



Health Management Information Systems

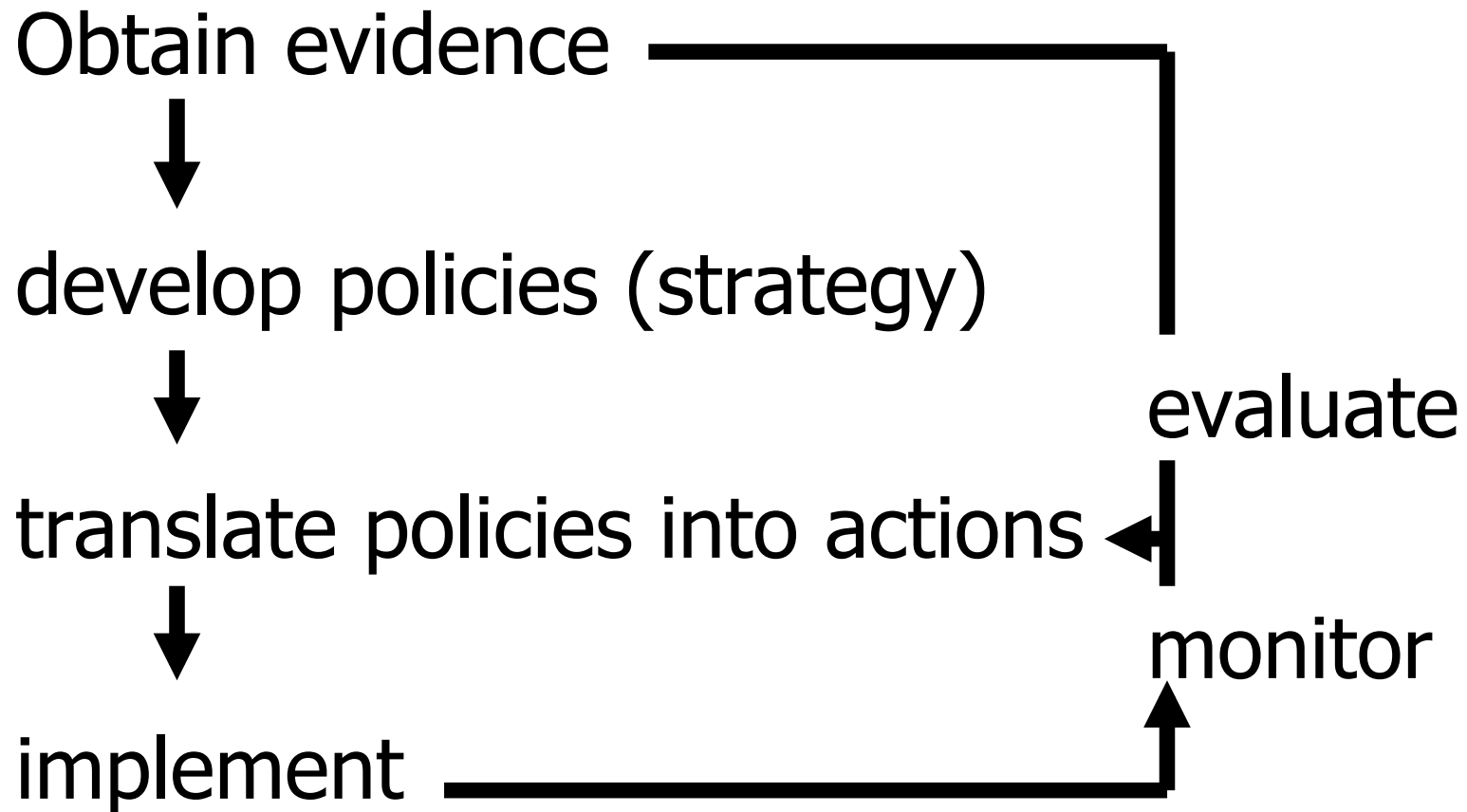
Jaap Koot, MD MBA



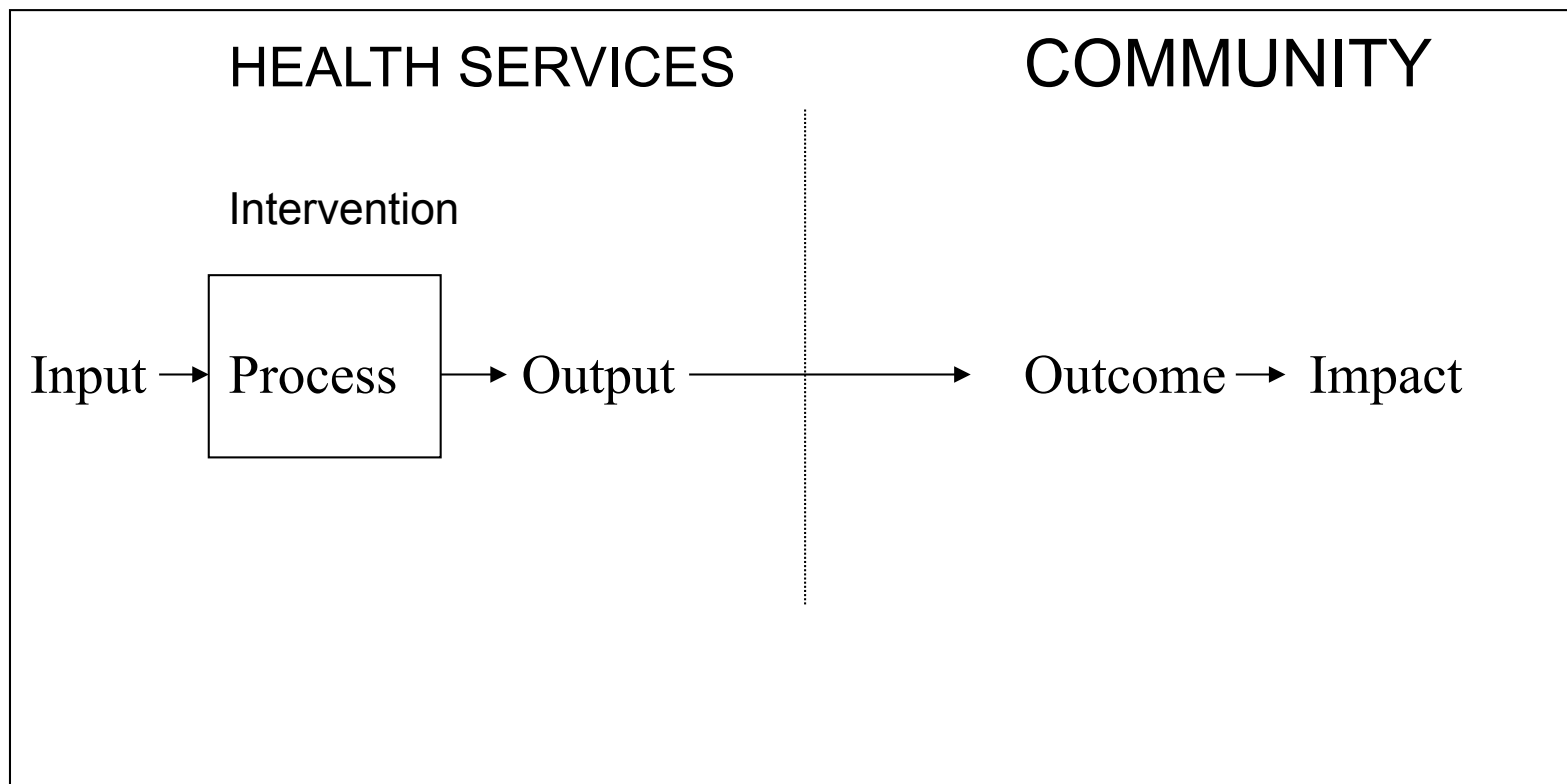
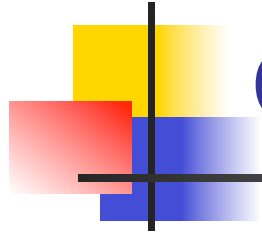
Topics

- Setting the scene: the purpose of information systems
