Health data and prevention

*by improving **data quality, relevance and accessibility***
well-being and prevention of disease could be improved

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Principal investigator, CLEOS – a large program for computerized history taking

What affects early death?

Life style and Life Conditions

40%

Family history and genetics

30%

Environmental and social factors

20%

Healthcare

10 %

The NEW ENGLAND JOURNAL of MEDICINE Schroeder NEJM 2007

SIMPLE ROOT CAUSE ANALYSIS

*WHO Europe
"…estimates indicate that at least 80% of all
- heart disease,
- stroke
- type 2 diabetes
and
- at least one third of cancer cases are avoidable"

https://www.euro.who.int/__data/assets/pdf_file/0004/235975/Prevention-and-control-of-noncommunicable-diseases-in-the-European-Region-A-progress-report-Eng.pdf

https://www.oecd-ilibrary.org/social-issues-migration-health/the-heavy-burden-of-obesity_67450d67-en

From Ebba Carbonnier

Primary Prevention – nudging healthy behaviours

www.discovery.co.za/medical-aid/about-discovery-health

Can we beat the 'Prevention Paradox'?

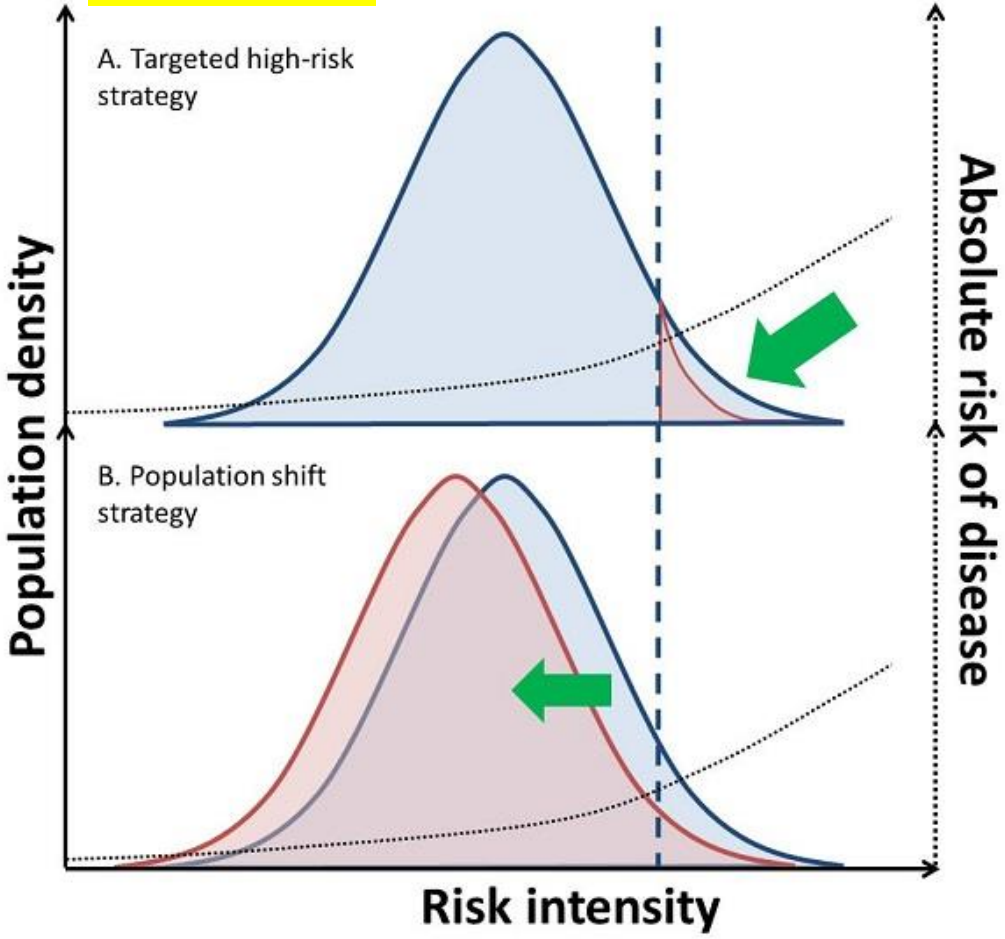


Figure 1. Illustration of disease prevention strategies. Inspired by Rose 1985 *IJE*.

Interventions addressing a large number of people who are at a small risk may be more effective in reducing injury and illness than interventions addressing small numbers at high risk.

Convergence in the making?

