Mothering Transitions RESEARCH

Preconception Health: Does it Matter?

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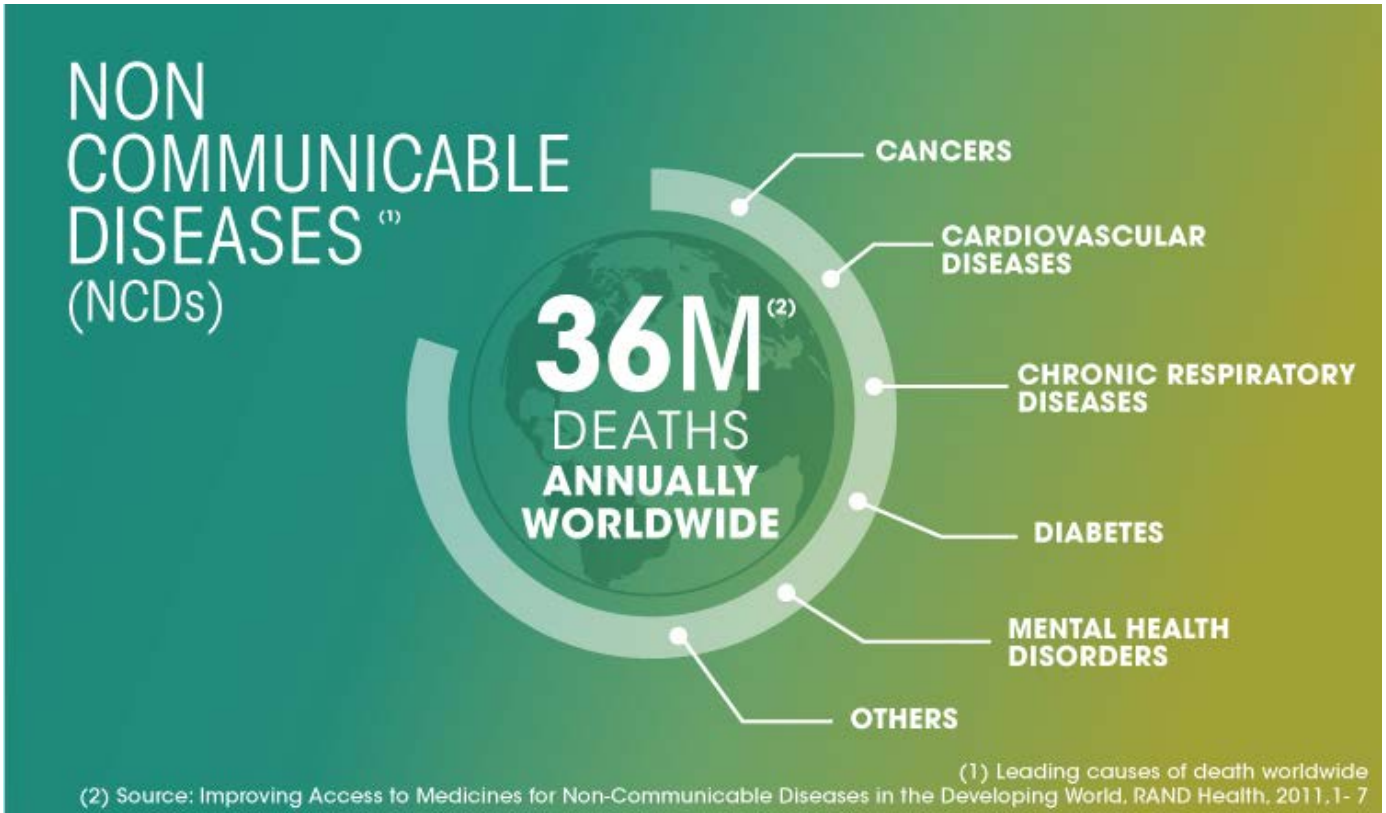
The Rise of Non-Communicable Diseases (NCDs)

- Non-communicable diseases (NCDs), including cardiovascular disease, type 2 diabetes and mental illness, are major global contributors to premature death and disability



In Canada,
NCDs account for an estimated
89% of all mortality

Risk Factors for NCDs

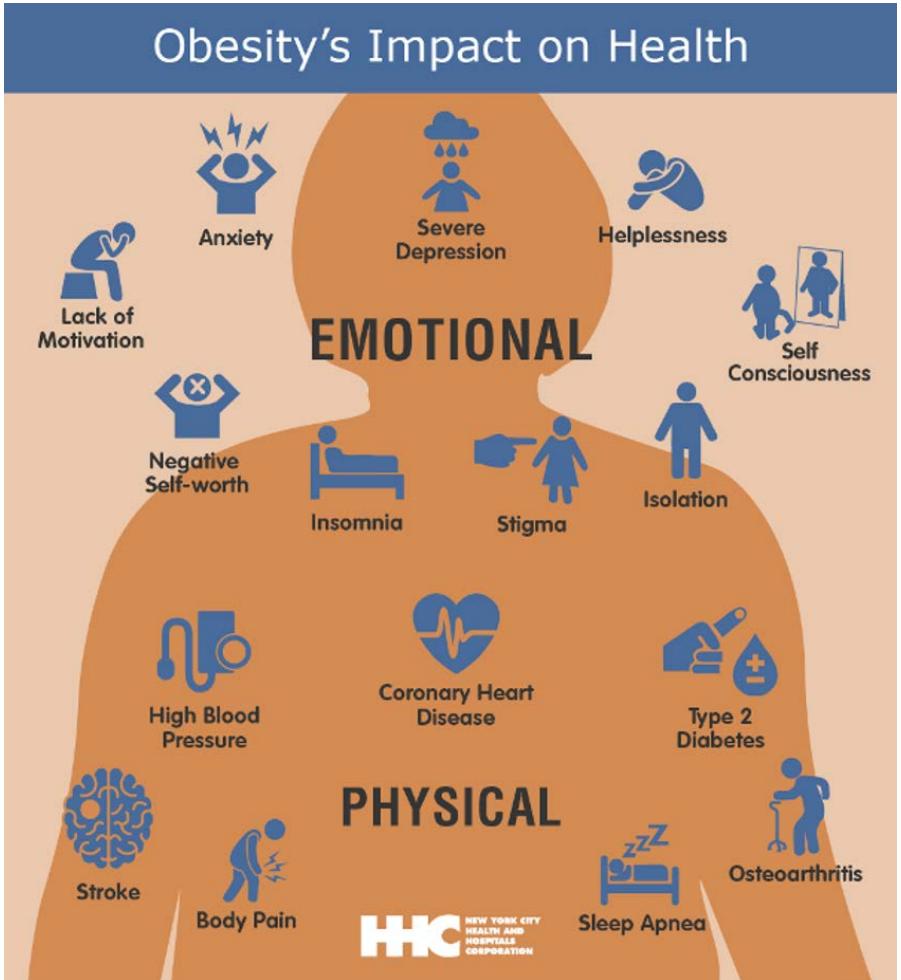
Common, preventable risk factors underlie most NCDs

- NCDs are the result of four particular behaviours–
  1. Tobacco use
  2. Physical inactivity
  3. Unhealthy diet
  4. Harmful use of alcohol

- They lead to four key metabolic/physiological changes—
  1. Raised blood pressure
  2. Raised blood glucose
  3. Raised cholesterol
  4. **Overweight/obesity**

Obesity in Canada

In Canada, 70% of men and 60% of women are overweight and obese



Obesity is creeping into younger age groups

Obesity in Canadian Children

Today, 1 in 3 Canadian children are overweight or obese

This is forecasting serious economic, societal, and personal consequences

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Consequences of Child Obesity

- Accelerated growth in infancy and early childhood is a strong risk factor for obesity in adolescence
- A higher body mass index (BMI) in the preschool aged child is associated with subclinical atherosclerosis in adulthood *(Raj et al 2012)*
- Child overweight and obesity negatively impacts child development:
  - Cognitive dysfunction
  - Impaired social achievement
  - Mental illness

(Bergmeier et al 2014; Bisset et al 2013; Datar et al 2004; Datar et al 2006; Jeong et al 2005; Tandon et al, 2015; Sedgh et al 2014)

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This Matters!

Our children are falling behind

- In a UNICEF report on child wellbeing, Canada ranked 17/29 among high-income nations
- 1 in 4 children is not developmentally prepared for school -- a major predictor of lifelong health and income earnings -- potentially costing Canada $3 billion annually
- 1 in 5 children has a mental health problem, reducing educational achievement and lifetime income by ~$300,000 per individual

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>>>
Children who are overweight or obese as preschoolers are **FIVE TIMES AS LIKELY** to be obese as adults.
(Source: CDC).

The situation in Canada

Almost

2/3

of Canadian adults are now either overweight or obese

33%

of **children** are overweight or obese

#5

Canada ranks fifth among countries where obesity is prevalent in adults

1. United States
2. Mexico
3. New Zealand
4. Australia
5. Canada

SINCE 1980

2x

# of obese adults

3x

# of obese children

Developmental Origins of Obesity and NCDs

- Intrauterine and early infancy exposures appear to influence a person's risk for obesity and NCDs

- This is the core idea of the DOHaD hypothesis

Developmental Origins of Health and Disease (DOHaD)

The DOHaD hypothesis suggests that a healthy trajectory of growth and development in pregnancy and early childhood is critical for an optimal lifetime of health and wellbeing

Scientific research into DOHaD is now clearly demonstrating the complex link between maternal, perinatal and early childhood factors and the risk of developing heart disease, diabetes, obesity, cancer and many other NCDs in later life

- While we have long recognized the risk factors of unhealthy diet, lack of exercise, smoking, alcohol

- New risk factors are now being identified such as:

1. Stress
2. Altered patterns of microbial exposure
3. Environmental pollutants

The mechanisms and magnitude of their effects are much more profound than previously expected

Mechanisms of Programming

- The early-life environment can influence 'phenotypic plasticity' and long-term 'metabolic memory' through epigenetic mechanisms, such as DNA methylation

- Environmental factors -- maternal/paternal diet and body composition, parental stress and non-nurturing parenting postnatally-- can each induce epigenetic modifications in target tissues of the placenta and fetal/infant pancreas and liver, altering gene expression and disease tendency later in life, including the metabolic syndrome

(Donkin, et al 2016; Lillycrop et al 2011; Pembrey et al 2014; Schagdarsurengin et al 2016; Slyvka et al 2015;Waterland et al 2003)

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DOHaD Example

- Poor maternal nutrition in pregnancy can lead to fetal growth restriction, and a sequence of responses predisposes the fetus to cardiometabolic disease in adulthood (e.g. diabetes, hypertension) *(Warner et al 2010)*

