Housing Characteristics and Hospital Admissions due to Falls on Stairs: A National Birth Cohort Study

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Objective To assess associations between housing characteristics and risk of hospital admissions related to falls on/from stairs in children, to help inform prevention measures.

Study design An existing dataset of birth records linked to hospital admissions up to age 5 for a cohort of 3 925 737 children born in England between 2008 and 2014, was linked to postcode-level housing data from Energy Performance Certificates. Association between housing construction age, tenure (eg, owner occupied), and built form and risk of stair fall-related hospital admissions was estimated using Poisson regression. We stratified by age (<1 and 1-4 years), and adjusted for geographic region, Index of Multiple Deprivation, and maternal age.

Results The incidence was higher in both age strata for children in neighborhoods with homes built before 1900 compared with homes built in 2003 or later (incidence rate ratio [IRR], 1.40; 95% CI, 1.10-1.77 [age <1 year], 1.20; 95% CI, 1.05-1.36 [age 1-4 years]). For those aged 1-4 years, the incidence was higher for those in neighborhoods with housing built between 1900 and 1929, compared with 2003 or later (IRR, 1.26; 95% CI, 1.13-1.41), or with predominantly social-rented homes compared with owner occupied (IRR, 1.21; 95% CI, 1.13-1.29). Neighborhoods with predominantly houses compared with flats had higher incidence (IRR, 1.24; 95% CI, 1.08-1.42 [<1 year] and IRR 1.16; 95% CI, 1.08-1.25 [1-4 years]).

Conclusions Changes in building regulations may explain the lower fall incidence in newer homes compared with older homes. Fall prevention campaigns should consider targeting neighborhoods with older or social-rented housing. Future analyses would benefit from data linkage to individual homes, as opposed to local area level. *(J Pediatr 2024;275:114191)*.

Unintentional injuries (UIs) in children constitute a major public health problem and can result in substantial long-term ill health, disability, and even death.[1] Falls are the leading cause of nonfatal injury in children.[2] Globally, the World Health Organization estimates that approximately 37.3 million falls occur annually resulting in the deaths of >15 000 children <5 years of age.[3] In England and Wales, falls on or from stairs or steps (stair falls) resulted in >11 000 hospital admissions in children <5 years of age between 2012 and 2016.[4]

There are several socioeconomic and environmental risk factors for UIs in children. Using an area-level measure of material deprivation, a study in the UK estimated that children from the most deprived quintile (ie, the lowest socioeconomic status areas) were almost twice as likely to suffer from burns and poisonings than in the least deprived quintile, with a less pronounced socioeconomic gradient for fractures.[5] Area deprivation, maternal occupation, social class, and relationship status are all risk factors for UIs in children, particularly in the home.[5] More deprived areas and younger maternal age (age <20 years at child's birth) are associated with higher childhood hospital admission rates for UIs in the UK.[6] A Scottish study found area deprivation index to be a predictor of severe (vs nonsevere), multiple (vs one-off) and home (vs other location) injuries in children.[7] The pathways that explain the socioeconomic gradient of UI in children include the environmental safety (eg, the level of organization of the home), supervision, and the child's abilities and behaviors.[8] Children's age, size, and developmental stage are also associated with risk of UIs, with children <4 years of age accounting for 39% of all fall-related injuries among children aged 0-19 years treated in emergency departments in the US.[9] Geographic region within the UK is associated with infant hospital admission rates in general,

APC	Admitted patient care
CI	Confidence interval
EPC	Energy performance certificate
HES	Hospital episode statistics
IMD	Index of multiple deprivation
IRR	Incidence rate ratio
LSOA	Lower-layer super output area
ONS	Office for National Statistics
UI	Unintentional injuries

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with lower rates observed in Greater London, which is not explained by individual factors and may be because of differences in admission practices and service provision.[6]

