## Supplementary Material

# Urinary concentrations of phthalate/DINCH metabolites and body mass index among European children and adolescents in the HBM4EU Aligned Studies: a cross-sectional multi-country study.

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## List of Supplementary Tables



## List of Supplementary Figures

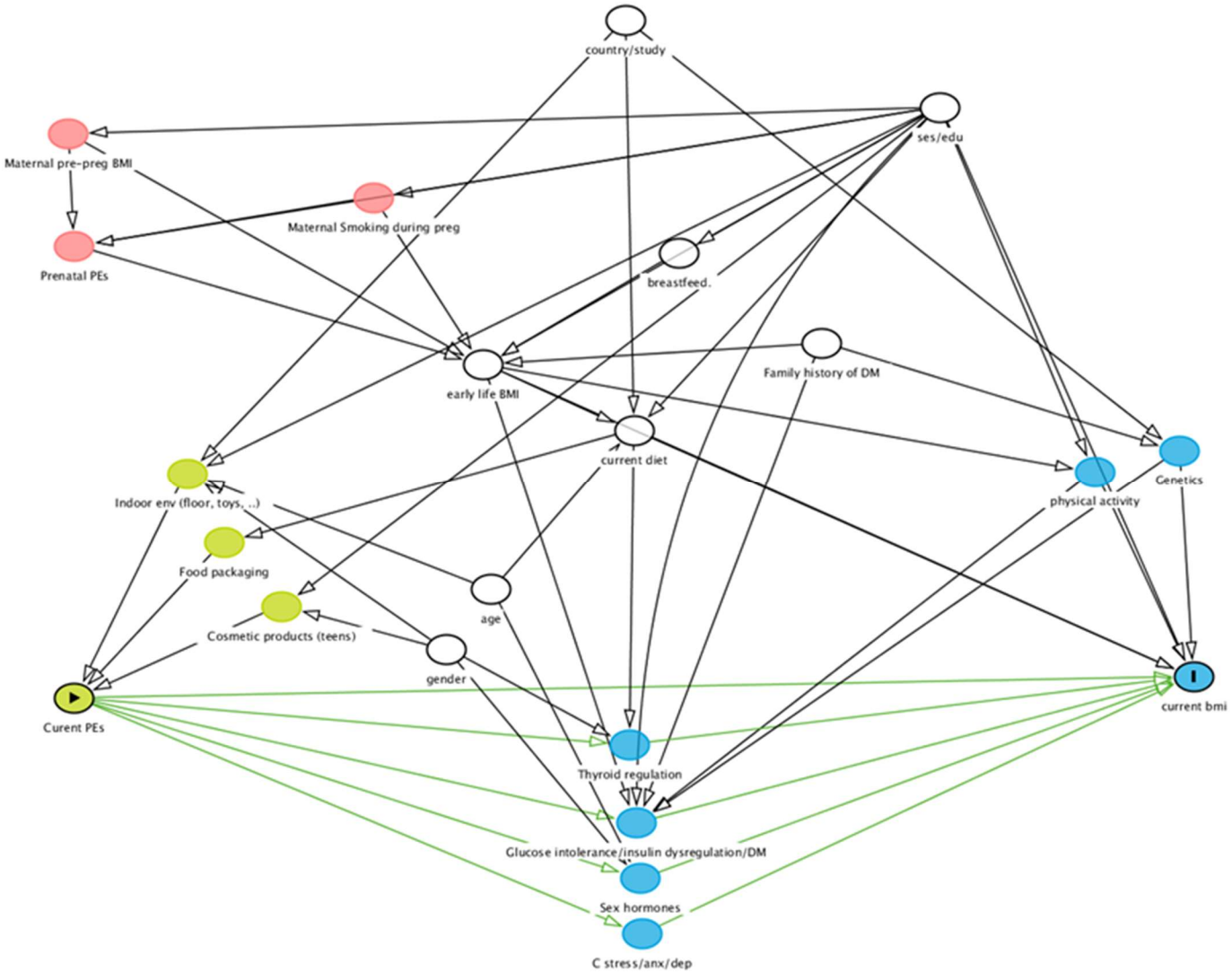



Figure S1. Directed acyclic graph (DAG) representing the assumed relationships between the exposure phthalates/DINCH and the outcome BMI, for children and adolescents. Blue nodes represent the outcome and ancestors of the outcome; green node the exposure; red nodes ancestors of both the exposure and the outcome and white nodes are the minimal sufficient adjustment set. The green edge (=arrow) shows the assumed causal path between the exposure and outcome and the black edge shows the unbiased paths between the exposure and the outcome. Abbreviations: PEs phthalates, BMI body mass index, DM diabetes mellitus, SES/edu socio-economic status/education

*Supplementary Table S1. Supplementary Table S1.- Phthalate and DINCH parent compounds and their metabolites measured, form for inclusion as exposures in this study). Separate Excel file*

*Supplementary Table S2. Supplementary Table S1.- Phthalates (DINCH) concentrations (µg/L) in urine collected among children in 12 HBM4EU Aligned Studies (n=2876, 6-11 years, 2014–2021). Separate Excel file*

*Supplementary Table S3. Phthalates (DINCH) concentrations (µg/L) in urine collected among adolescents in 10 HBM4EU Aligned Studies (n=2449, 12-18 years, 2014–2021). Separate Excel file.*

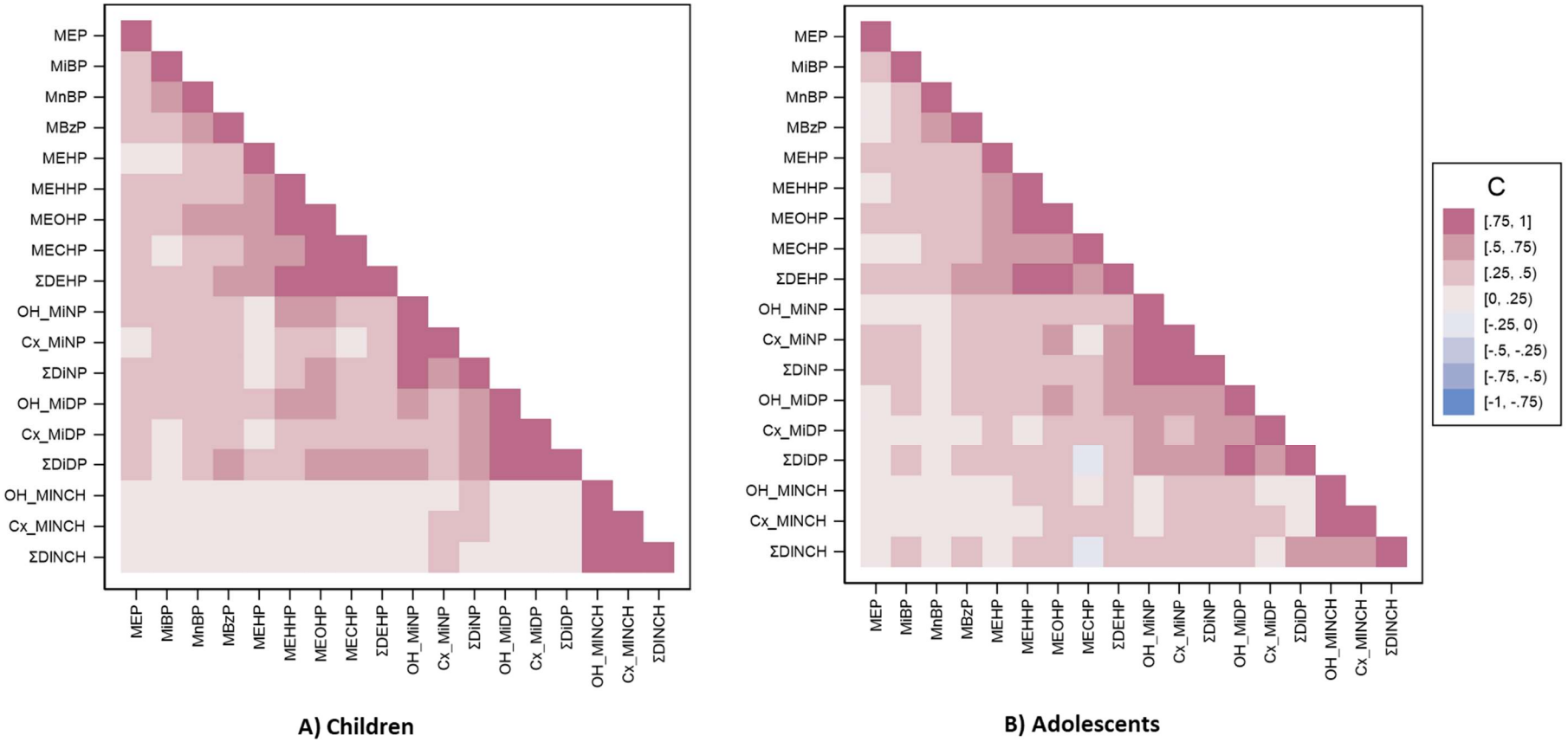
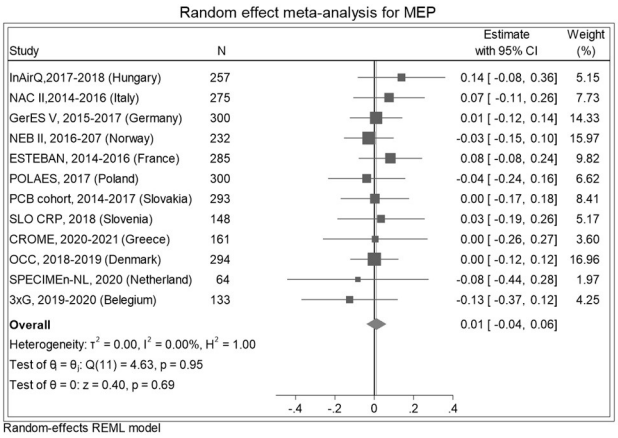