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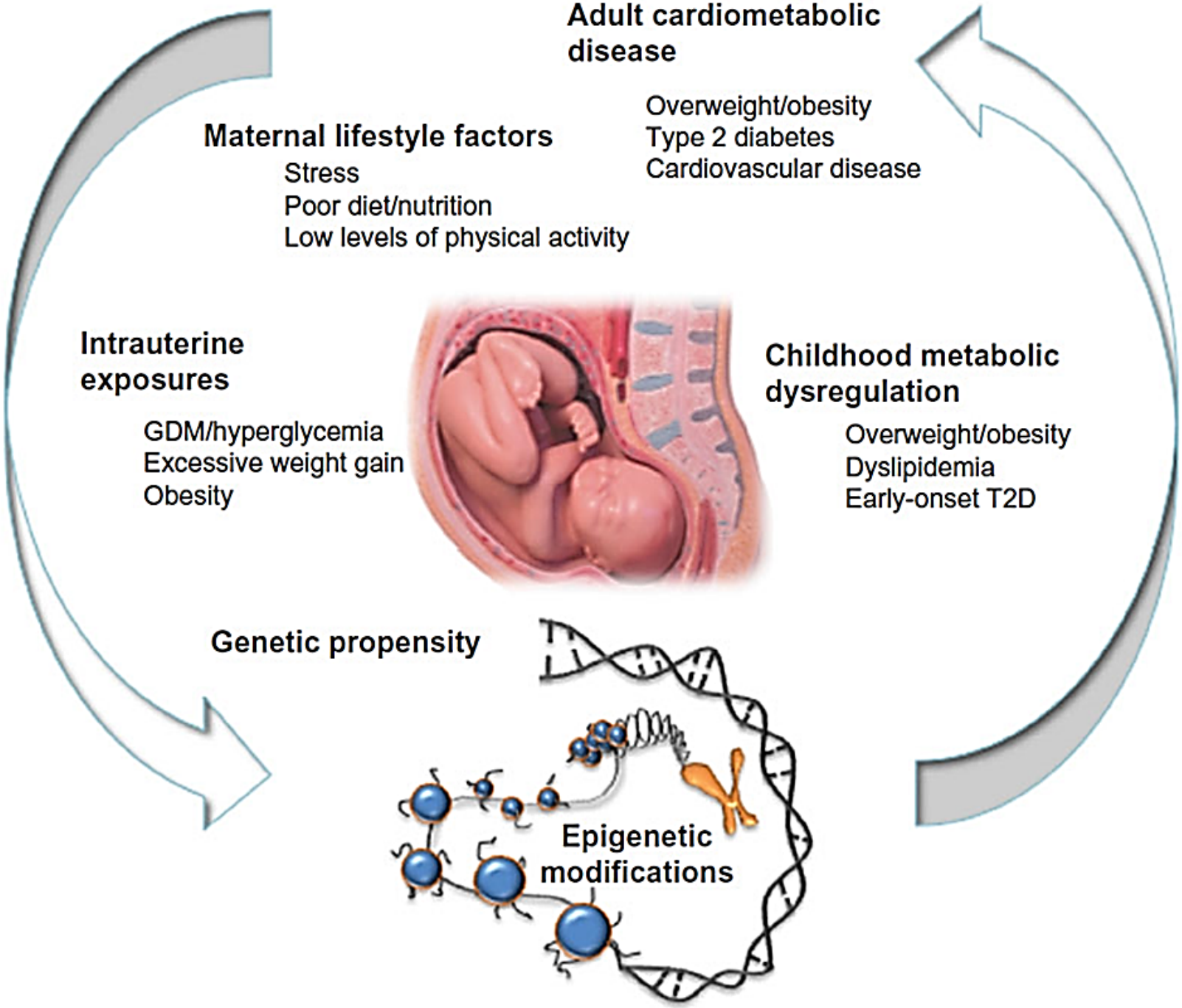
- Low birthweight and in utero exposure to maternal diabetes, hypertension, and obesity are EACH associated with elevated blood pressure, plasma glucose, insulin, and lipid concentrations in children at age 5 years *(Tam et al 2010; Boney et al 2005; Krishnaveni et al 2015)*

- These childhood risk markers at age 5 years predicts cardiometabolic disease in adulthood *(Barker et al 1989; Barker et al 2001; Hales et al 1992; Hanson et al 2011; Bao et al 1995; Joshi et al 2014)*


Adult cardiometabolic disease
Overweight/obesity
Type 2 diabetes
Cardiovascular disease
Maternal lifestyle factors
Stress
Poor diet/nutrition
Low levels of physical activity
Intrauterine exposures
GDM/hyperglycemia
Excessive weight gain
Obesity
Childhood metabolic dysregulation
Overweight/obesity
Dyslipidemia
Early-onset T2D
Genetic propensity
Epigenetic modifications

Intergenerational Effect

- Epigenetic changes caused by maternal diet or stress may be heritable across generations *(Lillycrop et al 2011; Kaati et al 2002)*

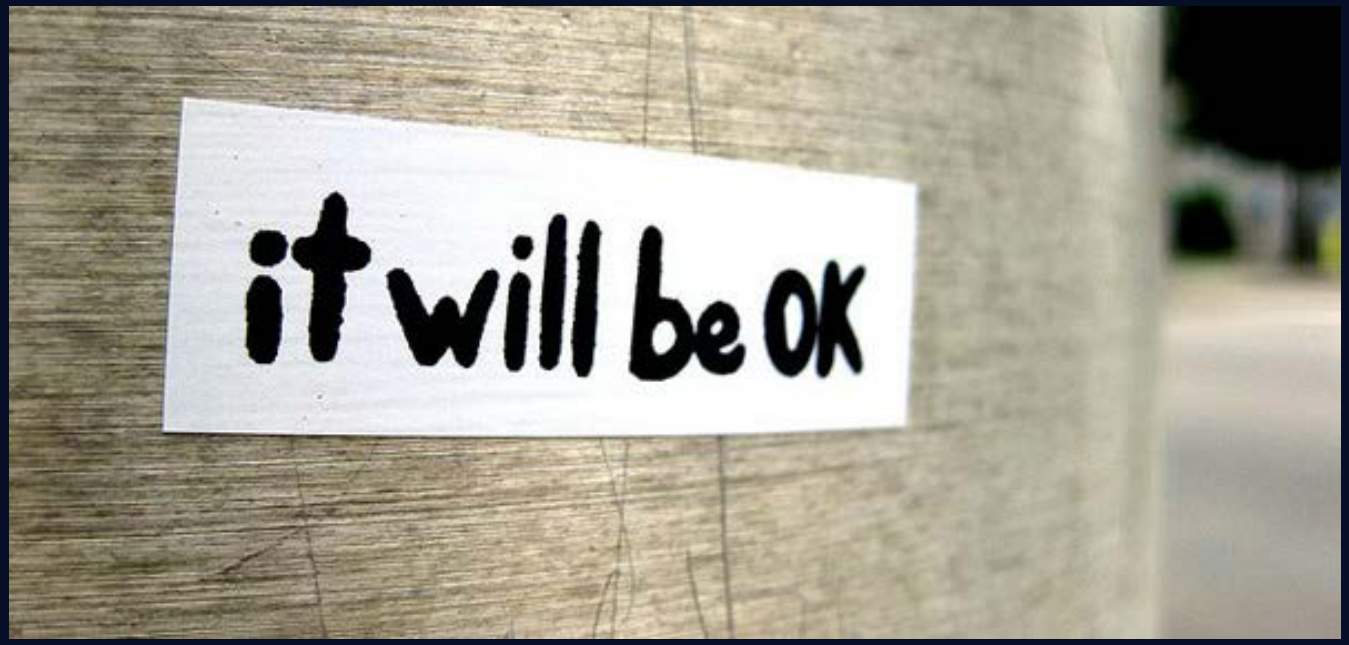
Microbiome

- Data also suggest that maternal preconception body composition, obesity, and diabetes shape the gut microbiome of the fetus *(Ley et al 2005; Turnbaugh et al 2009; Larsen et al 2010; Qin et al 2012; Bervoets et al 2013)* which is required for nutrient production and metabolism *(LeBlanc et al 2013)*
- Gut bacteria are also critical for immune system regulation and maintenance of immune barriers
- The maternal microbiome may influence not only fetal/infant growth, but the infant's own microbiome, such as transfer of microbes and nutrients in breast milk *(O'Sullivan et al 2015)*

Parental Mental Health

- Early infant environment also affects brain structure
- Early deprivation (neglect, maltreatment) can lead to changes in the shape and volume of various brain structures, especially in regions involved in learning and memory *(Teicher et al 2013)*

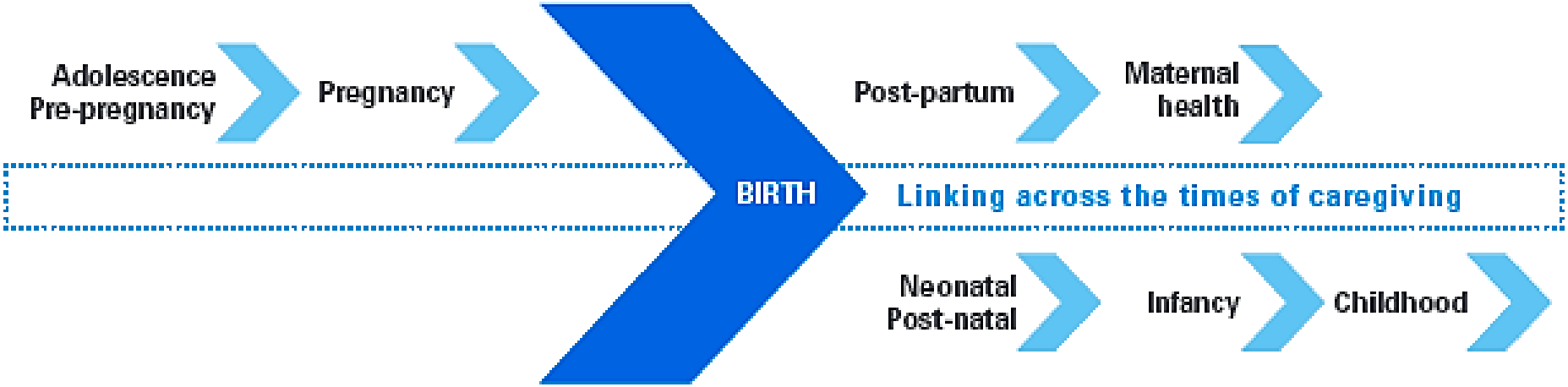
Hence, adverse exposures can
further exacerbate the
likelihood and severity of NCDs



Early interventions can improve these negative child health and developmental trajectories!

