
The emergence of health gaps in early life: The role of childhood deprivation

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ANR EGAL: “The Emergence of health Gaps in early Life: A dynamic analysis of three national birth cohorts”

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- Socioeconomic inequalities in health are prominent feature of our societies (Marmot, 2001):
 - They persist over time (Mackenback et al., 2003)
 - They accumulate throughout the lifecourse (Hertzman, 2001);
 - They begin from birth (Irwin et al., 2007).
- **The early childhood period plays a crucial role in (re)production of health inequalities throughout life.**
- In the health inequalities literature, for children, we usually rely on markers of their parents' "socioeconomic status":
 - Parental education;
 - Parental occupational class;
 - Parental ethnicity;
 - **Household income.**
- Consequences of poverty for child health:
 - Children growing up in poverty have poorer outcomes on a range of domains of health and wellbeing (Heckman 2006; Blanden et al., 2013);
 - Both concurrent and long-term effects (Barker, 1995; Currie and Moretti, 2007; Reichman 2005);
 - The magnitude of the association between income and child health appears to be getting stronger over time.

- **Do parent-based measures of socioeconomic background capture the same concept for young children as for adults?**
- Income has been criticized as a marker of deprivation for children (Guio et al., 2009; Leturcq and Panico, 2019):
 - Does not capture the full extent of children's lived experience of poverty;
 - Does not capture family composition;
 - Cannot capture prioritization of resources towards children;
 - Financial security and disposable income are also based on savings, debt, housing tenure etc.;
 - Ignores multidimensionality of "poverty";
 - Poverty is about more than just the inability to meet basic needs, e.g., people value ability to participate in society (capability approach).
- **➡ How to measure "socio-economic status" to describe health gaps in childhood?**

- Towards the concept of ***multidimensional childhood deprivation*** (Bradshaw et al., 2007; Nolan and Whelan, 2011):
 - Recognition of children as distinct individuals with their own needs and deprivations;
 - Extending beyond a single dimension of deprivations.
- ➡ **Multidimensional deprivation is a tool to better understand childhood disadvantage.**
- Main challenge: Difficult to operationalize (longitudinally), especially for (young) children, and for comparative analysis.
- Previous work (Leturcq and Panico, 2019; Castillo Rico, Leturcq and Panico, 2021) proposed multidimensional deprivation indicators that are:
 - Relevant to children's own lived experience;
 - Relevant to a given child age, including youngest children;
 - Relevant to children's changing needs across time;
- ➡ A nuanced understanding of children's own lived experience of their multiple environments across time (AND: flexible enough to be applied to secondary data analyses)

- Gaps in the literature:
 - No empirical work on the link between multidimensional deprivation and child health;
 - In general, few child health studies explore multiple facets of disadvantage at the same time;
 - Some qualitative studies have explored the link between multidimensional deprivation and children's health and wellbeing (see for example Ridge, 2011, for a review);
 - Comparative literature: Secular trends of growing inequities in child resources ("diverging destinies" framework, McLanahan, 1994) observable in many countries, but with important cross-national differences in the pace and magnitude:
 - Less is known about whether the impact of these trends on child health inequalities is the same across countries;
 - Comparative research often relies on single indicators, i.e. income, because of its ease in harmonization;
 - From a comparative perspective, **income does not account for benefits and services** such as childcare and healthcare, the different purchasing powers of households, different costs associated to social participation in normative activities etc. across countries;
 - Socio-economic inequalities (income/maternal education) and health outcomes with the main focus on Anglophone countries (Martinson & Reichman, 2016);
 - Anglophone countries + Europe: mainly focused on birthweight (Panico, Goisis & Martinson, 2024; Panic & Tô, 2023).

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 - What is the association between multidimensional deprivation and child early health in France?
 - Do different dimensions of deprivation, or their combinations, matter differently for health?
 - Does the depth of deprivation at a given age increase the magnitude of the association with child health?
 - Does the accumulation of deprivation over time associate with child health?
 - Does the use of multidimensional deprivation give rise to different patterns of early health inequalities compared to classical income-based poverty?
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 - Do these associations vary across child gender, age, and family characteristics?
- **How do these associations vary across three countries: France, UK, US?**

Institutional background: FR-UK-US

- National contexts and policy environments may have a strong effect in moderating the relationship between early experience of deprivation and child health;
- Similarities: broad social characteristics, such as major political and demographic shifts;
- Differences: family and health policies, including availability, generosity, quality, and targeting of benefits and services; norms creating different food and physical activity environments (Thevenon, 2011);
- For example, provision of benefits and services for families and children
 - Generosity: **US<UK<France**;
 - The US and the UK: a targeted approach; the French system: a more universal approach;
 - Big heterogeneity across states in the US; and countries in the UK.
- Differences in provisions in childcare, education, health services, and redistributive policies suggest that the impacts of growing inequities in child resources on health might differ across countries.

