoate

- Oral or injectable
- Longer release profile
- 4-8 week injection intervals may be adequate
- Maintains testosterone in physiological range
- Large dose required

Testosterone Buciclate

- No “burst” effect
- Long-acting injectable
- Injections at 3-4 month intervals may be adequate
- High dose required

Hormonal Approaches to Male Contraception

Androgen alone

Suppression Efficacy Recovery

100
90
80
70
60
50
40
30
20
10
0

P

0 6 12 18 24

months

Suppression phase: percentage of men remaining unsuppressed

Efficacy phase: sperm concentration in millions per ml (means)

Recovery phase: sperm concentration in millions per ml (means)

P = pregnancy

Hormonal Approaches to Male Contraception

Androgen with Progestin

- More rapid and effective sperm suppression
- Effective in diverse populations
- Reduced overall drug load
- Physiological testosterone levels
- Requires a 2 drug regimen
- Drugs may have different routes or frequencies of administration

Hormonal Approaches to Male Contraception

Androgen with Progestin

Progestagen	Androgen	% Azoo-spermic	% Oligozoo spermic	Reference
DMPA 250 mg every 6 weeks	**19 NT** (200 mg every week x 6/7 weeks, then 200 mg/3 or 4 weeks).	67 (W) 98 (A)	92 (W) 99 (A)	Knuth et al (1987)
	TE (200 mg(IM every week x 6/7 weeks, then 200 mg/4 weeks)	59 (W) 96 (A)	91 (W) 96 (A)	WHO (1993)
DMPA 300 mg	**T implant** (800 mg)	90 (W)	100 (W)	Handelsman et al (1996)

