



science and policy
for a healthy future

HBM4EU project

Quality Assurance in the preanalytical phase

Holger M. Koch

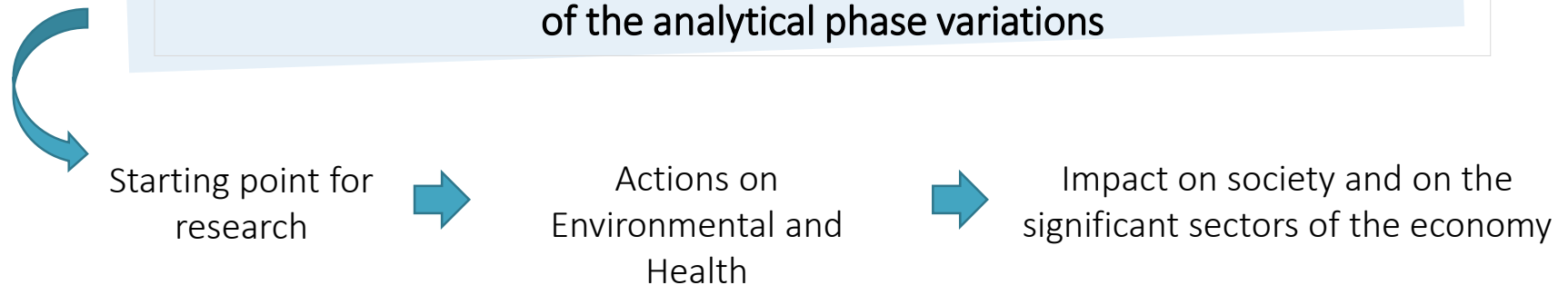
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2nd HBM4EU Training School 2018

Environmental exposure

- Daily
- Low concentrations
- Mixtures
- Multiple sources of exposure fuentes de exposure
- Different routes of exposure
- Individual susceptibility
- Physiological and health conditions

Ensure that the observed differences/associations are not a consequence of the analytical phase variations



Metrology and Quality Assurance

One analysis done here, valid
throughout the world

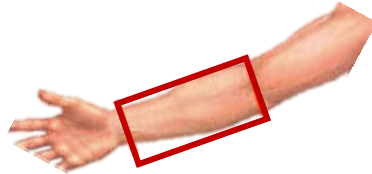


Basic principles of metrology



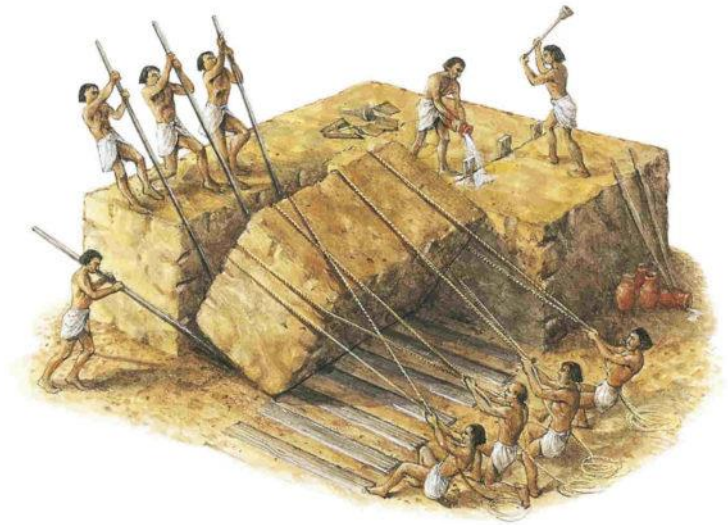
Unit of length

Ulna = Length of the Pharaoh's forearm



Primary standard:

Granite block



Basic principles of metrology

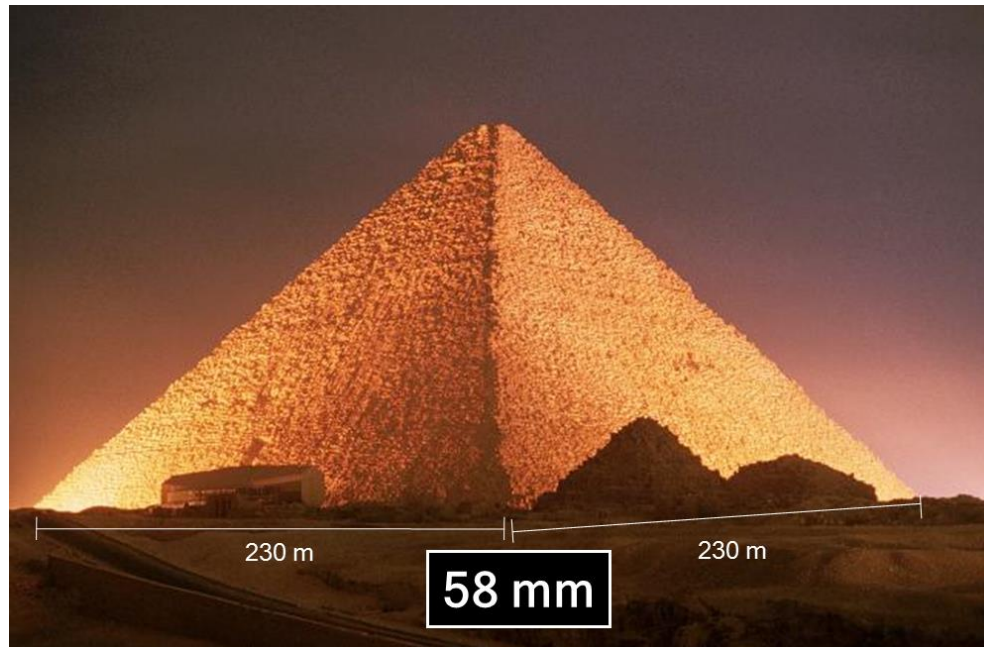
Secondary standard:

Wooden rods



Basic principles of metrology

The Great Pyramid of Cheops



...in human biomonitoring

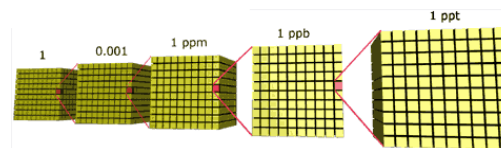


Even more difficult!

Metrology & QA in Human Biomonitoring



Biological
matrices



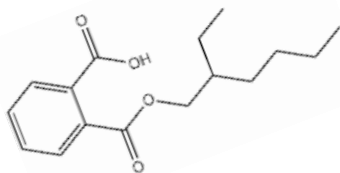
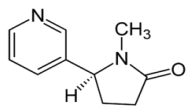
Low
concentrations



