

Prevalence of Infertility

Dr S. Van der Poel
focal point for
Infertility

on behalf of
WHO/RHR and HRP



Infertility: Primary versus Secondary

❑ Primary infertility:

- inability to become pregnant (or have a child) despite actively trying for a certain number of years*

❑ Secondary infertility:

- inability to become pregnant (or have a child) despite actively trying for a certain number of years* and having had been pregnant (or had a child) in past

*Number of years:

- 1 year (clinical definition),
- 2 years (epidemiological definition), or
- 5 years (demographic definition based not on pregnancy but childlessness)

Infertility - a clinical definition



Infertility (clinical definition):

"a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse."

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human reproduction SIMULTANEOUS PUBLICATION Infertility

The International Committee for Monitoring Assisted Reproductive Technology (ICMART) and the World Health Organization (WHO) Revised Glossary on ART Terminology, 2009[†]

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BACKGROUND: Many definitions used in medically assisted reproduction (MAR) vary in different settings, making it difficult to standardize and compare procedures in different countries and regions. With the expansion of infertility interventions worldwide, including lower resource settings, the importance and value of a common nomenclature is critical. The objective is to develop an internationally accepted and continually updated set of definitions, which would be utilized to standardize and harmonize international data collection, and to assist in monitoring the availability, efficacy, and safety of assisted reproductive technology (ART) being practiced worldwide.

METHOD: Seventy-two clinicians, basic scientists, epidemiologists and social scientists gathered together at the WHO headquarters in Geneva, Switzerland in December 2008. Several months in advance, three working groups were established which were responsible for terminology in three specific areas: clinical conditions and procedures, laboratory procedures and outcome measures. Each group reviewed the existing ICMART glossary, made recommendations for revisions and introduced new terms to be considered for glossary expansion.

RESULTS: A consensus was reached on 87 terms, expanding the original glossary by 34 terms, which included definitions for numerous clinical and laboratory procedures. Special emphasis was placed in describing outcome measures such as cumulative delivery rates and other markers of safety and efficacy in ART.

CONCLUSIONS: Standardized terminology should assist in analysis of worldwide trends in MAR interventions and in the comparison of ART outcomes across countries and regions. This glossary will contribute to a more standardized communication among professionals responsible for ART practice, as well as those responsible for national, regional and international registries.

Introduction

The need for standard definitions is critical for benchmarking the outcomes of assisted reproductive technology (ART) procedures, at both a national and international level. Increase in the use of ART treatment worldwide and the continuing discussions, controversies and debates

over measures of efficacy and safety have generated both scientific and public interest (GD Adamson et al. 2006; J de Mouzon et al. 2004; RP Dickey, 2007; European IVF Monitoring Consortium Report, ESHRE, 2008). Definitions used in medically assisted reproduction within different countries are frequently the result of adaptations to particular medical, cultural and religious settings. However, when undertaking

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The International Committee for Monitoring Assisted Reproductive Technology (ICMART), an entity responsible for the collection and dissemination of worldwide data on ART, published the first glossary of ART terminology in 2006 (5, 6). That particular glossary resulted from discussions by participants at an international meeting on "Medical, Ethical, and Social Aspects of Assisted Reproduction" organized by the World Health Organization (WHO) in 2001 (7).

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Conclusions: Standardized terminology should assist in analysis of worldwide trends in MAR interventions and in the comparison of ART outcomes across countries and regions. This glossary will contribute to a more standardized communication among professionals responsible for ART practice, as well as those responsible for national, regional, and international registries. (Fertil Steril[®] 2009;92:1530–4. ©2009 World Health Organization. All rights reserved. Published with permission.)

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WHO Infertility Task Force (1979-1984)



WHO Infertility estimate on prevalence:

- ❑ 80 million couples worldwide (often quoted)
- ❑ Use of an epidemiological definition of 2 years of unprotected sex
- ❑ This prevalence is based upon patient numbers who came to the clinics requesting assistance for infertility. *"These patients likely represent significantly less than half of all couples requiring care - even less in developing countries where an infertility diagnosis can be a "death sentence" within communities/ societies. Due to high stigma, patients are afraid to come for help with a fertility problem."*

WHO 1979-1984, P. Rowe et al.