Three nationally representative cohort studies:

- **France: Etude Longitudinale Française depuis l'Enfance:** ~18,000 children born in 2011;
- **UK: Millennium Cohort Study:** ~19,000 children born in 2000-2002;
- **US: Early Childhood Longitudinal Study – Birth Cohort:** ~10,700 children born in 2001;
- Four comparable ages: birth, 9m/1y, 3/3.5, and 5/5.5 years;
- A multidisciplinary approach (child development and health, socio-economic context, environmental exposures);

Analytical sample:

- Three survey waves: 9m/1y, 3/3.5, and 5/5.5 years;
- Include all households that do not have missing information on the items used in construction of multi-dimensional childhood deprivation;
- Sample sizes: France ~32,000 observations; the UK ~47,000 observations; the US ~25,000 observations.

Multidimensional deprivation: construction

- Based on counting methods to measure adult multidimensional poverty (Alkire and Foster, 2009);
- Modified by Leturcq and Panico (2019):
 - Conceptualisation of deprivation as child-centred;
 - Longitudinal measures that are comparable but adapt over time to account for children's changing needs.
- Deprivation identification:
 - Identify potential items that may measure child-centred deprivation (!data availability);
 - Apply multiple component analysis to explore which clusters of variables emerge and identify discrete dimensions of deprivation that are important for children in early childhood;
 - Dimensions of deprivation stay constant over time;
 - The indicators making up each dimension are a mix of stable and changing variables that reflect children's needs at different age.
 - Apply a double-counting approach to identify if a child is deprived or not (1) across dimensions and (2) overall:
 - Weights and cut-offs.

Multidimensional deprivation: construction

- FR-UK-US harmonisation:
 - Harmonization (as much as possible) of items at each given wave (but, some difficulties);
 - 4 dimensions of deprivation: material, housing, parenting, health behaviours;
 - We apply the same weight and cut-offs in all three countries based on our results for France.
- Four dimensions of deprivation:
 - **Material deprivation:** living conditions of the household and inability to afford “basic” items (toys, affordability of waterproof coat/shoes for the child, affordability of a balanced meal for a child, holidays away from home once a year, etc.);
 - **Housing deprivation:** poor housing amenities (difficulty to heat the home, damp, mold and noise, overcrowd house, living in temporary housing);
 - **Parenting deprivation:** parents’ involvement in childrearing and activities (shared reading, playing with the child etc.);
 - **Health behaviours deprivation:** nutrition, sleep, physical activity and sedentary behaviour.
- Cut-offs:
 - A child is classified as ***deprived in a particular dimension*** if he/she is deprived in 20% or more of the weighted indicators in this dimension;
 - A child is classed as ***multidimensionally deprived*** if deprived in at least two dimensions.

Multidimensional deprivation: descriptive statistics



Table 1 - Share of deprived and income poor children, average across waves, %

	France	UK	US
Multidimensionally deprived	7.1	13.1	16.9

Multidimensional deprivation: descriptive statistics



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<i>By dimension</i>			
Material deprivation	5.4	7.5	10.6
Housing deprivation	13.2	19.3	16.8
Parenting deprivation	6.4	6.7	4.8
Health behaviours deprivation	19.2	25.1	44.6

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<i>Depth of deprivation</i>			
No deprivation	64.1	52.3	43.8
1 dimension deprived	28.8	34.6	39.3
2 dimensions deprived	6.0	10.9	13.3
3 or 4 dimensions deprived	1.1	2.2	3.6

