Individual lipids & risk of T2D

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www.unav.es/preventiva

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Overview

- Case-cohort design
- Outcome: type 2 diabetes
- 206 lipids:
  - 10 lysophosphatidylcholines
  - 24 phosphatidylcholines
  - 15 phosphatidylcholine plasmalogens
  - 1 hydroxy-phosphatidylcholine
  - 8 lysophosphatidyl-ethanolamines
  - 12 phosphatidylethanolamines
  - 13 phosphatidylethanolamine plasmalogens
  - 2 phosphatidylinosotols
  - 2 phosphatidylserines
  - 3 phosphatidylserine plasmalogens
  - sphingosine
  - palmithoylethanolamine
  - 4 ceramides
  - 11 sphingomyelins
  - 13 cholesterol esters
  - 4 monoacylglycerols
  - 14 diacylglycerols
  - 67 triacylglycerols
  - cholesterol

- Analysis 1:
  - Intervention → 1-y changes
- Analysis 2:
  - Intervention group and change in acyl chain # of carbon atoms and # of double bonds
- Analysis 3:
  - Baseline metabolites (# double bonds & # C atoms)→ T2D
- Analysis 4:
  - 1-y changes (Blom's transformation) → T2D

- **Analysis 1:**
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Analysis 1: Intervention → 1-y changes

- Baseline lipid concentrations were inversely normally transformed according to Blom's method
- Change in the lipid concentrations were inversely normally transformed according to Blom's method
- Linear regression models:
  - Normally transformed change as dependent variable
  - Intervention group as independent term (2 dummies)
  - Adjusted for baseline lipid peaks.

Significant differences in 1-year changes MedDiet+EVOO group vs. control

Direct association	Inverse association
	Phosphatidylcholine (34:4)
	Phosphatidylcholine (36:4)b
	Phosphatidylcholine (38:4)
	Sphingomyeline (16:1)

Significant differences in 1-year changes MedDiet+nuts group vs. control

Direct association	Inverse association
Phosphatidylinositol (34:0)	Phosphatidylcholine (34:1)
Palmithoylethanolamide	Phosphatidylcholine (36:4)b
DAG (34:3)	Phosphatidylcholine (36:1)
	Phosphatidylcholine (38:4)
	Phosphatidylcholine (38:3)
	Phosphatidylcholine plasmalogen (34:2)
	Phosphatidylcholine plasmalogen (38:7)
	Phosphatidylcholine plasmalogen (38:4)
	Phosphatidylserine plasmalogen (36:1)

Significant differences in 1-year changes
MedDiet+nuts group vs. control

Direct association	Inverse association
	Ceramide (16:0)
	Cholesterol ester (16:1)
	Cholesterol ester (20:3)
	Cholesterol ester (22:5)
	TAG (44:0)
	TAG (46:1)
	TAG (48:2)
	TAG (56:4)
	TAG (56:3)

- Analysis 2:
  - Intervention → 1-y changes

- **Analysis 2:**
  - **Intervention group and change in acyl chain # of carbon atoms and # of double bonds**

- Analysis 3:
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Analysis 2:
Intervention group and change in acyl chain # of carbon atoms and # of double bonds

- Blom's transformation for baseline lipid peak and lipid peak change

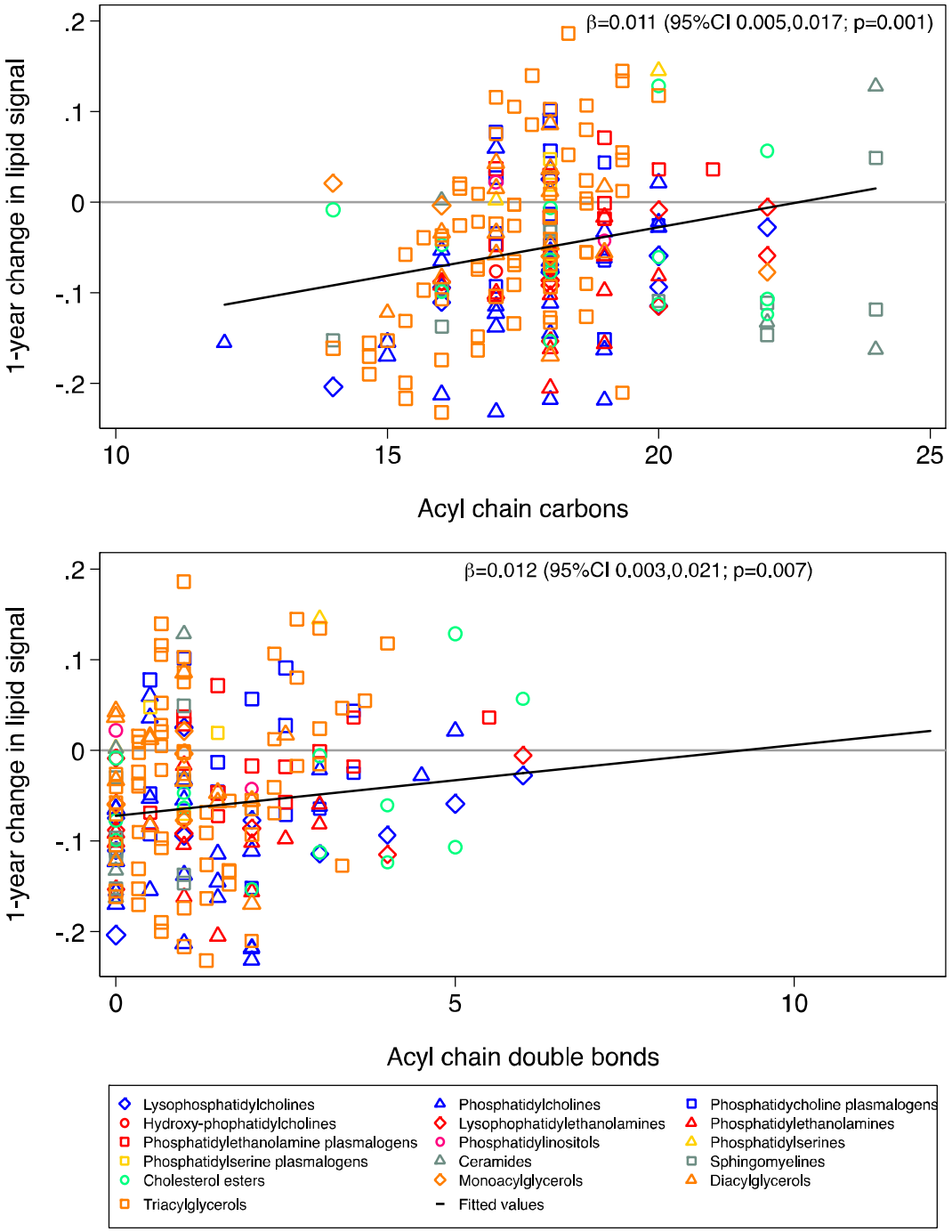
- Regression model with lipid change as dependent variable and intervention group as independent terms (control as reference) and adjusted for baseline lipid peak

- Metarregression to assess if the acyl chains' number of carbon atoms and double bonds could explain the effect of the intervention

MedDiet+EVOO

vs.