Evidence-base from the WHO Infertility Task Force - Evaluation of 6000 couples worldwide
Common protocol utilized for diagnosis and evaluation at over 36 WHO Collaborating Centres in developing and developed countries

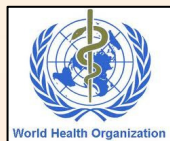
Determining Prevalence of infertility in women:

Reproductive health indicators: Guidelines for their generation, interpretation and analysis for global monitoring. (WHO, 2006)

*The percentage of women of reproductive age (15-49 years) at risk of becoming pregnant (not pregnant, sexually active, not using contraception and not lactating) who report trying for a pregnancy for **two** years or more.*

Calculation:

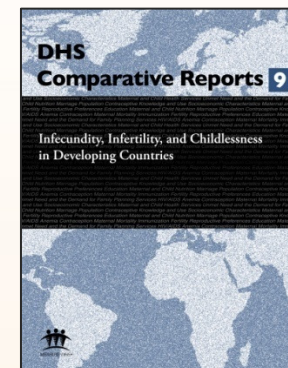
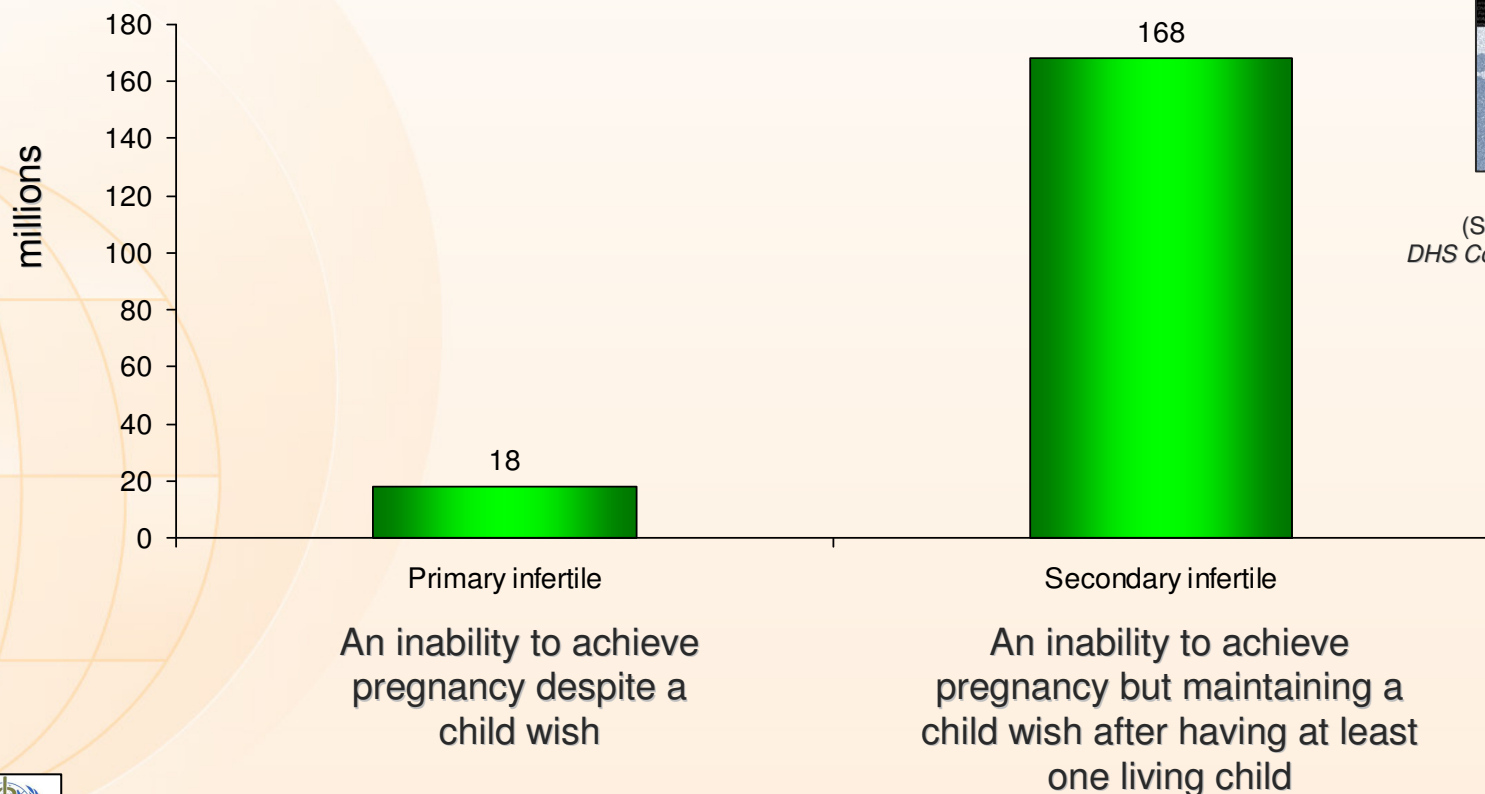
- ❑ **Numerator:**
Number of women of reproductive age (15-49 years) at risk of becoming pregnant (as defined above) *who report trying unsuccessfully* for a pregnancy for **two** years or more X100
- ❑ **Denominator:**
Total number of women of reproductive age at risk of becoming pregnant (as defined above)



