



Wisconsin Collaborative of Treatment Professionals
FOR EDUCATION AND CAPACITY TRAINING

Neonatal Abstinence Syndrome: A Family Affair

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Disclosure

I have no conflicts of interest to disclose.

Objectives

- Define Neonatal Abstinence Syndrome (NAS)/Neonatal Opioid Withdrawal Syndrome (NOWS);
- Describe the rationale for medical management of NAS/NOWS;
- Describe the impact of social determinants on infant developmental outcomes.

Outline

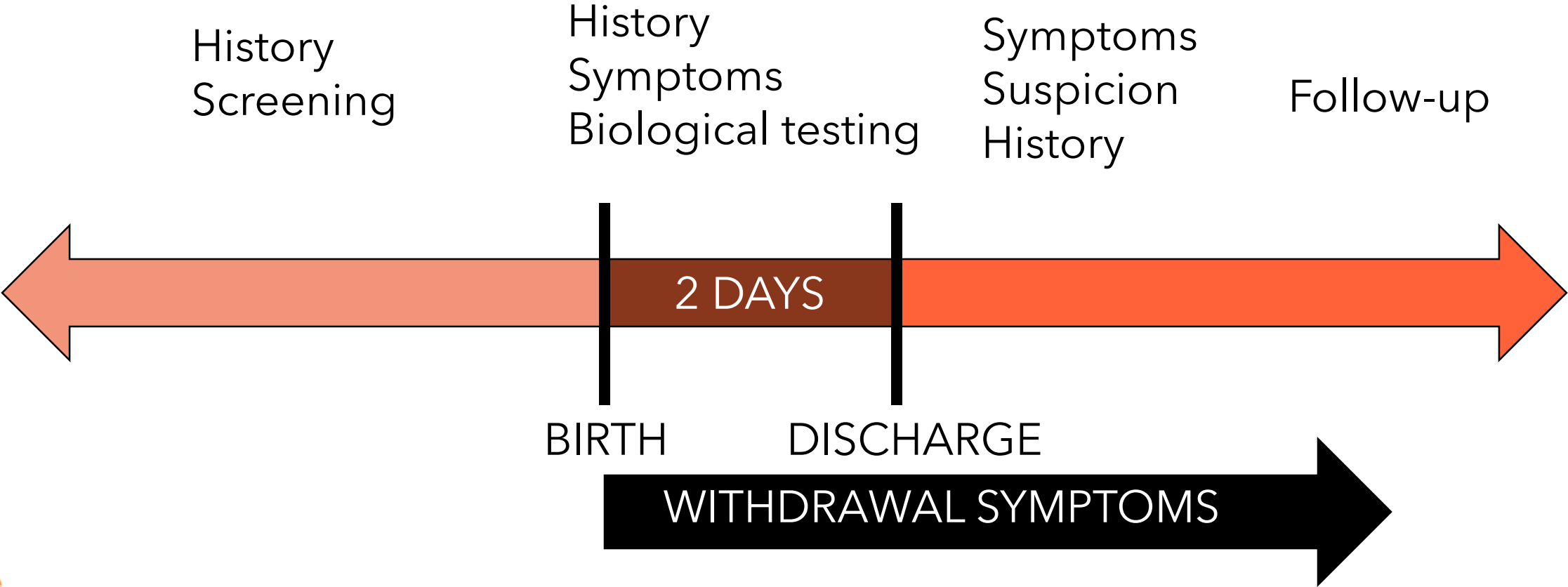
- What is NAS?
- How is it a family affair?
 - Parents and grandparents (preconception and pregnancy)
 - Parents and infant (birth and hospitalization)
 - Parents, infant, and future generations (after discharge)
- Investing in the family

What is Neonatal Abstinence Syndrome (NAS)?

Definition: Neonatal Abstinence Syndrome

A postnatal opioid withdrawal syndrome that can occur in newborns whose mothers were addicted to or treated with opioids while pregnant.

