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ORIGINAL RESEARCH

Increased Cardiometabolic and Mortality Risk Following Childhood Maltreatment in the United Kingdom

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BACKGROUND: Childhood maltreatment remains a significant public health issue associated with a number of poor health outcomes. This study explores the association between childhood maltreatment and the subsequent development of cardiometabolic disease and all-cause mortality.

METHODS AND RESULTS: Using a UK primary care database between January 1, 1995 and December 31, 2018, we conducted a population-based open retrospective cohort study. We matched 80 657 adult patients with a historic recording of childhood maltreatment or maltreatment-related concerns (exposed group) to 161 314 unexposed patients. Outcomes of interest were the development of cardiovascular disease, hypertension, type 2 diabetes mellitus, and risk of all-cause mortality. During the study period there were 243 new diagnoses of cardiovascular disease (incidence rate 8.3 per 10 000 person-years) in the exposed group compared with 254 in the unexposed group (incidence rate 4.6 per 10 000 person-years). Following adjustment for key covariates, this translated to an adjusted incidence rate ratio of 1.71 (95% CI 1.42–2.06). Additionally, the exposed group had an increased risk of hypertension (adjusted incidence rate ratio 1.42; 95% CI, 1.26–1.59), type 2 diabetes mellitus (adjusted incidence rate ratio 2.13; 95% CI, 1.86–2.45) and all-cause mortality (adjusted incidence rate ratio 1.75; 95% CI, 1.52–2.02) during the study period compared with the unexposed group.

CONCLUSIONS: Considering the high prevalence of exposure to childhood maltreatment, we have demonstrated the substantial associated burden of preventable cardiometabolic disease. There is a clear need to ensure that public health approaches are implemented to prevent the adverse consequences following exposure to childhood maltreatment.

Key Words: cardiovascular diseases ■ childhood maltreatment ■ hypertension ■ type 2 diabetes mellitus

Childhood maltreatment is defined as any form of physical, sexual, or emotional abuse or neglect experienced by those under the age of 18 years.[1] The prevalence is substantial, with 1 in 4 children thought to be affected within the United Kingdom [2] and 1 in 3 globally.[1] Exposure to childhood maltreatment and wider household markers of dysfunction has been associated with negative health and social consequences in adulthood, which consequently creates a significant financial burden for the state.[3–10]

Childhood maltreatment has been demonstrated to be associated with the subsequent development of cardiometabolic disease (cardiovascular disease [CVD], hypertension, and type 2 diabetes mellitus).[11–14] The currently hypothesized and accepted mechanism for this relationship includes 3 pathways that occur following childhood maltreatment: the adoption of poor lifestyle behaviors (physical inactivity, poor diet, disrupted sleep, substance misuse, and smoking), development of mental and biological

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CLINICAL PERSPECTIVE

What Is New?

- It is unclear whether those who are exposed to maltreatment in childhood have an increased risk of cardiometabolic abnormalities and death.
- We assessed the risk of cardiometabolic disease and all-cause mortality in a large primary care database, comprising 80 657 patients with a history of childhood maltreatment and 161 314 matched controls.
- We found those with a history of maltreatment in childhood had a 71%, 42%, 113%, and 75% increased risk of subsequent cardiovascular disease, hypertension, type 2 diabetes mellitus, and all-cause mortality, respectively.

What Are the Clinical Implications?

- Considering the high prevalence of childhood maltreatment globally, these findings may translate into a substantial burden of cardiometabolic disease associated with childhood maltreatment.
- Clinicians should be made aware of the disproportionally increased cardiovascular risk in this population, and thus are encouraged to consider early risk-management interventions.

Nonstandard Abbreviations and Acronyms

aIRR	adjusted incidence rate ratio
CVD	cardiovascular disease
IR	incidence rate
THIN	The Health Improvement Network

ill health because of alteration of the immune, metabolic, neuroendocrine, and autonomic nervous system.[15] A recent statement from the American Heart Association[15] scientific consensus drew upon available observational data and gave recommendations for imminent research required to further understand this important relationship.

There were numerous key recommendations from the consensus meeting relating to global gaps in the literature on this topic. Some of the current evidence gaps that have yet to be addressed by preceding literature include the following: (1) heterogeneity of definitions concerning childhood adversity (with some studies including information on adverse childhood experiences, which are a broader class of adversity not usually included in the global or UK definition of childhood maltreatment)[16,17]; (2) much of the evidence is derived from case–control and cross-sectional studies, which were often small in size and susceptible to recall bias as information about exposure was noted during adulthood; (3) because of study design there was an inability to account for confounders; and (4) much of the available evidence is derived from populations outside of Europe, which may mean the results are not generalizable to the United Kingdom because of differences in child protection support and healthcare service infrastructure.[18]

Following this noted limitation in the consensus report relating to geographical scarcity of information, there are still very few cohort studies derived from UK populations. One such cohort study is the British Birth Cohort, which followed up all births in 1 week from March 1958 in England, Scotland, and Wales until the present.[19,20] Participants in this cohort appeared to experience higher levels of adiposity and biomarker inflammation following experiences of bullying and childhood adversity, which the authors stated put them at a high risk of type 2 diabetes mellitus.[19,20] However, this study did not provide risk estimates for the development of cardiometabolic outcomes in later life. Additionally, aside from the recording of neglect at age 7 years, questions relating to childhood adversity were introduced at the 45-year point, which means that future cohort results are likely to be limited by recall bias.[21] An alternative UK cohort study (Avon Longitudinal Study of Parents and Children) also explored the relationship between CVD risk factors and self-reported abuse at cohort entry in 3612 women.[22] However, again recording of childhood maltreatment occurs during adulthood, and the cohort data do not provide outcomes on cardiometabolic end points.

Considering the potential public health burden posed by cardiometabolic disease occurring following exposure to childhood maltreatment, it is important to document the cardiometabolic risk in a UK cohort, taking into consideration important confounding factors. Therefore, we conducted the first UK retrospective cohort study using "The Health Improvement Network" (THIN) data set exploring the association between officially confirmed childhood maltreatment and maltreatment-related concerns (possible/suspected maltreatment) with the subsequent development of cardiometabolic outcomes and all-cause mortality.

METHODS

Transparency and Openness Statement

The anonymized data that support the findings of this study are available from the senior author (k.nirantharan@bham.ac.uk). However, this will be subject to approval from the data providers (Cegedim).

Study Design, Population, and Data Source

This study is a population-based, retrospective open cohort study using the THIN database, which consists of 787 general practices. The study period was set between January 1, 1995 and December 31, 2018. An open cohort study allows for patients to enter and exit the study at different time points, with each individual patient only contributing person-years of follow-up from the time of cohort entry (index date) to the time they leave the cohort (exit date).

The database is representative of the UK population in terms of demographic structure and prevalence of key comorbidities.[23] Symptoms, examinations, and diagnoses in THIN are recorded using a hierarchical clinical coding system called Read codes.[24] As entry into the database relies on the use of specific electronic records software (Vision), the number of contributing practices can vary over time. In order to reduce underrecording of events, general practices were included 12 months following their installment of electronic practice records or from the practice's acceptable mortality recording date.[25]

Exposure and Outcome Definition

The purpose of this study was to compare exposed (those with a code identifying officially confirmed childhood maltreatment or a maltreatment-related concern code under the age of 18 years) adult (over the age of 18 years at index date) patients with unexposed patients (those without such codes) and then calculate their risk of developing cardiometabolic disease and all-cause mortality.

Exposure codes relating to officially confirmed child maltreatment were selected with the assistance of public health clinicians and general practitioners who have expertise in Read code selection. Exposure codes used to define maltreatment-related concern were adapted from previous research conducted using THIN and consist of codes designed to capture clinical concern relating to suspected or possible maltreatment.[26] Patients were included in the exposed group if they had a maltreatment or maltreatment-related code inserted before the age of 18 years but only were able to enter the cohort once they were the age of 18 years or older.

Outcome codes relating to cardiometabolic disease (defined as CVD [ischemic heart disease, heart failure, peripheral vascular disease and Stroke/Transient ischemic attack, hypertension, and type 2 diabetes mellitus]) are well coded in THIN as they form part of the Quality Outcomes Framework[27] (performance indicators linked to general practice payments in the United Kingdom). Hence, Read code lists relating to cardiometabolic disease were largely based on Quality and Outcomes Framework recommended codes and expert opinion from general practitioners with expertise in Cardiometabolic Read code selection.

Read code lists relating to exposure terms and outcomes are provided (Data S1).

Selection of Unexposed Group

Each exposed patient was matched with up to 2 unexposed control patients, who had no documented Read code relating to the exposure. Controls were taken from other general practices within the database and were matched by age at index date (±1 year) and sex. Matching was conducted in the selection of the unexposed group only and not as part of any analytical approaches.

Follow-Up Period

The index date for those in the exposed group was the date at which they reached 18 years of age, a year after registration with the general practice or the date the general practice was eligible to contribute to the database, whichever was the latest. To mitigate immortality time bias,[28] the same index date was assigned to the corresponding unexposed patient. The follow-up period for each patient was from the index date until the exit date. Exit date is defined as the earliest of the following dates: study end date, last date of data collection from a given general practice, date patient transferred from general practice, date of death, or date the outcome of interest occurred.

Covariates

Covariates relating to the development of the outcomes of interest such as body mass index, smoking status, the use of lipid-lowering drugs, Charlson comorbidity index,[29] and Townsend deprivation score[30] were extracted in the baseline data.

Statistical Analysis

STATA version 15.1 MP/4 software (Statacorp 2017) was used to conduct all analysis.

Categorical baseline data were described using proportions, and continuous data were described using means or median with standard deviations or interquartile range. Missing data are highlighted in relevant baseline characteristic tables. Where there were missing data in our covariates, they were treated as a separate missing category and included in the final analysis.

In order to calculate an incidence rate ([IR] per 10 000 person-years) for each of the outcomes of interest, patients with the same pre-existing illness (defined as a Cardiometabolic Read code) were excluded to ensure the IR reflected outcomes that

occurred following cohort entry. Poisson regression offsetting for log(person-years) of follow-up specified as an exposure was then used to calculate an incidence rate ratio (IRR) for each outcome of interest during the study period. Alternative models such as the negative binominal Poisson model were used to examine the possible effects of dispersion. However, the results were identical, suggesting absence of overdispersion. Therefore, a Poisson model was utilized. The mathematical model used for the Poisson model was the following:[31,32]

$$\log(E((y)) = b_0 + b_1 x + \ldots + \log(t)$$

where y is dependent variable; E(y), Expected count value; x, independent variable; b_0, b_1 etc., Regression coefficients; and t, exposure time.

Following adjustment for the covariates, we calculated and present an adjusted IRR (aIRR). All CVD outcomes were adjusted for body mass index, age, sex, smoking, diabetes mellitus status, lipid-lowering drug use, hypertension, and Townsend deprivation score at baseline. The hypertension outcome was adjusted for these factors excluding hypertension and likewise for type 2 diabetes mellitus outcome, we excluded diabetes mellitus status from the covariates. Mortality was adjusted for the same factors as CVD in addition to Charlson comorbidity index.[29] In all of the Poisson models, the year of registration was also included in the multivariable model to account for any changes in recording practice over time.[26] In all models relating to the main analyses, the adjusted model showed a better fit than the unadjusted model (higher pseudo R2 and likelihood ratios). Further details relating to the covariate significance and fit criterion can be seen in Table S1.