Estimate of magnitude of the involuntary infertile

Demographic definition - 5 years of childlessness despite actively trying
(in developing countries minus China, data up to year 2000)

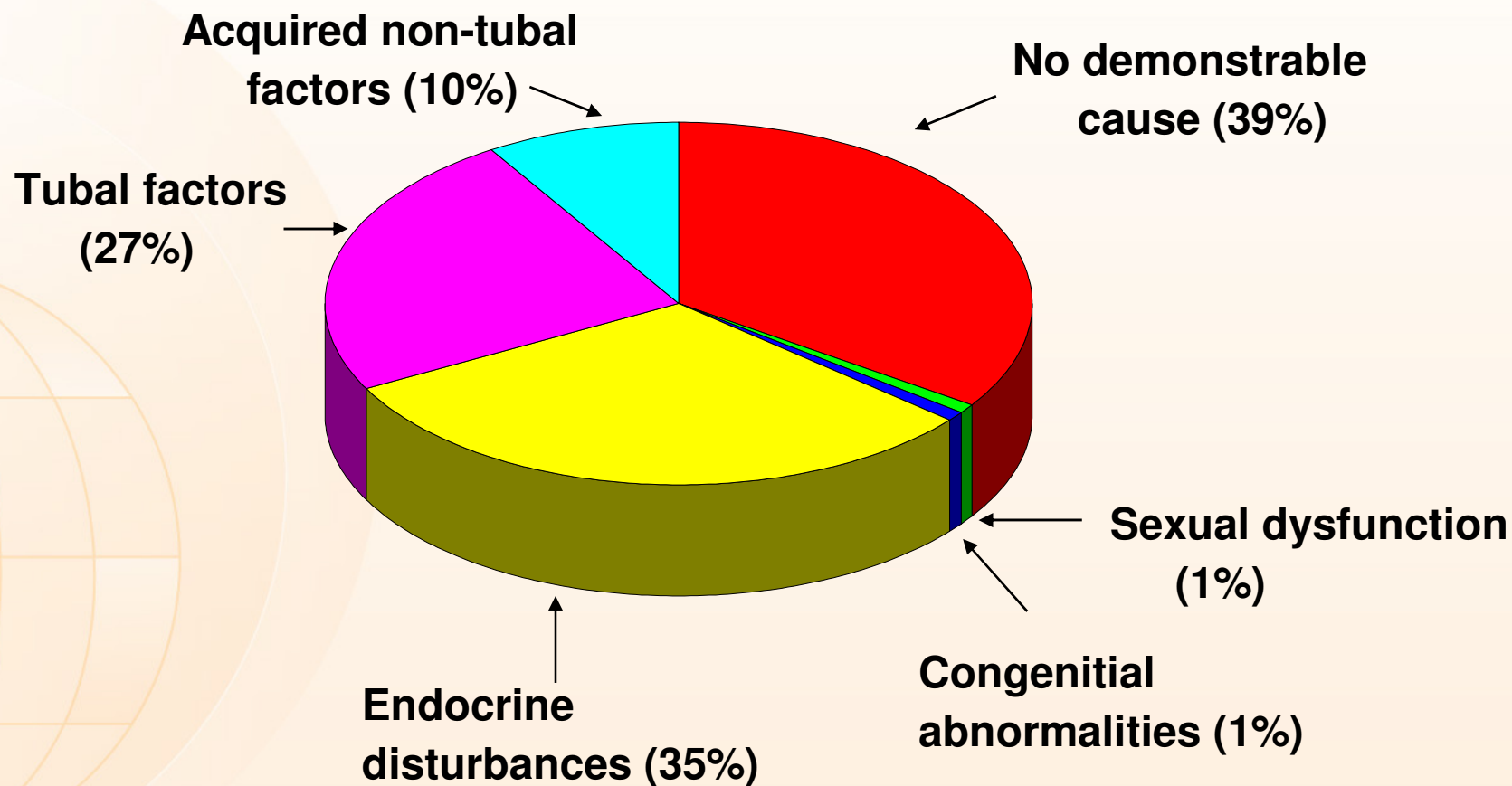
Total: 186 million women



(Source: Rutstein and Shah, *DHS Comparative Reports*, no. 9, 2004)