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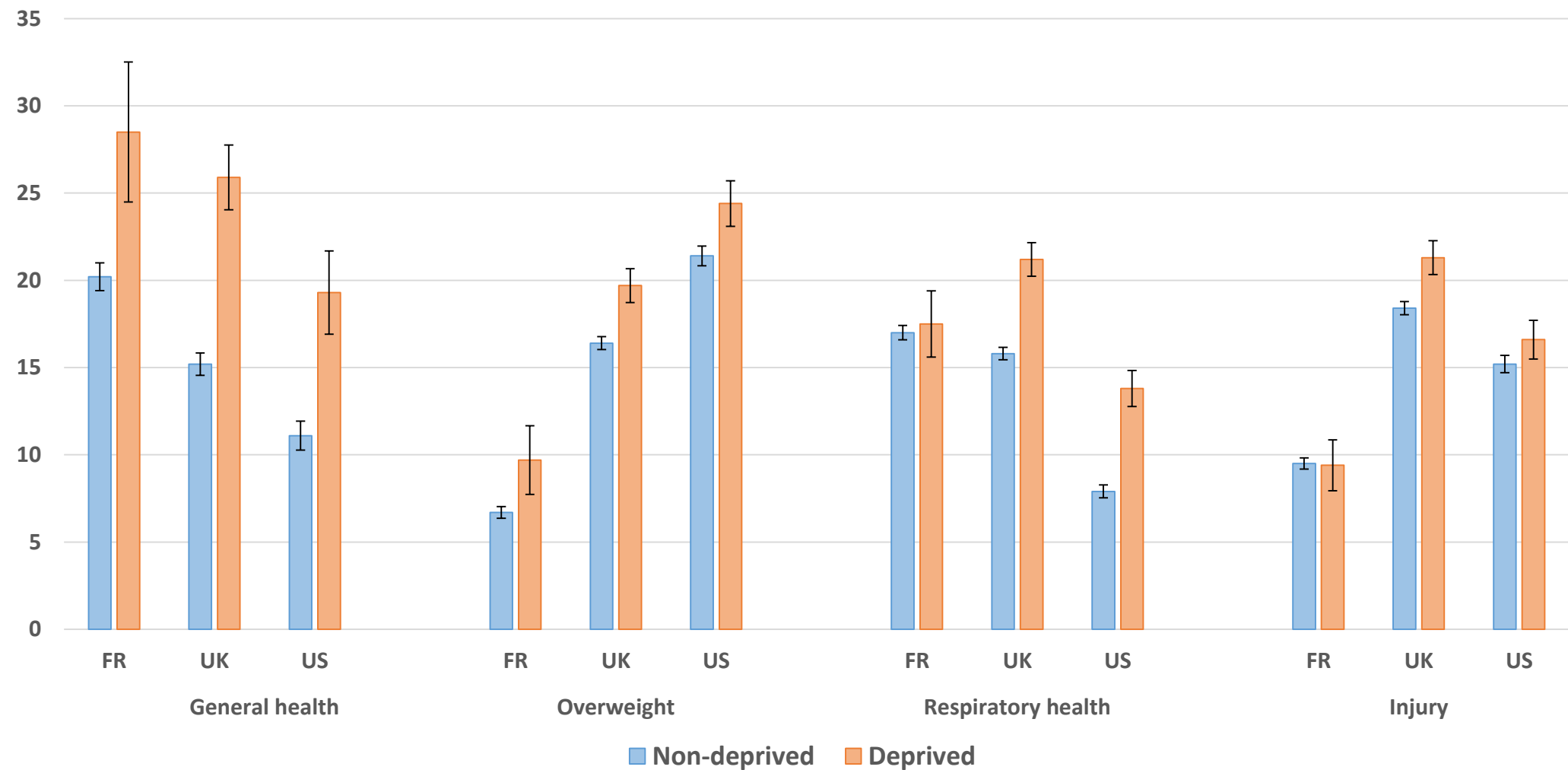
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<i>Income poverty</i>			
Income poor	15.6	26.7	30.3
Poor among deprived	40.1	56.6	68.2
Poor among non-deprived	13.8	21.7	22.6
Deprived & Income poor	2.8	7.4	11.5

Empirical approach

- **Logistic regression model:** $Health\ outcome_{it} = \alpha + \theta_1 Deprivation_{it} + \theta_2 X_{it} + \eta_t + \mu_h + \xi_{it}$
- **Model specifications:**
 - **Model 1** – unadjusted estimates;
 - **Model 2** – adds to M1 time, region and hospital fixed effects;
 - **Model 3** – adds to M2 child and family characteristics.
- **Deprivation specifications:**
 - Overall multidimensional deprivation index;
 - Each individual dimensions of deprivation;
 - Accumulation of dimensions of deprivation at each time point, i.e. depth of deprivation.
- **Covariates (time variant and invariant):**
 - Child: gender, low birthweight, high birthweight;
 - Parent/household: highest parental educational, household migrant background, household employment status, family structure, number of siblings, mother's age, maternal smoking during pregnancy.

- **General health:**
 - equals to 1 if parents report that child is in “less than good health” vs “good health” at age 5 years;
- **Overweight:**
 - equals to 1 if a child’s weight status is overweight or obese;
 - based on child’s weight-for-length or BMI;
 - weight and height/length are professionally measured;
- **Respiratory health:**
 - equals to 1 if parents report at least one episode of chest wheezing or asthma in the last 12 months;
 - France and the UK: wheezing or asthma; the US: asthma only;
- **Unintentional injury:**
 - equals to 1 if parents report any injuries that required contact with medical services in the last 12 months between the current and the previous wave (cranial trauma, burns, wound, ingestion of medical or cleaning products, etc.).