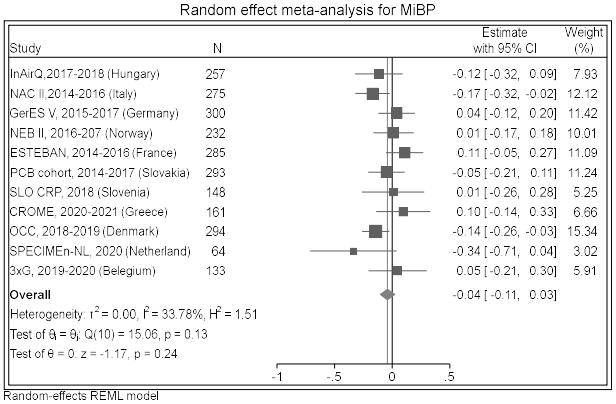

Figure S2. Heat map of Pearson correlation coefficient matrix for phthalates and DINCH metabolites measured in urine samples of A) children (12 studies) and B) adolescents (10 studies) in the HBM4EU Aligned Studies (2014-2021). *Dark red or blue indicates a positive or a negative correlation, respectively. The intensity of the colour reflects the magnitude of the correlation coefficient.*

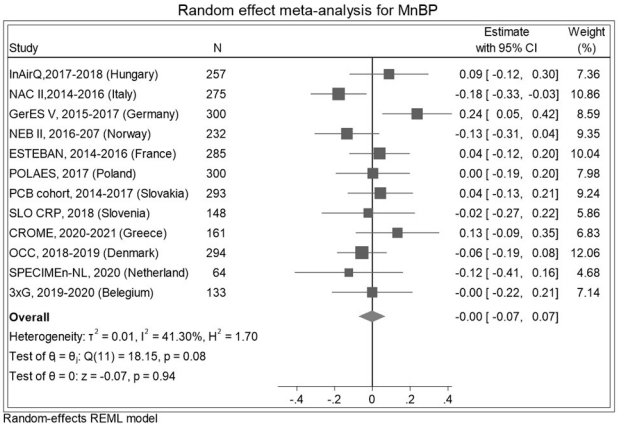
Abbreviations: HBM4EU Human Biomonitoring for Europe, BMI body mass index, MEP mono-ethyl phthalate, MiBP mono-iso-butyl phthalate, MnBP mono-n-butyl phthalate, MBzP mono-benzyl phthalate, ΣDEHP molar sum of di(2-ethylhexyl) phthalate metabolites (MEHP + 5OH-MEHP + 5oxo-MEHP + 5cx-MEPP), ΣDiNP molar sum of diisononyl phthalate metabolites (OH-MiNP + cx-MiNP), ΣDiDP molar sum of diisodecyl phthalate (OH-MiDP + cx-MiDP) , ΣDINCH molar sum of di(isononyl) cyclohexane-1,2-dicarboxylate metabolites (OH-MINCH + cx-MINCH). Details of abbreviations can be found in Supplementary Table S1. Note: In the figure, an underscore (_) should be read as a dash or hyphen (e.g., OH_MINP should be read as OH-MINP).

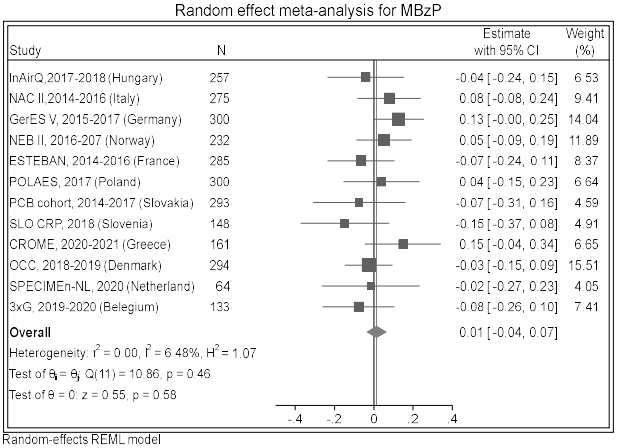
Figure S3. Association between creatinine-adjusted urinary concentrations of phthalate and DINCH metabolites and BMI z-score per interquartile range increase in log-natural (ln) concentration for individual and pooled aligned studies using random effects meta-analysis for (A) Children (B) Adolescents in the HBM4EU Aligned Studies (n= 2,876 children (7-11 years), n= 2499 adolescents (12-17 years), 2014–2021).