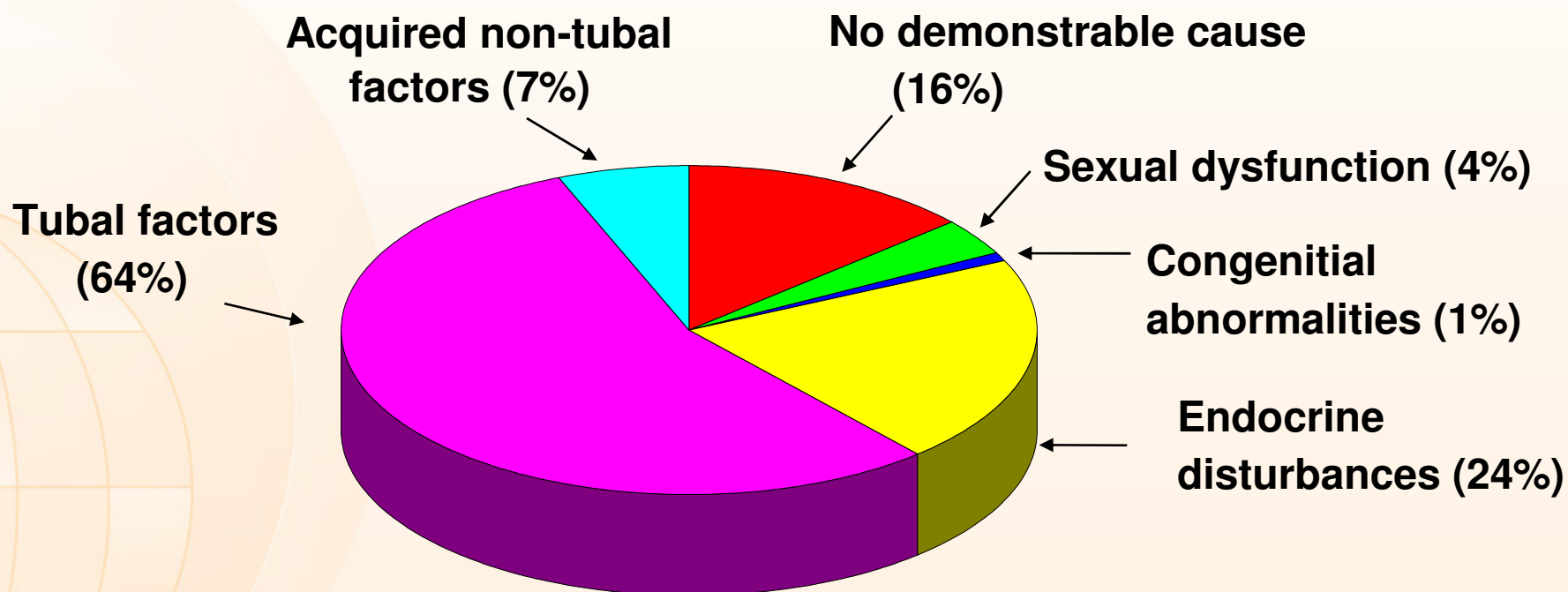


Distribution of Infertility Diagnosis (Female - Developed Countries)



(WHO Infertility Task Force multi-country study, P. Rowe)

Distribution of Infertility Diagnosis (Female - Africa)



(WHO Infertility Task Force multi-country study, P. Rowe)

WORLD REPORT ON DISABILITY



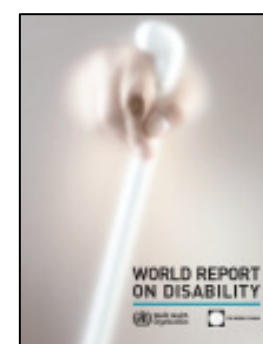
World Health
Organization



THE WORLD BANK

9 June 2011

Data from the
Global Burden of
Disease Group



"The world report on disability suggests steps for **all stakeholders to create enabling environments, develop support services, create inclusive policies and programmes,** and enforce new and existing standards and legislations, to the benefit of people with disabilities and the wider community."

Dr Margaret Chan
Director-General
World Health Organization

Mr Robert B Zoellick
President
World Bank Group

Infertility defined as a "disability:"

Physical, cognitive, mental, sensory, emotional, developmental or some combination of these.

