

European countries, their dietary habits & diabetes prevalence



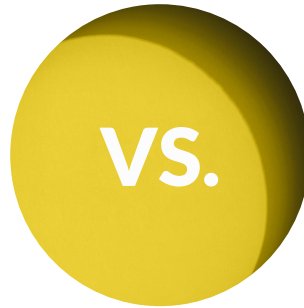
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In 2020...

**COVID-19
PATIENTS**

3-4%

of world population



**DIABETES
PATIENTS**

6-7%

of world population

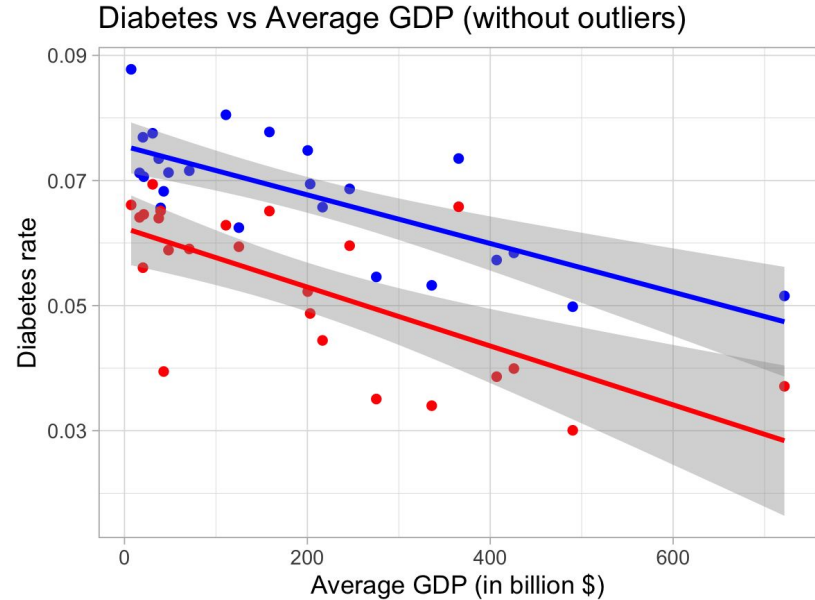
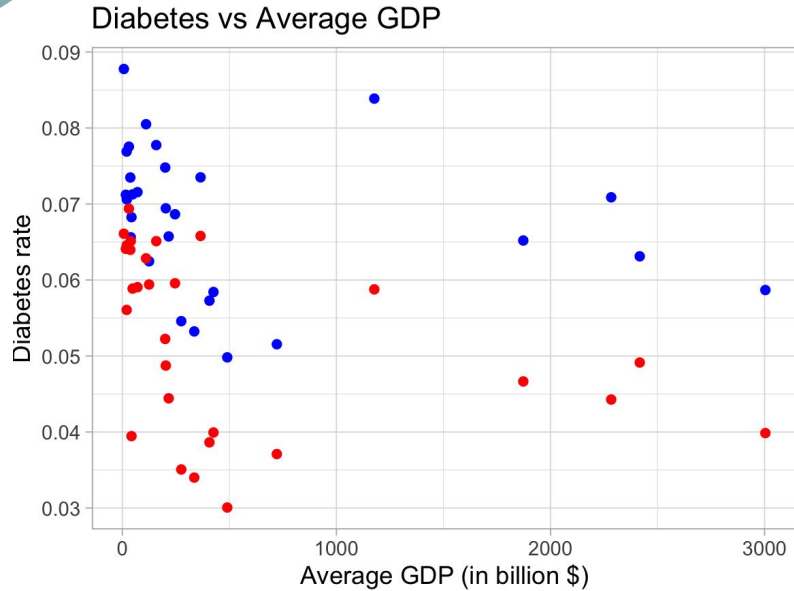
→ Diabetes can be treated and/or prevented with a healthier diet and more physical activity

Therefore :

1. Do European countries that have higher GDPs really have lower diabetes prevalence ?
2. Do European countries that have higher GDPs consume less calories ?
3. How do the proportions of macronutrients (animal protein/plant protein/fat/carbohydrates) consumed differ between richer and poorer governments ?
4. How do these differences relate to the diabetes prevalence in these countries ? What is the typical diet that can be observed in richer states that relates to lower diabetes prevalence ?



