Wade
Living with acromegaly
Salt Lake City, USA

"Le jumeau numérique" at Ipsen

How Virtual Patients & In Silico Clinical Trials initiative can support clinical trials design & evaluation of PoS ?

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An opportunity for innovative R&D

Regulators "willing to see" + **Data explosion RWD** + **Advanced analytical methods** = **Virtual Patients & ISCT approaches**

- *Advanced computer modeling recommendation*
- *Framework for RWD*

- *Need to leverage all data available, in particular external data*

- *A team fully integrated in Ipsen R&D*
- *Panel of scientists with data expertise (data scientists, bioinformaticians, data miners, RWD...)*

- *To support efforts from pre-clinical to phase III*
- *A key point is the interaction between modeling team with R&D project teams*

Ipsen virtual patients initiative: a breaking down approach in pharma

Generate virtual patients clinically plausible to better anticipate clinical responses and better design our trials for patients benefit !

What is a virtual patients cohort ?

• Based on data from real patients + internal knowledge:

① Create virtual patients with key clinical characteristics

② Assign a predicted endpoint to each patient based on the clincial endpoint(s) of the study

Type of patients generated

• Completely clinically-plausible patients

• Virtual patients who are slightly different to anticipate responses on patients not yet enrolled in our studies
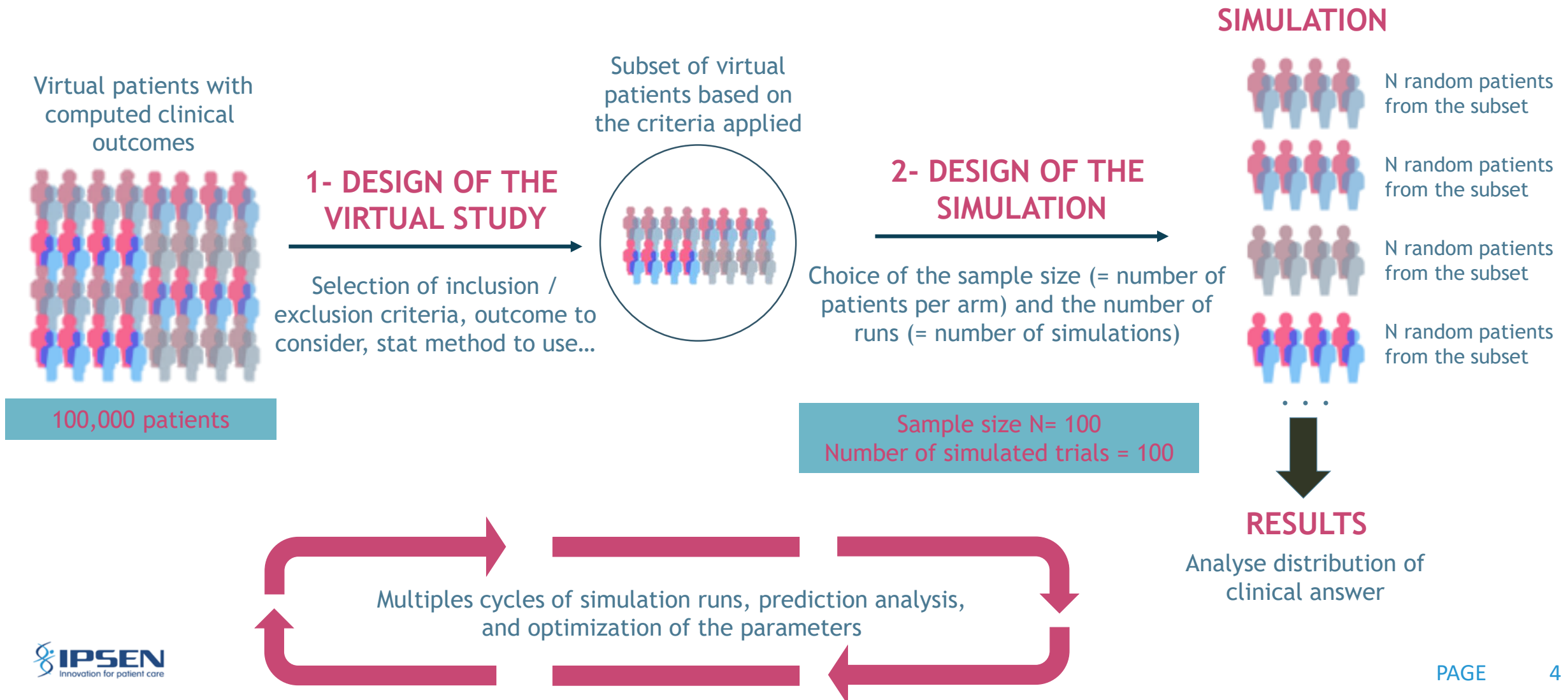
Simulate clinical response