Control



MedDiet+nuts

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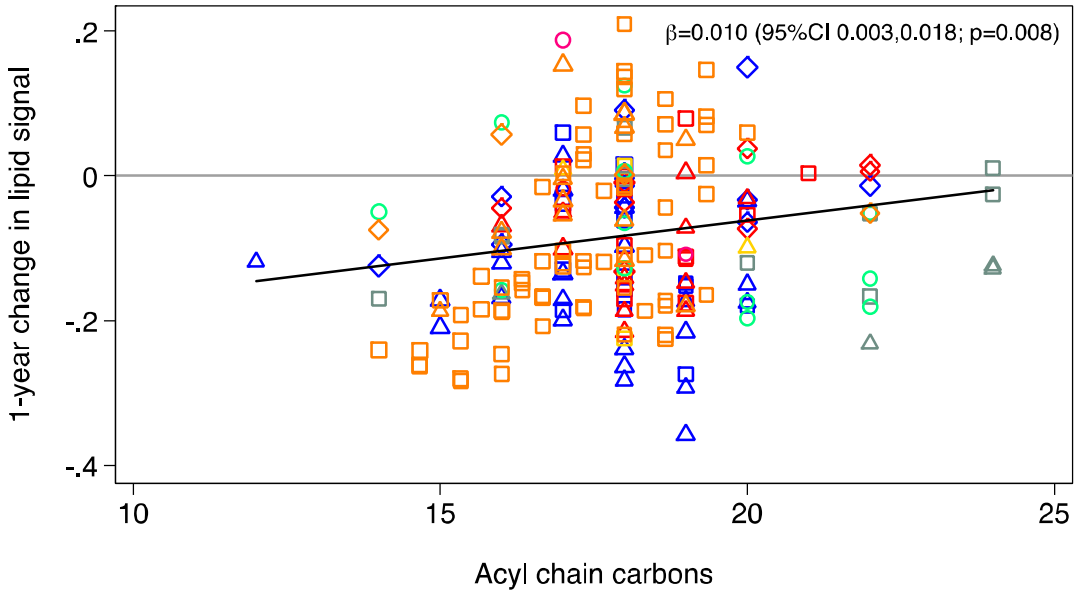
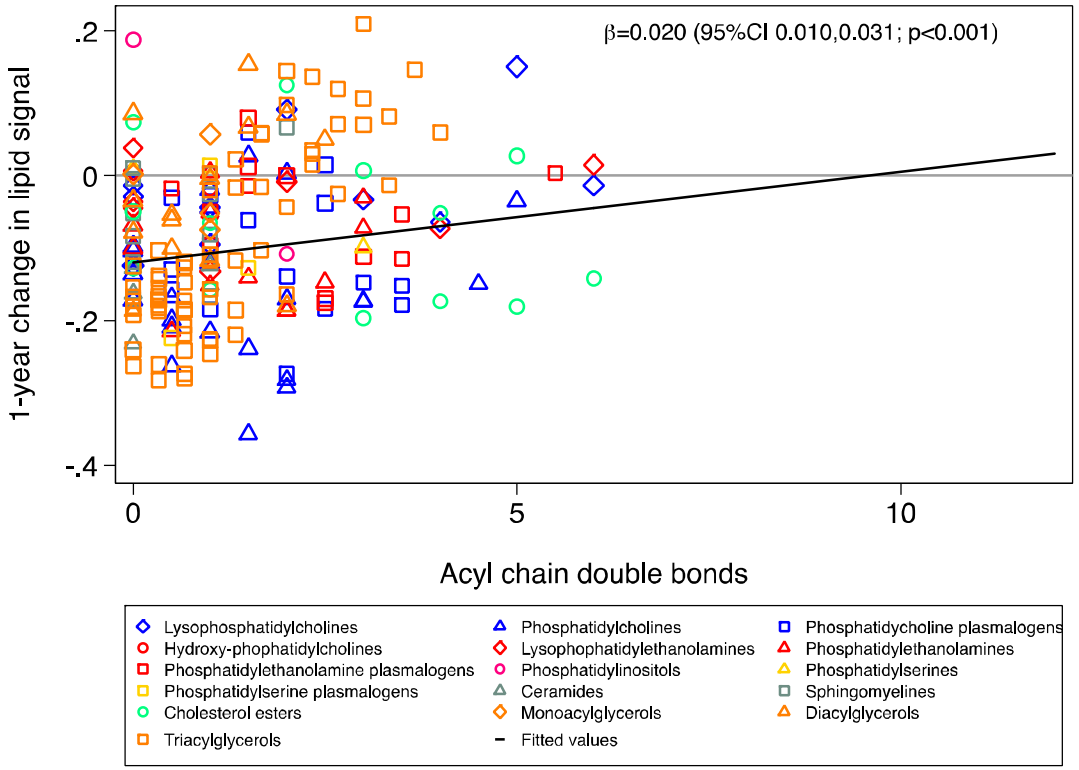
Control