NAS Timeline



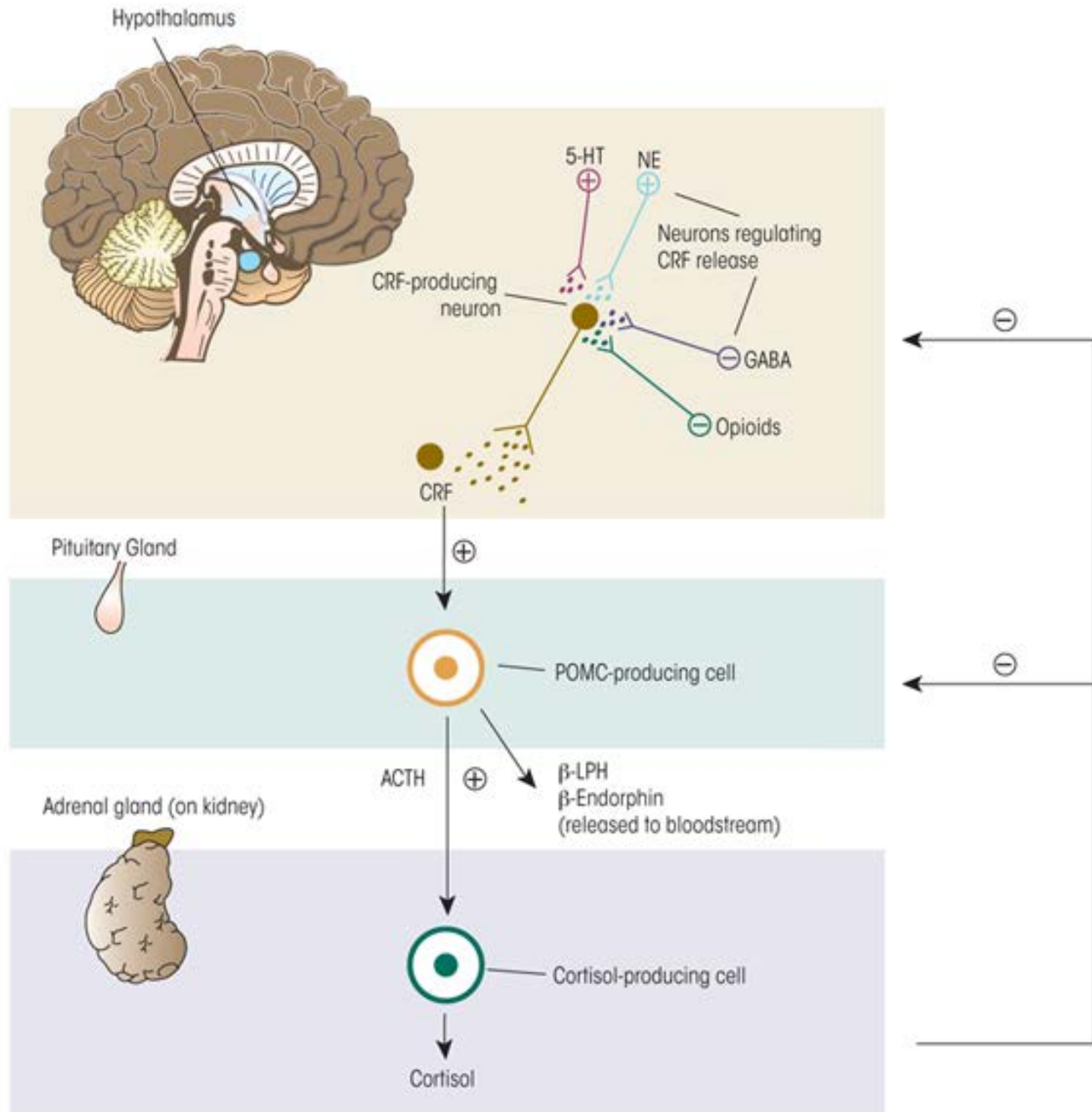
Parents and Grandparents (Preconception and Pregnancy)

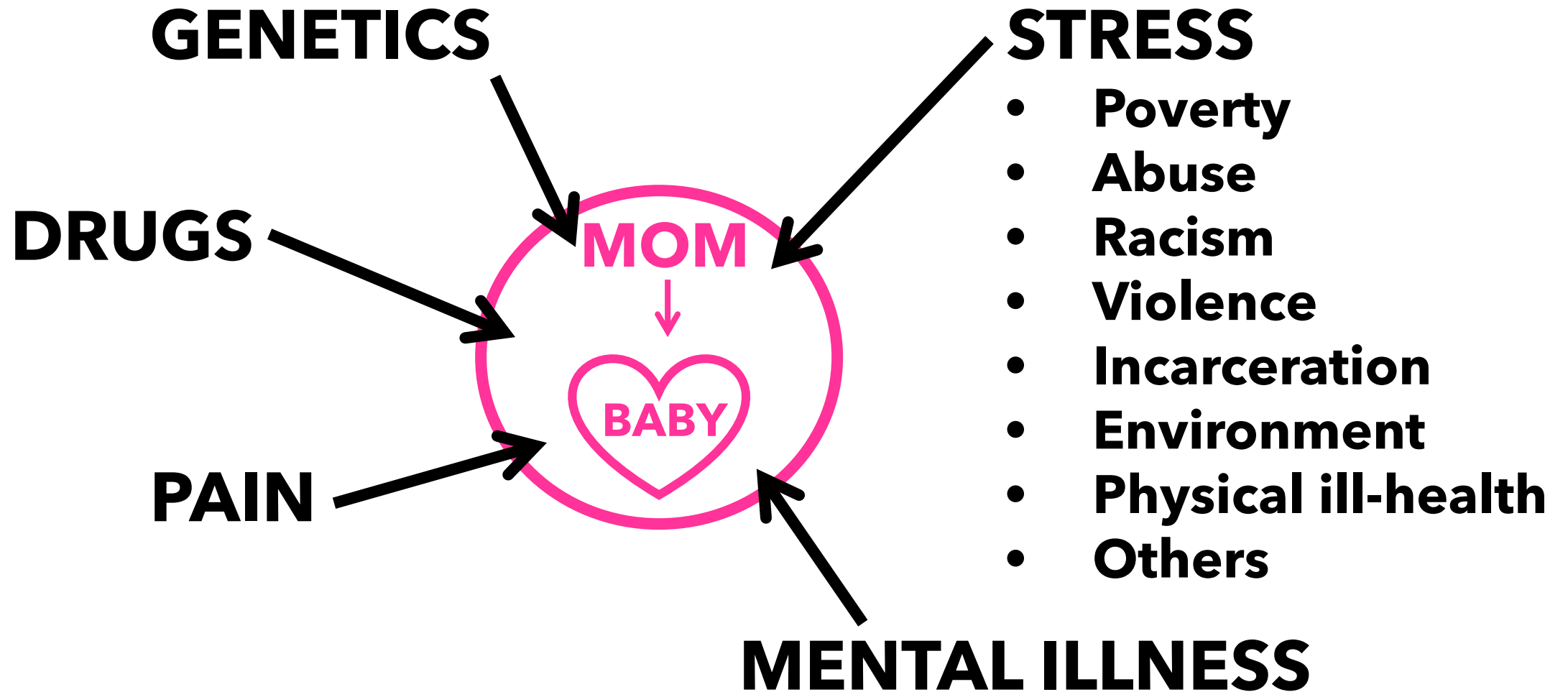


What is stress?

