

Pregnancy & Birth as a Window to the World

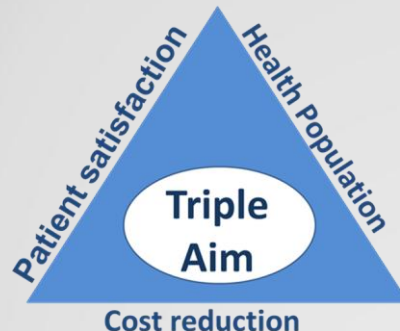
Long-term consequences for mothers and offspring

Muchas gracias por
la invitacion



Pablo Picasso: Window to the World 1955,

- **CARDIOVASCULAR DISEASES**
- Pre-eclampsia
- Preterm delivery
- **METABOLIC DISEASES**
- Gestational diabetes
- Overweight and obesity
- **MENTAL DISEASES**
- Maternal anxiety
- Stress
- **PELVIC FLOOR DISEASES**
- Connective tissue change
- Trauma during birth



Pregnancy: An Underutilized Window of Opportunity to Improve Long-term Maternal and Infant Health—An Appeal for Continuous Family Care and Interdisciplinary Communication

Birgit Arabin^{1,2*} and Ahmet A. Baschat^{1,2}

The Unfinished Agenda of Global Health

Reinvigorated energy/ political will to improve

By 2030, **8.3 billion people** are globally expected: 13% >65 y.
Inequalities of life expectancies: **45.6 y.**  Lesotho **86.4 y.**  Japan.
Murray, et al. Lancet 2013; 382: 9–11

Since 1990, **non-communicable diseases (NCD)** increased by **41.8%**, **injuries by 10%**. This will affect generations to come.
Sepúlveda & Murray. Science 2014; 345; 6202:1275-9

The UN calls upon governments to reverse the NCD burden and identified the Sustainable Development Goals, to “end all forms of malnutrition” by 2030. **GBD transition likely?**

Commission on Ending Childhood Obesity. www.WHO.int/entity/end-childhood-obesity/final-report/en/



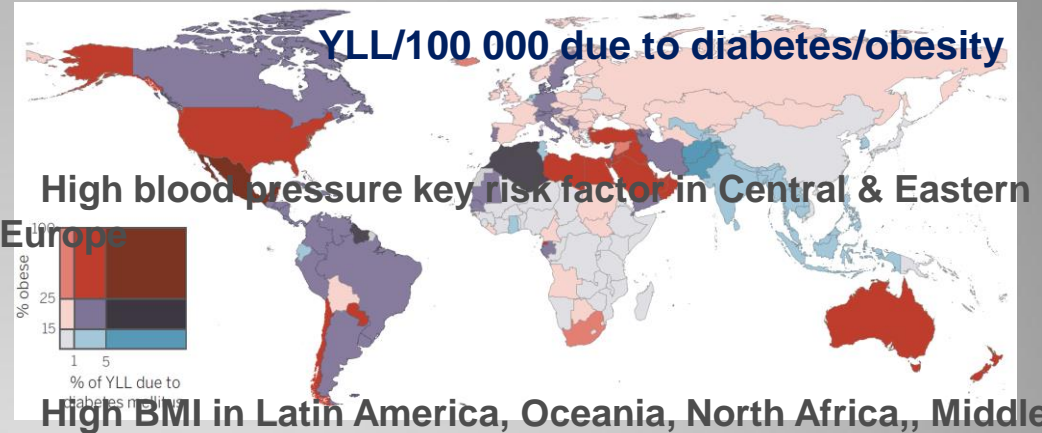
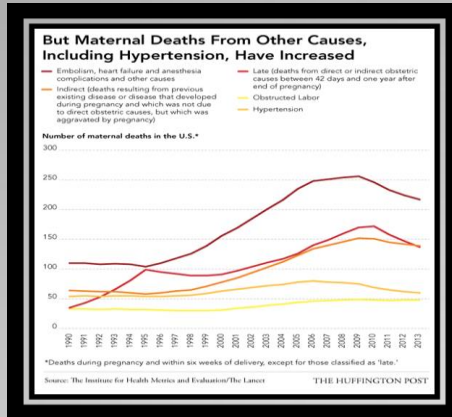
Ban Ki Moon

"We strive for an international commitment that puts non-communicable diseases high on the development agenda".

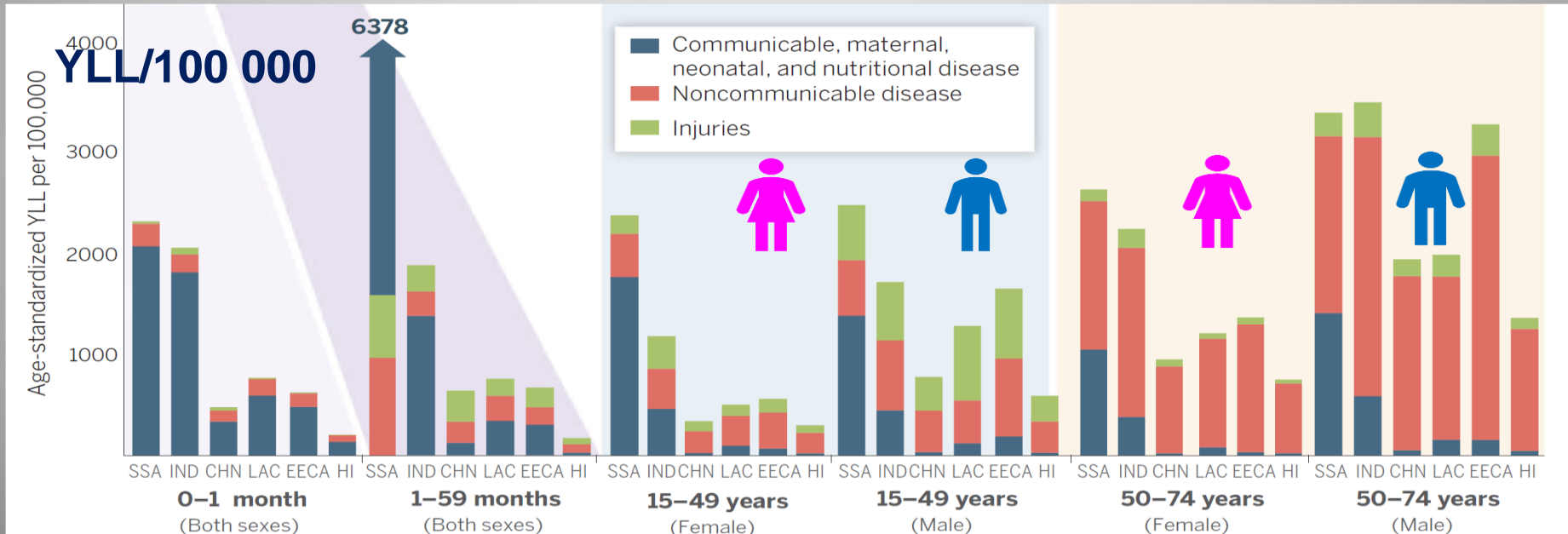
The Global Burden of Diseases: Life Expectancy

Sepúlveda & Murray. Science 2014; 345; 6202:1275-9 **Cave Transition!**

Since 1990 communicable diseases & neon./mat. death rates **decreased by >25%**



Age-standardized years of potential life lost/100,000 across life stages and regions



Setting Priorities—globally, locally, individually

Mismatch between needs & development assistance for health (DAH), we need broader discussions and changes of attitude. The allocation of DAH improves health of the poor; but is **influenced by underrecognition of the epidemiological transition**. *Sepúlveda & Murray. Science 2014; 345 202:1275-9*

| | Low income | | Lower middle income | | Upper middle income | |
|-------------------------------------|------------|--------|---------------------|-------|---------------------|-------|
| | YLL | DAH | YLL | DAH | YLL | DAH |
| HIV/AIDS | 7.6% | 41.6% | 3.7% | 32.0% | 4.8% | 41.1% |
| Malaria | 11.2% | 14.3% | 4.8% | 9.6% | 0.0% | 2.2% |
| Tuberculosis | 3.1% | 3.3% | 3.5% | 6.6% | 1.0% | 7.0% |
| Maternal, newborn, and child health | 37.8% | 17.1 % | 32.1% | 23.7% | 8,2% | 70% |
| Noncommunicable diseases | 20.7% | 0.2% | 34.0% | 1.0% | 66,3% | 2% |
| Other | 19.7% | 23.5% | 21.9% | 27.1% | 20.8% | 39.8% |

Cardio-Vascular Diseases during Life Course

A Model for Obstetric Syndromes

Not to see what nobody has seen, but to think what nobody has thought what everybody sees (Schopenhauer)

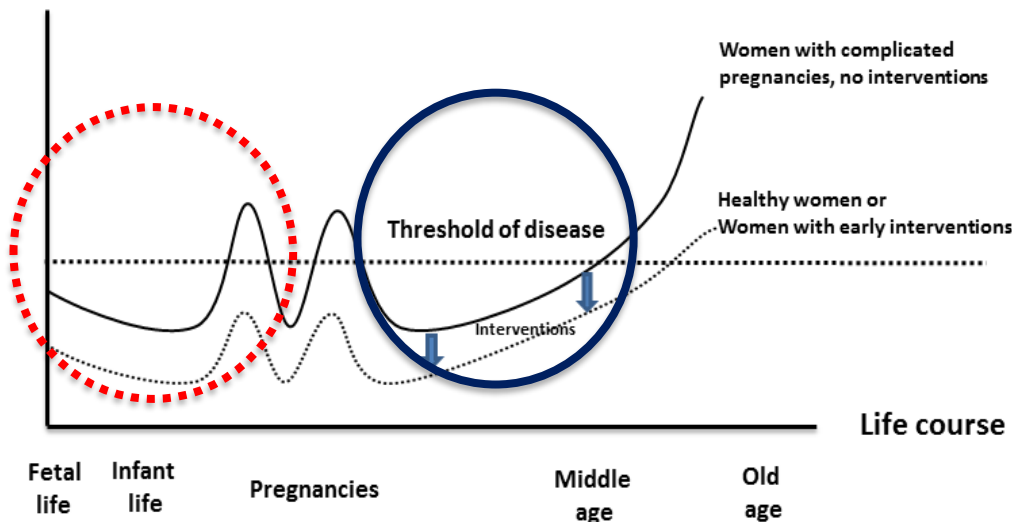
Seeming vs. genuine reality (Saul Bellow)

Obstetric syndromes unmask preceding risks, predict modifiable health risks of mother & offspring. (Barker /reverse Barker)

Pregnancy complications and maternal cardiovascular risk: opportunities for intervention and screening?