- From data to information
- From information to evidence
- Decision making processes

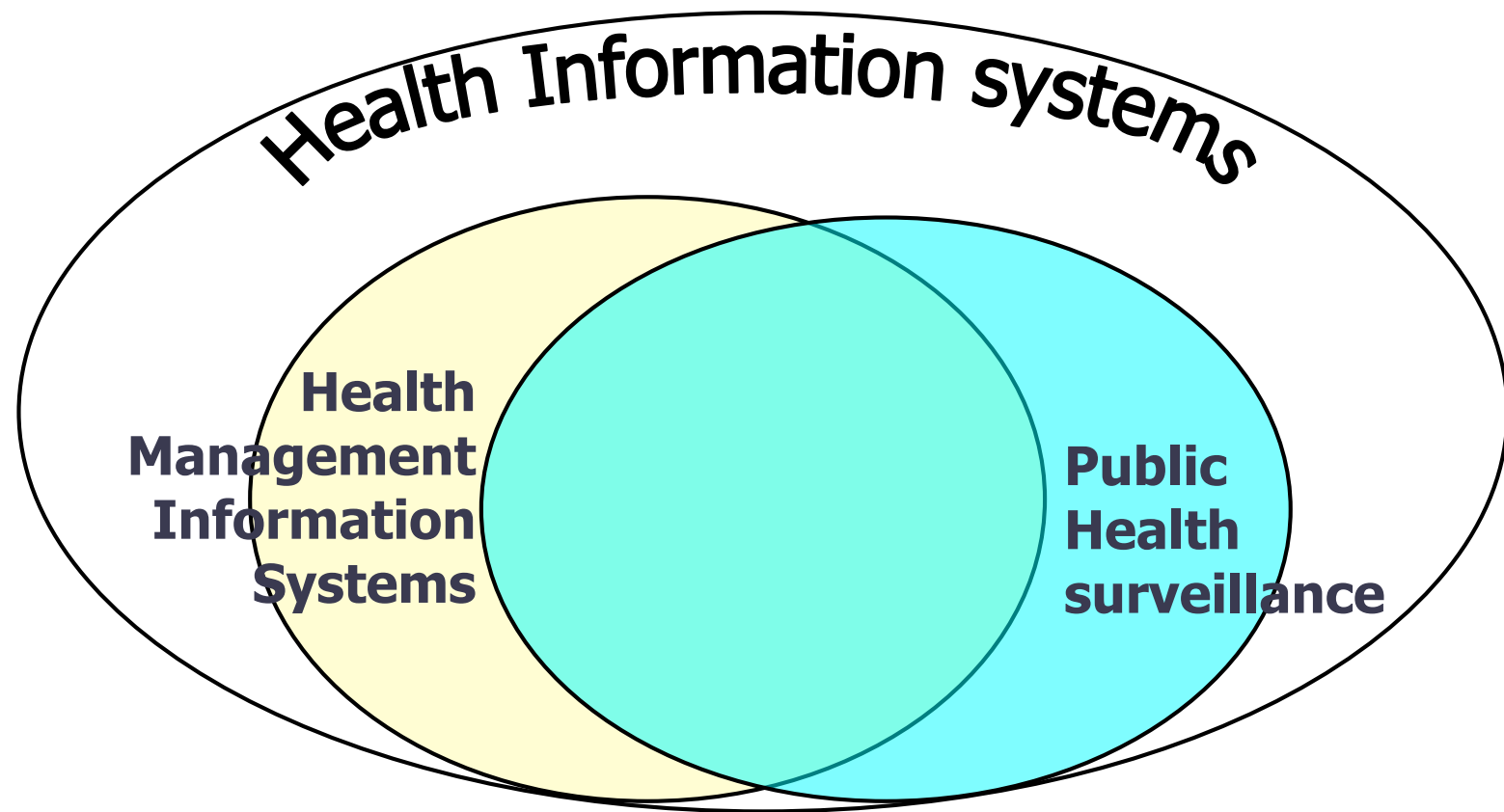
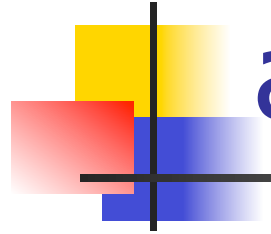
Elements of evidence based health care