Any stimulus that alters the balance or equilibrium of the normal physiologic state of the organism.

The Hypothalamic-Pituitary-Adrenal (HPA) Axis





PERINATAL STRESS

Social Determinants

Parental Psychopathology

Teratogenic Exposures

Environmental

Physiological Response

HPA Axis



Immune

Domain Vulnerabilities

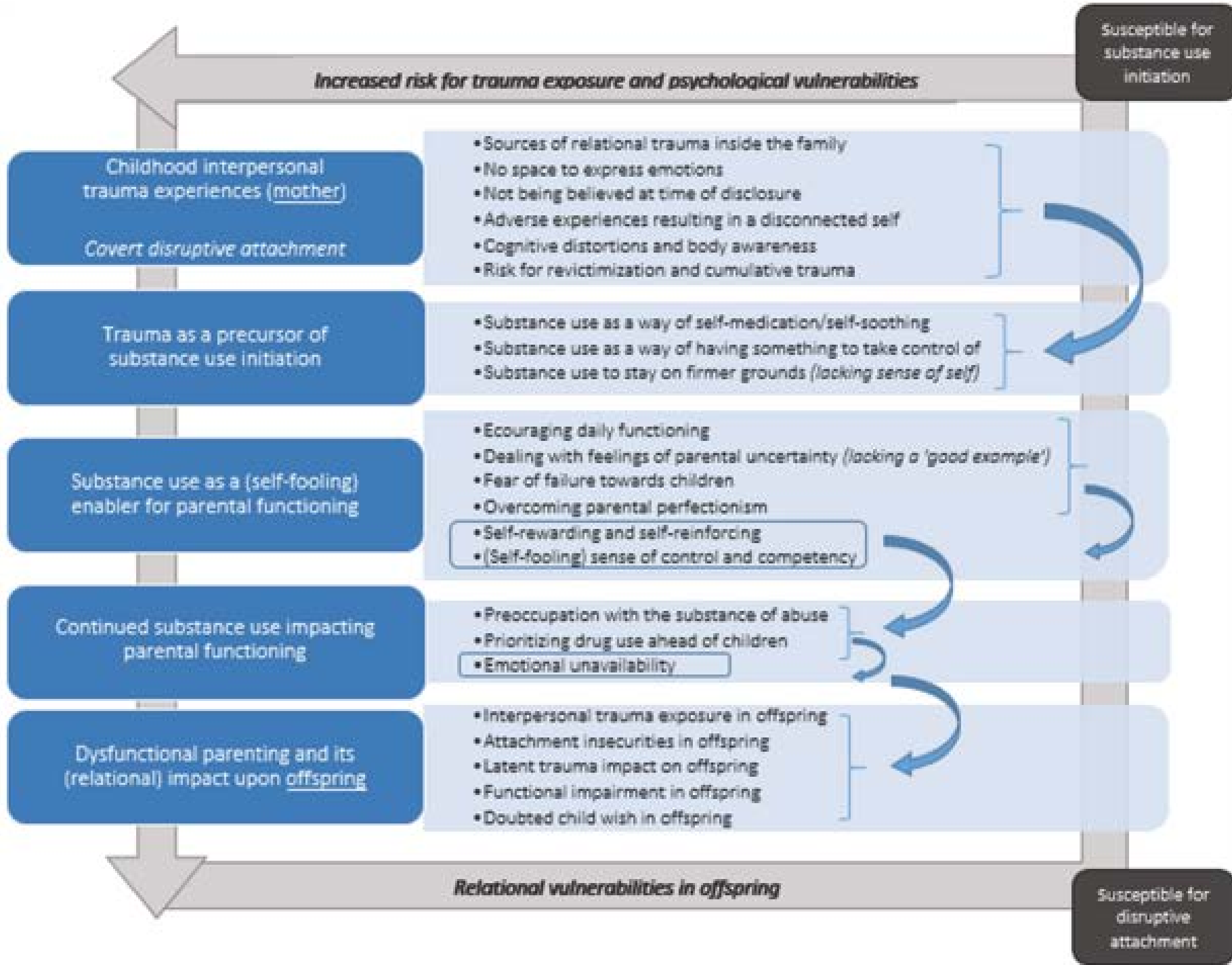
Cognitive

Psychosocial

Neurobiological

SUBSTANCE USE/ABUSE VULNERABILITY

From Horn et al., 2018



Parents and Infant (Birth and Hospitalization)

AAP recommendations

- Protocol defining indications/procedures for screening; standardized plan for evaluation/ treatment of infants
- Screen using multiple methods
- Initial approach–non-pharmacological methods
- Score withdrawal using published tool
- Breastfeeding, unless contraindicated
- Observe for 4-7 days