Sometimes no reference
material available

HUMAN BIOMONITORING

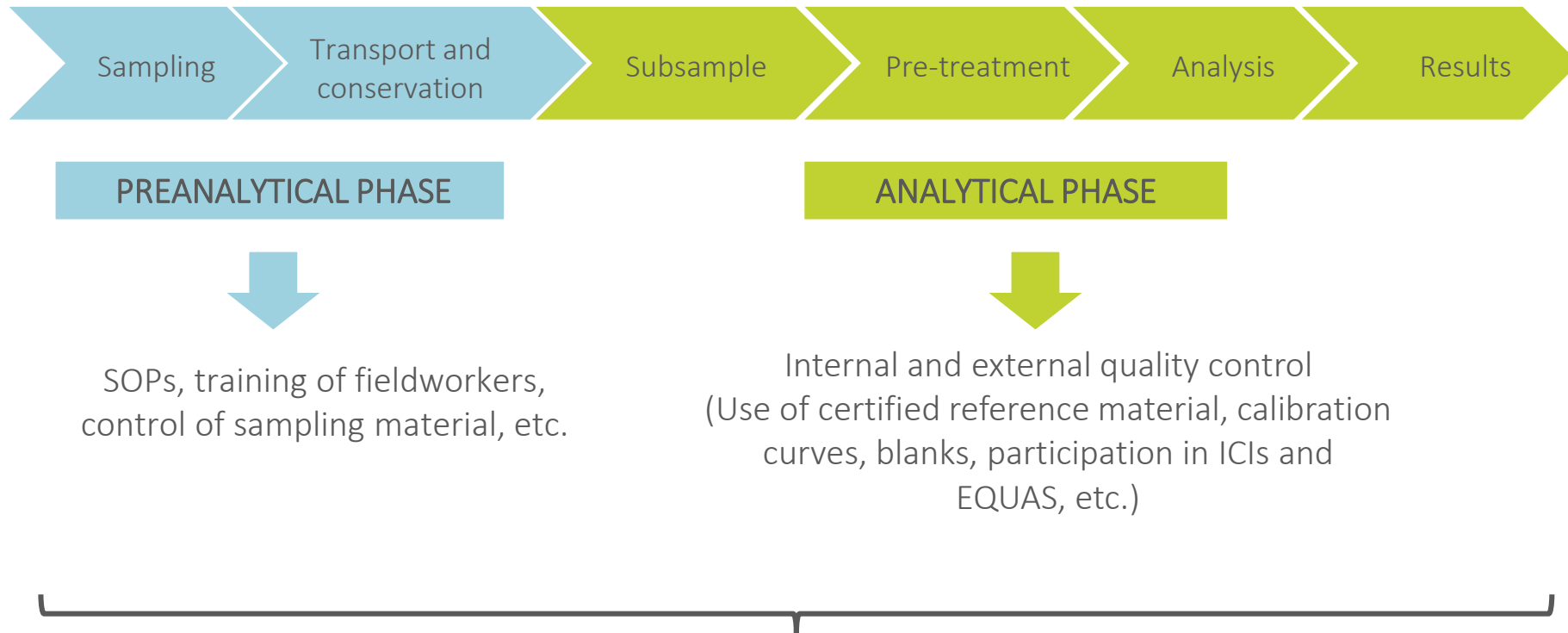
Parent
compounds or
metabolites...?



Ubiquitous
compounds



Importance of the preanalytical phase



Reliable and comparable results

Preamalytical phase

The pre-analytical phase comprises all actions and aspects that occur prior to the analytical phase:

- Sample collection
- Handling
- Transport and conservation
- Aliquoting
- Storage until the analysis

Influencing & interfering factors

Influencing factors

- Specific for each biomarker
- Present before the sampling
- *Examples: biological half-life of a chemical, alcohol consumption, medication intake or individual habits such as diet, etc.*

Actions: they must be identified and a sampling strategy that takes them into account designed and finally considered during the results interpretation

Interfering factors

- They can modify the concentration of the biomarker after sampling
- External contamination, physical or chemical changes in the biomarker during transport or storage, or changes in the biological matrix
- *Examples: exogenous contamination at the sampling location, contamination from the sampling equipment or vessels or alterations due to absorption of the components to be analyzed onto the walls of the vessel employed, coagulation or sedimentation)*

Actions: identify and avoid possible sources of contamination

QA/QC in preanalytical phase

Standard Operating Procedures

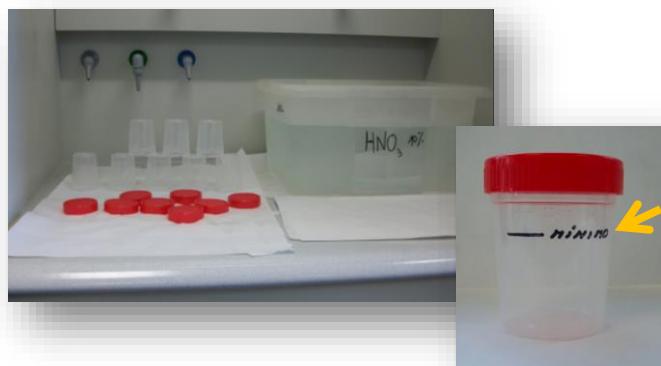
- Clear, concise, comprehensive and detailed step-by-step written description of a sampling and recruitment procedure
- Unambiguous identification of the specimens and related documents (questionnaires, personal data, etc.) and conservation of the samples
- Support them with training activities