Risk of vascular or metabolic disease

Sattar & Greer BMJ 2002;325:157–60



High Plasticity

Inadequate response to new challenges

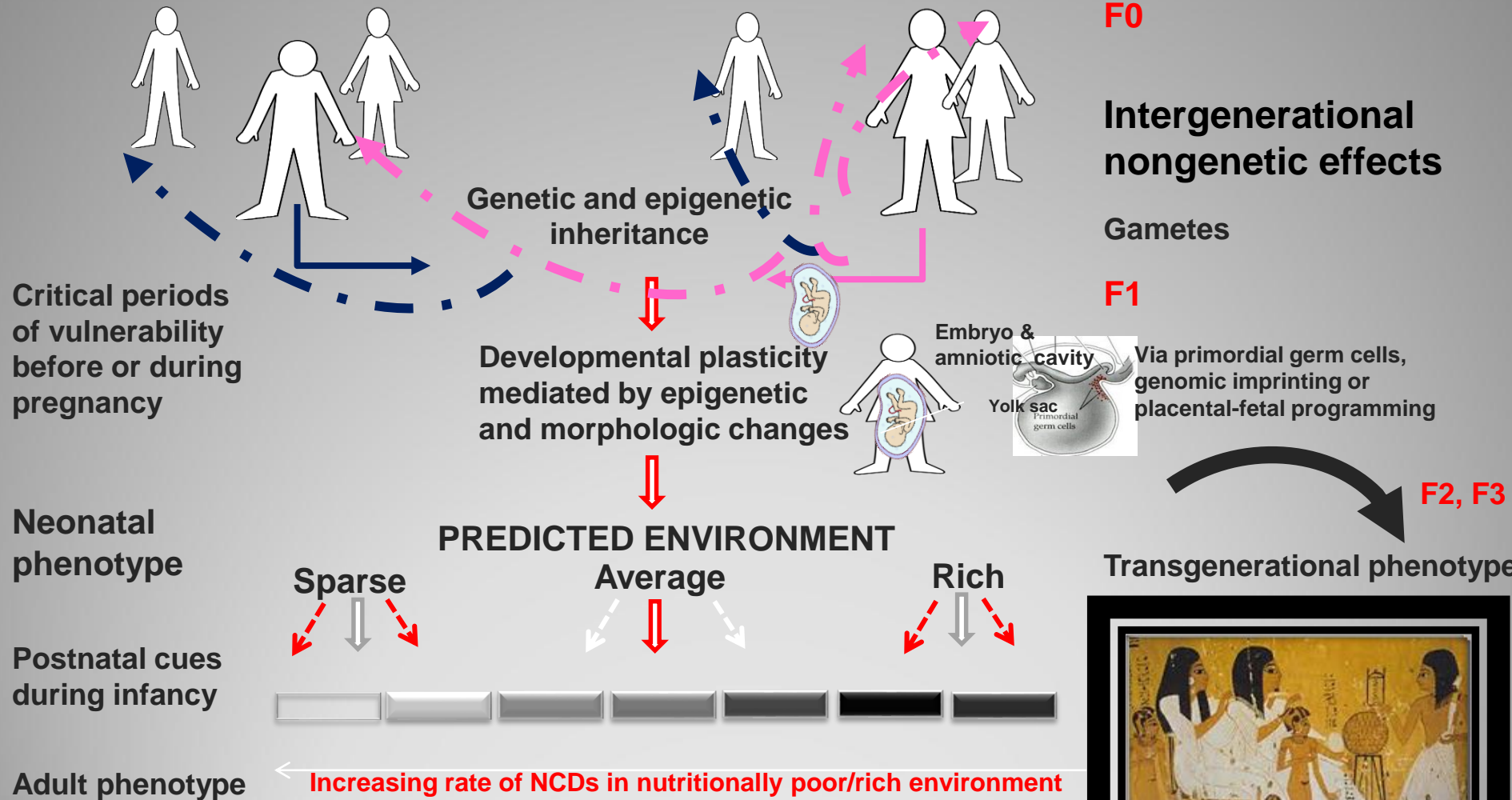


Gustav Klimt, 1902 Belvedere Vienna

(Epi)genetic Impact on the Offspring

Programming in vulnerable periods

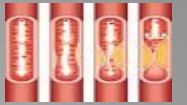
Gender-specific transgenerational programming




Modified acc. to : Gluckman et al. *NEJM* 2008 ; 359:61;
Gabory et al. *Biol Sex Differences* 2013; 4:5

Egyptian, ca. 1500 BC, Eg.Museum Berlin

I Cardiovascular Diseases (Infarction, Stroke)



- 31% of all deaths in the US.
- Increasing rates for women between 35 and 44 years.
- Increasing rates hypertension/ mortality early adulthood.
- Ca.75% of patients with infarction/stroke have RR > 140/90.
- In 15 years mortality due to  RR increased by 39%.
- If only 10% of hypertensive women (US) would get early treatment: 14.000 deaths/year in US would be prevented.

Cardiovascular Disease after Risk Pregnancies

Forest Plots of studies: a) CVD (general) b) CVD (ischemic) c) Stroke

Heida et al. Eur.J Prevent Cardiol 2016; 23:1863-79

Is this communicated?



Pre-eclampsia

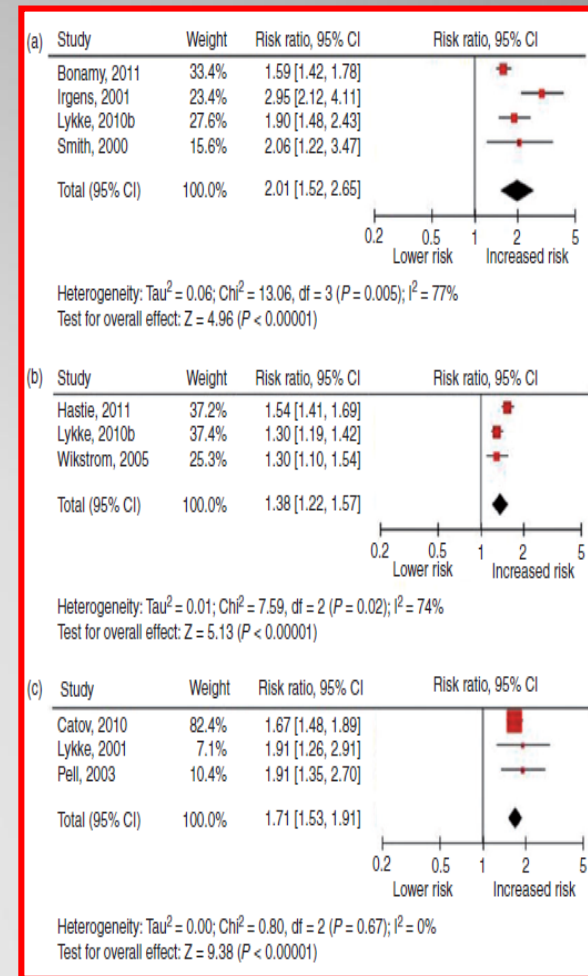
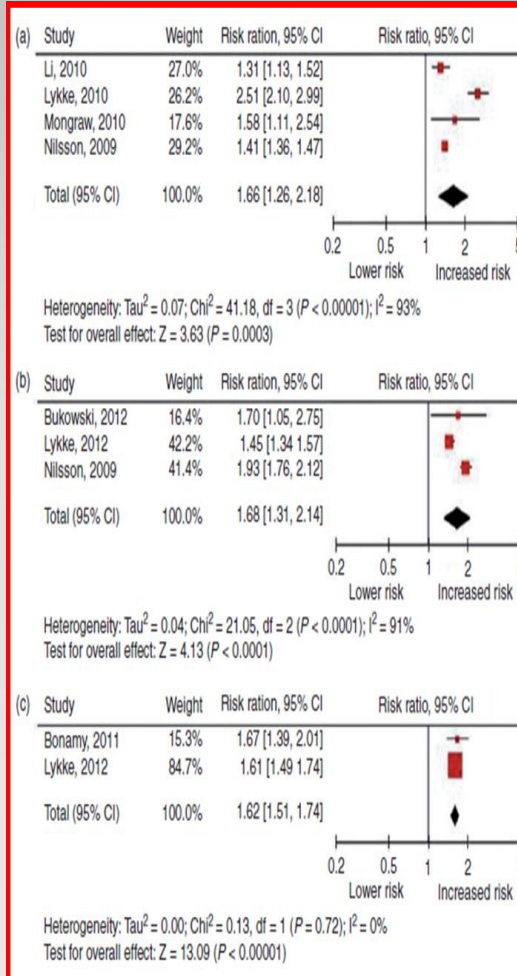
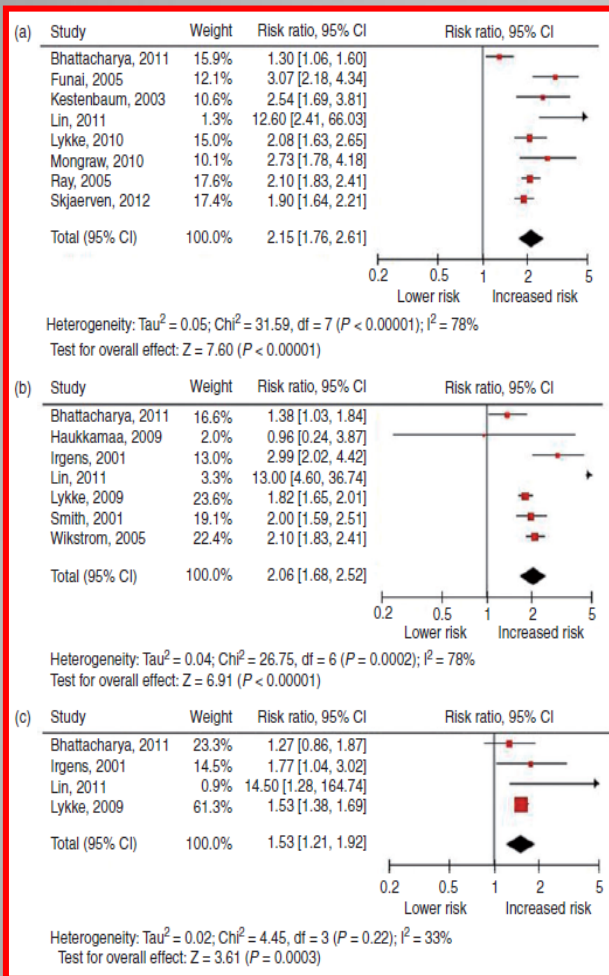
Fetal growth restriction

Preterm Birth

C
V
D

G
I

S
T
R
O
K
E



Different Conditions of Pre-eclampsia lead to Early Maternal CV Mortality

Health risks depend on the reproductive experience



Norsk Epidemiologi 2015; 25 (1-2): 53-62

Registry based perinatal epidemiology: The importance of sibling and generation data

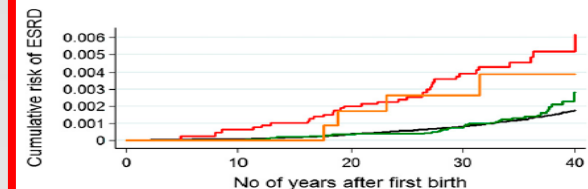
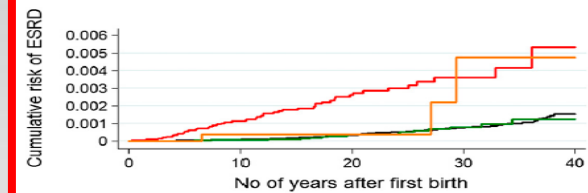
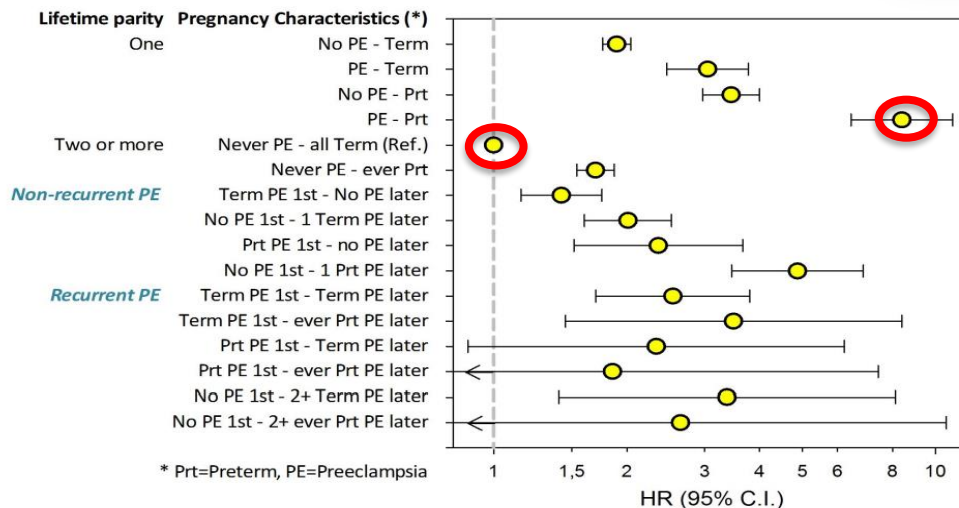
Rolv Skjærven

Department of Global Public Health and Primary Care, University of Bergen, Bergen, Norway
Medical Birth Registry of Norway, Norwegian Institute of Public Health, Bergen, Norway
E-mail: rolv.skjaerven@nub.no



Women with PE have a 6-fold increase of ESRD, but not their siblings or children

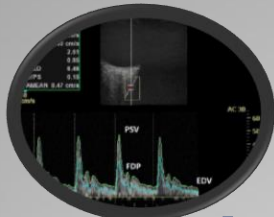
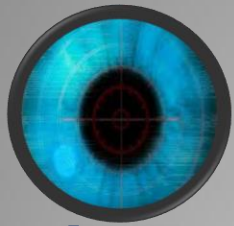
in 1st or later pregnancies, Norway and Sweden, 1967-2014 and 1973-2010



Maternal Preeclampsia



Many patients with PE have features not consistent with the placental origin hypothesis. Uterine Doppler reflects general maternal CV status.