/continued

Hormonal Approaches to Male Contraception

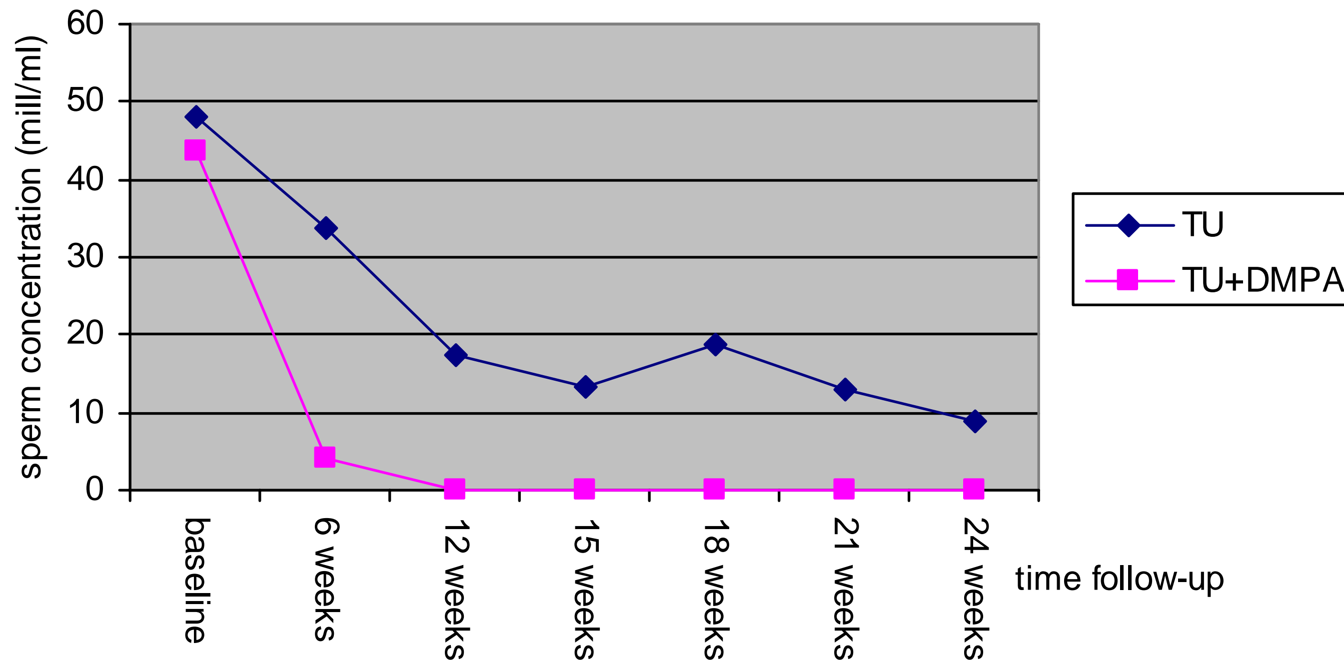
Androgen with Progestin

Progestagen	Androgen	% Azoo-spermic	% Oligozoo-spermic	Reference
Levonorgestrel (oral)				
500 μg/day	**TE** (100 mg/week IM)	67 (W)	94 (W)	Bebb et al (1996)
250 μg/day	**TE** (100 mg/week IM)	78 (W)	89 (W)	Anawalt et al (1997)
125 μg/day	**TE** (100 mg/week IM)	61 (W)	94 (W)	
Desogestrel **(oral)**				
300 μg/day	**TE** (100 mg/week IM)	81 (W)	94 (W)	Wu et al (1998)
150 μg/day	**TE** (50 mg/week IM)	73 (W)	100 (W)	

W=White, A=Asian, DMPA=depotmedroxyprogesterone acetate, TE=testosterone enanthate
19 NT= 19 nortestosterone hexyloxyplenylpropionate

Hormonal Approaches to Male Contraception

Androgen with Progestin



Hormonal Approaches to Male Contraception

Other Approaches

- Androgen with anti-androgen (*cyproterone acetate*)
  - Progestin with anti-androgen properties
  - May block the activity of any residual T in the testis
- Androgen with GnRH Analogue
  - Effective suppression of gonadotrophins
  - High cost; frequent application

Disrupting Sperm Function and Preventing Fertilization

- Targeted basic science research on testicular, epididymal or vas approaches

  Some promising targets:
  - functional development, i.e. motility
  - structural development, i.e. organelles
  - structure and function, i.e. membrane integrity and intracellular pathways

Male Reproductive Health Agenda

- Contraceptive research and development
- Targeted basic science -physiology and fertility
- Social & behavioral sciences
- Men’s roles in reproductive health
- Building networks

Acceptability/Sociobehavioral Studies

- Current use of male methods
- Preferences for new methods
- Characteristics of new methods
- Continuation and discontinuation of trial
- Effects on mood
- Effects on behavior
- Effects on cognition
- Partner's views on mood and behavior

Acceptability/Sociobehavioral Studies

Reports from 25 Swedish men participating in TE trial

Expectations

- Freedom and security
- Problems with female methods
- Desire for more satisfying sex life
- Need for male control
- Fear of negative side effects

Satisfaction

- Greater freedom
- More ease in sex life
- Would recommend method to others
- Trouble with injections
- Fear of problems with aggressiveness
- Dermatological problems

Acceptability/Sociobehavioral Studies

	Very important	*Somewhat important*	*Not important*
Men should share responsibility for contraception	41.2	51.0	7.8
Contributing to solving the population problem	41.6	48.7	9.7
I felt I was doing a good thing for my country	36.7	52.9	7.9
I like to be involved in new things	25.0	56.8	18.2
I felt pride in contributing to scientific advancement	26.9	51.6	21.4
Pioneer of a new method of contraception	24.4	46.1	29.5
My wife wanted me to take responsibility	23.1	44.8	32.1
I joined for getting the financial compensation	12.7	28.6	58.8

Acceptability/Sociobehavioral Studies

	Month 4 %	Month 8 %
Reasons for perceived inconvenience	(n = 78)	(n = 117)
Have to come to clinic	23.1	9.3
Once a month too frequent	70.5	76.3
Wait at the clinic	1.3	5.1
Other	5.1	9.3
Total	100.0	100.0
Reasons for dissatisfaction	(n = 87)	(n = 117)
Side effect	11.5	6.0
Inconvenience	54.0	48.7
Injection pain	21.8	12.0
Others	12.6	33.3
Total	100.0	100.0

Men's Roles in Reproductive Health

Men can:

• Inhibit access to and use of FP	OR	• Facilitate & support use of contraception
• Expose women and themselves to disease including HIV	OR	• Protect themselves and their partners from infection
• Act as barriers to women's reproductive health	OR	• Act as partners in promoting reproductive rights and care for all

Providing FP Services to Men

- How can FP service facilities address men's needs?
- How to create and then address an increase in demand for FP services for men?
- Who will provide FP services to men?