Assessment: Maternal risk

Source of opioids

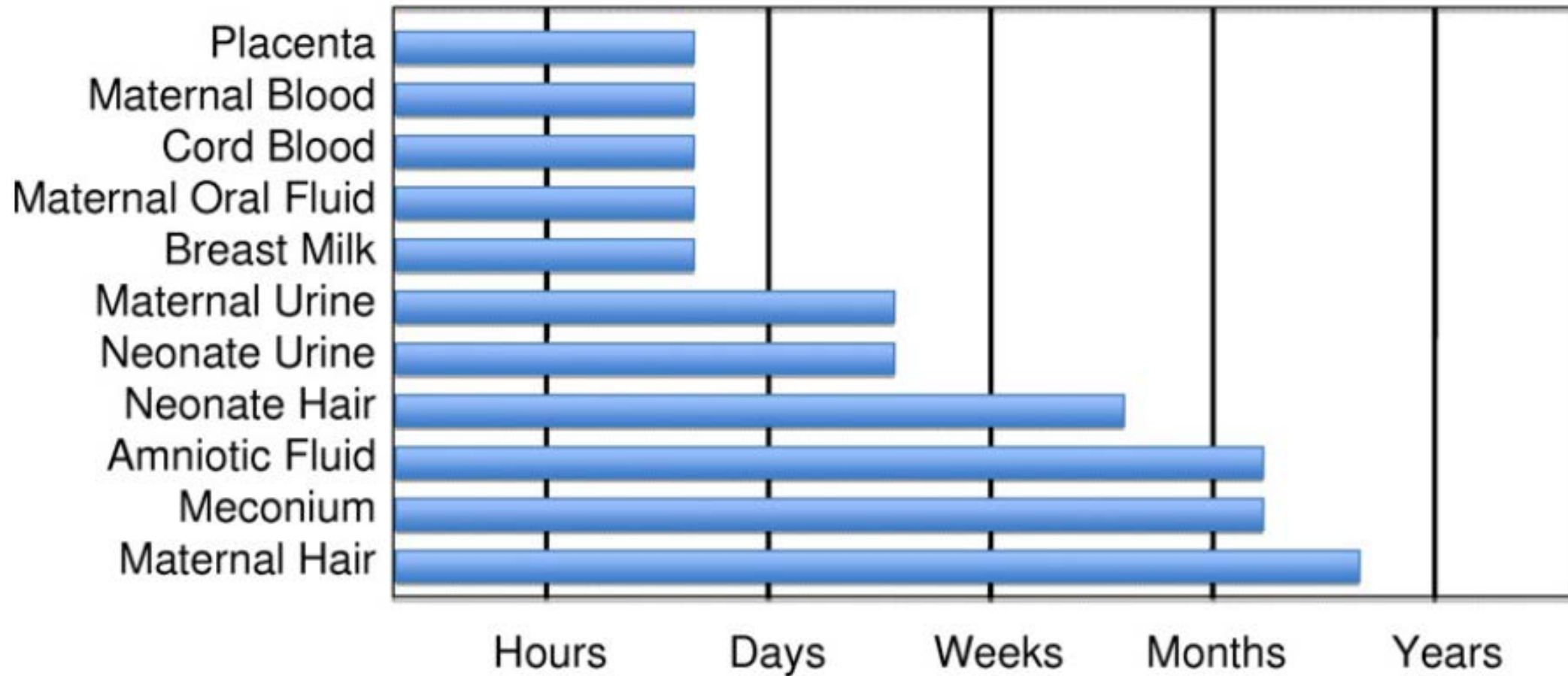
- Prescribed medications, used as written
- Misused prescription drugs
- Illicit drugs

Assessment

- Screening
- Medical/medication history
- Prescription Drug Monitoring Program (PDMP)

Biological Testing

Window of Detection For Biological Specimens



Interventions

- Low-stimulation environment
 - Quiet
 - Low light
 - Low activity level
- Responsive care
 - Feeding when hungry
 - Arranging cares with active periods

Symptoms of Withdrawal

- Central Nervous System (CNS)
 - Irritability
 - Increased fussiness
 - Increased muscle tone
 - Sleep problems
 - High-pitched cry
 - Skin breakdown (knees/face)
 - Tremors
 - Seizures
- Gastrointestinal (GI)
 - Excessive sucking
 - Poor feeding
 - Spitting up
 - Skin breakdown (buttocks)
 - Diarrhea
 - Dehydration
- Autonomic Nervous System
 - Nasal stuffiness, sneezing
 - Hiccups
 - Sweating
 - Frequent yawning
 - Fast breathing
 - Forgetting to breath
 - Fever

Medications

- “Standard”
 - Morphine sulfate
 - Phenobarbital
 - Clonidine

- More information
 - Methadone
 - Buprenorphine

Breastfeeding

- Prescribed opioids for withdrawal are not an absolute contraindication to breastfeeding
- Women should not stop breastfeeding abruptly
- Women taking non-prescribed medications or drugs should not breastfeed

Eat, Sleep, Console

- Developed in 2017
- Management based on newborn's ability to function
 - **Eat:** Eat an appropriate amount for age (1-2 d, <1 oz/fd; ≥3 d, ≥1 oz/fd; if breastfeeding, "good" as defined by mother and nurse)
 - **Sleep:** Able to sleep undisturbed for minimum of 1 hr. Holding is often necessary.
 - **Console:** Able to be consoled within 10 minutes. If not, non-pharmacologic interventions should be increased

Meanwhile, back in Wisconsin...

- Wisconsin Perinatal Quality Collaborative (WisPQC)
 - Initiative to improve care to infants with NAS/NOWS by:
 - Improving identification
 - Standardizing care

Parents, Infant, and Future Generations (After Discharge)

Attachment Theory

The central theme of **attachment theory** is that primary caregivers who are available and responsive to an infant's needs allow the child to develop a sense of security. The infant knows that the caregiver is dependable, which creates a secure base for the child to then explore the world.

