

# Ultra-processed food consumption, depression, and diabetes: results from the CARTaGENE Study

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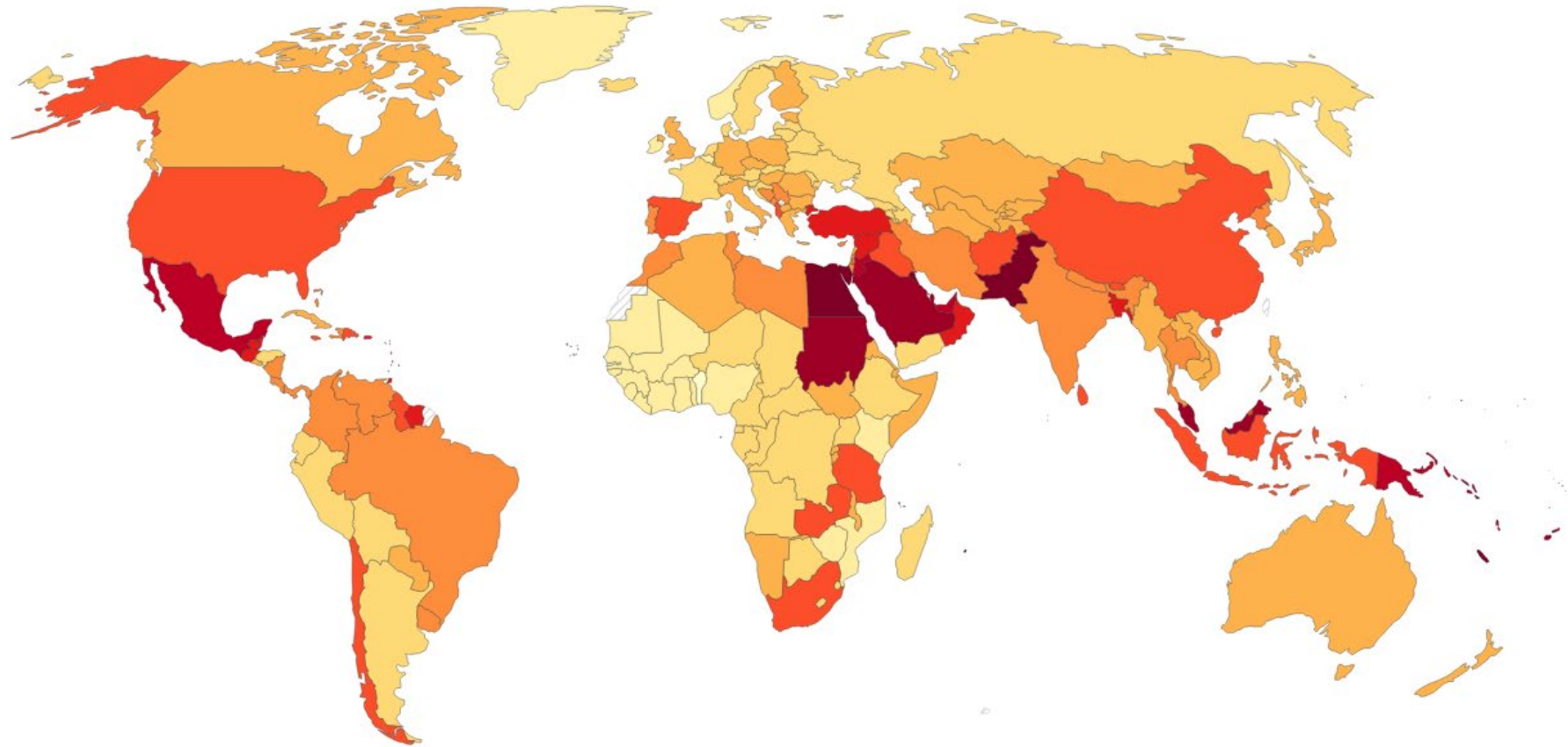
