OBERON SCIENCES
Next Generation Personalized Medicine

- Improving effectiveness
- Revolutionizing outcomes
- Augmenting the standard of care

Oberon Sciences’ system improves adherence

The digital system by Oberon Sciences **improves outcomes.**
Increases effectiveness and overcomes drug tolerance.

- Low engagement and lack of trust of patients and providers in digital systems that assist in diagnosis data analysis.

- Health systems can not afford extra costs for *“nice to have”* systems.

Chronic medications lose their effect over time

US chronic disease market is valued at > 3 trillion USD/year

- 30-50% of patients lose the response to therapies.
- > 40% of patients do not adhere to their drugs.
  - increased admissions, use of expensive drugs.
  - significant loss to pharma companies.

55% of people > 60 suffer from ≥1chronic diseases

- A third of patients with heart failure are resistant to diuretics.
- 30-40% of patients with epilepsy or depression resist **all drugs.**

- Drug-resistant cancer leads to **mortality.**
- Resistant to opioids mandate increasing dosages leading to **mortality.**

- 40% of patients receiving Humira, the blockbuster drug for arthritis and colitis, develop resistance.

Ilan, Y 2020. Overcoming Compensatory Mechanisms. | Mol Ther Methods Clin Dev. 2020 Jun 10;18:335-344 | Nature Reviews 2017; 13:708

The Digital Pill: A drug regulated by artificial intelligence
Optimizing the standard of care, improving adherence

Version 0.0:
A reminder to take medications

20 mg BID:
7 AM; 7 PM

Improves adherence by reminding

Lack of trust
Low engagement

Version 1.0
Alterations in times and dosages within an approved range

15 or 20 mg BID
7 AM ± 2 hours;
7 PM ± 2 hours

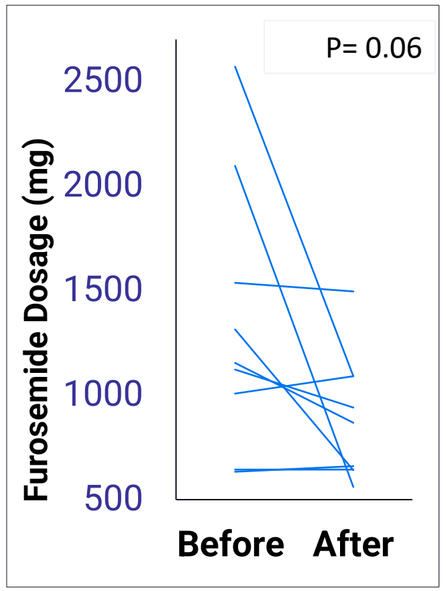
Overcomes tolerance

Increases adherence by improving outcomes

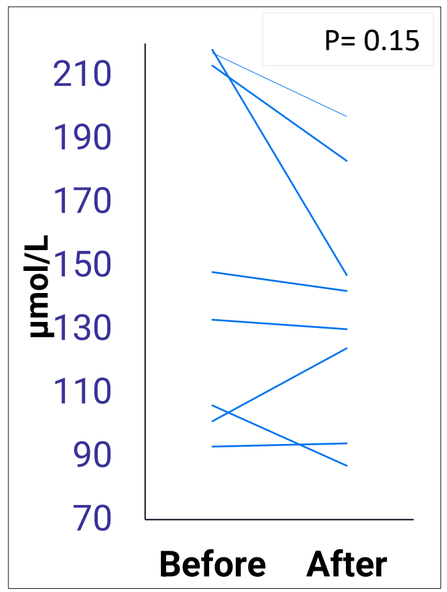
Science-driven effectiveness

Improving the response to diuretics in patients with heart failure and diuretic resistance

