



PROPHET FOR ALL - FACTSHEET#1

PERSONALIZED PREVENTION CONCEPTS AND LEVELS

WHAT IS PERSONALIZED PREVENTION ?



Definition



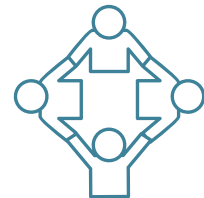
Personalized prevention aims to prevent diseases before they start, get worse, or come back. It uses personalized/tailored actions guided by information about each person, such as:



Person's body information: like genes and other biomarkers**, age, and current health conditions.



Environment & behaviour: where you live, work, and the lifestyle choices you make.



Social context: economic situation and cultural background.



The aim is to act **at the right time**, in ways that are **effective** and **fair for everyone**, so people can maintain the best possible health **throughout their lives**.

***Biomarkers: measurable signs from the body that tell us something about health or disease: i.e., cholesterol level (heart problem risk); blood pressure (heart problem and stroke risk); Viral load (amount of virus in the blood); genetic variants (e.g., a BRCA1/2 change linked to cancer risk), etc.*

PERSONALIZED MEDICINE PERSONALIZED PREVENTION

VS



Personalized medicine is “a medical model that uses information about a person’s traits and genes (for example, molecular tests, medical imaging, lifestyle data) to choose the **best treatment** for each person at the right time. It can also help identify someone’s risk of disease and support timely, targeted prevention” (from Horizon 2020 Advisory Group definition).

≠ What’s the difference with personalized prevention?

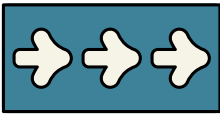
- **Personalized medicine** covers the whole care pathway: diagnosis, treatment, and follow-up.
- **Personalized prevention** is about preventing diseases before they start, get worse, or come back. It looks at a person's risk and uses that to plan how to keep them healthy.

PERSONALIZED PREVENTIVE APPROACHES AT DIFFERENT LEVELS



Concretely, a personalized preventive approach means using information about a person's body, like genes and health conditions, along with their lifestyle and environment, to decide on actions to prevent diseases from starting, progressing, or coming back. So, personalized preventive actions can be taken at three different levels:

- **Primary prevention:** it means stopping diseases before they start. It includes education, support for healthy habits, and preventive intervention targeted at people who are at increased/higher risk.



For example, someone with a family history of heart disease may have a genetic test* for familial hypercholesterolemia (FH) to find out if they are at risk while they are still symptom-free.

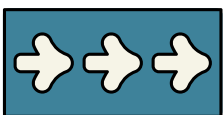
If they are, they can start a heart-healthy diet and, where appropriate, cholesterol-lowering medicines to cut cardiovascular risk.

*Testing can be



- Offered broadly (to everyone, regardless of background risk),
- Targeted to higher-risk groups (e.g., specific age ranges with existing health conditions), or
- Extended to families via cascade screening (a step-by-step way to offer testing to relatives of someone with a known risk, because family members may share that risk).

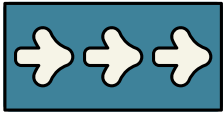
- **Secondary prevention:** This is about **early** detection and treatment of health problems in people who don't show symptoms but are at high risk, to reduce the impact and prevent complications. It uses tests (i.e., blood or genetic tests) and personal information to find out who is at **high risk**, then offers in-depth checks and tailored follow-up. As with primary prevention, cascade screening of family members may be used to include relatives.



For example, if someone has a family history of *colorectal cancer (CRC)*, they might get special tests and have personalized screening schedules to catch it early.

- **Tertiary prevention:** This is about helping people who **already have a disease** to reduce progression and recurrences, improving quality of life: so, to live better and stop it from getting worse. It uses tests to find the right medicine and dose for each person.