Doppler a.ophthalmica predicts Pre-eclampsia

Kane et al. Ophthalmic artery Doppler analysis: a window into the cerebrovasculature of women with PE. UOG 2017: 48; 15-21

Link between Biomedical and Epidemiological Data?

AOGS

ACTA Obstetrica et Gynecologica



Scandinavica

AOGS REVIEW ARTICLE

Acta Obstet Gynecol Scand. 2015;94(8):820-32.

Angiogenic biomarkers in pregnancy: defining maternal and fetal health

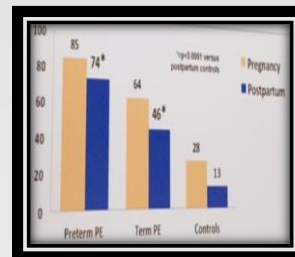
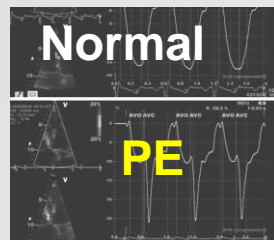
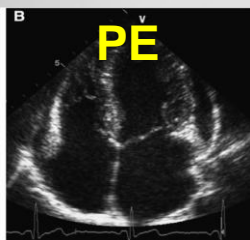
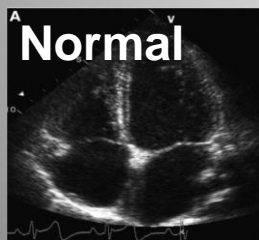
LENE G. RASMUSSEN^{1,2}, JACOB A. LYKKE^{2,3,4} & ANNE C. STAFF^{1,5}

Dysregulated angiogenic proteins (PGF, sFlit-1) associated with PE/placental dysfunction, also dysregulated in CVD and DM targeting women who may benefit from prevention programs.



Deficient remodelling?
Deficient cardiac performance?

Diastolic dysfunction
LV concentric remodelling,
Pericard perfusion
Impaired contractility



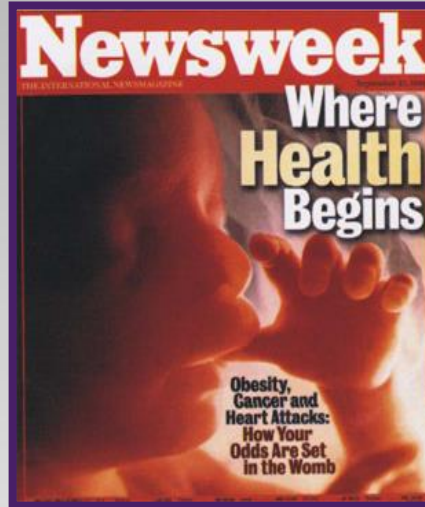
Thilaganathan: Perspectives, UOG 2017

Pre-eclampsia and Risk for Child / Later Adult

Risk increase at 20 years for...



Is this
communicated?



Hypertension

aOR: 6.25 (1.96 - 19.96)

aOR: 6.63 (1.17- 37.57)

aOR: 6.74 (1.25 - 36.29)



Overweight/Obesity

aOR 1.68 (1.18 - 2.39)

aOR 1.62 (1.05 - 2.52)

aOR 1.59 (1.02 - 2.48)

These health risks persist or even increase with age.

Krantz et al. Pregnancy hypertension 2015;5(1):92

Preterm Birth and Risk for NCDs as Child/ Adult



Prematurity is equally associated with epigenetic mechanisms

- Microalbuminuria at young adulthood.
- Altered glucose tolerance/ insulin resistance.
- Lung, behaviour, bone mineral density affected.
- Hypertension at the age of 20 years (arterial stiffness)



The early environment has long-lasting effects on gene expression when DNA imprinting is most active, and thus contributes to risk modifications for a wide range of NCDs.

Simeoni et al. Early Hum Dev 2014;90:23-4

Fetuses exposed to cytokines: Re-programming of immune system, gest. age at birth is negatively correlated with infant's insulin resistance.

Wang et al. JAMA 2014, 311:587-596

Luyckx et al. Lancet 2017; 22; 390:424-48

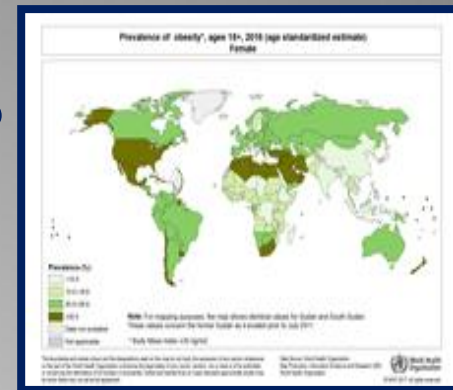


A developmental approach to the prevention of hypertension and kidney disease: a report from the Low Birth Weight and Nephron Number Working Group

Valerie A. Luyckx*, Norberto Perico*, Marco Somaschini, Dario Manfredotto, Herbert Valensise, Irene Cetin, Umberto Simeoni, Karel Allegaert, Bjørn Egil Vikse, Eric A. Steegers, Dwomoo Adu, Giovanni Morlini, Giuseppe Remuzzi, Barry M. Brenner, for the writing group of the Low Birth Weight and Nephron Number Working Group

II Metabolic Diseases

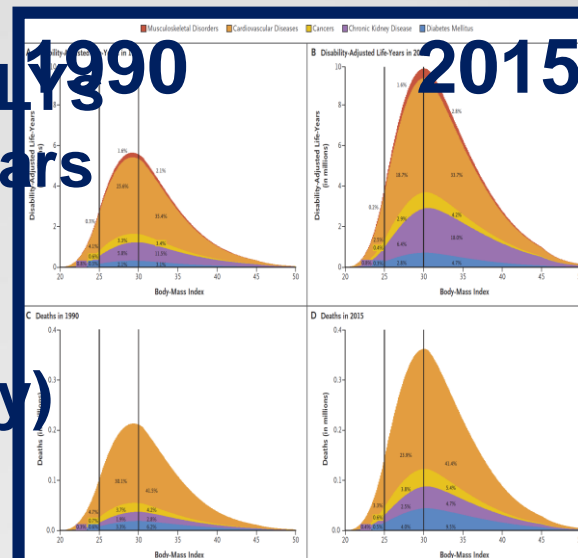
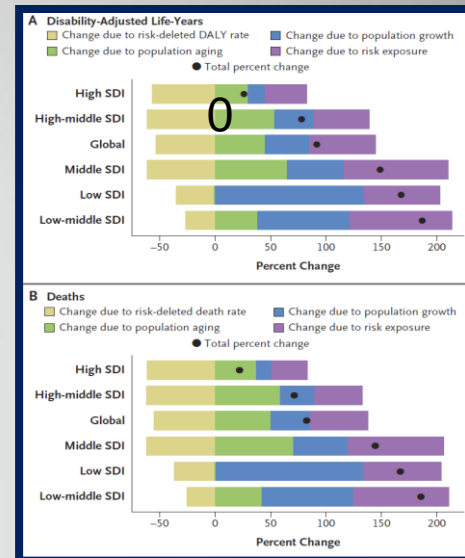
(Obesity, Diabetes, Hyperlipidemia)



Female(+18) Obesity
(WHO, BMI>30), 2016



Change in different SDIs/age/growth Risk



Diabetes 2000 vs. 2030

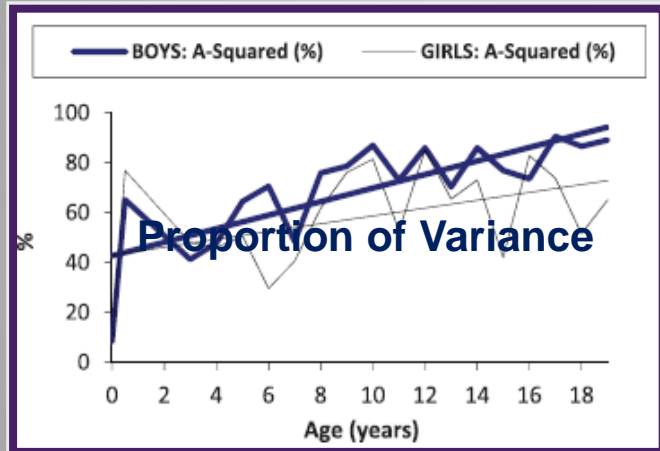
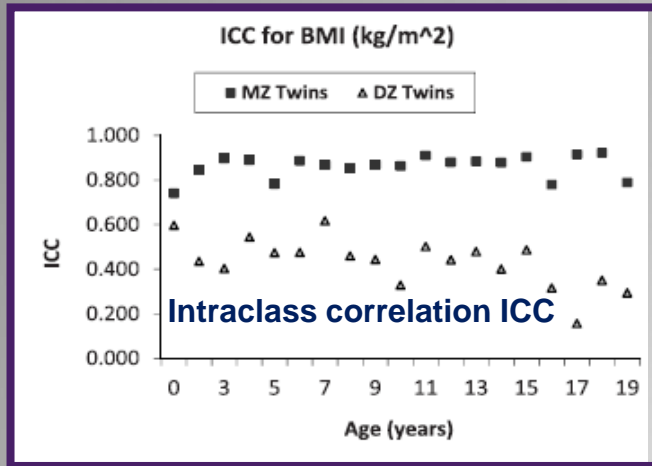
- Ca. 65% of women (US) overweight or obese 41.5% obese.
- **Definition Metabolic Syndrome (WHO):**
- *The Diabetes Prevention Program (DPP): Diabetes care 2002, 25(12):2165-2171*
- BMI > 30 kg/m², RR>140/90, proteinuria, high TG und HDL.
- Women with PE: High Insulin resistance/dyslipidemia p.p.
- Each criterion increases risk of PE

TRANSITION Disease/DALYs
Disability-Adjusted Life-Years
(in Millions, globally)

Deaths (in Millions, globally)
The GBD 2015 Obesity Collaborators.