Evidence in the institution or in the street?

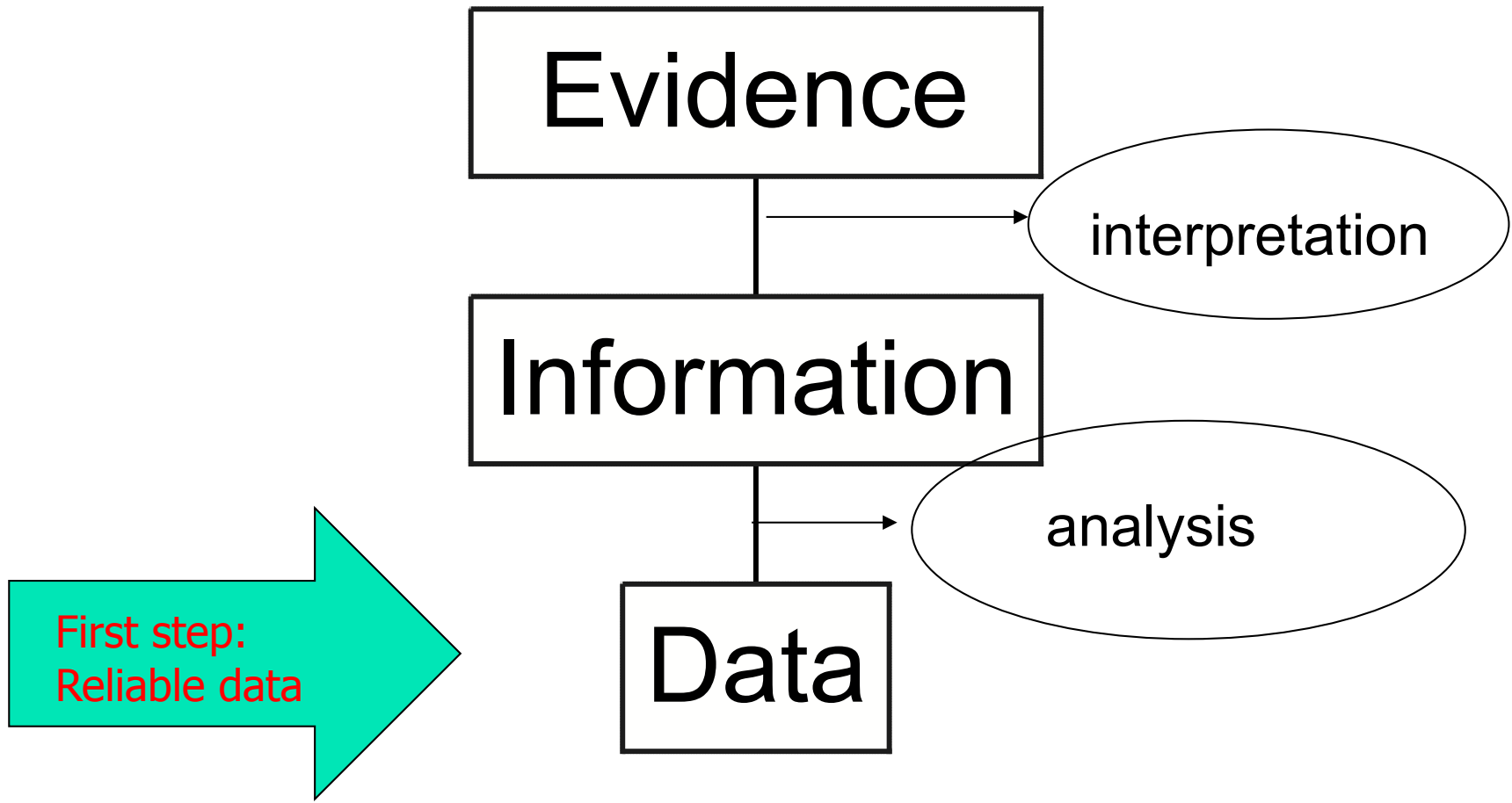


HMIS is only a part of the available options





Flow from data to evidence





Data Sources

- Community
 - Demography
 - Geography
 - Vital statistics
 - Health status
 - Diseases
- Other sectors (e.g. Education, Agriculture)
 - community based
 - institution based
- Health Institutions (incl. CBHC)
 - Diagnoses
 - Service provision
 - Managerial information (human resources, supplies, finances)