Precision Medicine

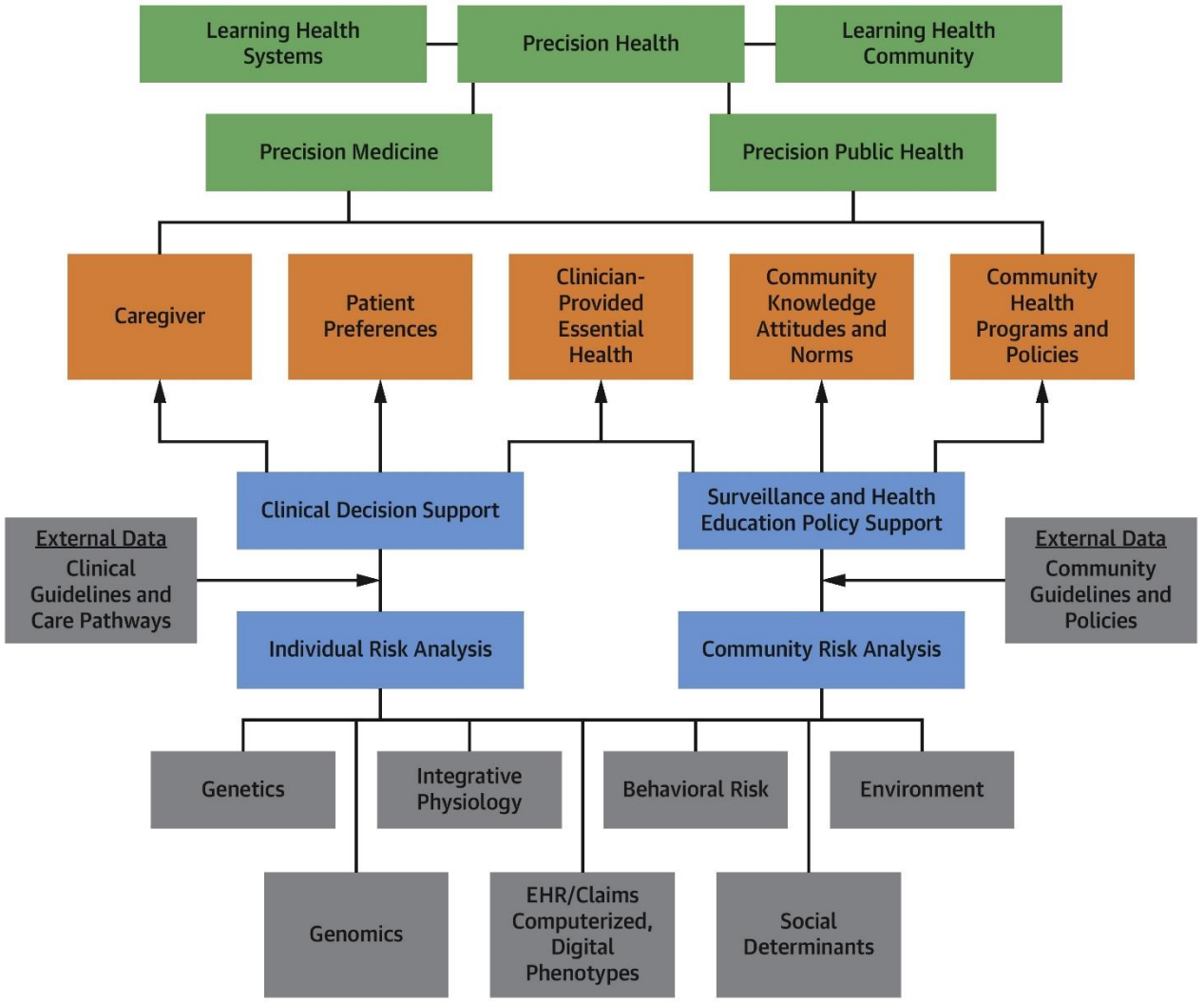
+

Precision Public Health

=

Precision Health?