Epigenetics and Genetics in Families with Obesity

Genetic / Epigenetic Variance (>12000 twins up to 19 years)



Dubois et al. *Plus One* 2012; 7:e30153



Margerita Sikorskaia
2001 Angela King Gallery New Orleans



2001 Angela King Gallery New Orleans

Obesogens: an emerging threat to public health

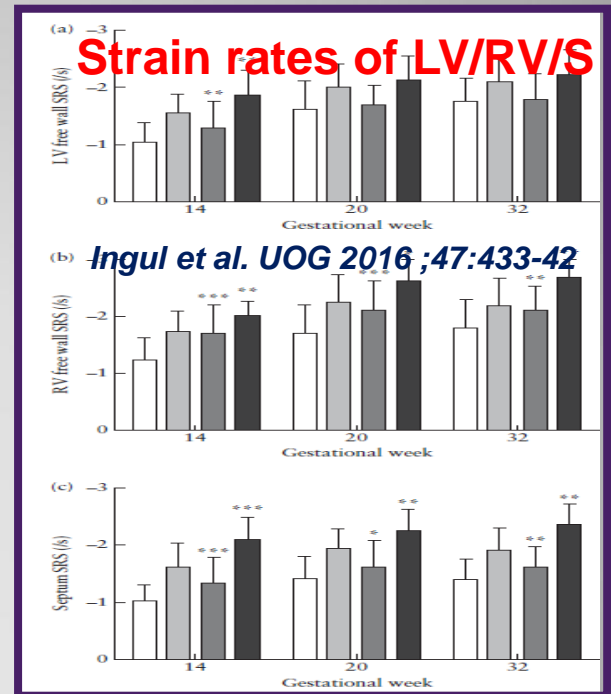
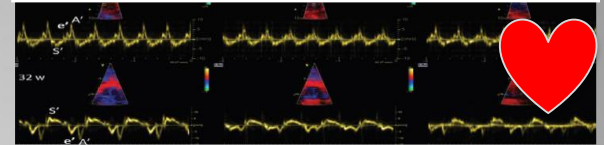
Amanda S. Janesick, PhD; Bruce Blumberg, PhD

Janesick & Blumberg:
AJOG 2016;214:559-65

Programming fetal CVS (early ultrasound)

Ultrasound Obstet Gynecol 2016; 47: 433-442
Published online 14 March 2016 in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/ug.14841

Maternal obesity affects fetal myocardial function as early as in the first trimester



Ingul et al. UOG 2016;47:433-42

Pregnancy Complications & Later Disease of the Child



Gestational diabetes+LGA

Metabolic syndrome at 11 years

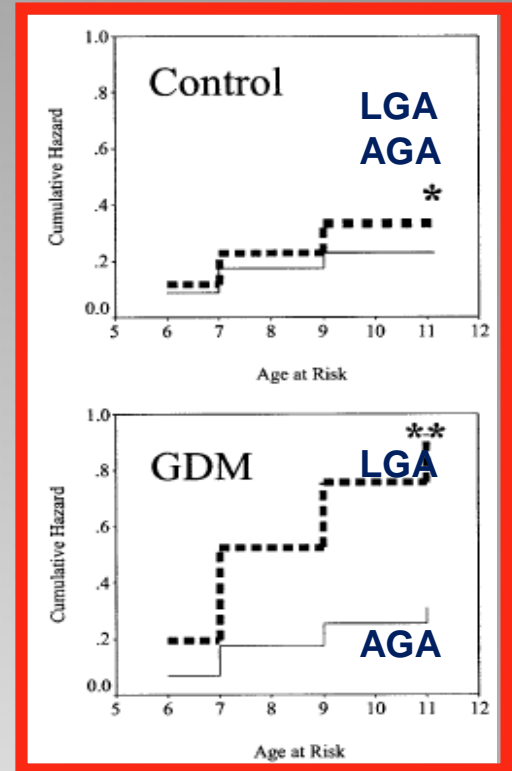
(increased insulin resistance and obesity)

OR 10.4 (1.5-74.4)

Cumulative risk function for metabolic syndrome stratified for AGA and LGA:

**Only in children of mothers with GDM:
3.6-x fold risk of LGA children by 11y.**

Boney et al. Pediatrics. 2005 ;115(3):e290-6.



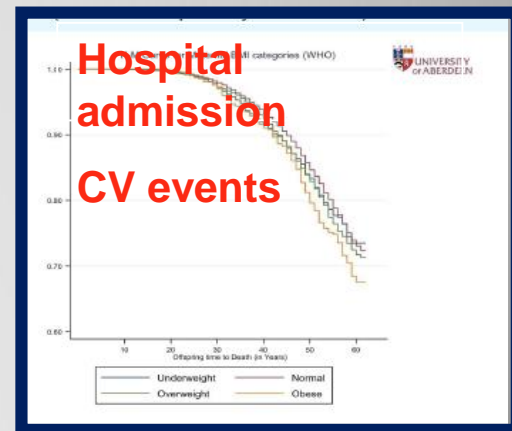
Obesity and programming of early death

Even after adjustment for age, gender, socioeconomic status, BW or BMI of child is the life expectancy significantly shorter.

This implies:

Weight reduction before and reduced weight increase during pregnancy should help in reducing the detrimental effects.

Reynolds et al. BMJ 2013;347: 34539



What can we do?

New Approach for Parenthood

WHO Commission on Ending Childhood Obesity



Jean Eugene Bunand 1890,
Art Museum Basel

Problems higher in hard-to-access members of society.

(low socioeconomic status, educational attainment, migrants, displaced).

Committed societies/policy makers must give this priority (DAH).

www.who.int/entity/end-childhood-obesity/final-report/en/acc. 14-02-2017

Ma et al. *Lancet Diabetes Endocrinol* 2016; 4: 1037–49

Godfrey et al. *Lancet Diabetes Endocrinol* 2017; 5: 53–64

Hanson & Gluckmann. *Lancet Diab Endocrin* 2016;4: 966-7

Helping Doctors and Patients Make Sense of Health Statistics

Gerd Gigerenzer,^{1,2} Wolfgang Gaissmaier,^{1,2} Elke Kurz-Milcke,^{1,2} Lisa M. Schwartz,³ and Steven Woloshin³

UK Committee on Safety of Medicines (CSM) (1995):

„The third-generation oral contraceptive pills increased the risk of potentially life-threatening blood clots in the legs or lungs twofold - that is, by 100%“.

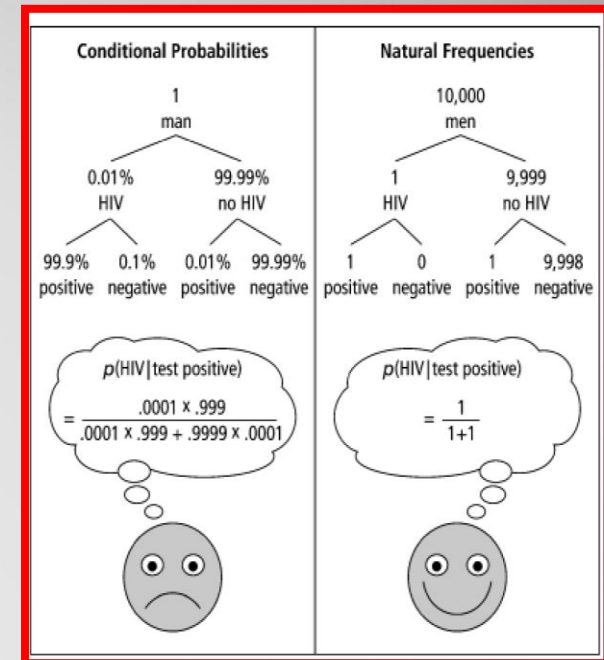
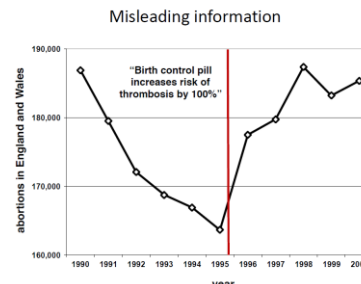
= relative risk

100% = 1 vs. 2/7000

„The risk of thrombosis increases with the third generation pill from 1 to 2 out of 7,000 women.“

= absolute risk

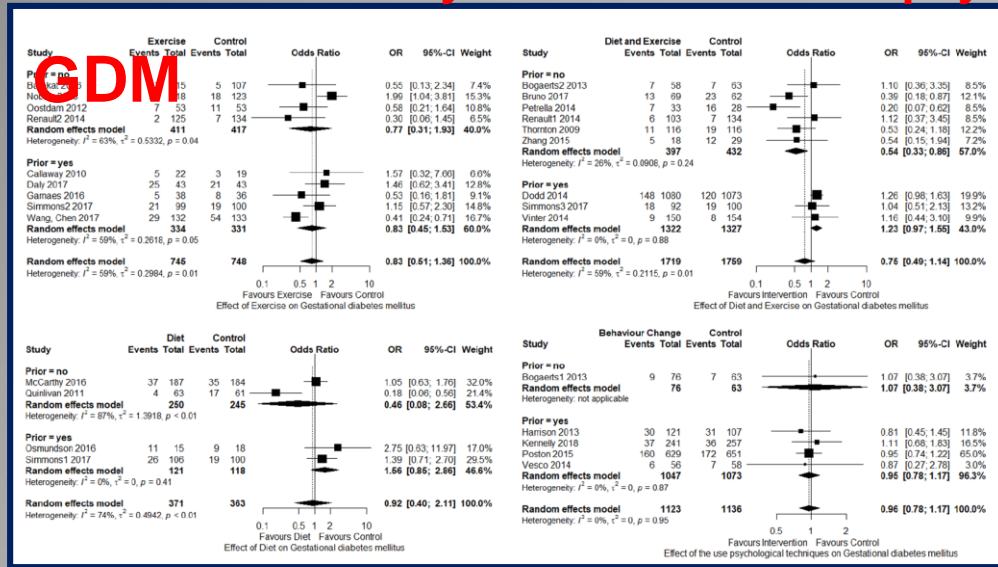
Risk of thrombosis



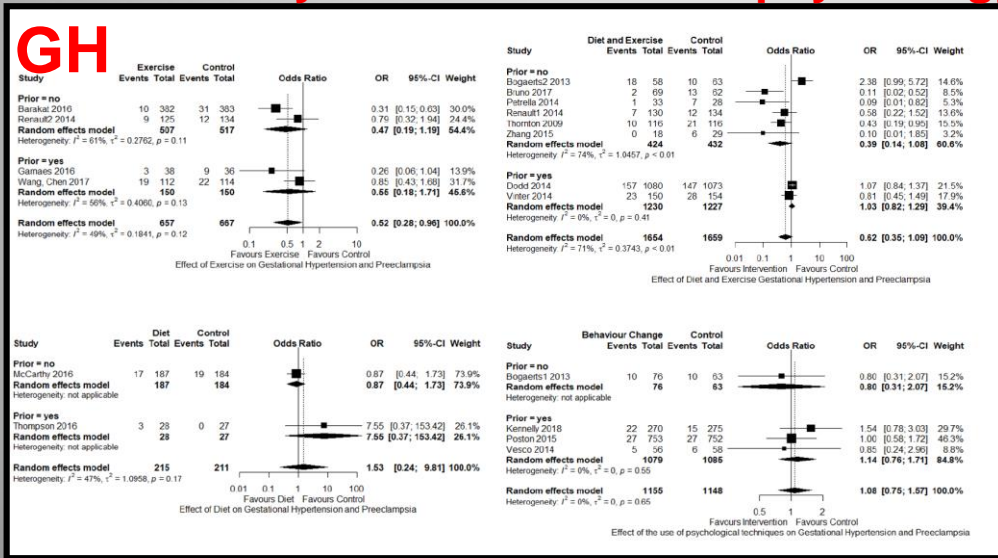
How to explain Evidence to Lay Pregnant Women?

(Cochrane bias tools 2012 & Prior tools BJOG 2017/ PRISMA tools & AMSTAR- tools)

NO 18: Prevention by diet/exercise/both/psychology

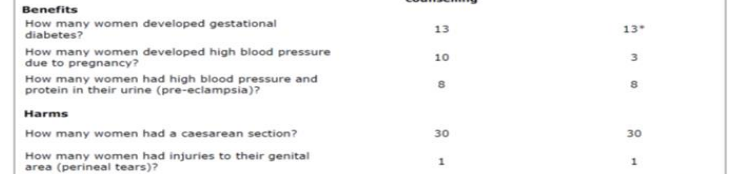


Prevention by diet/exercise/both/psychology



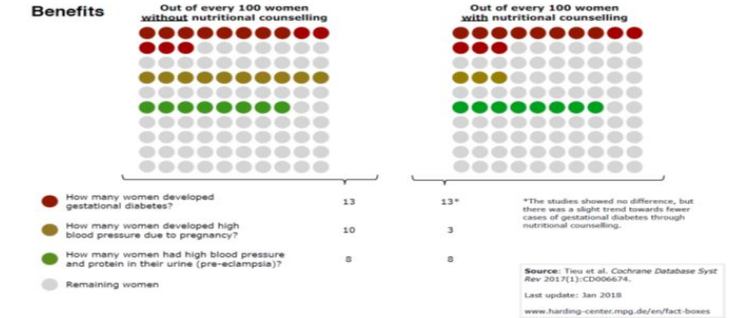
Nutritional counselling in pregnancy to prevent gestational diabetes

Numbers for pregnant women who either did or did not receive nutritional counselling before their blood sugar level was tested (glucose tolerance test).