Data Collection Systems and Tools

- Routine systems

- community- based (CBHIS)
- institution-based (HMIS)

- Special activities

- survey: point or period in time
- trial, case-control study
- cohort studies (longitudinal)
- sentinel surveillance

- Tools

- Registers
- Tally sheets
- Log books
- Questionnaires
- Check lists



Data quality

- Garbage in = garbage out
- Data quality problematic in many information systems



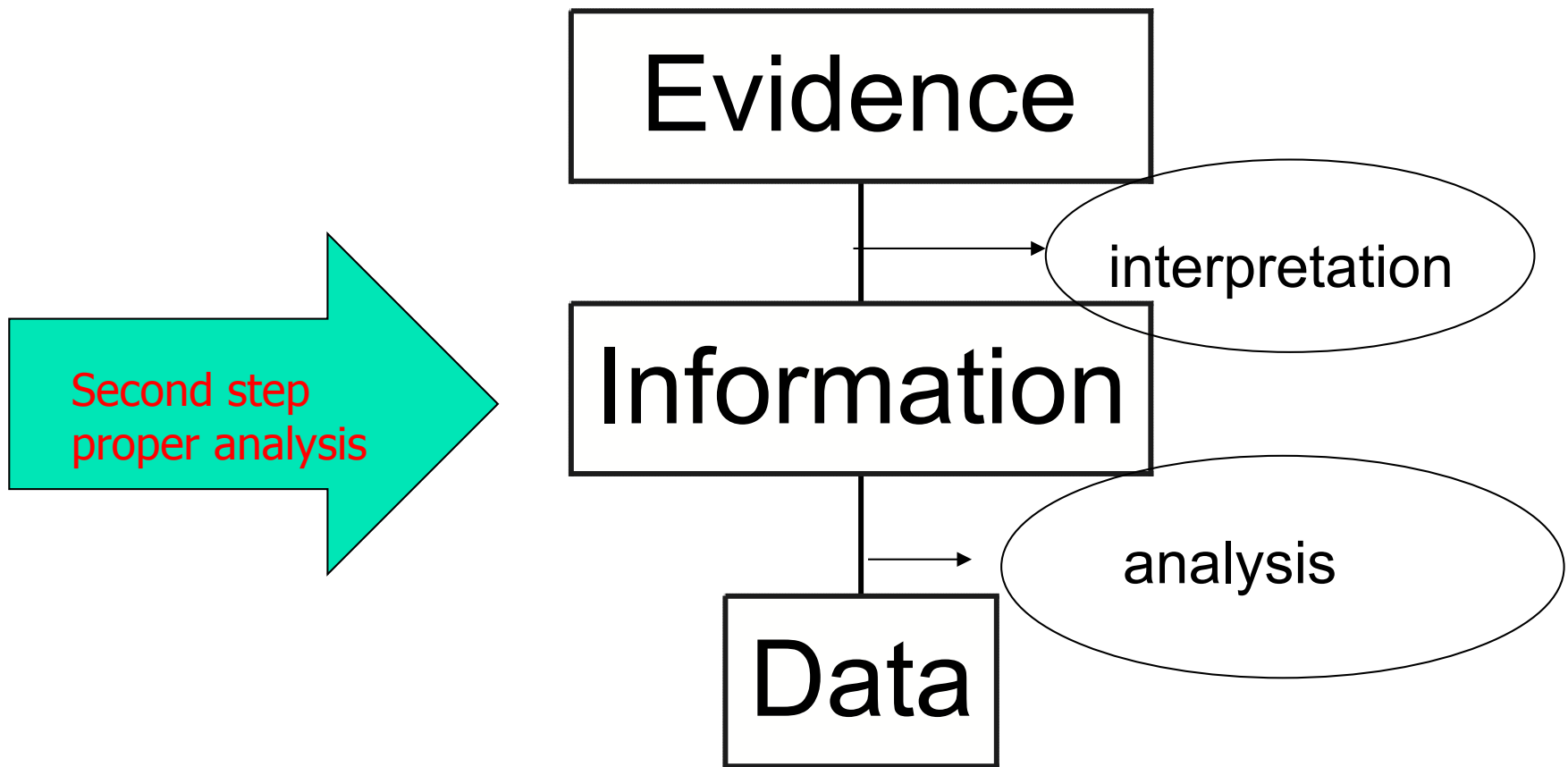
Data Quality Formula

$$P = \frac{M \times C}{B}$$

P= performance M= motivation
C= capacity B= barriers



Flow from data to evidence





Information

- Data become information through processing and analysing
- Analysis means linking data sets
 - time (trend)
 - group (coverage)
 - person
- From absolute data to relative data