Decisions regarding covariate adjustment were influenced by previous research examining cardiometabolic outcomes.[14,33–35] Previous literature has stated the importance of taking into consideration the confounding role of age, sex, and deprivation when exploring the relationship between childhood maltreatment and cardiometabolic disease, hence their inclusion in our model.[14] Other covariates included in our model have been previously suggested as mediators in this relationship.[36] However, because of the young age of this cohort at cohort entry, it is clear that many of these covariates are likely to occur after index date. We, however, adjusted for the presence of such covariates at baseline because it was not possible to determine whether the exposure of interest or the covariates occurred first. IRRs are presented with 95% CIs where statistical significance was set at $P<0.05$.

A sensitivity analysis was conducted to explore whether findings differed when only looking at officially confirmed maltreatment codes.

Ethical Approval

Anonymized data provided by the data provider to the University of Birmingham were used throughout the study. Studies using the THIN database have had initial ethical approval from the National Health Service South-East Multicentre Research Ethics Committee, subject to prior independent scientific review. The Scientific Review Committee (IQVIA) approved the study protocol (Reference Number: SRC18THIN034) before its undertaking.

RESULTS

We identified 80 657 exposed patients who were matched to 161 314 unexposed patients during the study period, who on average were followed up for 2.3 years. The median follow-up was similar in the exposed group (2.3 years) compared with the unexposed group (2.2 years). Mean age (23 years) and sex proportions (42% males) were similar in the cohort because of matching. There were substantial missing data for body mass index (49%). There was a higher proportion of smokers in the exposed cohort (38%) compared with the unexposed cohort (20%). There was also a greater proportion of socio-economic deprivation, comorbidity, and pre-existing cardiometabolic disease at baseline in the exposed population compared with the unexposed. Baseline characteristics are described in Table 1.

There were 243 new CVD events in the exposed group (0.3%, IR 8.3 per 10 000 person-years) compared with 254 (0.2%, IR 4.6 per 10 000 person-years) in the unexposed group. This translated to an increased aIRR of 1.71 (95% CI, 1.42–2.06). When broken down by type of CVD event, this risk persisted significantly for ischemic heart disease (aIRR 1.57; 95% CI, 1.16–2.13) and Stroke/transient ischemic attack (aIRR 2.15; 95% CI, 1.66–2.81). Though the risk was raised for heart failure and peripheral vascular disease, this did not reach statistical significance (heart failure: aIRR 1.51; 95% CI, 0.92–2.51; peripheral vascular disease: aIRR 1.54; 95% CI, 0.87–2.73).

There were 537 (0.7%, IR 18.6 per 10 000 person-years) and 504 (0.6%, IR 17.3 per 10 000 person-years) new diagnoses of hypertension and type 2 diabetes mellitus in the exposed group compared with 780 (0.5%, IR 14.3 per 10 000 person-years) and 414 (0.3%, 7.6 per 10 000 person-years), respectively, in the unexposed group. This translated into an increased risk of developing hypertension (aIRR 1.42; 95% CI, 1.26–1.59) and type 2 diabetes mellitus (aIRR 2.13; 95% CI, 1.86–2.45) in the exposed group when compared with the unexposed group. Further details can be seen in Table 2 and Figure.

When exploring the risk of all-cause mortality, during the study period 501 patients in the exposed group

Table 1. Baseline Characteristics of Those Exposed and Unexposed to Childhood Maltreatment

Baseline Characteristics (SD, IQR, or Percentage)		
	Exposed Group	Unexposed Group
Number of patients	80 657	161 314
Median follow-up period (person y)	2.3 (IQR 0.9–5.1)	2.2 (IQR 0.7–4.9)
Age at cohort entry (y)	23.3 (SD 7.3)	23.4 (SD 7.2)
Age when maltreatment occurred (y)	9.6 (SD 5.2)	…
Sex; Male (%)	33 614 (41.7%)	67 228 (41.7%)
Body mass index		
<25 kg/m^2	24 091 (29.9%)	56 694 (35.2%)
25–30 kg/m^2	7642 (9.5%)	18 659 (11.6%)
>30 kg/m^2	6322 (7.8%)	11 132 (6.9%)
Not available	42 602 (52.9%)	74 829 (46.4%)
Smoking status		
Current smoker	30 462 (37.8%)	31 517 (19.5%)
Noncurrent/not available	50 195 (62.2%)	129 797 (80.5%)
Townsend index		
(Least deprived) 1	6296 (7.8%)	27 027 (16.8%)
2	7295 (9.8%)	25 086 (15.6%)
3	13 469 (16.7%)	29 771 (18.5%)
4	19 116 (23.7%)	29 857 (18.5%)
5	19 860 (24.6%)	22 849 (14.2%)
Not available	13 991 (17.4%)	26 725 (16.6%)
Charlson comorbidity index		
(Least comorbid) 0	59 352 (73.6%)	130 956 (81.2%)
1	19 975 (24.8%)	28 735 (17.8%)
2	888 (1.1%)	1178 (0.7%)
3	276 (0.3%)	289 (0.2%)
4 and above	166 (0.2%)	156 (0.1%)
Lipid-lowering drug use	309 (0.4%)	777 (0.5%)
Pre-existing cardiometabolic disease		
All cardiovascular disease	395 (0.5%)	345 (0.2%)
Ischemic heart disease	115 (0.1%)	115 (0.1%)
Heart failure	43 (0.1%)	50 (0.0%)
Stroke/transient ischemic attack	214 (0.3%)	160 (0.1%)
Peripheral vascular disease	56 (0.1%)	51 (0.0%)
Hypertension	633 (0.8%)	1111 (0.7%)
Diabetes mellitus	556 (0.7%)	631 (0.4%)

IQR indicates interquartile range.

had died (0.6%, IR 17.4 per 10 000 person-years) compared with 452 in the unexposed cohort (0.3%, IR 8.3 per 10 000 person-years). This translated into 75% increased risk for mortality (aIRR 1.75; 95% CI, 1.52–2.02). Further details can be seen in Table 3.

We identified within the total cohort that 22 078 (27.3% of total exposed cohort) patients had confirmatory codes relating to childhood maltreatment. These patients were matched with 44 156 unexposed patients (27.3% of the total unexposed cohort). The cohort details are described in Table S2. The average age at index date was higher than the combined cohort (27 years old). When comparing confirmed exposed cases only with their unexposed controls, the risk of developing the outcomes of interest (Tables S3 and S4) persisted; CVD aIRR 1.77 (95% CI, 1.36–2.30), hypertension aIRR 1.60 (95% CI, 1.36–1.87), type 2 diabetes mellitus aIRR 2.07 (1.68–2.56) and all-cause mortality (aIRR 1.58; 95% CI, 1.27–1.96).

DISCUSSION

To our knowledge this was the first study using UK primary care data to explore the relationship between childhood maltreatment and the subsequent development of cardiometabolic disease and all-cause mortality. The main analysis found an increased risk of developing combined types of CVD and hypertension as well as a doubling of risk of developing type 2 diabetes mellitus. Additionally, we found an increased risk of all-cause mortality in this cohort. When isolating to only patients who had a confirmed code of maltreatment, this described risk persisted across all outcomes.

Our study adds to the global literature describing a positive relationship between the development of cardiometabolic disease following exposure to childhood maltreatment,[14,15] particularly expanding on these findings with data taken from a large UK cohort. As our exposure and outcome definition is different from previously reported data,[11–14] it is difficult to make direct comparisons of our demonstrated IR with other data sets. However, of particular note where there was a previous discrepancy in literature describing the effect size between exposure to childhood maltreatment and subsequent hypertension diagnosis, we have demonstrated a positive association.[14,37–39]

Interestingly, although there were missing data at baseline for covariates, we did notice some significant differences between the exposed and unexposed groups. When considering smoking rates at baseline, the unexposed group current smoking prevalence is considerably higher than the exposed group. This is in line with current literature, which suggests that individuals take on certain harmful coping mechanisms such as smoking in response to high levels of distress, and this may be a contributing but preventable factor mediating the relationship

Table 2. Risk of Developing Cardiometabolic Disease in Those Exposed and Unexposed to Childhood Maltreatment

	All Cardiovascular Disease		Ischemic Heart Disease		Stroke/Transient Ischemic Attack		Heart Failure		Peripheral Vascular Disease		Hypertension		Type 2 Diabetes Mellitus	
	Exposed	Unexposed	Exposed	Unexposed	Exposed	Unexposed	Exposed	Unexposed	Exposed	Unexposed	Exposed	Unexposed	Exposed	Unexposed
Number of patients	80 262	160 969	80 542	161 199	80 443	161 154	60 614	161 264	80 601	161 263	80 024	160 203	80 101	160 683
Numbers of outcomes	243	254	94	100	139	117	30	40	30	27	537	780	504	414
Person-y	291928	549 812	293 452	551 136	293 030	551 051	294 004	551 687	293 954	551 707	289 125	543 743	290 782	548 301
Incidence rate (per 10 000 person- y)	8.3	4.6	3.2	1.8	4.7	2.1	1.0	0.7	1.0	0.5	18.6	14.3	17.3	7.6
Incidence rate ratio (95% CI)*	1.80 (1.51–2.15)		1.77 (1.33–2.34)		2.23 (1.75–2.86)		1.41 (0.88–2.26)		2.09 (1.24–3.51)		1.29 (1.16–1.45)		2.30 (2.02–2.61)	
P-value	<0.001		<0.001		<0.001		0.157		0.006		<0.001		<0.001	
Adjusted incidence rate ratio (95% CIs)†,‡	1.71 (1.42–2.06)		1.57 (1.16–2.13)		2.15 (1.66–2.81)		1.51 (0.92–2.51)		1.54 (0.87–2.73)		1.42 (1.26–1.59)		2.13 (1.86–2.45)	
P-value	<0.001		0.003		<0.001		0.106		0.135		<0.001		<0.001	

*Unadjusted incidence rate ratio.

†All cardiovascular disease, ischemic heart disease, stroke/transient ischemic attack, heart failure, and peripheral vascular disease outcomes were adjusted for body mass index, age, sex, smoking, diabetes mellitus status, lipid-lowering drug use, hypertension, and Townsend deprivation score at baseline as well as year of registration into the database. The hypertension outcome was adjusted for these factors excluding hypertension. The type 2 diabetes mellitus outcome was adjusted for these factors excluding hypertension and diabetes mellitus status.

‡The estimate associated with year of registration in the multivariable regression (adjusted incidence rate ratio; 95% CI, *P*-value): All cardiovascular disease (0.99; 0.99–1.00, 0.014), ischemic heart disease (0.99; 0.98–1.00, 0.136), stroke/transient ischemic attack (0.99; .98–1.00, 0.197), heart failure (0.99; 0.98–1.01, 0.320), peripheral vascular disease (1.00; 0.98–1.02, 0.996), hypertension (0.99;0.99–0.99, <0.001), and type 2 diabetes mellitus (1.00; 1.00–1.01, 0.499).