## (A) Children's study

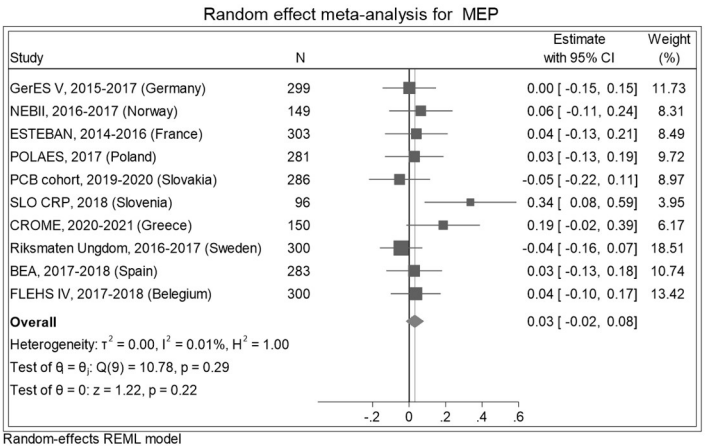


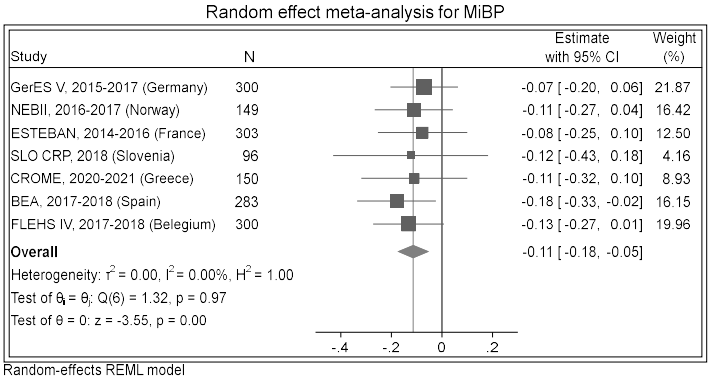



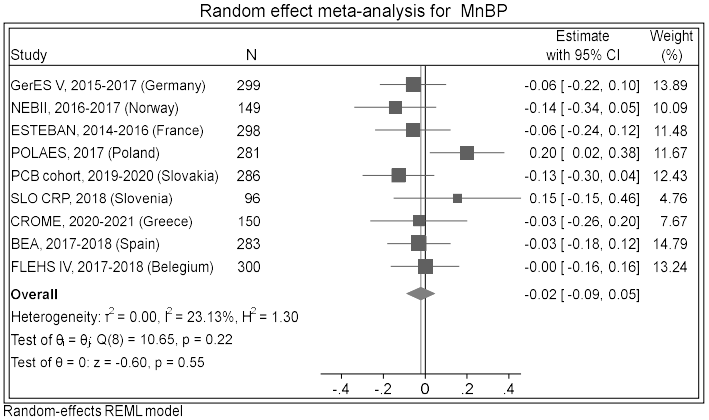



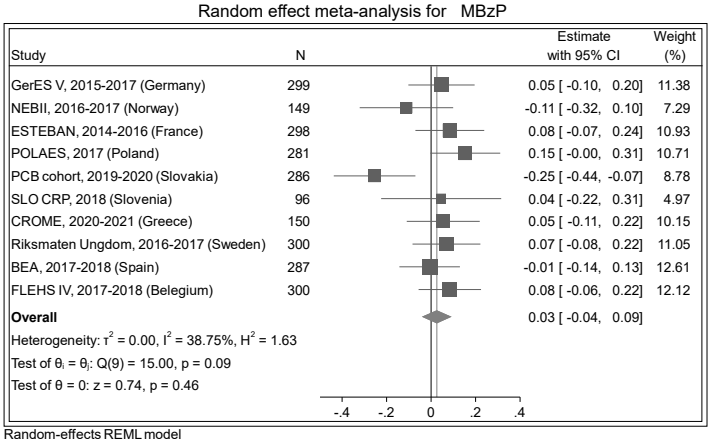



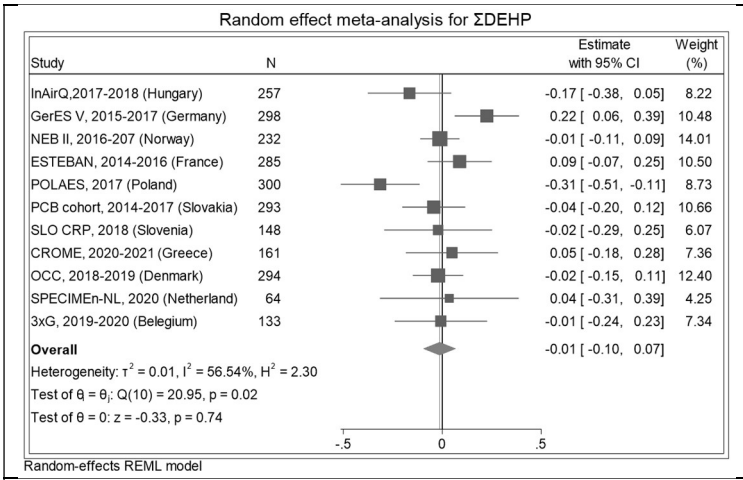

## (B) Adolescents' study

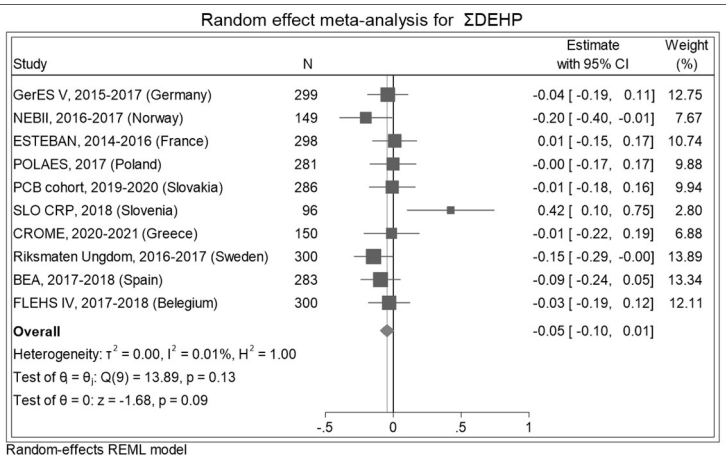


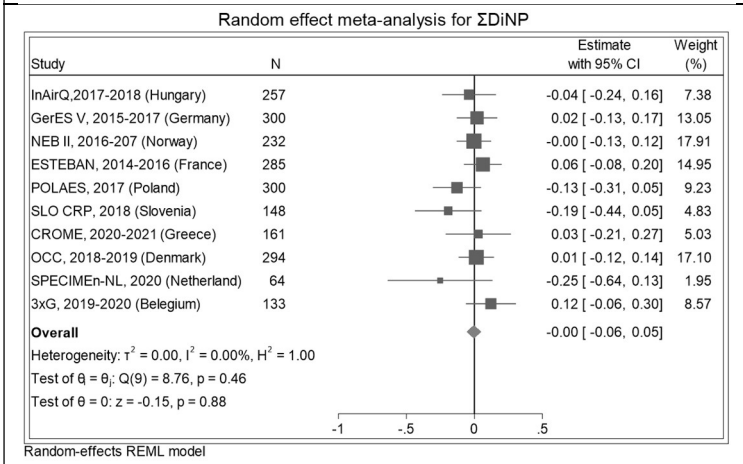



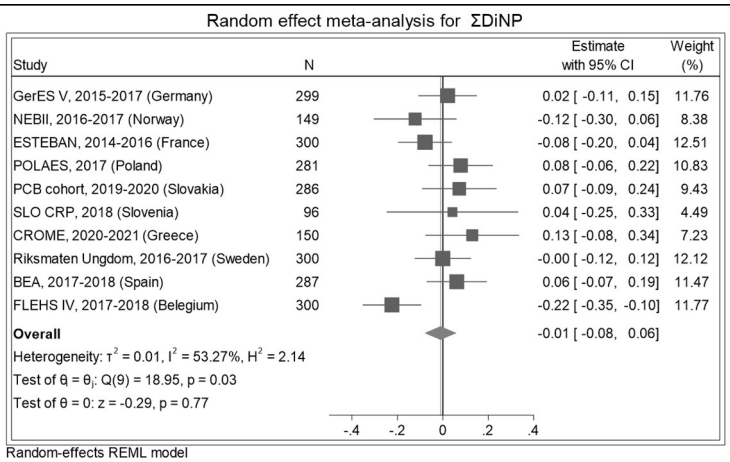



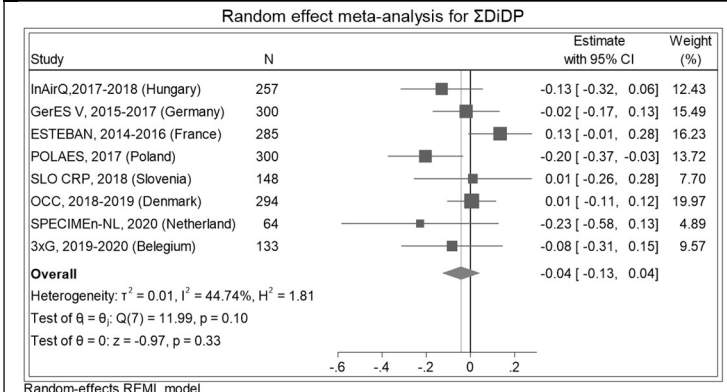



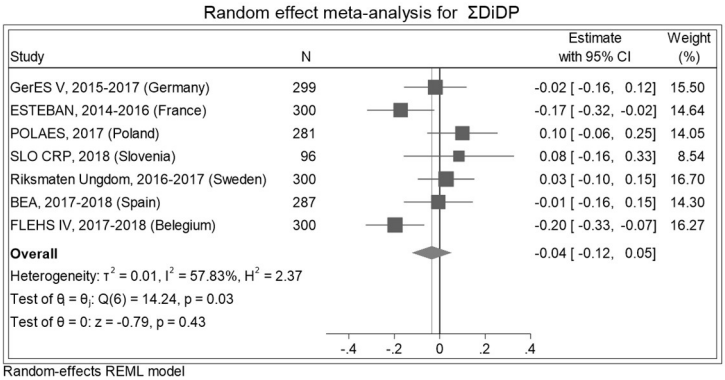


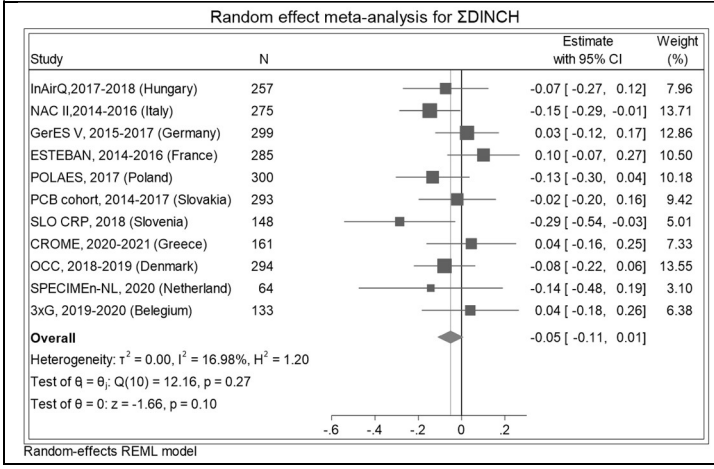



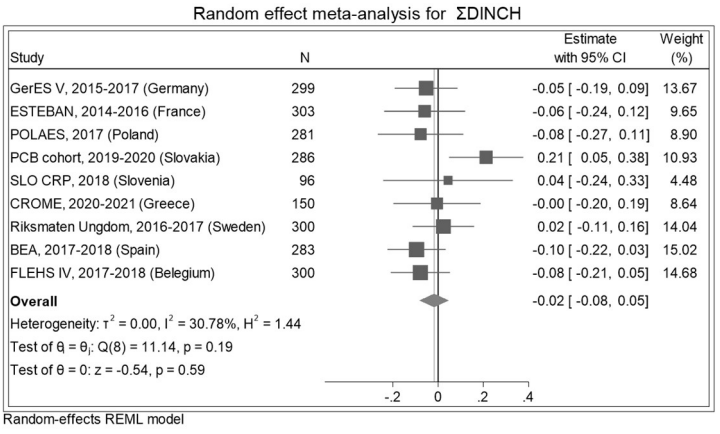



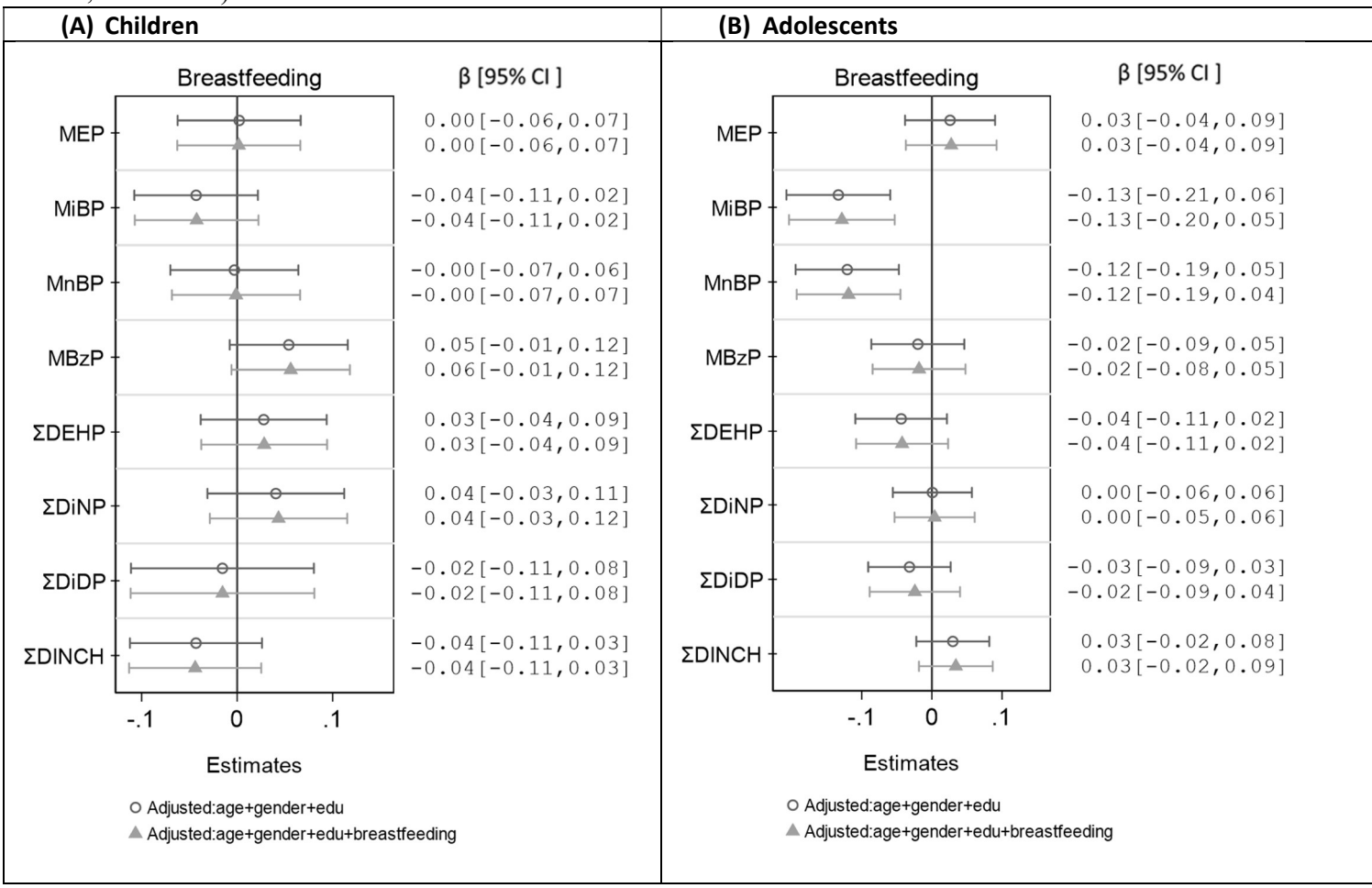




Models adjusted for household education, gender and child's age at outcome assessment, and fitted with a random intercept for aligned study. Exposures were natural log (ln)-transformed and scaled to their interquartile range.

*Note: GerESV= GerESV-sub*

Figure S4. Association between creatinine-adjusted urinary concentrations of phthalate and DINCH metabolites and BMI z-score per ln concentration increase in exposure for (A) Children, and (B) Adolescents as a sensitivity analysis for breastfeeding in selected HBM4EU Aligned Studies (N=8 children's studies, n=2051; N=6 adolescents' studies, n=1518, 2015–2021).



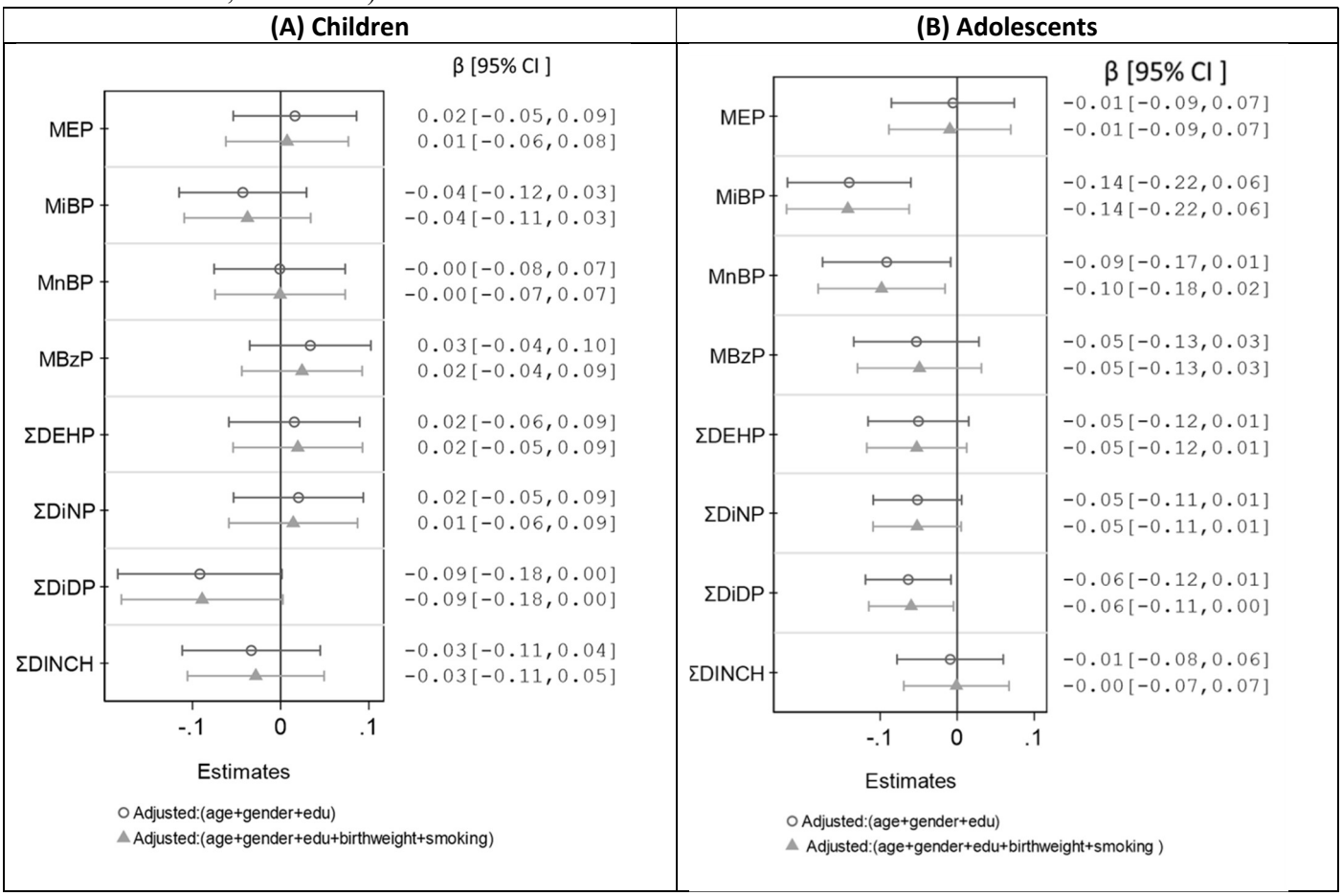

Models adjusted for household education, gender, and child's age at outcome assessment, and fitted with a random intercept for aligned study. Exposures were natural log (ln)-transformed and scaled to their interquartile range.