Well-known analyses

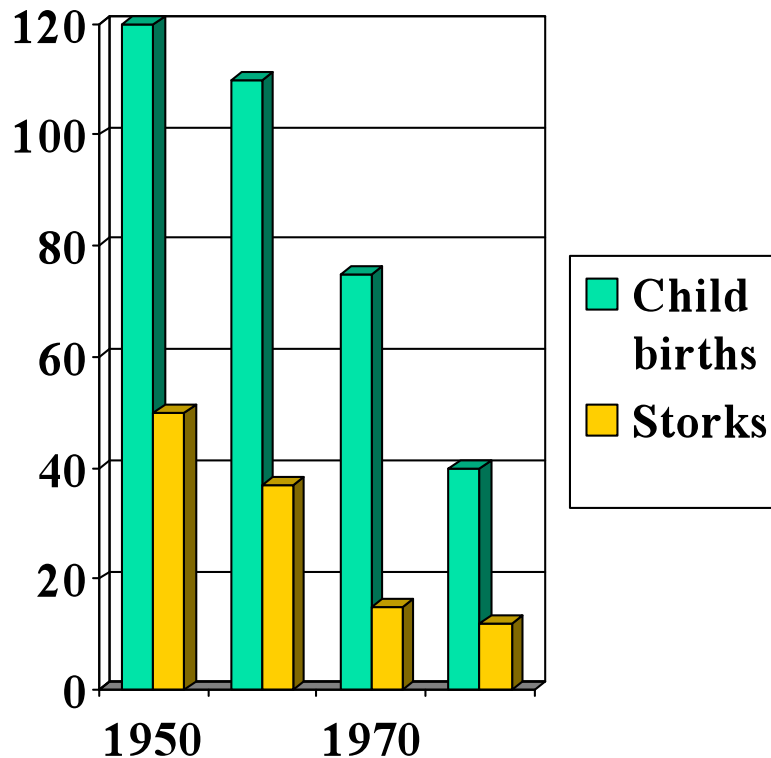
- Utilisation Rate
- Incidence Rate
- Prevalence Rate
- Case Fatality Rate
- Maternal Mortality Ratio



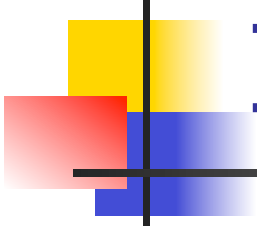
The Key Questions in Analysis

- **What** are the problems?
- **Who** is affected?
- **How many** are affected?
- **When** did it take place?
- **Where** did it occur?
- **Why** did it happen?
- How can we **manage** it?
- Which **approaches** are best in solving the problems?

Linking data without meaning



- The traditional belief in Holland is that babies are brought by storks.
- The graph shows clearly the relation between the decreasing number of child births and the decreasing number of storks in Holland



Indicators = Comparison

- Numerator/denominator
 - denominator is the standard
- Static: actual situation
 - baseline
- Dynamic: results of actions
 - achievement of plans in relation to targets



Types of Indicators

- Sentinel
 - single event, e.g. outbreak
- Tracer
 - performance in relation to standard
- Proxy
 - indirect measure when the “ideal” indicator is not feasible



SMART Indicators

Specific: Reflect actions taken

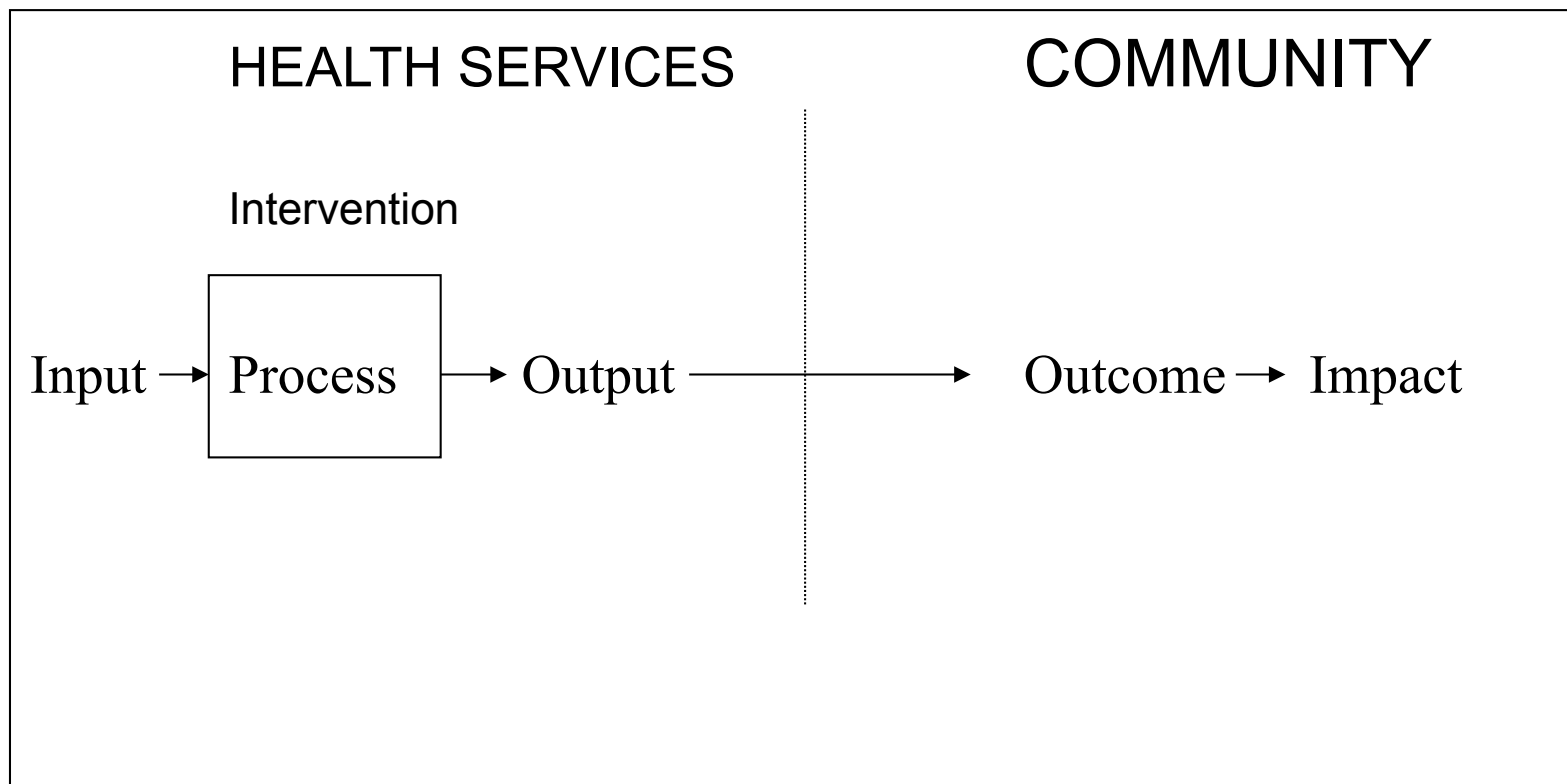
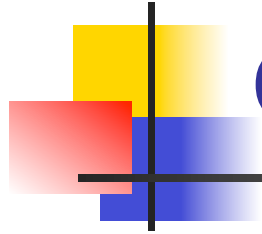
Measurable: Easily quantified