QA/QC in preanalytical phase

Contamination

- Field blanks
- Control of sampling (and storing) material
 - Selection of the appropriate material (*e.g. avoid glass when analyzing trace metals*)
 - Check background contamination in different batches
 - Use specific material (*e.g. blood tubes for trace element analysis*)
 - Pre-treat the material (*e.g. wash it with diluted HNO_3*)



QA/QC in preanalytical phase

Documents

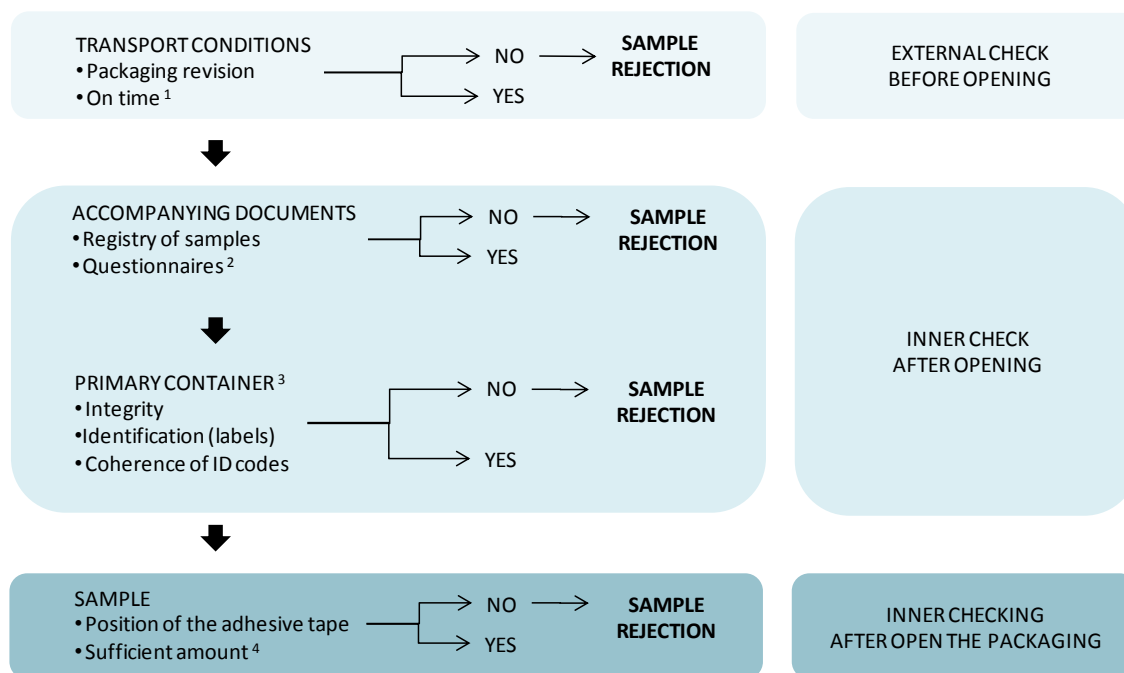
- Sampling questionnaires
 - Date and time of collection
 - Time of the last urination before sampling in case of urine
 - Time of the last meal before the sample collection
 - Type of food consumed within the last __hours previously to the sample collection
 - If applicable, reasons for not collecting the required samples (e.g. blood samples)
 - Problems during sampling and observations
 - Etc.

- Sheet of sample registration
 - Date and time of reception of sample to the lab
 - Problems encountered during reception: insufficient amount, spilled/broken tubes, ID disagreement, etc.)
 - Number/volume of the aliquots prepared
 - Date of freezing
 - Etc.