Most injuries in children <5 years old occur at home, so the home environment has a key role in children's health and safety.[10] Despite this finding, there have been few studies examining the link between home environment and injuries resulting from falls in children. A study of hospital admissions in the US found that 94% of injuries related to stair falls occurred at home.[11] Previous studies have found that male sex, socioeconomic status, use of bunk beds, and use of walkers are associated with greater risk of fall-related injuries in children.[12] A study of hospital admission rates in the state of Illinois from 1990 to 2000 found that rates of fall-related injury were higher in children in areas with more buildings built before 1950, and lower in areas with higher rates of owner occupation.[13] This finding was explained by the fact that older homes are more likely to have steeper steps, narrower stairways, or lack bannisters if they were built before regulations on the design of stairways were introduced, and maintenance is more likely to be deferred or inadequate in rented homes. A case control study in the UK found that children had significantly lower rates of stair fall-related injuries whose parents reported having a stairgate and keeping it shut, having carpeted stairs, or having a landing part-way down the stairs, and significantly higher rates if parents reported that their stairs were unsafe or in need of repair.[14] There is a knowledge gap regarding characteristics of dwellings in which children are most susceptible to injury from falls on stairs. Large-scale national-level datasets have also not been used commonly. This study addresses this gap by examining the effect on stair fall-related injuries of construction age, built form, and tenure in the UK using a large cohort.

In this study, we used a national population cohort of births in England linked at high spatial resolution to housing characteristics.[15-17] This article, therefore, demonstrates the feasibility of linking these datasets. The primary aim was to investigate the association between housing characteristics and the risk hospital admissions owing to stair falls in children <5 years of age.

Methods

Data Sources

The analysis used a dataset consisting of a cohort of children whose births occurred in England from January 1, 2008, to December 31, 2014.[17] The dataset, initially developed for the City Birth Cohort project, was constructed through linkage of birth registration data held by the Office for National Statistics (ONS) to birth records in the Hospital Episode Statistics (HES) database and to longitudinal hospital admission data from the HES Admitted Patient Care (APC) database.[15-18] For this study, these records were further linked to housing data from the Energy Performance Certificate (EPC) database. Diagnoses in the HES APC database are coded using the *International Classification of Diseases*, 10th edition. The EPC dataset is open access and available from the Department for Levelling Up, Housing and Communities. EPCs are intended to summarize the energy performance of homes. Variables extracted from the EPC database were aggregated at the postcode area level, which were linked to the birth registration data via the mothers' resident postcode at child's birth. All data are held in the ONS Secure Research Service, a UK-based secure research environment, where all analyses took place. We have obtained ethical or information governance approvals from the relevant committees.

Study Sample

Singleton children were followed from their date of birth until their date of death or their 5th birthday, whichever occurred first. They were excluded from the study if their parents opted out of their data being used for research; there was no link between ONS birth records and HES; there was no link to a postcode with ≥1 EPC; they were stillborn or born at <24 weeks' gestation; born as part of a multiple birth; had a private, military facility, or home birth; and/or data for any of the key exposure, outcome, or covariate variables were missing.

Outcome: Stair Fall-related Hospital Admissions

Our primary outcome was hospital admissions owing to injuries caused by falls on or from stairs and steps. Only falls on steps or stairs were considered, because they are most likely to take place in or around the home and, hence, may be linked to housing characteristics. stair fall-related hospital admissions were identified in HES APC using the United Kingdom National Health Service version of the *International Classification of Diseases*, 10th revision code (W100 Fall on and from stairs and steps – home or W109 Fall on and from stairs and steps – unspecified location) recorded as any diagnosis for an emergency admission.[19,20]

Exposure: Housing Characteristics

The EPC data provide housing characteristics to be used as the exposure variables in this study. Information within EPCs is recorded by trained surveyors and contains information related to the geometry, typology, construction, and age of homes. An EPC is required for a property before being sold or rented and may also be requested when undertaking energy efficiency upgrades. Coverage is, therefore, not complete for all postcodes.[21] For homes with multiple sequential EPCs, the most recent one was used.

