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Session 2

Identifying Measurable Variables and Specifying Their Relationships

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Illustrative Outcomes of Interest in Population-Based Studies

- **Demographic**
 - Fertility, Mortality, Migration, Marriage, etc.
- **Socio-economic**
 - Labor-force participation, school attainment, etc.
- **Health**
 - morbidity, nutrition, disability, etc.
- **Behavioral**
 - Contraception, smoking, violence, etc.

Identifying Variables and Their Relationships in Population-Based Studies

- I. Define the Outcome and Associated Variables**
- II. Specify Causal Relationships**
- III. Identify Measurable Variables in a Data Set**

Specification of Study Variables and Their Relationships Establishes

- **the population data to be studied**
- **the data required for the research**
- **the statistical analysis to be conducted**
- **the interpretation and generalizability of the results**

Chart 1

Association of Diarrhea and Bottlefeeding

	Diarrhea Cases	
Bottle Feeding	100	50%
Breastfeeding	100	50%
	200	<u>100%</u>

Chart 2

	Diarrheal Cases	No Diarrhea
Bottle feeding	100	40
Breastfeeding	100	160
	200	200

Relative Risk of Diarrhea with Bottlefeeding:

$$= \frac{100}{40} \div \frac{100}{160} = 4.00$$

Determinants of Diarrhea

- **Environmental Contamination**
 - Water sources, quality
 - Latrine facility
 - Food Storage/refrigeration
 - Use of soap, handwashing
 - Household crowding (other children)
 - Housing construction
 - Use of baby bottles
- **Personal Illness Control**
 - Measles immunization
- **Dietary Intake**
 - Breastfeeding, weaning practice

Chart 3

Association of Diarrhea with Bottlefeeding and with Toilet Facilities Among a Clinic Population

	Number	Diarrhea Number	Cases %
All children	500	100	20.0
Bottlefeeding	100	50	50.0
Breastfeeding	400	50	12.5
Other toilet	250	70	28.0
Indoor toilet	250	30	12.0

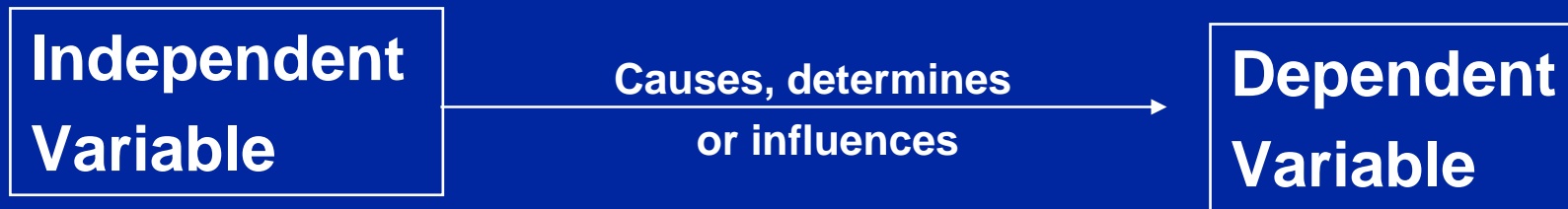
Chart 4

Association of Diarrhea with Bottlefeeding Among Families With and Without Indoor Toilets