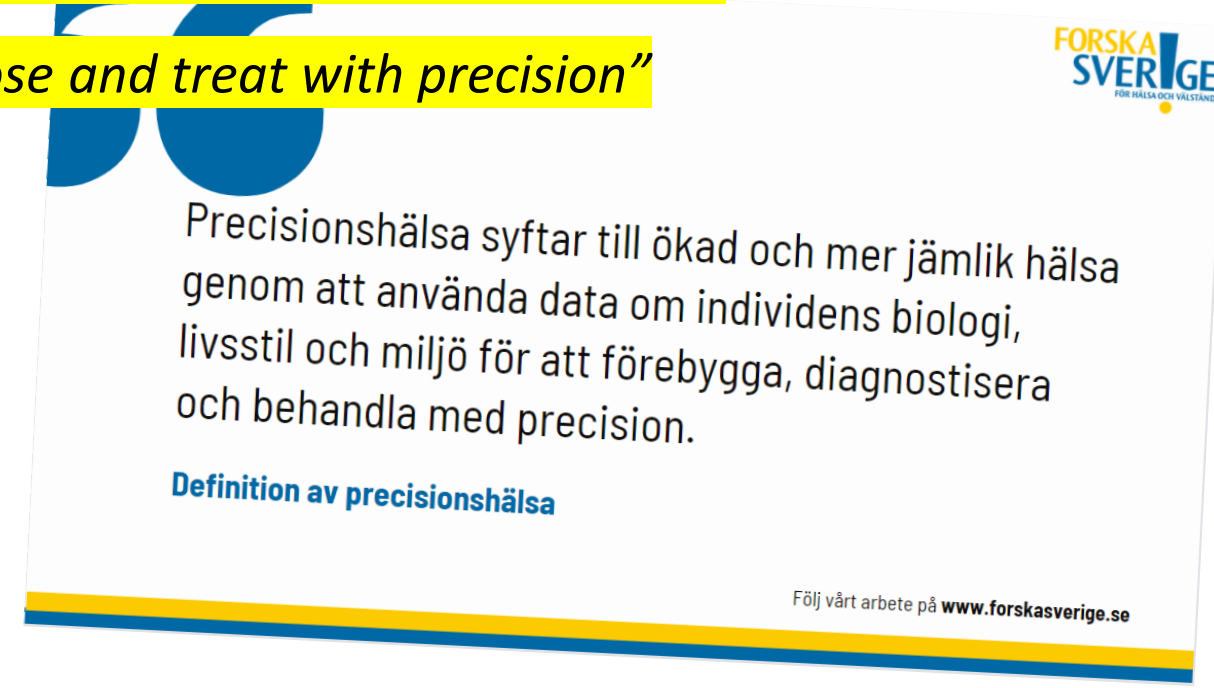
CENTRAL ILLUSTRATION: The Integration of Multidimensional Data, Precision Analytics, and Implementation Research Into Precision Health



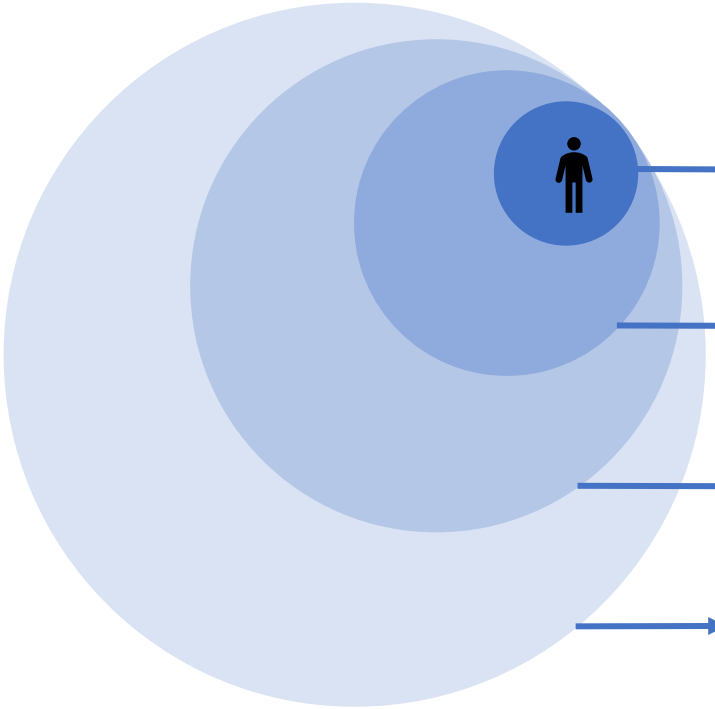
Pearson, T.A. et al. J Am Coll Cardiol. 2020;76(3):306-20.

Towards ”Precision Prevention”…

” Precision health aims to improved and more equitable health by using data on individuals’ biology, lifestyle and context to prevent, diagnose and treat with precision”