Because only residential postcodes were available in the birth cohort, EPC data were aggregated up to the postcode level before linkage. Each postcode covers an average of 15 homes, although some have >100 homes (**Table I**). Postcodes were assigned a categorical value for each exposure variable using the unweighted modal category within each postcode. Categorical variables included household tenure (owner occupied, private, or social rented), construction age band (before 1900, 1900-1929, 1930-1949, 1950-1966, 1967-1975, 1976-2002, and 2003 onward), and housing type (house, flat, or bungalow). The words house, flat, and bungalow refer to

Table I. Descriptive statistics for children included and excluded (at any point in the exclusions flowchart) from the sample

Variables	Included Count	Excluded Count	Excluded %	Total
Child gender				
Female	1 910 892	377 567	16.5	2 288 459
Male	2 014 845	397 352	16.5	2 412 197
Region of residence				
North East	184 812	23 631	11.3	208 443
North West	511 484	97 871	16.1	609 355
Yorkshire and Humber	393 290	65 307	14.2	458 597
East Midlands	323 530	54 492	14.4	378 022
West Midlands	416 501	80 353	16.2	496 854
East of England	413 398	87 399	17.5	500 797
Greater London	731 865	167 018	18.6	898 883
South East	604 142	122 879	16.9	727 021
South West	346 715	65 362	15.9	412 077
Unknown	0	691	100.0	691
Wales	0	9398	100.0	9398
Missing	0	518	100.0	518
IMD quintile				
1 (most deprived)	1 077 842	215 896	16.7	1 293 738
2	887 502	162 982	15.5	1 050 484
3	731 082	134 039	15.5	865 121
4	631 181	120 122	16.0	751 303
5 (least deprived)	598 130	111 919	15.8	710 049
Missing	0	29 961	100.0	29 961
Age of mother, years				
≤19	117 915	22 645	16.1	140 560
20-24	636 025	117 685	15.6	753 710
25-29	1 032 450	194 310	15.8	1 226 760
30-34	1 179 265	230 790	16.4	1 410 055
35-39	736 305	156 585	17.5	892 890
≥40	223 775	52 895	19.1	276 670
Missing	0	<10	-	<10
Housing type				
Bungalow (single story)	123 509	19 438	13.6	142 947
Flat	857 733	210 601	19.7	1 068 334
House	2 944 495	516 148	14.9	3 460 643
Missing	0	28 732	100.0	28 732
Unknown	0	3156	100.0	3156
Owner occupied	2 666 162	398 293	13.0	3 064 455
Rental (private)	514 861	95 060	15.6	609 921
Rental (social)	744 714	115 043	13.4	859 757
Unknown	0	134 635	100.0	134 635
Missing	0	28 732	100.0	28 732
Housing construction age				
Before 1900	317 152	56 613	15.1	373 765
1900-1929	817 243	132 729	14.0	949 972
1930-1949	701 772	95 628	12.0	797 400
1950-1966	693 540	94 990	12.0	788 530
1967-1975	440 266	61 466	12.3	501 732
1976-2002	698 281	99 624	12.5	797 905
2003 onward	257 483	45 683	15.1	303 166
Invalid	0	159 454	100.0	159 454
Missing	0	28 732	100.0	28 732
No. of EPCs in postcode				
0	0	113 514	100.0	113 514
1-4	25 487	16 768	39.7	42 255
5-9	260 340	71 262	21.5	331 602
10-49	568 678	107 422	15.9	676 100
50-99	2 889 245	437 922	13.2	3 327 167
≥100	181 987	28 031	13.3	210 018
Total	3 925 737	774 919	16.5	4 700 656

Counts for age of mother have been rounded to the nearest 5 to prevent disclosure.

specific built forms in the present study. A house is a self-contained single unit residential building. Bungalow refers to a single story house. A flat (or apartment) is a home typically on 1 story that is part of a larger building. Maisonettes are flats within a 2-story building where the flats have separate front doors; they are included with flats for the present study. Construction age band ranges were largely predetermined by the EPC, but some bands were merged owing to low counts (age bands 1976-2002 and 2003 onward were made up of smaller ranges). Social rented refers to homes let at below-market price by registered providers such as housing associations and local authorities.