Health outcomes by deprivation status

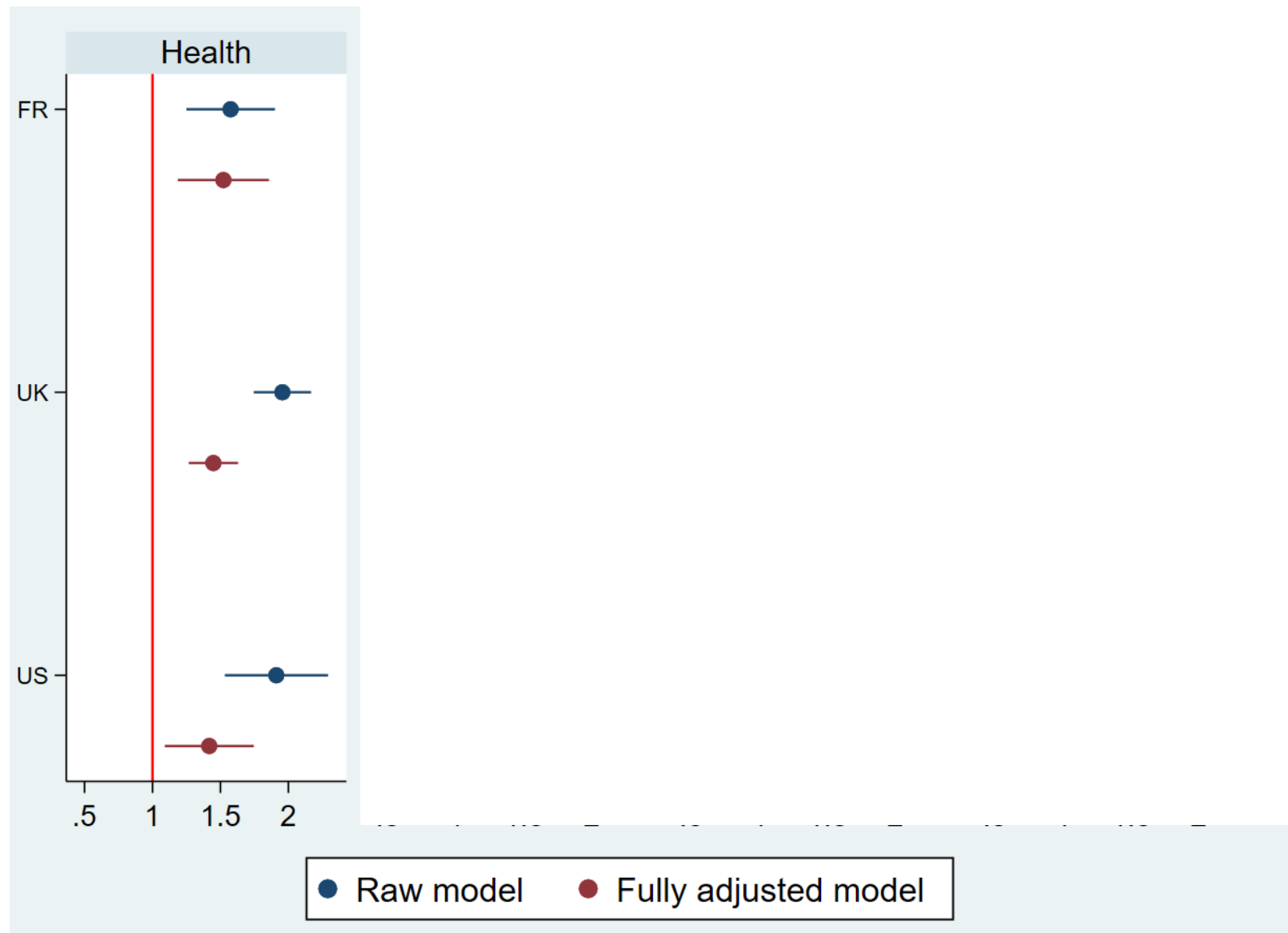


Overall deprivation and child health

*Figure 1 - Multidimensional
deprivation and health
outcomes, odds ratio,
logit estimation, pooled data*