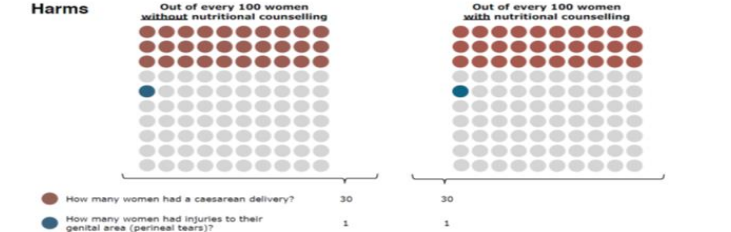
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Nutritional counselling in pregnancy to prevent gestational diabetes

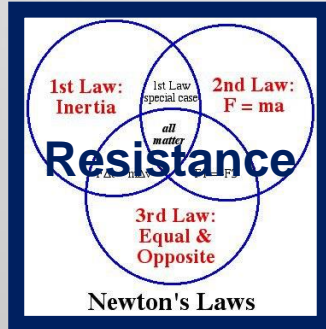
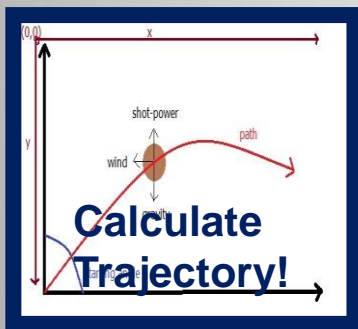
Numbers for pregnant women who either did or did not receive nutritional counselling before their blood sugar level was tested (glucose tolerance test).



Several icon arrays in progress...
Based on Tieu et al, Cochrane Rev 2017

Statistics vs. Heuristics

The weakness of complicated, the power of simple solutions



$$R = -\varepsilon \frac{v}{|v|} |v|^s = \begin{pmatrix} -\varepsilon v_1 |v|^{s-1} \\ -\varepsilon v_2 |v|^{s-1} \end{pmatrix} = \begin{pmatrix} -\varepsilon x_4 |v|^{s-1} \\ -\varepsilon x_5 |v|^{s-1} \\ -\varepsilon x_6 |v|^{s-1} \end{pmatrix}$$

Rotation

$$M = \begin{pmatrix} 0 \\ -\frac{x_6}{x_5} \\ 1 \end{pmatrix} \frac{\pi \rho \omega r^2 |v|}{\sqrt{\frac{x_6^2}{x_5^2} + 1}} = \begin{pmatrix} 0 \\ -\frac{x_6}{x_5} \\ 1 \end{pmatrix} \frac{x_5 \pi \rho \omega r^2 |v|}{\sqrt{x_6^2 + x_5^2}} = \begin{pmatrix} 0 \\ -x_6 \\ x_5 \end{pmatrix} \pi \rho \omega r^2$$

MASS?
TORQUE?
REACTION?
NEWTONS?
WEIGHT?
FRICTION?
VELOCITY?
ACCELERATION?



My Neighbours: Dog Uriel: Less can be more !
Calculations do not work in a World of Uncertainty.
Benjamin Franklin: Weigh Pros and Cons.

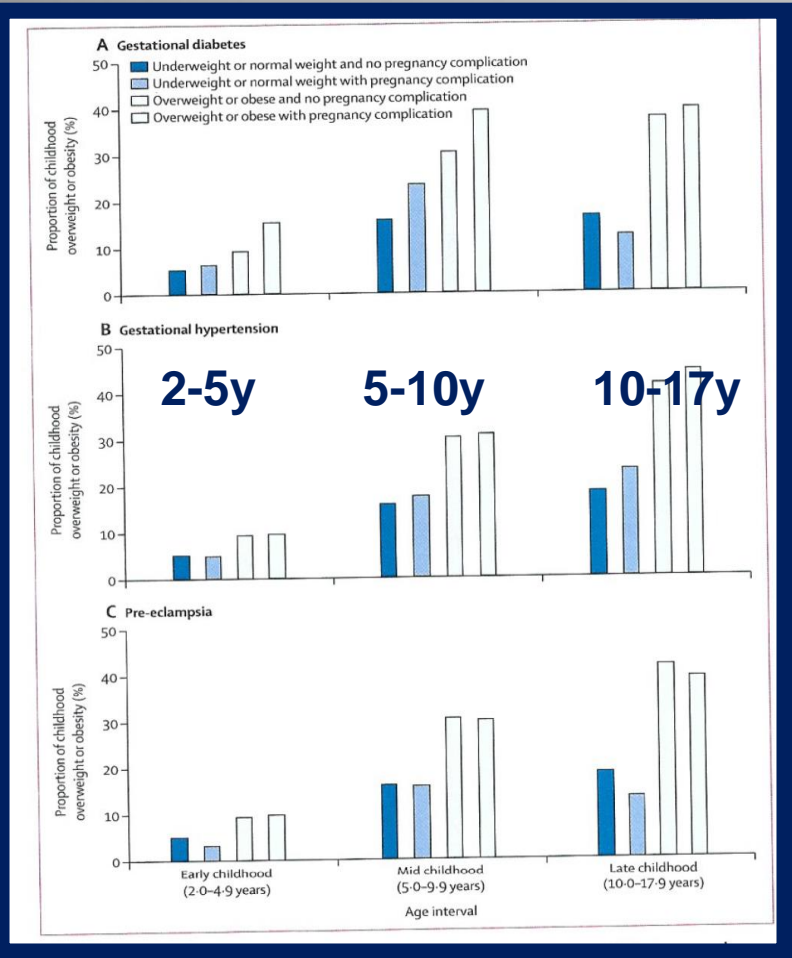
Complex situations require simple solutions.
Remember Jeffrey Skiles / Canadian geeze hit engines.

Do doctors know the evidence, take the time, have no conflict of interest nor defensive decision making? Patients have to decide!

Pregnancy Complications & Childhood Obesity: BMI-independent?

Individual participant data meta-analysis of 160 757 mother-offspring pairs

Golab et al. *Lancet Child Adolesc Health* 2018; 2, 812-21



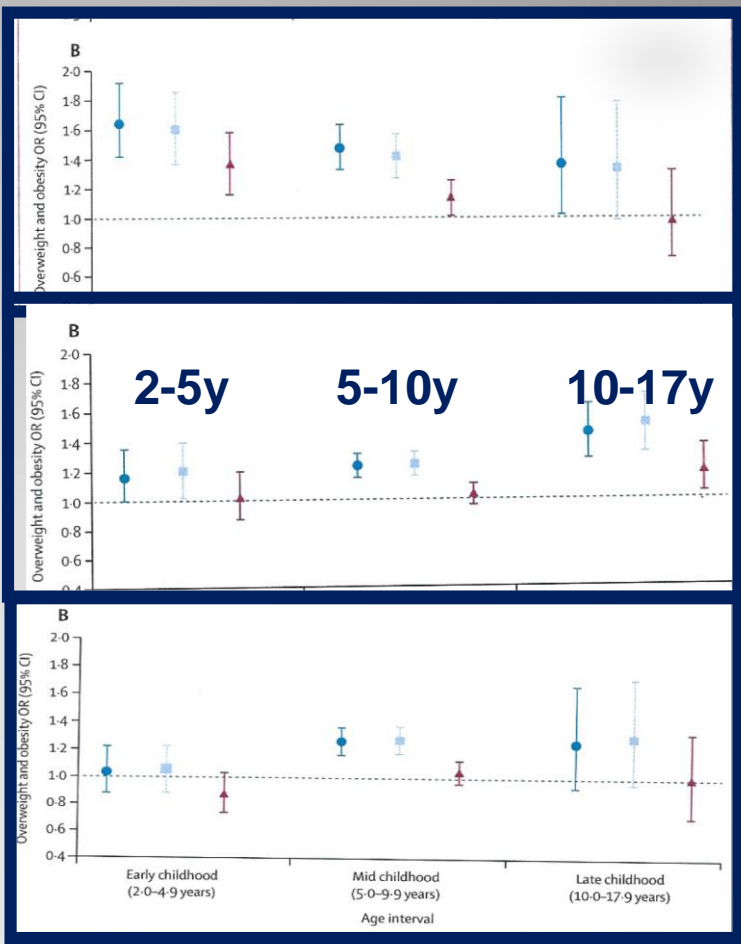
Presence or absence of

GDM

GHD

PE

Childhood overweight acc.to complications and maternal pre-pregnancy BMI



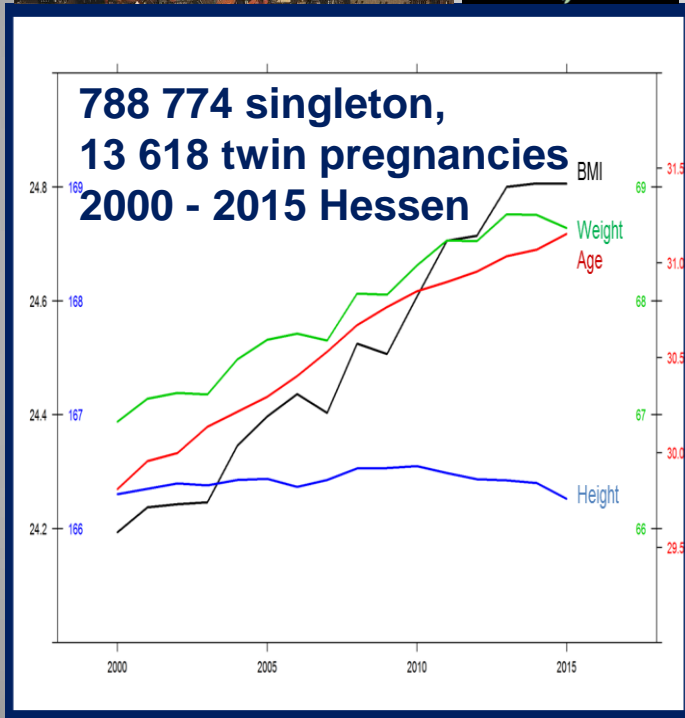
Childhood overweight acc.to complications/ adjusted for different factors & BMI

How to Translate Science to Patients?

Show regional data to patients/ colleagues and politicians

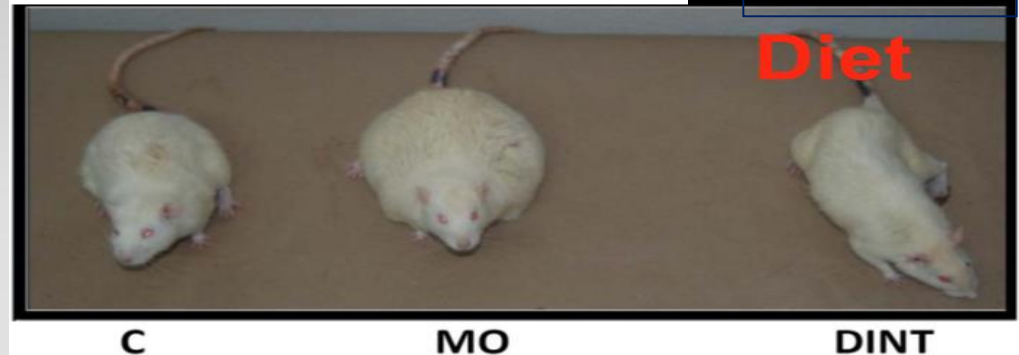
Make Science visible & understandable

Use 1st Trimester to Induce Health Literacy!



Interventions to prevent adverse fetal programming due to maternal obesity during pregnancy

Peter W Nathanielsz, Stephen P Ford, Nathan M Long, Claudia C Vega, Luis A Reyes-Castro, and Elena Zambrano



Nathanielsz et al. Nutrition reviews. 2013;71 Suppl 1:S78-87

Breastfeeding: Impact on Mothers/Offspring



Margerita Sikorskaia 2002 Angela King Gallery New Orleans

- Low activation HPA Axis
- Lower blood pressure
- Mobilization of fat tissue still recognizable after 7 years
- Lower rate of T-2 Diabetes also in case of GDM
- Prolactin increases pancreas mass
- Lower rates of infection and cancer (ovary, breast)

Ip et al. 2007(153):1-186. Bartick et al. : Obstetrics & Gynecology 2013, 122(1):111-19.

