Evolution or Revolution? From vision to decision!!

Pratibha Jalui

What's in store…

- Our Hypothesis of Interest
- The Journey so far!!
- Advancements in Clinical Trials: The Promise and the Potential
  - Operational Advancements
  - Methodological Advancements
- Technological Revolution
- The Path Ahead

Our Hypothesis of Interest

- H_0: Faster Access to New Medicine – Cutting Down the Development Lifecycle by 25%: A Dream

versus

- H_1: Faster Access to New Medicine – Cutting Down the Development Lifecycle by 25%: Not a Dream but Reality

“The charm of history and its enigmatic lesson consist in the fact that, from age to age, nothing changes and yet everything is completely different.”

- Aldous Huxley

The Journey so far!!

562 BC - 1537: Pre-James Lind Era

1747: James Lind and Scurvy Trial

1800: Arrival of Placebo

1943: The First Double blind Controlled Trial – Patulin for Common Cold

1946 First Randomized Curative Trial RCT of Streptomycin

1947 onwards: Evolution of Ethical and Regulatory Framework

Evolution of Clinical Trials

Time for Revolution of Clinical Trials

Advancements in Clinical Trials: The Promise and the Potential

Advancements in Clinical Trials

- Higher stakes than ever before
- Clinical Development marketplace has become much more competitive, stricter regulatory standards – greater emphasis on trial oversight and patient safety
- Study Designs are becoming more complex, more endpoints needed to demonstrate product value
- Technology that not only aggregates but also integrates study data can greatly improve trial efficiency

Operational Advancements

Operational Advancements

- Electronic Data Capture (EDC): Record clinical data from research subjects
  - EDC Market estimated to grow from $ 350M to $ 1.16B
  - Average cost savings of 49-62% when compared to paper CRFs
  - Time savings 86% (reduction in queries), 30% (decline in study duration), 43% (decline in time to database stock)

- Electronic Trial Master File (eTMF): Store and manage essential trial-related documents
  - Real-Time Tracking & Viewing of documents
  - Shortened Clinical Trial Time
  - Improved inspection-readiness (67%) and speeding study startup (53%)

Reference:
https://forteresearch.com/news/infographic/electronic-data-capture-stay-infographic/
https://www.centerwatch.com/news-online/2016/06/27/tmf-survey-adoption-etmf-applications-increased-nearly-twofold/