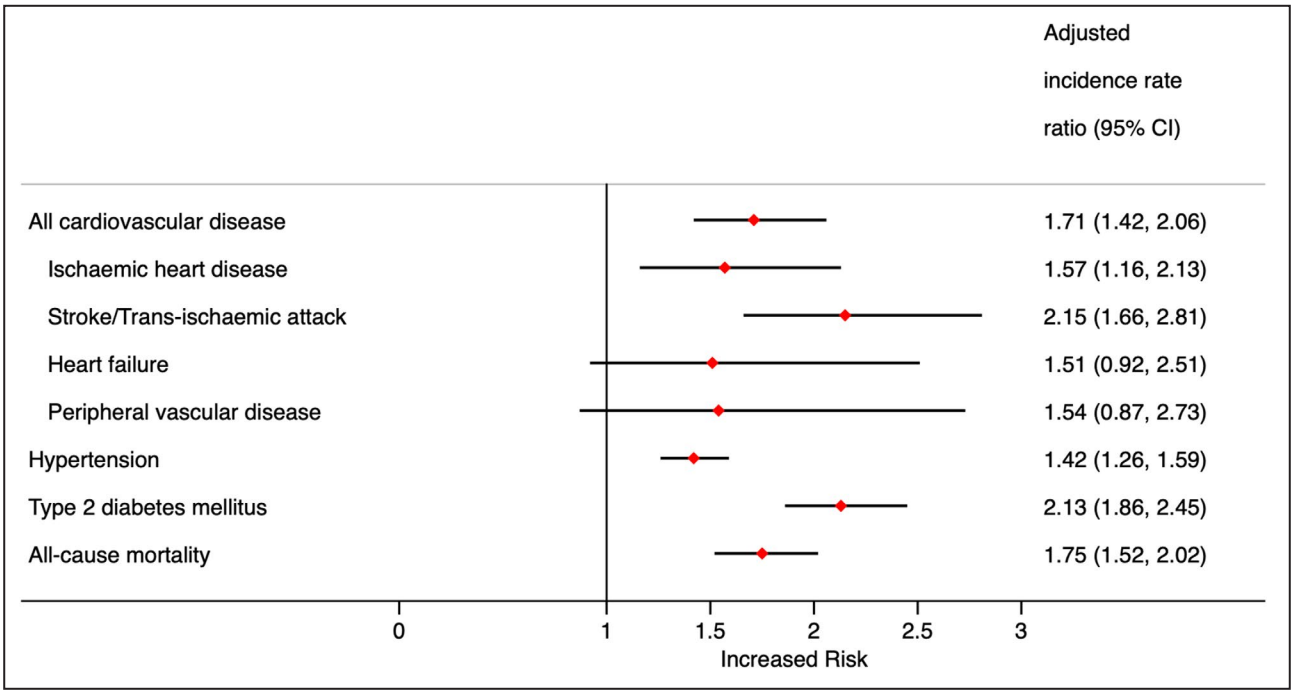

Figure. The risk of developing cardiometabolic disease and all-cause mortality in those exposed and unexposed to childhood maltreatment.

between childhood maltreatment and cardiometabolic disease.[40]

These findings are of particular note in the United Kingdom, where there is an increasing burden of morbidity relating to cardiometabolic disease.[41,42] Considering the estimated prevalence of childhood maltreatment within the United Kingdom (potentially 1 in 4 children being affected),[2] this could suggest a significant proportion of the cardiometabolic disease burden may be attributable to maltreatment. Therefore, there is a clear public health message that requires a population-based approach to not only prevent childhood maltreatment but also the negative consequences as a result of it. There is a push by academic bodies and the UK Government to improve evidence in the area of early-years intervention to prevent these negative consequences.[43,44] Specifically, focusing on cardiometabolic disease prevention using holistic and family-oriented-based programs has shown great promise in the reduction of risk factors that may mediate the pathway between maltreatment and disease.[45,46] Additionally, considering the increased smoking risk in this group that may mediate the relationship, evidence-based school-based or family-based smoking cessation programs may need to be targeted at this high-risk group.[47]

Additionally, our results play an important role in the global context of the literature. Current global evidence has been limited by factors relating to the retrospective nature of case ascertainment, limited sample size, and inability to account for confounders, which we have taken into consideration in the design of our study.[14,15] We hope these findings provide further evidence for the association and the need for public health approaches to tackle the burden of cardiometabolic disease associated with childhood maltreatment.

Table 3. Risk of Mortality in Those Exposed and Unexposed to Childhood Maltreatment

	Exposed	Unexposed
Number of patients	80 657	161 314
Numbers of outcomes	501	452
Person-y	288 757	545 808
Incidence rate (per 10 000 person-y)	17.4	8.3
Incidence rate ratio (95% CIs)*	2.10 (1.84–2.48)	
P-value	<0.001	
Adjusted incidence rate ratio (95% CIs)†,‡	1.75 (1.52–2.02)	
P-value	<0.001	

*Unadjusted incidence rate ratio.

†Adjusted for body mass index, age, sex, smoking status, diabetes mellitus status, lipid-lowering drug use, hypertension, Charlson comorbidity score, and Townsend deprivation score, as well as year of registration into the database.

‡The estimate associated with year of registration in the multivariable regression (adjusted incidence rate ratio; 95% CI, *P*-value): (0.99; 0.99–1.00, 0.006).

However, the results of this study must be considered in light of its limitations. The use of electronic care records relies upon the accuracy of imputation of codes by the healthcare professionals contributing to the data set. Although we believe that recording of cardiometabolic outcomes may be largely accurate, there have yet to be any studies validating recording of childhood maltreatment that may introduce a misclassification bias into our exposure selection.[48] This may mean that the unexposed group may include patients who have experienced childhood maltreatment, which may in fact underestimate the effect size seen in this study.

It has been shown from previous literature that the recording of childhood maltreatment in primary care records has improved over time.[26] This may mean that the potential for misclassification bias is greater in the earlier years of the study. However, in our study we have tried to mitigate for the change in documentation rates over time by adjusting for year of registration. Interestingly, effect of year of registration played little role in the overall effect size (Tables 2 and 3 footnotes).

Another similar important consideration is that if maltreatment was recorded by the general practitioner, it could mean that the maltreatment was particularly severe. In order to mitigate this, we have utilized the maltreatment-related code lists to identify other factors relating to maltreatment that could identify children who may be at risk of childhood maltreatment. Also, in this study, because of nongranularity of the exposure Read codes, we were unable to examine outcomes in the subtypes of abuse or of differing levels of severity.

In conclusion, our study demonstrated an increased risk of developing cardiometabolic disease and all-cause mortality following childhood maltreatment. This highlights the need for public health approaches to both encourage the prevention of childhood maltreatment and for reduction of risk factors responsible for cardiometabolic disease, which may increase as a result of maltreatment.

ARTICLE INFORMATION

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Disclosures

None.

Supplementary Materials

Data S1
Tables S1–S4

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Supplemental Material

Data S1.

Read code lists

Maltreatment related codes

Code	Description
13IC.00	Child on at risk register
13ICZ00	Child on at risk regist NOS
13IM.00	Child on protection register
13Id.00	On child protection register
13Iv.00	Subject to child protection plan
64c..00	Child protection procedure
Z35..00	Child protection procedure
3874000	Multidisciplinary case conference
3875000	Social services case conference
3879000	Review case conference
8CM6.00	Child protection plan
Z331.00	Child protection plan
9F2..00	Child at risk-case conference
Z352.00	Child protection investigation
13VF.00	At risk violence in the home
13IB.00	Child in care
13IB000	Child in foster care
13IB100	Looked after child
13IV.00	Looked after child - Children (Scotland) Act 1995
13ZV.00	At risk of neglect by others
13ZT.00	At risk of physical abuse
13ZW.00	At risk of sexual abuse
13ZR.00	At risk of emotional/psychological abuse
13VX.00	At risk of sexual exploitation
13ZZ100	At risk of psychological abuse
13HP600	Violence between parents
38C0.00	Child in care health assessment
6982000	Fostering medical examination
13If.00	Child is cause for concern
13Ip.00	Family is cause for concern
13IF.00	Child at risk
13IF.11	Vulnerable child
13IQ.00	Vulnerable child in family
13IS.00	Child in need

14XD.00	History of domestic abuse
14X3.00	History of domestic violence
13W..11	Family problems
1BE1.00	Problem situation
625..00	A/N care: social risk
625Z.00	A/N care: social risk NOS
8CM5.00	Child in need plan
13G4.00	Social worker involved
8H75.00	Refer to social worker
ZL79.11	Refer to social worker
8HHB.00	Referral to Social Services
9NDA.00	Report received from social services
9N26.00	Seen by social worker
9Nl6.00	Seen by social services
9NNV.00	Under care of social services
9NNk.00	Under care of social worker
9b0k.00	Social services report
1J3..00	Suspected child abuse
1J30.00	Suspected sexual abuse of child
1J31.00	Suspected non-accidental injury to child
1J32.00	Suspected victim of child neglect

Officially confirmed maltreatment codes

Code	Description
13WT.00	Child protection observation
13WT000	Child protection category
13WT100	Child protection category emotional
13WT200	Child protection category physical
13WT300	Child protection category sexual
13WT400	Child protection category neglect
13W3.00	Child abuse in family
13W4.00	Parent/child conflict
13W4000	Child/parent violence
6254000	A/N care: H/O child abuse
SN55z11	Child abuse NEC
ZV61200	[V]Child abuse
Z352.11	Child abuse investigation
SN55.00	Child maltreatment syndrome
SN55000	Emotional maltreatment of child
SN55011	Emotional deprivation of child
SN55012	Emotional abuse of child

SN55100	Nutritional maltreatment of child
SN55111	Nutritional deprivation of child
SN55112	Malnutrition in child maltreatment syndrome
SN55200	Non-accidental injury to child
SN55211	NAI - non-accidental injury to child
SN55212	Physical injury to child
SN55300	Battered baby or child syndrome NOS
SN55311	Battered baby syndrome NOS
SN55312	Battered child syndrome NOS
SN55400	Multiple deprivation of child
SN55500	Physical abuse of child
SN55600	Non-accidental traumatic head injury to child
SN55z00	Child maltreatment syndrome NOS
SN55z12	Child deprivation syndrome
SN55z13	Neglect affecting child NEC
ZV61213	[V]Parent - child conflict
ZV61212	[V]Child neglect
ZV61211	[V]Child battering
13II.00	Child deserted by parents
13II.11	Child deserted by mother
13Ii.00	Subject to care order under Children Act 1989
13Ii000	Subject to care order under section 20 of Children Act 1989
13Ii100	Subject to care order under section 21 of Children Act 1989
13Ii200	Subject to care order under section 25 of Children Act 1989
13Ii300	Subject to care order under section 31 of Children Act 1989
13Ij.00	Subject to interim care order under Children Act 1989
13Ij000	Sub to interim care order under section 38 Children Act 1989
13Ij100	Emergency protective order section 44 Children Act 1989
13Ih.00	Subject to supervision order under Children Act 1989
Z787.00	Self-neglect
222R.00	Neglected appearance
R037.00	[D]Insufficient intake of food and water due to self neglect
R2y3.11	[D] Self neglect
Ry18.00	[D]Self neglect
SN57000	Neglect or abandonment
TE40.00	Accidents due to abandonment or neglect of helpless person
TLx4.00	Assault by criminal neglect
U3M..00	[X]Neglect and abandonment
U3M0.00	[X]Neglect and abandonment, by spouse or partner
U3M1.00	[X]Neglect and abandonment, by parent
U3M2.00	[X]Neglect and abandonment, by acquaintance or friend
U3My.00	[X]Neglect and abandonment, by other specified persons