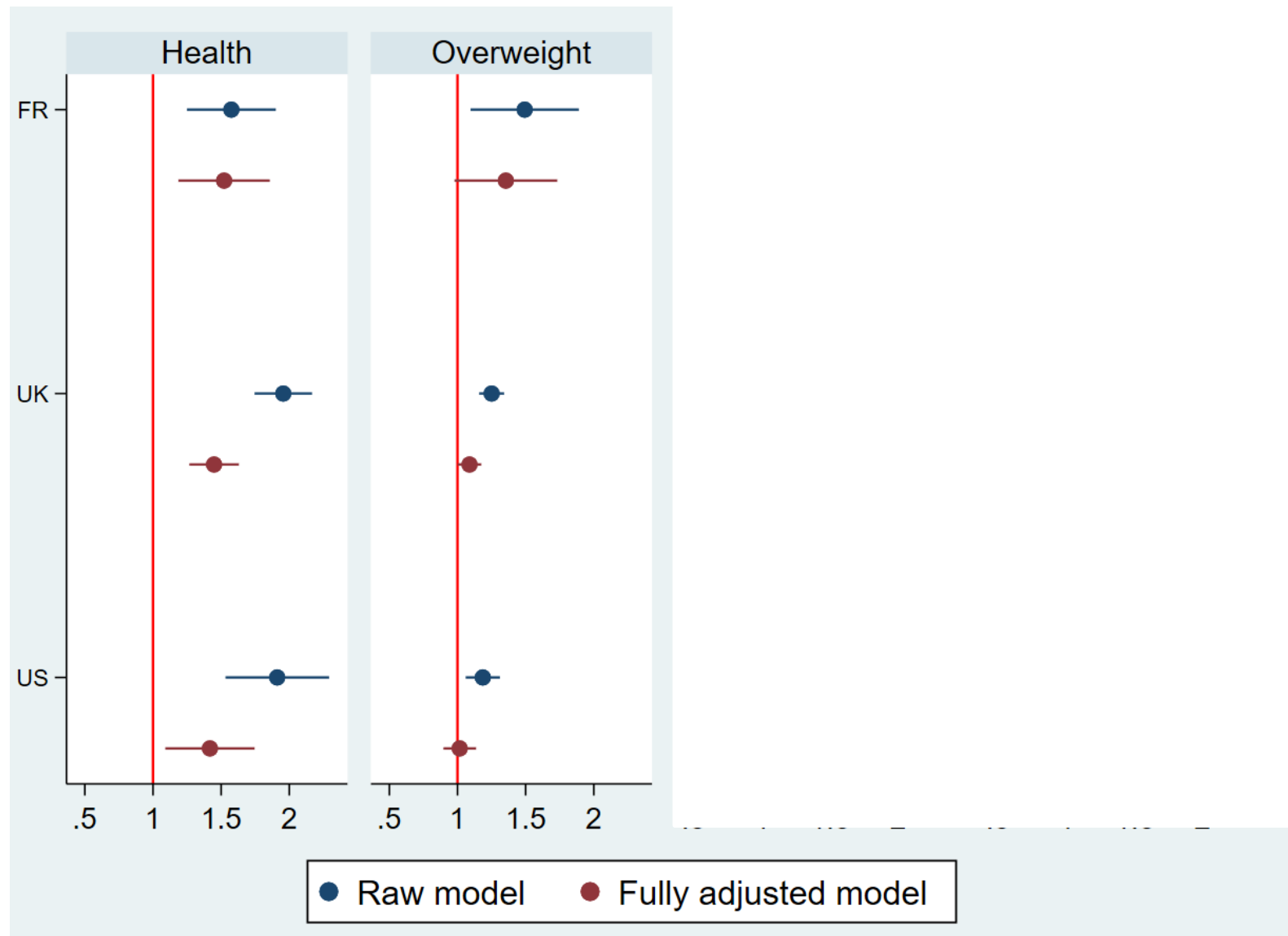
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Figure 1 - Multidimensional deprivation and health outcomes, odds ratio, logit estimation, pooled data