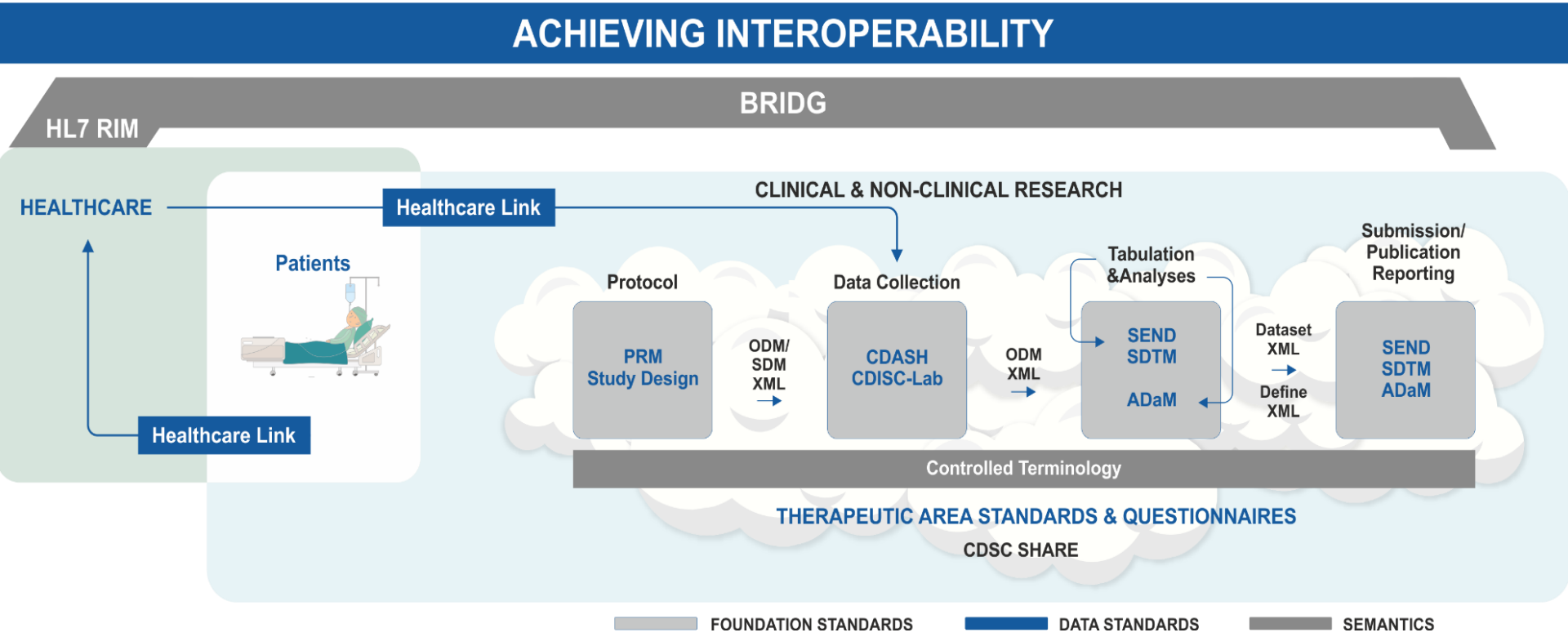
Operational Advancements

- Clinical Trial Management Systems (CTMS): Track progress and performance of certain trial-related processes
  - Monitoring efficiencies improved by 50%
  - 5% savings in efforts on issue management
- Supply chain Management & Randomization using IVRS (IWRS): Manage randomization and supply of investigational products and/or placebo.
  - IVR is 7 Times Cheaper than Talking to a Live Agent
- Electronic Submissions: Revolution of Common Technical Document (CTD)
  - 2003, CTD mandated format for NDAs in EU/Japan, strongly recommended format for NDAs submitted to Health Authorities.

Reference:
https://www.veeva.com/resources/4-key-benefits-of-a-modern-clinical-trial-management-system/
https://www.tmcnet.com/channels/bpa/articles/376364-survey-reveals-ivr-7-times-cheaper-than-talking.htm

Methodological Advancements

Standardization



- Use of standards from start → Save 60% of the non-subject participation time
- ~ 80% savings in the startup stage
- Average of two years can be saved off of an average 12-year clinical development program lifecycle – just by standardizing data!!

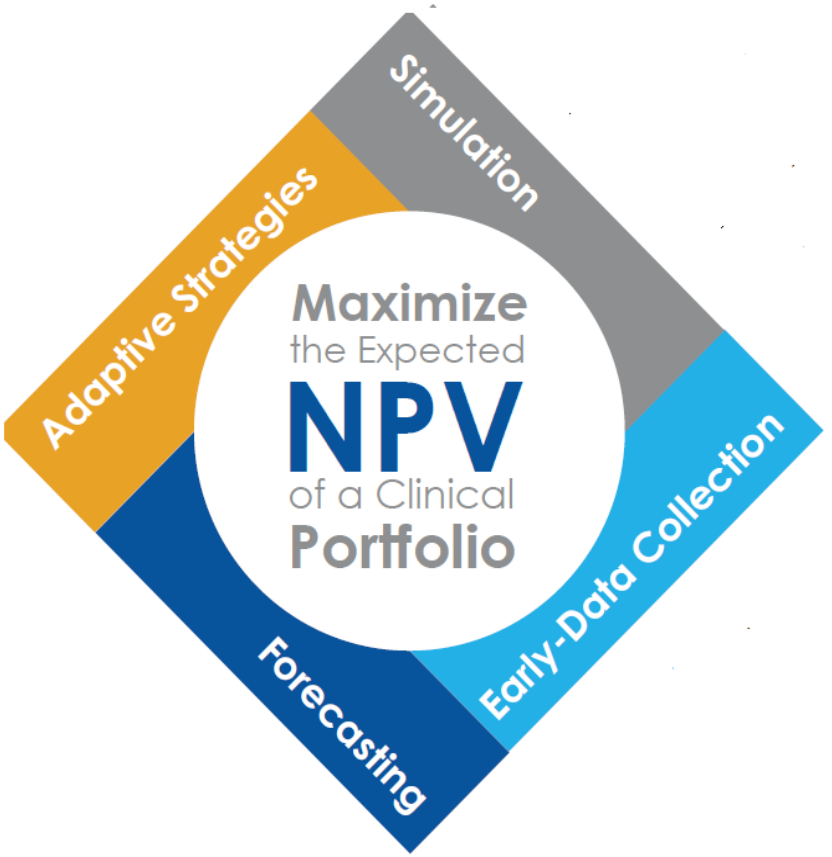
Ref: https://www.cdisc.org/system/files/all/article/PDF/The%20Case%20for%20CDISC%20Standards-FINAL-30SEP.pdf

Data Handling Techniques

- Missing data - a familiar situation in clinical trials
- Focus towards more scientifically evolved techniques like **Multiple Imputation to handle partial data**
- Sensitivity analyses play a crucial role in assessing the robustness of the findings or conclusions based on primary analyses of data in clinical trials

Adapting to Adaptive Trials

- Scientific: Maintain Statistical Rigor and Increase Biological Knowledge
- Financial: Manage Uncertainty and Scale New Knowledge
- Strategic: Allow for Holistic Program & Portfolio Development
- Ethical: Timely Benefit to Patients