GDP vs. Diabetes



colour

- Men
- Women

Correlations and linear regression results



Correlation

With outliers :

- Average GDP & women diabetes rate : -0.369
- Average GDP & men diabetes rate: -0.236

Without outliers

- Average GDP & women diabetes rate : -0.696
- Average GDP & men diabetes rate: -0.739

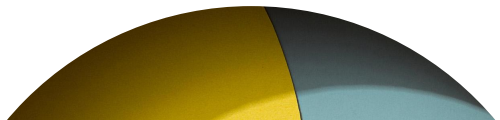


Linear regression

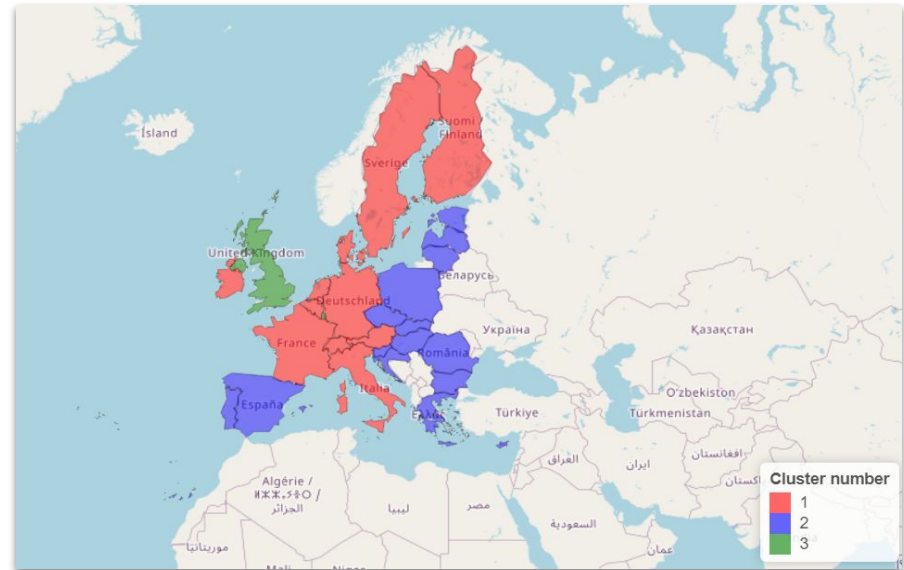
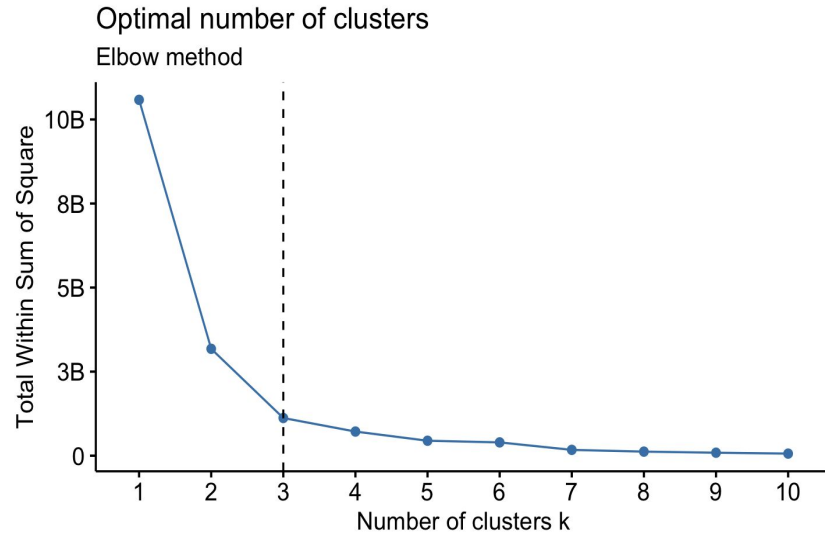
Significance of parameters increase
when we remove outliers !



