Ultra-processed foods: Exercise can cut type 2 diabetes risk

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Type 2 diabetes risk is shaped by genetics and lifestyle together, but how those factors interact, whether being physically active can meaningfully offset a high genetic risk score, or a diet heavy in ultra-processed food, has been unclear. A new analysis presented at the EASD Annual Meeting in Milan uses UK Biobank data combining dietary records, wearable-measured activity and polygenic risk scores to test exactly that.

KEY TAKEAWAYS

- The Pivot: Genetic risk for type 2 diabetes is not fixed destiny, diet and activity changes lower risk meaningfully even in people with high polygenic risk scores.
- The Data: Meeting WHO activity guidelines cut risk by up to 58% even among high ultra-processed food eaters, and combining lower UPF intake with activity cut risk by up to 70% depending on genetic risk band.
- The Action: Physical activity counselling deserves equal billing with dietary advice in type 2 diabetes prevention, including for patients told they have high genetic risk.

The prospective analysis included 56,964 UK Biobank participants without diabetes at baseline, mean age 61.5 years, 42.3% men, who had dietary, accelerometer and genetic data available. Diet was assessed using repeated 24-hour dietary records classified by the Nova system, moderate-to-vigorous physical activity (MVPA) was derived from 7-day wrist-worn accelerometers, and genetic susceptibility was quantified using a type 2 diabetes polygenic risk score (PRS). Over a mean follow-up of 7.8 years, 926 participants developed type 2 diabetes.

Diet, activity and genes each move the needle independently

Ultra-processed food (UPF) intake was linearly associated with higher type 2 diabetes risk: each 10% increase in UPF as a share of total food weight raised risk by 7% (HR 1.07, 95% CI 1.03-1.12). Physical activity showed a different shape of relationship, an L-shaped curve, where risk dropped sharply with initial increases in activity and then levelled off. Meeting the WHO recommendation of at least 150 minutes of MVPA per week was associated with a 39% lower risk of type 2 diabetes (HR 0.61, 95% CI 0.53-0.70) relative to not meeting it.

Genetic susceptibility did not override the value of lifestyle change. Among participants with high polygenic risk, lower UPF intake was associated with a 35% lower risk (HR 0.65, 95% CI 0.49-0.85), and meeting WHO activity recommendations was associated with a 33% lower risk (HR 0.67, 95% CI 0.55-0.81), each considered independently.

The combination that cuts risk the most, across every genetic risk band

Among participants with high UPF intake specifically, meeting WHO activity recommendations still lowered type 2 diabetes risk across all three genetic risk strata: 31% lower in the high genetic risk group (HR 0.69, 95% CI 0.50-0.96),

57% lower in the intermediate group (HR 0.43, 95% CI 0.29-0.66), and 58% lower in the low genetic risk group (HR 0.42, 95% CI 0.25-0.72).
Combining lower UPF intake with meeting WHO activity recommendations produced the largest reductions of all: 49% lower risk in the high genetic risk group (HR 0.51, 95% CI 0.38-0.68), 70% lower in the intermediate group (HR 0.30, 95% CI 0.21-0.42), and 59% lower in the low genetic risk group (HR 0.41, 95% CI 0.24-0.66). No funding or industry conflicts were declared for this analysis.

These findings underscore a critical message for healthcare professionals: lifestyle interventions, particularly the combination of reducing UPF intake and increasing physical activity, offer substantial and independent protection against type 2 diabetes, even in individuals with a high genetic predisposition. This challenges the notion that genetic destiny is immutable, empowering clinicians to advocate for robust lifestyle modifications across all patient risk profiles. The dose-response relationship observed for physical activity, with significant benefits seen even at the WHO minimum recommendations, suggests that even modest increases in activity can yield meaningful reductions in risk.

Clinical Implications and Patient Counseling Strategies

The study’s robust findings provide clear guidance for clinical practice, emphasizing that a multi-pronged approach to lifestyle modification is the most effective strategy for type 2 diabetes prevention. Clinicians should proactively assess both dietary patterns, specifically UPF consumption, and physical activity levels in all patients, regardless of their genetic risk profile. The data suggests that even in individuals with high genetic susceptibility, significant risk reduction is achievable through lifestyle changes. This empowers healthcare providers to deliver a message of hope and agency, rather than fatalism, to patients concerned about their genetic predisposition to type 2 diabetes.

When counseling patients, it is crucial to highlight the synergistic benefits of combining reduced UPF intake with increased physical activity. Instead of focusing solely on calorie restriction or weight loss, clinicians can frame dietary advice around reducing UPF, which are often energy-dense, nutrient-poor, and highly palatable, contributing to overconsumption. Practical strategies for patients could include encouraging home cooking, reading food labels to identify UPFs, and opting for whole, unprocessed foods. Simultaneously, promoting adherence to WHO physical activity guidelines – at least 150 minutes of moderate-to-vigorous activity per week – should be a cornerstone of preventive care. This could involve prescribing specific exercise regimens, referring to community-based exercise programs, or simply encouraging incremental increases in daily activity, such as brisk walking.

It is also important to manage patient expectations and address potential barriers to lifestyle change. While the study demonstrates significant risk reduction, it does not imply a complete elimination of risk. Furthermore, socioeconomic factors, access to healthy foods, and individual preferences can all influence a patient's ability to adopt and maintain these changes. Clinicians should adopt a patient-centered approach, tailoring recommendations to individual circumstances and providing ongoing support and encouragement. Regular follow-up and monitoring of progress can help reinforce positive behaviors and address challenges as they arise.

While this study provides compelling evidence, it is important to acknowledge its limitations. The observational nature

of the study means that causality cannot be definitively established, although the prospective design and large sample size strengthen the associations. Dietary assessment relied on 24-hour dietary records, which can be subject to recall bias, and the Nova classification system, while widely used, has its own inherent limitations in categorizing food items. Future research, including randomized controlled trials, would be valuable to further confirm these findings and explore the mechanisms by which UPFs and physical activity interact to influence type 2 diabetes risk. Nevertheless, the current evidence strongly supports integrating these lifestyle interventions into routine clinical practice for effective type 2 diabetes prevention.

CLINICAL IMPLICATIONS

For clinicians counselling patients on type 2 diabetes prevention, this data pushes back against a fatalistic reading of genetic risk scores. Even in the high polygenic risk group, meeting a widely publicised, low-cost activity target (150 minutes of moderate-to-vigorous activity a week) was associated with a meaningful risk reduction, and the effect held even among people with high ultra-processed food intake.

The dose-response analysis, using restricted cubic splines, found an L-shaped relationship for activity, meaning the biggest gains came from moving people from very low activity to a moderate level, not from pushing already-active people further. That has a direct counselling implication: getting an inactive patient with prediabetes or high genetic risk to any regular activity may matter more than perfecting an already-active patient's routine.

As an observational cohort analysis, this cannot establish causation, and UK Biobank's participants are healthier and more affluent on average than the general population, which may affect how these effect sizes generalise. But the consistency of the direction of effect across every genetic risk stratum, and at every level of UPF intake, makes a reasonably strong case for activity counselling regardless of a patient's genetic risk result.

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REFERENCES

1. Xu W, Chen T, Zhang W, Sakal C, Li X. Joint associations of ultra-processed food, wearable-measured physical activity and genetic susceptibility with incident type 2 diabetes. Abstract 296. Presented at the European Association for the Study of Diabetes (EASD) Annual Meeting, Milan, Italy, 27 September-2 October 2026.

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