U3Mz.00	[X]Neglect and abandonment, by unspecified person
Z787200	Neglect of clothes
Z787400	Neglect of personal hygiene
Z787500	Neglect of physical health
Z787600	Neglect of dental care
Z787700	Neglect of physical illness
Z787800	Neglect of common dangers
ZV1B400	[V]Personal history of neglect
ZV4H300	[V]Emotional neglect of child
ZV4H400	[V]Other problems related to neglect in upbringing
ZVu4B00	[X]Other problems related to neglect in upbringing
14X6.00	Victim of sexual abuse
14X..00	History of abuse
14X0.00	History of physical abuse
14X1.00	History of sexual abuse
14X2.00	History of emotional abuse
14X3.00	History of domestic violence
14X5.00	Victim of physical abuse
14X6000	Victim of sexual harassment
14X7.00	Victim of emotional abuse
14X8.00	Victim of domestic violence
14XD.00	History of domestic abuse
14XD000	H/O domestic emotional abuse
14XD100	H/O domestic physical abuse
14XD200	H/O domestic sexual abuse
14XE.00	History of being victim of domestic violence
14XF.00	Victim of human trafficking
14XG.00	Victim of domestic abuse
14XH.00	Victim of child sexual exploitation
14XJ.00	Victim of psychological abuse
14XK.00	Victim of financial abuse
14XP.00	Victim of discriminatory abuse
14XR.00	Victim neglect & acts omission
SN57.00	Maltreatment syndromes
SyuH500	[X]Other maltreatment syndromes
TL7..00	Child battering and other maltreatment
TL70.00	Child battering or other maltreatment by parent
TL7y.00	Child battering or other maltreatment by other spec person
TL7z.00	Child battering or other maltreatment by person NOS
U3N..00	[X]Other maltreatment syndromes
U3N0.00	[X]Other maltreatment syndromes, by spouse or partner
U3N1.00	[X]Other maltreatment syndromes, by parent

U3N2.00	[X]Other maltreatment syndromes, by acquaintance or friend
U3N3.00	[X]Other maltreatment syndromes, by official authorities
U3Ny.00	[X]Other maltreatment syndromes, by other specified persons
U3Nz.00	[X]Other maltreatment syndromes, by unspecified person
U3P..00	[X]Maltreatment
U3P0.00	[X]Maltreatment, by spouse or partner
U3P1.00	[X]Maltreatment, by parent
U3P2.00	[X]Maltreatment, by acquaintance or friend
SN42000	Deprivation of food, unspecified
SN43000	Deprivation of water
SN57100	Sexual abuse
SN56000	Battered person unspecified, syndrome
SN57200	Child affected by Munchausen's by proxy

Type 2 Diabetes

Clinical Code	**Description**
C10..00	Diabetes mellitus
C100.00	Diabetes mellitus with no mention of complication
C100100	Diabetes mellitus, adult onset, no mention of complication
C100111	Maturity onset diabetes
C100112	Non-insulin dependent diabetes mellitus
C100z00	Diabetes mellitus NOS with no mention of complication
C101.00	Diabetes mellitus with ketoacidosis
C101100	Diabetes mellitus, adult onset, with ketoacidosis
C101y00	Other specified diabetes mellitus with ketoacidosis
C101z00	Diabetes mellitus NOS with ketoacidosis
C102.00	Diabetes mellitus with hyperosmolar coma
C102100	Diabetes mellitus, adult onset, with hyperosmolar coma
C102z00	Diabetes mellitus NOS with hyperosmolar coma
C103.00	Diabetes mellitus with ketoacidotic coma
C103100	Diabetes mellitus, adult onset, with ketoacidotic coma
C103y00	Other specified diabetes mellitus with coma
C103z00	Diabetes mellitus NOS with ketoacidotic coma
C104.00	Diabetes mellitus with renal manifestation
C104.11	Diabetic nephropathy
C104100	Diabetes mellitus, adult onset, with renal manifestation
C104y00	Other specified diabetes mellitus with renal complications
C104z00	Diabetes mellitus with nephropathy NOS
C105.00	Diabetes mellitus with ophthalmic manifestation

C105100	Diabetes mellitus, adult onset, + ophthalmic manifestation
C105y00	Other specified diabetes mellitus with ophthalmic complicatn
C105z00	Diabetes mellitus NOS with ophthalmic manifestation
C106.00	Diabetes mellitus with neurological manifestation
C106.11	Diabetic amyotrophy
C106.12	Diabetes mellitus with neuropathy
C106.13	Diabetes mellitus with polyneuropathy
C106100	Diabetes mellitus, adult onset, + neurological manifestation
C106y00	Other specified diabetes mellitus with neurological comps
C106z00	Diabetes mellitus NOS with neurological manifestation
C107.00	Diabetes mellitus with peripheral circulatory disorder
C107.11	Diabetes mellitus with gangrene
C107.12	Diabetes with gangrene
C107100	Diabetes mellitus, adult, + peripheral circulatory disorder
C107200	Diabetes mellitus, adult with gangrene
C107400	NIDDM with peripheral circulatory disorder
C107y00	Other specified diabetes mellitus with periph circ comps
C107z00	Diabetes mellitus NOS with peripheral circulatory disorder
C108y00	Other specified diabetes mellitus with multiple comps
C108z00	Unspecified diabetes mellitus with multiple complications
C109.00	Non-insulin dependent diabetes mellitus
C109.11	NIDDM - Non-insulin dependent diabetes mellitus
C109.12	Type 2 diabetes mellitus
C109.13	Type II diabetes mellitus
C109000	Non-insulin-dependent diabetes mellitus with renal comps
C109011	Type II diabetes mellitus with renal complications
C109012	Type 2 diabetes mellitus with renal complications
C109100	Non-insulin-dependent diabetes mellitus with ophthalm comps
C109111	Type II diabetes mellitus with ophthalmic complications
C109112	Type 2 diabetes mellitus with ophthalmic complications
C109200	Non-insulin-dependent diabetes mellitus with neuro comps
C109211	Type II diabetes mellitus with neurological complications
C109212	Type 2 diabetes mellitus with neurological complications
C109300	Non-insulin-dependent diabetes mellitus with multiple comps
C109311	Type II diabetes mellitus with multiple complications
C109312	Type 2 diabetes mellitus with multiple complications
C109400	Non-insulin dependent diabetes mellitus with ulcer
C109411	Type II diabetes mellitus with ulcer
C109412	Type 2 diabetes mellitus with ulcer
C109500	Non-insulin dependent diabetes mellitus with gangrene
C109511	Type II diabetes mellitus with gangrene

C109512	Type 2 diabetes mellitus with gangrene
C109600	Non-insulin-dependent diabetes mellitus with retinopathy
C109611	Type II diabetes mellitus with retinopathy
C109612	Type 2 diabetes mellitus with retinopathy
C109700	Non-insulin dependent diabetes mellitus - poor control
C109711	Type II diabetes mellitus - poor control
C109712	Type 2 diabetes mellitus - poor control
C109800	Reaven's syndrome
C109900	Non-insulin-dependent diabetes mellitus without complication
C109911	Type II diabetes mellitus without complication
C109912	Type 2 diabetes mellitus without complication
C109A00	Non-insulin dependent diabetes mellitus with mononeuropathy
C109A11	Type II diabetes mellitus with mononeuropathy
C109A12	Type 2 diabetes mellitus with mononeuropathy
C109B00	Non-insulin dependent diabetes mellitus with polyneuropathy
C109B11	Type II diabetes mellitus with polyneuropathy
C109B12	Type 2 diabetes mellitus with polyneuropathy
C109C00	Non-insulin dependent diabetes mellitus with nephropathy
C109C11	Type II diabetes mellitus with nephropathy
C109C12	Type 2 diabetes mellitus with nephropathy
C109D00	Non-insulin dependent diabetes mellitus with hypoglyca coma
C109D11	Type II diabetes mellitus with hypoglycaemic coma
C109D12	Type 2 diabetes mellitus with hypoglycaemic coma
C109E00	Non-insulin depend diabetes mellitus with diabetic cataract
C109E11	Type II diabetes mellitus with diabetic cataract
C109E12	Type 2 diabetes mellitus with diabetic cataract
C109F00	Non-insulin-dependent d m with peripheral angiopath
C109F11	Type II diabetes mellitus with peripheral angiopathy
C109F12	Type 2 diabetes mellitus with peripheral angiopathy
C109G00	Non-insulin dependent diabetes mellitus with arthropathy
C109G11	Type II diabetes mellitus with arthropathy
C109G12	Type 2 diabetes mellitus with arthropathy
C109H00	Non-insulin dependent d m with neuropathic arthropathy
C109H11	Type II diabetes mellitus with neuropathic arthropathy
C109H12	Type 2 diabetes mellitus with neuropathic arthropathy
C109J00	Insulin treated Type 2 diabetes mellitus
C109J11	Insulin treated non-insulin dependent diabetes mellitus
C109J12	Insulin treated Type II diabetes mellitus
C109K00	Hyperosmolar non-ketotic state in type 2 diabetes mellitus

C10A.00	Malnutrition-related diabetes mellitus
C10A.11	Jamaica type diabetes
C10A000	Malnutrition-related diabetes mellitus with coma
C10A100	Malnutrition-related diabetes mellitus with ketoacidosis
C10A200	Malnutrition-related diabetes mellitus with renal complicatn
C10A300	Malnutrit-related diabetes mellitus wth ophthalmic complicat
C10A400	Malnutrition-related diabetes mellitus wth neuro complicatns
C10A500	Malnutritn-relat diabetes melitus wth periph circul complctn
C10A600	Malnutrition-related diabetes mellitus with multiple comps
C10A700	Malnutrition-related diabetes mellitus without complications
C10AW00	Malnutrit-related diabetes mellitus with unspec complics
C10AX00	Malnutrit-relat diabetes mellitus with other spec comps
C10B.00	Diabetes mellitus induced by steroids
C10B000	Steroid induced diabetes mellitus without complication
C10C.00	Diabetes mellitus autosomal dominant
C10C.11	Maturity onset diabetes in youth
C10D.00	Diabetes mellitus autosomal dominant type 2
C10D.11	Maturity onset diabetes in youth type 2
C10ER00	Latent autoimmune diabetes mellitus in adult
C10F.00	Type 2 diabetes mellitus
C10F.11	Type II diabetes mellitus
C10F000	Type 2 diabetes mellitus with renal complications
C10F011	Type II diabetes mellitus with renal complications
C10F100	Type 2 diabetes mellitus with ophthalmic complications
C10F111	Type II diabetes mellitus with ophthalmic complications
C10F200	Type 2 diabetes mellitus with neurological complications
C10F211	Type II diabetes mellitus with neurological complications
C10F300	Type 2 diabetes mellitus with multiple complications
C10F311	Type II diabetes mellitus with multiple complications
C10F400	Type 2 diabetes mellitus with ulcer
C10F411	Type II diabetes mellitus with ulcer
C10F500	Type 2 diabetes mellitus with gangrene
C10F511	Type II diabetes mellitus with gangrene
C10F600	Type 2 diabetes mellitus with retinopathy
C10F611	Type II diabetes mellitus with retinopathy
C10F700	Type 2 diabetes mellitus - poor control
C10F711	Type II diabetes mellitus - poor control
C10F800	Reaven's syndrome
C10F811	Metabolic syndrome X
C10F900	Type 2 diabetes mellitus without complication
C10F911	Type II diabetes mellitus without complication
C10FA00	Type 2 diabetes mellitus with mononeuropathy