Attachment-Based Framework

- High rates of comorbidity between SUDs, trauma histories, and psychiatric disorders
- Intergenerational transmission of attachment patterns and poor developmental outcomes of children with parents with SUDs
- Individuals who experience early adversity may have greater difficulties with affect regulation and engaging in rewarding relationships, increasing vulnerability to drug use for coping

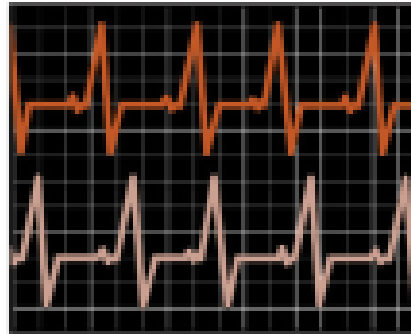
Biology of Attachment

- Oxytocin
 - Produced in hypothalamus
 - Modulates emotional functions of the amygdala and brain stem
 - In context of safety, allows optimal expression of positive social behaviors
 - Regulation of emotion, autonomic nervous system, homeostasis, coping, and healing
- Vasopressin
 - Produced in hypothalamus
 - Activates more possessive and aggressive sides of attachment (protection)

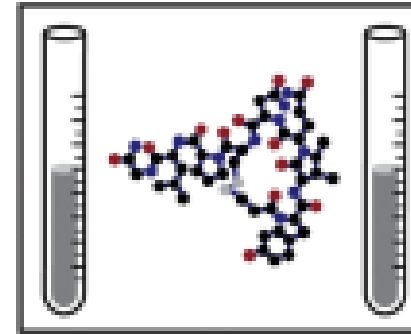
Biobehavioral synchrony in human attachments



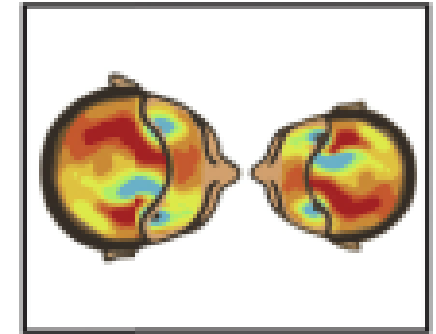
Behavioral synchrony



Heart rate coupling



Endocrine fit



Brain-to-brain synchrony



Parents

- Synchronized behavior in gaze, affect, vocal, and touch
- Mother-specific father-specific

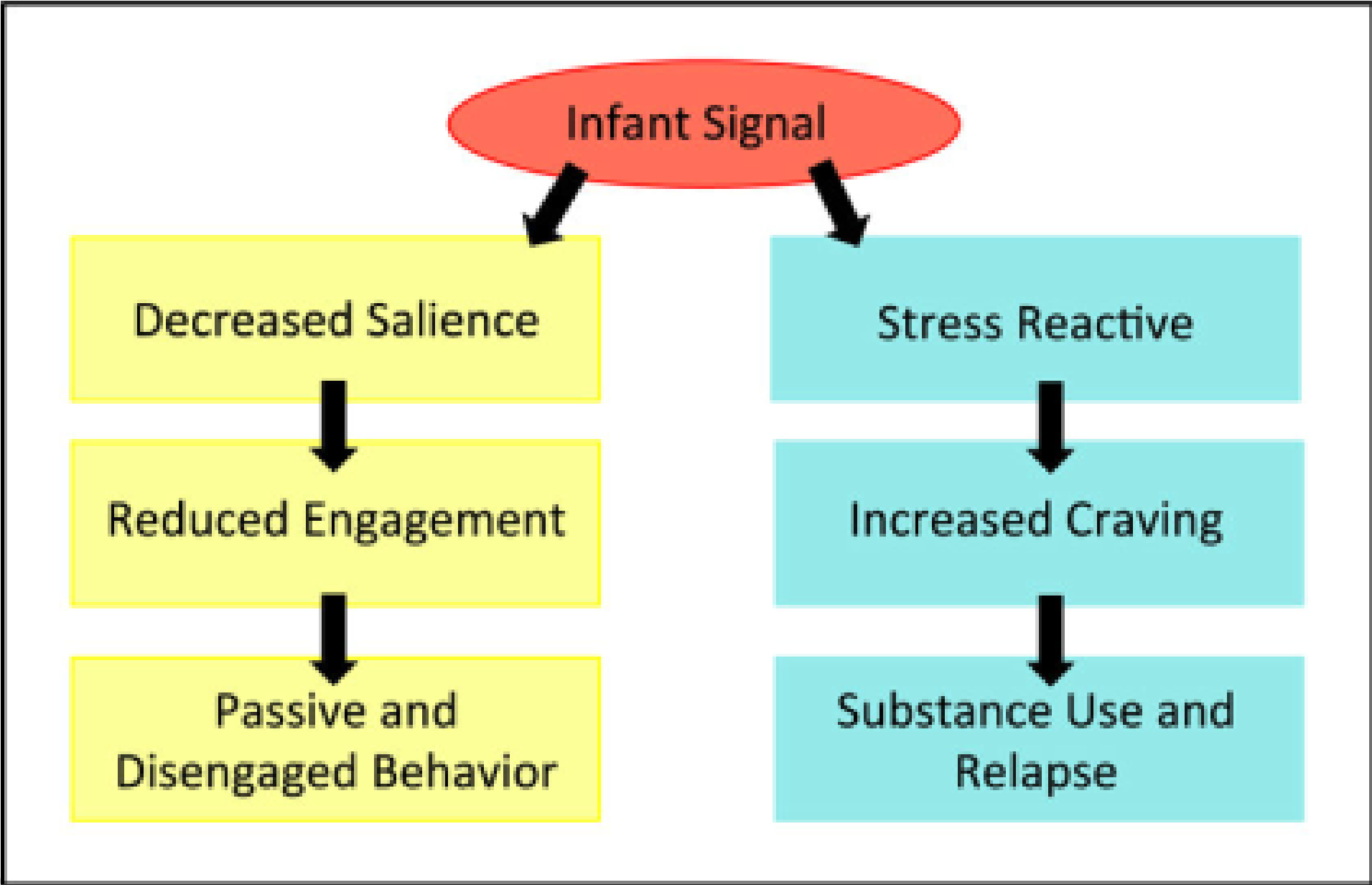
- Synchronized HR during synchronized interactions