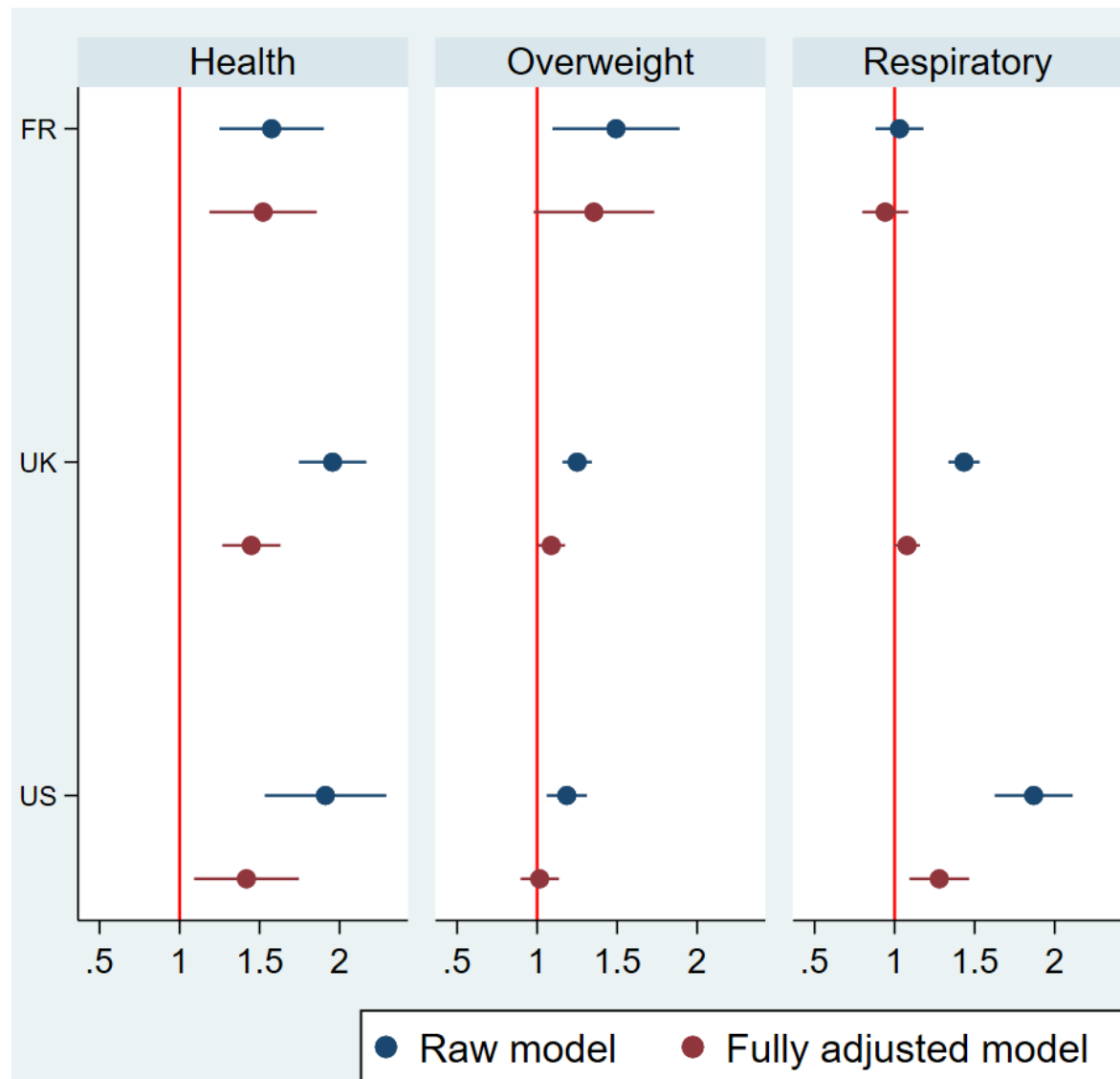
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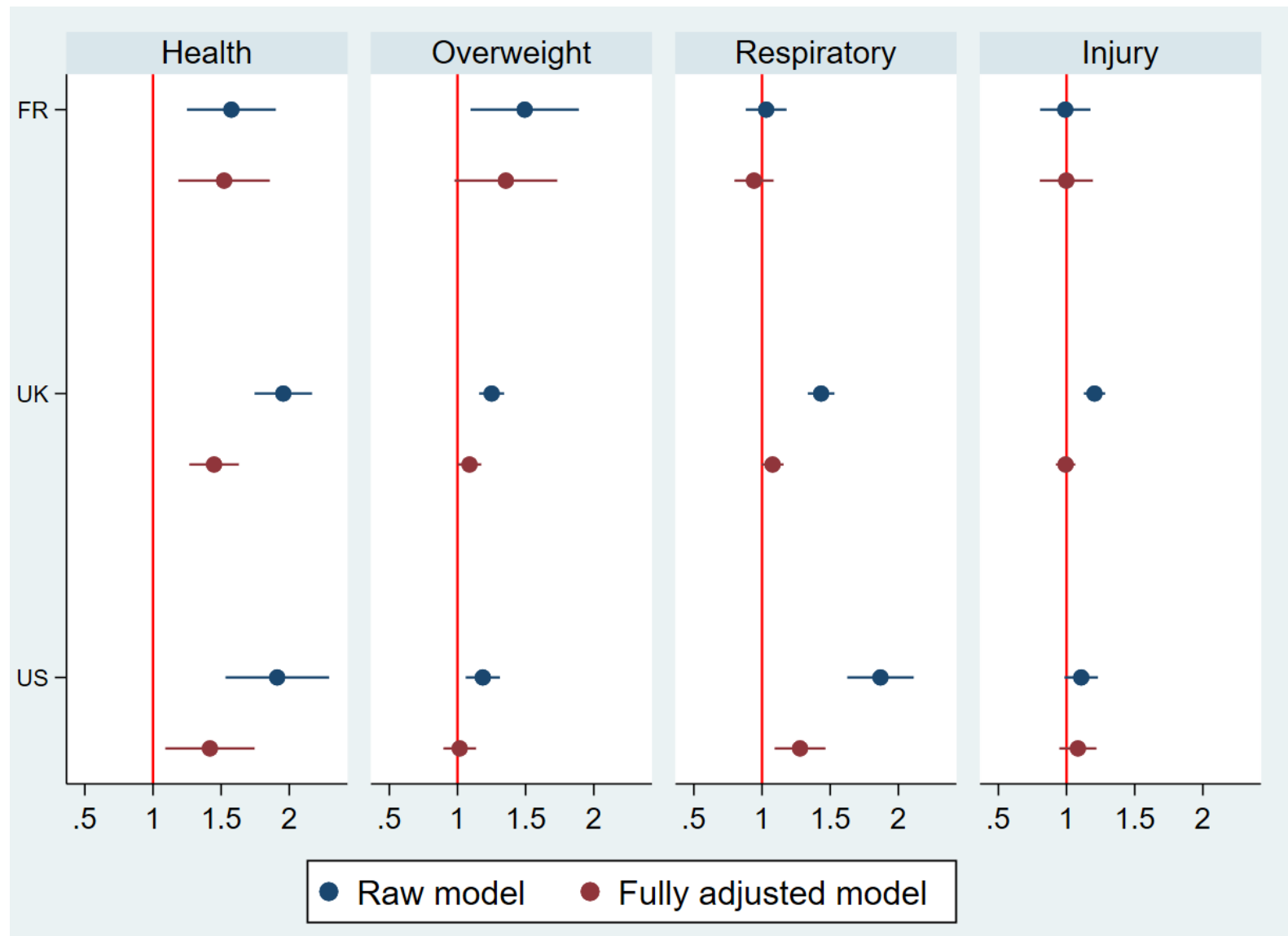
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Dimensions of deprivation and child health