Reduces diuretic dosages

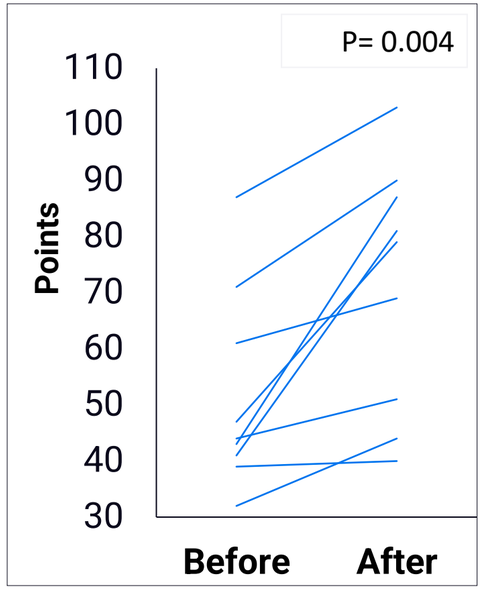


Improves kidney function



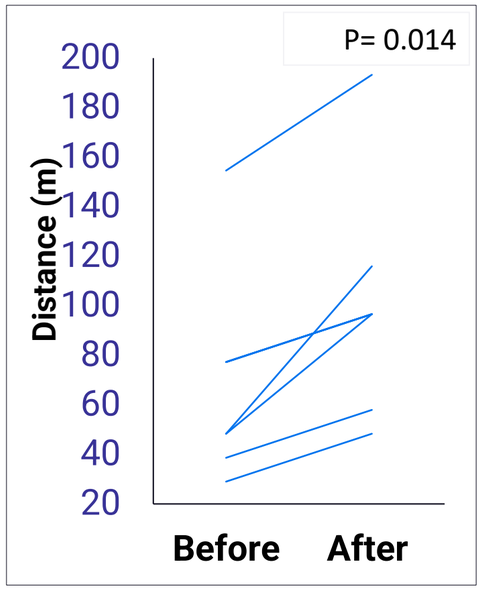
Serum Creatinine

Improves functional capacity

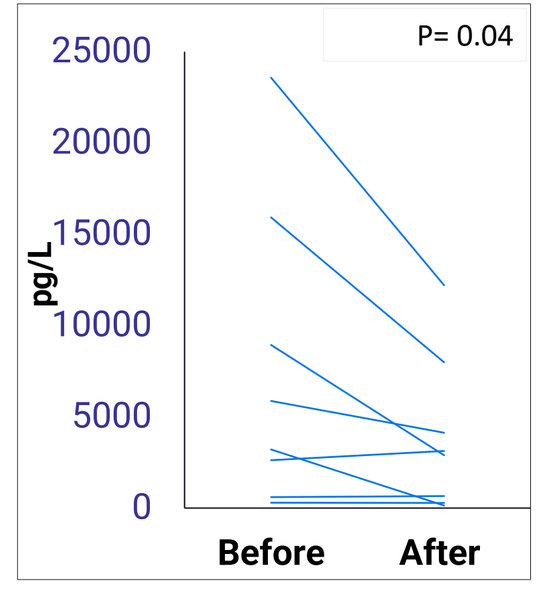


Kansas City Cardiomyopathy Questionnaire

Improves 6-minute walk test



Reduces NT-ProBNP serum levels



A measure of severity of heart failure

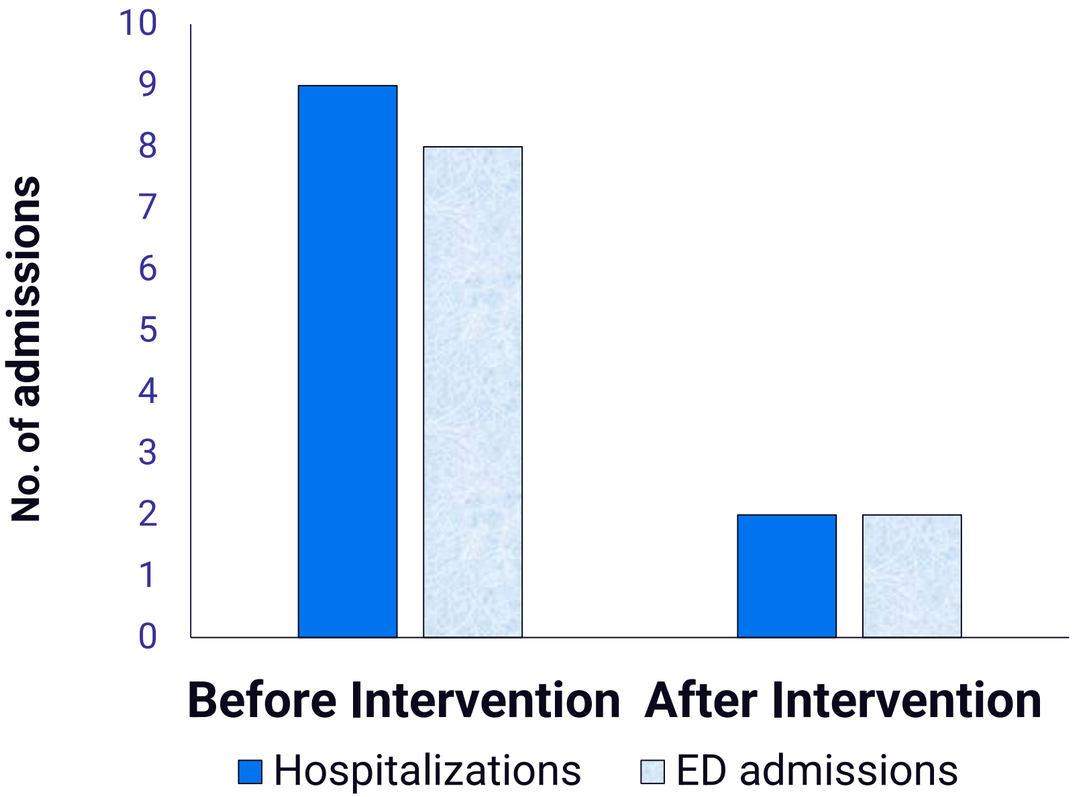
Stanford University

Hadassah University Hospital

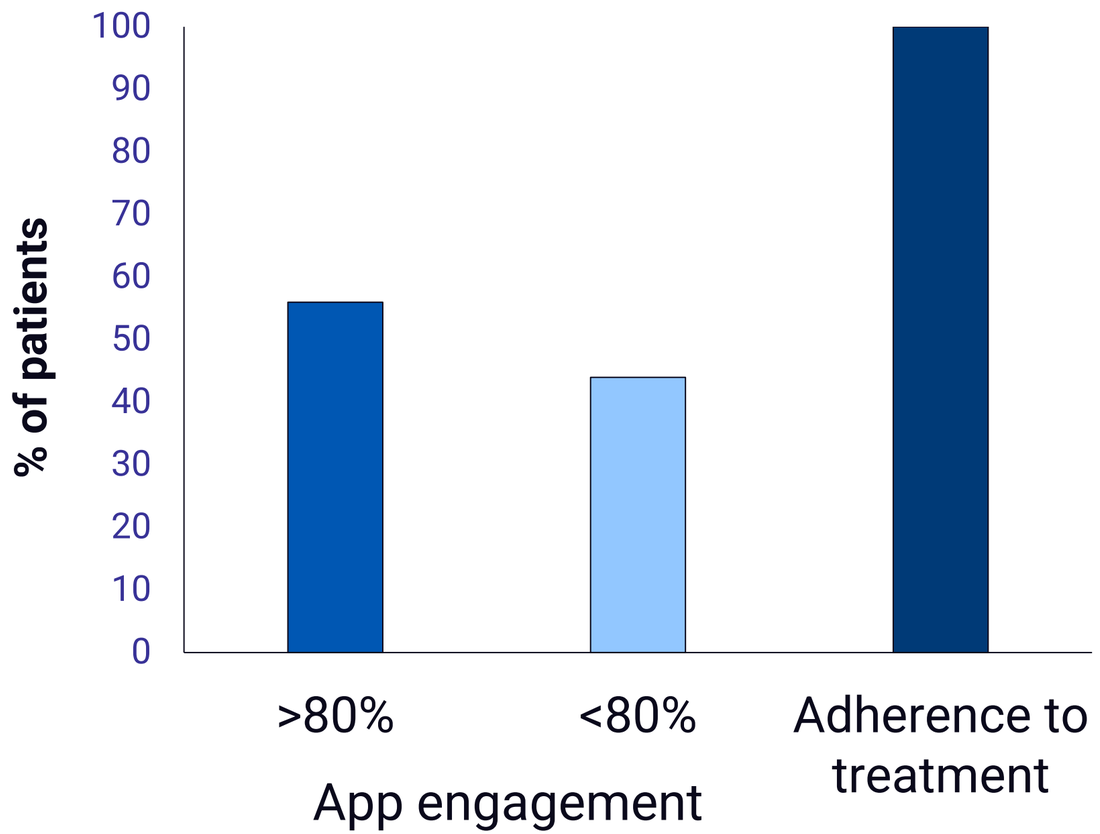
Gelman R, Biomed Pharmacother. 2023161:114334