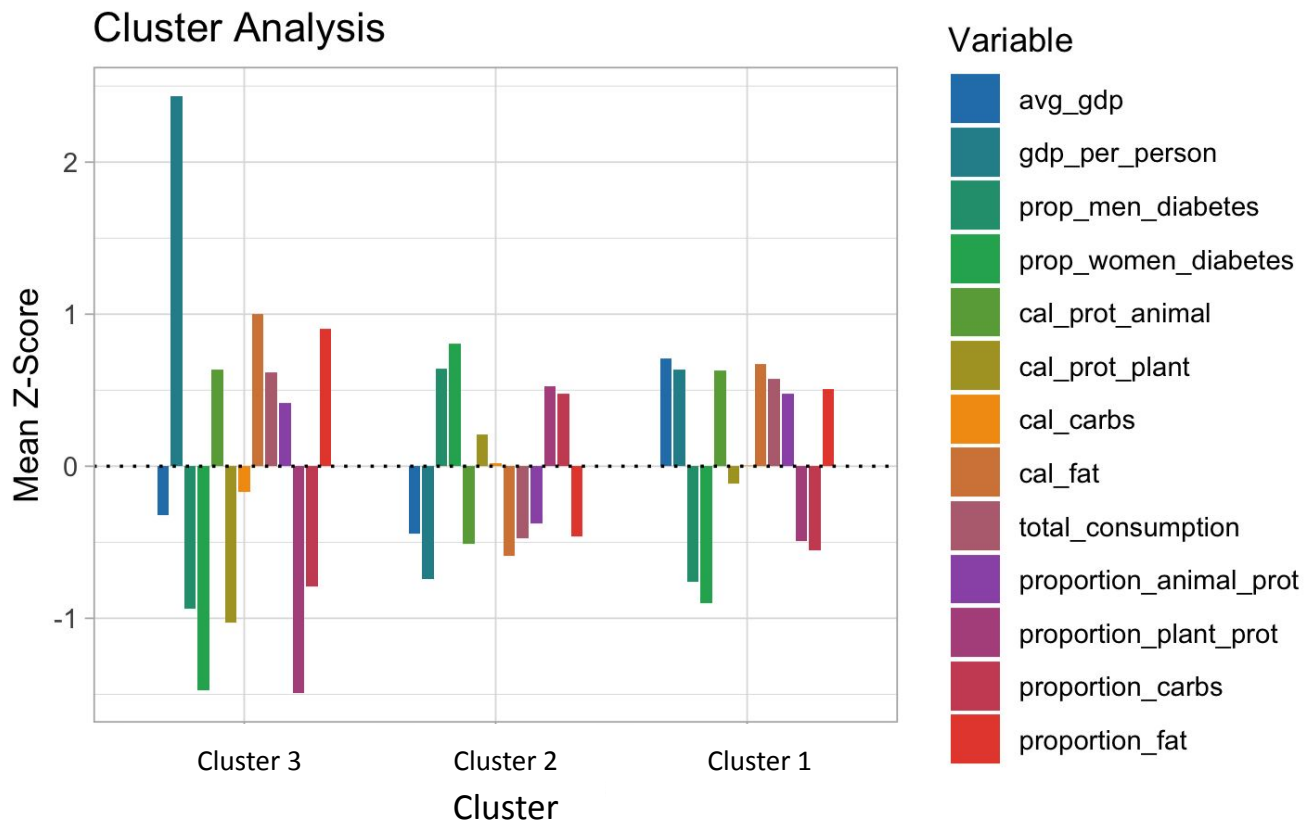
What to do ?