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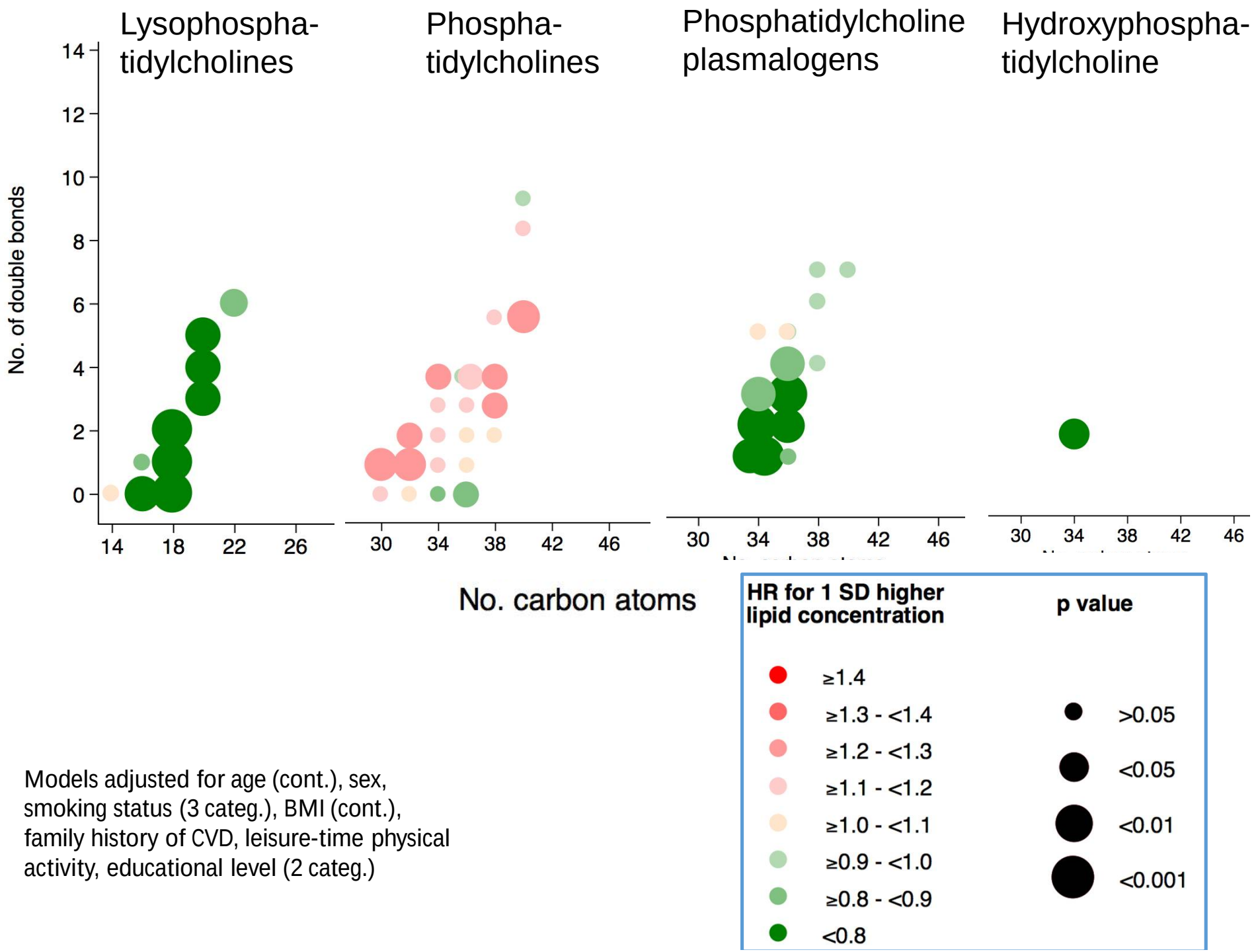
Analysis 3:
Baseline metabolites (# double bonds & # C atoms)→ T2D

- Normal inverse transformation of the baseline lipid
- Weighted Cox regression models to assess the association between the transformed lipid and the subsequent risk of T2D(years 0 to 5)
- Representation based on the # double bonds and the # C atoms
- Models adjusted for age (cont.), sex, smoking status (3 categ.), BMI (cont.), family history of CVD, leisure-time physical activity, educational level (2 categ.)



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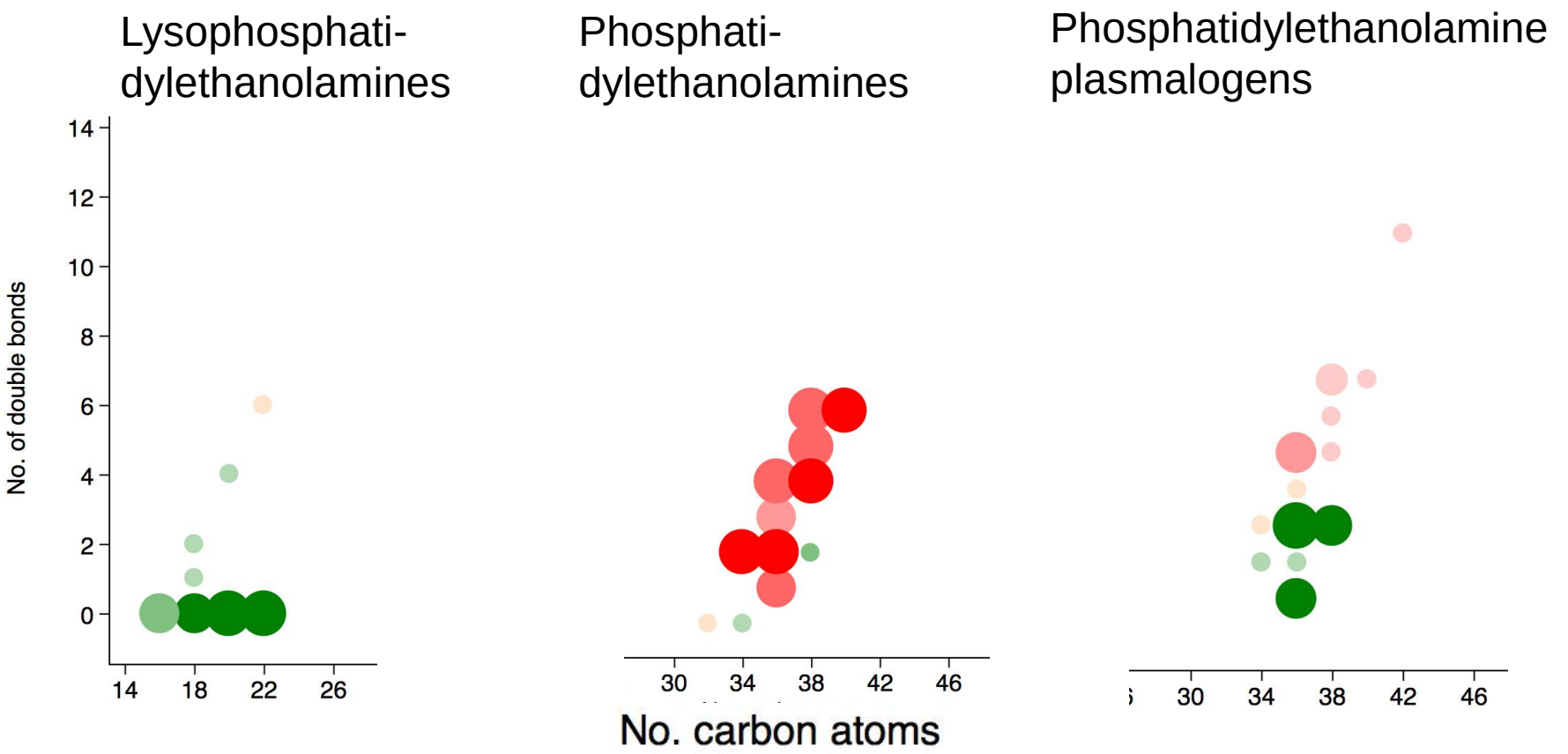