Improving the response to diuretics in heart failure

Reduces hospitalizations and emergency room admissions



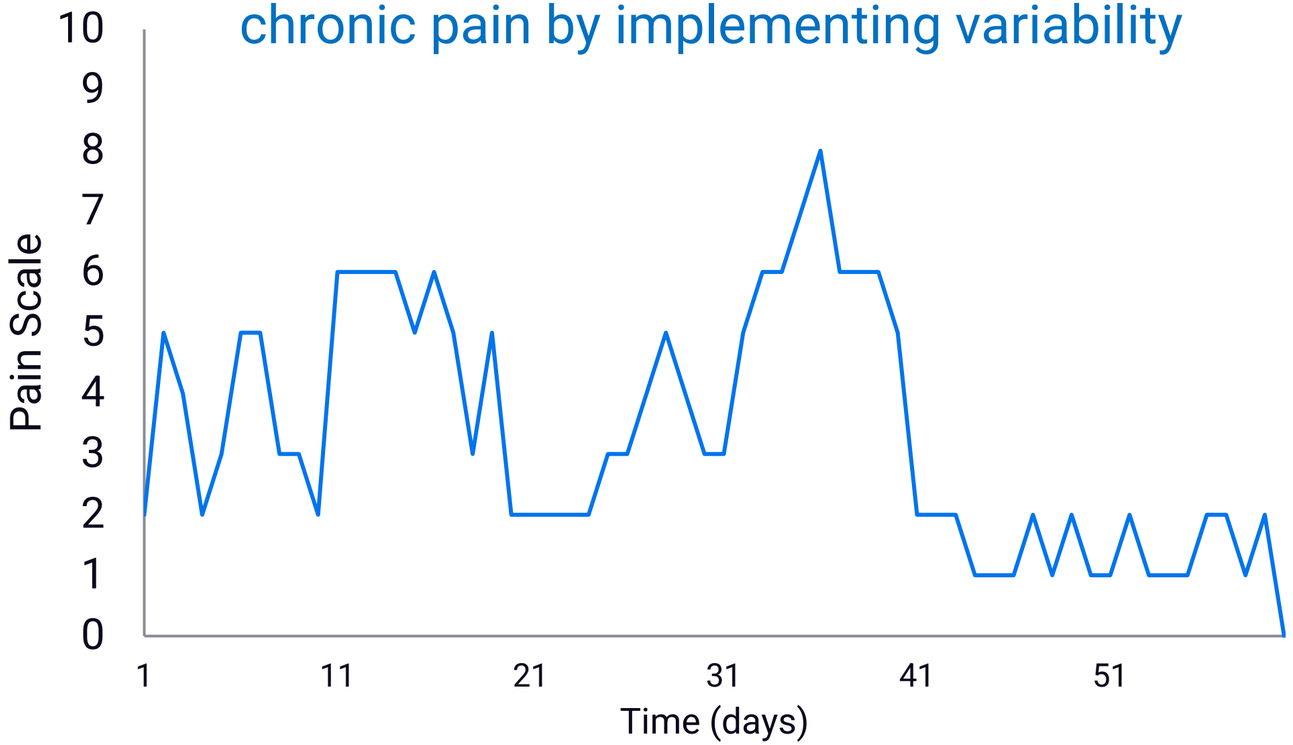
Improves engagement and adherence



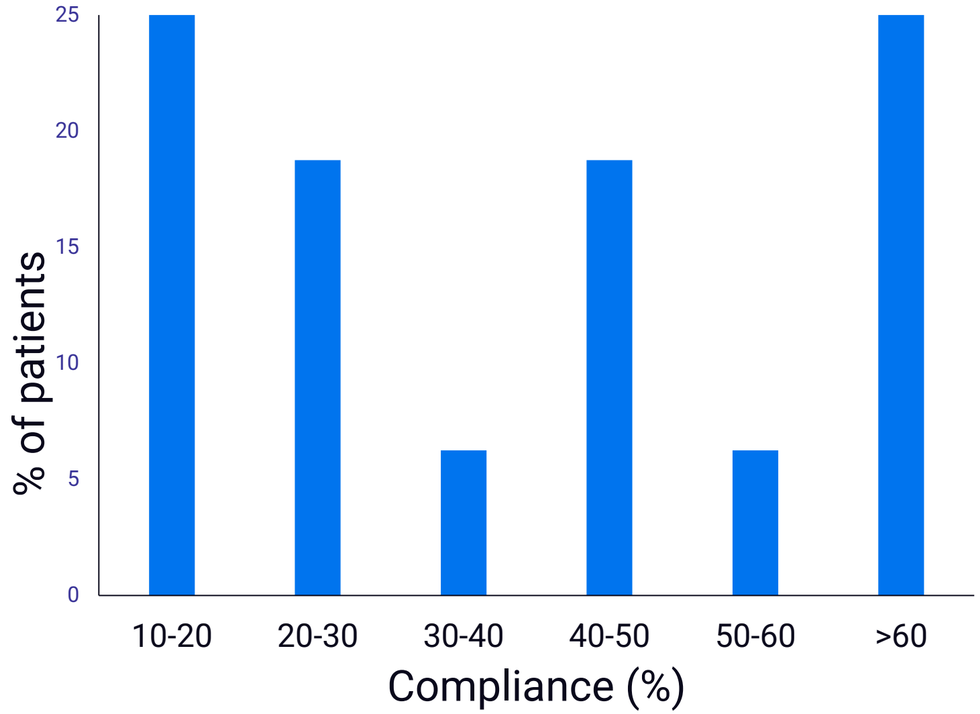
Gelman R, Biomed Pharmacother. 2023161:114334

Overcoming the tolerance to analgesics
Digital Medical Cannabis real-world data

Improving the pain score in patients with chronic pain by implementing variability