Ref: Adaptive_Trials_white_paperV2.pdf

Technological Revolution

**"Everyone in the office is getting a netbook.
Little screens make our problems look smaller!"**

Blockchain: A New Era For Our Data

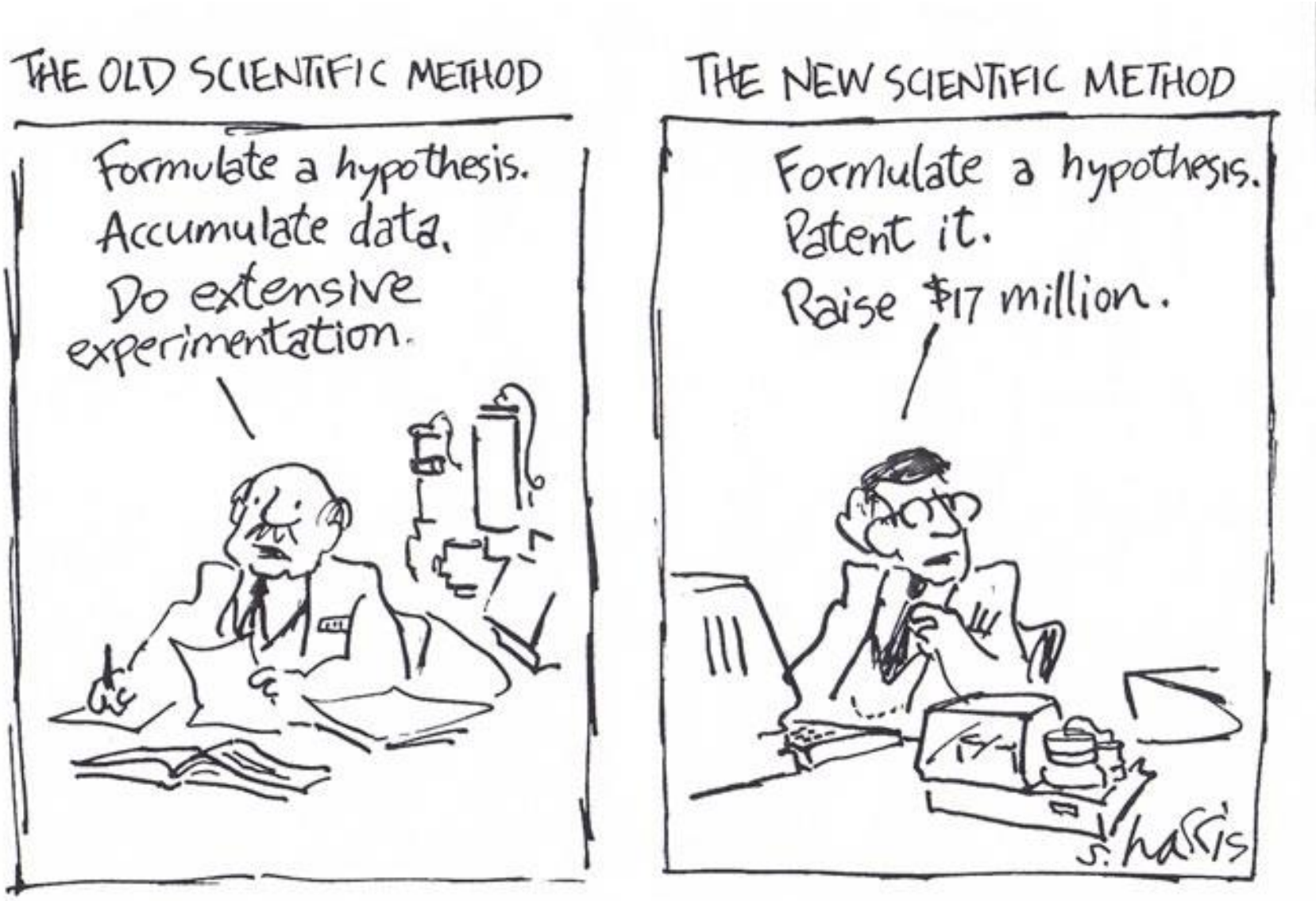
- From managing patient data to tracking drugs through the supply chain, blockchain has it all!!

- Key USPs
  - Data integrity
  - Traceability and auditability
  - Cryptographic access control
  - Smart contract automation

"This medication can actually improve your memory. Each capsule contains a tiny hard drive."

AI Comes to Clinical Trials

- Make Clinical Trials Intelligent – AI driven protocol designs
- Optimize Clinical Trial Processes
  - Helps address top challenges like patient recruitment and retention
    - ~ 50% of sites fail to meet enrollment targets, ~ 30% patients dropout of clinical trials
- Gain Greater Insight for Smarter Decision Making
  - Detect patterns using Artificial Intelligence (AI), Machine Learning (ML) and Deep Learning (DL) techniques in clinical research data, using it to accelerate drug discovery , devise hypotheses beyond human ability.


THE OLD SCIENTIFIC METHOD
Formulate a hypothesis.
Accumulate data.
Do extensive experimentation.
THE NEW SCIENTIFIC METHOD
Formulate a hypothesis.
Patent it.
Raise $17 million.
S. Harris

For healthcare to move forward, we need to be fostering innovation from the bottom up.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GLASBERGEN
"My topic is 'How To Give A Presentation Without Losing Your Audience's Attention'. The End. Thank you for coming."

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