Children's Aligned studies (N=8, n=2051) included were: InAirQ (n=262), NACII (n=300), GerES V, (n=300 NEB II, PCB cohort (n=295), CROME (n=161), OCC (n=300), and VITO 3xG (n=133). The total number of metabolites included are as follows: MEP (n=2051), MiBP (n= 2050), MnBP (n = 2050), MBzP (n = 2050), ΣDEHP (n = 1749), ΣDiNP (n =1456), ΣDiDP (n =995), and ΣDINCH (n = 1750).

Adolescents' Aligned Studies (N=6, n=1518) included were GerEs V-sub (n=300), NEB II (n=181), PCB-follow-up teenagers (n=287), CROME (n=150), Riksmaten-SE (n=300), and FLEHS IV (n=300). The total number of metabolites included are as follows: MEP (n=1518), MiBP (n= 1218), MnBP (n = 1218), MBzP (n =1518), ΣDEHP (n =1517), ΣDiNP (n =900), ΣDiDP (n =900), ΣDINCH (n = 1336).

Abbreviations: HBM4EU Human Biomonitoring for Europe, BMI body mass index, MEP mono-ethyl phthalate, MiBP mono-iso-butyl phthalate, MnBP mono-n-butyl phthalate, MBzP mono-benzyl phthalate, ΣDEHP molar sum of di(2-ethylhexyl) phthalate metabolites (MEHP + 5OH-MEHP + 5oxo-MEHP + 5cx-MEPP), ΣDiNP molar sum of diisononyl phthalate metabolites (OH-MiNP + cx-MiNP), ΣDiDP molar sum of diisodecyl phthalate (OH-MiDP + cx-MiDP) , ΣDINCH molar sum of di(isononyl) cyclohexane-1,2-dicarboxylate metabolites (OH-MINCH + cx-MINCH). Details of abbreviations can be found in Supplementary Table S1.

Figure S5. Association between creatinine-adjusted urinary concentrations of phthalate and DINCH metabolites and BMI z-score per ln concentration increase in exposure for (A) Children, and (B) Adolescents as a sensitivity analysis for birth weight and maternal smoking in HBM4EU Aligned Studies with available data (n=6 children's studies, n=4 adolescents' studies, 2014–2021).