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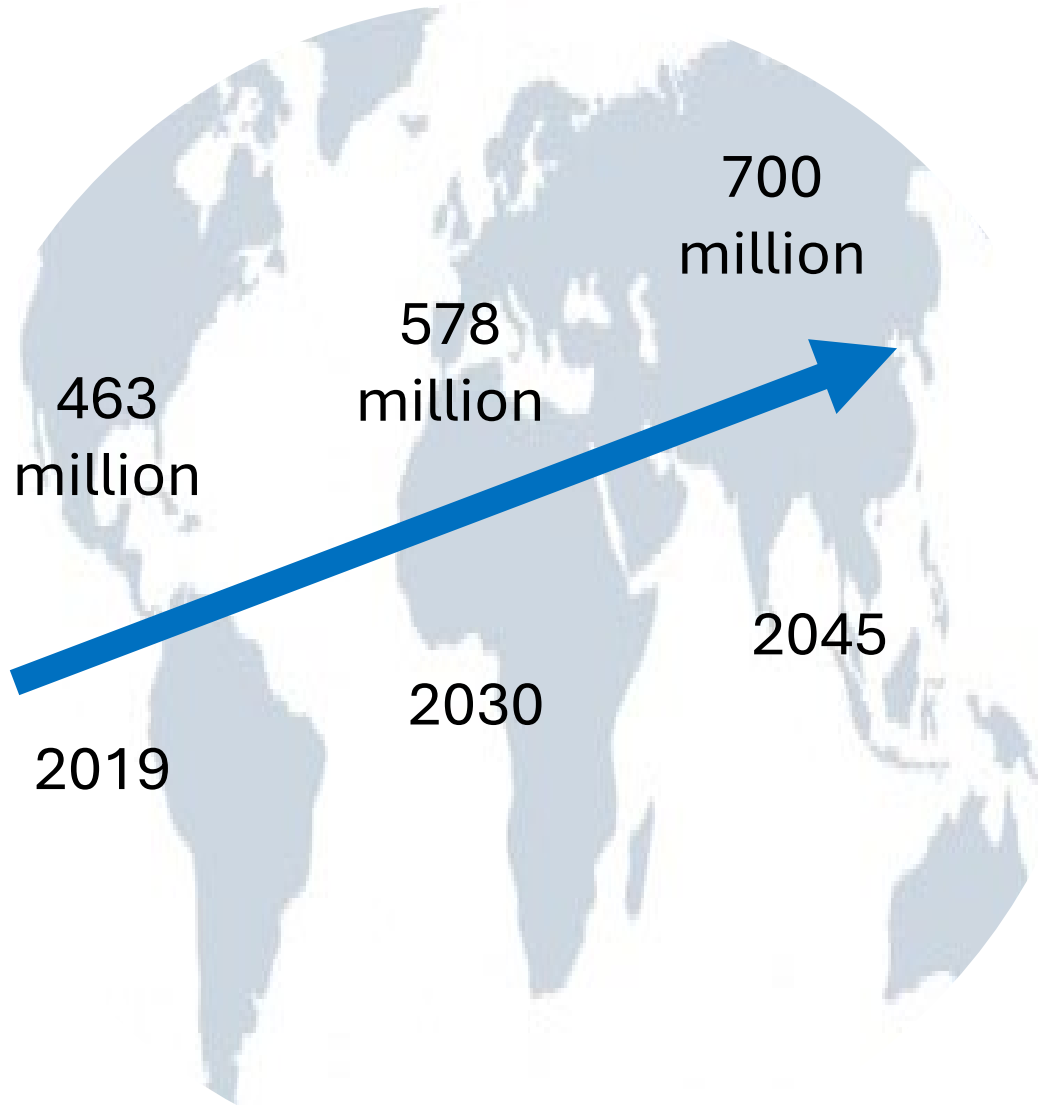
# Diabetes prevalence, 2021

The share of people aged 20-79 who have diabetes.