"Disabilities is an umbrella term, covering impairments, activity limitations, and participation restrictions.

- An impairment is a problem in body function or structure;
- An activity limitation is a difficulty encountered by an individual in executing a task or action; and,
- A participation restriction is a problem experienced by an individual in involvement in life situations.

Thus disability is a complex phenomenon, reflecting an interaction between features of a person's body and features of the society in which he or she lives."



First World Report on Disability - Prevalence Values

Table D.1. Prevalence of moderate and severe disability (in millions), by leading health condition associated with disability, and by age and income status of countries

Health condition ^(b, c)	High-income countries ^(a) (with a total population of 977 million)		Low-income and middle-income countries (with a total population of 5 460 million)		World (population 6 437 million)
	0–59 years	60 years and over	0–59 years	60 years and over	All ages
1 Hearing loss ^(d)	7.4	18.5	54.3	43.9	124.2
2 Refractive errors ^(e)	7.7	6.4	68.1	39.8	121.9
3 Depression	15.8	0.5	77.6	4.8	98.7
4 Cataracts	0.5	1.1	20.8	31.4	53.8
5 Unintentional injuries	2.8	1.1	35.4	5.7	45.0
6 Osteoarthritis	1.9	8.1	14.1	19.4	43.4
7 Alcohol dependence and problem use	7.3	0.4	31.0	1.8	40.5
8 Infertility due to unsafe abortion and maternal sepsis	0.8	0.0	32.5	0.0	33.4
9 Macular degeneration ^(f)	1.8	6.0	9.0	15.1	31.9
10 Chronic obstructive pulmonary disease	3.2	4.5	10.9	8.0	26.6
11 Ischaemic heart disease	1.0	2.2	8.1	11.9	23.2
12 Bipolar disorder	3.3	0.4	17.6	0.8	22.2
13 Asthma	2.9	0.5	15.1	0.9	19.4
14 Schizophrenia	2.2	0.4	13.1	1.0	16.7
15 Glaucoma	0.4	1.5	5.7	7.9	15.5
16 Alzheimer and other dementias	0.4	6.2	1.3	7.0	14.9
17 Panic disorder	1.9	0.1	11.4	0.3	13.8
18 Cerebrovascular disease	1.4	2.2	4.0	4.9	12.6
19 Rheumatoid arthritis	1.3	1.7	5.9	3.0	11.9
20 Drug dependence and problem use	3.7	0.1	8.0	0.1	11.8

**33.3- 33.4 Million
Women**

Infertile due to maternal sepsis and unsafe abortion*
(5 year secondary infertility definition)

Ranking rises within populations of reproductive age (15-45 years)

(*did not include infertility prevalence in: men, primary or unexplained infertility, or other causes of infertility)

Secondary Infertility: A neglected maternal morbidity

Addressing maternal health

Maternal morbidity is quoted as being 16 times more frequent than maternal mortality.

Conditions or risk factors for sequelae:

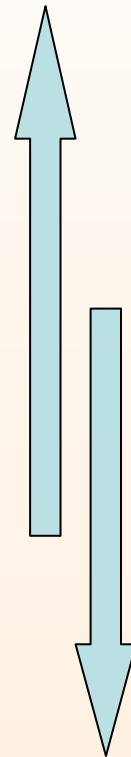
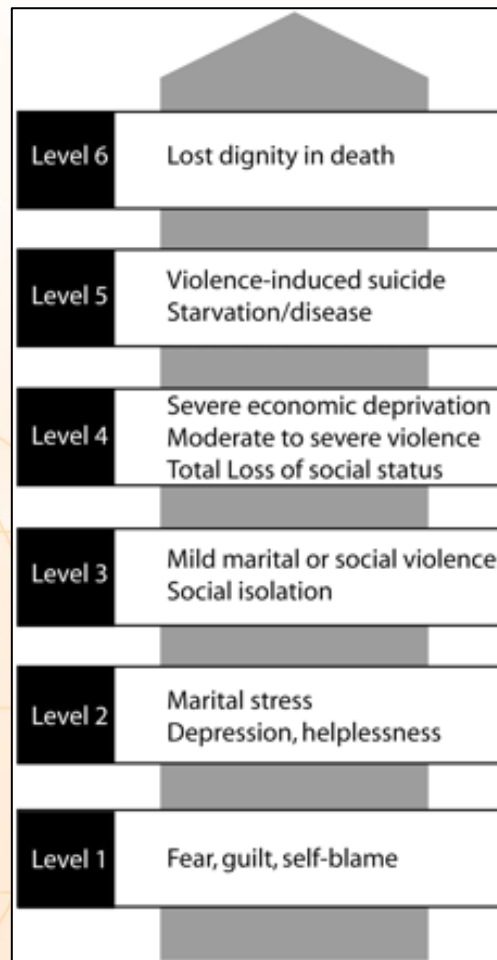
Prolonged labour, Haemorrhage, Sepsis, Pre-eclampsia, unsafe abortion.