Continuum of Care

- Widespread agreement → to improve childhood outcomes a **continuum of care** needs to be provided through pregnancy, childbirth, the postnatal period, infancy, childhood, adolescence and adulthood



Gap in the Continuum of Care

There is increasing realization that a gap exists

- The most critical period for organ development occurs before many women even know they are pregnant
- The first contact with antenatal care is often too late for advice about health behaviour changes
- A growing body of evidence is showing that **preconception care – care before pregnancy** – can increase the health and well-being of women and improve subsequent pregnancy and child health outcomes

Preconception Care

- **Definition**: the provision of preventive, promotive or curative interventions intended to identify and modify biomedical, behavioural, and social risks in women of reproductive age

- **Goal**: to improve pregnancy outcomes and women's health in general through prevention of disease and management of risk factors that affect pregnancy outcomes and the health of future generations

Preconception Care Also Includes Men

- Existing approaches tend to focus solely on the yet-to-be mother
- Increasingly, scientific evidence shows that the preconception health of the future father is also important *(Dunford et al 2017)*
- This represents an unrealized and under-developed opportunity

Benefits of Preconception Care

1. The Centers for Disease Control and Prevention (CDC)
2. Erasmus University in the Netherlands
3. The Health Council of the Netherlands
4. Aga Khan University in Pakistan

→ All have published **exhaustive reviews** of the evidence of preconception care interventions in contributing to a range of health and development outcomes

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Health Benefits (WHO)

- ↓ pregnancies that are too early, too close, or unplanned
- ↓ maternal and neonatal mortality and morbidity, stillbirths, preterm births, low-birthweight infants
- ↑maternal nutrition, such as tackling obesity and related issues, undernutrition and micronutrient deficiencies
- ↑ fertility
- ↑ awareness of the importance of men's health
- ↑ opportunities to improve mental health
- ↑ early detection of chronic conditions
- ↑ social benefits, such as empowerment of women and better communication and more shared decision-making by couples

Common Contents of Preconception Care

- Family planning (more than just contraception)
- Sexual health and behaviour (screening, counselling, treatment)
- Tobacco cessation (including exposure to second-hand smoke)
- Harmful environmental exposures (e.g. indoor air pollution)
- Nutrition and micronutrients
- Mental health problems
- Intimate partner violence
- Harmful alcohol and drug use

How Do We Best Delivery Preconception Care?

We must make sure that we do not overburden health providers who already have a lot to do!

Ideas for Delivering Preconception Care

1. Use both existing and innovative mechanisms

2. Try to integrate preconception care into ongoing programs

3. Present preconception care as part of the continuum rather than on its own – it should be layered on top of maternal and newborn care

4. Include activities at both community and clinic levels if we are to reach more people and to build positive attitudes and personal responsibility

5. Use every opportunity of a woman contacting a health facility to provide preconception messages and interventions

6. Work both within and outside the health sector and use a variety of settings, the mass media, and popular technologies

7. Identify and build on the preconception activities that are already under way

For example:

Wellington-Dufferin-Guelph Public Health

My Health eSnapshot
HEALTH. FOR LIFE.

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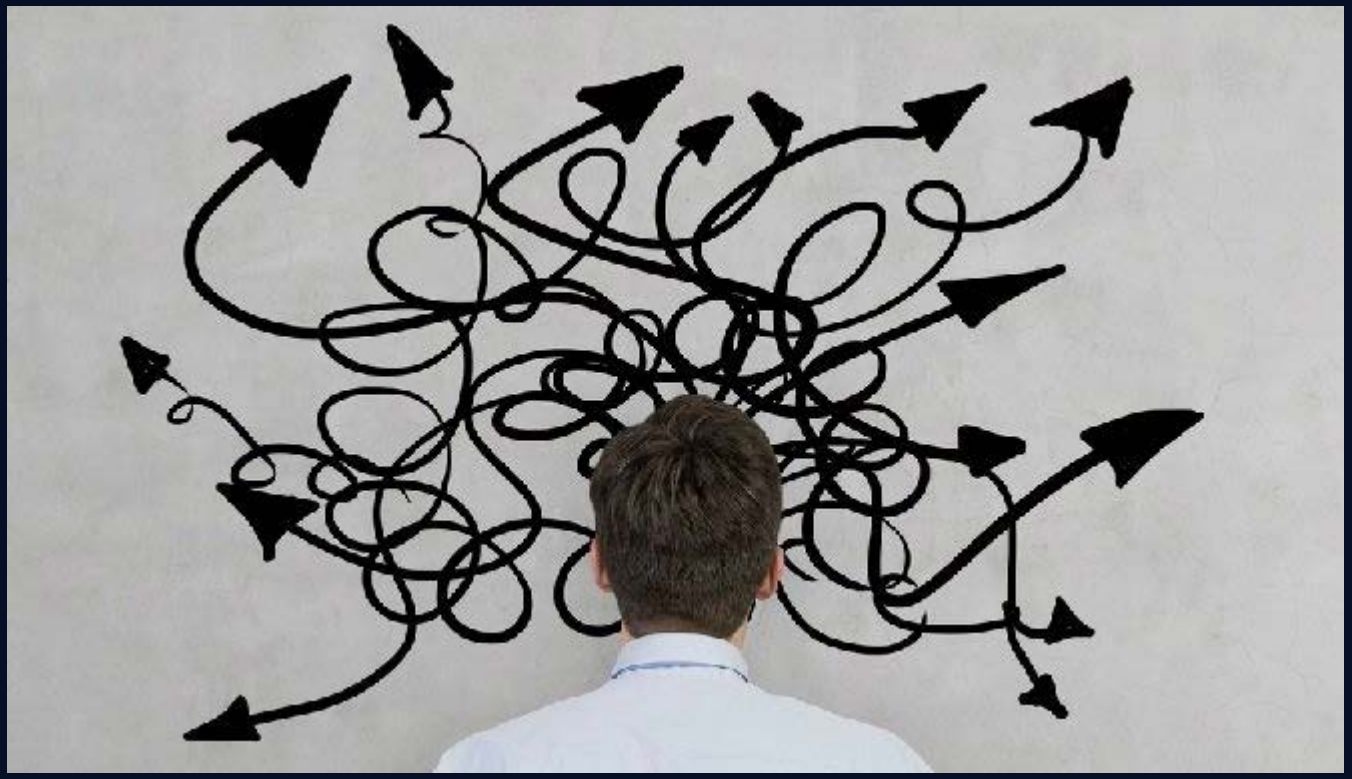

What Are The Next Steps?

Healthy Life Trajectories Initiative (HeLTI)

- A collaboration between Canada, China, India, South Africa and the World Health Organization (WHO) to develop linked international intervention cohorts that will implement and test approaches to:

1. Prevent overweight and obesity in children and risk factors for non-communicable diseases (NCDs)
2. Improve early childhood development (ECD)

Goal: to generate evidence that will inform national policy and decision-making for the improvement of health and the prevention of NCDs throughout the lifespan

Introduction to HeLTI Canada

TROPHIC Trial:

TRajectories **O**f healthy life using **P**ublic **H**ealth and primary care **I**nterventions in **C**anada

$17,050,000 for 10 years

A pan-Canadian team of 48 established investigators

from 21 institutions, across 6 provinces

What Will We Do?

Primary Objectives

- To determine whether the complete 4-phase "preconception to early childhood" lifecourse intervention can by child age **5 years**:

1. Reduce child overweight and obese states
2. Improve child cardiometabolic risk factors
3. Enhance child development and school readiness

(**Objective 1**)

4. Positively impact **parental** outcomes (**Objective 2**)

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Cumulative-Impact

- Preconception phase on **parental** outcomes at the time of conception (**Objective 3**)
- Preconception + pregnancy phases on adverse **pregnancy** outcomes (**Objective 4**)
- Preconception + pregnancy + infancy phases on **child** outcomes at age 2 years (**Objective 5**)

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Sibling Child and Genetics Included

- Our unique design = opportunity to understand the effect of the infancy + early childhood phases of the intervention on

  "**sibling child**" outcomes at age 5 years (**Objective 6**)

- We will address genetic and epigenetic risk factors that underlie child overweight/obese states, and the impact of the 4-phase intervention on these mechanistic factors (**Objective 7)**

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How Will These Objectives Be Achieved?

Design

- A randomized controlled trial
- **5230** women planning (intending) to get pregnant
- **786** nulliparous (15%) and **4444** primiparous (85%) women and their partners
- Subjects randomly allocated in a 1:1 ratio to the 4-phase intervention or to usual care
- An “index child” conceived after randomization (n = **3660**; 70%) will be followed until age 5 years and assessed for the primary and secondary outcomes

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Inclusion/Exclusion Criteria

- Non-pregnant women:

1. Nulliparous (no children) or primiparous (one child) between 3-12 months postpartum
2. Planning a pregnancy in the next 3 years
3. Understands spoken and written English

Excluded are women with:

1. Type 1 diabetes
2. Parity ≥ 2

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Why Primarily Primiparous Women?

- Statistics Canada suggests Canadian women have approximately 1.7 children with an average inter-pregnancy interval of 24 months

- The Canadian population with the largest preconception needs are those who have recently had a first child and are likely to have a second child within 2-3 years (primiparous women)

Why Recruit Between 3-12 Months Postpartum?

- Natural contact with health professionals
- Provides time to enable behaviour change and to ↓ identified risks prior to conception
- Sperm epigenome (contributes to child development outcomes)
  - modifiable and responds to health behaviour changes such as diet
- Equally important to recruit male partners early to allow sufficient time for behaviour modification to affect new sperm

Why Pregnancy Planning Women?

1. **Feasibility**: based on sample size requirements and budget constraints
2. **Clinical Practicalities**: These are the women who can be targeted and motivated in the 'real world' for a preconception program

Universal vs Targeted Interventions

Setting

- The trial will be conducted in 2 of Canada's most populous provinces: Alberta (4.3 million) and Ontario (14 million)

- Two recruitment settings:
  1. Public Health Departments
  2. Primary Care Practices

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Intervention Phases

- The intervention will be provided in 4 phases:

1. Preconception
2. Pregnancy
3. Infancy [0-2 years]
4. Early childhood [3-5 years]

- Each phase has time-sensitive goals based on child obesity risk factor meta-analyses

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Preconception-Early Childhood Lifecourse Intervention

Defining Attributes

- Professionally-facilitated
- Proactive
- Individualized
- Will target women AND their partners
- Multifaceted
- Build on existing research and clinical resources while recognizing the growing trend of e-Health
- Local stakeholders, such as public health nurses, will participate in guiding the intervention to ensure it is tailored to local circumstances
- Among primiparous women, we will also provide information to address concerns with the sibling child with the goal of taking a family-approach to care

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Unique Core Strategies

1. **Public health nurse collaborative care**
2. **Individualized e-health cloud platform** *that includes web-based resources and multi-platform interventions*
3. **A preconception-lifecourse app** *with monthly notifications and other social media activities (Facebook, Twitter, Google+)*

Comprehensive, personalized, multifaceted intervention

Phase-Specific Goals and Activities

Preconception Phase Goals	Pregnancy Phase Goals	Infancy Phase Goals (0-2 years)	Early Childhood Phase Goals (3-5 years)
1. Promote healthy pre-pregnancy weight **2. Encourage healthy behaviours** **3. Support parental mental health** **4. Boost parental relationships** **5. Optimize home environment**	**Continue Goals 1-5** 6. Prevent excessive gestational weight gain	**Continue Goals 1-5** 7. Support breastfeeding 8. Encourage child health behaviours 9. Promote nurturing care	**Continue Goals 1-9 (as appropriate)** 10. Promote parental skills to encourage school readiness

1. Public Health Nurse Collaborative Care

- We will hire trial public health nurses (t-PHN)
  - Trained in Healthy Conversation Skills
  - Will work in the HeLTI Canada office
  - Telephone-based to provide care across Ontario and Northern Alberta
- Part I: Telephone Assessment
- Part II: Structured Management Plan
- Part III: Scheduled Follow-Up