Covariates and Confounders

Covariates and potential confounders recorded in the birth cohort dataset included the child's age (<1 and 1-4 years old; based on a child's developmental stage, because children aged 1-4 years are typically more mobile and able to walk), mother's age at child's birth (≤19, 20-24, 25-29, 30-34, 35-39, and ≥40 years), Index of Multiple Deprivation (IMD) quintile of the home address at birth (1 = most to 5 = least deprived), and geographic region (North East, North West, Yorkshire and Humber, West Midlands, East Midlands, East of England, South West, Greater London, and South East).[22] The IMD is a combined index describing relative socioeconomic deprivation at lower-layer super output area (LSOA) level in England, produced by the UK government by combining various administrative data on income, employment, health deprivation and disability, education, crime, barriers to housing and services, and the living environment.[23] An LSOA is an area used for reporting certain official statistics in the UK, containing between 400 and 1200 households.[24] We selected these variables a priori based on evidence from a systematic review of variables associated with UIs in children.[12]

Statistical Analysis

We calculated stair fall-related admission rates by age and for each exposure and covariate. Poisson regression models were used to calculate the unadjusted and adjusted incidence rates of stair fall-related hospitalization for each housing variable of interest. Poisson regression was determined to be appropriate as the variance of the outcome variable was close to the mean (**Appendix B1**, online; available at www.jpeds.com). Variance inflation factors were used to check for multicollinearity of covariates: all variables had variance inflation factors in the range of 1-2, which was deemed acceptable for inclusion in the regression model (**Appendix A**, online; available at www.jpeds.com). Regression models, stratified by age group (<1 years and 1-4 years), were adjusted for geographic region, IMD quintile, and maternal age.[25] All statistical analyses were conducted in Stata v17 and graphs were produced in Python v3.10.

Ethics

We obtained ethical or information governance approvals from all of the relevant the committees. National Health Service London Queen Square Ethics Committee (18/LO/1514); Confidentiality Advisory Group (18/CAG/0159); Administrative Data Research Network (PROJ-194); ONS Research

Table II. Counts of the outcome (stair fall-related hospital admissions), exposure time, and unadjusted incidence rate for each exposure variable and covariate

Variables	Admission count	Exposure time (million child-years)	Rate (per thousand child-years)	Lower 95% CI	Upper 95% CI
Child gender					
Female	4302	6.11	0.70	0.68	0.73
Male	4877	6.40	0.76	0.74	0.78
Single year of age					
0	1968	3.60	0.54	0.52	0.56
1	3969	3.10	1.28	1.24	1.32
2	1837	2.50	0.73	0.70	0.76
3	973	1.90	0.50	0.47	0.53
4	432	1.40	0.32	0.29	0.35
Child age band					
0-1	1968	3.60	0.54	0.52	0.56
1-4	7211	8.90	0.81	0.79	0.83
Region					
North East	686	0.60	1.14	1.06	1.23
North West	1781	1.60	1.10	1.05	1.15
Yorkshire and Humber	995	1.30	0.78	0.73	0.83
East Midlands	680	1.10	0.65	0.60	0.70
West Midlands	1158	1.30	0.88	0.84	0.94
East of England	723	1.30	0.55	0.51	0.59
London	1045	2.30	0.45	0.42	0.48
South East	1337	1.90	0.69	0.66	0.73
South West	774	1.10	0.69	0.65	0.74
IMD quintile					
1 (most deprived)	2981	3.40	0.87	0.84	0.90
2	2133	2.80	0.75	0.72	0.79
3	1626	2.30	0.70	0.66	0.73
4	1298	2.00	0.64	0.61	0.68
5 (least deprived)	1141	1.90	0.59	0.56	0.63
Age of mother, years					
≤19	503	0.41	1.22	1.12	1.33
20-24	2101	2.10	0.99	0.95	1.04
25-29	2517	3.30	0.76	0.73	0.79
30-34	2312	3.70	0.63	0.60	0.65
35-39	1386	2.30	0.59	0.56	0.63
≥40	360	0.70	0.51	0.46	0.57
Home type					
Bungalow (single story)	229	0.39	0.58	0.51	0.66
Flat	1630	2.70	0.60	0.57	0.63
House	7320	9.40	0.78	0.76	0.79
Construction age					
Before 1900	763	1.00	0.75	0.69	0.80
1900-1929	2121	2.60	0.81	0.78	0.85
1930-1949	1568	2.20	0.70	0.67	0.74
1950-1966	1702	2.20	0.77	0.74	0.81
1967-1975	996	1.40	0.71	0.67	0.75
1976-2002	1529	2.30	0.68	0.64	0.71
2003 onward	500	0.82	0.61	0.56	0.67
Tenure					
Owner occupied	6026	8.50	0.71	0.69	0.72
Rental (private)	1075	1.60	0.66	0.62	0.70
Rental (social)	2078	2.40	0.87	0.83	0.91
Total	9179	12.60	0.73		

Note that child gender and single year of age were not included in the regression models but are presented here for context.