- Biologic signals for cell growth/differentiation
- Improved lung function (also in preterms)
- Lower rates of infection, asthma, dermatitis
- Lower rates of obesity and diabetes
- Lower rates of SID and leukemia



Johnston et al. Pediatrics 2012, 129 (3):e 827-841

• **Suboptimal Breastfeeding costs \$17.4 billions/year (US)**

Recommendations for postnatal follow up related to metabolic & cardiovascular diseases



SBAR3: Situation, Background, Assessment, Recommendation

Bridging the diabetes postpartum gap
SBAR3 for obstetric-primary care transition
Utilize reminder system.

Women with a history of PE benefit from CV assessment 1-2 years pp to identify need targ. intervention.

Noelke et al. AJOG 2017; 217: 314-21 DIAMIND RCT: Diabet Med 2015

Heida et al. Eur.J Prevent Cardiol 2016; 23:1863-79


Optimizing postpartum care for the patient with gestational diabetes mellitus



Review

Cardiovascular risk management after reproductive and pregnancy-related disorders: A Dutch multidisciplinary evidence-based guideline

European Journal of Preventive Cardiology
 Q09 1-17
 © The European Society of Cardiology 2016
 Reprints and permissions:
sagepub.co.uk/journalsPermissions.nav
 DOI: 10.1177/2047487316659573
ejpc.sagepub.com
 SAGE

| Societies (US) | Time line / test | Interventions | Offspring  |
|-------------------|--|--|--|
| Am Diab. Ass | 6-12 wk.pp. 75g OGTT, Retest 1-2 y | Methformin Int.lifestyle | Follow for obesity glucose tolerance Breast feeding! |
| Endocrine Society | 24-72 h pp Fast. glucose | Couselling lifestyle Cave hypoglycemia | Child BW / GDM should become part permanent record, breast feeding ! |
| ACOG | 6-12 wk pp. Fasting pl. glucose, 75g OGTT, retest | Refer to preventive therapy | |

| Pregnancy Disorder | Recommendation (NL) |
|--|--|
| 1st wk pp. preeclampsia | Treatment hypertension (if necessary) |
| 6 wk pp to 49 years in women with PE, with SGA, sPB, rec. Miscarriage, POI | Optimizing lifestyle, inform about modifiable CV risks Treatment hypertension (if necessary) |
| At age of 50 years | Full CV risk profile Acc. to Dutch guidelines |

Maternal Obesity + Mental Health/Neurodevelopment

ORIGINAL ARTICLE

Wilden et al. Matern Child Nutr. 2018;14:e12481.

Prepregnancy overweight and obesity are associated with impaired child neurodevelopment

Maternal obesity and excessive GWG are –modifiable- risk factors for adverse child cognitive development.

The effects are gender dependent and reflected by the brain transcriptome. Dietary change in pregnancy results in more dysregulated pathways in male than in female brains ($p < 0.001$).

Hinkle et al. J epidemiol and community health. 2016;70(7):696-703.

Edlow et al. AJOG 2016;Suppl.1:S 125; 206.

Maternal obesity is associated with lower verbal recognition (Peabody) scores in mid-childhood and with lower academic scores at 6, 10 and 14 years.

Wilden et al. Matern Child Nutr. 2018;14:e12481

Life-time trajectories are programmed and determine with genetics and life challenges the ultimate health. If maternal obesity is associated with psychosocial stress, brain function throughout life course is more affected.

Pugh et al. Journal of epidemiology and community health. 2016;70(6):534-40. O'Donnell & Meaney.

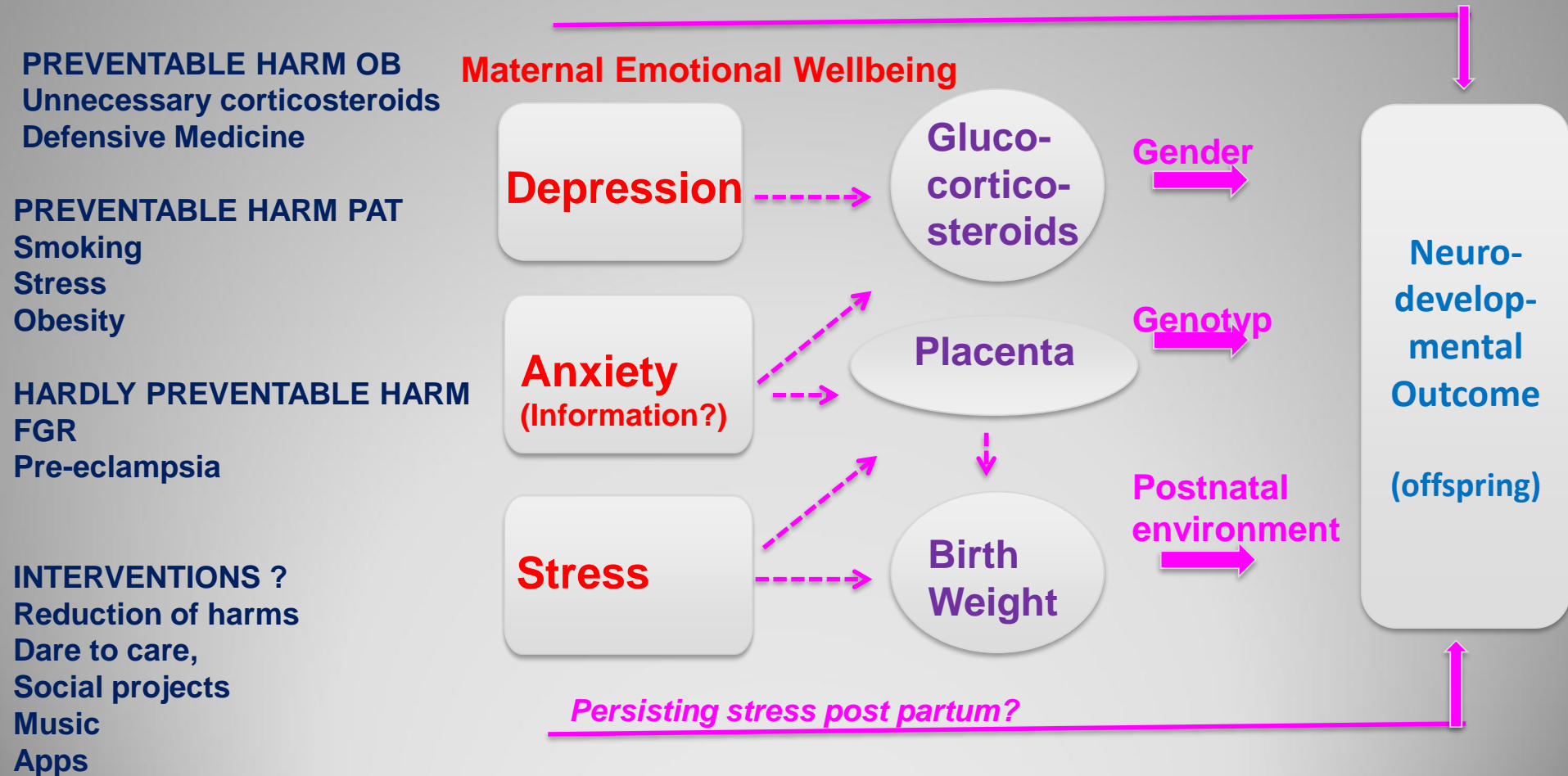
Am J Psychiatr 2017;174(4):319-28.

III Fetal Origins of Later Mental Health

Pre-and postnatal nurturing care is essential to enable children to become citizens with adequate creative intellectual and emotional skills

Main Outcome 5 to 18 months is at cognitive and temperamental levels

250 mil children (43%) <5 y at risk of not reaching their developmental potential



FGR and Mental Health

Low BW associated with “hostility”, e.g. a rival cynic personality with mistrust and negative affections in adult life.

Rikkonen et al. Psychosomatic medicine. 2008;70(3):306-13

Mothers with **famine** during conception/ 1st trimester have children at risk for schizophrenia, depression, inadequate stress responsiveness.

Roseboom et al. Maturitas. 2011;70(2):141-5

Gest. age & BW explain only 1% of variance in child behavior when maternal mental health/ socioeconomic status were considered !

Still, the effects of maternal care or socioeconomic status are greater among children with LBW versus normal BW in the offspring.

O'Donnell et al. Dev & Psychopath 2014;26:393-403, Buss et al. J Neuroscience 2007;27:2592-5

Effect of breastfeeding on cognition greater in LBW / NBW children.

Blair C et al. Development and psychopathology. 2002;14(2):311-32

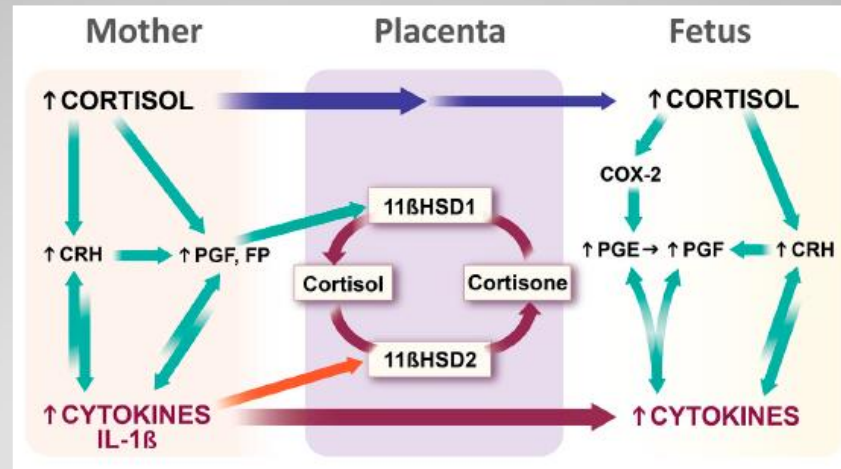
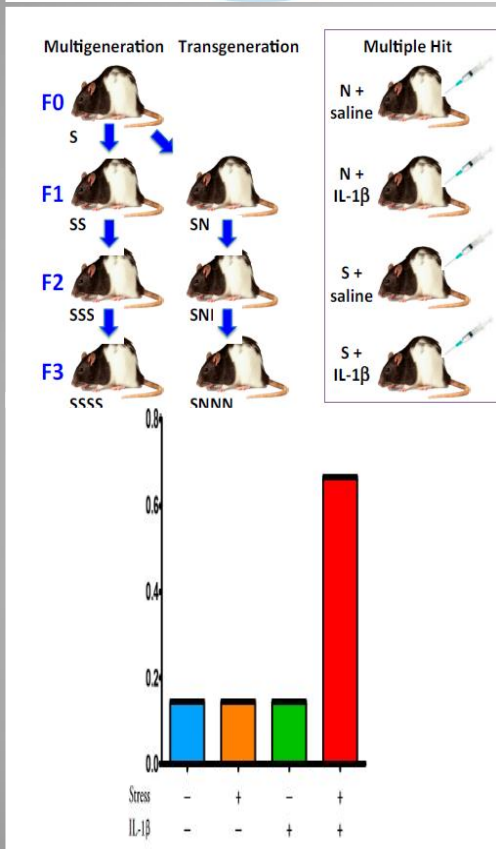
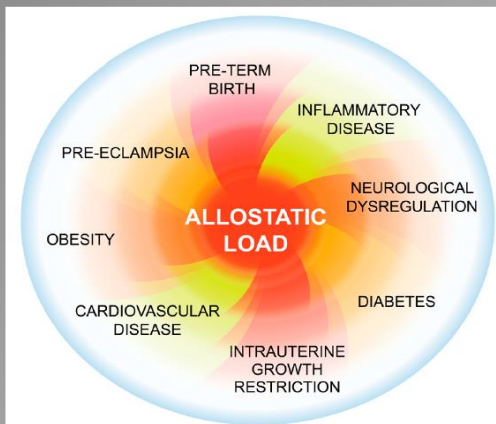
The “**metaplasticity**” extends: Effect of socioeconomic status on long-term memory greater among children exposed to **antenatal glucocorticoid treatment** .