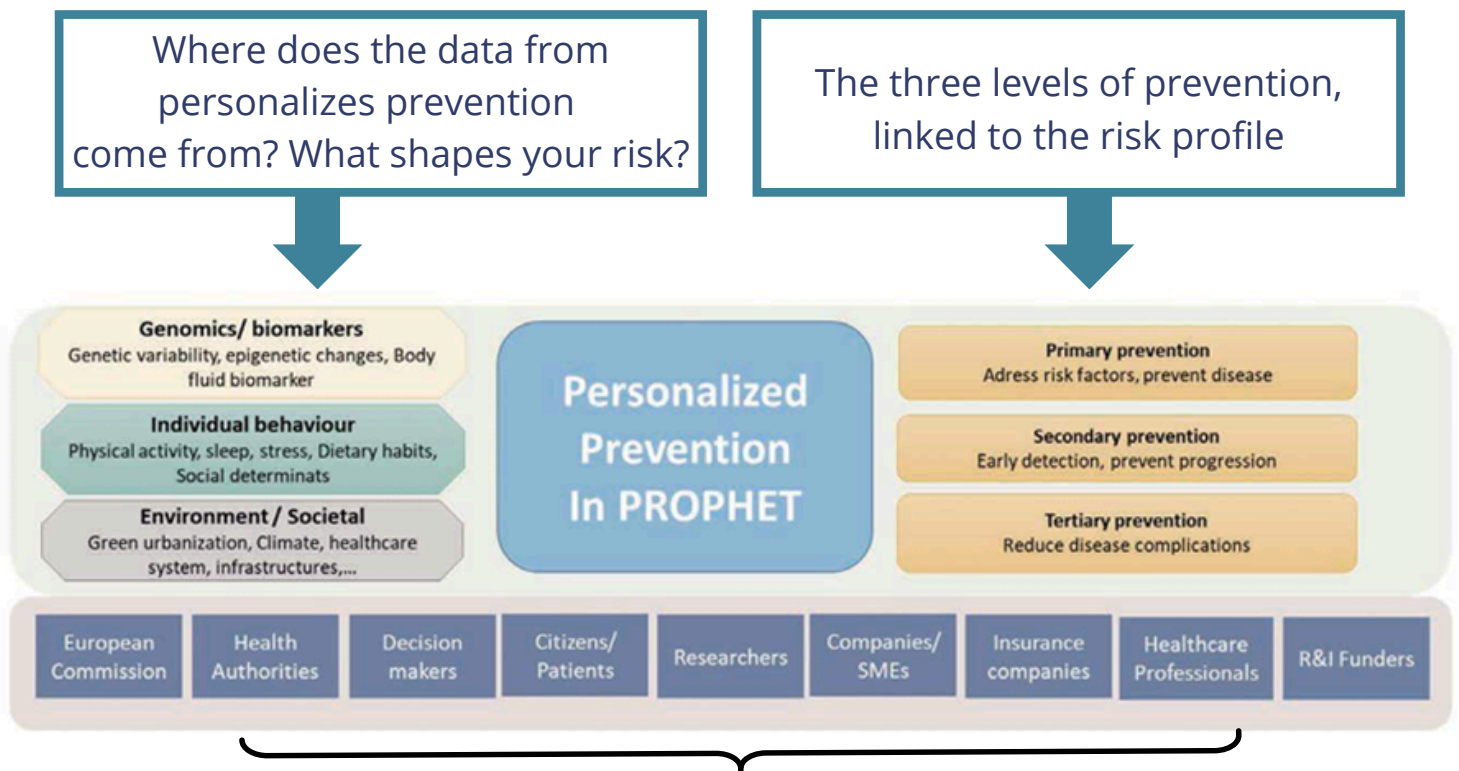
This helps to avoid problems and prevent side effects. A pharmacogenomic test, for instance, is a medical test that helps doctors evaluate how your genes affect your response to a specific medicine.



For example, in people with depression, pharmacogenomic testing - highlighting genes that influence how the body processes many antidepressants - can help select the most effective drug and dose.

In fact people with certain variants may be at higher risk of side effects and can benefit from dose adjustments or alternative medicines tailored to their genetic profile.

THE PROPHET PERSONALIZED PREVENTION IMAGE



Who should cooperate? A coordinated effort is needed from the European Commission, health authorities, policy makers, citizens/patients, researchers, companies/Small-Medium Enterprises, insurers, healthcare professionals, and research & innovation funders. **The takeaway:** personalized prevention isn't only clinical—it's an ecosystem where many actors use biological, behavioural, and environmental data to choose the right intervention (primary, secondary, or tertiary) at the right time.

GENETICS, GENOMICS, & OTHER OMICS SCIENCES

Why they matter in personalized prevention ?



Personalized prevention uses **genetics** and other “omics” sciences (gen**omics**, prote**omics**, metabol**omics**, and others) to understand health better. These sciences - analyzing your genes, your proteins, or many small molecules - help us learn more about how diseases work, find out who is at risk, and create prevention plans for each person.

GENETICS: “sometimes a change in one gene could strongly increase a person’s risk for a specific disease”



Genetics looks at **single** gene changes that can cause high risk for diseases like cancer or heart problems. For example, changes in the so-called *BRCA1/2* genes can lead to breast and ovarian cancer, and changes in *LDLR* (Low-Density Lipoprotein Receptor) genes can cause high cholesterol from a young age. Testing before symptoms appear can help reduce risk at an early stage, starting appropriate preventive actions such as more check-ups, surgery, or medication.



To use genetics well, we need to:

- Find people who might have or carry a genetic condition.
- Explain genetic information clearly so people can make good health choices.
- Follow agreed clinical guidelines to help patients with genetic conditions.

GENOMICS: “many genes at once”



Genomics examines all our genes (the genome) and helps analyze risks based on multiple genes and other factors. This helps with:

- **To guess/assess the risk of common diseases** like some cancers, type 2 diabetes, and heart disease. This risk may be influenced by many small gene changes, which may sometimes be grouped into a score called “Polygenic risk scores (PRS)”.
- **Tumor profiling:** This checks a cancer's DNA** to find the best treatments.
- Identify genetic mutations underlying **rare or hard-to-explain health problems** thanks to whole-genome/exome [1] sequencing.

Other “omics” sciences beyond genetics and genomics include:

- **Proteomics:** looks at all proteins in a cell to see biological activity
- **Metabolomics:** analyses small molecules from metabolism to follow cell function.
- **Epigenomics:** studies chemical changes that affect gene activity without changing DNA.
- **Radiomics:** uses computers to get data from medical images like CT (Computed Tomography) or MRI (Magnetic Resonance Imaging) scans.
- **Transcriptomics:** studies RNA [2] to see which genes are active.

Together, these sciences provide a multi-level view of health and disease. They combine information from genes, proteins, and metabolites to better understand risk. This helps to make the prevention of many diseases more accurate and effective.

***DNA is like a set of instructions that tells our body/cells what to do. It is the body's code—genes are the chapters, chromosomes are the books, and your genome is the whole library.*



a PeRsOnalized Prevention roadmap
for the future HEalThcare

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