Precision Medicine - data

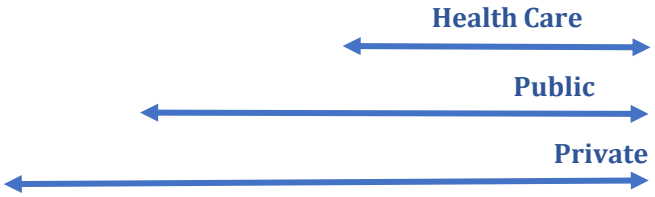


Biologic data: age, genome, fenotype, proteom, mikrobiom etc

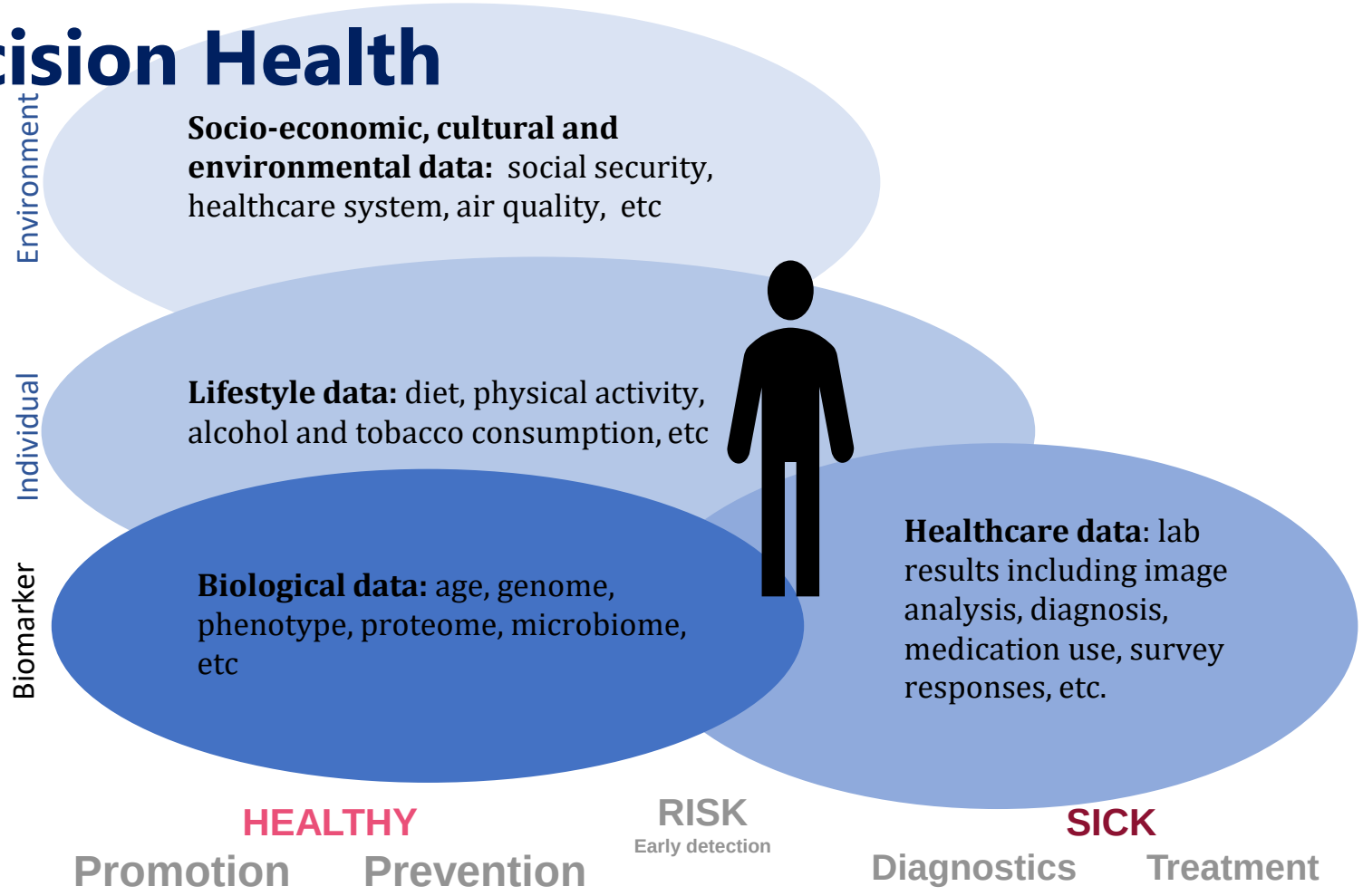
HealthCare data: labwork, imaging, diagnosis, drug use, anamnestic etc

Lifestyle data: diet, physical activity, alkohol- & tobacco consumption etc

Socioeconomic and environmental: social security, airquality, etc



Precision Health



WHY HEALTHCARE DATA IS DIFFICULT

Data sources for decision making and medical research

- Sources
  - → EHRs
  - → Lab, imaging, electrophysiology
  - → Registries
  - → Wearables/home monitoring
  - → PROMs
- Issues
  - → Legal
    - GDPR etc
  - → Interoperability
  - → Standardization
    - Technical
    - Semantic
  - → Transferability/availability

The many vital V's of Healthcare Big Data Analytics

- **Volume** – how much data is there?
- **Velocity** – how quickly is the data being created, moved, or accessed?
- **Variety** – how many different types of sources are there?
- **Veracity** – can we trust the data?
- **Validity** – is the data accurate and correct?
- **Viability** – is the data relevant to the use case at hand?
- **Volatility** – how often does the data change?
- **Vulnerability** – can we keep the data secure?
- **Visualization** – how can the data be presented to the user?
- **Value** – can the data produce a meaningful return on investment