High engagement rate

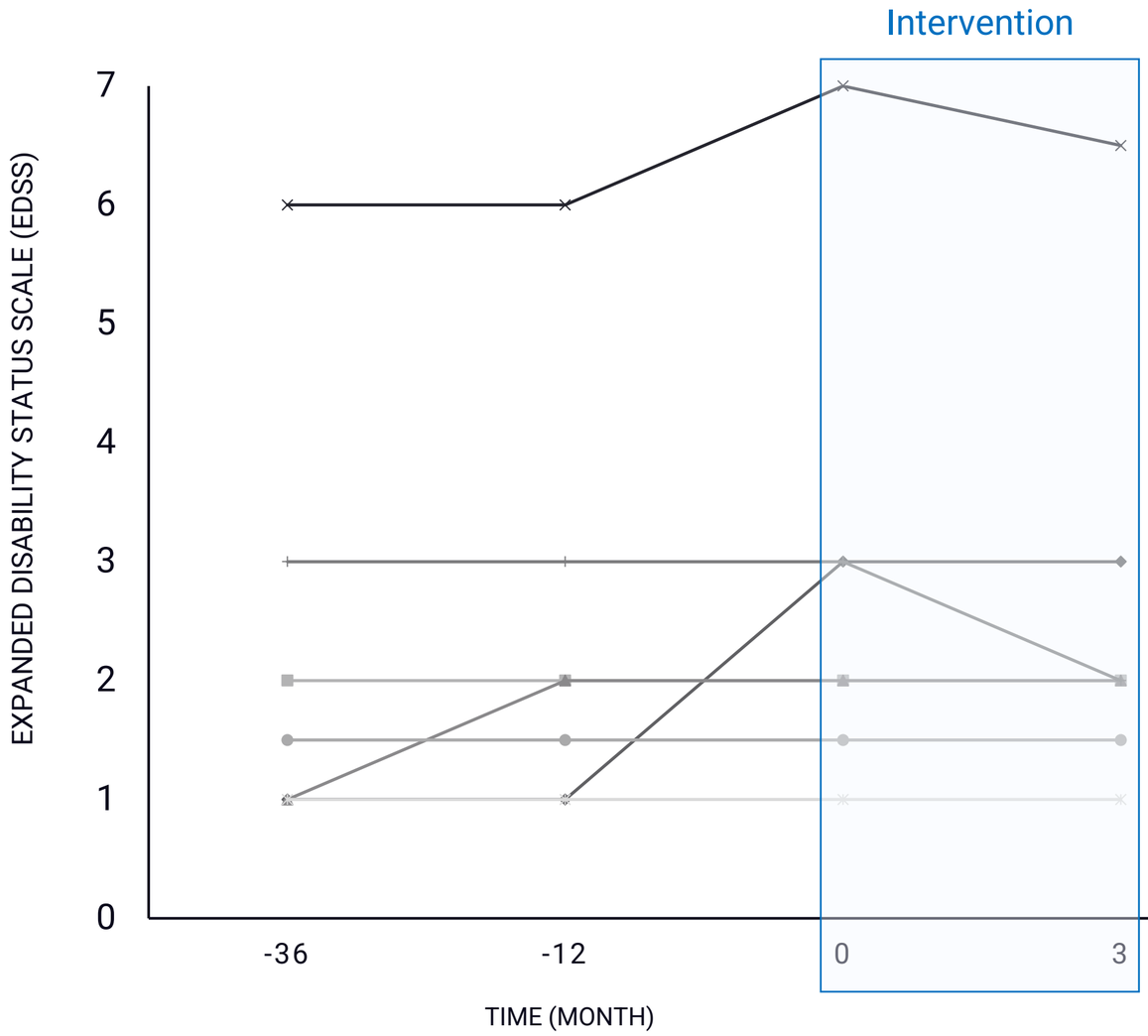


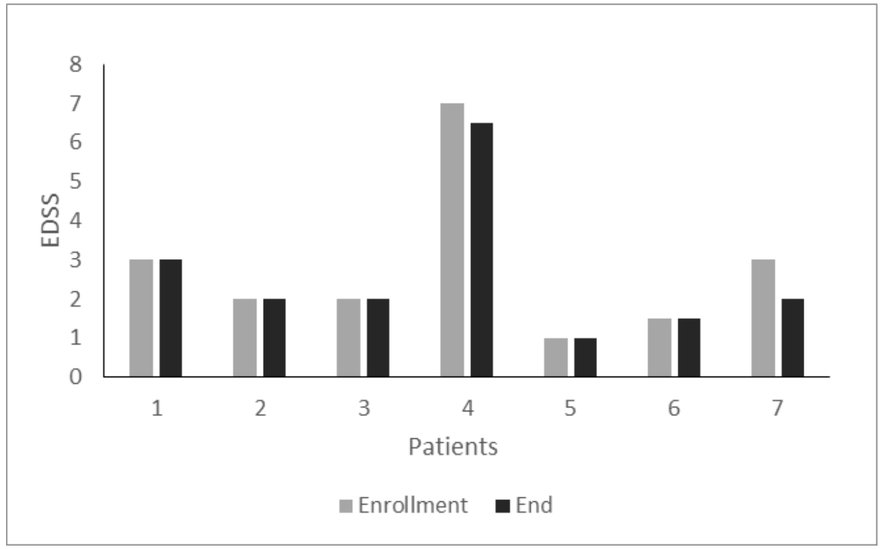
n=27

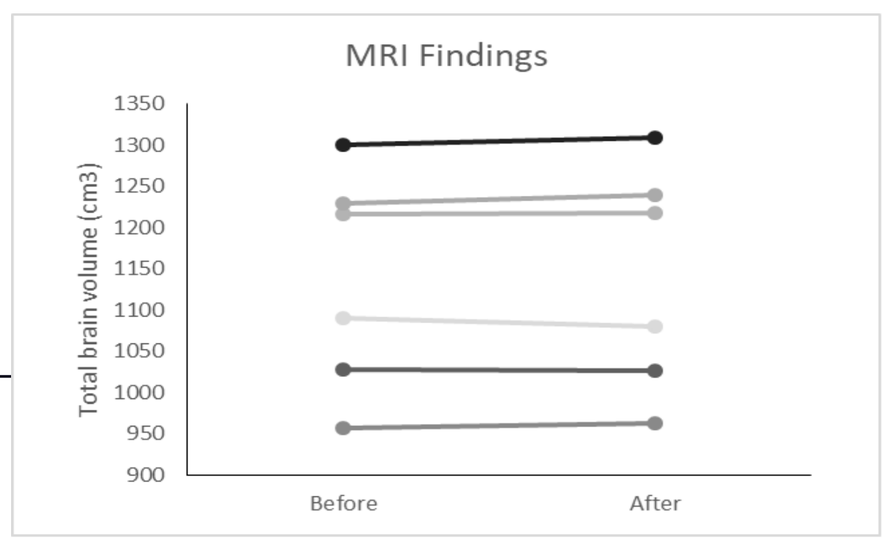
Use of app/day	2022-05-01	2022-05-02	2022-05-03	2022-05-04	2022-05-05	2022-05-06	2022-05-07	2022-05-08	2022-05-09	2022-05-10	2022-05-11	2022-05-12	2022-05-13	2022-05-14	2022-05-15	2022-05-16
	3	3	3	3	1	3	2	3	3	3	1	3	3	3	3	3
Pain score	2022-05-02	2022-05-03	2022-05-04	2022-05-06	2022-05-07	2022-05-08	2022-05-09	2022-05-10	2022-05-12	2022-05-13	2022-05-14	2022-05-15	2022-05-16	2022-05-17	2022-05-18	2022-05-19
	6	**6**	**6**	**6**	**5**	**6**	**5**	**3**	**5**	**2**	**2**	**2**	**2**	**2**	**3**	**3**

Hurvitz N, in press, 2023

Stabilization and improvement of the clinical status of multiple sclerosis patients treated with Dimethyl Fumarate (Tacfidera)







Hadassah University Hospital

Real life Story

Good morning Dr. Lehmann
I feel great.
We are on vacation in the Dolomites, and I am proud to share that yesterday, I climbed after I already thought I wouldn't climb anymore (fear of stability and balance due to sclerosis). I did it successfully and, most importantly: with pleasure.

Add value to all players of the health care system:

Ensuring engagement and saving costs

Patients
- Improve outcome
- Reduce admissions and hospitalizations

Physicians
- Improve adherence

Payers
- Saves costs

Pharma
- Market disruptor
- Increase revenues

- Seven worldwide issued patents
- In the market
- A short time to market
- FDA exempt “no claim”-based reminder within common practice

Science-driven effectiveness

The Digital Pill increases effectiveness by introducing data-driven personalized regimens