World



## Diabetes is on rise



## Diabetes rates in Canada

**3.2 million** Canadians are living with diabetes

**Approximately 95% of cases in Canada are Type 2 Diabetes Mellitus (T2D)**

Worldwide trends in underweight and obesity from 1990 to 2022: a pooled analysis of 3663 population-representative studies with 222 million children, adolescents, and adults

*NCD Risk Factor Collaboration (NCD-RisC)\**



**Lancet 2024; 403: 1027-50**

**More than 1 billion people worldwide are now estimated to have obesity (Adults: BMI>30)**

**From 1990 to 2022, the prevalence of obesity roughly**

- doubled in women,**
- tripled in men and**
- quadrupled in children and adolescents.**

## Modifiable risk factors for type 2 diabetes:

### - Socioeconomic status

- Education
- Low-grade occupation

### - Lifestyle

- Unhealthy Diet
- Physical inactivity
- Alcohol consumption
- Smoking
- Unhealthy sleep

### - Metabolic factors

- General or central obesity
- Insulin resistance
- Prediabetes
- Hypertension
- Dyslipidemia

### - Mental Health

- Depression
- Chronic Stress

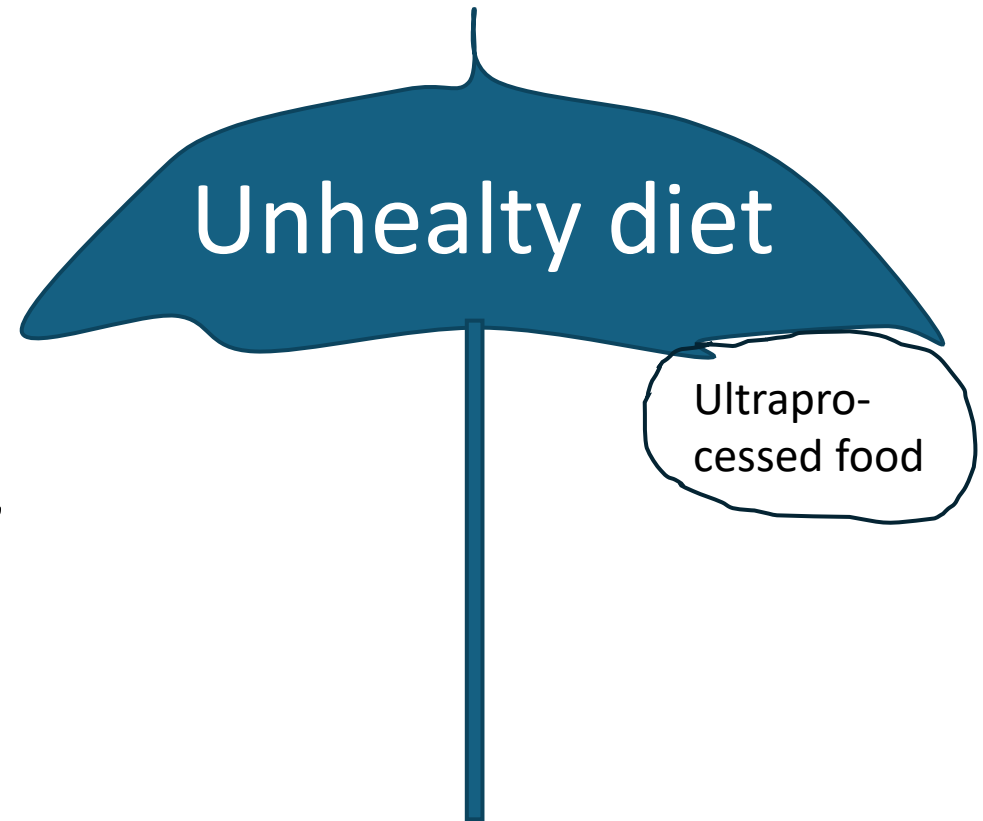
## **Unhealthy Diet** (broad term that includes)

- diets high in saturated fats, trans fats, cholesterol, added sugars, and salt.
- It also refers to diets low in fruits, vegetables, whole grains, fiber, nuts, and legumes

## **Ultra-processed food**

Foods are typically high in unhealthy fats, sugars, and salt, and low in fiber and nutrients.