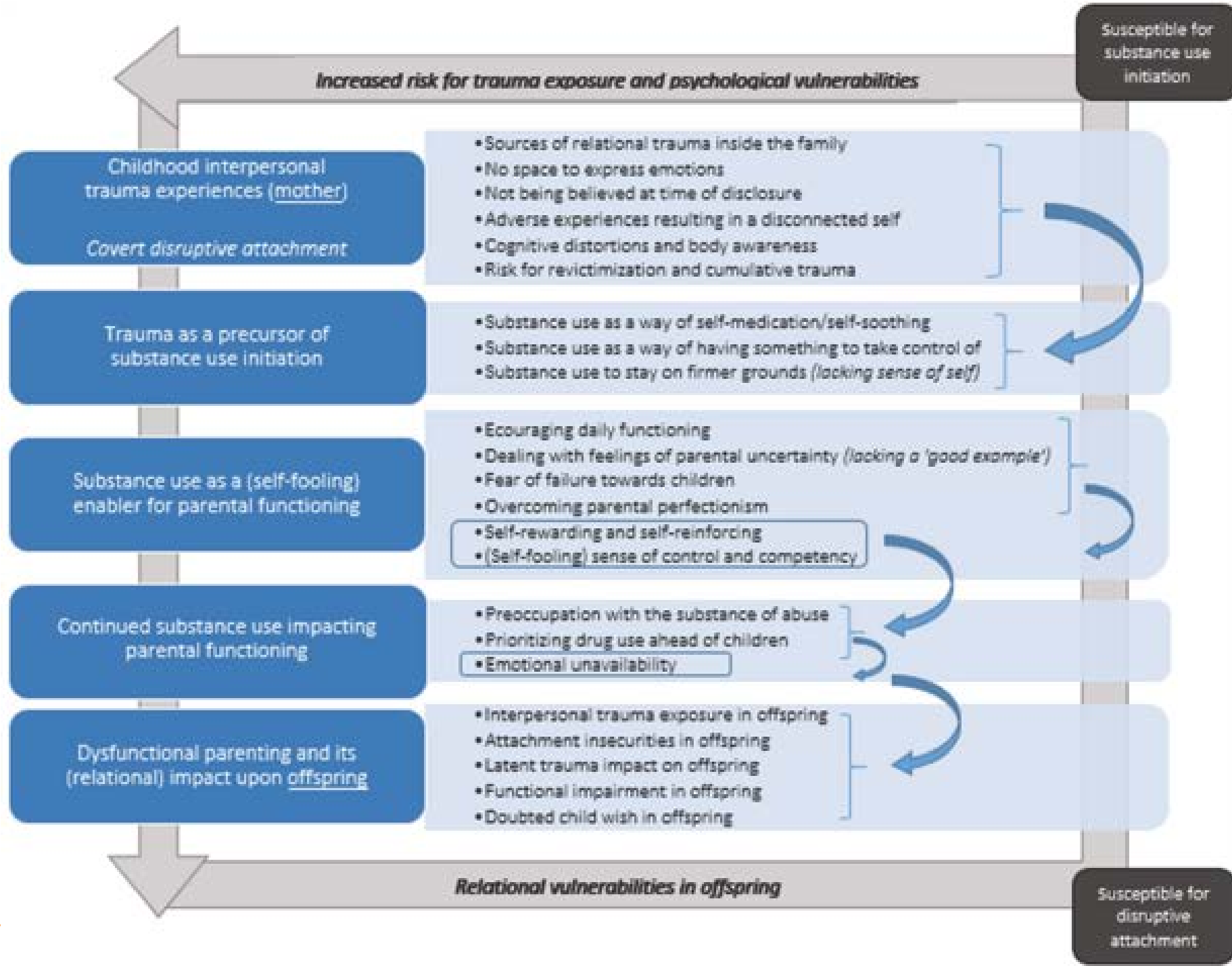
- Coordinated OT response following contact
- Coordinated cortisol response to stress

- Coordinated brain oscillations in alpha and gamma rhythms

Disrupted Attachment

- Strong evidence for importance of oxytocin pathways
- Increasing evidence for genetic and epigenetic differences that may affect capacity to cope with early life adversity
- Consequences include personality disorders, vulnerability to substance abuse, and addictions





Follow-up

- Care of neonate may focus on identification/ treatment of NAS
- Global aims should focus on mother/infant dyad
- Interventions should reinforce healthy parent-child attachment and interaction

Developmental risks

- Motor and cognitive impairments
- Inattention
- Hyperactivity
- ADHD

Medical follow-up

Almost a quarter of identified children of substance-using mothers are not accessing standard child health services in their first 2 years of life.

This study provides support for increased attention to the provision of child health services for children of methadone using mothers.

Further research into effective intervention strategies for children of illicit substance-using mothers is indicated.