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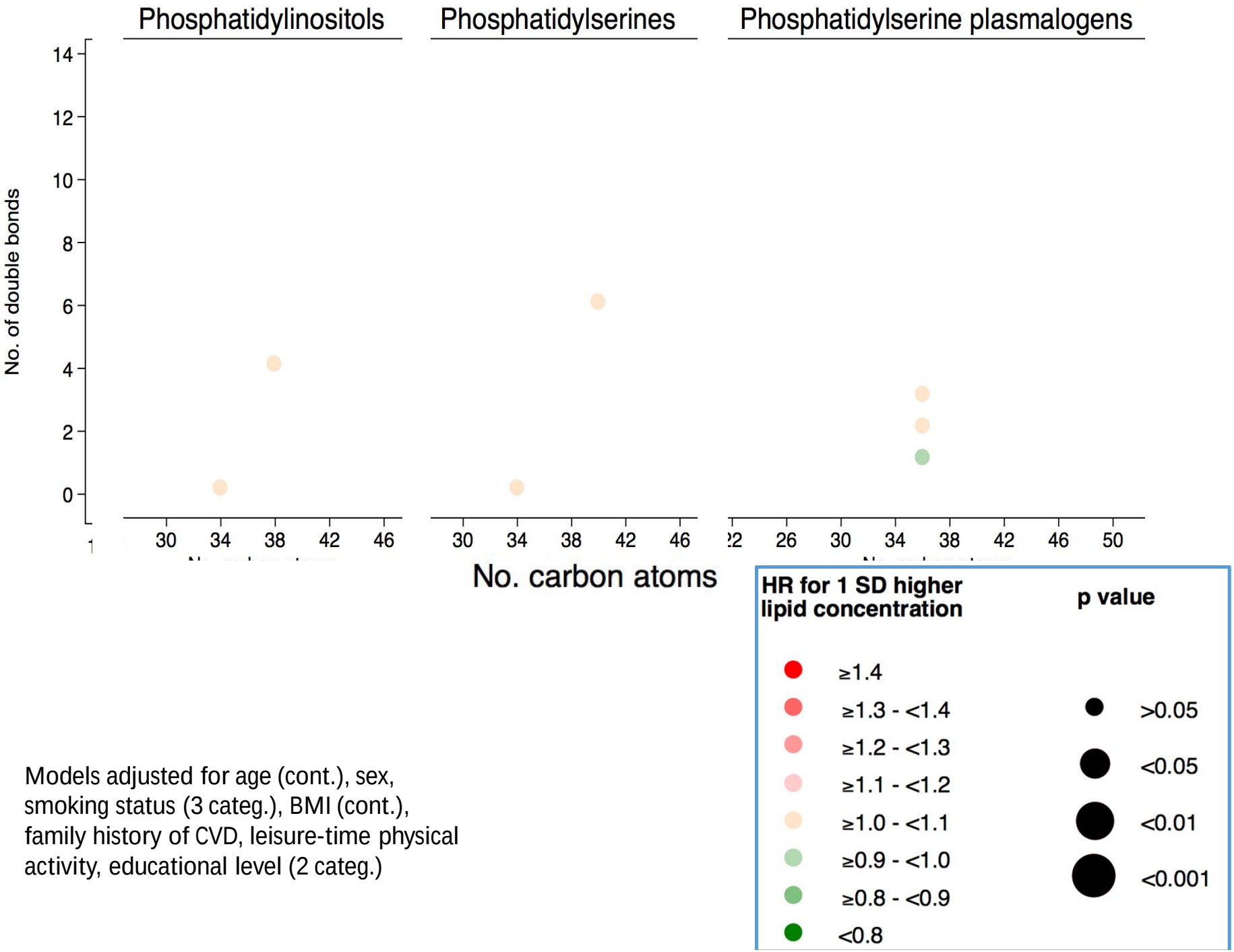