Accreditation Panel (2019/020); National Statistician's Data Ethics Advisory Committee (18 (07)); Independent Group Advising on Release of Data (DARS-NIC-234656).

Results

The selection of participants into this study is shown in Figure 1. The study sample included 3 925 737 children born from 2008 to 2014. The proportion of children excluded in the study as a percentage of the total sample is broadly consistent across covariate and exposure variables (Table I). However, rates of exclusion were higher in some regions of residence compared with others (highest in Greater London at 18.6% and lowest in the North East at 16.1%), and varied with housing construction age (highest before 1900 at 15.1% and lowest from 1930 to 1949 and 1950 to 1966 at 12.0%), housing type (highest in flats at 19.7% and lowest in bungalows at 13.6%), and

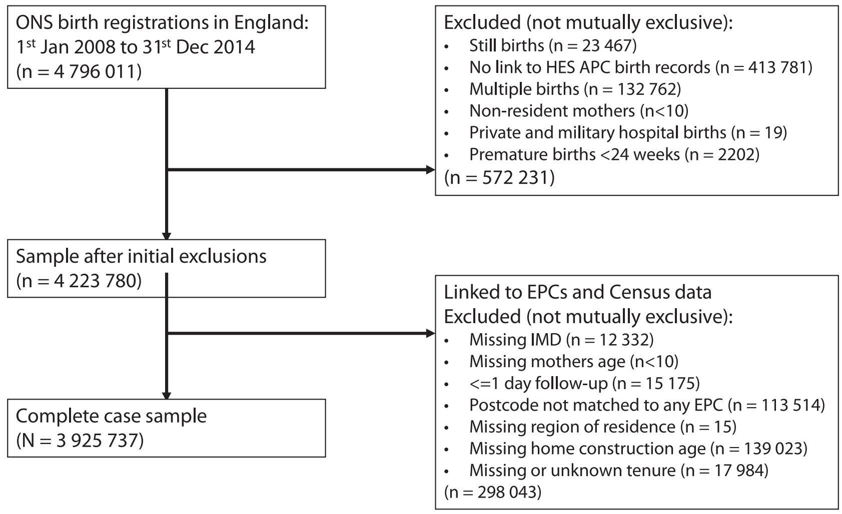

Figure 1. Flow chart of selection of participants into the study.

tenure (lowest in owner-occupied dwellings at 13.0% and highest in private renals at 15.6%). Differences in exclusion rates between IMD quintiles were relatively small, and there was not a clear socioeconomic gradient in exclusion.

A total of 9179 stair fall-related hospital admissions were recorded over the follow-up period (12.7 million child-years). There were 65 children who had >1 admission related to a fall on stairs, all of which were included. Raw counts and unadjusted rates of stair fall-related hospital admissions for all