Examples: soft drinks, packaged snacks, reconstituted meat products, and pre-packaged meals.



# Ultra-processed food (UPF) and Type 2 Diabetes (T2D)



104 707 participants  
repeated 24-hour dietary records  
median follow-up: 6 years

**A higher proportion of UPF in the diet was associated with a higher risk of T2D**

Controlling for age, sex, education, BMI, physical activity, smoking, alcohol, alcohol consumption, family history diabetes, overall nutrition quality...

JAMA Internal Medicine | [Original Investigation](#)

**Ultraprocessed Food Consumption and Risk of Type 2 Diabetes  
Among Participants of the NutriNet-Santé Prospective Cohort**

*JAMA Intern Med.* 2020;180(2):283-291. doi:10.1001/jamainternmed.2019.5942

Bernard Srour, PharmD, MPH, PhD; Léopold K. Fezeu, MD, PhD; Emmanuelle Kesse-Guyot, MSc, PhD;

**Depression → Diabetes**

**Diabetes is caused by “sadness  
or long sorrow and other  
depressions and disorders”**

**Thomas Willis, English Anatomist (1621-1675)**



# Three meta-analyses:

Knol (2006): prospective & retrospective studies: **depressed adults have a 37% increased risk** of developing type 2 diabetes mellitus.

Mezuk (2008): prospective studies: depression is associated with a **60% increase in risk** of developing type 2 diabetes

Rotella (2013): prospective studies: depression is associated with a **56% increase in risk** of developing type 2 diabetes

Journal of Affective Disorders 265 (2020) 224–232

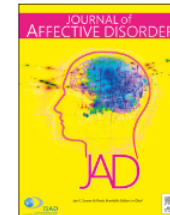


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Journal of Affective Disorders

journal homepage: [www.elsevier.com/locate/jad](http://www.elsevier.com/locate/jad)



Review article

Measures of depression and risk of type 2 diabetes: A systematic review and meta-analysis

Eva A Graham<sup>a,b,\*</sup>, Sonya S Deschênes<sup>c</sup>, Marina N Khalil<sup>b,d</sup>, Sofia Danna<sup>b</sup>, Kristian B Filion<sup>a,e,f</sup>, Norbert Schmitz<sup>a,b,d</sup>