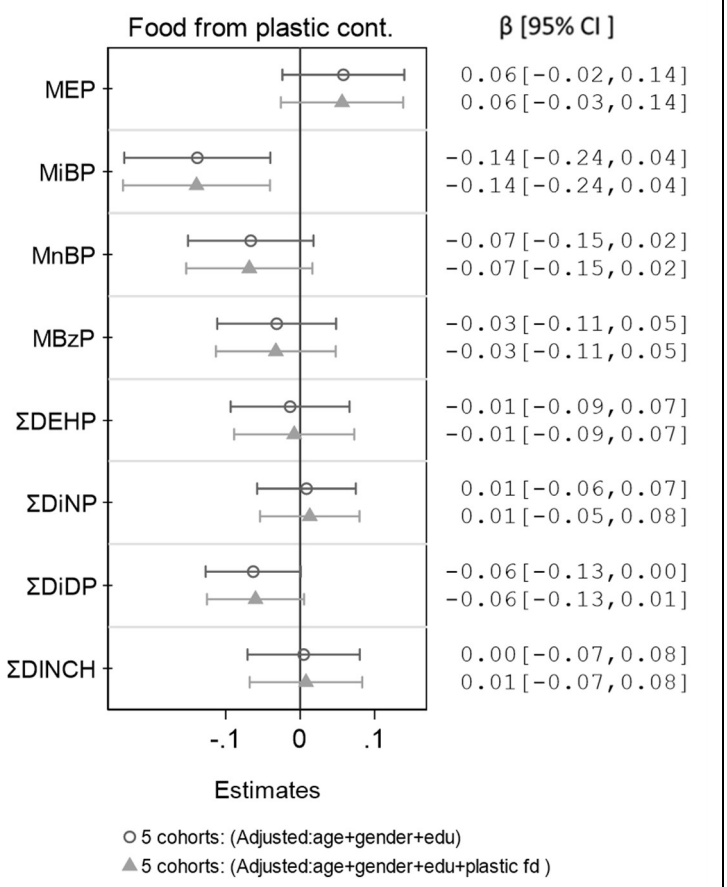

Models adjusted for household education, gender and child's age at outcome assessment, and fitted with a random intercept for aligned study, and further adjusted for further adjusted for birthweight and maternal smoking. Exposures were natural log (ln)-transformed and scaled to their interquartile range.

Children's Aligned studies (n=6, N=1490) included were NEB II (n=232), NAC II (n=275), InAirQ (n=257), GerESV-sub (n=300), PCB cohort (n=293), and VITO 3xG (n=133). The total number of metabolites included are as follows: MEP (n=1490), MiBP (n=1490), MnBP (n =1490), MBzP (n =1490), ΣDEHP (n=1213), ΣDiNP (n =922), ΣDiDP (n =690), and ΣDINCH (n =1257).

Adolescents' Aligned Studies (n=4, N=1068) included were: GerESV-sub (n=300), NEB II (n=181), PCB-follow-up teenagers (n=287), and FLEHS IV (n=300). The total number of metabolites included are as follows: MEP (n=1068), MiBP (n= 781), MnBP (n = 1068), MBzP (n =1068), ΣDEHP (n =1067), ΣDiNP (n =1068), ΣDiDP (n =600), ΣDINCH (n = 886).

Abbreviations: HBM4EU Human Biomonitoring for Europe, BMI body mass index, MEP mono-ethyl phthalate, MiBP mono-iso-butyl phthalate, MnBP mono-n-butyl phthalate, MBzP mono-benzyl phthalate, ΣDEHP molar sum of di(2-ethylhexyl) phthalate metabolites (MEHP + 5OH-MEHP + 5oxo-MEHP + 5cx-MEPP), ΣDiNP molar sum of diisononyl phthalate metabolites (OH-MiNP + cx-MiNP), ΣDiDP molar sum of diisodecyl phthalate (OH-MiDP + cx-MiDP) , ΣDINCH molar sum of di(isononyl) cyclohexane-1,2-dicarboxylate metabolites (OH-MINCH + cx-MINCH). Details of abbreviations can be found in Supplementary Table S1.

Figure S6. Association between creatinine-adjusted urinary concentrations of phthalate and DINCH metabolites and BMI z-score per ln concentration increase in exposure for (A) Children, and (B) Adolescents as a sensitivity analysis for consumption of food from plastic packaging in HBM4EU Aligned Studies with available data (n=0 children's studies, n=4 adolescents' studies, 2014–2021, N=1,137).

| (A) Children | (B) Adolescents |
|---|---|
| |  |

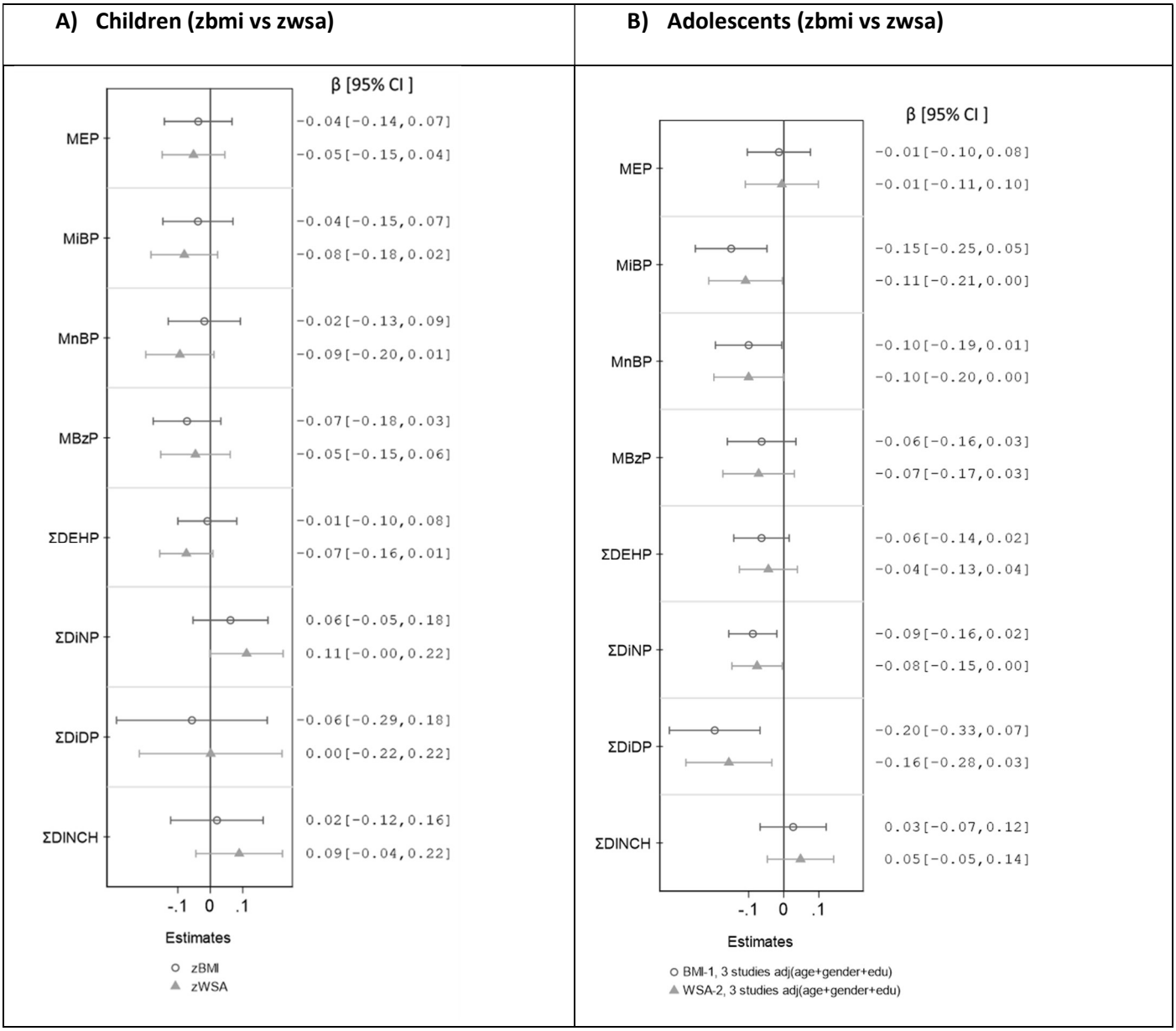


Models adjusted for household education, gender and child's age at outcome assessment, and fitted with a random intercept for aligned study, and further adjusted for consumption of food from plastic packaging. Exposures were natural log (ln)-transformed and scaled to their interquartile range.

No children's Aligned Studies had data on food from plastic packaging available. Adolescents' Aligned Studies (n=5 studies, N=1,137) included were ESTEBAN (n=304), SLO CRP (n=96), CROME (n=150), PCB cohort follow-up (n=287), and BEA (n=300). The total number of metabolites included are as follows: MEP (n=1137), MiBP (n= 850), MnBP (n = 1137), MBzP (n =1137), ΣDEHP (n =700), ΣDiNP (n =1137), ΣDiDP (n =700), ΣDINCH (n = 1137).

Abbreviations: HBM4EU Human Biomonitoring for Europe, BMI body mass index, MEP mono-ethyl phthalate, MiBP mono-iso-butyl phthalate, MnBP mono-n-butyl phthalate, MBzP mono-benzyl phthalate, ΣDEHP molar sum of di(2-ethylhexyl) phthalate metabolites (MEHP + 5OH-MEHP + 5oxo-MEHP + 5cx-MEPP), ΣDiNP molar sum of diisononyl phthalate metabolites (OH-MiNP + cx-MiNP), ΣDiDP molar sum of diisodecyl phthalate (OH-MiDP + cx-MiDP) , ΣDINCH molar sum of di(isononyl) cyclohexane-1,2-dicarboxylate metabolites (OH-MINCH + cx-MINCH). Details of abbreviations can be found in Supplementary Table S1.

Figure S7. Association between creatinine-adjusted urinary concentrations of phthalate and DINCH metabolites and BMI z-score (zbmi) and waist circumference z-score (zwsa) per ln concentration increase in exposure for (A) Children, and (B) Adolescents as a sensitivity analysis for outcome ascertainment in HBM4EU Aligned Studies with available data (n=3 children's studies, n=3 adolescents' studies, 2014–2021).