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Healthy Conversation Skills

- An engagement strategy based on a social-cognitive model of health behaviour, which emphasises the role of increasing self-efficacy in promoting behaviour change
- It is based on the understanding that providing participants with knowledge alone is insufficient to change behaviour unless they are also motivated and empowered to change
- T-PHNs will use their skills to explore the barriers that women in the intervention group have to changing their behaviour, ways of over-coming these barriers and setting goals for change
- This approach appears more effective than comparable forms of counselling in eliciting behaviour change and even brief interactions can be effective in producing small but important changes in behaviour

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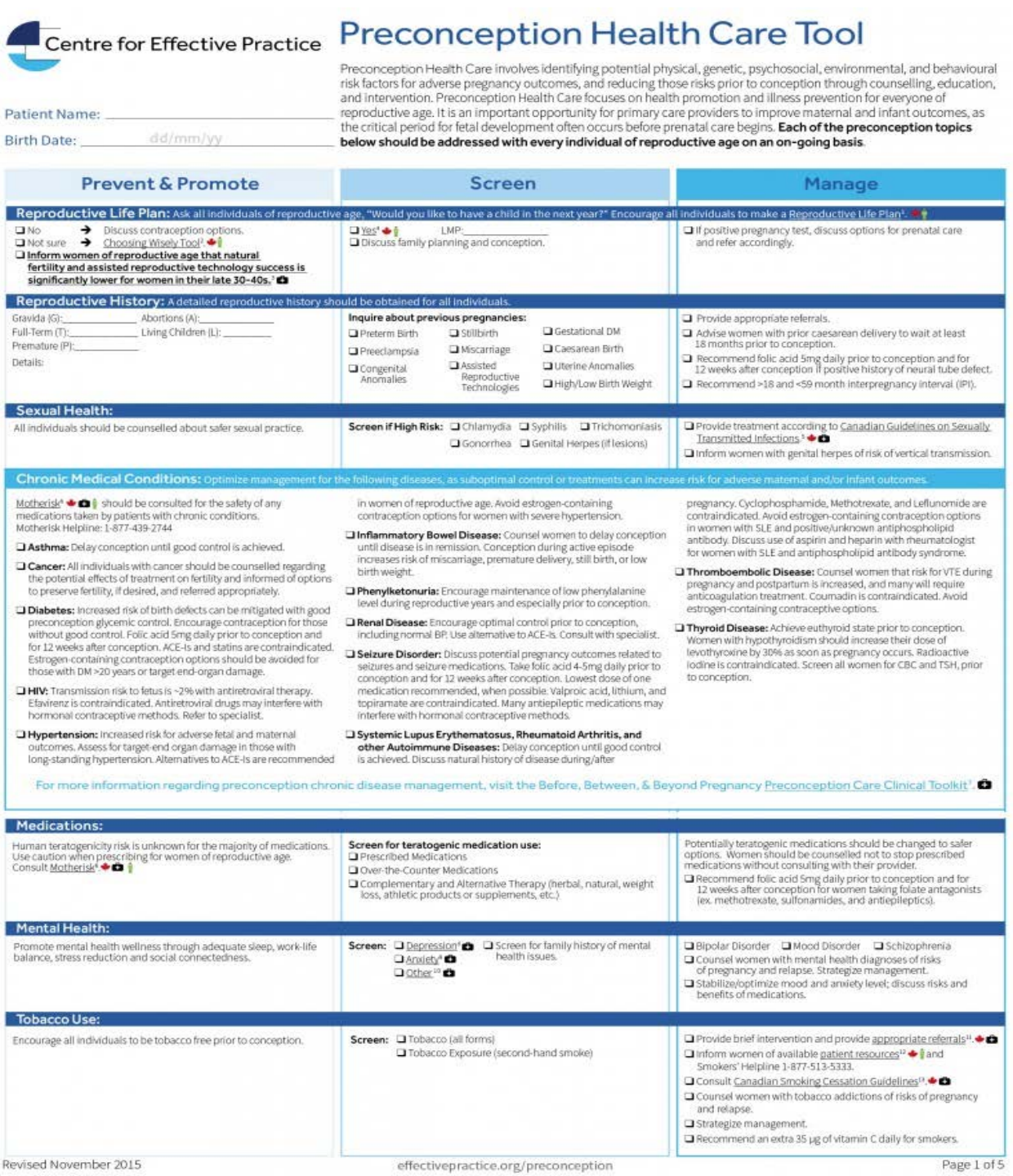
- **Part I – Telephone Assessment**
- At the beginning of each of the 4 intervention phases, the assigned t-PHN will telephone the woman, complete an assessment based on phase goals, and identify potential risks



Centre for Effective Practice

Preconception Health Care Tool

Preconception Health Care involves identifying potential physical, genetic, psychosocial, environmental, and behavioural risk factors for adverse pregnancy outcomes, and reducing those risks prior to conception through counselling, education, and intervention. Preconception Health Care focuses on health promotion and illness prevention for everyone of reproductive age. It is an important opportunity for primary care providers to improve maternal and infant outcomes, as the critical period for fetal development often occurs before prenatal care begins. **Each of the preconception topics below should be addressed with every individual of reproductive age on an on-going basis.**

Patient Name: _____

Birth Date: _____ dd/mm/yy

Prevent & Promote

Reproductive Life Plan: Ask all individuals of reproductive age, "Would you like to have a child in the next year?" Encourage all individuals to make a Reproductive Life Plan[1].

- ❑ No → Discuss contraception options.
- ❑ Not sure → Choosing Wisely Tool[2]
- ❑ **Inform women of reproductive age that natural fertility and assisted reproductive technology success is significantly lower for women in their late 30-40s.[3]**

Reproductive History: A detailed reproductive history should be obtained for all individuals.

Gravida (G):_____ Abortions (A):_____
Full-Term (T):_____ Living Children (L): _____
Premature (P):_____
Details:

Inquire about previous pregnancies:

- ❑ Preterm Birth
- ❑ Preeclampsia
- ❑ Congenital Anomalies
- ❑ Stillbirth
- ❑ Miscarriage
- ❑ Assisted Reproductive Technologies
- ❑ Gestational DM
- ❑ Caesarean Birth
- ❑ Uterine Anomalies
- ❑ High/Low Birth Weight

Sexual Health:

All individuals should be counselled about safer sexual practice.

Screen if High Risk: ❑ Chlamydia ❑ Syphilis ❑ Trichomoniasis ❑ Gonorrhea ❑ Genital Herpes (if lesions)

- ❑ Provide treatment according to Canadian Guidelines on Sexually Transmitted Infections[5]
- ❑ Inform women with genital herpes of risk of vertical transmission.

Chronic Medical Conditions: Optimize management for the following diseases, as suboptimal control or treatments can increase risk for adverse maternal and/or infant outcomes.

Motherisk[4] should be consulted for the safety of any medications taken by patients with chronic conditions.
Motherisk Helpline: 1-877-439-2744

- ❑ **Asthma:** Delay conception until good control is achieved.
- ❑ **Cancer:** All individuals with cancer should be counselled regarding the potential effects of treatment on fertility and informed of options to preserve fertility, if desired, and referred appropriately.
- ❑ **Diabetes:** Increased risk of birth defects can be mitigated with good preconception glycemic control. Encourage contraception for those without good control. Folic acid 5mg daily prior to conception and for 12 weeks after conception. ACE-Is and statins are contraindicated. Estrogen-containing contraception options should be avoided for those with DM >20 years or target end-organ damage.
- ❑ **HIV:** Transmission risk to fetus is ~2% with antiretroviral therapy. Efavirenz is contraindicated. Antiretroviral drugs may interfere with hormonal contraceptive methods. Refer to specialist.
- ❑ **Hypertension:** Increased risk for adverse fetal and maternal outcomes. Assess for target-end organ damage in those with long-standing hypertension. Alternatives to ACE-Is are recommended in women of reproductive age. Avoid estrogen-containing contraception options for women with severe hypertension.
- ❑ **Inflammatory Bowel Disease:** Counsel women to delay conception until disease is in remission. Conception during active episode increases risk of miscarriage, premature delivery, still birth, or low birth weight.
- ❑ **Phenylketonuria:** Encourage maintenance of low phenylalanine level during reproductive years and especially prior to conception.
- ❑ **Renal Disease:** Encourage optimal control prior to conception, including normal BP. Use alternative to ACE-Is. Consult with specialist.
- ❑ **Seizure Disorder:** Discuss potential pregnancy outcomes related to seizures and seizure medications. Take folic acid 4-5mg daily prior to conception and for 12 weeks after conception. Lowest dose of one medication recommended, when possible. Valproic acid, lithium, and topiramate are contraindicated. Many antiepileptic medications may interfere with hormonal contraceptive methods.
- ❑ **Systemic Lupus Erythematosus, Rheumatoid Arthritis, and other Autoimmune Diseases:** Delay conception until good control is achieved. Discuss natural history of disease during/after pregnancy. Cyclophosphamide, Methotrexate, and Leflunomide are contraindicated. Avoid estrogen-containing contraception options in women with SLE and positive/unknown antiphospholipid antibody. Discuss use of aspirin and heparin with rheumatologist for women with SLE and antiphospholipid antibody syndrome.
- ❑ **Thromboembolic Disease:** Counsel women that risk for VTE during pregnancy and postpartum is increased, and many will require anticoagulation treatment. Coumadin is contraindicated. Avoid estrogen-containing contraceptive options.
- ❑ **Thyroid Disease:** Achieve euthyroid state prior to conception. Women with hypothyroidism should increase their dose of levothyroxine by 30% as soon as pregnancy occurs. Radioactive iodine is contraindicated. Screen all women for CBC and TSH, prior to conception.

For more information regarding preconception chronic disease management, visit the Before, Between, & Beyond Pregnancy Preconception Care Clinical Toolkit[7]

Medications:

Human teratogenicity risk is unknown for the majority of medications. Use caution when prescribing for women of reproductive age. Consult Motherisk[4].

Screen for teratogenic medication use:

- ❑ Prescribed Medications
- ❑ Over-the-Counter Medications
- ❑ Complementary and Alternative Therapy (herbal, natural, weight loss, athletic products or supplements, etc.)

Potentially teratogenic medications should be changed to safer options. Women should be counselled not to stop prescribed medications without consulting with their provider.

- ❑ Recommend folic acid 5mg daily prior to conception and for 12 weeks after conception for women taking folate antagonists (ex. methotrexate, sulfonamides, and antiepileptics).

Mental Health:

Promote mental health wellness through adequate sleep, work-life balance, stress reduction and social connectedness.

Screen: ❑ Depression[9] ❑ Anxiety[8] ❑ Other[10] ❑ Screen for family history of mental health issues.

- ❑ Bipolar Disorder ❑ Mood Disorder ❑ Schizophrenia
- ❑ Counsel women with mental health diagnoses of risks of pregnancy and relapse. Strategize management.
- ❑ Stabilize/optimize mood and anxiety level; discuss risks and benefits of medications.

Tobacco Use:

Encourage all individuals to be tobacco free prior to conception.

Screen: ❑ Tobacco (all forms) ❑ Tobacco Exposure (second-hand smoke)

- ❑ Provide brief intervention and provide appropriate referrals[11]
- ❑ Inform women of available patient resources[12] and Smokers' Helpline 1-877-513-5333.
- ❑ Consult Canadian Smoking Cessation Guidelines[13]
- ❑ Counsel women with tobacco addictions of risks of pregnancy and relapse.
- ❑ Strategize management.
- ❑ Recommend an extra 35 µg of vitamin C daily for smokers.