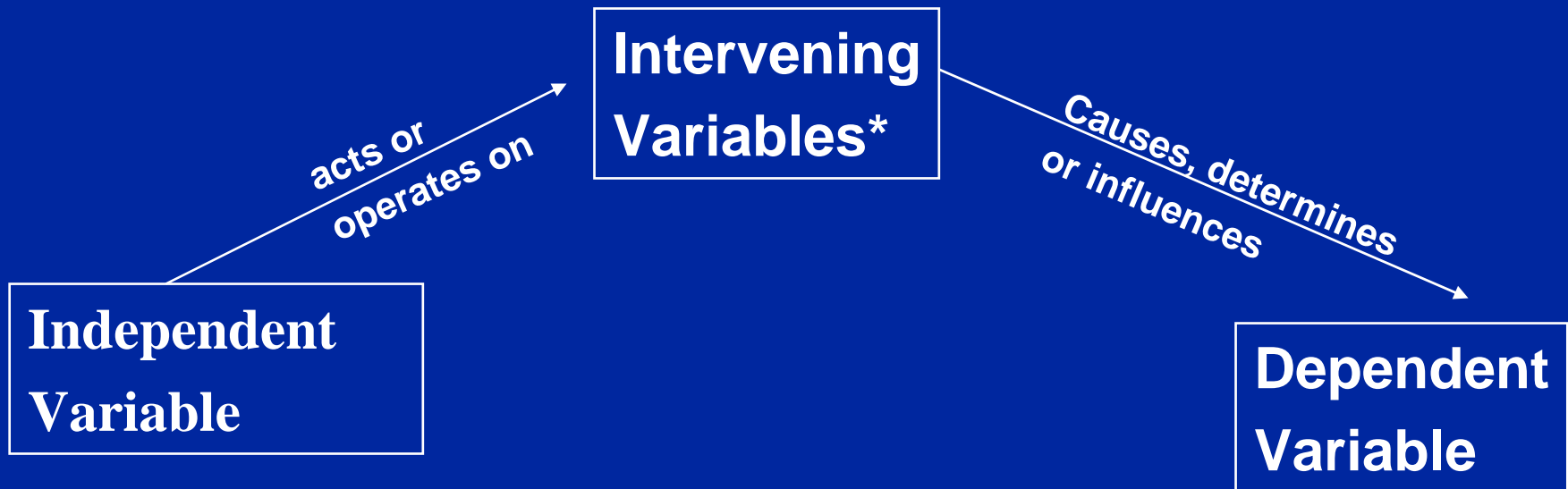
		Number	Diarrhea Number	Cases %
Other toilet	Bottle feeding	50	40	80.0
	Breast feeding	200	30	15.0
Indoor toilet	Bottle feeding	50	10	20.0
	Breast feeding	200	20	10.0
		500	100	20.0

Specifying Causal Relationships

1. A Direct Relationship

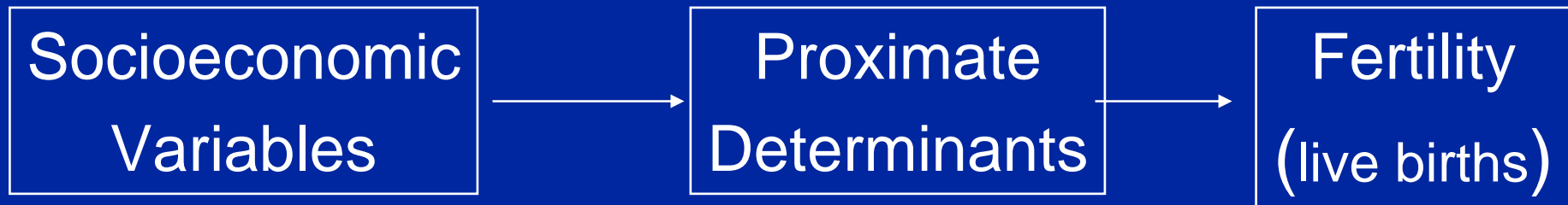


2. An Indirect Relationship



*Also: Intermediate/Proximate variables

Proximate Determinants of Fertility



Proximate Determinants of Fertility (Kingsley Davis and Judith Blake)

- **Factors Affecting Exposure to Intercourse**
 - Age of marriage (sexual union)
 - Permanent celibacy
 - Divorce/separation/death of husband
 - Voluntary abstinence
 - Involuntary abstinence (illness, etc.)
 - Coital frequency