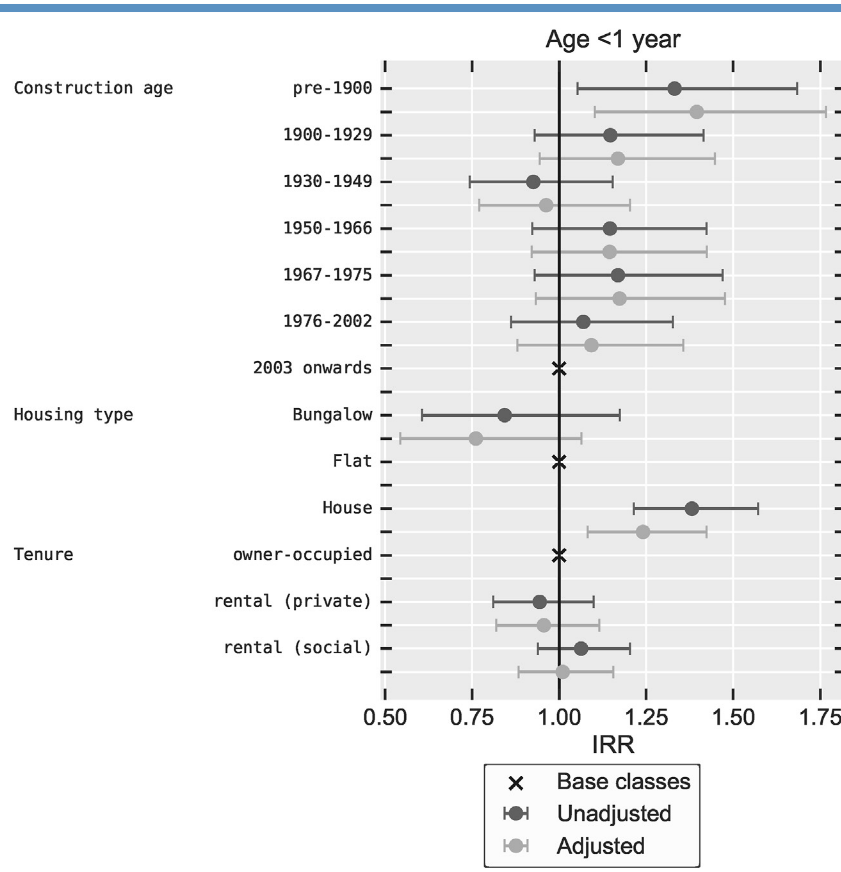

Figure 2. Unadjusted and adjusted IRRs with 95% CIs for stair fall-related admissions in children aged <1 years by housing variables derived from EPC data. Error bars represent 95% CIs.

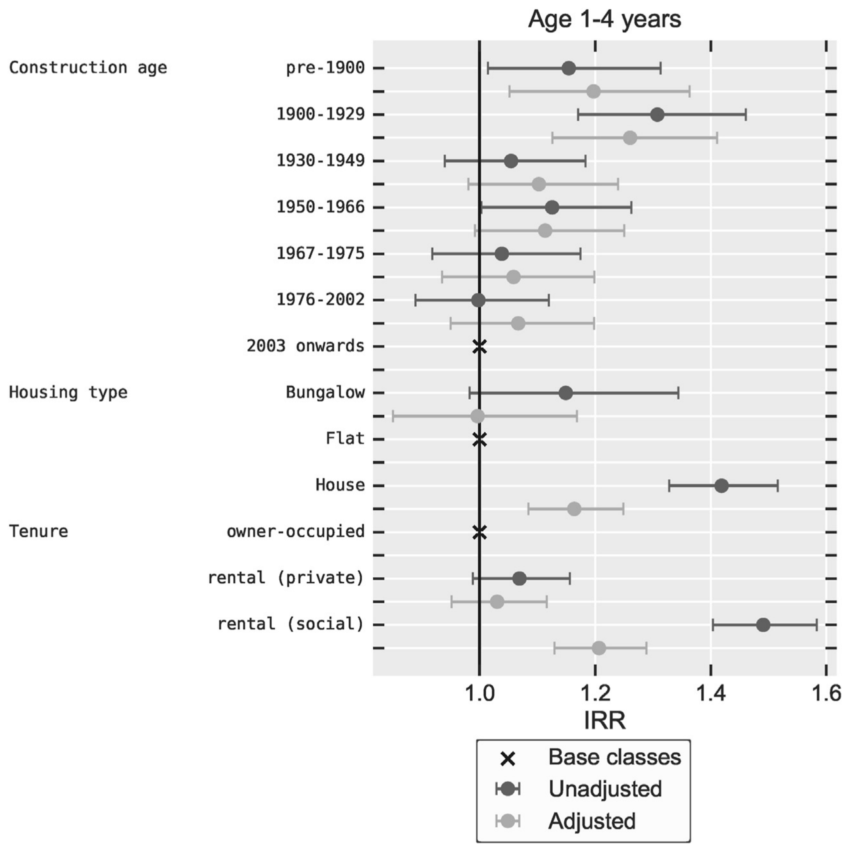

Figure 3. Unadjusted and adjusted IRRs with 95% CIs for stair fall-related admissions in children aged 1-4 years of age by housing variables derived from EPC data. Error bars represent 95% CIs.

analysis variables as well as the child's age are provided in Table II. The average rate of stair fall-related admissions was 0.73 per 1000 child-years. Incidence rates were highest at age 1-2 years of age at 1.28 (95% CI, 1.24-1.32) per 1000 child-years. Admission rates were higher for male children, children born to mothers ≤19 years of age, and children living in areas in the most deprived IMD quintile. Of stair fall-related hospital admissions included in the analysis, 82% were recorded as having occurred in the home and the remaining as occurring in an unspecified location.

