Conceptual framework
Extreme heat and maternal, newborn and child health

Heat hazards
- Increased intensity, duration and frequency of heat stress and heatwaves
- Seasonal timing of events
- Rise in average temperatures
- Future climate scenarios
- Solar radiation, humidity, wind

Vulnerability factors
- Compound hazards
- Biological factors
- Socio-political factors
- Geographical factors
- Socio-economic factors

Direct impacts through
- Dehydration
- Endocrine system dysfunction
- Vasodilatation
- Increased skin blood flow
- Heat strain
- Oxidative stress and release of stress hormones
- Release of heat shock proteins
- Elevation of core temperature
- Hyperventilation/hypotension
- Sleep disturbances

Critical windows of exposure

Indirect impacts through
Individual level
- Work conditions
- Self-care and family care practices
- Lactation and sub-optimal feeding practices
- Care-seeking
- Social interaction
- Food security
- Risk and patterns of transmission of food, water and vector-borne diseases

Family and community level
- Family stress
- Lack of local plans to prepare for extreme heat
- Food security
- Risk and patterns of transmission of food, water and vector-borne diseases
- Domestric violence/community violence
- Migration/immigration

Health worker and facility level
- Health worker performance
- Impaired cold chain and safe storage of drugs
- Effects on service delivery, quality of care and response times
- Power outages

Organized services
- Disruption to infrastructure (power, water, transport)
- School closures
- Loss of productivity
- Economic losses

Maternal health
- Gestational hypertension
- Pre-eclampsia
- Gestational diabetes

Fetal and perinatal health
- Stillbirths
- Congenital disorders

Newborn health
- Preterm birth
- Low birthweight
- Hospital admissions

Child Health and development
- Infant mortality
- Respiratory diseases, including asthma
- Wasting, stunting, being underweight, and weight loss
- Heat stroke, heat related illness
- Infections, including vector-borne diseases
- Gastrointestinal conditions, including diarrhoea
- Hospital admissions
- Lower educational attainment

World Health Organization
High Horizons
Additional information

Extreme heat and maternal, newborn and child health

Examples of vulnerability factors
- **Compound hazards**  
  (pollution, drought, wildfire, flash flood, and drought);
- **Biological factors**  
  (nutritional status, comorbidities, disabilities, etc...);
- **Geographical factors**  
  (urban/rural, greenspace, infrastructure, altitude, access to water, etc...);
- **Socio-political factors**  
  (complex emergencies, political stability, etc...);
- **Socio-economic factors**  
  (poverty, displacement, occupation, cultural practices and gender norms, education, security, equity and human rights).

Additional direct impacts

**Maternal and Fetal/Perinatal health**
- Dehydration
- Compromised placental development and function
- Elevation of core temperature
- Endocrine system dysfunction
- Vasodilation
- Increased skin blood flow
- Hyperventilation/hypotension
- Heat strain
- Oxidative stress and release of stress hormones
- Release of heat shock proteins
- Sleep disturbances
- Impaired cognition
- Lactation practices

**Newborn health**
- Elevation of core temperature
- Impaired heat exchanges
- Increased heat absorption rate (high ratio of surface area to mass)
- Dehydration
- Vasodilation
- Hypotension
- Hypertemtia
- Inefficient heat dissipation
- Oscillations in breathing patterns
- Impact on the autonomic nervous system
- Heat stress
- Sleep disturbances
- Dependency on others for cooling and hydration
- Lactation practices

**Child Health**
- Elevation of core temperature
- Impaired heat exchanges
- Increased heat absorption rate (high ratio of surface area to mass)
- Dehydration
- Vasodilation
- Hypotension
- Inefficient heat dissipation
- Small blood volume compared to body size
- Low sweating rate
- Activation of inflammatory response
- Heat stress
- Sleep disturbances
- Impaired cognition
- Dependency on others for cooling and hydration

Additional maternal health outcomes
- Antepartum and postpartum haemorrhage
- Mental health
- Infections, including vector-borne diseases
- Prenatal rupture of membranes
- Caesarean section
- Skin disorders
- Renal disease
- Maternal admissions
- Caesarean section rates

Additional newborn health outcomes
- Jaundice
- Infections, including vector-borne diseases
- INR alterations
- Sudden infant death syndrome (SIDS)

Additional child health outcomes
- Renal disease, including kidney stones
- Cardiovascular disease
- Unintentional injuries
- Allergy development
- Cardiovascular disease
- Violence against children

Sources