Categorizing EU countries



Trends across clusters



Correlations and linear regression results



Correlation

Cluster 1 :

- Average GDP & women diabetes rate : 0.368
- Average GDP & men diabetes rate: 0.297

Cluster 2 :

- Average GDP & women diabetes rate : -0.235
- Average GDP & men diabetes rate: 0.325

Cluster 3* :

- Average GDP & women diabetes rate : -1
- Average GDP & men diabetes rate: -1



Linear regression

No significant parameter in all fitted linear models

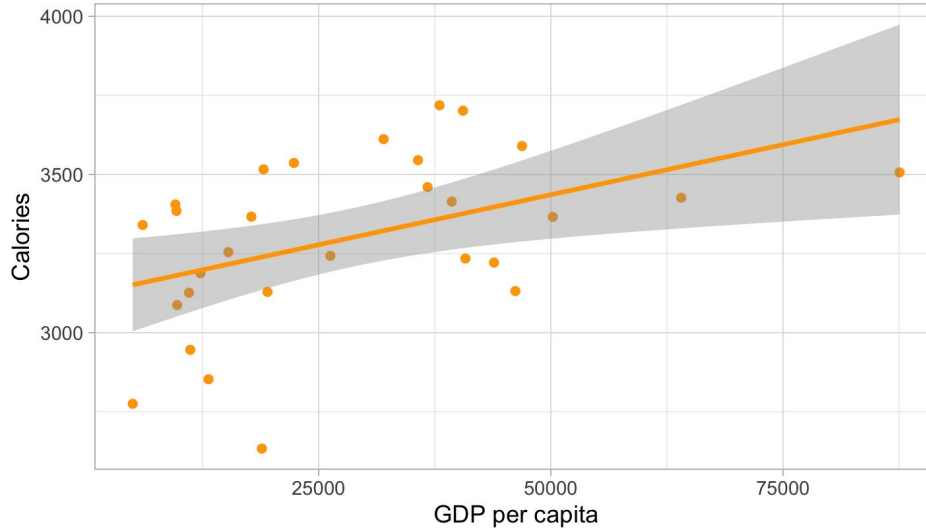


Negative link between GDP & diabetes (when considering all but outliers)

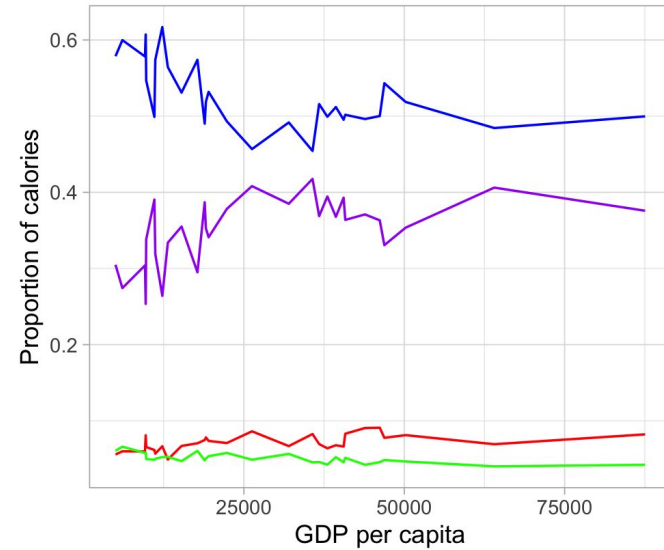


GDP vs. Dietary habits

Daily total calories vs GDP per capita



Consumption in proportions vs GDP per capita




- total_consumption
- cal_carbs
- cal_fat
- cal_prot_animal
- cal_prot_plant



Correlations

	Total calories	Animal protein	Plant protein	Carbs	Fat
GDP General	0.458	0.536	-0.683	-0.575	0.544
GDP Cluster 1	-0.469	0.566	-0.351	0.553	-0.695
GDP Cluster 2	0.224	0.676	-0.417	-0.751	0.659
GDP Cluster 3	1	1	1	1	-1