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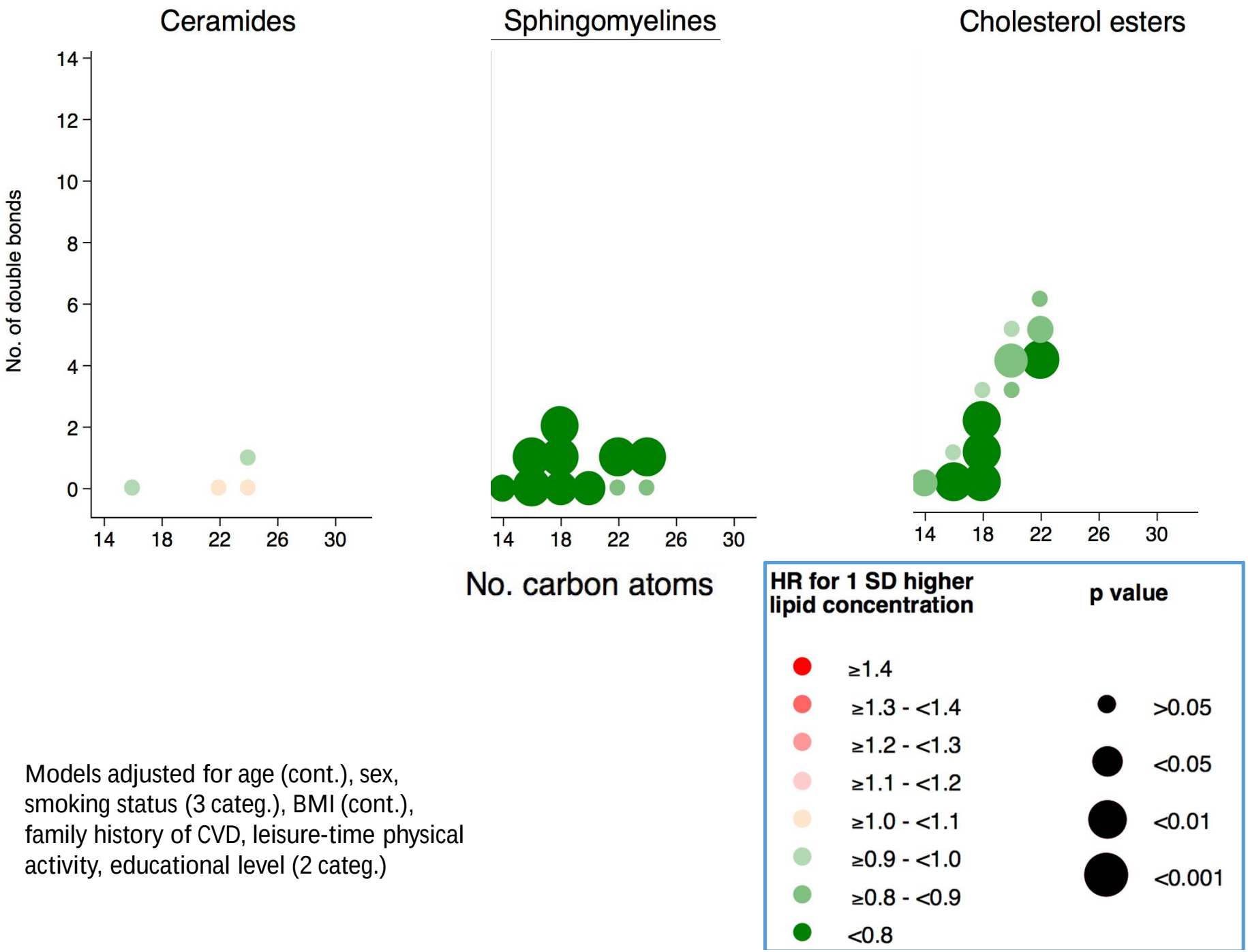

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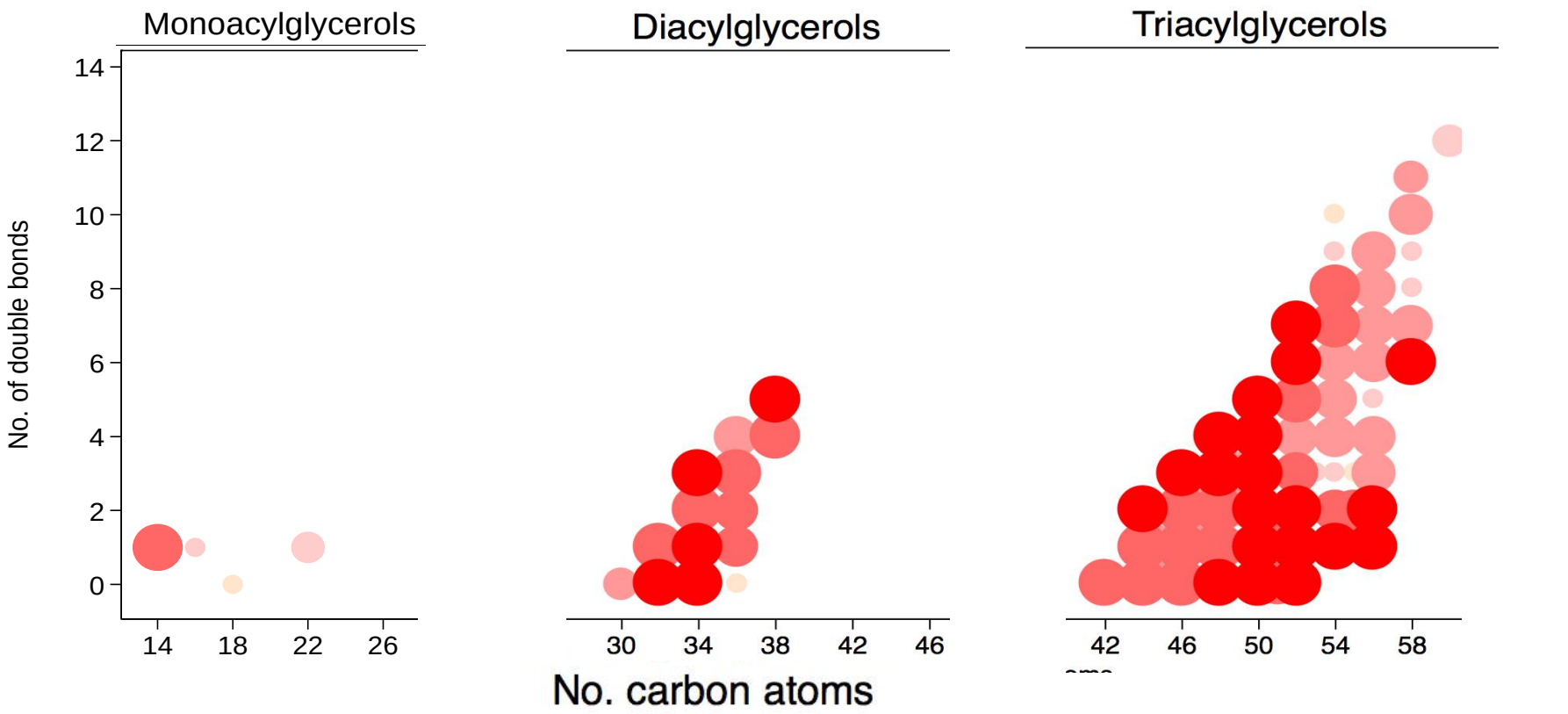