## Depression is heterogeneous condition !!

Major depressive disorder in DSM-V may include symptoms of

Weight gain OR weight loss

Increased OR decreased appetite

Insomnia OR hypersomnia

Psychomotor agitation OR retardation

***Important to understand when and how depression affects health outcomes.***

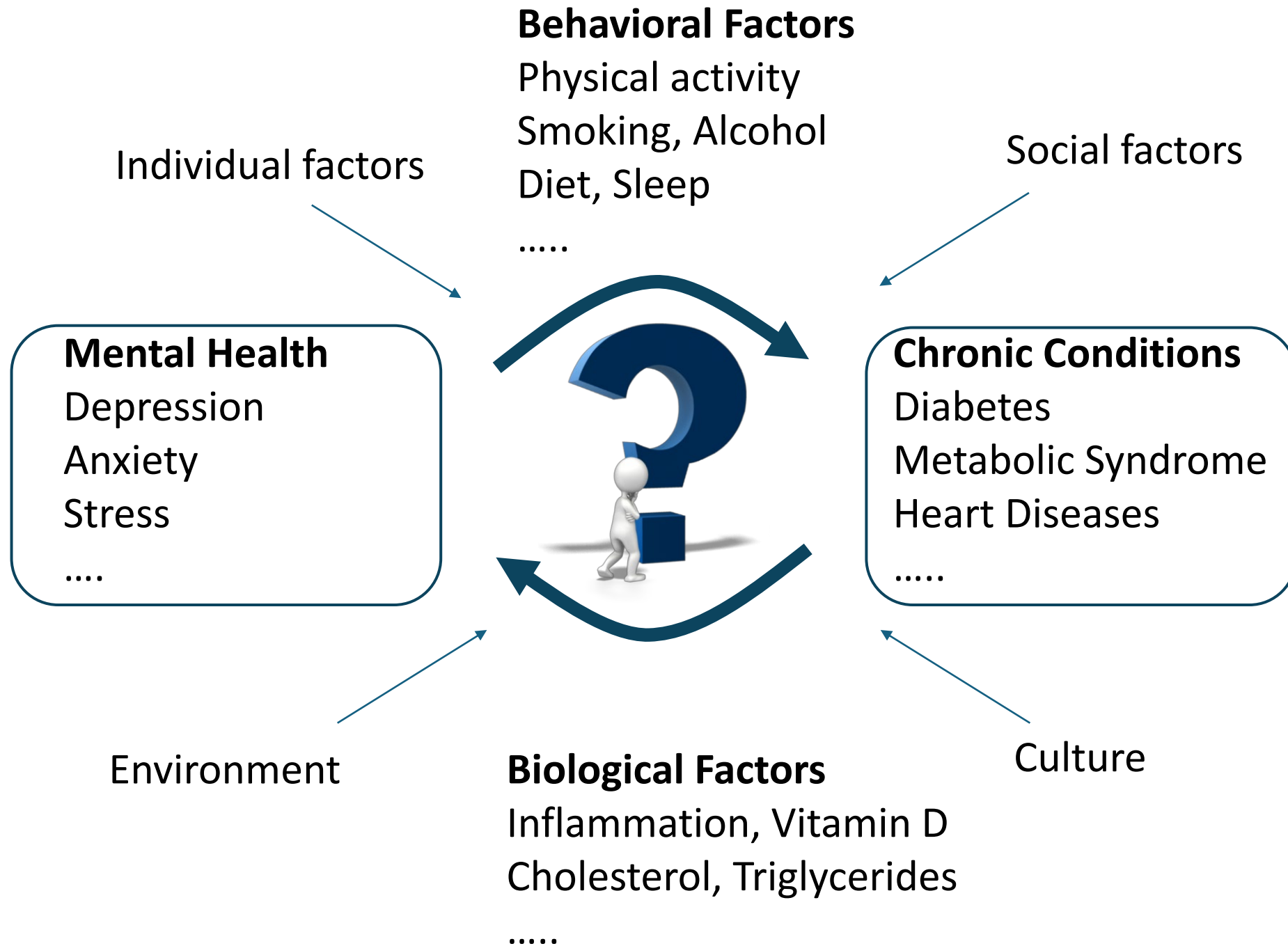


**What is the role of depression in the development of diabetes?**

**What is the role of depression in the development of complications in people with diabetes?**

**How does depression interact with other (behavioral) risk factors and lead to diabetes (or poor outcomes in diabetes)?**





# Ultra-processed food and depression

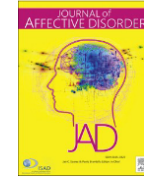
Journal of Affective Disorders 335 (2023) 57–66



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High ultra-processed food consumption is associated with elevated psychological distress as an indicator of depression in adults from the Melbourne Collaborative Cohort Study

Melissa M. Lane <sup>a,\*</sup>, Mojtaba Lotfaliany <sup>a</sup>, Allison M. Hodge <sup>b,c</sup>, Adrienne O'Neil <sup>a</sup>,



Higher ultra-processed food intake at baseline was associated with subsequent elevated psychological distress as an indicator of depression at follow-up.