Linear regression results

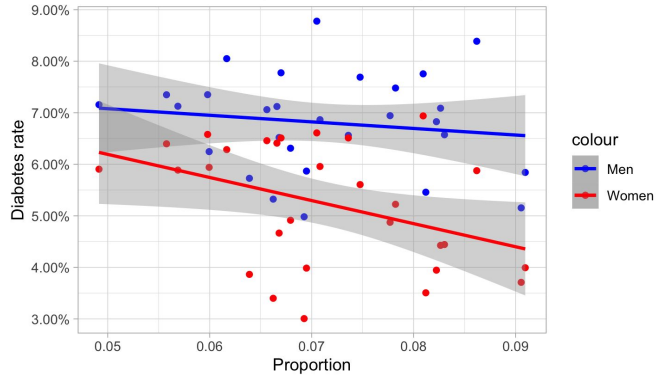
	Total calories	Animal protein	Plant protein	Carbs	Fat
GDP General	✓	✓	✓	✓	✓
GDP Cluster 1	✗	✗	✗	✗	✓
GDP Cluster 2	✗	✓	✗	✓	✓
GDP Cluster 3	✗	✗	✗	✗	✗

* ✓ : Moderately to strongly significant parameters

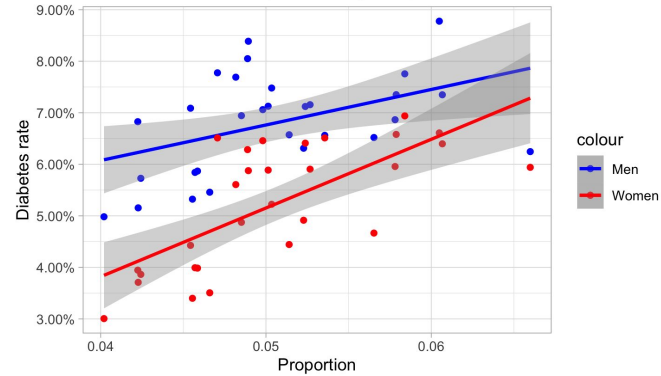
✗ : Weakly significant to not significant parameters

Diabetes vs. Dietary habits

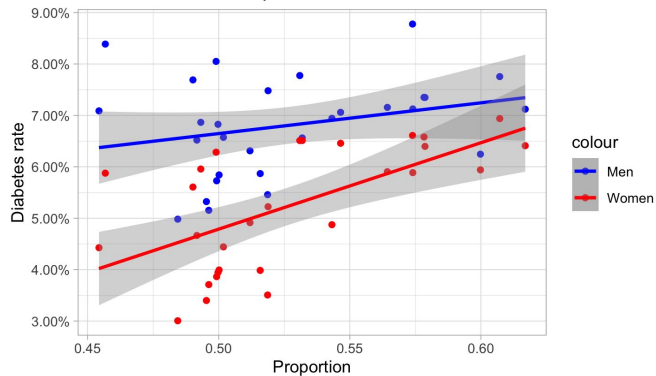
Diabetes rate vs Proportion of animal protein consumed



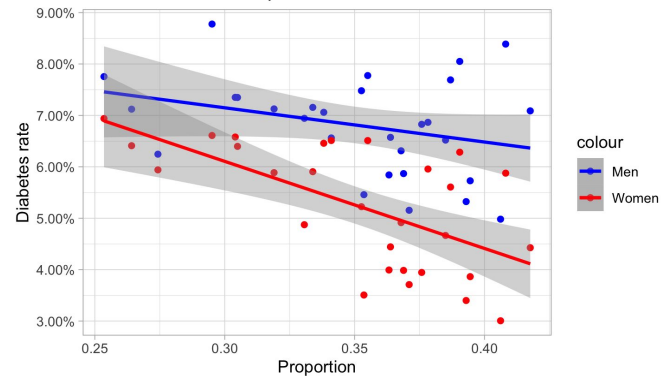
Diabetes rate vs Proportion of plant protein consumed