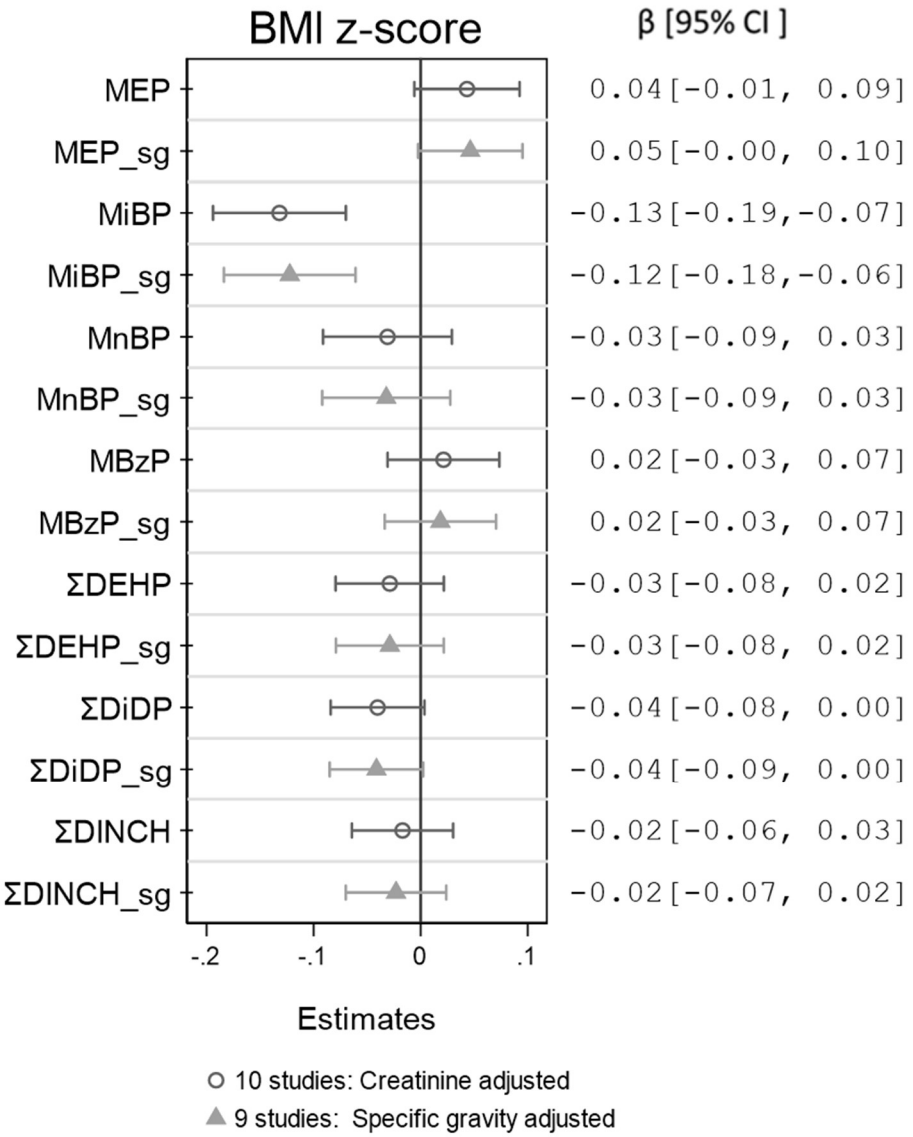

Models adjusted for household education, gender, and child's age at outcome assessment, and fitted with a random intercept for aligned study. Exposures were natural log (ln)-transformed and scaled to their interquartile range.

Children's Aligned studies (n=3 studies, N=658) included were NEB II (n=232), PCB cohort (n=293), and 3xG (n=133). The total number of metabolites included are as follows: MEP (n=658), MiBP (n= 658), MnBP (n = 658), MBzP (n =658), ΣDEHP (n =658), ΣDiNP (n =365), ΣDiDP (n =133), ΣDINCH (n =426).

Adolescents' Aligned Studies (n=3 studies, N=768) included were NEB II (n=181), PCB-follow-up teenagers (n=287), and FLEHS IV (n=300). The total number of metabolites included are as follows: MEP (n=768), MiBP (n= 481), MnBP (n = 768), MBzP (n =768), ΣDEHP (n =768), ΣDiNP (n =768), ΣDiDP (n =300), ΣDINCH (n =587).

Abbreviations: HBM4EU Human Biomonitoring for Europe, BMI body mass index, MEP mono-ethyl phthalate, MiBP mono-iso-butyl phthalate, MnBP mono-n-butyl phthalate, MBzP mono-benzyl phthalate, ΣDEHP molar sum of di(2-ethylhexyl) phthalate metabolites (MEHP + 5OH-MEHP + 5oxo-MEHP + 5cx-MEPP), ΣDiNP molar sum of diisononyl phthalate metabolites (OH-MiNP + cx-MiNP), ΣDiDP molar sum of diisodecyl phthalate (OH-MiDP + cx-MiDP) , ΣDINCH molar sum of di(isononyl) cyclohexane-1,2-dicarboxylate metabolites (OH-MINCH + cx-MINCH). Details of abbreviations can be found in Supplementary Table S1. Note: In the figure, an underscore (_) should be read as a dash or hyphen (e.g., OH_MINP is OH-MINP).

Figure S8. Sensitivity analysis for the association between phthalate/DINCH metabolites and BMI z-score per ln concentration increase in exposure for creatinine-adjusted vs. specific gravity-adjusted urinary concentrations in adolescents (10 studies n=2,499, 12-18 years, 2014–2021).

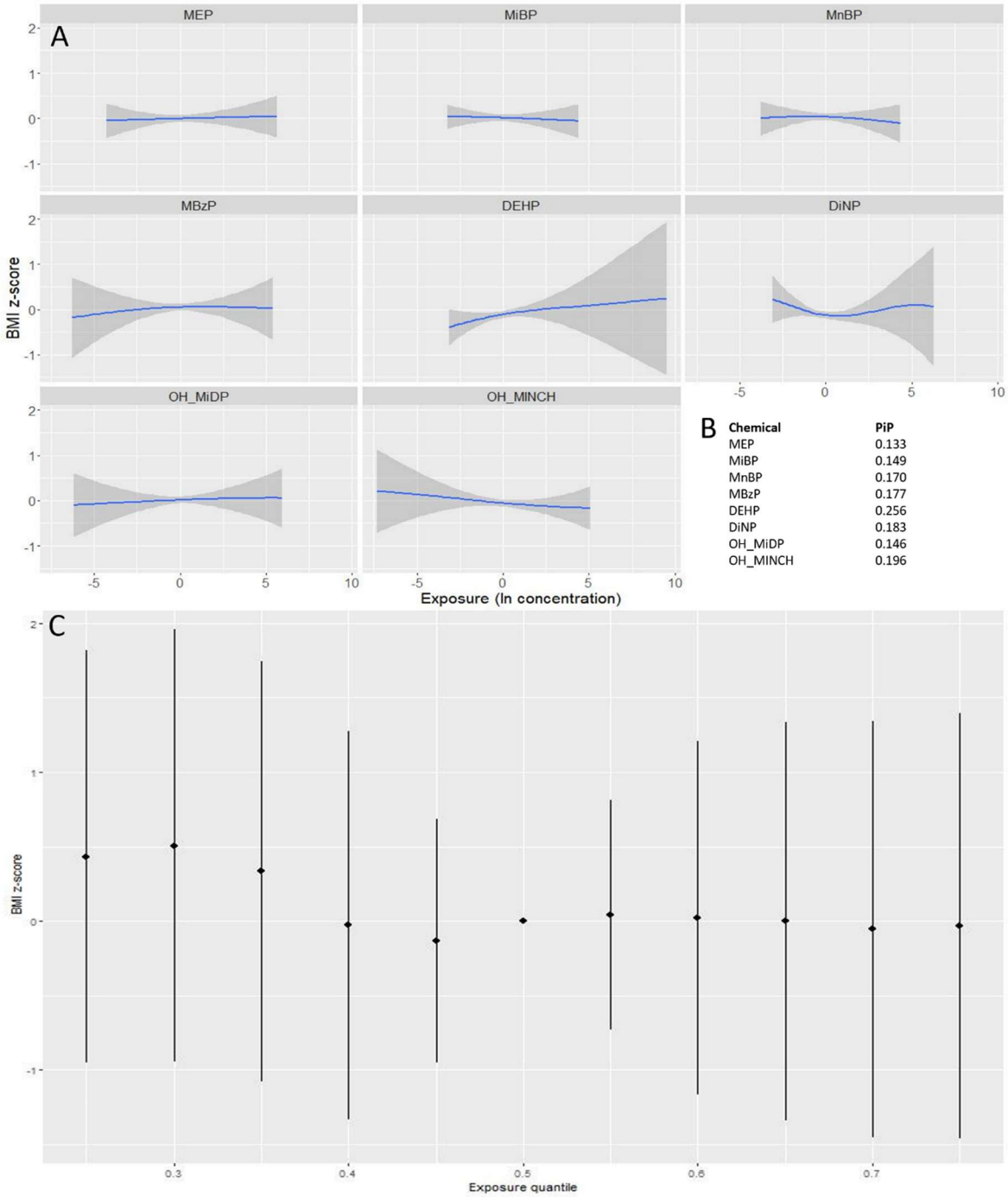



Models adjusted for age (years), gender, and household educational status, and fitted with a random intercept for aligned study. Exposures were natural log (ln)-transformed and scaled to their interquartile range. For each exposure, the first estimate (circle) is creatinine-adjusted while the second estimate (triangle) specific gravity-adjusted.