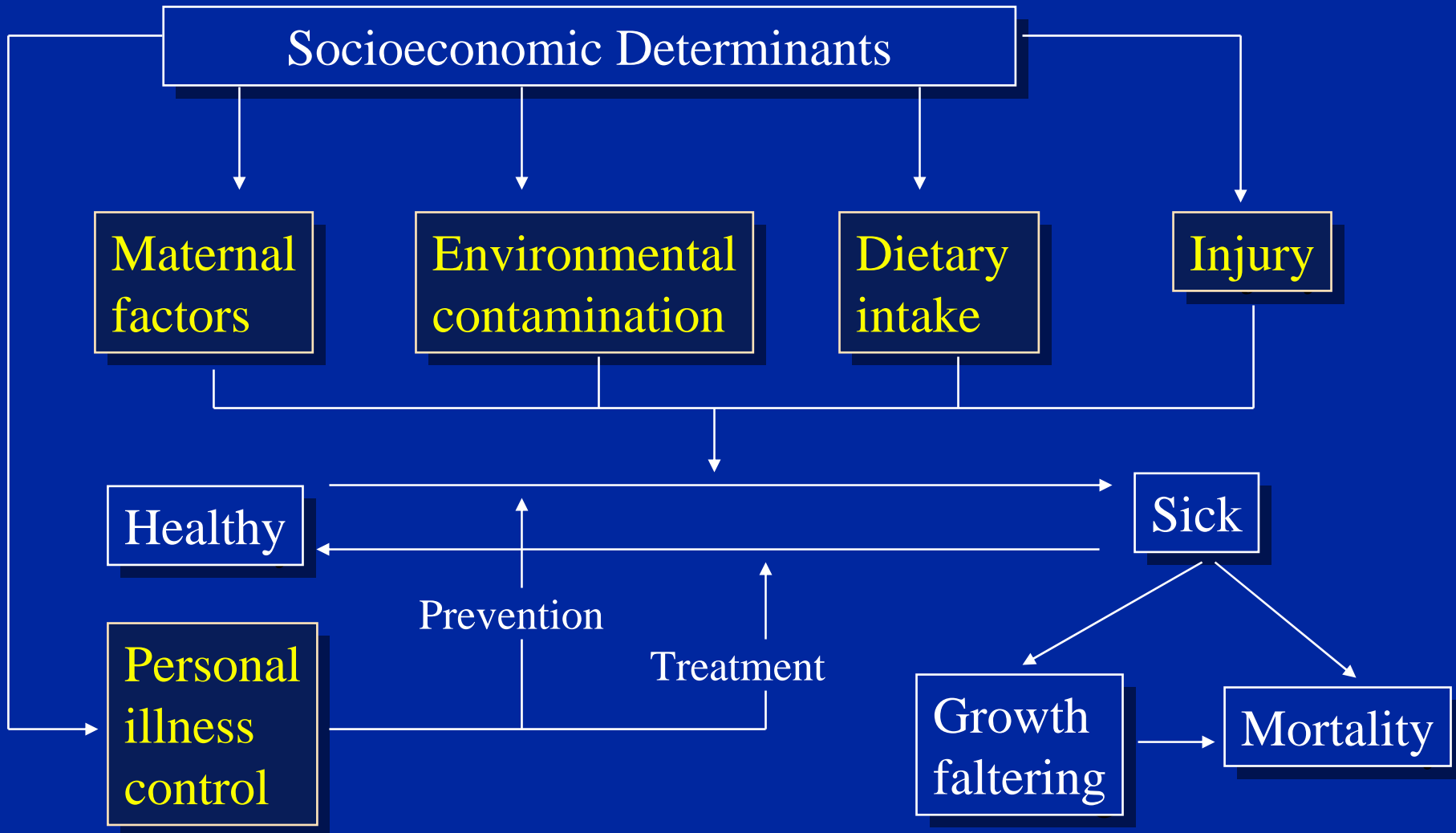
Proximate Determinants of Fertility

(Kingsley Davis and Judith Blake)

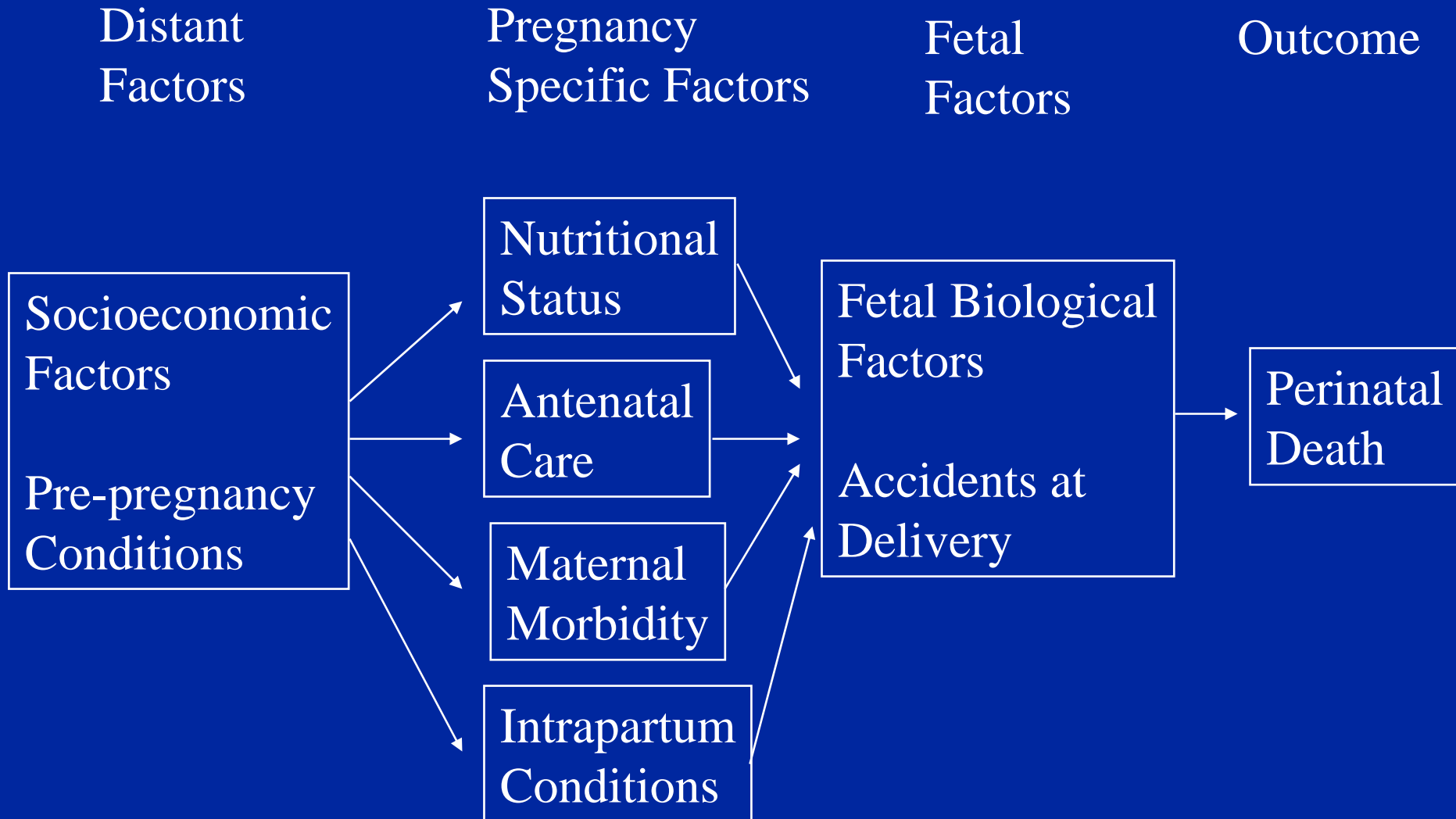
Continued....