C10FA11	Type II diabetes mellitus with mononeuropathy
C10FB00	Type 2 diabetes mellitus with polyneuropathy
C10FB11	Type II diabetes mellitus with polyneuropathy
C10FC00	Type 2 diabetes mellitus with nephropathy
C10FC11	Type II diabetes mellitus with nephropathy
C10FD00	Type 2 diabetes mellitus with hypoglycaemic coma
C10FD11	Type II diabetes mellitus with hypoglycaemic coma
C10FE00	Type 2 diabetes mellitus with diabetic cataract
C10FE11	Type II diabetes mellitus with diabetic cataract
C10FF00	Type 2 diabetes mellitus with peripheral angiopathy
C10FF11	Type II diabetes mellitus with peripheral angiopathy
C10FG00	Type 2 diabetes mellitus with arthropathy
C10FG11	Type II diabetes mellitus with arthropathy
C10FH00	Type 2 diabetes mellitus with neuropathic arthropathy
C10FH11	Type II diabetes mellitus with neuropathic arthropathy
C10FJ00	Insulin treated Type 2 diabetes mellitus
C10FJ11	Insulin treated Type II diabetes mellitus
C10FK00	Hyperosmolar non-ketotic state in type 2 diabetes mellitus
C10FK11	Hyperosmolar non-ketotic state in type II diabetes mellitus
C10FL00	Type 2 diabetes mellitus with persistent proteinuria
C10FL11	Type II diabetes mellitus with persistent proteinuria
C10FM00	Type 2 diabetes mellitus with persistent microalbuminuria
C10FM11	Type II diabetes mellitus with persistent microalbuminuria
C10FN00	Type 2 diabetes mellitus with ketoacidosis
C10FN11	Type II diabetes mellitus with ketoacidosis
C10FP00	Type 2 diabetes mellitus with ketoacidotic coma
C10FP11	Type II diabetes mellitus with ketoacidotic coma
C10FQ00	Type 2 diabetes mellitus with exudative maculopathy
C10FQ11	Type II diabetes mellitus with exudative maculopathy
C10FR00	Type 2 diabetes mellitus with gastroparesis
C10FR11	Type II diabetes mellitus with gastroparesis
C10FS00	Maternally inherited diabetes mellitus
C10G.00	Secondary pancreatic diabetes mellitus
C10G000	Secondary pancreatic diabetes mellitus without complication
C10H.00	Diabetes mellitus induced by non-steroid drugs
C10H000	DM induced by non-steroid drugs without complication
C10J.00	Insulin autoimmune syndrome
C10J000	Insulin autoimmune syndrome without complication
C10K.00	Type A insulin resistance
C10K000	Type A insulin resistance without complication
C10L.00	Fibrocalculous pancreatopathy
C10L000	Fibrocalculous pancreatopathy without complication

C10M.00	Lipoatrophic diabetes mellitus
C10M000	Lipoatrophic diabetes mellitus without complication
C10N.00	Secondary diabetes mellitus
C10N000	Secondary diabetes mellitus without complication
C10N100	Cystic fibrosis related diabetes mellitus
C10P.00	Diabetes mellitus in remission
C10P100	Type II diabetes mellitus in remission
C10P111	Type 2 diabetes mellitus in remission
C10y.00	Diabetes mellitus with other specified manifestation
C10y100	Diabetes mellitus, adult, + other specified manifestation
C10yy00	Other specified diabetes mellitus with other spec comps
C10yz00	Diabetes mellitus NOS with other specified manifestation
C10z.00	Diabetes mellitus with unspecified complication
C10z100	Diabetes mellitus, adult onset, + unspecified complication
C10zy00	Other specified diabetes mellitus with unspecified comps
C10zz00	Diabetes mellitus NOS with unspecified complication

Ischaemic Heart Disease

Clinical Code	Description
G3...00	Ischaemic heart disease
G3...11	Arteriosclerotic heart disease
G3...12	Atherosclerotic heart disease
G3...13	IHD - Ischaemic heart disease
G30..00	Acute myocardial infarction
G30..11	Attack - heart
G30..12	Coronary thrombosis
G30..13	Cardiac rupture following myocardial infarction (MI)
G30..14	Heart attack
G30..15	MI - acute myocardial infarction
G30..16	Thrombosis - coronary
G30..17	Silent myocardial infarction
G300.00	Acute anterolateral infarction
G301.00	Other specified anterior myocardial infarction
G301000	Acute anteroapical infarction
G301100	Acute anteroseptal infarction
G301z00	Anterior myocardial infarction NOS
G302.00	Acute inferolateral infarction
G303.00	Acute inferoposterior infarction
G304.00	Posterior myocardial infarction NOS
G305.00	Lateral myocardial infarction NOS

G306.00	True posterior myocardial infarction
G307.00	Acute subendocardial infarction
G307000	Acute non-Q wave infarction
G307100	Acute non-ST segment elevation myocardial infarction
G308.00	Inferior myocardial infarction NOS
G309.00	Acute Q-wave infarct
G30A.00	Mural thrombosis
G30B.00	Acute posterolateral myocardial infarction
G30X.00	Acute transmural myocardial infarction of unspecif site
G30X000	Acute ST segment elevation myocardial infarction
G30y.00	Other acute myocardial infarction
G30y000	Acute atrial infarction
G30y100	Acute papillary muscle infarction
G30y200	Acute septal infarction
G30yz00	Other acute myocardial infarction NOS
G30z.00	Acute myocardial infarction NOS
G31..00	Other acute and subacute ischaemic heart disease
G310.00	Postmyocardial infarction syndrome
G310.11	Dressler's syndrome
G311.00	Preinfarction syndrome
G311.11	Crescendo angina
G311.12	Impending infarction
G311.13	Unstable angina
G311.14	Angina at rest
G311000	Myocardial infarction aborted
G311011	MI - myocardial infarction aborted
G311100	Unstable angina
G311200	Angina at rest
G311300	Refractory angina
G311400	Worsening angina
G311500	Acute coronary syndrome
G311z00	Preinfarction syndrome NOS
G312.00	Coronary thrombosis not resulting in myocardial infarction
G31y.00	Other acute and subacute ischaemic heart disease
G31y000	Acute coronary insufficiency
G31y100	Microinfarction of heart
G31y200	Subendocardial ischaemia
G31y300	Transient myocardial ischaemia
G31yz00	Other acute and subacute ischaemic heart disease NOS
G32..00	Old myocardial infarction
G32..11	Healed myocardial infarction
G32..12	Personal history of myocardial infarction

G33..00	Angina pectoris
G330.00	Angina decubitus
G330000	Nocturnal angina
G330z00	Angina decubitus NOS
G331.00	Prinzmetal's angina
G331.11	Variant angina pectoris
G332.00	Coronary artery spasm
G33z.00	Angina pectoris NOS
G33z000	Status anginosus
G33z100	Stenocardia
G33z200	Syncope anginosa
G33z300	Angina on effort
G33z400	Ischaemic chest pain
G33z500	Post infarct angina
G33z600	New onset angina
G33z700	Stable angina
G33zz00	Angina pectoris NOS
G34..00	Other chronic ischaemic heart disease
G340.00	Coronary atherosclerosis
G340.11	Triple vessel disease of the heart
G340.12	Coronary artery disease
G340000	Single coronary vessel disease
G340100	Double coronary vessel disease
G341.00	Aneurysm of heart
G341.11	Cardiac aneurysm
G341000	Ventricular cardiac aneurysm
G341100	Other cardiac wall aneurysm
G341111	Mural cardiac aneurysm
G341200	Aneurysm of coronary vessels
G341300	Acquired atrioventricular fistula of heart
G341z00	Aneurysm of heart NOS
G342.00	Atherosclerotic cardiovascular disease
G343.00	Ischaemic cardiomyopathy
G344.00	Silent myocardial ischaemia
G34y.00	Other specified chronic ischaemic heart disease
G34y000	Chronic coronary insufficiency
G34y100	Chronic myocardial ischaemia
G34yz00	Other specified chronic ischaemic heart disease NOS
G34z.00	Other chronic ischaemic heart disease NOS
G34z000	Asymptomatic coronary heart disease
G35..00	Subsequent myocardial infarction
G350.00	Subsequent myocardial infarction of anterior wall

G351.00	Subsequent myocardial infarction of inferior wall
G353.00	Subsequent myocardial infarction of other sites
G35X.00	Subsequent myocardial infarction of unspecified site
G36..00	Certain current complication follow acute myocardial infarct
G360.00	Haemopericardium/current comp folow acut myocard infarct
G361.00	Atrial septal defect/curr comp folow acut myocardal infarct
G362.00	Ventric septal defect/curr comp fol acut myocardal infarctn
G363.00	Ruptur cardiac wall w'out haemopericard/cur comp fol ac MI
G364.00	Ruptur chordae tendinae/curr comp fol acute myocard infarct
G365.00	Rupture papillary muscle/curr comp fol acute myocard infarct
G366.00	Thrombosis atrium,auric append&vent/curr comp foll acute MI
G37..00	Cardiac syndrome X
G38..00	Postoperative myocardial infarction
G380.00	Postoperative transmural myocardial infarction anterior wall
G381.00	Postoperative transmural myocardial infarction inferior wall
G382.00	Postoperative transmural myocardial infarction other sites
G383.00	Postoperative transmural myocardial infarction unspec site
G384.00	Postoperative subendocardial myocardial infarction
G38z.00	Postoperative myocardial infarction, unspecified
G39..00	Coronary microvascular disease
G3y..00	Other specified ischaemic heart disease
G3z..00	Ischaemic heart disease NOS
Gyu3.00	[X]Ischaemic heart diseases
Gyu3000	[X]Other forms of angina pectoris
Gyu3100	[X]Other current complicatns following acute myocard infarct
Gyu3200	[X]Other forms of acute ischaemic heart disease
Gyu3300	[X]Other forms of chronic ischaemic heart disease
Gyu3400	[X]Acute transmural myocardial infarction of unspecif site
Gyu3500	[X]Subsequent myocardial infarction of other sites
Gyu3600	[X]Subsequent myocardial infarction of unspecified site

Heart Failure

Clinical Code	Description
1O1..00	Heart failure confirmed
2JZ..00	On optimal heart failure therapy
662f.00	New York Heart Association classification - class I
662g.00	New York Heart Association classification - class II
662h.00	New York Heart Association classification - class III
662i.00	New York Heart Association classification - class IV
8B29.00	Cardiac failure therapy

G58..00	Heart failure
G58..11	Cardiac failure
G580.00	Congestive heart failure
G580.11	Congestive cardiac failure
G580.12	Right heart failure
G580.13	Right ventricular failure
G580.14	Biventricular failure
G580000	Acute congestive heart failure
G580100	Chronic congestive heart failure
G580200	Decompensated cardiac failure
G580300	Compensated cardiac failure
G580400	Congestive heart failure due to valvular disease
G581.00	Left ventricular failure
G581.11	Asthma - cardiac
G581.13	Impaired left ventricular function
G581000	Acute left ventricular failure
G582.00	Acute heart failure
G583.00	Heart failure with normal ejection fraction
G583.11	HFNEF - heart failure with normal ejection fraction
G583.12	Heart failure with preserved ejection fraction
G584.00	Right ventricular failure
G58z.00	Heart failure NOS
G58z.12	Weak heart
G5y4z00	Post cardiac operation heart failure NOS
661M500	Heart failure self-management plan agreed
661N500	Heart failure self-management plan review
662p.00	Heart failure 6 month review
662T.00	Congestive heart failure monitoring
662W.00	Heart failure annual review
679W100	Education about deteriorating heart failure
8H2S.00	Admit heart failure emergency
8HBE.00	Heart failure follow-up
8HTL000	Referral to rapid access heart failure clinic
G232.00	Hypertensive heart&renal dis wth (congestive) heart failure
G234.00	Hyperten heart&renal dis+both(congestv)heart and renal fail
G581.12	Pulmonary oedema - acute
G58z.11	Weak heart
SP11111	Heart failure as a complication of care
SP11200	Cardiorespiratory failure as a complication of care
G554000	Congestive cardiomyopathy