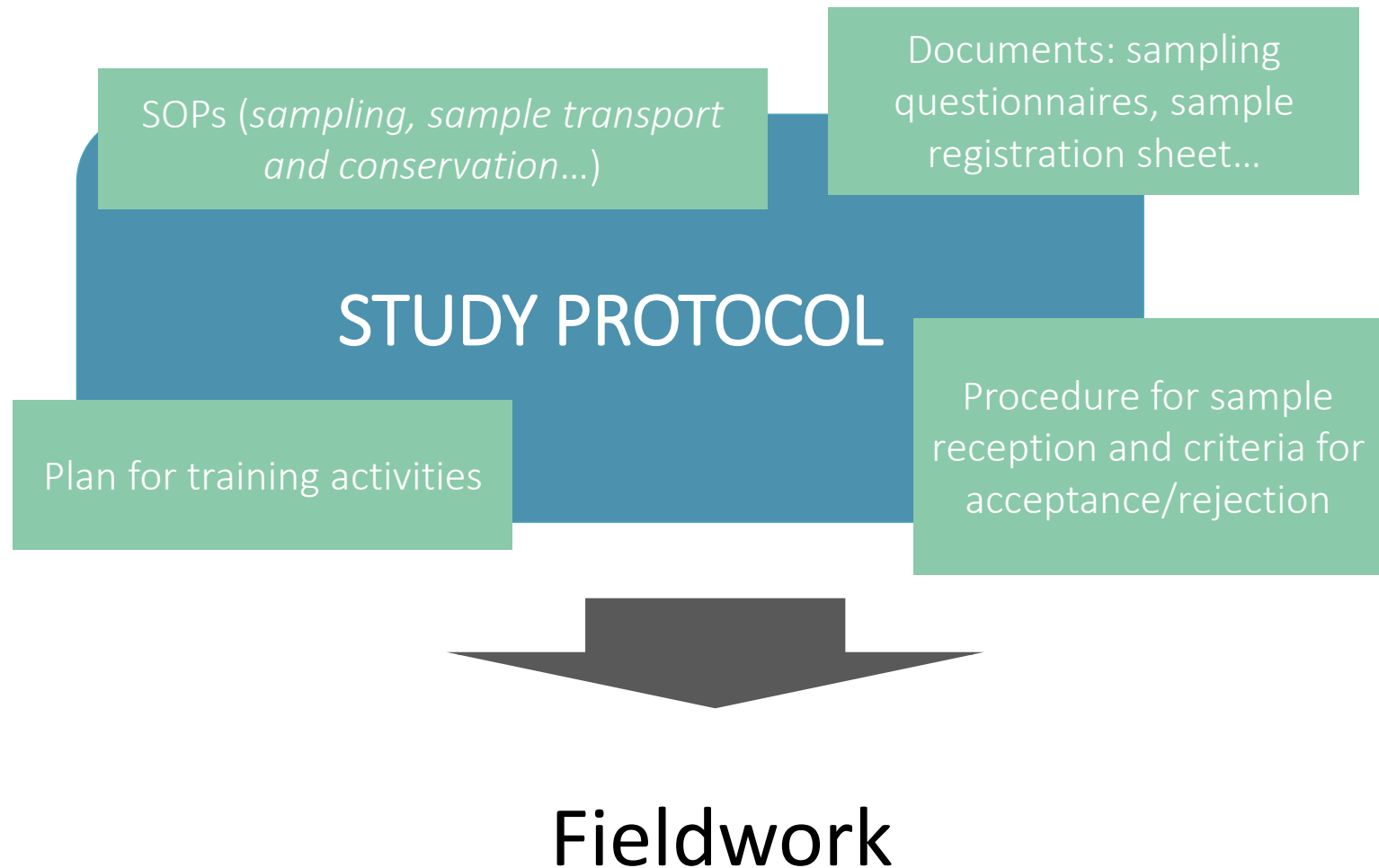
QA/QC in preanalytical phase

Criteria for acceptance/rejection of samples arriving to the lab


Example:



QA/QC in preanalytical phase



QA/QC in preanalytical phase in HBM4EU



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HORIZON2020 Programme
Contract No. 733032 HBM4EU

1st prioritisation Report on survey design: Study protocols, SOPs and Guidelines, tailored and transferred questionnaires for recruitment and sampling

Deliverable Report

D 7.3

WP 7 - Survey design and fieldwork preparation

Deadline: January 2018

Upload by Coordinator: 25 January 2018

Entity	Name of person responsible	Short name of institution	Received [Date]
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