Epigenetic consequences

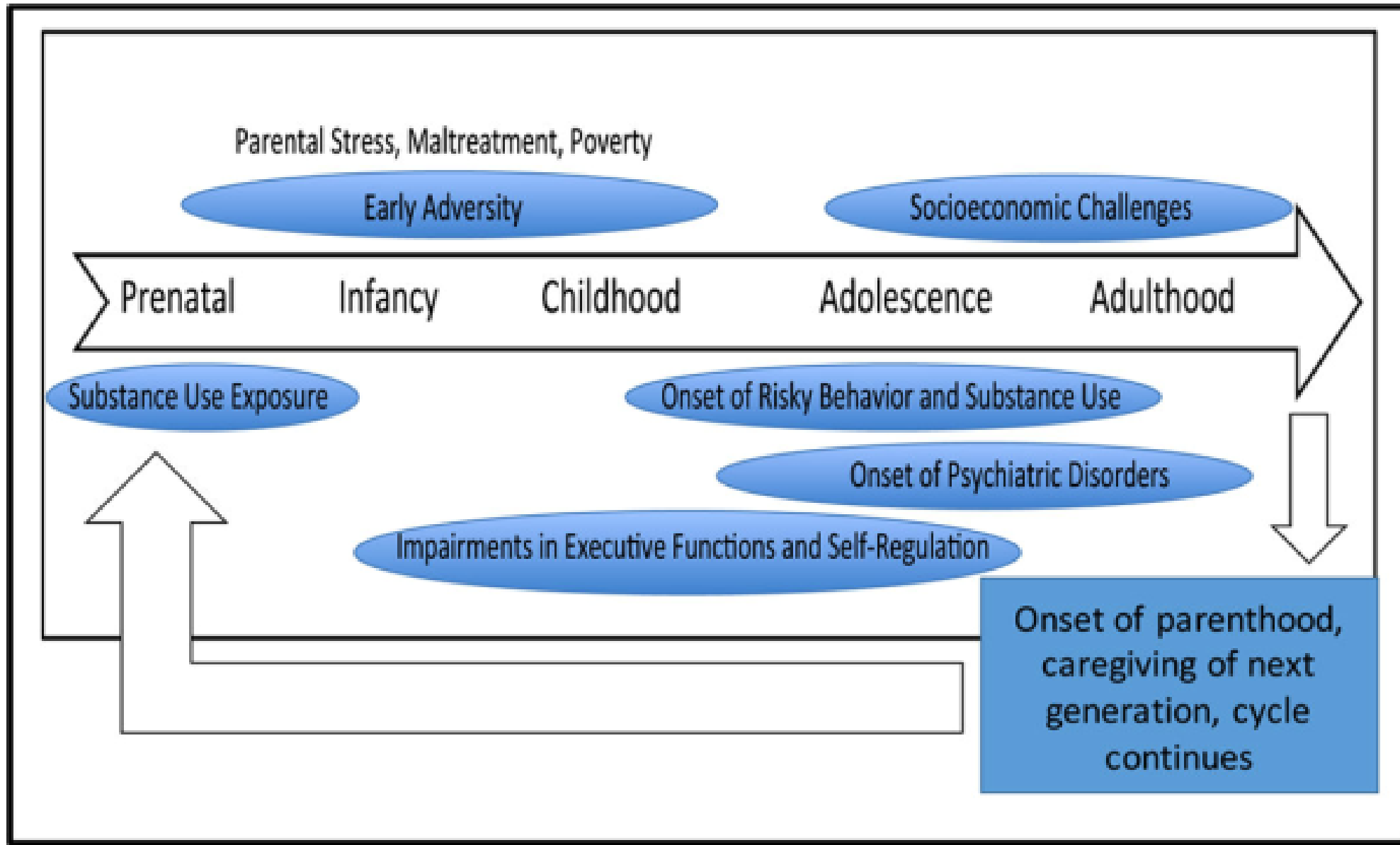
- Epigenetics: the study of heritable changes in gene expression without changes to DNA
- Genes can be turned on or off
- Longer-term effects