• Play with inclusion / exclusion criteria to evaluate clinical response & its heterogeneity

• Understand the key baseline characteristics driving the clinical response

Evaluate probability of success

• Better identify patients who will benefit from the treatment

• Gain more confidence in patients population and envisaged clinical endpoints → better anticipate risk

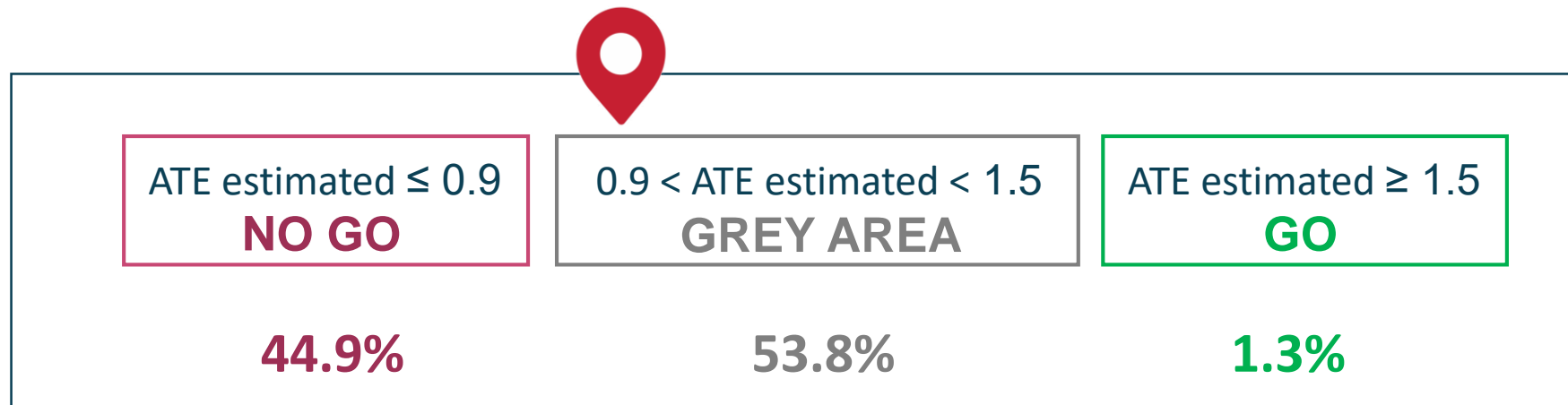# In Silico Clinical Trial designed the same way than a real one

SIMULATION

Virtual patients with computed clinical outcomes

Subset of virtual patients based on the criteria applied

N random patients from the subset

N random patients from the subset

1- DESIGN OF THE VIRTUAL STUDY

2- DESIGN OF THE SIMULATION

N random patients from the subset

Selection of inclusion / exclusion criteria, outcome to consider, stat method to use...

Choice of the sample size (= number of patients per arm) and the number of runs (= number of simulations)

N random patients from the subset

100,000 patients

Sample size N= 100
Number of simulated trials = 100

RESULTS

Analyse distribution of clinical answer

Multiples cycles of simulation runs, prediction analysis, and optimization of the parameters

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Virtual patients can support us making better decisions to increase PoS of a clinical trial

✓ Evaluation of Phase II PoS with the defined inclusion & exclusion criteria and clinical endpoint using Average Treatment Effect (ATE) distribution

Average Treatment Effect between **Drug X** & **Placebo** ≥ **1.5**

Phase II Result

Results of **1,000** simulations on virtual cohort	ATE estimated ≤ 0.9 **NO GO**	0.9 < ATE estimated < 1.5 **GREY AREA**	ATE estimated ≥ 1.5 **GO**
	44.9%	**53.8%**	**1.3%**

👍 **SUCCESS** ➡ CRITICAL to have multidisciplinary team bringing together clinical & scientific experts and modeling experts

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