IS THE QUESTION IMPORTANT ?

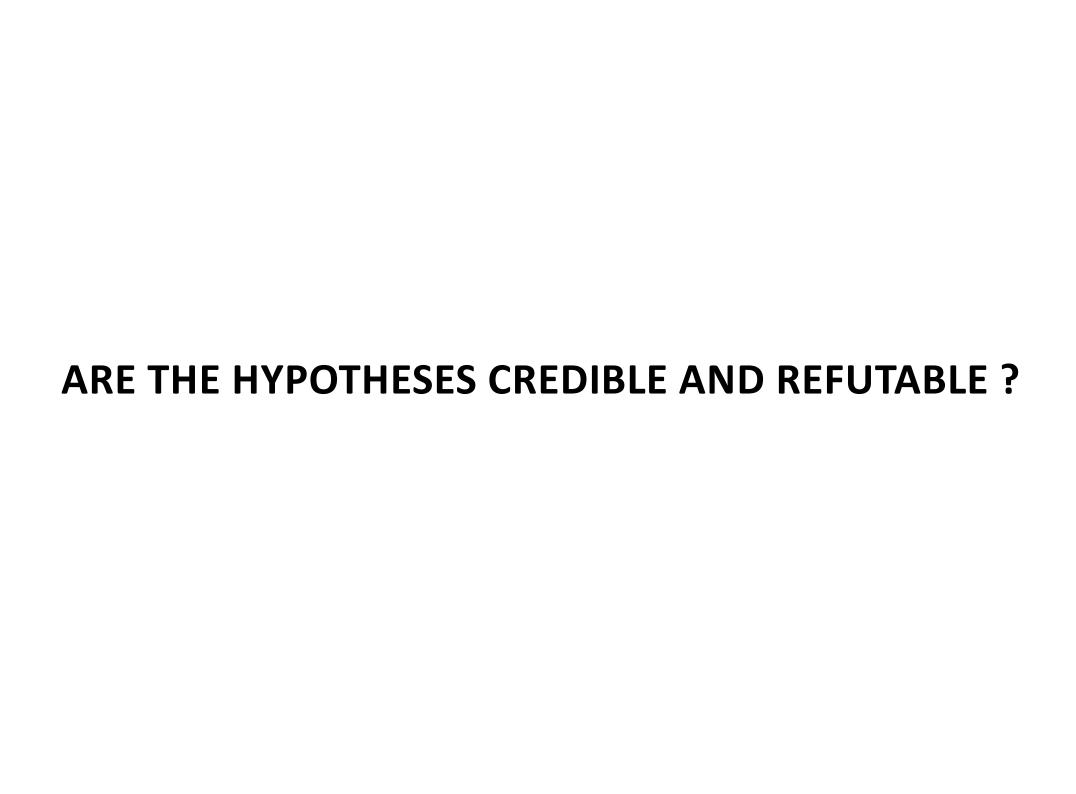# HAS THE QUESTION BEEN WELL FORMULATED ?

DO DATA EXIST THAT PERMIT
A SOLUTION TO THE PROBLEM ?

IF NOT

CAN THE DATA BE OBTAINED AS PROPOSED?

ARE THERE CLASSICAL ETHICAL CONSIDERATIONS

THAT NEED TO BE ADDRESSED?

ARE THE HYPOTHESES CREDIBLE AND REFUTABLE ?

WHAT ARE THE EXPERIMENTAL METHODS PROPOSED – ARE THEY FEASIBLE ?

ARE THEY ABLE TO PROVIDE AN ANSWER TO THE QUESTION POSED ?

TECHNIQUES THAT CONSTITUTE NEW TOOLS FOR DOING BETTER MEDICINE

MULTIVARIATE ANALYSIS

MACHINE LEARNING & CLASSIFICATION

DEEP LEARNING

LARGE & CHEAP MEMORY

DISTRIBUTED COMPUTING

MASSIVELY PARALLEL COMPUTING

SUPERCOMPUTERS

FUNDAMENTAL ISSUE

CLINICAL AND NEUROSCIENCE DATA MUST BE INTEGRATED

SIMULATION is an analytical methodology & depends on high performance computing

SIMULATION is always bottom up – it is a reconstruction from real data
   It generates complexity from simpler elements
   It results in a PREDICTIVE MODEL that CONSTRAINS next level organisation

SIMULATION can start from any level but always bottom-up and data led
   But data are useless unless they help reconstruction from one level to the next.

WE NEED GOOD PREDICTIVE SIMULATION MODELLING TO REDEFINE
& REFINE NEURO-DIAGNOSES IN FUTURE DIAGNOSTIC MANUALS

WHAT STATISTICAL AND ANALYTICAL

METHODS ARE PROPOSED ?

WHAT IMPACT WILL THE RESULTS HAVE

ON SOCIETY AND INDIVIDUALS

IN THE FUTURE?

THE ETHICAL ASPECTS OF A PROJECT
OR EXPERIMENT ARE AN INTEGRAL COMPONENT
OF ITS CONCEPTUALISATION, SPECIFICATION
AND FORMULATION

IN NO CASE IS THE ETHICAL PROCESS
AN IMPEDIMENT OR A NUISANCE TO SCIENCE;
IT CONSTITUTES THE VERTEBRAL COLUMN
OF SCIENTIFIC EXPERIMENTATION

REAL ETHICAL QUESTIONS

IN MEDICINE IS IT ETHICAL TO...

- ✓ TO UNDERUSE INFORMATION (hospital databases)
- ✓ TO MISUSE COMMUNITY RESOURCES (taxpayers money)
- ✓ TO RETARD ACQUISITION OF KNOWLEDGE BY RESEARCH

- ✓ FAIL TO BALANCE RISKS (car driving vs taking treatment)
- ✓ FAIL TO BALANCE RIGHTS (health and privacy)
- ✓ FAIL TO BALANCE SAFETY AGAINST EFFICACY (individual risk from treatment)

- ✓ USE INADEQUATE METHODS IN RESEARCH (linear vs complex analytics)
- ✓ DO UNDERPOWERED RESEARCH (statistics)
- ✓ FAIL TO COMMUNICATE RESULTS ACCURATELY (sensationalism vs education)

?????????