- **Factors Affecting Exposure to Conception**
 - Fecundity affected by disease, etc.
 - Contraception
 - Voluntary infecundity (sterilization)
- **Factors Affecting Gestation/Successful Parturition**
 - Involuntary fetal mortality
 - Voluntary fetal mortality (abortion)

Proximate Determinants of Child Survival



Conceptual Framework for the Analysis of Perinatal Mortality



Conceptual Framework for the Analysis of Perinatal Mortality

Distant Determinants

Socio-Demographic Variables

- Urban/Rural Residence
- Region
- Ethnicity
- Religion
- Women's Education
- Husband's Education
- Gainful employment
- Husband's Occupation
- Durable Goods/Housing Characteristics

Pre-pregnancy Conditions

- Age at Event
- Parity/Gravity
- Maternal Nutritional Status
- Past Obstetric History
- Inter-pregnancy Interval
- Preference/Intention

Items for Summative Scale for Socioeconomic Status

- Car
- Bicycle/motorcycle
- Electricity
- Refrigerator
- Gas/electric stove
- Television
- Cement/wood floor
- Toilet
- Indoor Water

Conceptual Framework for the Analysis of Perinatal Mortality

Pregnancy Specific Determinants

Antenatal Factors

- Trimester of 1st visit
- Number of visits
- Tetanus injection
- Bleeding during 2nd/3rd trimester

Intranatal Factors

- Rupture of membranes prior to labor
- Delivery assisted by trained person
- Place of delivery
- Reported symptoms of prolonged labor, hemorrhage, sepsis, eclampsia

Diagnostic Algorithms for Obstetric Complications

Complications

Definition

- Eclampsia
Convulsions (not from fever) reported during pregnancy or during labor/delivery and no convulsions experienced outside of pregnancy
- Sepsis
Report of sickness during labor and or delivery with a very high fever
- Intrapartum Hemorrhage
Report of losing a lot of blood around time of labor or delivery or attendant recognized bleeding as severe problem or report of manual evacuation of placenta
- Prolonged labor
Report of heavy labor lasting longer than 12 hours

Diagnostic Algorithm for Measles

- Child *5 months or more old*
- Child had *fever*
- *Blotchy rash lasting 3 or more days*
- *Peeling or darkening of the skin among children who survived 5 or more days*
- Cough, running nose or red eyes
- Other cases of measles
- Above conditions occurred 1-3 months prior to death

Note: First four signs required for measles diagnosis

Pregnancy Specific Determinants

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Items for Summative Scale for Antenatal Care Based on WHO Essential Care Package