Preconception Health Care Tool

- Assist in identifying potential modifiable risk factors for adverse pregnancy and child health outcomes
- Developed by the University of Toronto Centre for Effective Practice (CEP) in collaboration with the Ontario College of Family Physicians , and Nurse Practitioners' Association of Ontario

- Funded by the Ontario Ministry of Health and Long-Term Care, the tool was developed in response to recommendations in the Ministry of Health and Long Term Care's *No Time to Wait: The Healthy Kids Strategy*

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Part II: Structured Management Plan

- The t-PHN's role will be to:

1. **Educate** the woman and her partner (if applicable) about identified risks and management options
2. **Assess** management barriers and preferences
3. **Coordinate** a management plan with appropriate public health, primary care, and community services. E.g., if a woman needs maternal mental health care she will be connected
4. **Follow-up** on the referrals to promote uptake

- Local public health nurses may subsequently refer participants to other community services or programs (e.g., Canadian Prenatal Nutrition Network) as necessary and this will be tracked

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Part III: Scheduled Follow-Up

- The t-PHN will telephone participants every 2 weeks to:

1. Review management plans
2. Monitor management initiation and adherence
3. Track targeted behaviours (e.g., nutrition, physical activity) or symptomatology (e.g., depression)

- Telephone contacts will last between 15 to 45 minutes based on individual needs
- This monitoring will facilitate early detection of risk that can be targeted

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2. Individualized e-Health Cloud Platform

- Each women and her partner will be provided with their own secure login to a website
- Includes personalized web-based educational materials and multi-platform interventions based on the needs identified by their t-PHN
- The *HeLTI* team will be divided into intervention workgroups based on expertise
- Will recommend evidence-based materials for targeting health behaviours (e.g., nutrition, physical activity, sleep) and health risks (e.g., depression, smoking cessation, parenting stress)

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3. Preconception-Lifecourse App

- We will electronically “push” notifications, suggestions, reminders, and resources to women and their partners via a private app that provides time-sensitive general information across the four interventions phases
- We will build upon the (M+B)2B app already created by Symetric Productions (www.symetricproductions.com/) for the Niagara Public Health Department in Ontario
- This app includes general preconception, pregnancy, and infancy information using **Best Start**, Ontario's Maternal Newborn and Early Child Development Resource Centre **expert-derived key messages** developed for health promotion in expectant and new parents

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Preconception Health Care Goals

1. Promote healthy pre-pregnancy weight
2. Encourage healthy behaviours
3. Support parental mental health
4. Boost parental relationships
5. Optimize home environment

Goal 1
Promote Healthy Pre-Pregnancy Weight

Promote Healthy Pre-Pregnancy Weight

- A meta-analysis of 38 studies found a consistent relation between maternal pre-pregnancy weight and child obesity *(Woo Baidal et al 2016)*

- Maternal pre-pregnancy obesity is also linked to the hypertensive disorders of pregnancy, gestational diabetes, high infant birthweight and shorter breastfeeding duration *(Dunford et al 2017; Bodnar et al 2009; Leeners et al 2006 Robinson et al 2005; Samuels-Kalow et al 2007; Chu et al 2007; Lu et al 2001; Li et al 2003; Hilson et al 2004)*

- 25% of primiparous women do not lose their pregnancy weight before going into their next pregnancy

- A meta-analysis of 23 trials found that preconception interventions can positively modify maternal health behaviours, including calorie restriction with heightened physical activity, when reinforced by a support system and monitoring *(Dean et al 2014)*

- Importantly, growing evidence suggests that health behaviour interventions, even those producing a modest change, can successfully and efficiently reduce metabolic disease risk in pregnancy *(Lindstrom et al 2003; Thangaratinam et al 2012; Saha et al 2010)*

Prevent Excessive Gestational Weight Gain

- In a meta-analysis of 21 studies, excessive gestational weight gain was a consistent risk factor for high birthweight and child obesity *(Woo Baidal et al 2016)*

- Although a systematic review of 13 trials evaluating maternal pregnancy weight interventions found substantial variability in the content, delivery, and dietary assessment methods, 9 studies found significantly reduced gestational weight gain *(Woo Baidal et al 2016)*

- While gestational diabetes is strongly associated with child obesity, there is limited data on the effectiveness of maternal glycemic control in reducing childhood obesity *(Guillemette et al 2017)*

Goal 2
Encourage Healthy Behaviours

Encourage Healthy Behaviours

Goal 3
Support Parental Mental Health

Perinatal Depression Prevalence

- 1 in 8 women will experience depression in the perinatal period (antenatally and postnatally)

- National Canadian data = 8% will continue to experience depression past the first year postpartum

Review

Journal of Psychiatric Research 70 (2015) 67–82

Prevalence of postpartum depression among immigrant women: A systematic review and meta-analysis

Kobra Falah-Hassani [a, *], Rahman Shiri [b], Simone Vigod [c], Cindy-Lee Dennis [a]

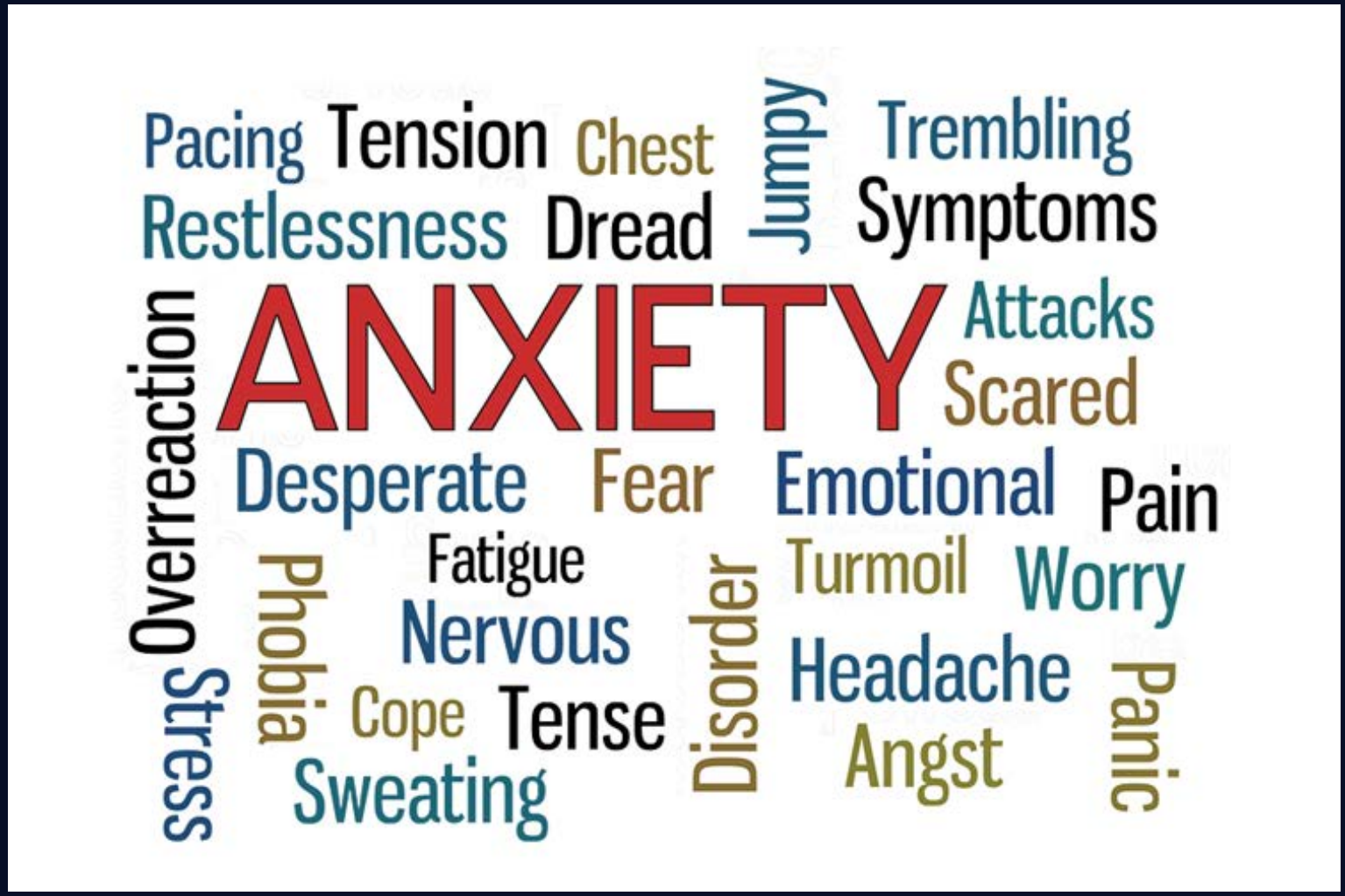
Overall pooled prevalence = 20%

95% CI=17-22, 18 studies, N=14,239 women

Compared Immigrant vs Non-Immigrant Women

OR =2.17, 95% CI=1.79 to 2.65

15 studies, N=50,519 women


Pacing
Tension
Chest
Jumpy
Trembling
Restlessness
Dread
Symptoms
ANXIETY
Attacks
Overreaction
Scared
Desperate
Fear
Emotional
Pain
Fatigue
Turmoil
Worry
Phobia
Nervous
Disorder
Headache
Stress
Cope
Tense
Angst
Panic
Sweating

Clinical Importance of Anxiety

- A common mental health problem women experience during the perinatal period is **anxiety** → limited attention

- Significant omission → ever-growing evidence indicating maternal anxiety both antenatally and postnatally may also lead to negative outcomes for children

Review article

Prevalence of antenatal and postnatal anxiety: systematic review and meta-analysis

Cindy-Lee Dennis, Kobra Falah-Hassani and Rahman Shiri

BJPsych | The British Journal of Psychiatry
1–9. doi: 10.1192/bjp.bp.116.187179

- We reviewed 21,464 abstracts, retrieved 783 articles, and included 102 studies

- 26 study authors provided additional information to promote the comprehensiveness and generalizability of the meta-analytic results

- Antenatal anxiety data = 70 studies
- Postnatal anxiety data = 57 studies

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Antenatal Anxiety

Self-Reported Symptoms

- 1st trimester = **18.2%** (95%CI 13.6.-22.8, 10 studies, N=10,577)
- 2nd trimester = **19.1%** (95%CI 15.9-22.4, 17 studies, N=24,499)
- 3rd trimester = **24.6%** (95%CI 21.2-28.0, 33 studies, N=116,720)

Overall pooled prevalence across the three trimesters was

22.9% (95% CI 20.5-25.2, 52 studies, N=142,833)

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Antenatal Anxiety

Clinical Diagnosis of Any Anxiety Disorder

- 1st trimester = **18.0%** (95% CI 15.0-21.1, 2 studies, N=615)
- 2nd trimester = **15.2%** (95% CI 3.6-26.7, 4 studies, N=3002)
- 3rd trimester = **15.4%** (95% CI 5.1-25.6, 4 studies, N=1603)

Overall pooled prevalence across the three trimesters was **15.2%** (95% CI 9.0-21.4, 9 studies, N=4648)