Grant et al. Psychol Science. 2015;26(7):1054-62

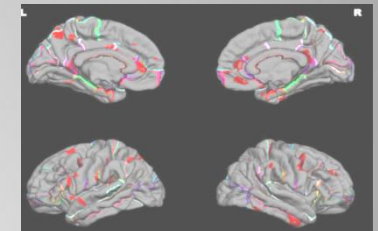
„Allostatic Load“

Allostatic = Physiologic consequences to increased neuroendocrine reaction to chronic stress (McEwen and Stellar, 1993).

Transgenerational Transmission of stress



Cortisol, Epinephrine, Reactions to inflammatory processes
HOMEOSTASIS (?)



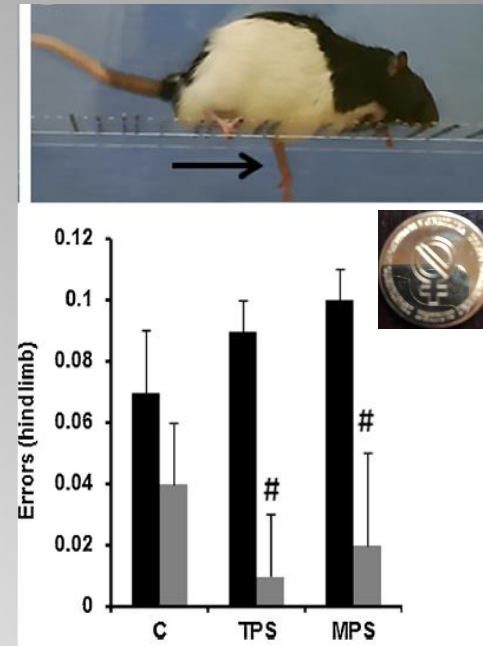
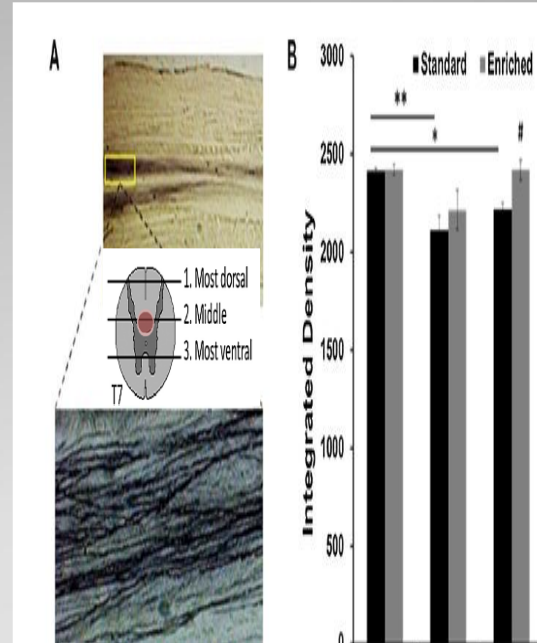
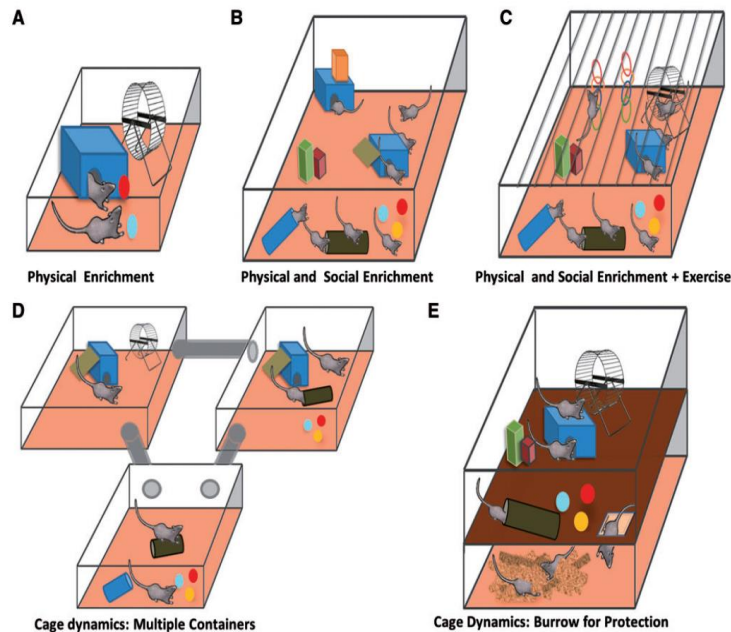
Cytokines: block 11β-HSD2 / Cortisol – Cortisone (not active)
HSD11B2 prevents the fetus of the effect of Cortisol

„Two-hit hypothesis“: Induced stress combined with injection of IL-18 causes preterm births up to the 3rd generation.

Olson et al. *Int. J. Mol. Sci.* 2015, 16, 29856–74

“Environmental Enrichment” (EE)–a late Antagonist

Transgenerational stress leads to reduced axon density and GC-receptors (CNS), disturbed motor coordination and anxious behavior



C= No transgenerational stress, TPS=Transgenerational stress, MPS=multigenerational stress

EE reduces neuro-morphologic consequences of transgenerational stress

Stress markers are detectable: miR-182 expression + brain-derived neurotrophic factor (BDNF), neurotrophin-3 (NT-3) regulation.

Early Origin of Adult Capabilities?

Variations in maternal care alter transgenerational gene expression mediating CRF synthesis/release and thus stress reactivity, cognition in the offspring.

Cerebral oxytocin receptors regulate maternal behavior. Licking-grooming mothers have increased oxytocin receptors and altered sensitivity to estrogens and dopamine.



Why do we not screen for maternal psychological disorders, stress, anxieties?

Nurturing parents spent regular time with their children from prenatal stage onwards up to 3 y. After talking: 58% positive, 26% negative attitudes, **After music: 90-100% only positive attitudes.**

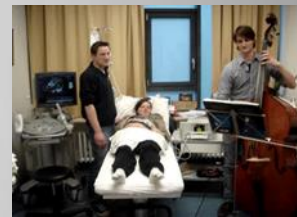
Manrique et al. 1992; in: Blum (ED) Human Bonding, Leonardo Publ



ORIGINAL ARTICLE

"Need for interventional studies on the impact of music in the perinatal period: results of a pilot study on women's preferences and review of the literature"

Birgit Arabin¹ & Michael Jahn²



Maternal Emotional Well-being / Stress and Mental Health

**Maternal stress accounts for 17% of the variance
cognitive abilities of children (PTB for 1-2%) !**

Bergman et al. J Am Acad Child and Adolescent Psychiatry. 2007;46(11):1454-63

**Children of mothers with high anxiety scores have a 2-fold increase in behavioral
problems equating to a doubling of prevalence of childhood psychiatric disorders.**

O'Donnell & Meaney. Am J Psychiatry. 2017;174(4):319-28.

**Chronic stress predispose children for changes in brain connectivity leading to
autism, ADHD, addiction, depression or schizophrenia.**

Grant et al. Psychological science. 2015;26(7):1054-62.

**Mediators connecting stressed mothers with fetuses are cortisol, catecholamines,
reactive oxygen species, cytokines, serotonin/tryptophan, maternal microbiota.**

Rakers et al. Neuroscience and biobehavioral reviews. 2017. Epub 2017/02/27

**The consequences may not be apparent until a critical age when exposed
to other insults. Adequate preventive programs should not be too late.**

Lifestyle, Stress, IUGR

Multivariate analysis, 48 variables related to work load (n = 7892, 1989-91)

East Germany < 1990

**1 child and ...
Irregular/night shifts**

West Germany < 1990

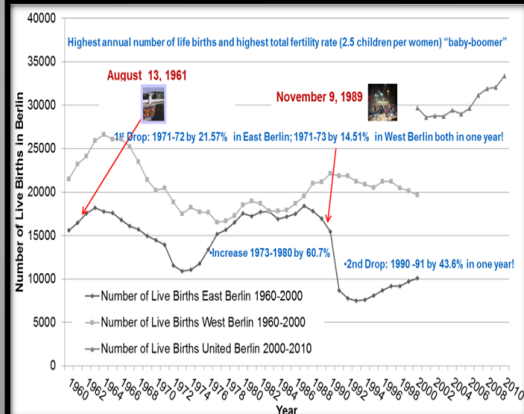
**Unfriendly environment
Competition, no recognition**

Risk for LBW < 5 centile

after correction with BMI, smoking, parity, age

aOR=2.3; 95% CI: 1.20 – 4.25

aOR=2.2; 95% CI: 1.05 – 4.64



Contents lists available at [ScienceDirect](#)

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journal homepage: www.elsevier.com/locate/bpobgyn

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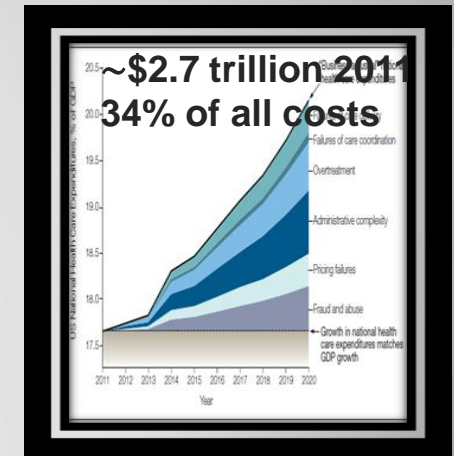
9

Irresponsible and responsible resource
management in obstetrics

Birgit Arabin, MD, PhD ^{a, b, *}

**Choosing
Wisely**

An initiative of the ABIM Foundation



Berwick et al JAMA. 2012;307:1513-6

Therapeutic Options of Enrichment in Humans



Prenatal influences fine-tune postnatal sound preference for the mother's voice/ lullabies suggesting prenatal sound discrimination.

James et al. UOG 2002; 20:3431-38

Fetuses & newborns react to musical speech rhythms and orientate to the social world this relationship is musical (babies do not yet understand words).

De Caspar AJ, Fifer WP. Science 1980; 208: 1174-76

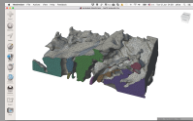


From Destruction to Creation:

The intrauterine Sound A Symphony for the Baby (9)



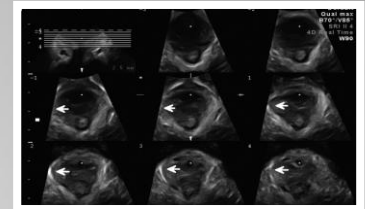
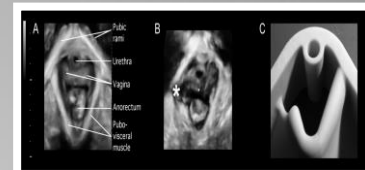
IV Urogynecologic Diseases



Pelvic disease during pregnancy/ post partum & later disease

2-3 days fter vaginal birth / 6 weeks and 12 months p.p.