# Ultra-processed food and depression

## Potential pathways:

Nutrient Deficiency and Brain Function

(Chronic) Inflammation

Gut Microbiome

Blood Sugar Fluctuations

Psychological and Social Factors (stress coping)

Lifestyle Factors

## Diabetes, Depression, Complications

Depression associated with adverse outcomes in people with T2D:

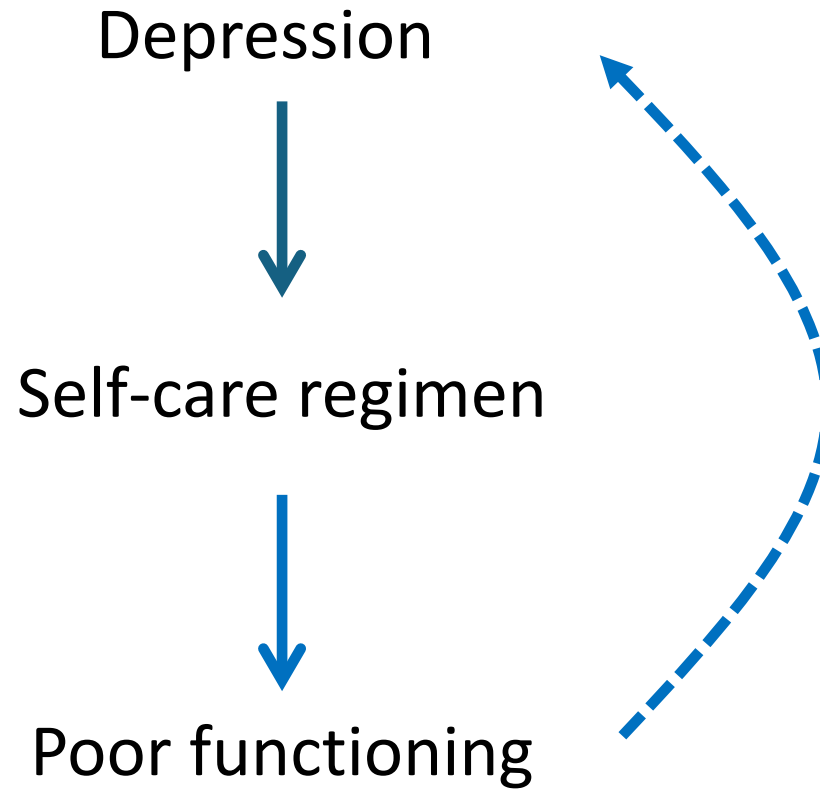
Increased risk of physical complications

Increased risk of mortality

Increased risk of poor glucose levels

Worsened adherence to self-care regimen

# Diabetes, Depression, Complications



*Psychosomatics 2014;55:659–667 Crown Copyright © 2014 Published by Elsevier Inc. on behalf of The Academy of Psychosomatic Medicine. All rights reserved.*

## Original Research Reports

Association of Depression and Anxiety Symptoms  
With Functional Disability and Disability Days  
in a Community Sample With Type 2 Diabetes