Six maternal morbidities/ sequelae - neglected within developing countries*:

1. **Infertility**
2. Anaemia
3. Maternal depression
4. Obstetric fistula
5. Uterine rupture and scarring
6. Genital and uterine prolapse

**Hardee, Gay & Blanc (2012) "Maternal Morbidity: Neglected dimension of safe motherhood in the developing world" Global Public Health (2012), 1-15.*

**Challenge: to address infertility as an impairment of body function
which is *affected by societal features***



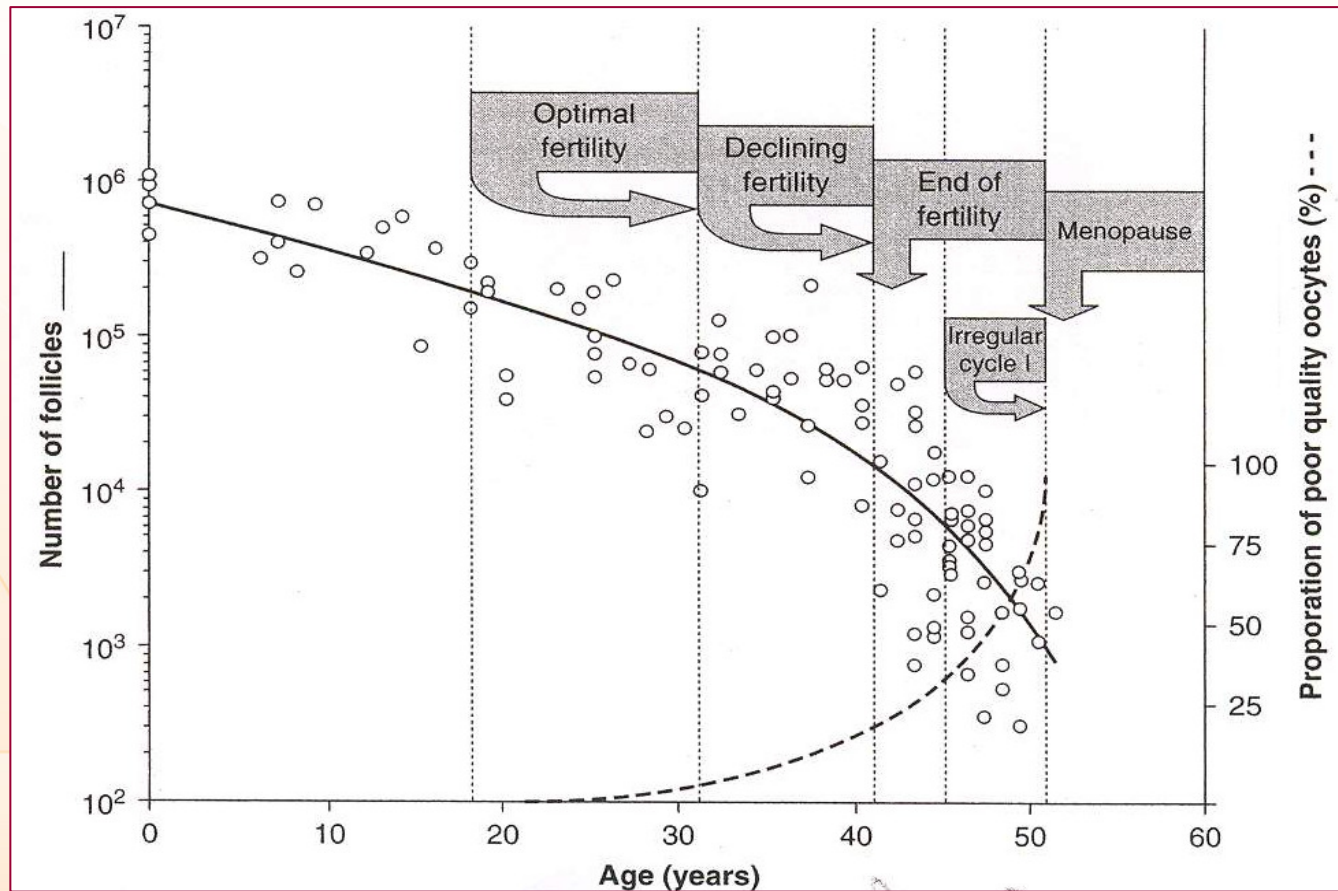
Developing/ transitional societies –
burden of societal "impairment" is higher in these societies
however is not captured in "prevalence" numbers