Version 1.0

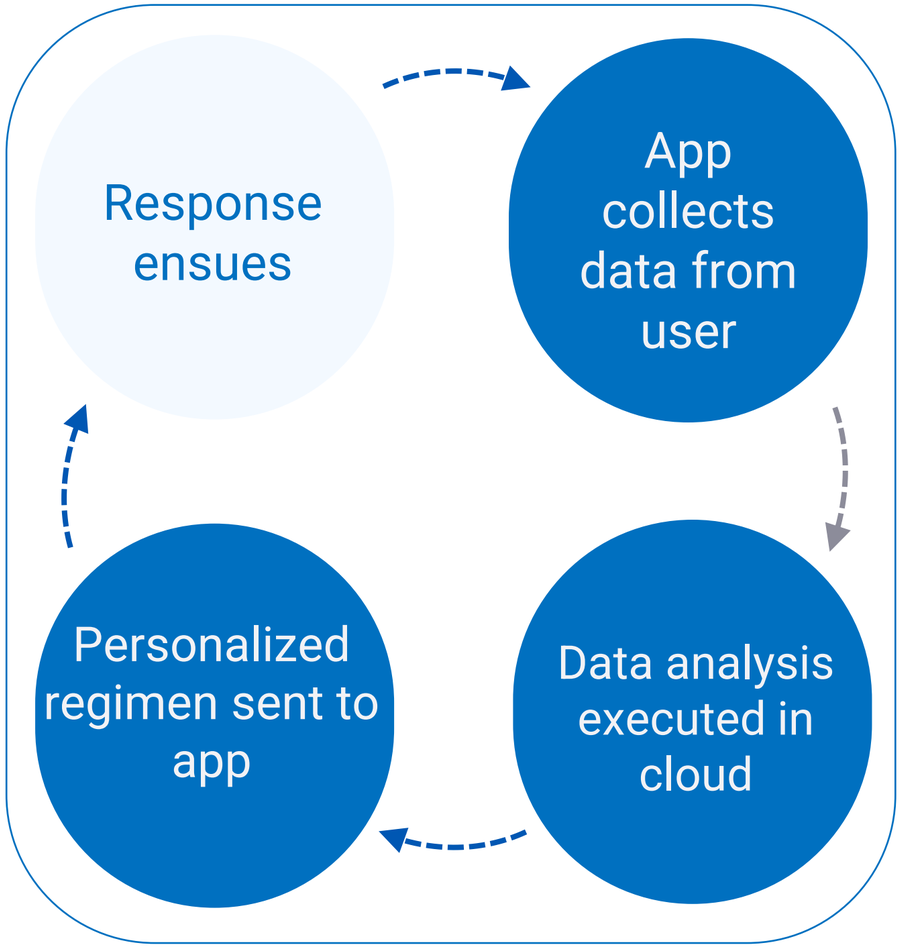
Introduces variability in dosing and times of administration within the approved range

Version 2.0

A closed-loop system that alters variability based on outcome

Version 3.0

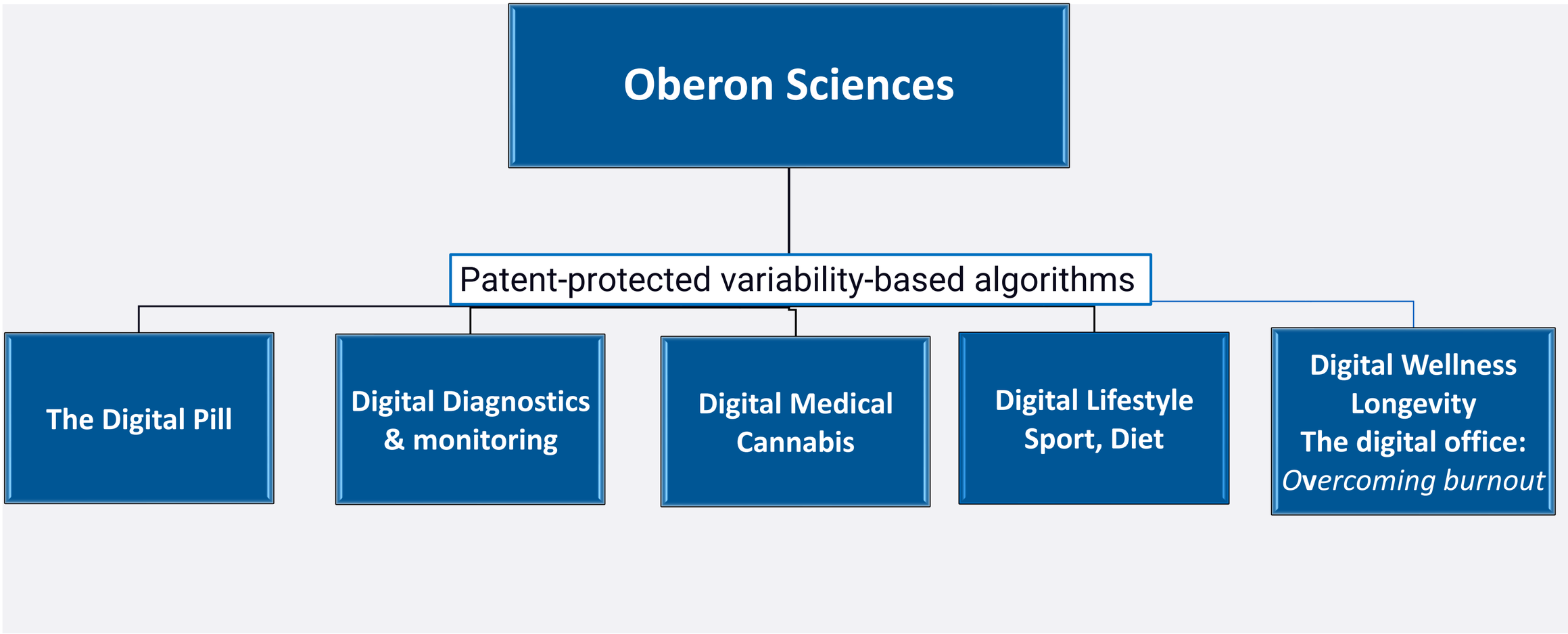
Quantifying variability signatures and incorporating them into the algorithm