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Analysis 4:
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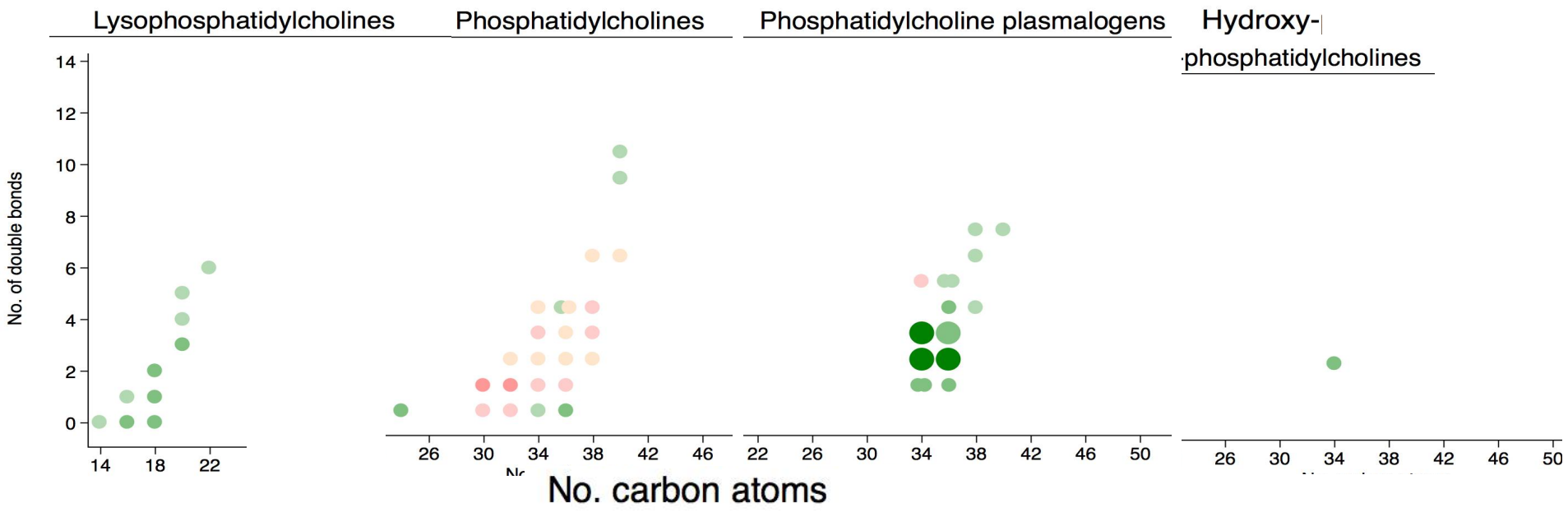
- Change was inversely normally transformed (Blom's method)
- Weighted Cox regression models to assess the association between the change (year1-year0) and the subsequent risk of T2D(years 2 to 5)
- Representation based on the # double bonds and the # C atoms
- Models adjusted for baseline lipid peak (cont.), age (cont.), sex, smoking status (3 categ.), BMI (cont.), family history of CVD, leisure-time physical activity, educational level (2 categ.)



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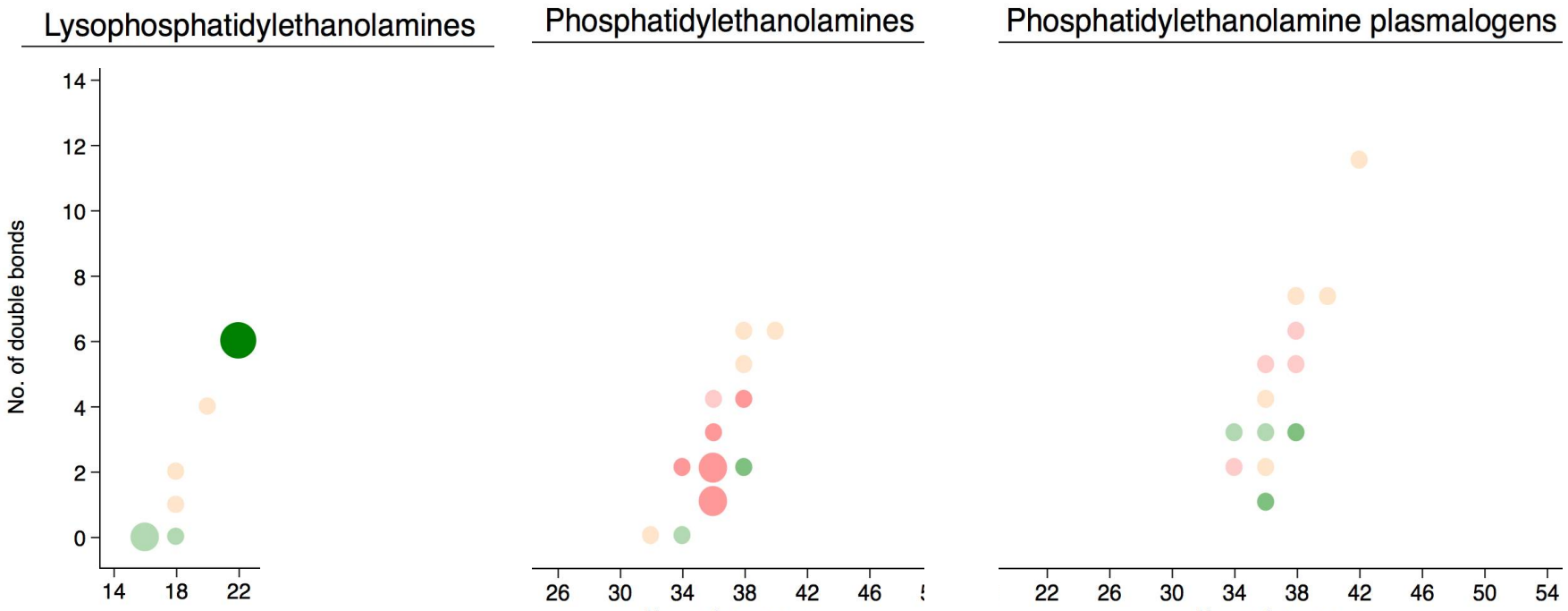