Developed societies



WHO Current Practices and Controversies in Assisted Reproduction, "*Infertility and social suffering*,"
Daar & Merali, 2001, page 18, Figure 2.

Decline of ovarian follicle pool



Decline both in quantity (from birth) and quality (from age 20)

Image from: *Hum. Reprod. Update* (November/December 2006) 12 (6): 685-718. doi: 10.1093/humupd/dml034
First published online: August 4, 2006

Issues of low fertility

-impact on unmet need for infertility/sub-fertility interventions

Mean age of women at the birth of the first child:

UN Statistics, July 2011 (2008 data)

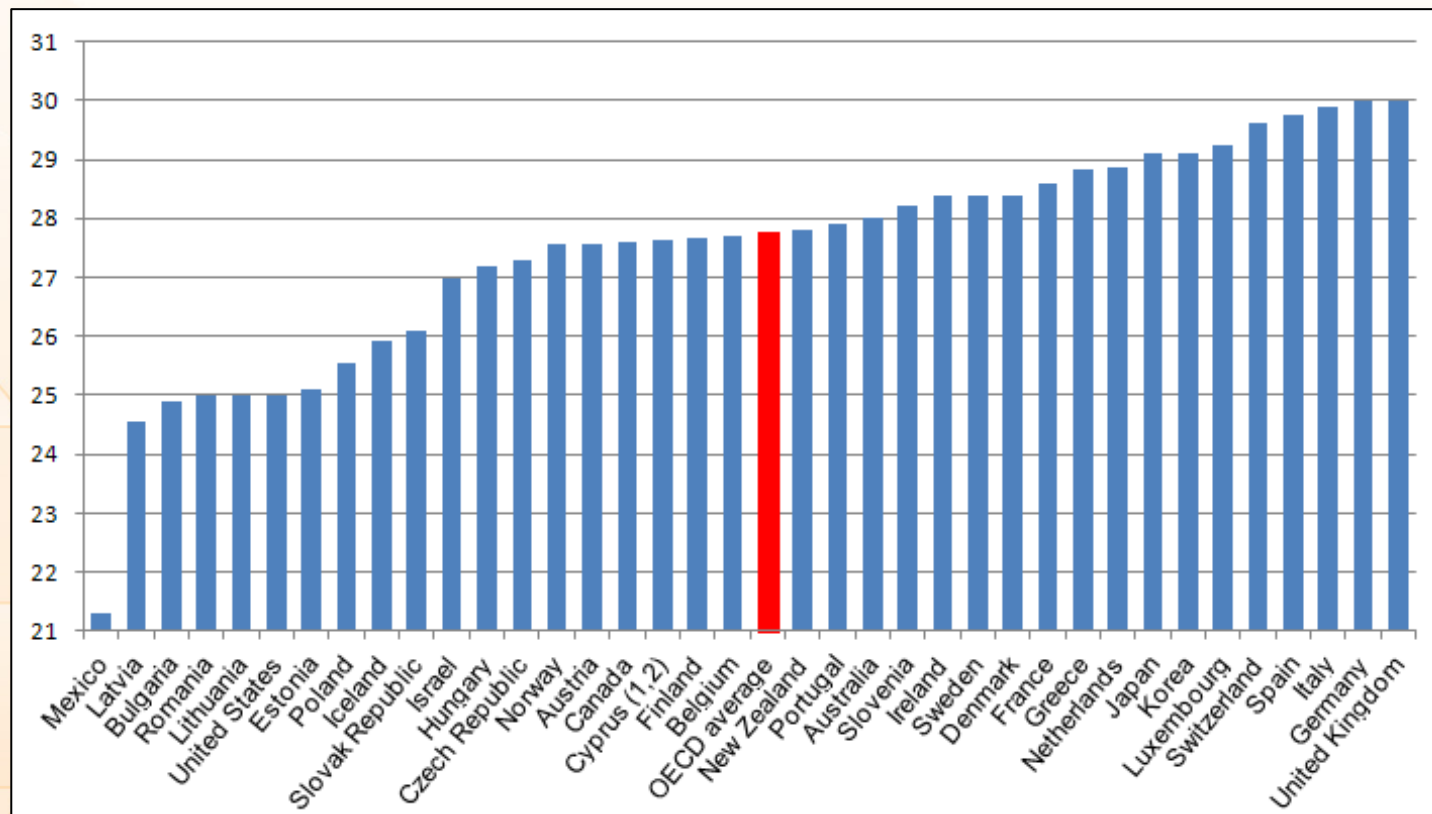


Image from the OECD 2011 Report (Organization for economic cooperation and development)