- Vaginal examination for levator avulsion
- Perineal ultrasound: bladder neck, puborectalis position at rest, during PFMC supine position
- if possible before/ after vaginal birth **6 weeks post partum**
- US & POPQ (pelvic organ prolapse quantification)
- Validated pelvic floor (PF) questionnaire

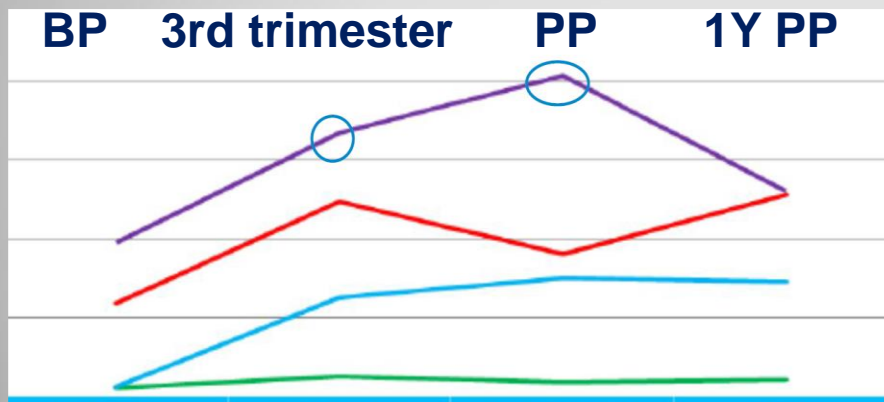


**Two days pp. 35% of women have a prolapse grade II,
One year pp. 29% have symptoms of prolapse, 22% of incontinence.
Impact of parity decreases with aging.**

The Norwegian Epicon Study (N= 27900) Rortveit et al. 2001

Dietz et al. UOG 2017; 49:252-6

Prevalence of pelvic disease



Sexual dysfunction

Urinary incontinence

Genital prolapse

Anal incontinence



What can Obstetricians do During/After Pregnancy?

The Fourth Trimester & Inter-Pregnancy Care

ACOG Committee Opinion No.736: Optimizing Postpartum Care. *Obstet Gynecol* 2018; 131:949-951

Postpartum care should become **an ongoing process and tailored as well as communicated to each woman's individual needs...**

- within 3 weeks p.p., followed with ongoing care as needed,
- at or < 12 weeks p.p. comprehensive visits including a full assessment of emotional well-being; infant care and feeding; contraception; chronic disease management; health maintenance.

Weight loss of 4.5 kg (>4000 mothers) causes decreased rates of GDM by 40% next pregnancy.

Jacobsen et al. J Thromb Haemost 2008; 6: 905-912

J Matern Fetal Neonatal Med 2018; 22:1-8

THE JOURNAL OF MATERNAL-FETAL & NEONATAL MEDICINE, 2018
<https://doi.org/10.1080/14767058.2018.1450383>



Taylor & Francis
Taylor & Francis Group

REVIEW ARTICLE

How to improve health literacy to reduce short- and long-term consequences of maternal obesity?

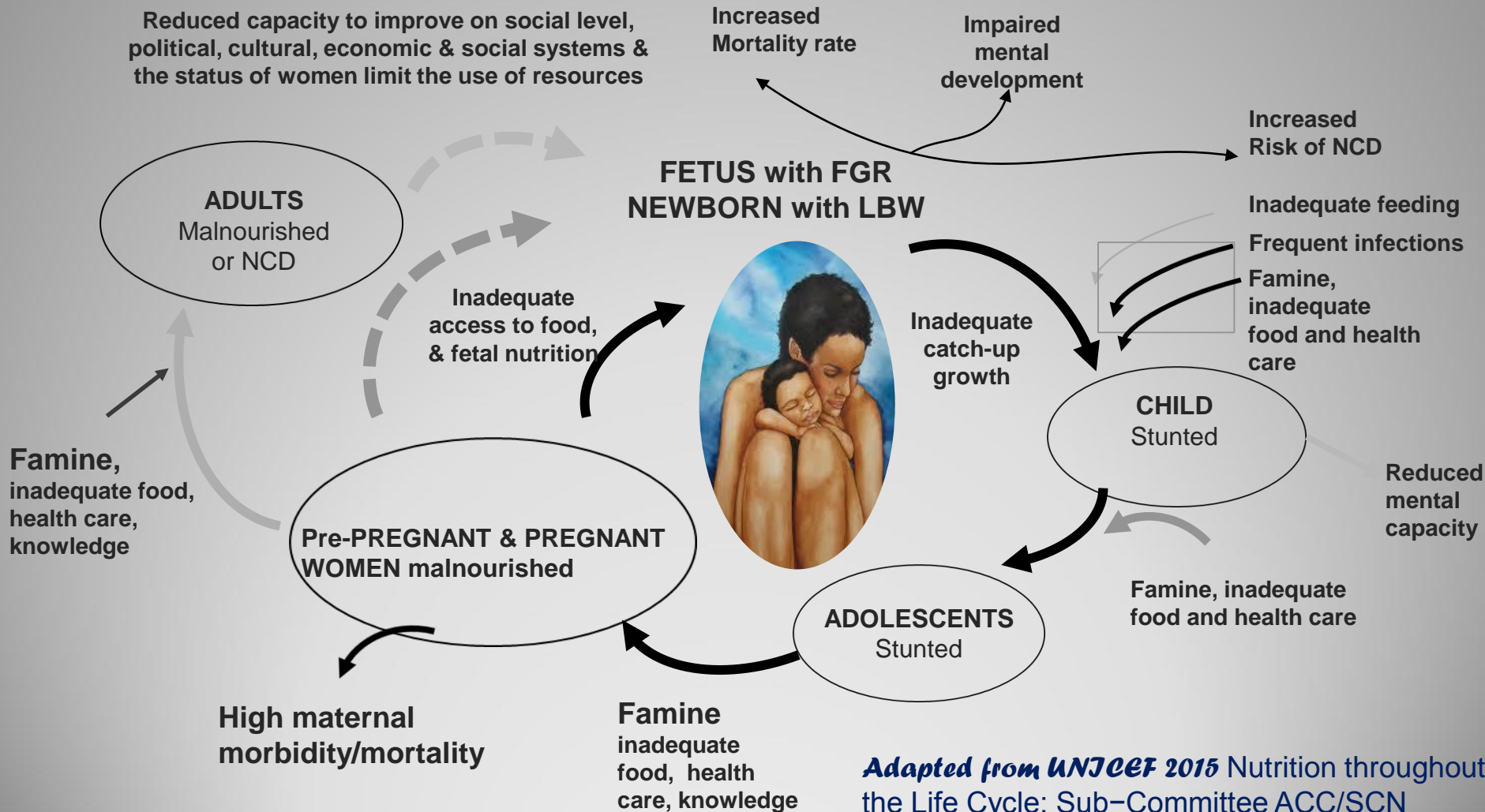
Birgit Arabin^{a,b}, Nina Timmesfeld^c, Kathrin Noever^{a,b}, Susann Behnam^{a,b}, Christin Ellermann^d and Mirjam A. Jenny^d

^aCenter for Mother and Child, Philipps University Marburg, Marburg, Germany; ^bClara Angela Foundation, Witten, Germany; ^cDepartment of Medical Biometry, Philipps University Marburg, Marburg, Germany; ^dHarding Center for Risk Literacy, Max Planck Institute for Human Development, Berlin, Germany



Vicious Circles: Undernutrition/Stress

Hypertension, Diabetes, Metabolic Syndrome, Neurologic Disease



Adapted from UNICEF 2015 Nutrition throughout the Life Cycle; Sub-Committee ACC/SCN

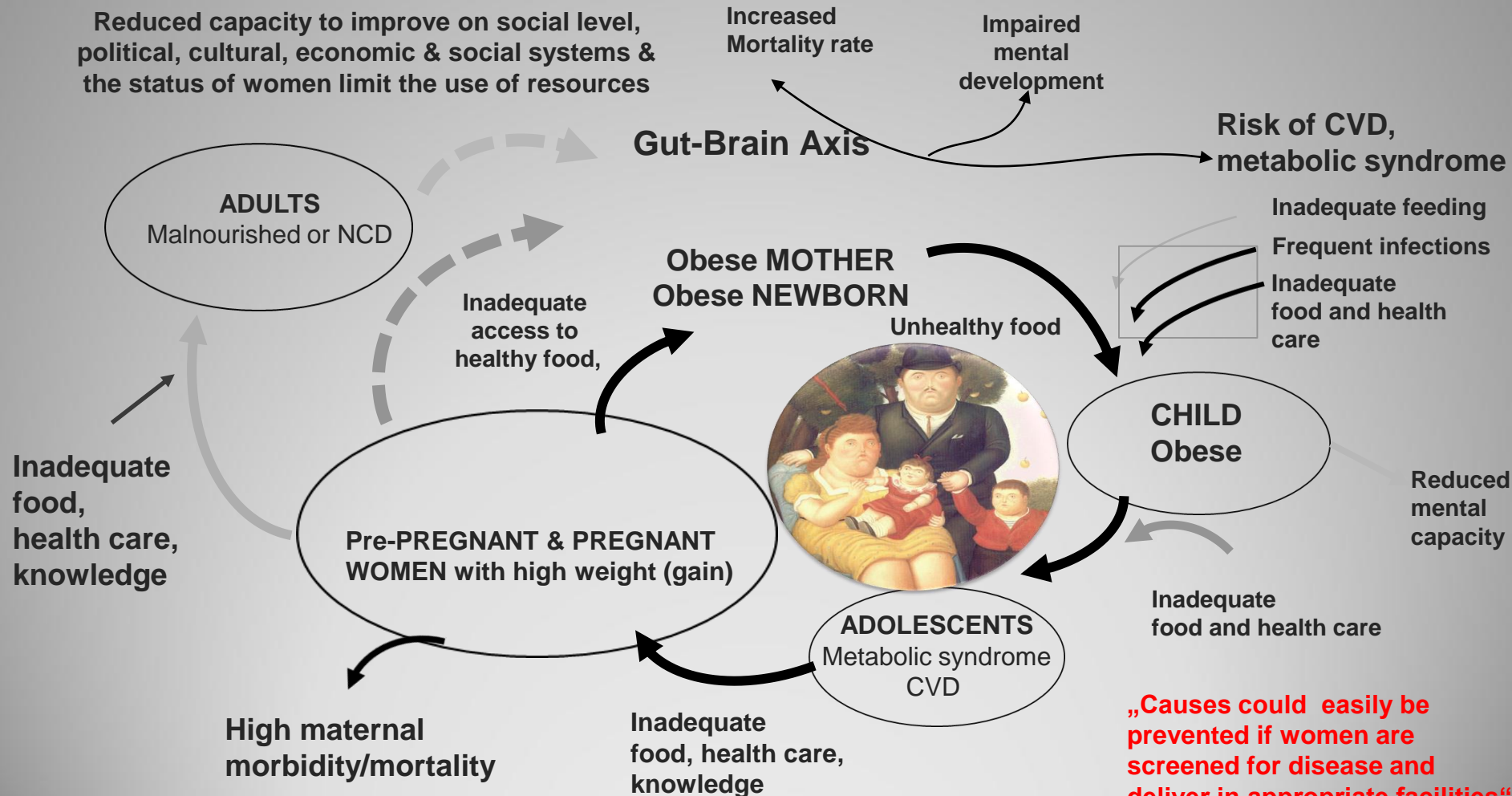
Vicious Circles: Overnutrition

Effect of maternal obesity on neonatal death in sub-Saharan

Africa: multivariable analysis of 27 national datasets

Jenny A Cresswell, Oona M R Campbell, Mary De Silva, Veronique Filippi

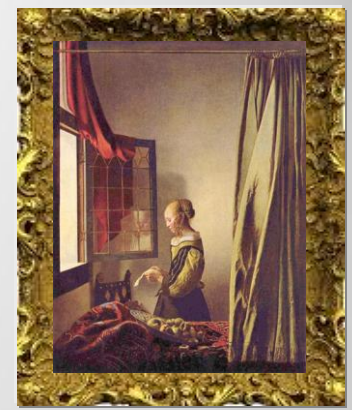
Hypertension, Obesity, Diabetes, Metabolic Syndrome, Cognitive Impairment



Take-Home Questions

Do you dare to care?

VIEWPOINT Era 3 for Medicine and Health Care



D. Berwick JAMA 2016; 315:1329-30

Jan Vermeer, 1650, Art Gallery Dresden

- Would you shift to another strategy even by giving up prerogatives?
- Would you promote earlier/better information, apps, webprograms ?
- Would you share decisions with patients, colleagues, politicians?
- Do you support holistic approaches/ collective intelligence?
- **Don' expext awards which usually go to those who want to maintain and not to improve a status quo.**

Thanks for listening!

For questions/ comments: Bine.clara.angela@gmail.com