Investing in the Family

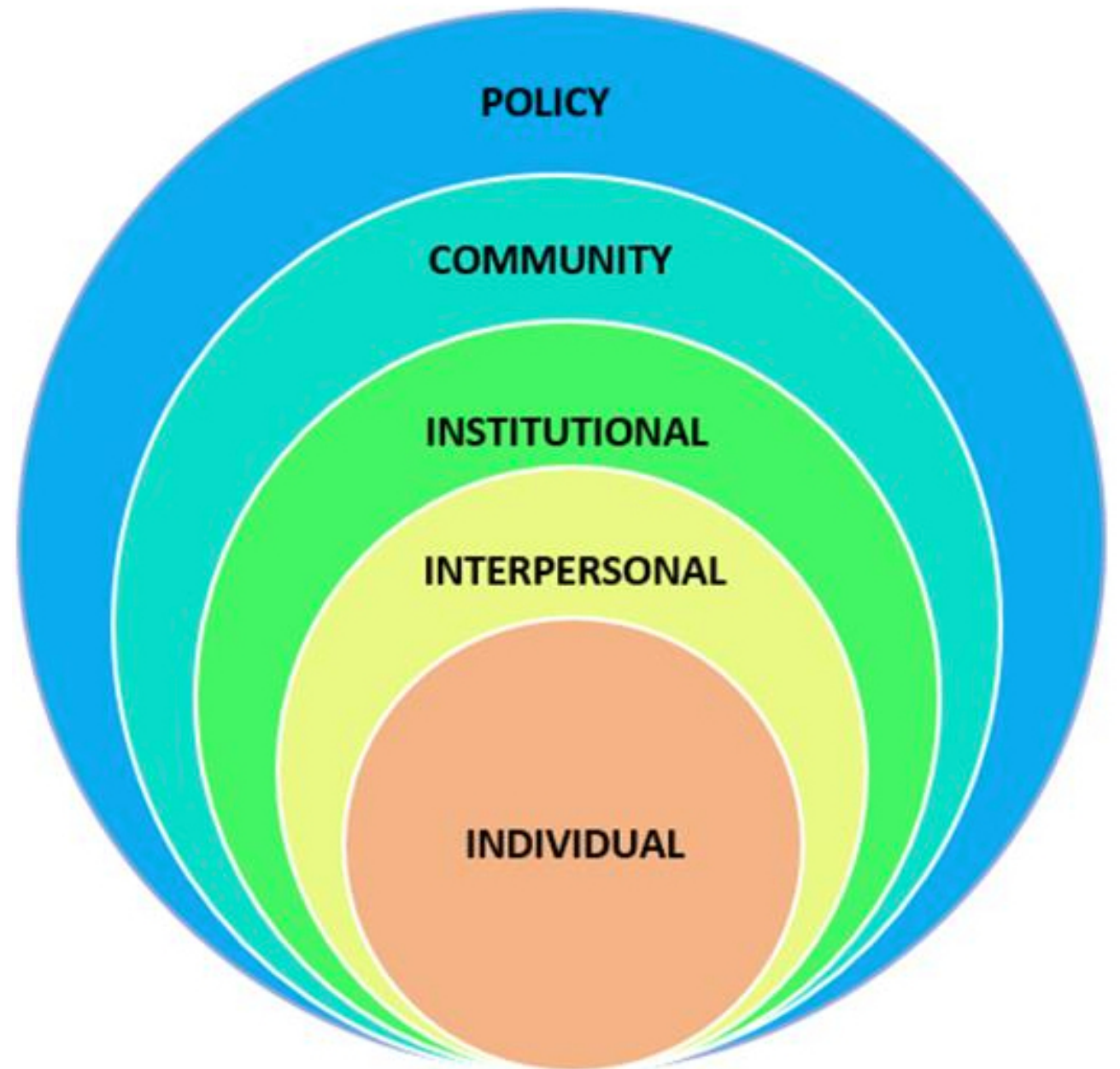


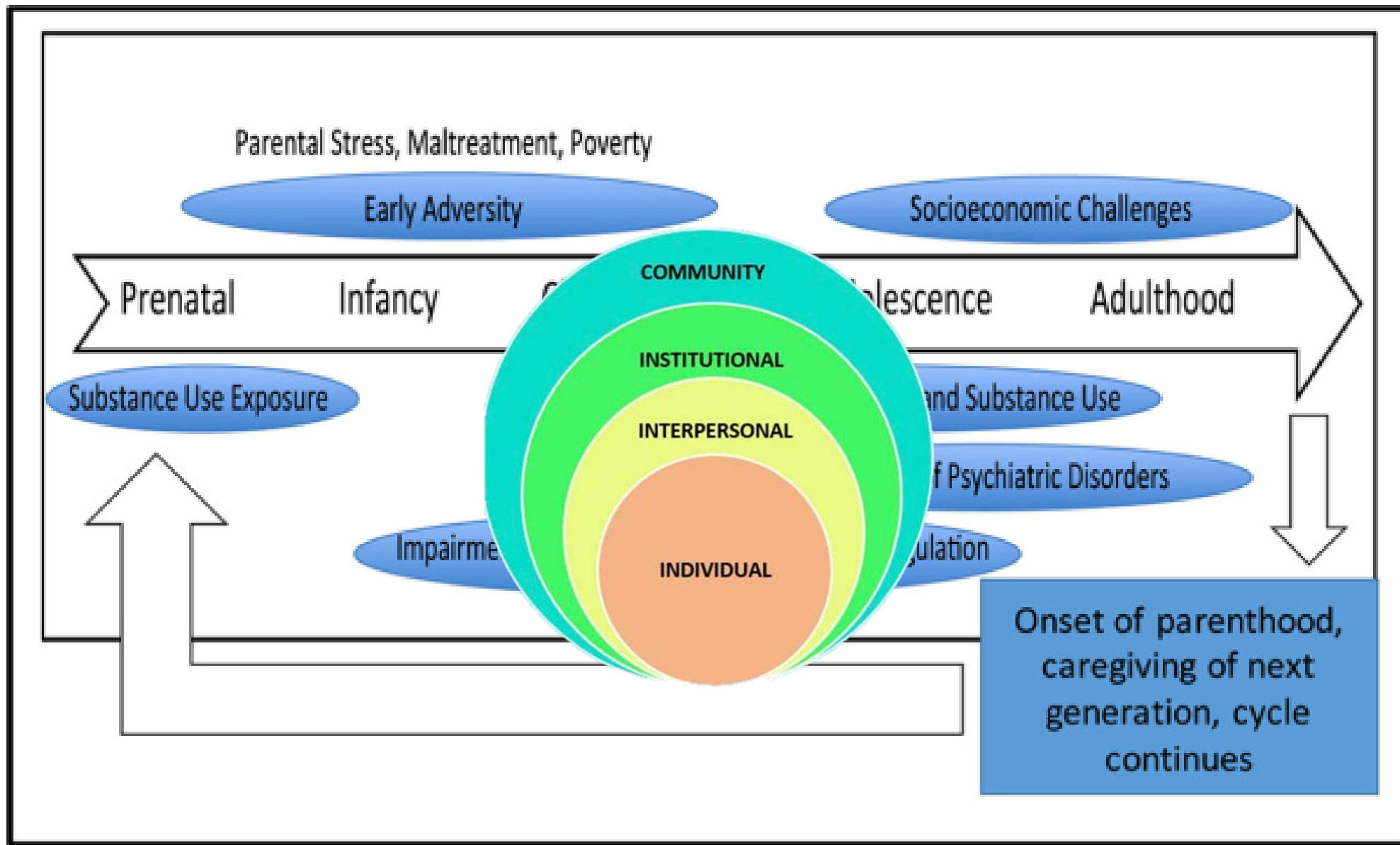
Public health systems approach

- Define the problem through systematic data collection
- Identify risk and protective factors
- Public/private sector collaboration
- Broad implementation of effective interventions and recovery support
- Monitor impact of interventions



Social-Ecological Model





Questions?

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