Figures 2 and 3 provide unadjusted and adjusted incidence rate ratios (IRRs) relative to a base housing characteristic (housing age, 2003 onward; home type, flat; tenure, owner occupied) for stair fall-related admissions of children aged <1 and 1-4 years, respectively. Only the exposures (housing characteristics) are shown, with results for the covariates provided in Appendix Figures C1 and C2 and Tables C1, C2, C3, and C4, online; available at www.jpeds.com. The intercept stair fall-related admission rates were 0.26 (95% CI, 0.18-0.36) and 0.24 (0.20-0.29) per 1000 child-years for children <1 year old and 1-4 years old, respectively.

For both age groups, compared with children living in neighborhoods that predominantly have flats, adjusted incidence rates were higher for children living in neighborhoods which predominantly had houses (age <1 year, IRR 1.24; 95% CI, 1.08-1.42; age 1-4 years, 1.16; 95% CI, 1.08-1.25) and not significantly different for bungalows (single story houses). For children <1 year old, compared with children living in areas where housing was built predominantly 2003 or later, children living in neighborhoods where housing was built predominantly before 1900 had higher incidence rates (IRR, 1.40; 95% CI, 1.10-1.77). For 1- to 4-year-olds, children living in neighborhoods where the housing is predominantly older (compared with housing built in 2003 or later) had higher incidence rates, with highest risks for 1900-1929 (IRR, 1.26; 95% CI, 1.13-1.41) and before 1900 (IRR, 1.20; 95% CI, 1.05-1.36); other construction age categories have CIs covering an IRR of 1. For 1- to 4-year-olds, compared with children living in neighborhoods where housing is predominantly owner occupied, rates of the outcome were higher for children living in neighborhoods that are predominantly social rentals (IRR, 1.21; 95% CI, 1.13-1.29).

Discussion

In this national birth cohort study, we found that children living in areas with older housing, or with mostly socially rented housing (vs owner occupied), or with mostly flats (vs houses) were more likely to experience a stair fall-related hospital admission. We found that children aged 1-4 years living in neighborhoods with older housing, built between 1900 and 1929 and before 1900 had a 26% and 20% higher incidence of stair fall-related admissions vs homes built 2003 or later, respectively. Children <1 year of age had a 21% increase in incidence in homes built before 1900 vs homes built 2003 or later. Children aged 1-4 years living in neighborhoods with predominantly social rentals (as opposed to owner-occupied) had higher incidence by 21%. This is broadly consistent with the Illinois (US) study that found fall rate ratios of 0.94 and 1.10 per 10% increase in the percentage of owner-occupied and older (built before 1950) homes in a neighborhood, respectively.[13] Safety improvements in housing and stair design over the years owing to changes in with building regulations (introduced in England in 1965) may have helped to prevent falls.[26] We also found that rates of stair fall-related hospital admissions were 24% higher for children aged 1-4 years (16% for children aged <1 year of age) living in neighborhoods that predominantly had houses as opposed to flats. This finding may be explained by flats decreasing exposure to stairs: flats typically have no internal stairs (by definition), so children's exposure to stairs is limited.