Stroke/Trans-ischaemic attack

Clinical code	Description
G6...00	Cerebrovascular disease
G60..00	Subarachnoid haemorrhage
G600.00	Ruptured berry aneurysm
G601.00	Subarachnoid haemorrhage from carotid siphon and bifurcation
G602.00	Subarachnoid haemorrhage from middle cerebral artery
G603.00	Subarachnoid haemorrhage from anterior communicating artery
G604.00	Subarachnoid haemorrhage from posterior communicating artery
G605.00	Subarachnoid haemorrhage from basilar artery
G606.00	Subarachnoid haemorrhage from vertebral artery
G60X.00	Subarachnoid haemorrh from intracranial artery, unspecif
G60z.00	Subarachnoid haemorrhage NOS
G61..00	Intracerebral haemorrhage
G61..11	CVA - cerebrovascular accid due to intracerebral haemorrhage
G61..12	Stroke due to intracerebral haemorrhage
G610.00	Cortical haemorrhage
G611.00	Internal capsule haemorrhage
G612.00	Basal nucleus haemorrhage
G613.00	Cerebellar haemorrhage
G614.00	Pontine haemorrhage
G615.00	Bulbar haemorrhage
G616.00	External capsule haemorrhage
G617.00	Intracerebral haemorrhage, intraventricular
G618.00	Intracerebral haemorrhage, multiple localized
G619.00	Lobar cerebral haemorrhage
G61X.00	Intracerebral haemorrhage in hemisphere, unspecified
G61X000	Left sided intracerebral haemorrhage, unspecified
G61X100	Right sided intracerebral haemorrhage, unspecified
G61z.00	Intracerebral haemorrhage NOS
G62..00	Other and unspecified intracranial haemorrhage
G620.00	Extradural haemorrhage - nontraumatic
G621.00	Subdural haemorrhage - nontraumatic
G622.00	Subdural haematoma - nontraumatic
G623.00	Subdural haemorrhage NOS
G62z.00	Intracranial haemorrhage NOS
G63..00	Precerebral arterial occlusion
G63..11	Infarction - precerebral

G63..12	Stenosis of precerebral arteries
G630.00	Basilar artery occlusion
G631.00	Carotid artery occlusion
G631.11	Stenosis, carotid artery
G631.12	Thrombosis, carotid artery
G632.00	Vertebral artery occlusion
G633.00	Multiple and bilateral precerebral arterial occlusion
G634.00	Carotid artery stenosis
G63y.00	Other precerebral artery occlusion
G63y000	Cerebral infarct due to thrombosis of precerebral arteries
G63y100	Cerebral infarction due to embolism of precerebral arteries
G63z.00	Precerebral artery occlusion NOS
G64..00	Cerebral arterial occlusion
G64..11	CVA - cerebral artery occlusion
G64..12	Infarction - cerebral
G64..13	Stroke due to cerebral arterial occlusion
G640.00	Cerebral thrombosis
G640000	Cerebral infarction due to thrombosis of cerebral arteries
G641.00	Cerebral embolism
G641.11	Cerebral embolus
G641000	Cerebral infarction due to embolism of cerebral arteries
G64z.00	Cerebral infarction NOS
G64z.11	Brainstem infarction NOS
G64z.12	Cerebellar infarction
G64z000	Brainstem infarction
G64z100	Wallenberg syndrome
G64z111	Lateral medullary syndrome
G64z200	Left sided cerebral infarction
G64z300	Right sided cerebral infarction
G64z400	Infarction of basal ganglia
G65..00	Transient cerebral ischaemia
G65..11	Drop attack
G65..12	Transient ischaemic attack
G65..13	Vertebro-basilar insufficiency
G650.00	Basilar artery syndrome
G650.11	Insufficiency - basilar artery
G651.00	Vertebral artery syndrome
G651000	Vertebro-basilar artery syndrome
G652.00	Subclavian steal syndrome
G653.00	Carotid artery syndrome hemispheric
G654.00	Multiple and bilateral precerebral artery syndromes
G655.00	Transient global amnesia

G656.00	Vertebrobasilar insufficiency
G657.00	Carotid territory transient ischaemic attack
G65y.00	Other transient cerebral ischaemia
G65z.00	Transient cerebral ischaemia NOS
G65z000	Impending cerebral ischaemia
G65z100	Intermittent cerebral ischaemia
G65zz00	Transient cerebral ischaemia NOS
G66..00	Stroke and cerebrovascular accident unspecified
G66..11	CVA unspecified
G66..12	Stroke unspecified
G66..13	CVA - Cerebrovascular accident unspecified
G660.00	Middle cerebral artery syndrome
G661.00	Anterior cerebral artery syndrome
G662.00	Posterior cerebral artery syndrome
G663.00	Brain stem stroke syndrome
G664.00	Cerebellar stroke syndrome
G665.00	Pure motor lacunar syndrome
G666.00	Pure sensory lacunar syndrome
G667.00	Left sided CVA
G668.00	Right sided CVA
G669.00	Cerebral palsy, not congenital or infantile, acute
G67..00	Other cerebrovascular disease
G670.00	Cerebral atherosclerosis
G670.11	Precerebral atherosclerosis
G671.00	Generalised ischaemic cerebrovascular disease NOS
G671000	Acute cerebrovascular insufficiency NOS
G671100	Chronic cerebral ischaemia
G671z00	Generalised ischaemic cerebrovascular disease NOS
G672.00	Hypertensive encephalopathy
G672.11	Hypertensive crisis
G673.00	Cerebral aneurysm, nonruptured
G673000	Dissection of cerebral arteries, nonruptured
G673100	Carotico-cavernous sinus fistula
G673200	Carotid artery dissection
G673300	Vertebral artery dissection
G674.00	Cerebral arteritis
G674000	Cerebral amyloid angiopathy
G675.00	Moyamoya disease
G676.00	Nonpyogenic venous sinus thrombosis
G676000	Cereb infarct due cerebral venous thrombosis, nonpyogenic
G677.00	Occlusion/stenosis cerebral arts not result cerebral infarct
G677000	Occlusion and stenosis of middle cerebral artery

G677100	Occlusion and stenosis of anterior cerebral artery
G677200	Occlusion and stenosis of posterior cerebral artery
G677300	Occlusion and stenosis of cerebellar arteries
G677400	Occlusion+stenosis of multiple and bilat cerebral arteries
G678.00	Cereb autosom dominant arteriop subcort infarcts leukoenceph
G679.00	Small vessel cerebrovascular disease
G67A.00	Cerebral vein thrombosis
G67B.00	Reversible cerebral vasoconstriction syndrome
G67B.11	Call-Fleming syndrome
G67y.00	Other cerebrovascular disease OS
G67z.00	Other cerebrovascular disease NOS
G68..00	Late effects of cerebrovascular disease
G680.00	Sequelae of subarachnoid haemorrhage
G681.00	Sequelae of intracerebral haemorrhage
G682.00	Sequelae of other nontraumatic intracranial haemorrhage
G683.00	Sequelae of cerebral infarction
G68W.00	Sequelae/other + unspecified cerebrovascular diseases
G68X.00	Sequelae of stroke,not specfd as h'morrhage or infarction
G6y..00	Other specified cerebrovascular disease
G6z..00	Cerebrovascular disease NOS
Gyu6.00	[X]Cerebrovascular diseases
Gyu6000	[X]Subarachnoid haemorrhage from other intracranial arteries
Gyu6100	[X]Other subarachnoid haemorrhage
Gyu6200	[X]Other intracerebral haemorrhage
Gyu6300	[X]Cerebrl infarctn due/unspcf occlusn or sten/cerebrl artrs
Gyu6400	[X]Other cerebral infarction
Gyu6500	[X]Occlusion and stenosis of other precerebral arteries
Gyu6600	[X]Occlusion and stenosis of other cerebral arteries
Gyu6700	[X]Other specified cerebrovascular diseases
Gyu6C00	[X]Sequelae of stroke;not specfd as h'morrhage or infarction
Gyu6D00	[X]Sequelae/other unspecified cerebrovascular diseases
Gyu6E00	[X]Subarachnoid haemorrh from intracranial artery, unspecif
Gyu6F00	[X]Intracerebral haemorrhage in hemisphere, unspecified
Gyu6G00	[X]Cereb infarct due unsp occlus/stenos precerebr arteries
G6W..00	Cereb infarct due unsp occlus/stenos precerebr arteries
G6X..00	Cerebrl infarctn due/unspcf occlusn or sten/cerebrl artrs

Hypertension

Clinical Code	Description
G2...00	Hypertensive disease

G2...11	BP - hypertensive disease
G20..00	Essential hypertension
G20..11	High blood pressure
G20..12	Primary hypertension
G200.00	Malignant essential hypertension
G201.00	Benign essential hypertension
G202.00	Systolic hypertension
G203.00	Diastolic hypertension
G20z.00	Essential hypertension NOS
G20z.11	Hypertension NOS
G21..00	Hypertensive heart disease
G210.00	Malignant hypertensive heart disease
G210000	Malignant hypertensive heart disease without CCF
G210100	Malignant hypertensive heart disease with CCF
G210z00	Malignant hypertensive heart disease NOS
G211.00	Benign hypertensive heart disease
G211000	Benign hypertensive heart disease without CCF
G211100	Benign hypertensive heart disease with CCF
G211z00	Benign hypertensive heart disease NOS
G21z.00	Hypertensive heart disease NOS
G21z000	Hypertensive heart disease NOS without CCF
G21z011	Cardiomegaly - hypertensive
G21z100	Hypertensive heart disease NOS with CCF
G21zz00	Hypertensive heart disease NOS
G22..00	Hypertensive renal disease
G22..11	Nephrosclerosis
G220.00	Malignant hypertensive renal disease
G221.00	Benign hypertensive renal disease
G222.00	Hypertensive renal disease with renal failure
G22z.00	Hypertensive renal disease NOS
G22z.11	Renal hypertension
G23..00	Hypertensive heart and renal disease
G230.00	Malignant hypertensive heart and renal disease
G231.00	Benign hypertensive heart and renal disease
G232.00	Hypertensive heart&renal dis wth (congestive) heart failure
G233.00	Hypertensive heart and renal disease with renal failure
G234.00	Hyperten heart&renal dis+both(congestv)heart and renal fail
G23z.00	Hypertensive heart and renal disease NOS
G24..00	Secondary hypertension
G240.00	Secondary malignant hypertension
G240000	Secondary malignant renovascular hypertension
G240z00	Secondary malignant hypertension NOS