Specific gravity was measured in all adolescent studies (n=9) except for the ESTEBAN study in France. For creatinine-adjusted measurements, 10 studies had data for MEP (n=2499), MBzP (n=2499), MnBP (n=2199, except Riksmaten-SE), MiBP (n=1918, except POLAES-PL, PCB cohort-SK, Riksmaten-SE), ΣDiDP (n=1881, except NEBII-NO, PCB cohort-SK, CROME-EL), and ΣDINCH (n=2317, except GerSV-DE). The Σ refers to the molar sum of the metabolites as shown in Supplemental Table S1.

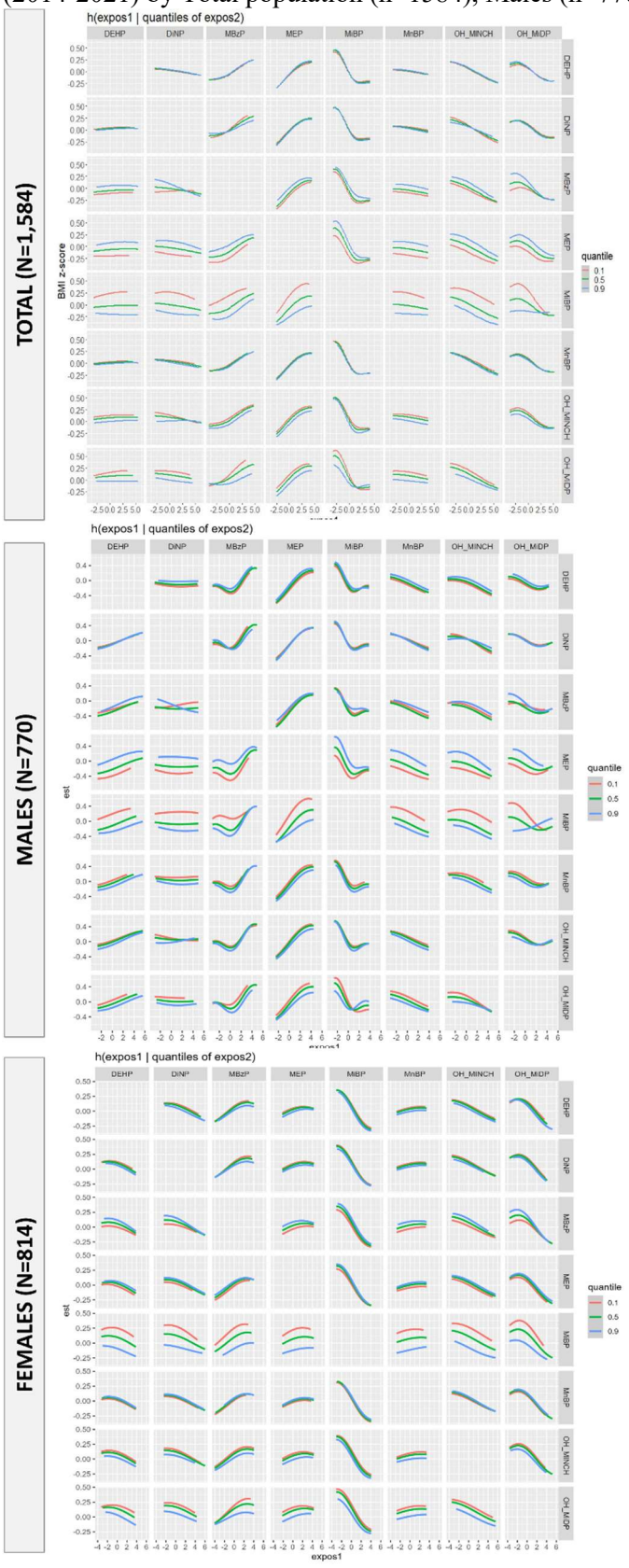
Abbreviations: HBM4EU Human Biomonitoring for Europe, BMI body mass index, MEP mono-ethyl phthalate, MiBP mono-iso-butyl phthalate, MnBP mono-n-butyl phthalate, MBzP mono-benzyl phthalate, ΣDEHP molar sum of di(2-ethylhexyl) phthalate metabolites (MEHP + 5OH-MEHP + 5oxo-MEHP + 5cx-MEPP), ΣDiNP molar sum of diisononyl phthalate metabolites (OH-MiNP + cx-MiNP), ΣDiDP molar sum of diisodecyl phthalate (OH-MiDP + cx-MiDP) , ΣDINCH molar sum of di(isononyl) cyclohexane-1,2-dicarboxylate metabolites (OH-MINCH + cx-MINCH).

Figure S9. Summary estimates from BKMR on the association between mixtures of natural logarithm (ln) transformed creatinine-adjusted urinary concentrations of phthalate and DINCH metabolites and BMI z-score in children in 9 HBM4EU aligned studies (n=1873, 2014-2021)



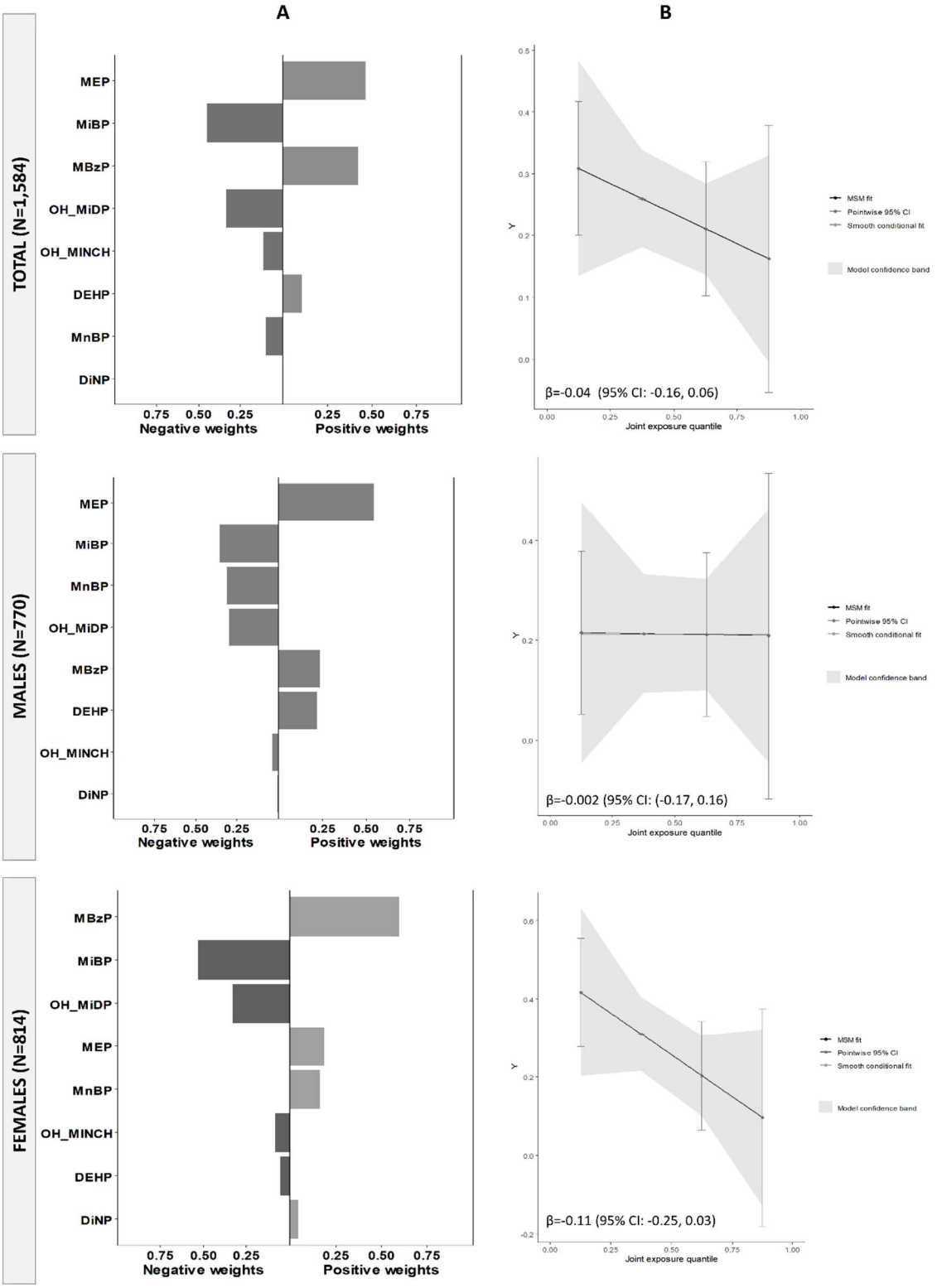

(A) Exposure-response associations for each chemical when the others are fixed at their median. (B) Posterior inclusion probabilities (PiP) of each chemical in the mixture-response function for BMI z-score. (C) Joint effect of phthalates/DINCH mixture on BMI z-score in childhood. Models adjusted for household income, gender and child's age at outcome assessment, and Aligned Study. Aligned Studies included: InAirQ (Hungary, n=257), GerES V-sub (Germany, n=297), NEBII (Norway, n= 232), ESTEBAN (France, n=285), OCC (Denmark, n=294), SLO CRP (Slovenia, n=148), CROME (Greece, n=161), SPECIMEn (Netherlands, n=66), 3xG (Belgium, n=133). **Abbreviations:** HBM4EU Human Biomonitoring for Europe, BMI body mass index, MEP mono-ethyl phthalate, MiBP mono-iso-butyl phthalate, MnBP mono-n-butyl phthalate, MBzP mono-benzyl phthalate, OH-MINCH Cyclohexane-1,2-dicarboxylate-mono-(hydroxyl-iso-nonyl) ester, and OH-MIDP Mono-(9-hydroxydecyl) phthalate (Supplementary Table S1). Note: In the figure, an underscore (_), is read as a hyphen (e.g., OH_MINP is OH-MINP).