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Postnatal Anxiety

Self-Reported Symptoms

- 1-4 weeks = **17.8%** (95% CI 14.2-21.4, 14 studies, N=10,928)
- 5-12 weeks = **14.9%** (95% CI 12.3-17.5, 22 studies, N=19,158)
- 1-24 weeks =**15.0%** (95% CI 13.7-16.4, 39 studies, N=145,293)
- >24 weeks = **14.8%** (95% CI 10.9-18.8, 7 studies, N=11,528)

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Postnatal Anxiety

Clinical Diagnosis of Any Anxiety Disorder

- 5-12 weeks = **9.6%** (95% CI 3.4-15.9, 5 studies, N=2712)
- 1-24 weeks = **9.9%** (95% CI 6.1-13.8, 9 studies, N=28,495)
- >24 weeks = **9.3%** (95% CI 5.5-13.1, 5 studies, N=28,244)

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Postpartum Anxiety Risk Factors

	Odds ratio	95% confidence interval	P value
Perceived stress	5.19	2.92-9.22	<0.001
Multiparous parity	3.46	1.39-8.65	0.008
History of psychiatric problems	2.73	1.12-6.62	0.026
Childcare stress	1.74	1.13-2.70	0.013
Partner support	0.66	0.44-0.99	0.045
Breastfeeding self-efficacy	0.66	0.46-0.96	0.028

Dennis et al, 2016 Acta Psychiatrica Scandinavica

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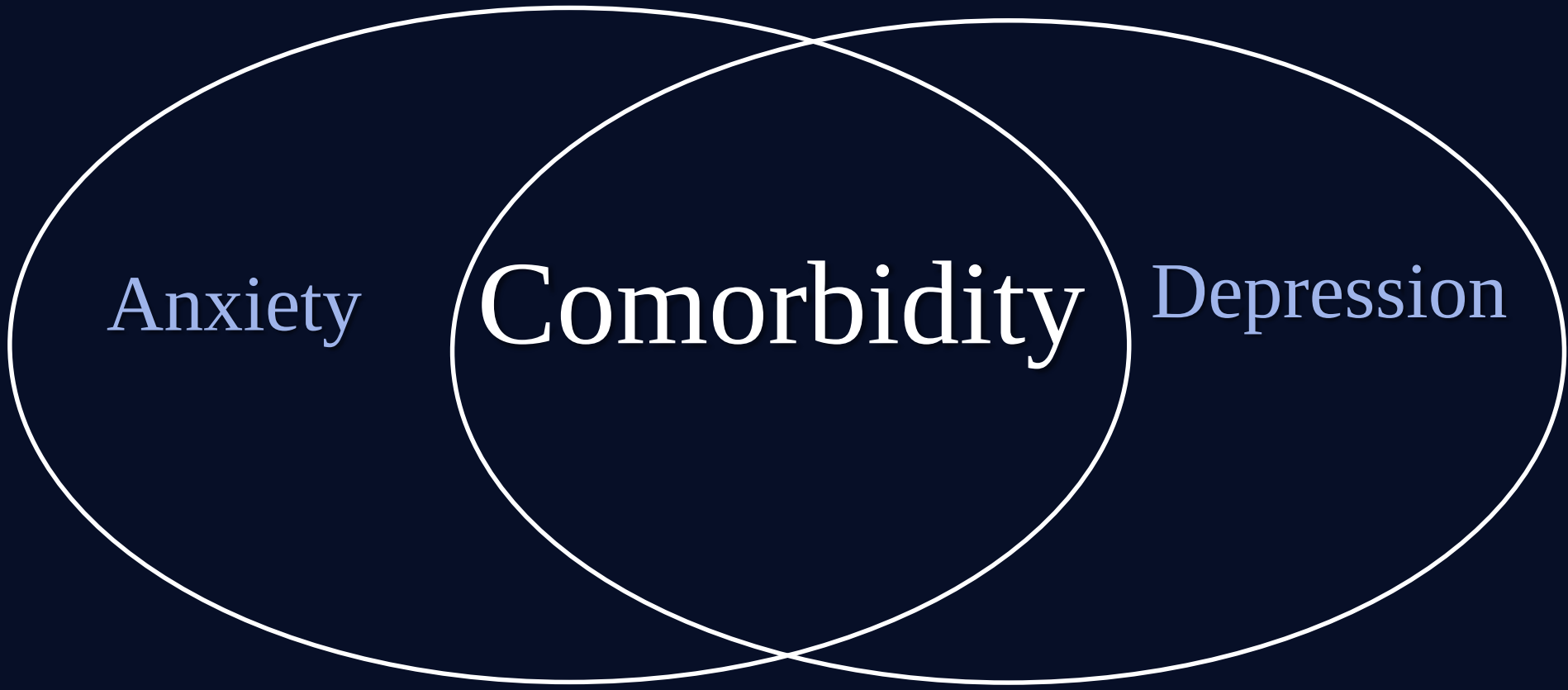
Depression and Anxiety in the General Population

- Depression and anxiety disorders make up 50% of the international disease burden attributable to psychiatric and substance abuse disorders *(Whiteford et al., Lancet 2013)*

- Epidemiologic data suggests that >20% of the general population will have at least one of these disorders in their lifetime *(Pedersen et al. JAMA Psychiatry 2014)*


Anxiety
Comorbidity
Depression

Why is Comorbidity Important Clinically?

- More severe and persistent symptomatology
- Increased disability and impaired functioning
- Poorer response to treatment
- Increased risk to commit suicide

(Meier et al 2015; Fichtner et al 2010, Merikanges et al 2003; Kessler et al 1997; Rush et al 2005)

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Psychological Medicine, Page 1 of 13. © Cambridge University Press 2017
doi:10.1017/S0033291717000617

REVIEW ARTICLE

The prevalence of antenatal and postnatal co-morbid anxiety and depression: a meta-analysis

- Included 66 (24 published and 42 unpublished) studies incorporating 162,120 women from 30 countries

Antenatally

Overall prevalence of anxiety and mild to severe depressive symptoms

9.5% (95% CI 7.8-11.2, 17 studies, N=25,592)

Postnatally

Overall prevalence of anxiety and mild to severe depressive symptoms

8.2% (95% CI 6.5-9.9, 15 studies, N = 14,731)

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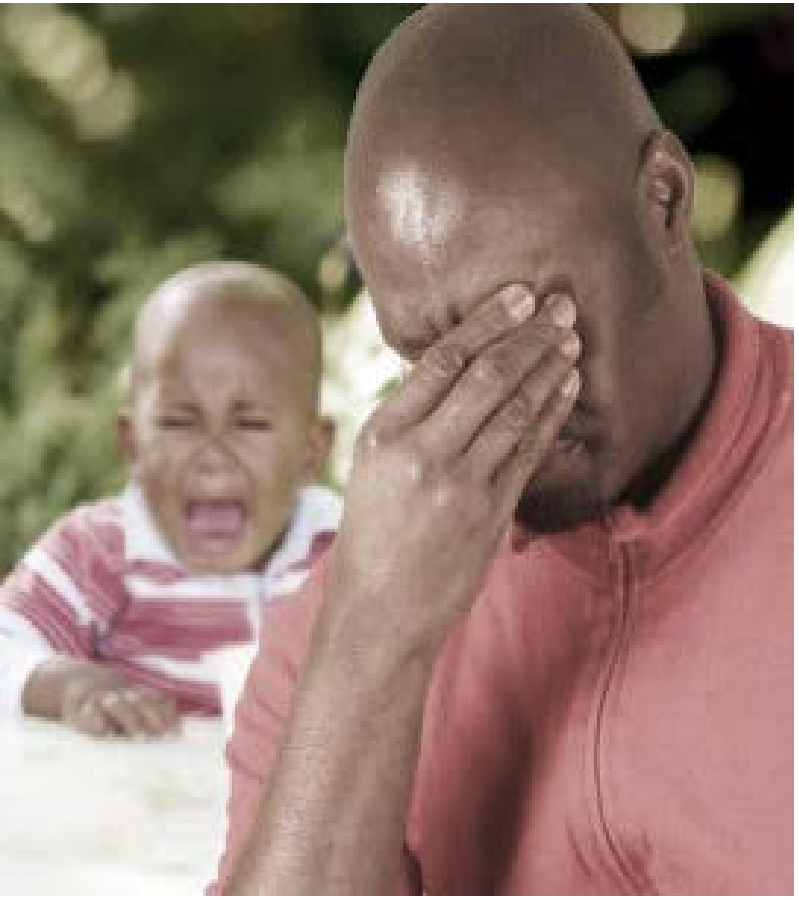
Mental health issues are the most frequent form of maternal morbidity across the perinatal period

Paternal Depression



A meta-analysis suggests that approximately 10.4% of fathers will experience depression in the first year postpartum

(Paulson et al. JAMA 2010)

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Cochrane Systematic Review

Cochrane
Pregnancy and Childbirth

Psychosocial and Psychological Interventions for the Prevention of Postpartum Depression:

An Update

Dennis, C-L., Dowswell, T. (2013). Psychosocial and psychological interventions for preventing postpartum depression. The Cochrane Database of Systematic Reviews, Issue 2.

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Summary

Overall, psychosocial and psychological interventions may decreased the risk of developing postpartum depression by approximately 22%

(N=28 trials, 17,000 women)

Postpartum Depression Peer Support Trial

(Dennis et al . BMJ 2009)

Underlying Mechanisms of Peer Support

- Peer support can:
  - Increase social networks
  - Reinforce help-seeking behaviours
  - Decrease barriers to care
  - Encourage effective coping
  - Promote social comparisons
  - Increase self-efficacy
  - Aid self-esteem

Alternative Interventions for the Prevention of Postpartum Depression

Cochrane Pregnancy and Childbirth

- To assess the effects of interventions other than pharmacological, psychosocial, or psychological interventions compared with usual antepartum or postpartum care in the prevention of postpartum depression

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Physical Activity

- Five trials
- Dodd 2015 (*Australia*); Huang 2011 (*Taiwan*), Lewis 2014 (*USA*), Norman 2010 (*Australia*), Songoygard 2012 (*Norway*)

- Depressive symptomatology

RR=0.87, 95% CI 0.35 - 2.14; 2 trials, n=1940

- Mean depression scores

SMD=-0.30, 95% CI -0.50 to -0.10; 3 trials, n = 387

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Management of Perinatal Mental Health

Case Identification

- The first step in the management is case identification

- Research consistently demonstrates that informal surveillance is imprecise with less than 50% of women with mental health problems are identified despite various interactions with health professionals *(Yawn et al 2012; Goodman & Tyer-Viola, 2010)*

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Edinburgh Postnatal Depression Scale

(EPDS)

- 10-item self-report instrument
- Scores range from 0 to 30
- Cut-off 12/13 (> 12) – probable depression
- Cut-off 9/10 (> 9) – possible depression
- Widely available and free

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Research is Clear

Screening alone is insufficient

to ensure the provision of appropriate treatment

and thus ultimately improving clinical outcomes

- The U.S. Preventive Services Task Force recommends screening adults for depression in clinical practices that have systems in place to assure:

1. Accurate diagnosis

2. Effective treatment

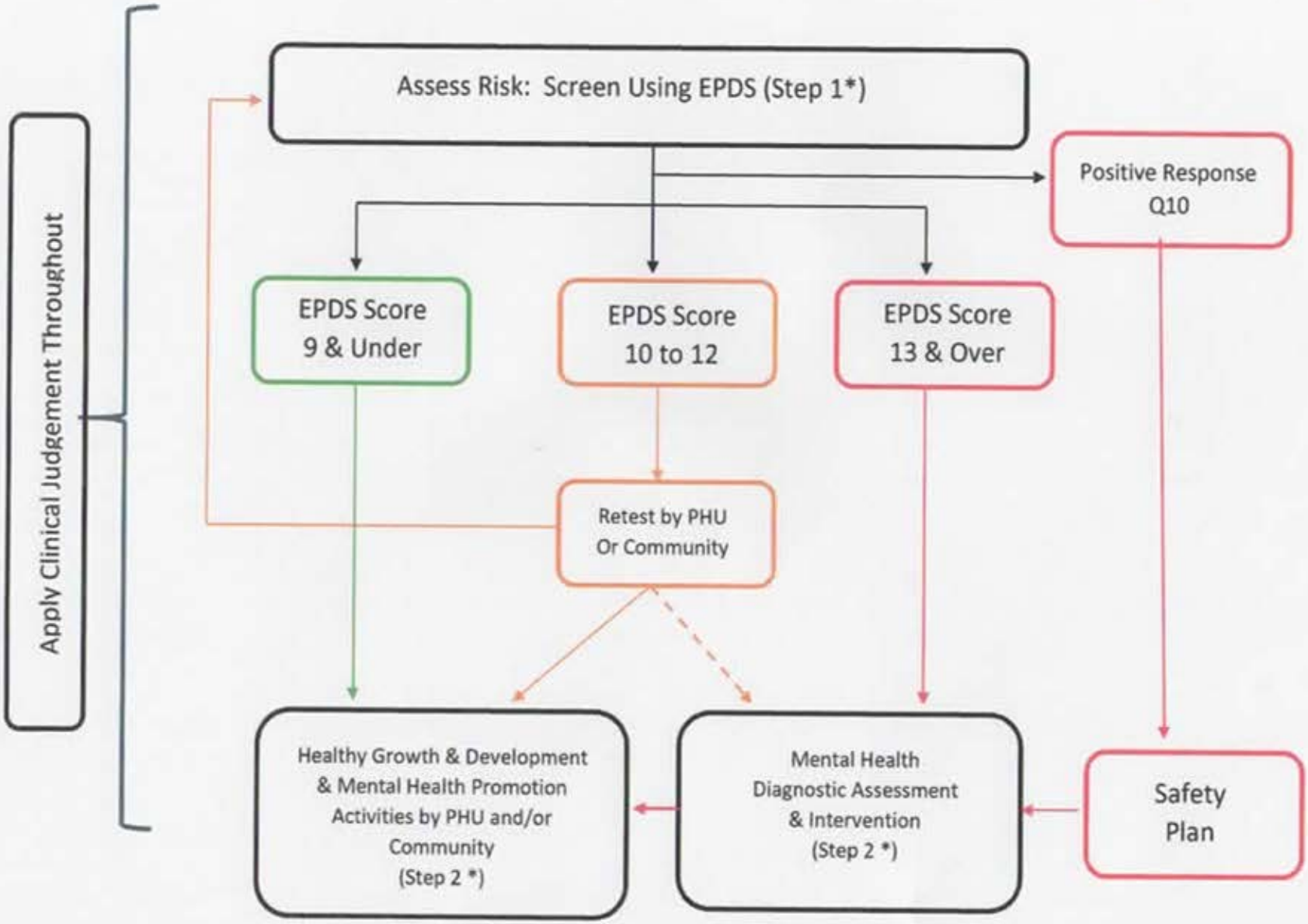
3. Follow-up

Healthy Human Development Table

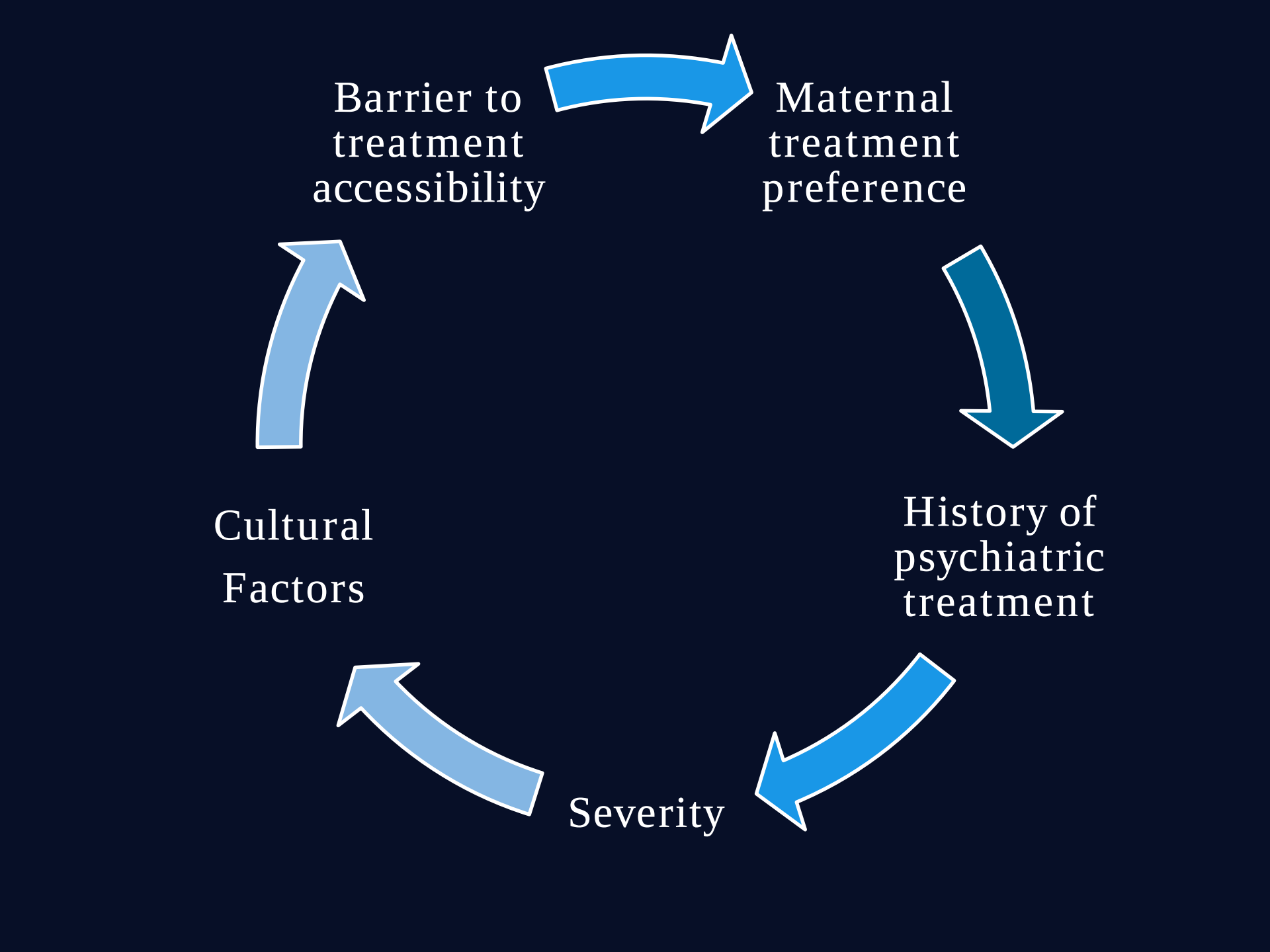
Supported by Public Health Ontario

Perinatal Mental Health Toolkit for Ontario Public Health Units

Public Health Perinatal Mental Health Care Pathway



*Alignment with Mental Health Stepped Care Model


Barrier to treatment accessibility
Maternal treatment preference
History of psychiatric treatment
Severity
Cultural Factors

Goal 4
Boost Parental Relationships

Partner Support

- The importance of partner support is well established
- Partners are ideally positioned to provide consistent long term support
- Given that parents show a preference for support from their partner, strategies that target the couple relationship are likely to be beneficial *(Forsyth et al 2011; Rowe, et al 2013)*

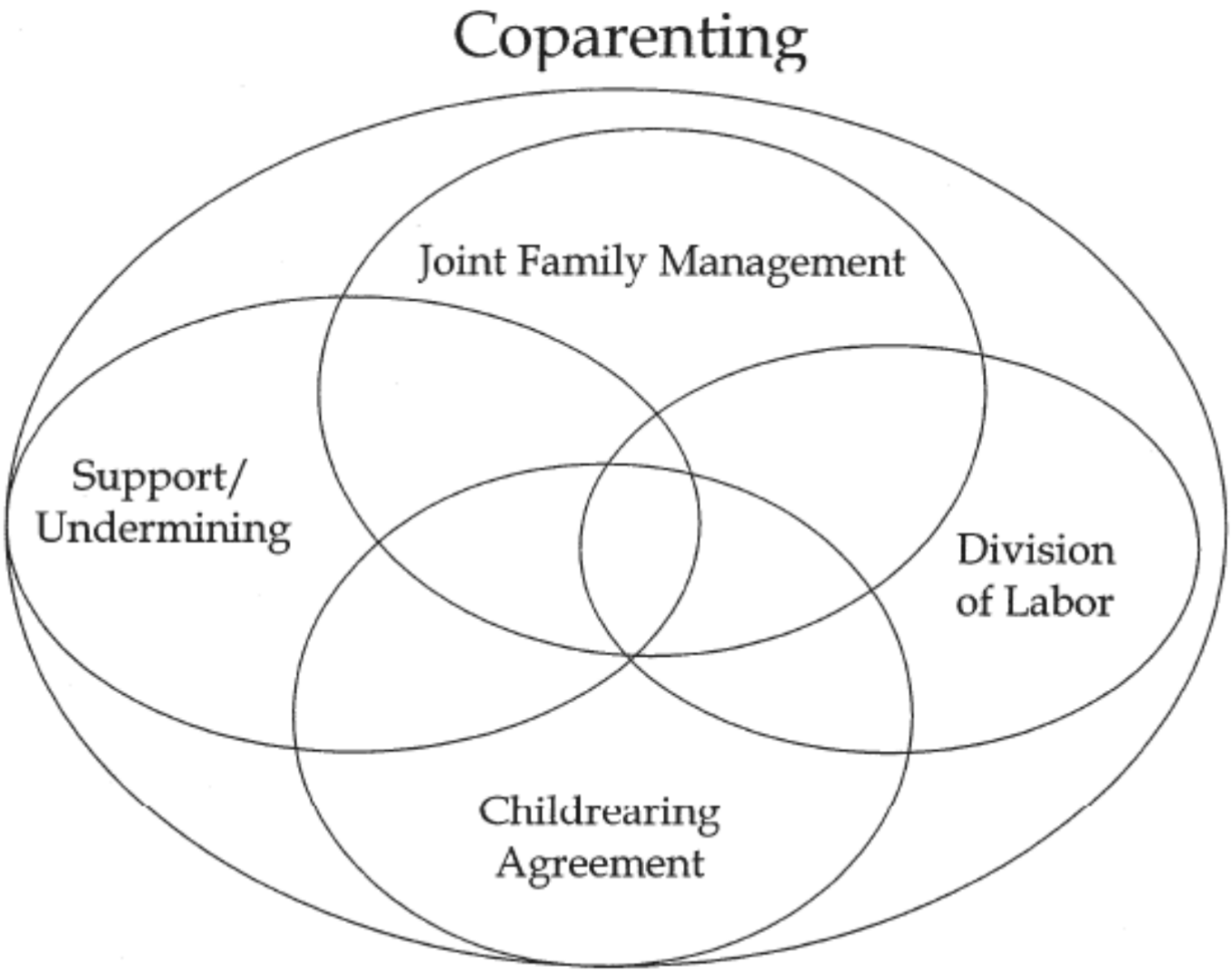
Coparenting

Coparenting refers to the manner in which parents coordinate their childcare responsibilities and work together to achieve their jointly determined child health and development goals

