Appendix B – Methodology

Emergency admission definition

An admission was defined by continuous periods in hospital that could consist of several finished consultant episodes (FCEs – a period of hospital stay under a single consultant). Admissions that occurred within one day of the date of discharge or included a hospital transfer were considered as a single admission. For infants, we only considered emergency admissions that were at least seven days after their postnatal discharge.
Admissions were classed as emergency admissions based on the 'method of admission' variable in HES, which classifies admissions as elective, emergency, maternity or birth admissions.

Primary diagnosis group: six broad groupings

We classified indications for emergency admission using two classification methods. First, we grouped indications in six broad groups for admission: infections, chronic conditions, injuries, perinatal conditions (for the <5 year group) or pregnancy-related (for girls aged>10 years), signs or symptoms, or other. These six groupings were based on existing, published code lists[1–4] for the first four groups. As codes from the ICD-10 chapter 'Symptoms, signs and abnormal clinical and laboratory findings' made up a significant proportion of residual diagnosis codes, we created a separate category for these codes. Remaining codes were grouped as 'other'.

The code list for chronic conditions defined a chronic condition as any health problem requiring follow-up by health services in more than 50% of cases, where follow-up could be repeated hospital admission, specialist follow-up through outpatient department visits, medication, or use of support services such as physiotherapy. Chronic conditions were grouped according to the likely clinical pathways or specialist input required to manage the conditions. The list of ICD-10 codes was developed in collaboration with and reviewed by a clinical panel.

As the codes lists used for our grouping were developed separately, there was some overlap between the six groups. For instance, ICD-10 code O24.0 for pre-existing insulin-dependent diabetes mellitus in pregnancy was included in both the chronic condition and pregnancy-related code lists. We developed decision rules to determine how to group ICD-10 codes which were included in multiple categories.

We first categorised codes relating to pregnancy or perinatal conditions. If codes from this group were included in code list for injuries, infections or chronic conditions (e.g. O23 – Infections of genitourinary tract in pregnancy), we reclassified the code as part of the new group.

Next , we extracted codes relating to injury admissions. Similar to the pregnancy and perinatal condition diagnosis codes, codes were reclassified as infection or chronic condition when codes were also included in those code lists (e.g. T43 – Poisoning by psychotropic drugs was reclassified as self-harm and included as a chronic condition).

Codes that were grouped as both an infection and a chronic condition (e.g. B20 – Human immunodeficiency virus [HIV] disease resulting in infectious and parasitic diseases) were classified as chronic conditions.

Codes were categorised as ‘Signs and symptoms’ or ‘Other’ if they were not included in any of the four other code lists (e.g. R11 – Nausea and vomiting – was categorised as an infection code, as per Baker et al.[1]).

Indications: ICD-10 chapter

In addition, we grouped indications by ICD-10 chapter. We grouped chapters 19 and 20 (‘Injury, poisoning and certain other consequences of external causes’ and ‘External causes of morbidity and mortality’) together as both chapters refer to injuries. Due to small numbers we also grouped chapters 7 and 8 (‘Diseases of the eye and adnexa’ and ‘Diseases of the ear and mastoid process’) together.

For the interactive data visualisation, we included only the ten most common ICD-10 chapters for each group, and grouped the residual chapters in one ‘other’ group.

1 Baker MG, Barnard LT, Kvalsvig A, *et al.* Increasing incidence of serious infectious diseases and inequalities in New Zealand: a national epidemiological study. *The Lancet* 2012;**379**:1112–9. doi:10.1016/S0140-6736(11)61780-7

2 Hardelid P, Dattani N, Davey J, *et al.* Overview of child deaths in the four UK countries. HQIP bit.ly/hardelidreport

3 González-Izquierdo A, Cortina-Borja M, Woodman J, *et al.* Maltreatment or violence-related injury in children and adolescents admitted to the NHS: comparison of trends in England and Scotland between 2005 and 2011. *BMJ Open* 2014.

4 Wijlaars L, Hardelid P, Woodman J, *et al.* Contribution of recurrent admissions in children and young people to emergency hospital admissions: retrospective cohort analysis of hospital episode statistics. *Arch Dis Child* 2014.