Attainable: Target can be reached with available resources within available time

Relevant: Fit local needs, capacities

Time bound: Target to be achieved by a certain time

Evidence in the institution or in the street?





input - process - output - outcome indicators

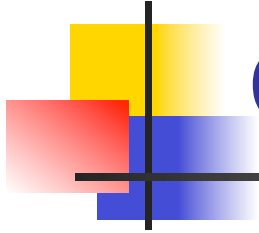
- Inputs: available personnel, facilities, drugs
 - easy to measure, but may not produce improved health status
- Outputs: curative & preventive service delivery= production figures
 - harder to measure than inputs, but come closer to what is “really” happening
- Outcomes: changes in group of beneficiaries as result of intervention
 - most difficult & expensive to measure

Steps in Selecting an Indicator

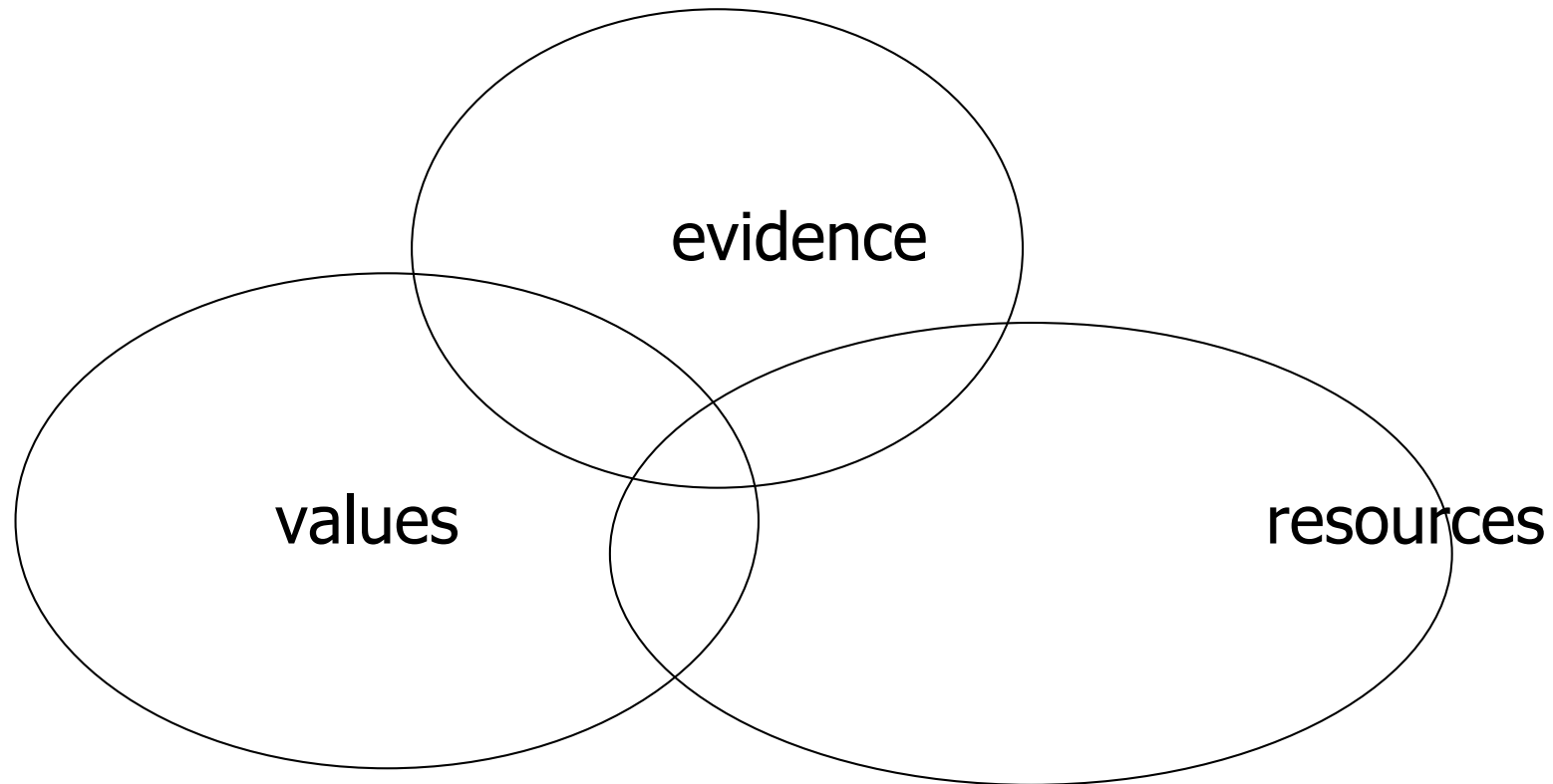


1. Define area of interest
2. Define what you want to measure
input/process/output/outcome/impact
2. Name the indicator
3. Define formula to calculate the indicator
describe numerator and denominator
4. Produce standards for indicator if applicable
targets to be achieved
5. Indicate responsible party

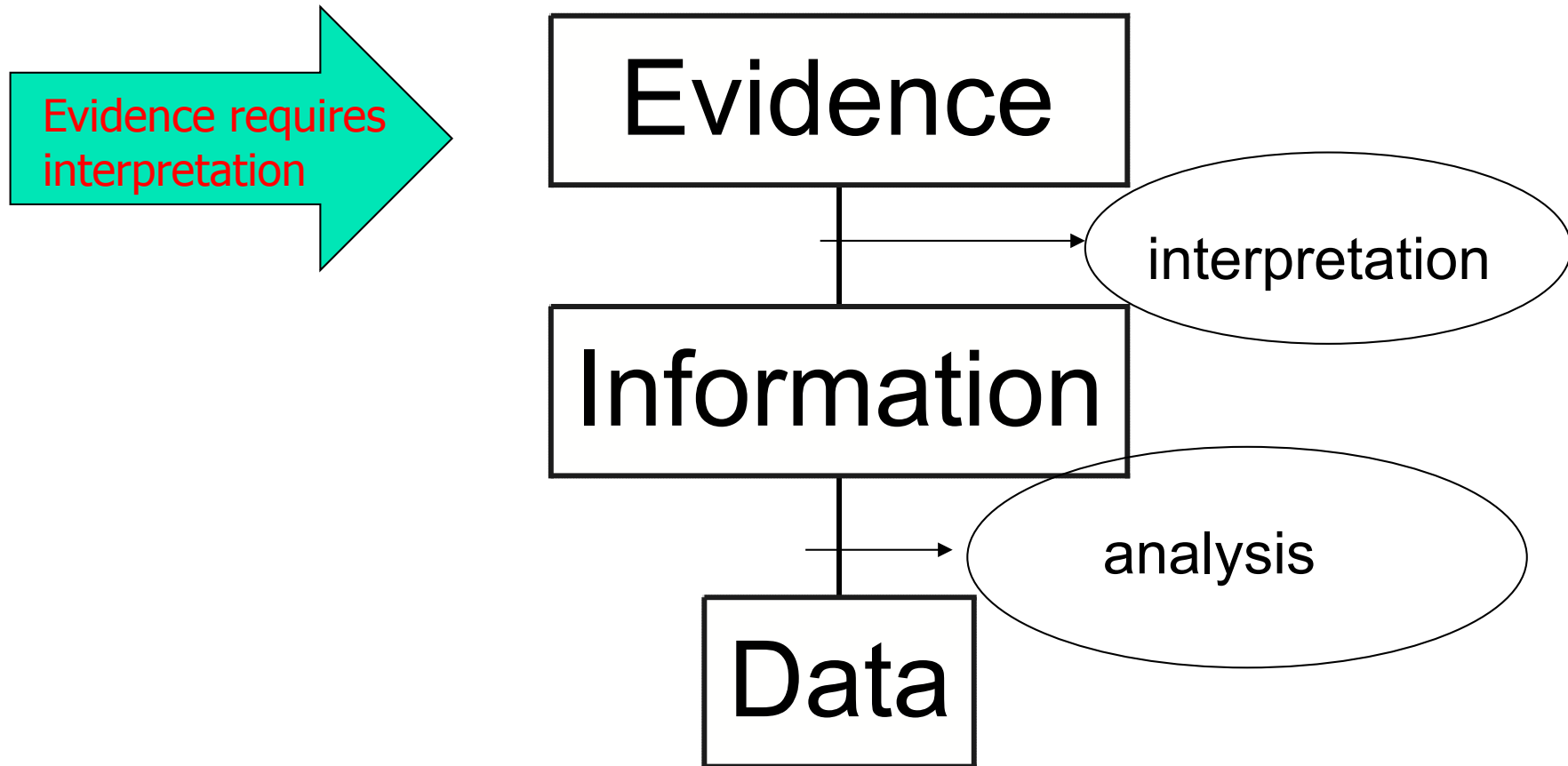
Limitations of evidence in decision making