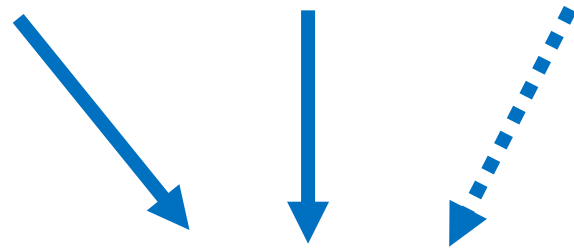
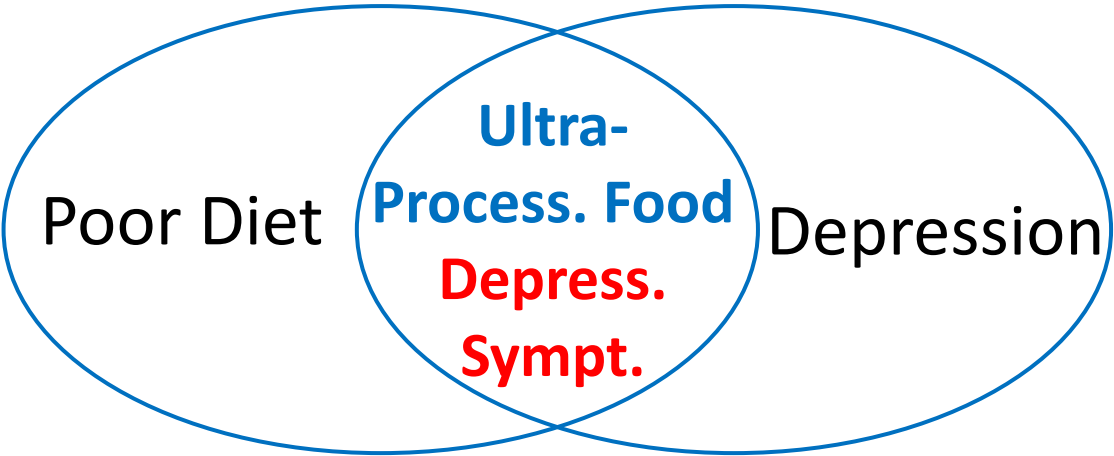


To understand how UPF consumption in combination with depression can increase the risk of T2D incidence and its complications.

Large population-based studies with long follow-ups and detailed assessment of mental health and behaviour factors are needed

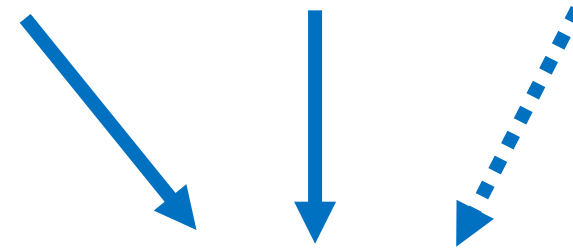
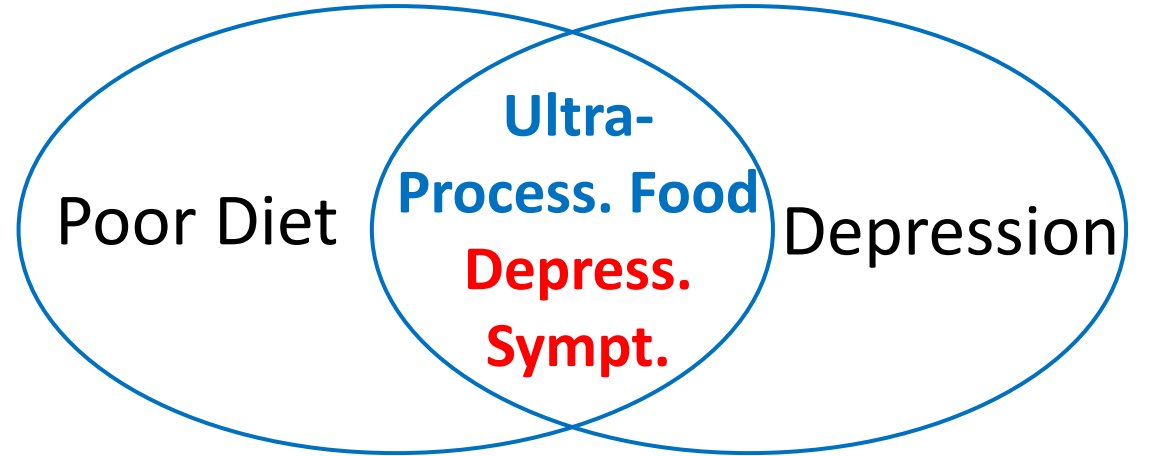


## No Type 2 Diabetes



**Type 2 Diabetes**

## Type 2 Diabetes



**Diabetes specific complications**

# Solution

CARTaGENE



Le monde en vous