G241.00	Secondary benign hypertension
G241000	Secondary benign renovascular hypertension
G241z00	Secondary benign hypertension NOS
G244.00	Hypertension secondary to endocrine disorders
G24z.00	Secondary hypertension NOS
G24z000	Secondary renovascular hypertension NOS
G24z100	Hypertension secondary to drug
G24zz00	Secondary hypertension NOS
G25..00	Stage 1 hypertension (NICE - Nat Ins for Hth Clin Excl 2011)
G25..11	Stage 1 hypertension
G250.00	Stage 1 hyperten (NICE 2011) without evidnce end organ damge
G251.00	Stage 1 hyperten (NICE 2011) with evidnce end organ damge
G26..00	Severe hypertension (Nat Inst for Health Clinical Ex 2011)
G26..11	Severe hypertension
G27..00	Hypertension resistant to drug therapy
G28..00	Stage 2 hypertension (NICE - Nat Ins for Hth Clin Excl 2011)
G2y..00	Other specified hypertensive disease
G2z..00	Hypertensive disease NOS
Gyu2.00	[X]Hypertensive diseases
Gyu2000	[X]Other secondary hypertension
Gyu2100	[X]Hypertension secondary to other renal disorders

Lipid Lowering Drugs

Clinical code	Description
81048998	Atorvastatin 20mg chewable tablets sugar free
81051998	Atorvastatin 10mg chewable tablets sugar free
83099998	Simvastatin 40mg/5ml oral suspension sugar free
82655998	Nicotinic acid & laropiprant 1g+20mg tablets
83030998	Simvastatin 80mg tablets
81050998	Atorvastatin 10mg chewable tablets sugar free
84268998	Colesevelam 625mg tablets
84267998	Colesevelam 625mg tablets
83594998	Nicotinic acid 1g / laropiprant 20mg modified-release tablets
79254979	Simvastatin 20mg/5ml oral suspension sugar free
83188998	Bezafibrate 200mg tablets
83187998	Bezafibrate 400mg modified-release tablets
81049998	Atorvastatin 20mg chewable tablets sugar free
82141978	Eicosapentaenoic acid 460mg / Docosahexaenoic acid 380mg capsules
87853998	Nicotinic acid 1g modified-release tablets

87852998	Nicotinic acid 500mg modified release tablets
89154996	Cerivastatin 300microgram tablets
86791998	Simvastatin 80mg / Ezetimibe 10mg tablets
87854998	Nicotinic acid 750mg modified-release tablets
89153996	Cerivastatin sodium 300mcg tablets
88298997	Fenofibrate micronised 267mg capsules
88534998	Rosuvastatin 10mg tablets
86794998	Simvastatin 80mg / Ezetimibe 10mg tablets
86510979	Ispaghula husk 3.5g sugar free granules
87025998	Bezafibrate 400mg modified-release tablets
87418998	Simvastatin 10mg tablets
87918998	Simvastatin 10mg tablets
89401998	Bezafibrate 400mg modified-release tablets
87917998	Simvastatin 20mg tablets
89089998	Bezafibrate 400mg modified release tablets
87373998	Simvastatin 10mg tablets
87760998	Colestipol 5g granules sachets sugar free
86798998	Simvastatin 20mg / Ezetimibe 10mg tablets
88297996	Fenofibrate micronised 267mg capsules
87848998	Nicotinic acid pack
86796998	Simvastatin 40mg / Ezetimibe 10mg tablets
87849998	Nicotinic acid 375mg + 500mg + 750mg modified-release tablet
87850998	Nicotinic acid 1g modified release tablets
87851998	Nicotinic acid 750mg modified release tablets
86797998	Simvastatin 20mg / Ezetimibe 10mg tablets
87916998	Simvastatin 40mg tablets
89306996	Atorvastatin 40mg tablets
89311998	Atorvastatin 10mg tablets
89617998	Ispaghula husk 3.5g sugar free granules
89154997	Cerivastatin 200microgram tablets
86795998	Simvastatin 40mg / Ezetimibe 10mg tablets
89311997	Atorvastatin 20mg tablets
89306998	Atorvastatin 10mg tablets
89311996	Atorvastatin 40mg tablets
88298996	Fenofibrate micronised 200mg capsules
86788998	Simvastatin 40mg / Ezetimibe 10mg tablets
86789998	Simvastatin 20mg / Ezetimibe 10mg tablets
89153998	Cerivastatin sodium 100mcg tablets
86787998	Simvastatin 80mg / Ezetimibe 10mg tablets
89154998	Cerivastatin 100microgram tablets
88297998	Fenofibrate micronised 67mg capsules
86467998	Rosuvastatin 5mg tablets

89285979	Nicotinic acid 500mg modified release tablets
89800998	Eicosapentaenoic acid 460mg / Docosahexaenoic acid 380mg capsules
89284979	Nicotinic acid 750mg modified release tablets
88298998	Fenofibrate micronised 67mg capsules
88297997	Fenofibrate micronised 200mg capsules
89306997	Atorvastatin 20mg tablets
87855998	Nicotinic acid 500mg modified-release tablets
89283979	Nicotinic acid 1g modified release tablets
89153997	Cerivastatin sodium 200mcg tablets
86468998	Rosuvastatin 5mg tablets
92447998	Cerivastatin sodium 400mcg tablets
90973998	Rosuvastatin 20mg tablets
93619998	Simvastatin 10mg tablets
92408998	Rosuvastatin 20mg tablets
93620996	Simvastatin 40mg tablets
92448997	Cerivastatin 800microgram tablets
92410998	Rosuvastatin 40mg tablets
93620997	Simvastatin 20mg tablets
93620998	Simvastatin 10mg tablets
93871990	Simvastatin 40mg tablets
92409998	Rosuvastatin 10mg tablets
93243996	Pravastatin 40mg tablets
91194998	Fluvastatin 80mg modified-release tablets
93010990	Colestyramine 4g oral powder sachets sugar free
92549990	Fenofibrate micronised 200mg capsules
93244998	Pravastatin 10mg tablets
93244997	Pravastatin 20mg tablets
93244996	Pravastatin 40mg tablets
92539998	Rosuvastatin 40mg tablets
90310998	Atorvastatin 80mg tablets
93243997	Pravastatin 20mg tablets
92448998	Cerivastatin 400microgram tablets
94407990	Simvastatin 20mg tablets
93838990	Bezafibrate 200mg tablets
92471998	Simvastatin 80mg tablets
93851992	Colestipol 5g granules sachets sugar free
90309998	Atorvastatin 80mg tablets
92460998	Fenofibrate micronised 160mg tablets
91316998	Colestyramine sugar free powder
93243998	Pravastatin 10mg tablets
92292998	Ezetimibe 10mg tablets

92154990	Simvastatin 20mg/5ml oral suspension sugar free
93541998	Colestyramine 4g oral powder sachets
93542998	Colestyramine 4g oral powder sachets sugar free
92804997	Fluvastatin 40mg capsules
94189997	Fenofibrate micronised 200mg capsules
92293998	Ezetimibe 10mg tablets
90649998	Fenofibrate 200mg capsules
92805998	Fluvastatin 20mg capsules
92804998	Fluvastatin 20mg capsules
92805997	Fluvastatin 40mg capsules
93619996	Simvastatin 40mg tablets
92220998	Simvastatin 80mg tablets
90653998	Colestyramine 4g oral powder sachets sugar free
94188997	Fenofibrate micronised 200mg capsules
94112992	Cholestyramine 325 mg cap
94188998	Fenofibrate 100mg capsule
94189998	Fenofibrate 100mg capsules
92804996	Fluvastatin 80mg modified-release tablets
93619997	Simvastatin 20mg tablets
95480990	Simvastatin 10mg tablets
95479990	Simvastatin 20mg tablets
95952997	Bezafibrate 400mg modified-release tablets
95550990	Simvastatin 20mg tablets
95551990	Simvastatin 10mg tablets
94925998	Eicosapentaenoic acid 170mg / Docosahexaenoic acid 115mg capsules
95478990	Simvastatin 40mg tablets
95471990	Simvastatin 40mg tablets
95475990	Simvastatin 20mg tablets
94799998	Fenofibrate micronised 160mg tablets
96295997	Gemfibrozil 600mg tablets
95474990	Simvastatin 40mg tablets
95472990	Simvastatin 20mg tablets
95451990	Simvastatin 10mg tablets
95549990	Simvastatin 40mg tablets
96295998	Gemfibrozil 300mg capsules
94927990	Simvastatin 80mg tablets
94827992	Colestyramine 4g oral powder sachets
95501990	Simvastatin 40mg tablets
94782990	Pravastatin 20mg tablets
95185990	Simvastatin 80mg tablets
95494990	Simvastatin 20mg tablets

94605998	Colestipol 5g granules sachets sugar free
95495990	Simvastatin 10mg tablets
94851990	Pravastatin 10mg tablets
95500990	Simvastatin 80mg tablets
94830990	Pravastatin 20mg tablets
95502990	Simvastatin 20mg tablets
97078998	Fish oil concentrate 1g capsules
96685990	Bezafibrate 400mg modified-release tablets
96685989	Bezafibrate 200mg tablets
97377979	Cerivastatin sodium 300mcg tablets
94831990	Pravastatin 10mg tablets
97078997	Fish oil concentrate oral liquid
94661998	Colestipol 5g granules sachets sugar free
95482990	Simvastatin 20mg tablets
95483990	Simvastatin 10mg tablets
95486990	Simvastatin 40mg tablets
95508990	Simvastatin 10mg tablets
95487990	Simvastatin 20mg tablets
95952998	Bezafibrate 200mg tablets
97078996	Fish oil concentrate oral emulsion
94850990	Pravastatin 20mg tablets
94849990	Pravastatin 40mg tablets
94662998	Colestipol 5g granules sachets sugar free
95493990	Simvastatin 40mg tablets
95847990	Colestyramine 4g oral powder sachets sugar free
95098992	Hexopal 200 mg tab
97455979	Pravastatin 10mg tablets
95481990	Simvastatin 40mg tablets
94661997	Colestipol 5g granules sachets sugar free
97430979	Fluvastatin 20mg capsules
95805998	Bezafibrate 400mg modified release tablets
95405990	Simvastatin 40mg tablets
94789990	Pravastatin 10mg tablets
95401998	Probucol 250mg tablet
97247997	Gemfibrozil 600mg tablets
97247998	Gemfibrozil 300mg capsules
96134990	Colestyramine 4g oral powder sachets
95278990	Simvastatin 20mg tablets
95277990	Simvastatin 40mg tablets
95372990	Simvastatin 40mg tablets

Table S1. (Main cohort) The full Poisson models demonstrated in Table 2 and 3 in the manuscript.