Ilan,Y In J Env Res Pu Health 2021

Oberon Sciences

Improving effectiveness & function by second-generation artificial intelligence

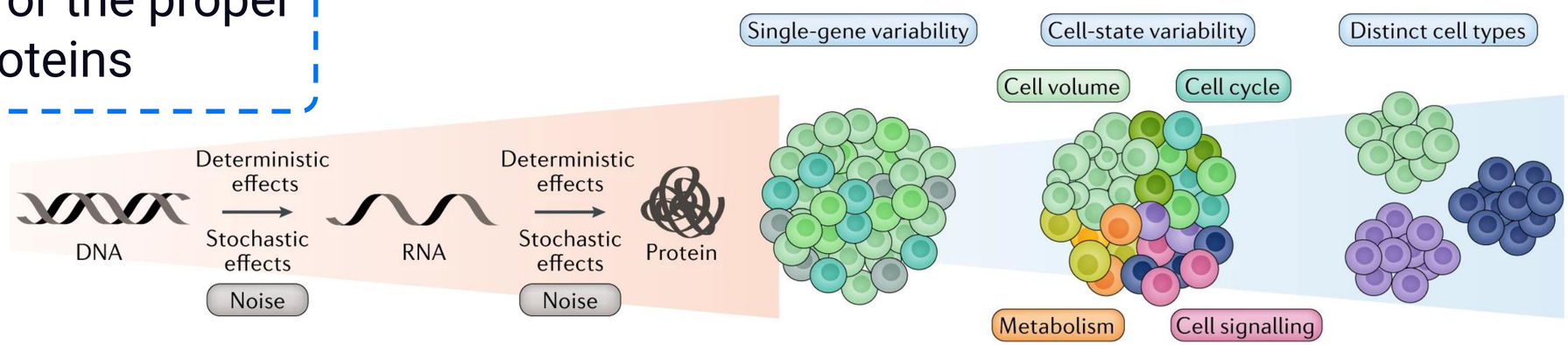


Science-driven effectiveness

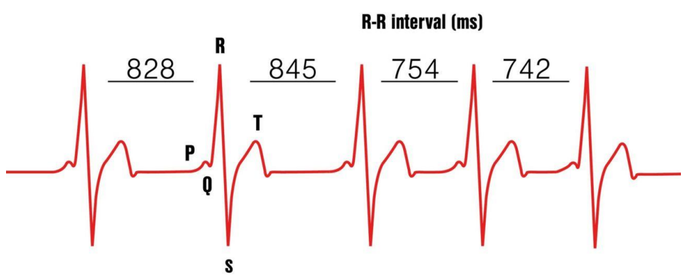
The Science

Noise is essential for the proper function of biological systems

Variability is mandatory for the proper function of genes and proteins

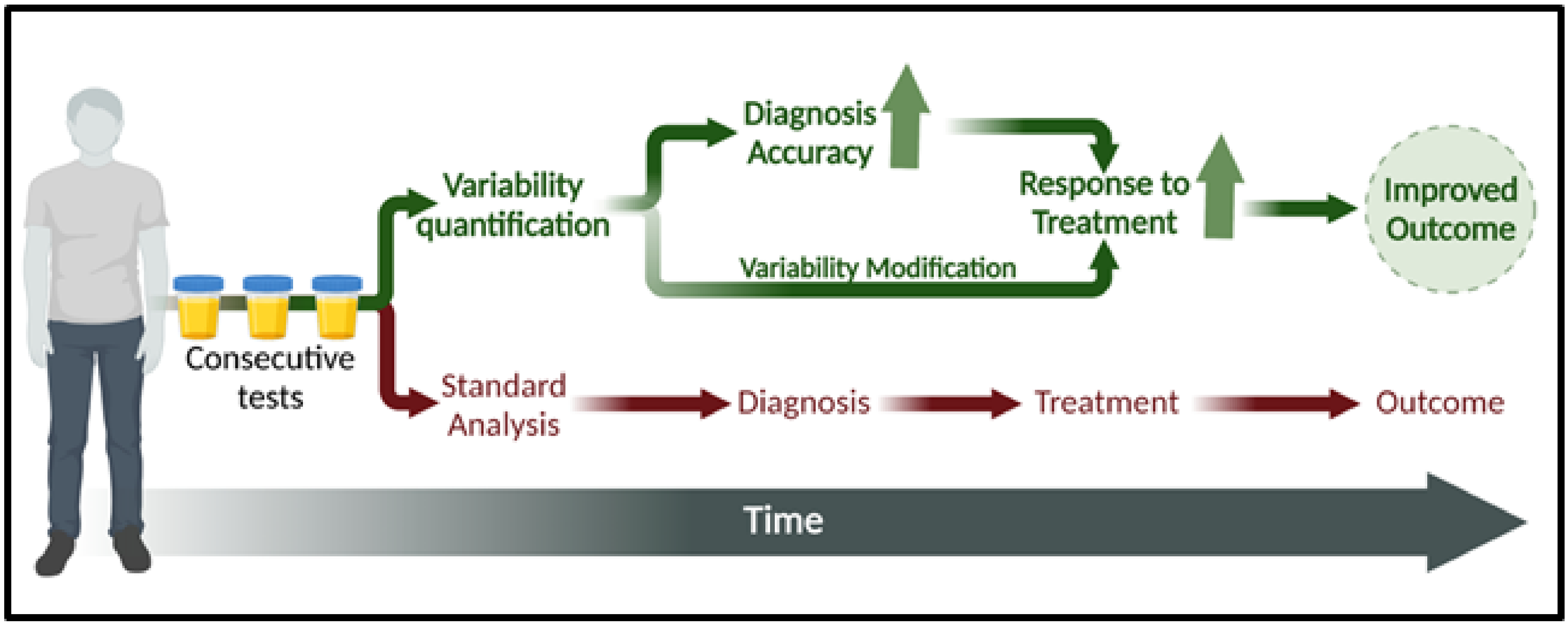


- Heart rate variability (HRV): a beat-to-beat variation in heart
- Loss of variability is associated with a poor prognosis and increased mortality



Ian Y. J Biosci 2019;44.;Ilan Y. J Comput Biol 2020;27:20-29.;Ilan Y Cell Biol Int 2019;43:739-748.
Casanova MP, Nanoethics (2020) 14:113–122
https://pastel.archives-ouvertes.fr/file/index/docid/945214/filename/ThePhysics of Life Reviews Volume 2, Issue 2, Del Giudice et al., 1998; 2006; Buiatti M, Longo G. Theory Biosci. 2013 Sep;132(3):139-58

Improving outcomes by implementing variability-based algorithms for improving early and accurate diagnosis

