

Earlier detection of cardiometabolic risk factors for kids may be possible through next generation biomarkers

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The next generation of cardiometabolic biomarkers should pave the way for earlier detection of risk factors for conditions such as obesity,

diabetes and heart disease in children, according to a new [scientific statement from the American Heart Association](#) published in the journal *Circulation*.

"The rising number of children with major risk factors for cardiometabolic conditions represents a potential tsunami of preventable disease for our health care system," says the statement's lead author Michele Mietus-Snyder, M.D., a preventive cardiologist and [clinical research](#) scientist at Children's National Hospital. "But by the time a child is identified based on today's clinical biomarkers, it's often too late to reverse the disease trajectory."

The scientific statement included biomarkers that met three criteria:

- Early and precise clinical detection of metabolic abnormalities before a child begins to show the current clinical signs such as high body mass index (BMI), [blood pressure](#) or cholesterol.
- Mechanistic intervention targets providing immediate risk measures and giving clinicians new targets to personalize and optimize interventions.
- Modifiable biomarkers that are capable of tracking progression toward or away from cardiometabolic health.

The statement's identified biomarkers included measures of:

- Epigenetic, or environmental, factors
- Gut microbiome health
- Small particle metabolites in the body
- Different types of lipids and their impacts on cell membranes
- Inflammation and inflammatory mediators

The authors proposed these biomarkers with the goal of "expanding awareness to include a whole new realm of biomarkers that precede the

traditional risk factors we currently rely upon, such as BMI, blood pressure, cholesterol and blood sugar," says Mietus-Snyder. "Ideally, these new biomarkers will be added to the array of measures used in clinical research to better assess their value for earlier identification and prevention of global patterns of cardiometabolic health and risk."

The next generation cardiometabolic biomarkers outlined by the authors are all currently used in research studies and would need to be validated for clinical use. However, Mietus-Snyder notes that the data already collected from these biomarkers in research can make a difference in [clinical practice](#) by enhancing our understanding of the deep metabolic roots for children at risk.

Evidence reviewed in the statement shows the risk factors children are exposed to, even before birth, can set the stage for cardiovascular and metabolic health across the lifespan.

Interestingly, all the different factors reviewed have been found to alter the functioning of the mitochondria—the complex organelles responsible for producing the energy for the body that every cell and organ system in turn needs to function. Every class of biomarkers reviewed is also favorably influenced by heart-healthy nutrition, a simple but powerful tool known to improve mitochondrial function.

What's next

Even as the new so-called 'omic' biomarkers reviewed in this statement are developed for clinical applications, there are things clinicians can do to optimize them and improve mitochondrial function, according to Mietus-Snyder.

Most important is to strengthen the collective dedication of care providers to removing the barriers that prevent people, especially

expecting mothers and children, from living heart-healthy lifestyles.

We have long known lifestyle factors influence health. Even as complicated metabolic reasons for this are worked out, families can reset their metabolism by decreasing sedentary time and increasing activity, getting better and screen-free sleep, and eating more real foods, especially vegetables, fruits and whole grains, rich in fiber and nutrients, with fewer added sugars, chemicals, preservatives and trans fats. Clinicians can work with their patients to set goals in these areas.

"We know diet and lifestyle are effective to some degree for everyone but terribly underutilized. As clinicians, we have compelling reasons to re-dedicate ourselves to advocating for healthy lifestyle interventions with the families we serve and finding ways to help them implement them as early as possible. The evidence shows the sooner we can intervene for cardiometabolic health, the better."

More information: Michele Mietus-Snyder et al, Next Generation, Modifiable Cardiometabolic Biomarkers: Mitochondrial Adaptation and Metabolic Resilience: A Scientific Statement From the American Heart Association, *Circulation* (2023). [DOI: 10.1161/CIR.0000000000001185](https://doi.org/10.1161/CIR.0000000000001185)

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