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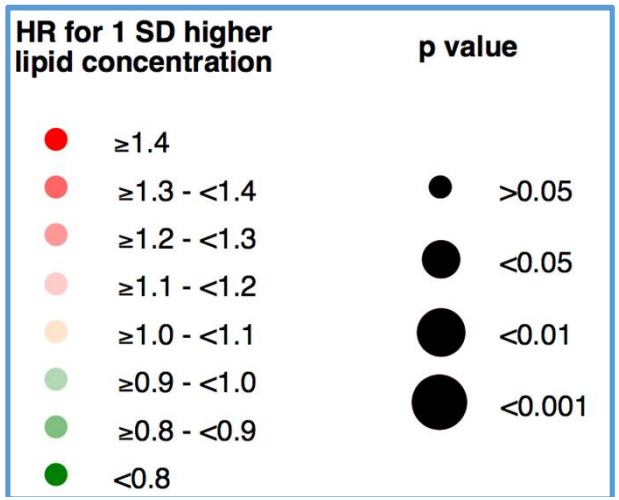

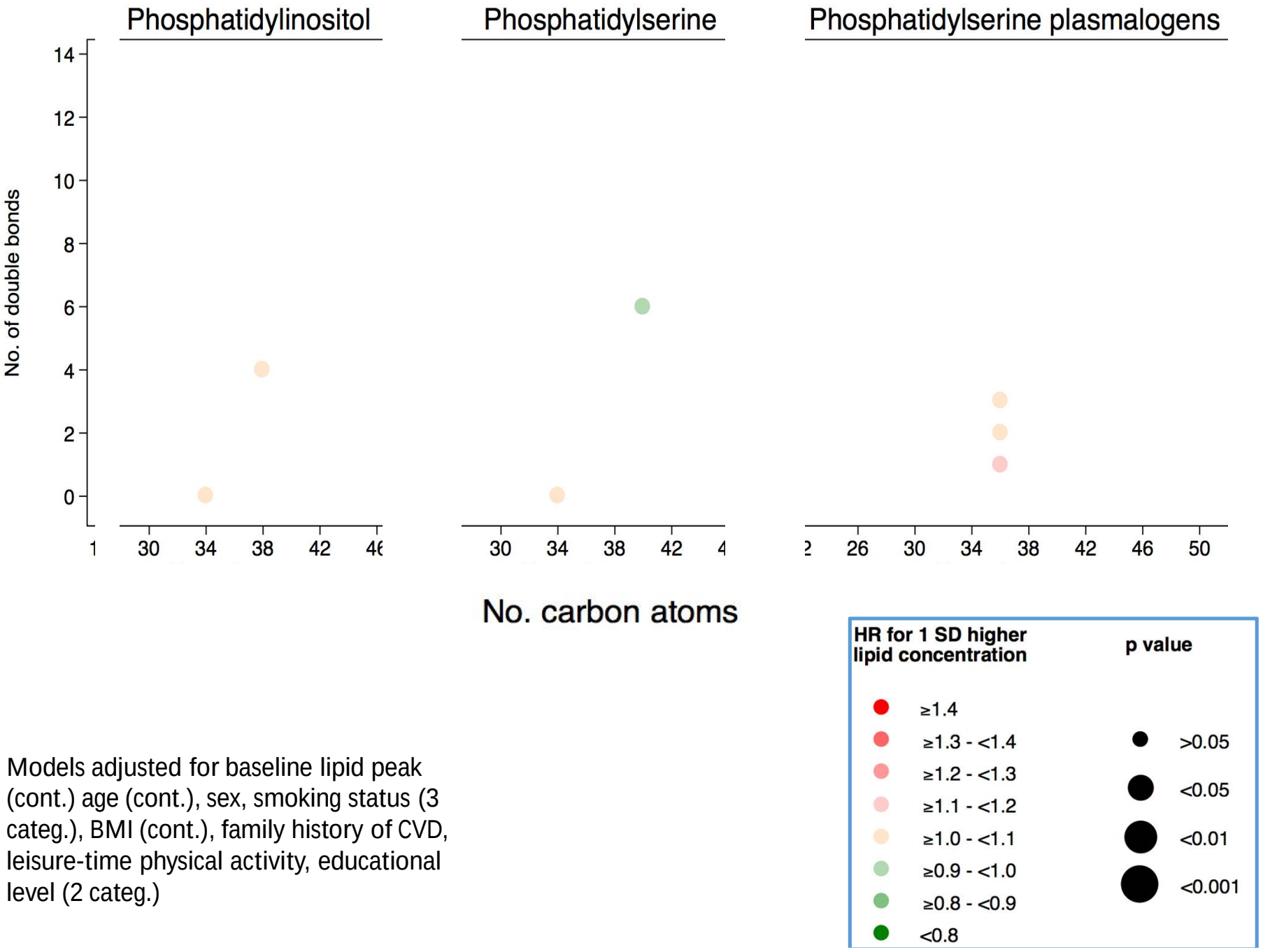

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