	All Cardiovascular Disease	Ischaemic Heart Disease	Stroke/Trans-Ischaemic Attack	Heart Failure	Peripheral Vascular Disease	Hypertension	Type 2 Diabetes Mellitus	All-cause mortality
Unadjusted Incidence Rate Ratio	1.80 (1.51-2.15)	1.77 (1.33-2.34)	2.23 (1.75-2.86)	1.41 (0.88-2.26)	2.09 (1.24-3.51)	1.29 (1.16-1.45)	2.30 (2.02-2.61)	2.10 (1.84-2.48)
Log likelihood	-3626.9	-1572.2	-2041.3	-643.7	-551.4	-8541.9	-6255.0	-6679.6
Likelihood ratio test (degrees of freedom)	(df 1) 42.27	(df 1) 15.36	(df 1) 40.90	(df 1) 1.96	(df 1) 7.60	(df 1) 20.84	(df 1) 156.74	(df 1) 128.71
Pseudo R2	0.0058	0.0049	0.0099	0.0015	0.0068	0.0012	0.0124	0.0095
Adjusted Incidence Rate Ratio	1.71 (1.42-2.06)	1.57 (1.16-2.13)	2.15 (1.66-2.81)	1.51 (0.92-2.51)	1.54 (0.87-2.73)	1.42 (1.26-1.59)	2.13 (1.86-2.45)	1.75 (1.52-2.02)
Log likelihood	-3053.5	-1233.0	-1824.2	-533.1	-435.8	-7253.4	-5540.4	-5975.6
Likelihood ratio test (degrees of freedom)	(df 16) 1189.0	(df 16) 693.76	(df 16) 475.18	(df 16) 223.19	(df 16) 238.79	(df 15) 2597.74	(df 14) 1586.04	(df 20) 1536.73
Pseudo R2	0.1630	0.2196	0.1152	0.1731	0.2151	0.1519	0.1252	0.1139
Covariates								
Age at index date	1.11 (1.10-1.12)	1.13 (1.16-2.13)	1.09 (1.08-1.10)	1.10 (0.92-2.51)	1.12 (1.10-1.14)	1.10 (1.10-1.10)	1.07 (1.06-1.07)	1.08 (1.07-1.08)
Sex	1.51 (1.26-1.80)	2.08 (1.56-2.79)	1.03 (0.80-1.34)	2.09 (1.29-3.40)	1.46 (0.86-1.14)	1.06 (0.95-1.19)	1.21 (1.06-1.39)	1.75 (1.53-1.99)
Body mass index group								
<25Kg/m2	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)

25-30 Kg/m2	1.25 (0.96-1.64)	1.25 (0.83-1.90)	1.18 (0.81-1.71)	1.92 (0.90-4.14)	1.06 (0.52-2.16)	2.23 (1.88-2.64)	3.45 (2.70-4.41)	0.87 (0.70-1.08)
>30 Kg/m2	1.72 (1.31-2.25)	2.09 (1.38-3.16)	1.39 (0.94-2.06)	2.91 (1.34-6.29)	0.82 (0.35-1.93)	4.07 (3.45-4.80)	10.18 (8.16-12.70)	0.88 (0.69-1.14)
Missing	1.14 (0.90-1.44)	0.99 (0.67-1.47)	1.07 (0.78-1.48)	1.54 (0.75-3.16)	0.87 (0.43-1.75)	1.44 (1.23-1.69)	2.14 (1.71-2.68)	1.41 (1.20-1.64)
Current smoking status	1.54 (1.27-1.87)	1.99 (1.46-2.70)	1.32 (1.00-1.74)	1.10 (0.63-1.92)	3.26 (1.83-5.77)	0.97 (0.85-1.10)	1.12 (0.97-1.29)	1.73 (1.51-1.99)
Use of lipid lowering drug	0.96 (0.62-1.49)	1.05 (0.58-1.91)	1.16 (0.65-2.08)	2.27 (0.97-5.28)	1.84 (0.77-4.43)	0.73 (0.52-1.03)	1.82 (1.33-2.50)	1.44 (1.03-2.00)
Hypertension	1.23 (0.88-1.74)	0.97 (0.59-1.60)	1.24 (0.75-2.03)	1.02 (0.45-2.29)	1.78 (0.75-4.21)	N/A	N/A	1.15 (0.84-1.58)
Type 2 Diabetes Mellitus	2.26 (1.45-3.54)	1.88 (0.96-3.66)	2.64 (1.47-4.76)	2.90 (1.19-7.05)	1.83 (0.64-5.25)	2.60 (1.90-3.56)	N/A	1.66 (1.13-2.43)
Townsend deprivation								
1 (Least deprived)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)	1 (Ref)
2	1.13 (0.79-1.62)	1.11 (0.61-2.03)	1.27 (0.777-2.08)	0.90 (0.50-2.06)	1.78 (0.54-5.80)	0.89 (0.73-1.09)	1.12 (0.84-1.50)	0.95 (0.72-1.25)
3	1.33 (0.95-1.87)	1.67 (0.96-2.89)	1.23 (0.76-2.00)	1.04 (0.47-2.31)	1.59 (0.48-5.20)	1.05 (0.87-1.26)	1.46 (1.12-1.90)	1.03 (0.80-1.33)
4	1.36 (0.97-1.91)	1.69 (0.97-2.94)	1.24 (0.77-1.99)	0.99 (0.44-2.22)	1.11 (0.32-3.84)	1.06 (0.88-1.27)	1.45 (1.12-1.88)	1.31 (1.03-1.66)
5	1.82 (1.31-2.53)	2.12 (1.22-3.68)	1.56 (0.97-2.50)	0.98 (0.43-2.25)	3.36 (1.11-10.17)	0.98 (0.81-1.20)	1.71 (1.32-2.22)	1.80 (1.42-2.28)
Missing	1.36 (0.95-1.94)	1.22 (0.65-2.29)	1.53 (0.94-2.50)	0.62 (0.23-1.69)	2.01 (0.60-6.75)	1.05 (0.86-1.29)	1.44 (1.09-1.89)	1.07 (0.82-1.41)
Registration year	0.99 (0.99-1.00)	0.99 (0.98-1.00)	0.99 (0.98-1.00)	0.99 (0.98-1.01)	1.00 (0.98-1.02)	0.99 (0.99-0.99)	1.00 (1.00-1.01)	0.99 (0.98-1.00)
Charlson comorbidity index								

0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1 (Ref)
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.44 (1.23-1.67)
2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.66 (2.78-4.83)
3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.85 (2.45-6.04)
4 and above	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10.65 (7.45-15.22)

Table S2. (Officially confirmed exposed case analysis) Baseline characteristics of those exposed and unexposed to childhood maltreatment.

Baseline Characteristics (Standard Deviation, Interquartile range or Percentage)		
	Exposed Group	**Unexposed Group**
Number of patients	22 078	44 156
Median follow-up period (person years)	2.4 (IQR 0.96-5.4)	2.3 (IQR 0.8-5.2)
Age at cohort entry (years)	26.7 (SD 9.4)	26.8 (SD 9.3)
Age when maltreatment occurred (years)	9.3 (SD 5.0)	-
Sex; Male (%)	6 982 (31.6%)	13 964 (31.6%)
Body mass index		
<25kg/m2	6 395 (29.0%)	17 030 (38.6%)
25-30kg/m2	2 447 (11.1%)	6 452 (14.6%)
>30kg/m2	2 242 (10.2%)	4 057 (9.2%)
Not available	10 994 (49.8%)	16 617 (37.6%)
Smoking status		
Current smoker	8 826 (40.0%)	9 451 (21.4%)
Non-current/Not available	13 252 (60.0%)	34 705 (78.6%)
Townsend index		
(Least deprived) 1	1 764 (8.0%)	7 066 (16.0%)
2	2 294 (10.4%)	6 940 (15.7%)
3	3 665 (16.6%)	8 133 (18.4%)
4	5 423 (24.6%)	8 269 (18.7%)
5	5 393 (24.4%)	6 438 (14.6%)
Not available	3 539 (16.0%)	7 310 (16.6%)
Charlson Co-morbidity Index		
(Least co-morbid) 0	15 730 (71.3%)	36 289 (82.2%)
1	5 810 (26.3%)	7 266 (16.5%)
2	347 (1.6%)	418 (1.0%)
3	110 (0.5%)	112 (0.3%)
4 and above	81 (0.4%)	71 (02%)
Lipid lowering drug use	180 (0.8%)	435 (1.0%)
Pre-existing cardiometabolic disease		
All cardiovascular disease	207 (0.9%)	165 (0.4%)
Ischaemic heart disease	79 (0.4%)	76 (0.2%)
Heart failure	19 (0.1%)	15 (0.0%)
Stroke/Trans-ischaemic attack	108 (0.5%)	75 (0.2%)
Peripheral vascular disease	29 (0.1%)	23 (0.1%)
Hypertension	387 (1.8%)	655 (1.5%)
Diabetes mellitus	248 (1.1%)	262 (0.6%)

Table S3. (Officially confirmed exposed case analysis) The risk of developing cardiometabolic disease in those exposed and unexposed to childhood maltreatment.

	All Cardiovascular Disease		Ischaemic Heart Disease		Stroke/Trans-Ischaemic Attack		Heart Failure		Peripheral Vascular Disease		Hypertension		Type 2 Diabetes Mellitus	
	Exposed	**Unexposed**	**Exposed**	**Unexposed**	**Exposed**	**Unexposed**	**Exposed**	**Unexposed**	**Exposed**	**Unexposed**	**Exposed**	**Unexposed**	**Exposed**	**Unexposed**
Number of Patients	21 871	43 991	21 999	44 080	21 970	44 081	22 059	44 141	22 049	44 133	21 691	43 501	21 830	43 894
Numbers of Outcomes	131	131	56	59	74	57	15	19	15	16	309	402	225	183
Person-years	85 298	157 859	86 036	158 433	85 953	158 529	86 436	158 879	86 431	158 814	83 366	154 130	84 878	157 415
Incidence Rate (per 10 000 person years)	15.4	8.3	6.5	3.7	8.6	3.6	1.7	1.2	1.7	1.0	37.1	26.1	26.5	11.6
Incidence Rate Ratio (95% Confidence intervals)*	1.85 (1.45-2.36)		1.75 (1.21-2.52)		2.39 (1.70-3.38)		1.45 (0.74-2.86)		1.72 (0.85-3.48)		1.42 (1.23-1.65)		2.28 (1.88-2.77)	
***p*-value**	<0.001		0.003		<0.001		0.281		0.130		<0.001		<0.001	
Adjusted Incidence Rate Ratio (95% Confidence intervals)**	1.77 (1.36-2.30)		1.62 (1.09-2.41)		2.38 (1.64-3.45)		1.53 (0.74-3.19)		1.03 (0.47-2.25)		1.60 (1.36-1.87)		2.07 (1.68-2.56)	
***p*-value**	<0.001		0.017		<0.001		0.250		0.949		<0.001		<0.001	

*Unadjusted incidence rate ratio

** All cardiovascular disease, ischaemic heart disease, stroke/trans-ischaemic attack, heart failure and peripheral vascular disease outcomes were adjusted for body mass index, age, sex, smoking, diabetes status, lipid lowering drug use, hypertension and Townsend deprivation score at baseline as well as year of registration into the database. The hypertension outcome was adjusted for these factors excluding hypertension. The type 2 diabetes outcome was adjusted for these factors excluding hypertension and diabetes status.

Table S4. (Officially confirmed exposed case analysis) The risk of mortality in those exposed and unexposed to childhood maltreatment.

	Exposed	**Unexposed**
Number of Patients	22 078	44 156
Numbers of Outcomes	211	196
Person-years	83 463	155 860
Incidence Rate (per 10 000 person years)	25.2	12.6
Incidence Rate Ratio (95% Confidence intervals)*	2.01 (1.66-2.44)	
***p*-value**	<0.001	
Adjusted Incidence Rate Ratio (95% Confidence intervals)**	1.58 (1.27-1.96)	
***p*-value**	<0.001	

* Unadjusted incidence rate ratio

** Adjusted for body mass index, age, sex, smoking status, diabetes status, lipid lowering drug use, hypertension, Charlson comorbidity score and Townsend deprivation score as well as year of registration into the database.