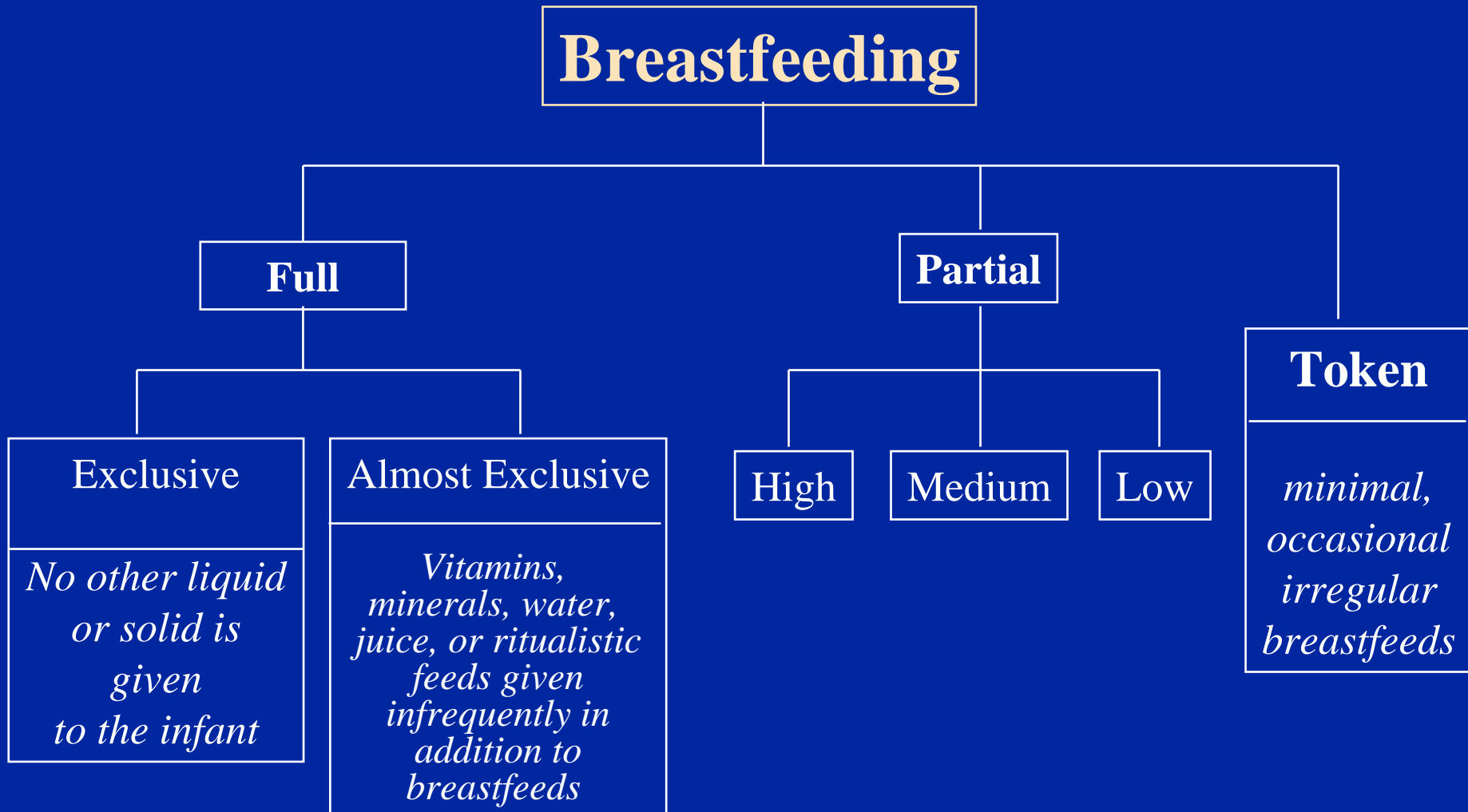
Included in the Questionnaire

- Checked baby's position
- Tetanus immunization
- Abdomen measured
- Urine test
- Blood test
- Weight
- Height
- Blood pressure
- Referred to hospital
- Internal examination
- Iron tablets
- Danger signs of pregnancy
- Family planning
- Postpartum care
- Breastfeeding

Not Included in the Questionnaire

Pap smear
Culture for Gonorrhoea
Hemoglobin measured
Obstetrical history taken

Schema for Breastfeeding Definition



Identifying Measurable Variables in Data Sets

- **Directly Measurable Variables**
- **Construction of Scales**
- **Use of Diagnostic Algorithms**
- **Use of Reference/Standard Definitions**
- **Use of Proxy Variables**