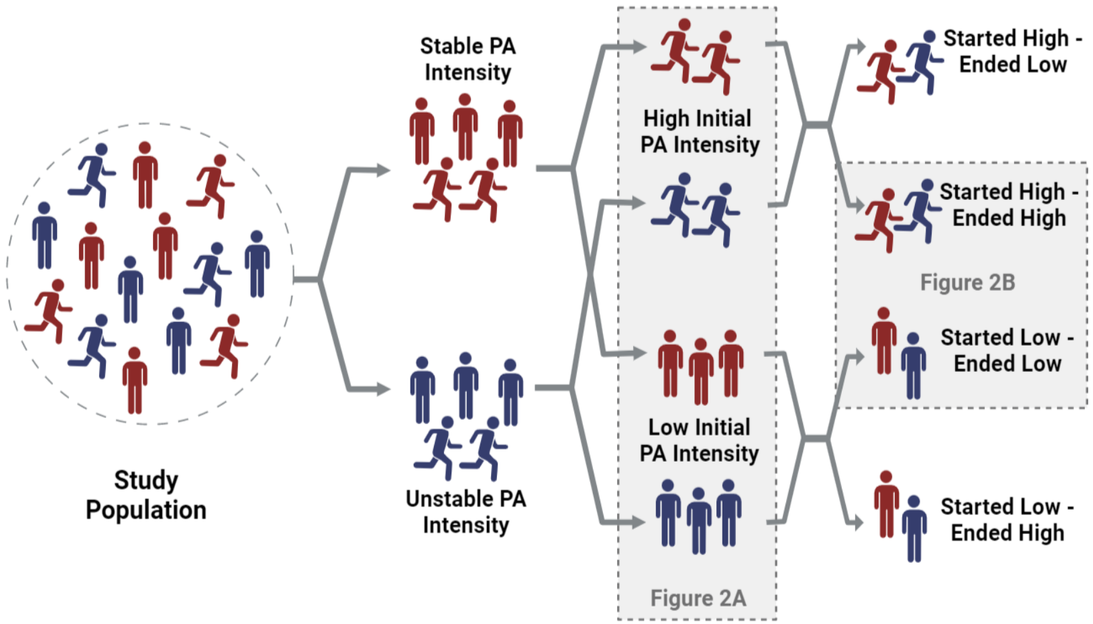


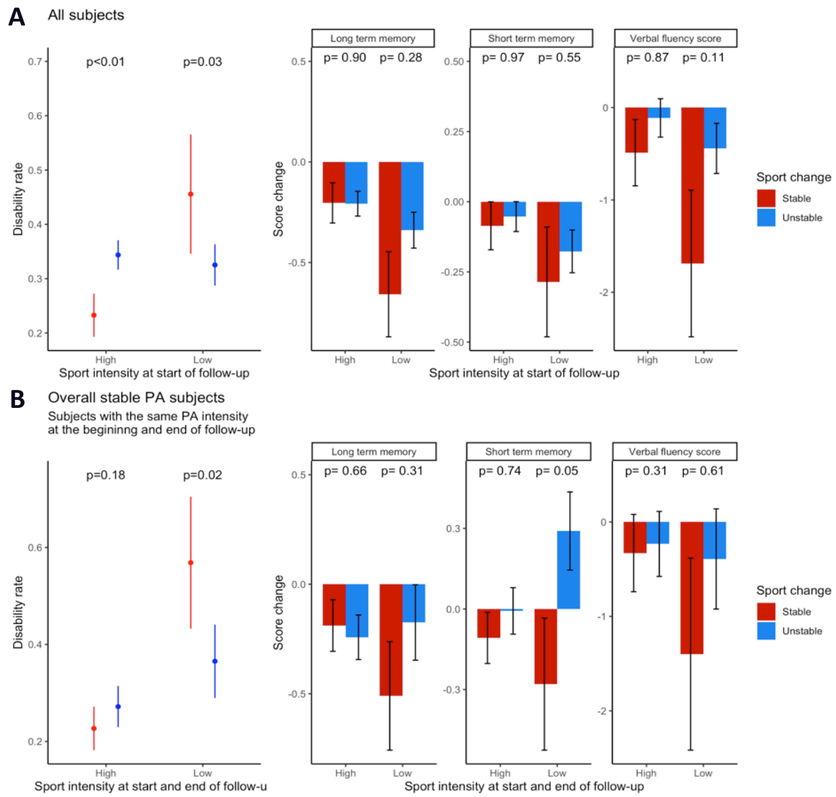
Science-driven effectiveness

Sigawi T, Ilan Y, In press, 2023

Implementing variability-based algorithms for improving outcome

In the low physical activity intensity group: variability was associated with less physical disability and improved short-term memory.





SHARE dataset: The most prominent social science study
27 countries; millions of subjects being followed for 18 years