Figure S10. Bivariate exposure-response function for phthalates/DINCH for Exposure 1 at quantiles of Exposure 2, when all the other exposures are fixed at the median for adolescents (12-18 years) in 7 HBM4EU aligned studies (2014-2021) by Total population (n=1584), Males (n=770) and Females (n=814).




Models adjusted for household income, gender and child's age at outcome assessment, and Aligned Study. Aligned Studies included: Esteban (France, n=303), Chrome (Greece, n=150), BEA (Spain, n=287), SLO CRP (Slovenia, n=96), NEB II (Norway, n=149), GerEs V-sub (Germany, n=299), FLEHS IV (Belgium, n=300). **Abbreviations:** HBM4EU Human Biomonitoring for Europe, BMI body mass index, MEP mono-ethyl phthalate, MiBP mono-iso-butyl phthalate, MnBP mono-n-butyl phthalate, MBzP mono-benzyl phthalate, OH-MINCH Cyclohexane-1,2-dicarboxylate-mono-(hydroxyl-iso-nonyl) ester, and OH-MIDP Mono-(9-hydroxydecyl) phthalate (Supplementary Table S1). Note: In the figure, an underscore (_), is read as a hyphen (e.g., OH_MINP is OH-MINP).

Figure S11. Quantile g-computation model results for the association between phthalates/DINCH and BMI z-score in adolescents (12-18 years) in 7 HBM4EU Aligned Studies (2014–2021), showing A) weights, and B) joint exposure quantile by Total population (n=1584), Males (n=770) and Females (n=814).




A) Weights represent the proportion of positive or negative partial effect for each component in the mixture on BMI z-score. Bar shading corresponds to the overall effect size: for "Total" the darker colored bars are for negative weights as the overall mixture effect is negative. Negative and positive weights each sum to 1, corresponding to the effect size relative to other effects in the same direction and are not directly comparable. B) The joint exposure quantile. Models adjusted for household income, gender and child's age at outcome assessment, and Aligned Study. Aligned Studies included: Esteban (France, n=303), Chrome (Greece, n=150), BEA (Spain, n=287), SLO CRP (Slovenia, n=96), NEB II (Norway, n=149), GerEs V-sub (Germany, n=299), FLEHS IV (Belgium, n=300). **Abbreviations:** HBM4EU Human Biomonitoring for Europe, BMI body mass index, MEP mono-ethyl phthalate, MiBP mono-iso-butyl phthalate, MnBP mono-n-butyl phthalate, MBzP mono-benzyl phthalate, OH-MINCH Cyclohexane-1,2-dicarboxylate-mono-(hydroxyl-iso-nonyl) ester, and OH-MIDP Mono-(9-hydroxydecyl) phthalate (Supplementary Table S1). Note: In the figure, an underscore (_), is read as a hyphen (e.g., OH_MINP is OH-MINP).

*Supplementary Table S4. Ethics committees and funding information of the HBM4EU Aligned Studies*

| Study acronym | Country | Ethics information | Funding information |
|---|---|---|---|
| NEBII | NO | Approved by The Regional Committees for Medical and Health Research Ethics in Norway, Reference: 2015/1340. | Funded by the Norwegian Institute of Public Health, and the work done as part of the HBM4EU aligned studies co-funded by two projects funded by the Research Council of Norway (references; 268465 and 275903). The Norwegian Mother, Father and Child Cohort Study (MoBa) was supported by the Norwegian Ministry of Health and Care Services and the Ministry of Education and Research. |
| OCC | DK | Approved by the Regional Scientific Ethical Review Committee for Southern Denmark (Project ID S-0090130) and the Danish Data Protection Agency (J.No.18/33119). | Funded by Odense University Hospital, Denmark, the Region of Southern Denmark, The Municipality of Odense, Denmark, The University of Southern Denmark, Odense Patient data Exploratory Network (OPEN), Denmark, The Danish Centre for Hormone Disrupting Chemicals, The Danish Research Council, Novo Nordisk Foundation, Denmark. |
| InAirQ | HU | Approved by the Medical Research Council of Hungary (registration number: 46399-4/2017/EKU) | Co-funded by Interreg CENTRAL EUROPE and the National Public Health Center, Hungary. |
| PCB cohort and PCB cohort (follow-up) | SK | Approved by the ethical committee of the Slovak Medical University in Bratislava (No. 01/2018 and 02/2019). | Funded by the Slovak Ministry of Health (project no. 2012/47-SZU-11) and the Slovak Research and Development Agency (project no. APVV-0571-12). The original cohort was funded by the U.S. National Institutes of Health, National Cancer Institute, grant R01-CA96525. PCB cohort (follow-up) received additional funding from the Ministry of Health of the Slovak Republic, program 07B0103. |
| POLAES | PL | Approved by the ethical committee of the Nofer Institute of Occupational Medicine (No. 10/2017). | POLEAS study was financially supported by Ministry of Education and Science (project no. 3764/H2020/2017/2) |
| SLO CRP | SL | Approved by the National Medical Ethics Committee, Republic of Slovenia (NMEC, number of accordance: 0120-118/2017/3). | Supported by the Chemicals Office of the Republic of Slovenia through the Jožef Stefan Institute program group P1- 0143 (Slovenia), and a national project "Exposure of children and adolescents to selected chemicals through their habitat environment" (CRP-V3-1640, grant agreement No. C2715-16-634802) |
| CROME | EL | Approved by the Committee on Ethics and Deontology for Research of AUTH, in the assembly 1/25-10-2018, by the request no. Prot. 111256 / 17-09-2018 regarding the research under the project "Cross-Mediterranean Environment and Health Network" and it was carried out in accordance with the current Code of Ethics of Aristotle University of Thessaloniki. | Co-funded by the European Commission research funds of Horizon 2020. |
| NAC II | IT | Approved by the Ethics Committees of the University of Udine and of the Institute for Maternal and Child Health - IRCCS Burlo Garofolo, Trieste (Italy), (CE/V-70 - 05/02/2007; CE/ V-109-12/04/2010). | Supported by the European Union through its Sixth Framework Program for RTD (contract "PHIME" no. FOOD-CT-2006-016253). Furthermore, it was funded by the grant RC 12/12 of Institute for Maternal and Child Health - IRCCS Burlo Garofolo, Trieste (Italy), CROME LIFE project "Cross – Mediterranean Environment and Health Network" (LIFE12 ENV/GR/001040) and H2020-MSCA ITN EJD-REP BIOTECH 675526 project. |
| ESTEBAN | FR | Approved by the Ile-de-France Protection to person committee on the 06.12.2012 (Internal number: CPP-IDF IX 12-012, EudraCT: 2012- | Funded by Santé Publique France and the French ministries of Health and the Environment. |

| Study acronym | Country | Ethics information | Funding information |
|---|---|---|---|
| | | A00459-34). The Committee has examined all provided and requested document (Inform consent, protocol, authorization form from the Ministry of Health, etc.). The French Data Protection Agency gave its approval on the 14.02.2013. A Decree of the State Council establishing a processing of personal data relating to biomonitoring, health surveillance and nutrition (The Esteban study) was established after approval of the French Advisory Committee on Information Processing for Research (CCTIRS). The French National Agency for Medicines and Health Products' Safety (ANSM) gave its approval for the use of biological samples and biobanking. | |
| GerES V-sub(unweighted) | DE | Approved by the Ethics Commission of the Berlin Chamber of Physicians (Eth-14/14) and the Federal Officer for Data Protection and Freedom of Information (III-425/009#0018). | Funded by the German Ministry for Environment, Nature Conservation and Nuclear Safety (BMU) and the German Ministry of Education and Research (BMBF). |
| 3xG | BE | Approved by the ethical committee of University Hospital Antwerp and University Antwerp on 09.11.2010 (Ref N° UA A10-58) and an amendment for follow-up at 7 years was approved on 09.01.2019, an amendment for conducting additional analysis in the frame of HBM4EU was approved on 24.08.2020 (Ref N° UA A10-58: 3xG). | Commissioned and co-financed by NIRAS/ONDRAF (Belgian National Agency for Radioactive Waste and enriched Fissile Material), STORA (Study and Consultation Radioactive Waste Dessel) and MONA (Mols Overleg Nucleair Afval).. |
| SPECIMEn-NL | NL | Approved by the ethical committee of METC, University Medical Centre Utrecht on 07.19.2019 (Ethical Approval number 19-513). | Funded by the HBM4EU project, co-financed under Horizon 2020 (grant agreement No 733032). |
| Riksmaten Adolescents 2016-17 | SE | Approved by the Regional Ethical Review Board in Uppsala, Sweden (No. 2015/190). | Conducted and mainly financed by the Swedish Food Agency. Financial support was provided from the Swedish Civil Contingencies Agency and from the Swedish Environmental Protection Agency (SEPA). |
| BEA | ES | Approved by the Comité de Ética de la Investigación del Instituto de Salud Carlos III (CEI PI 56_2017_v3) on 07.11.2017 | Funded by the MAGRAMA-ISCIII Project SEG 1321/15 |
| FLEHS IV | BE | Approved by the ethical committee of University Hospital Antwerp and University Antwerp on 12.06.2017 (Ref N° B300201732753) and an amendment for conducting additional analysis in the frame of HBM4EU was approved on 18.02.2019 and on 15.05.2020 (Ref N° B300201732753). | Commissioned and co-financed by the Government of Flanders, Department of Environment & Spatial Development. |

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