Diabetes rate vs Proportion of carbs consumed



Diabetes rate vs Proportion of fat consumed



































Correlations

	Animal protein	Plant protein	Carbs	Fat
Diabetes General	-0.141/-0.399	0.452/0.706	0.272/0.616	-0.303/-0.621
Diabetes Cluster 1	-0.023/-0.114	0.535/0.690	-0.114/0.125	0.016/-0.197
Diabetes Cluster 2	0.386/-0.067	-0.281/0.292	-0.309/0.486	0.261/-0.508
Diabetes Cluster 3	1/1	1/1	1/1	-1/-1

* Values : cor with men's diabetes/cor with women's diabetes

Linear regression results

	Animal protein	Plant protein	Carbs	Fat
Diabetes General	 / 	 / 	 / 	 / 
Diabetes Cluster 1	 / 	 / 	 / 	 / 
Diabetes Cluster 2	 / 	 / 	 / 	 / 
Diabetes Cluster 3	 / 	 / 	 / 	 / 



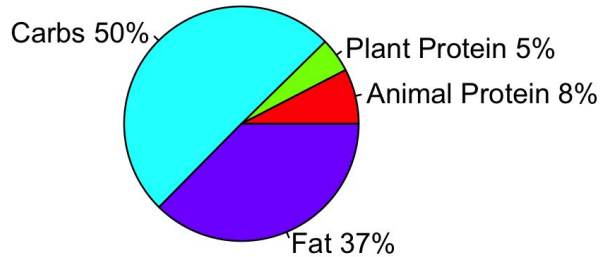
: Moderately to strongly significant parameters



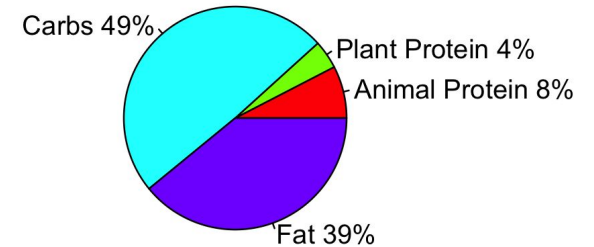
: Weakly significant to not significant parameters

Clusters and their typical diets

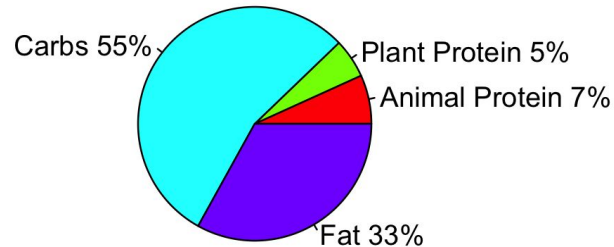
Consumption Pattern : Cluster 1



Consumption Pattern : Cluster 3



Consumption Pattern : Cluster 2



Conclusion



Results

- The higher a country's GDP, the lower its diabetes prevalence
- But not necessarily the calories consumed per capita
- High GDP countries consume more animal protein and fats, whereas low GDP countries consume more plant protein and carbs

⇒ Richer countries spend more on prevention and treatment ?
Nutrition not necessarily only explanation



To go further

- Study by also taking into account countries outside of EU, increase GDP gap between observations and see if results stay the same
- Carbs/fats ratio to explain diabetes ?
- Other interesting data : health expenditure, exercise frequency etc...

For more details...



- Check our complete report on the following website :

https://rpubs.com/clara-ness/DSFBA_Project

- Our report can also be found in our repository on **GitHub** with a Readme file that will guide you through our report :

https://github.com/clara-ness/DSFBA_Project