HARVARD T.H. CHAN SCHOOL OF PUBLIC HEALTH

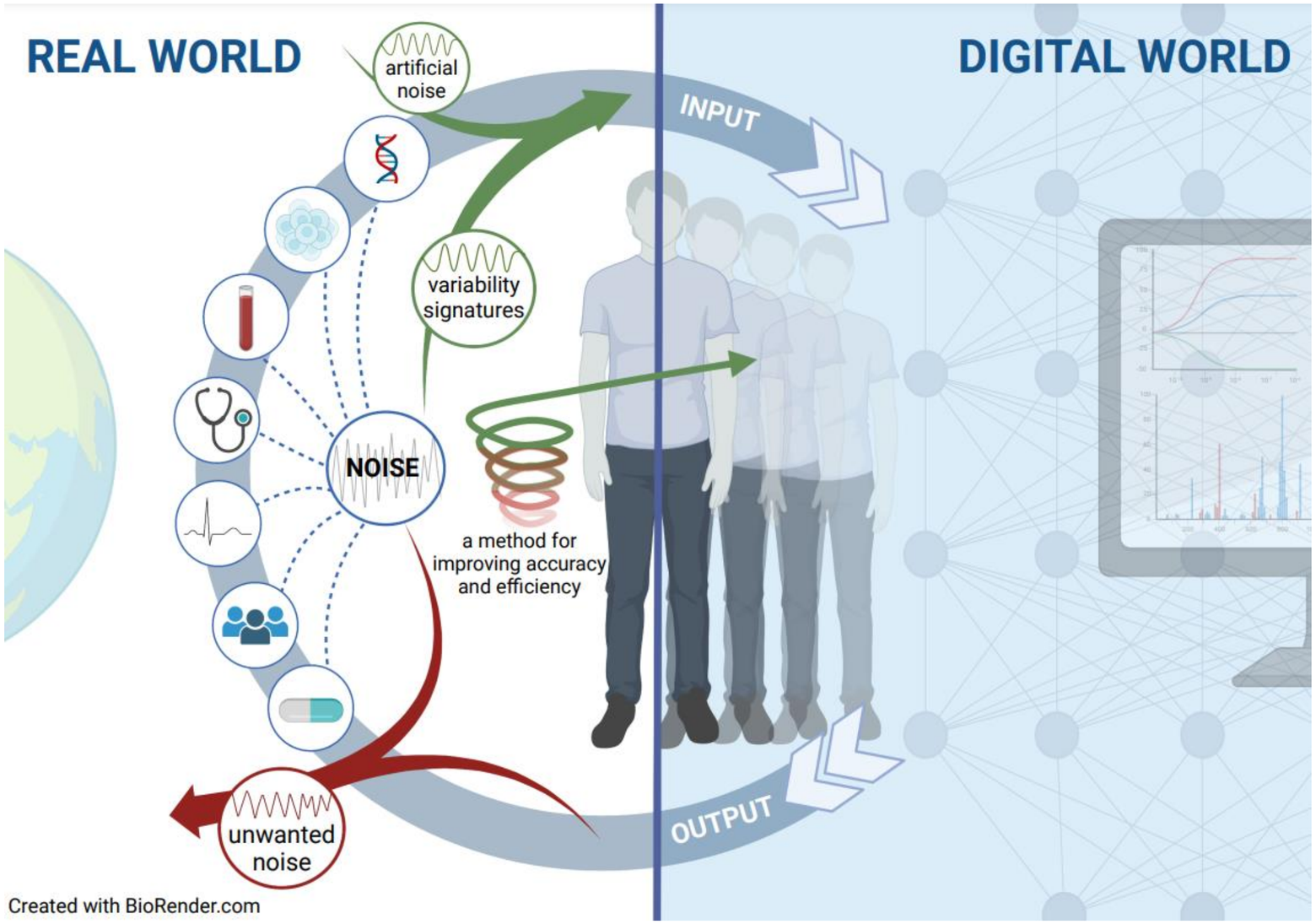
Hadassah University Hospital

Science-driven effectiveness

Rinot E, Sigawi T, Ilan Y, In press

Variability-based digital twins

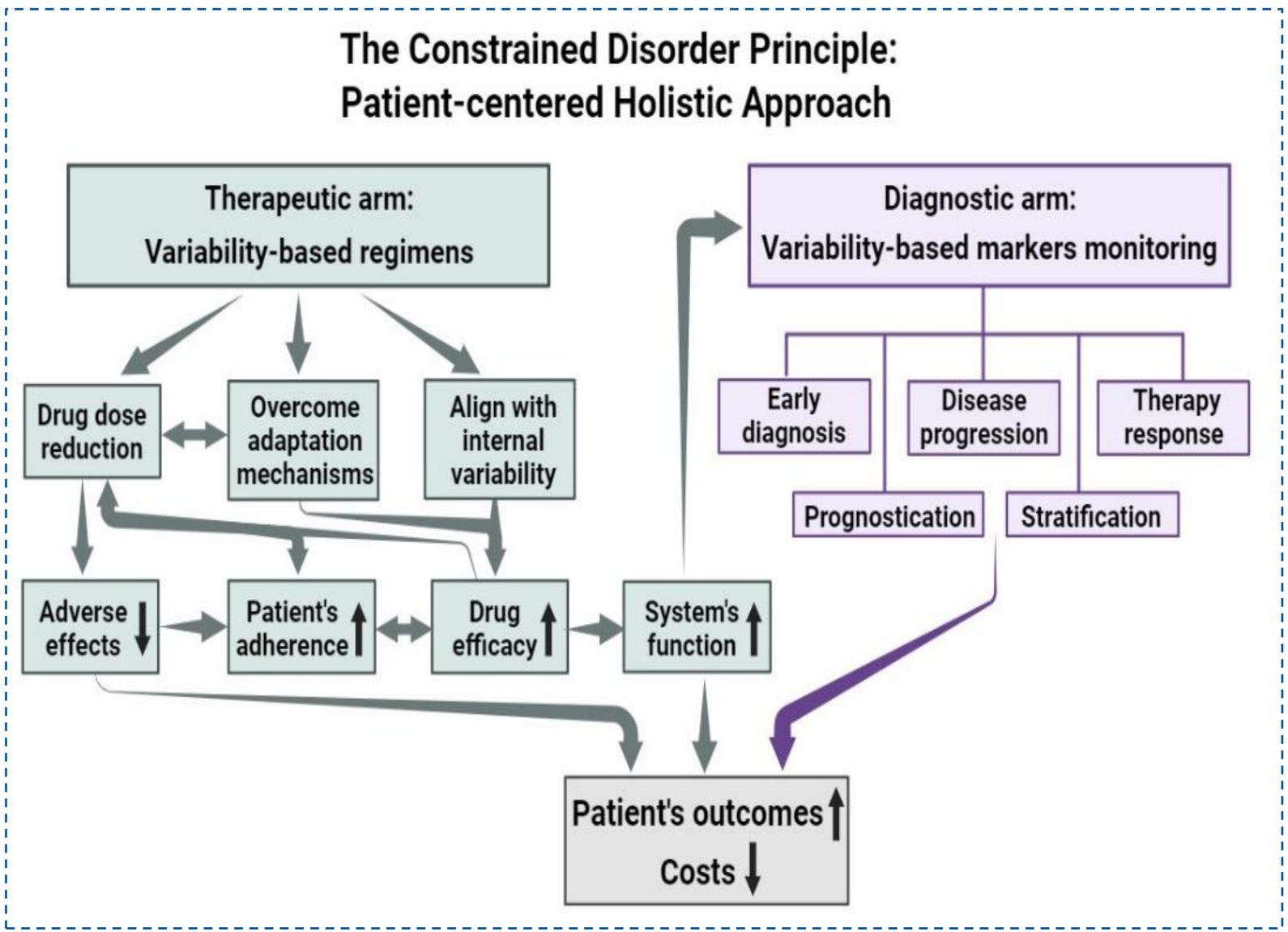
Improving the performance of prediction tools



Science-driven effectiveness

Sigawi T, Ilan Y, Biomimetic, 2023

The next-generation digital platform that improves diagnosis, monitoring, and effectiveness of drugs by implementing variability



- Applies to any disease
- Gathers data on response
- Guides future treatments
- Remote monitoring

Science-driven effectiveness

Ilan, Y in press 2023

> 40 publications & 2 books

Biomedicine & Pharmacotherapy 161 (2023) 114334

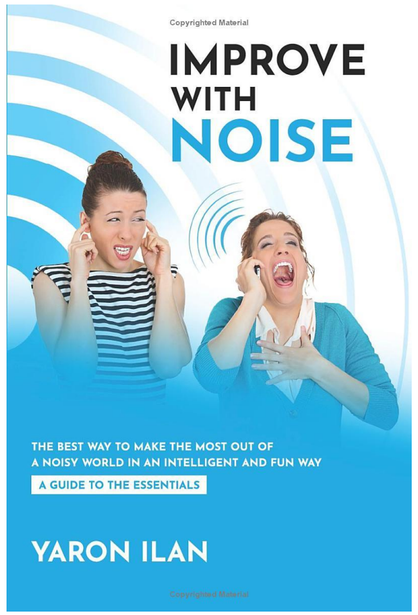
Contents lists available at ScienceDirect

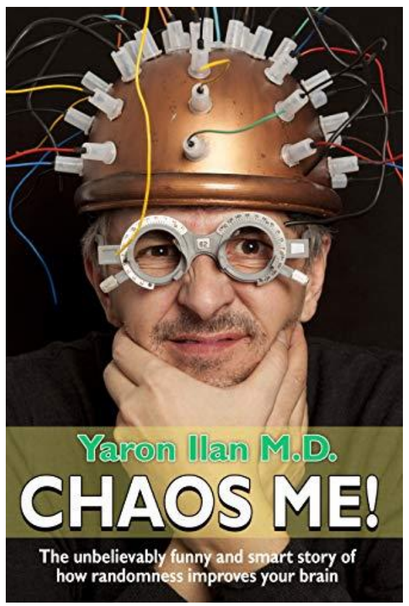
Biomedicine & Pharmacotherapy

journal homepage: www.elsevier.com/locate/biopha

A second-generation artificial intelligence-based therapeutic regimen improves diuretic resistance in heart failure: Results of a feasibility open-labeled clinical trial

Ram Gelman [a,1], Noa Hurvitz [a,1], Rima Nesserat [a], Yotam Kolben [a], Dean Nachman [b], Khurram Jamil [c], Samuel Agus [c], Rabea Asleh [b], Offer Amir [b], Marc Berg [c], Yaron Ilan [a,*]





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Science-driven effectiveness

✓ Ensuring adoption by improving outcomes:
augmenting the standard of care

Patients view the app as part of their treatment.

✓ Improving existing products: *An "Uber / Airbnb" model*

No need to develop expensive new products, no regulatory barriers:

✓ Saving costs to health systems

✓ Increasing pharma revenue

✓ A B2B win-win business model

A per patient per month fee and sharing revenues from data

OBERON SCIENCES
Next Generation Personalized Medicine