Factors influencing decision making



Flow from data to evidence





Information becomes evidence

- Information is interpreted
 - relevance is assessed
 - coherence is assessed
 - Consistency is assessed
- Information is put into a context
 - population, geography, time
- Information is systematically used
 - cycles in the management system



Example: AIDS

- End 1970s-early 1980s:
 - increasing numbers of case reports of “strange” diseases: Kaposi sarcoma, Psittacosis, Diarrhoea
 - epidemiological patterns found
 - microbiology: immuno-deficiency
- Mid 1980s:
 - clinical criteria for diagnosis
 - Human Immuno-virus identified
- 1990s
 - retro-viral drugs introduced



Evidence in all phases of the Management Cycle

- **Planning**

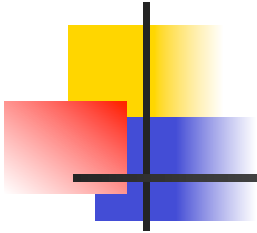
- What are the health problems?
- Who is having the health problems?

- **Monitoring**

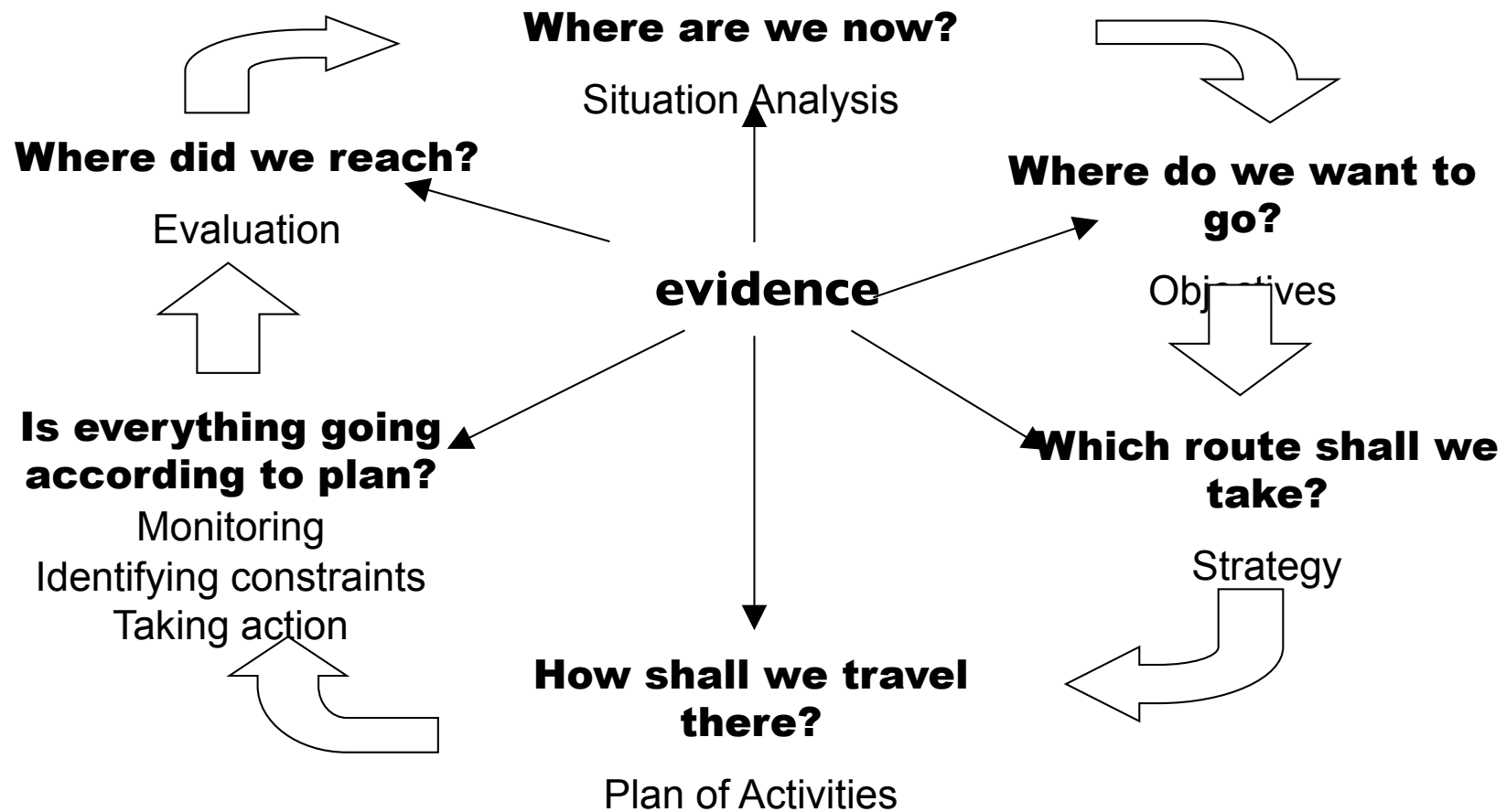
- Are we doing a good job (process)?
- Are we producing as planned (output)?

- **Evaluation**

- Have the beneficiaries got what we wanted to give them (outcome and impact)?



Management Cycle





Improvement of HMIS

- Decentralisation:
 - Who collects data, analyses data
- Action orientation:
 - Reduce system to those items relevant for action, other information in non-routine systems
- Feed back loops:
 - Performance based financing systems
- Timing:
 - Frequency of data collection geared towards need
 - Quick processing of data (use ICT)