Co-parenting as a Preventive Strategy

Coparenting has been previously shown to positively affect family relationships and emotional well-being, so it is hypothesized that educating couples about coparenting may also be effective in preventing depression and parenting stress

Coparenting Theory - Mark Feinberg



Productive Communication and Problem Solving

In coparenting relationships =

Couples engage in effective communication and problem solving

- In order for parents to work as an effective coparenting team and achieve their goals, these two skills are required

- Finding solutions to conflicts helps parents form supportive, cooperative coparenting relationships

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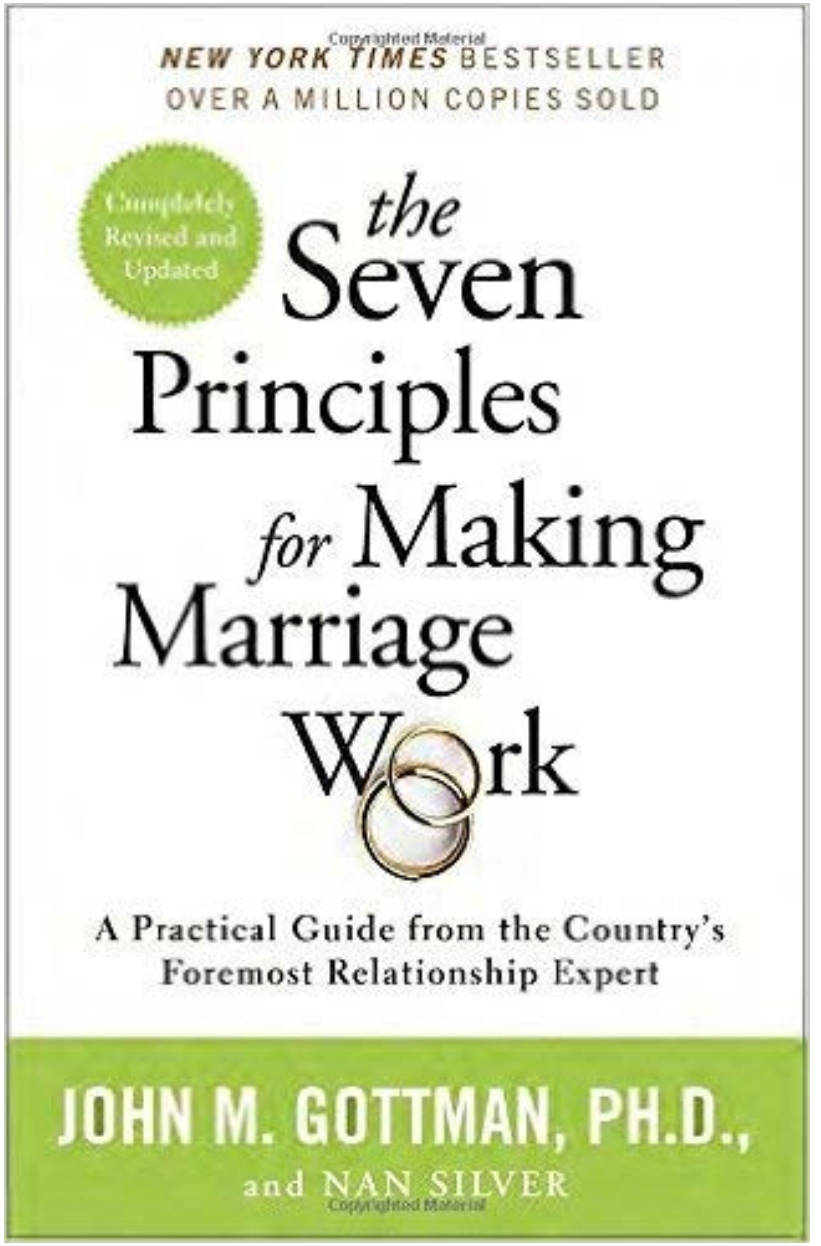

Dr. John Gottman's 7 Principles of Successful Relationships

1. Enhance your love maps. You know all of your partner's relevant information, from life dreams to favorite movies, as a best friend would.

2. Nurture fondness and admiration. You have a positive view and deep appreciation of your partner, and express it.

3. Turn toward your partner instead of away during times of stress. "You want your partner to be that confidante," Gover says.

4. Let your partner influence you. You shouldn't make important life decisions autonomously, as a single person would.

5. Solve your solvable problems. All couples have solvable and perpetual problems, but long-term couples solve those they can and understand there will always be perpetual problems.

6. Overcome gridlock. What often underlies perpetual problems are unfulfilled dreams. Talk about those dreams with the goal of making peace with the problem.

7. Create shared meaning. Develop the big and small rituals that help build the bond with your partners. Rituals range from hosting an annual party to having coffee together in the morning.

http://www.gottman.com

Coparenting breastfeeding support and exclusive breastfeeding: A randomized controlled trial (COSI Trial)

PI: Dr. Jennifer Abbass-Dick

- A multi-site randomized controlled trial
- To evaluate the effect of a Coparenting Breastfeeding Support Intervention (COSI) on breastfeeding outcomes among primiparous mothers and fathers

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Pam Pilkington

Partners to Parents: development of an online intervention for enhancing partner support and preventing perinatal depression and anxiety

Pamela D. Pilkington, Holly Rominov, Lisa C. Milne, Rebecca Giallo & Thomas A. Whelan

To cite this article: Pamela D. Pilkington, Holly Rominov, Lisa C. Milne, Rebecca Giallo & Thomas A. Whelan (2016): Partners to Parents: development of an online intervention for enhancing partner support and preventing perinatal depression and anxiety, Advances in Mental Health, DOI: 10.1080/18387357.2016.1173517

Clinical Psychologist **19** (2015) 63–75

APS Australian Psychological Society

A review of partner-inclusive interventions for preventing postnatal depression and anxiety

Pamela D. PILKINGTON, Thomas A. WHELAN and Lisa C. MILNE

School of Psychology, Faculty of Health Sciences, Australian Catholic University, Fitzroy, Victoria, Australia

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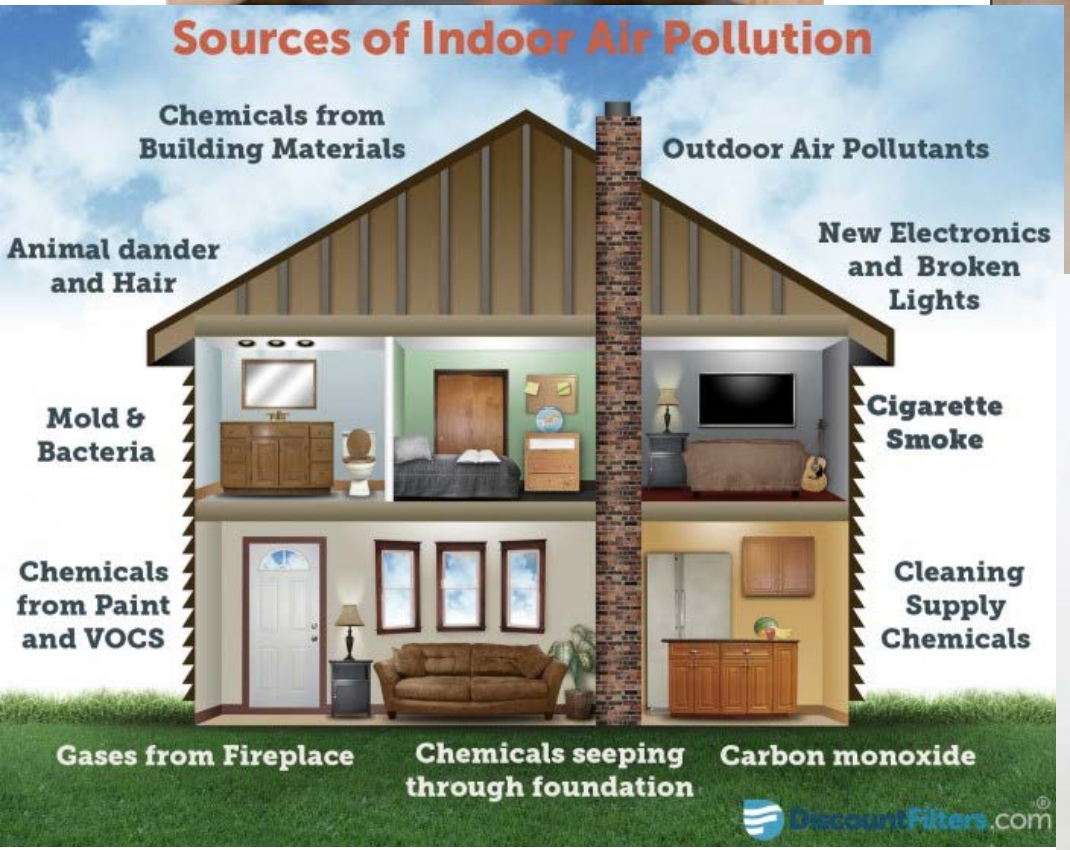
Goal 5
Optimize Home Environment

Optimize Home Environment



Parental Smoking

- A meta-analysis of 23 studies found maternal exposure to smoking in pregnancy was associated with increased risk of child obesity *(Woo Baidal et al 2016)*

- Fetal exposure to maternal smoking impacts prematurity, low birth weight, congenital malformations and sudden infant death syndrome *(Mitchell 1996; Len-Russo et al 2002; Ahmed et al 2002; Karimi et al 2007; Bozkurt et al 2007)* suggesting psychosocial smoking cessation programs *(Chamberlain et al 2013)* are warranted before conception

- Paternal smoking too is associated with childhood cancer, cardiovascular disease and obesity, not only in the child, but the grandchild as well, possibly through epigenetic mechanisms *(Pembrey et al 2014; Orsi et al 2015)*

Summary

- Rising rates of NCDs and obesity
- Child obesity is of significant concern
- DOHaD research suggests early experiences influences long-term health
- Epigenetic changes and metabolic memory
- Early interventions matter as do continuum of care
- Gap in preconception care despite the well documented benefits
- Content and delivery
- Next steps – HeLTI Canada study
- 4-phase intervention starting with preconception to decrease child obesity
- Outlined the specific intervention and preconception goals

Mothering Transitions RESEARCH

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