Table 2 – Dimensions of deprivation and health outcomes

	General health	Overweight	Respiratory health	Injury
France				
UK				
US				

Dimensions of deprivation and child health



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	General health	Overweight	Respiratory health	Injury
France	Housing		Housing	
UK	Housing	Housing	Housing	
US			Housing	Housing

Dimensions of deprivation and child health



Table 2 – Dimensions of deprivation and health outcomes

	General health	Overweight	Respiratory health	Injury
France	Housing		Housing	
UK	Housing	Housing	Housing	
US	Parenting		Housing	Housing

Dimensions of deprivation and child health



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	General health	Overweight	Respiratory health	Injury
France	Housing		Housing	
UK	Housing Health behaviours	Housing Health behaviours	Housing Health behaviours	
US	Parenting Health behaviours	Health behaviours	Housing	Housing

Dimensions of deprivation and child health



Table 2 – Dimensions of deprivation and health outcomes

	General health	Overweight	Respiratory health	Injury
France	Housing	---	Housing	---
UK	Housing Health behaviours	Housing Health behaviours	Housing Health behaviours	---
US	Parenting Health behaviours	Health behaviours	Housing	Housing

[illegible]

Table 3 – Odds ratio of deprivation and income poverty on health outcomes, logit estimation, pooled data

[illegible]

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[illegible]

Summary of results

- A need to consider children as distinct actors of their own health, with their own individual needs and deprivations, rather than vessels passively receiving and embodying their parents' social, economic and health worlds (Mayall, 1998; Brady, Lowe and Lauritzen, 2015);
- The importance of deprivation varies across deprivation dimensions, health outcomes, and countries;
- Multidimensional deprivation is associated with general health in all three countries, with overweight in France and UK, with respiratory health in the US; no associations with injury;
- Paying attention to the different forms of deprivation matters. Even for outcomes without significant associations with deprivation, we find associations with individual dimensions of deprivation (for example, for respiratory health housing deprivation matters in France and the UK);
- Associations appear to strengthen as depth of deprivation increases;
- Results are robust to the inclusion of poverty in models, suggesting that this is a distinct process.

Limitations

- Secondary analyses of available data; lack of repeated measures;
- Relatively few children are deprived in the samples (especially in France) → sample size issues;
- Sample attrition, with deprived children leaving the sample over time → underestimate the proportion of deprived children → our estimates are a lower bound.

Thank you!

