PROPHET

a PeRsOnalized Prevention roadmap for the future HEalThcare

PROPHET FOR ALL - FACTSHEET#3

HOW PERSONALIZED PREVENTION IS USED FOR CHRONIC DISEASES TODAY: A MAPPING REVIEW

As part of the PROPHET project, we reviewed studies and clinical guidelines about personalized prevention published between 2017 and 2023. We found 121 papers.

- **60** were primary studies*, and
- **61** were guidelines**

In total, there were **249** personalized preventive approaches mentioned: 113 came from studies, and 136 came from guidelines.

Why it matters ?

This shows that there is already a substantial—and growing—body of real-world studies and professional guidance on how to tailor prevention to each person.

* **Primary studies:** original research, such as clinical trials, that collect and analyze new data (not summaries of others' work)

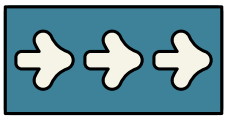
** **Guidelines:** evidence-based recommendations that help doctors and patients decide on the best care in common situations. They turn many studies into clear, practical advice.

CLASSIFICATION OF THE APPROACHES ACCORDING TO PREVENTION LEVELS

1

In primary prevention (this is about preventing diseases before they develop): about half of the approaches, we found in our review focus on heart diseases and the other half on cancer.

Among these, one strategy for **heart diseases** is to get a special test looking at people's genes (using the Polygenic Risk Score -PRS) to see if they are at increased risk. If they are, they get advice on how to live healthier or take medicine to prevent disease.



For example, in Estonia, a study showed how people with a higher risk of heart disease got special advice and medicine, that helped them lower their bad cholesterol. But using genes to decide on treatment is not yet common practice because we need more proof if and for what patients it works.

For **cancer**, an established approach in prevention, as reported in various guidelines**, is that doctors check patients for certain gene changes—such as *BRCA1/2*—which can increase the risk of breast, ovarian, and, in some cases, prostate cancer. People with these gene changes or a family history of cancer might get surgery, change their lifestyle, or take medicine to lower their risk.

2

In secondary prevention (this is about catching diseases early): most methods we found in our review focus on cancer screenings.

One approach is "Cascade testing": If someone in a family has a gene change that can cause a certain cancer (i.e., colorectal cancer - CRC), their family members can get advice/counselling and get tested too. If they have a gene variant that increases their risk, doctors will watch them closely to catch any problems early, even when they are kids or teenagers. This personalized approach helps prevent cancer from developing unnoticed.

There are many guidelines about personalized cancer screening, showing that this area of cancer prevention is well advanced in practice.

3 **In tertiary prevention** (this is about managing diseases better and decreasing/avoiding complications): also in this case, most of the approaches we found focus on **cancer** and **cardiovascular diseases.**

One example from primary studies* comes from the United States: in a study with older patients who take many medicines, doctors used a specific **pharmacogenetic test** (for CYP450)—a test that shows how your genes affect the way your body processes certain drugs — together with a computer tool to choose the **right medicine and dose**. Patients who had this approach had **fewer hospital readmissions** and **fewer emergency visits** for common conditions like COPD (chronic obstructive pulmonary disease), reflux, and hypothyroidism. It's promising, but it's not yet part of standard guidelines.

For cancer, many guidelines advise testing specific genes (DPYD) before giving certain chemotherapies (like 5-FU or capecitabine). These genes affect how the body breaks down these drugs, and the risk of severe side effects - so doctors can lower the dose or choose another medicine to keep patients safer.

CONCLUSIONS

Right now, **cancer** is where personalized prevention is most advanced and you can see it in the number of **recent guidelines**** already in place. **Heart disease** is not far behind: there's a wave of **new research**, especially in preventing problems before they start.

In areas like **neurology, mental health, and metabolic disorders** (e.g. diabetes), things are less advanced. Most personalized approaches are used to reduce complications once a condition exists, and to make treatments safer and better tailored.

Overall, the tools are coming, but many are not standard care yet. The next step is to turn strong research into clear, widely adopted guidelines**, so personalized prevention can benefit many more people across different diseases.

To read the paper related to this lay language factsheet:

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