This article presents the first nationwide analysis of linked housing and UI data in children <5 years of age and is the largest study of its kind. This work demonstrates that EPC data can be used to extract housing data at a postcode level and is of sufficient quality to provide insights into determinants of environmental exposures on health outcomes in children. EPCs can provide housing information, which is not available from other public sources and is available at a finer granularity than alternative sources, such as LSOA-level census statistics. EPCs could, therefore, be used in the future to explore associations with other types of injury or health conditions. For example, EPC data can be used to examine the link between energy efficiency in buildings and respiratory conditions, which are known to be associated with housing characteristics and the indoor environment.[27]

There are several limitations that need to be considered when interpreting the findings of our study. First, our definition of stair fall-related admissions depends on hospital records: only falls resulting in a hospital admission were captured, so differences in parental decision-making and resources could lead to children in some groups being more likely to examined be examined after a fall, which cannot be tested with this dataset.[7] Second, to minimize bias, we included falls for which the location was not specified, so the sample contains some falls outside the home that cannot have been caused directly by the conditions in the home.

Further limitations relate to the housing data extracted from EPCs. First, children were linked to EPC data via their birth mother's residential address recorded on their birth certificate, so changes of address and other addresses where the child could be resident are not captured. For children who did not have EPCs linked to their postcode, it may be that the postcode was recorded incorrectly in the birth registration or that there are genuinely no EPCs registered in the area. Misclassification owing to change of address is likely to increase with time from birth. Certain groups (eg, private renters) may move addresses more often, making the data less accurate for those groups. Second, our housing data are assessed at the postcode level rather than at the dwelling level, which would have greater statistical noise, particularly for housing categories with smaller sample sizes. Future work to link EPC data to specific addresses on health records via the Unique Property Reference Number (a unique identifier for each dwelling in the UK) would allow the association between housing characteristics and health outcomes to be evaluated at the property rather than the postcode level. Although the IMD is an area-level measure of deprivation, we also included maternal age as an individual-level proxy for socioeconomic status.[28] Third, the EPC data are treated as static in time, with the latest EPC for each building used. EPCs for newly constructed housing in existing postcodes during or after the study period could have changed the predominant categorization of the postcode, and to our knowledge EPCs are not removed from the database when buildings are demolished. Postcodes in which old housing with EPCs has been demolished and new housing built may be identified incorrectly as predominantly old. There may also be surveyor error resulting in inaccuracy in the recorded housing age or typology. Older buildings can be renovated to be made safer, and the EPC would not capture this factor. Fourth, we were unable to separate split-level, converted, and purpose-built flats using the EPC data; flats converted from houses may have different stairway configurations than purpose-built flats. This factor may lead to IRRs for houses compared with flats being underestimated, in contrast with had we been able to identify flats without internal stairs. Finally, it should be noted that certain neighborhoods have better EPC coverage than others, particularly those with a greater proportion of flats: neighborhoods with low or no EPC coverage were excluded from the analysis so this factor could introduce a bias.[21]

To conclude, this study found a higher incidence of stair fall-related hospital admissions for children <5 years old living in postcode areas with a higher proportion of houses, as opposed to flats, and with a greter proportion of older homes, built before the 1930s. Incidence was also higher for children aged 1-4 years living in postcode areas with mostly social rental homes, compared with areas with mostly owner-occupied homes. This study reinforces the importance of the home environment in preventing UIs. The lower incidence rates in neighborhoods with newer homes could suggest that changes in construction practice relating to stairs may have helped to prevent injuries. Future studies could improve the specificity of exposure by linking individual addresses rather than areas to home characteristics and accounting for changes of address. Previous studies have shown that safety equipment such as stair gates help to decrease the incidence of falls, that stairs should be kept clear and fitted with handrails, and that the use of walkers for infants and toddlers should be discouraged.[29-33] It may be that some older homes in particular do not meet current safety standards, so inspection and improvement of these homes could prevent falls. Fall prevention campaigns might be best targeted toward those living in older homes and those in social-rented homes. This practice could help to prevent avoidable injuries in children. ■

CRediT authorship contribution statement

Charles H. Simpson: Writing – original draft, Visualization, Formal analysis. **Kate Lewis:** Writing – review & editing, Software, Data curation. **Jonathon Taylor:** Writing – review & editing, Data curation. **Samantha Hajna:** Writing – review & editing. **Alison Macfarlane:** Writing – review & editing, Data curation. **Pia Hardelid:** Writing – review & editing, Supervision, Funding acquisition, Conceptualization. **Phil Symonds:** Writing – review & editing, Writing – original draft, Supervision, Resources, Project administration, Funding acquisition, Conceptualization.

Declaration of Competing Interest

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