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Motivation II

- French healthcare system has been globally recognized for its overall quality:
 - France is one of largest healthcare spenders: 11.2% of its GDP vs an average of 8.8% in OECD countries (OECD, 2019);
 - A high level of public support for expenses: direct out-of-pocket spending for patients is the lowest in the OECD at 9% vs 21% on average (OECD, 2019);
 - 99.9% of population is covered with a core set of healthcare services;
 - One of the highest life expectancies in the world – 82.9 years in 2018 (OECD, 2020);
- But, health inequality remains high: there is a 13-year gap in life expectancy at birth for men between the wealthiest and poorest 5% of the population (INSEE, 2018);
- The reduction of health inequalities is at the top of a healthcare policy framework outlined in the French National Health Strategy (Ministère des solidarités et de la santé, 2017).

Multidimensional deprivation index: dimensions (2)

Material deprivation: inverse-frequency weights; cut-off = 25% of weighted indicators

	2m	1y	2y	3.5y	5.5y	Cut-off
Affordability of new clothes	5.3	-	-	-	-	Cannot afford it
Affordability of 2 pairs of shoes per adult	5.2	-	-	-	-	Cannot afford it
Affordability of meat/fish every two days	4.7	-	-	-	-	Cannot afford it
Lack of at least 1 meal per day	2.9	-	-	-	-	Yes
Being able to pay bills on time	9.1	-	-	-	7.3	Cannot afford it
Affordability of replacing furniture	18.0	-	-	-	-	Cannot afford it
Affordability of one week of holidays per year	20.2	-	-	21.9	15.0	Cannot afford it
Affordability of inviting friends/family at least once a month	5.0	-	-	-	-	Cannot afford it
Affordability of presents to friends/family at least once a year	5.5	-	-	-	-	Cannot afford it
Wi-Fi/Internet at home	-	2.4	3.3	2.0	1.5	No
Toys	-	3.8	3.4	-	4.4	No
Birthday celebration	-	61.9	20.0	-	32.2	No
Sport clubs	-	-	-	82.8	37.6	No
% of deprived in this dimension	9.0	6.1	7.3	2.3	4.1	

Multidimensional deprivation index: dimensions (3)

Housing deprivation: equal weights; cut-off = 25% of weighted indicators

	2m	1y	2y	3.5y	5.5y	Cut-off
Difficult to heat the house	19.6	19.6	17.2	15.5	14.5	Yes
Damp in the house	8.5	8.5	6.8	5.6	5.2	Yes
Mould in the house	6.8	6.4	5.4	4.5	4.1	Yes
Noisy in the house	12.1	11.8	9.8	8.6	8.3	Yes
Private/shared with siblings room	36.0	19.5	10.7	5.6	1.9	No
% of deprived in this dimension	20.9	15.5	11.9	9.5	9.3	

Extreme living conditions: equal weights; cut-off = 25% of weighted indicators

	2m	1y	2y	3.5y	5.5y	Cut-off
Hot water in the house	1.2	1.1	0.7	0.5	0.4	No
Bathroom in the house	0.4	0.5	0.5	0.4	0.3	No
Toilets in the house	0.4	0.6	0.3	0.2	0.1	No
Extreme type of dwelling	1.0	0.7	0.7	0.5	0.4	Yes
% of deprived in this dimension	2.9	2.3	2.0	1.4	1.0	

Multidimensional deprivation index: dimensions (4)

Parental deprivation: inverse-frequency weights; cut-off = 25% of weighted indicators

	2m	1y	2y	3.5y	5.5y	Cut-off
Singing songs to the child	8.2	6.0	-	2.1	5.3	Rarely (W1,2)/ No (W4,5)
Talking to the child	1.5	2.9	-	2.0	1.9	Sometimes/Rarely (W1) Rarely (W2) / Less than once a week (W4,5)
Skin to skin contact with the child	35.2	1.3	-	-	-	No (W1) /Sometimes/Rarely (W2)
Playing with the child	-	1.7	5.2	-	-	Rarely (W2) Sometimes/Rarely (W3) No (W4,5)
Reading book to the child	-	22.5	-	2.4	3.6	Rarely (W2) / No (W4,5)
Physical activities with the child	-	-	24.4	-	12.6	Sometimes/Rarely
Drawing with the child	-	64.5	-	2.7	3.2	No
Teaching the child counting, writing, reading, etc.	-	-	-	9.7	4.3	No
% of deprived in this dimension	1.5	3.8	5.4	4.2	4.2	

Multidimensional deprivation index: dimensions (5)

Health deprivation: equal weights; cut-off = 25% of weighted indicators

	2m	1y	2y	3.5y	5.5y	Cut-off
Nutrition	49.9	17.3	21.6	20.5	12.9	Unhealthy eating
Sleep time	-	6.1	2.6	3.2	5.2	Less than recom. time
Sedentary behaviour - Screen time	-	23.5	28.3	47.7	40.7	More than recom. time
Physical activity	-	-	5.2	5.1	3.2	Sometimes/Rarely
% of deprived in this dimension	49.9	38.6	45.8	60.7	51.7	