Proportion (%) of women (currently aged 20-24) who had their first birth by the age of 18 (UN 2011, 2008 data)

- ❑ Niger 53
- ❑ Guinea 49
- ❑ Mali 47
- ❑ Cameroon 46
- ❑ Liberia 44
- ❑ Uganda 42
- ❑ Malawi 38
- ❑ Nigeria 35
- ❑ Senegal 34
- ❑ Zambia 34
- ❑ Burkina Faso 32
- ❑ Madagascar 31
- ❑ Togo 30
- ❑ Kenya 28
- ❑ Tanzania 28
- ❑ Guatemala 28
- ❑ Yemen 27
- ❑ Botswana 26
- ❑ Zimbabwe 25
- ❑ Ghana 23
- ❑ **Mexico 22***

- ❑ **Mexico 22***
- ❑ Bolivia 19
- ❑ Indonesia 19
- ❑ Namibia 18
- ❑ Dominican Rep. 17
- ❑ Pakistan 17
- ❑ Sudan 17
- ❑ Ecuador 16
- ❑ Paraguay 16
- ❑ Egypt 15
- ❑ Colombia 13
- ❑ Trinidad/Tob. 13
- ❑ Peru 12
- ❑ Turkey 11
- ❑ Thailand 9
- ❑ Rwanda 8
- ❑ Burundi 8
- ❑ Jordan 8
- ❑ Philippines 8
- ❑ Morocco 7
- ❑ Sri Lanka 5
- ❑ Tunisia 3
- ❑ Viet Nam 3



*Refer to previous slide in order
to position this right column onto
the OECD graph

What is needed to revive and address Infertility as a global public health issue

WHO Global **consultation on definitions** of infertility for global consensus to generate prevalence and initiate a mechanism for global monitoring

WHO Infertility **evidence-based guidelines** for diagnosis, management and interventions (last provided in 1992, based up on WHO studies completed in 1984) - to address all levels of care and ensure quality and early maternal and antenatal care, decrease multiples, decrease incidence of prematurity

Integrate infertility within the broader periconceptional health framework



What is needed to revive and address Infertility as a global public health issue

TOOLS:

Educational, self-education, health care workers for primary care:

- ❑ Healthy fertility decision-making
- ❑ Education to counter fears that polio and other vaccines result in infertility
- ❑ Education to counter fears that use of contraception results in permanent infertility
- ❑ Peri-conceptional / pre-pregnancy messaging for healthy mothers/births/child

Competency-based for mid-level providers for diagnosis, management, interventions and referral

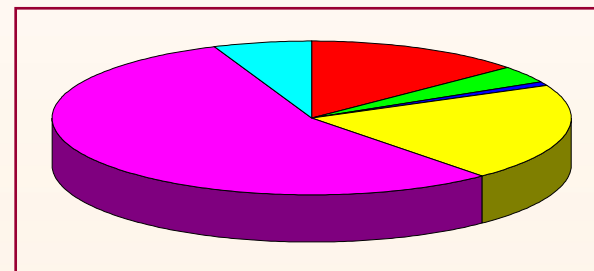
Competency-based for tertiary providers in PUBLIC and PRIVATE health care settings



What is needed to revive and address Infertility as a global public health issue (within the maternal, perinatal and reproductive health platform)

Access to innovative affordable infertility interventions:

- to address **tubal factors** which represent one of the most significant contributions to infertility in developing countries.
- to decrease **HIV transmission** (both horizontal and vertical) for HIV+ and HIV-discordant couples (as well as other STIs, such as syphilis)
- to address regional and community/social differences Operations and Implementation Research will be critical



Infertility diagnosis, management and care integration within the maternal, perinatal and reproductive health strategies

Access to safe and recommended infertility interventions help to:

Ensure healthier motherhood and fatherhood

Increase vaccine acceptance

Increase contraceptive use

Decrease HIV acquisition