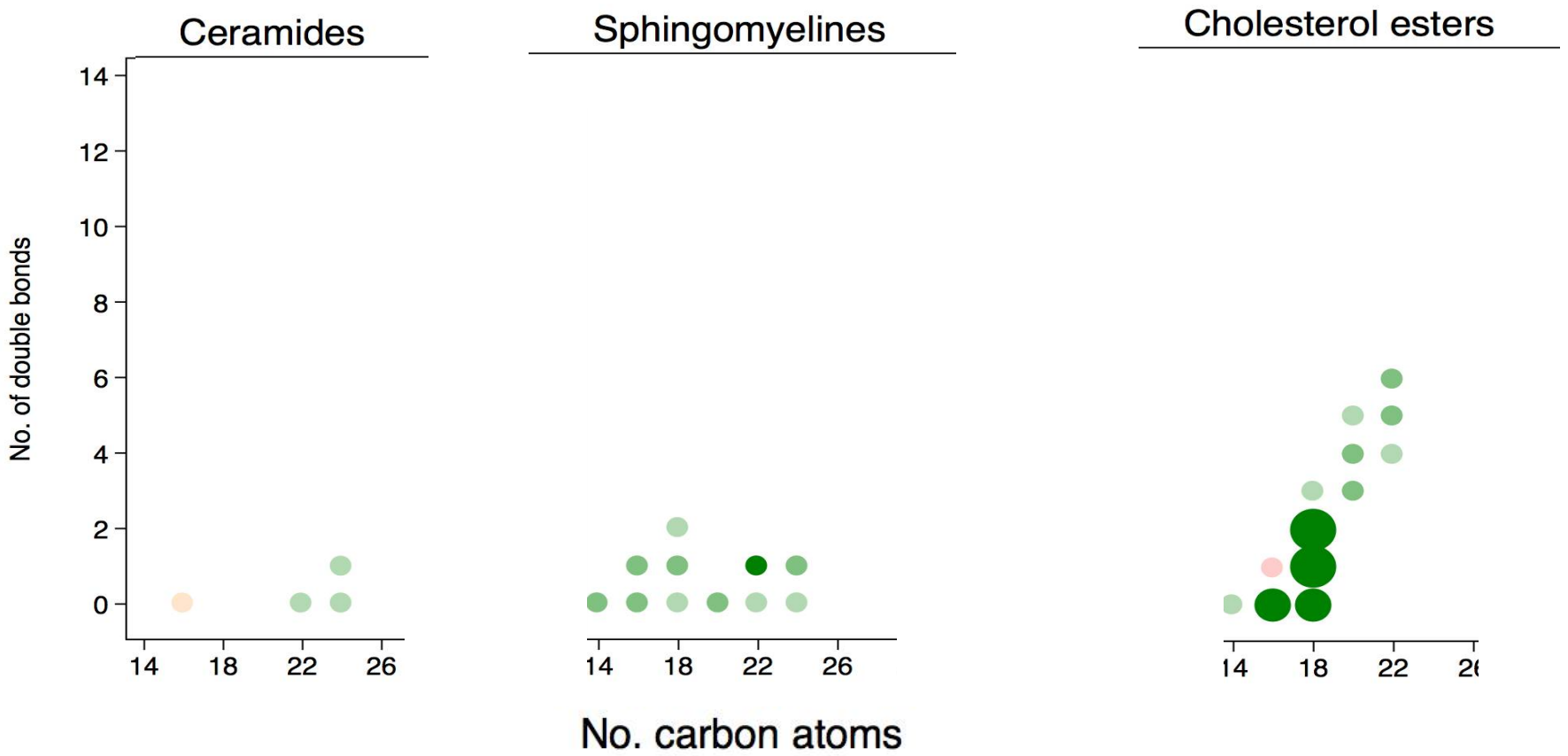

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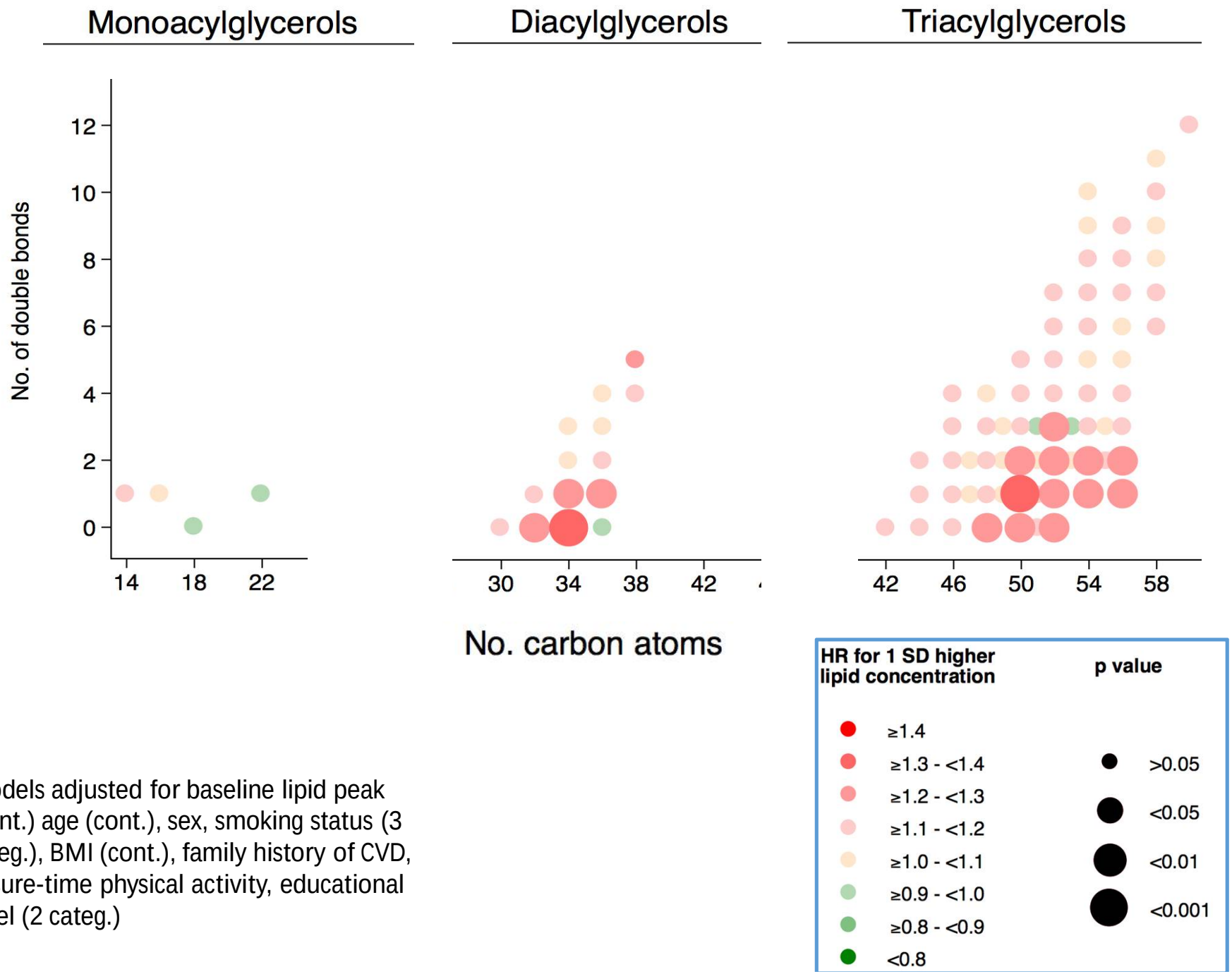

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