

Supplement 1_online_supp: Valid diagnosis (ICD) and procedure (OPCS) codes used to identify cohort of interest extracted from HES (Note all procedure codes from K chapter were required to be supplemented by at least one of the listed procedure codes from the Y chapter†). KEY: NEC: not elsewhere classified, NOC: not otherwise classifiable)

	Code	Description
Diagnosis	I05.2	Mitral stenosis with insufficiency
	I05.8	Other mitral valve diseases
	I05.9	Mitral valve disease, unspecified
	I08.0	Disorders of both mitral and aortic valves
	I08.1	Disorders of both mitral and tricuspid valves
	I08.3	Combined disorders of mitral, aortic and tricuspid valves
	I34	Mitral (valve) insufficiency
	Q23.3	Congenital mitral insufficiency
Procedural	*K25.3	Prosthetic replacement of mitral valve
	K25.5	Mitral valve repair NEC
	K25.8	Other specified plastic repair of mitral valve
	K25.9	Unspecified plastic repair of mitral valve
	K30.1	Revision of plastic repair of mitral valve
	K30.8	Other specified revision of plastic repair of valve of heart
	K30.9	Unspecified revision of plastic repair of valve of heart
	K35.1	Percutaneous transluminal mitral valvotomy
	K35.5	Percutaneous transluminal valvuloplasty
	K35.8	Other specified therapeutic transluminal operations on valve of heart
	K35.9	Unspecified therapeutic transluminal operations on valve of heart
	†Y02.1	Implantation of prosthesis into organ NOC
	†Y02.2	Insertion of prosthesis into organ NOC
	†Y02.8	Other specified placement of prosthesis in organ NOC
	†Y02.9	Unspecified placement of prosthesis in organ NOC
	†Y07.2	Clipping of organ NOC

*Note one hospital used K25.3 + Y02.1 procedure codes for MitraClip procedures conducted prior to 1st August 2016

Supplement 2_online_supp: Cohort identification.

Search criteria: Any finished consultant episode of care (FCE=1) discharged between 1st April 2014 and 31st March 2018, age at admission > 18 years (STARTAGE), including procedure code (OPERTN1-24: K253|4|5|8|9|K301|8|9|K351|5|8|9|+Y072|Y021|2|8|9) or diagnosis (DIAG1-20: I080|1|3|I052|8|9|I34|Q233) from hospitals submitting to registry (PROCEDURE3: RA7|RJE|RLY|RM2|R0A|RRK|RT3)

Supplement 3_online_supp: Comprehensive cleaning of HES data**STEP 1: Episode cleaning**

- Episodes with missing or invalid (“-1”) spell number as generated by SUS (SUSSPELLID) were removed.
- Episodes with missing spell number as generated by provider hospital (PROVSPNOPS) were removed.
- Patients (ENCRYPTED_HESID) from identified episodes were searched in mortality database, and any marked with subsequent activity after date of death (SUBSEQUENT_ACTIVITY=Y) or date of death (DOD) before tonsillectomy admission date (ADMIDATE) were removed

STEP 2: Spell aggregation

- Some admissions (also called spells) are made up of multiple episodes of care, therefore episodes were aggregated together into spells if they had the same unique spell number as generated by SUS (SUSSPELLID).
- Episodes with missing spell number as generated by provider hospital (PROVSPNOPS) were removed.
- Episodes within a spell were ordered by episode order (EPIORDER) and start episode flag (EPISTART).

STEP 3: Spell cleaning

- Missing or invalid (“1800-01-01” or “1801-01-01”) values of admission date (ADMIDATE) were replaced with NULL.
- Missing or invalid (“1800-01-01” or “1801-01-01”) values of discharge date (DISDATE) were replaced with NULL.
- Missing or invalid (e.g. “011800”) values of month and year of birth (MYDOB) were replaced with NULL.
- Spells with inconsistent patient identifier (ENCRYPTED_HESID) were removed.
- Spells with inconsistent admission date (ADMIDATE) were removed.
- Spells with a missing spell start (SPELBGIN) or missing spell end (SPELEND) flag or missing starting episode (EPIORDER=1) were removed.
- Spells with missing admission date (ADMIDATE) were removed.
- Spells with missing discharge date (DISDATE) and missing last episode (EPIEND) were removed.

STEP 4: Index tonsillectomy admission

- As some patients can have multiple tonsillectomy procedures, the earliest procedure within our study time frame (i.e. index procedure) was identified for each patient (ENCRYPTED_HESID) using minimum admission date (ADMIDATE).
- Any remaining duplicates were removed by retaining only the spell with the highest spell number as generated by SUS (SUSSPELLID).

STEP 5: Longitudinal cleaning

- Episodes with missing or invalid (“-1”) spell number as generated by SUS (SUSPELLID) were removed (prior to spell aggregation of follow-up spells).
- Episodes with missing spell number as generated by provider hospital (PROVSPNOPS) were removed.
- Missing or invalid (“1800-01-01” or “1801-01-01”) values of admission date (ADMIDATE) were replaced with NULL.
- Missing or invalid (“1800-01-01” or “1801-01-01”) values of discharge date (DISDATE) were replaced with NULL.
- Missing or invalid (e.g. “011800”) values of month and year of birth (MYDOB) were replaced with NULL.
- Mortality records with a reported date of death which was one day prior to tonsillectomy discharge were corrected to the date of tonsillectomy discharge.

Supplement 4_online_supp: OPCS codes used to identify cardiac interventions conducted post-MitraClip implantation (recorded during subsequent readmissions).

		Code	Description
Mitral valve intervention	Replace	K25.1	Allograft replacement of mitral valve
		K25.2	Xenograft replacement of mitral valve
		K25.3	Prosthetic replacement of mitral valve
		K25.4	Replacement of mitral valve NEC
	Repair	K25.5	Mitral valve repair NEC
		K25.8	Other specified plastic repair of mitral valve
		K25.9	Unspecified plastic repair of mitral valve
		K30.1	Revision of plastic repair of mitral valve
	Other	K31.1	Open mitral valvotomy
		K32.1	Close mitral valvotomy
		K34.1	Annuloplasty of mitral valve
		K35.1	Percutaneous transluminal mitral valvotomy
		K37.5	Excision of supramitral ring
K38.3		Operation on mitral subvalvar apparatus	
	*Z32.1	Mitral valve	
Cardiac pacemaker insertion	K60.1	Implantation of intravenous cardiac pacemaker system NEC	
	K60.5	Implantation of intravenous single chamber cardiac pacemaker system	
	K60.6	Implantation of intravenous dual chamber cardiac pacemaker system	
	K60.7	Implantation of intravenous biventricular cardiac pacemaker system	
	K60.8	Other specified cardiac pacemaker system introduced through vein	
	K60.9	Unspecified cardiac pacemaker system introduced through vein	
	K61.1	Implantation of cardiac pacemaker system NEC	
	K61.5	Implantation of single chamber cardiac pacemaker system	
	K61.6	Implantation of dual chamber cardiac pacemaker system	
	K61.7	Implantation of biventricular cardiac pacemaker system	
	K61.8	Other specified other cardiac pacemaker system	
K61.9	Unspecified other cardiac pacemaker system		
Cardioverter defibrillator insertion	K59.1	Implantation of cardioverter defibrillator using one electrode lead	
	K59.2	Implantation of cardioverter defibrillator using two electrode leads	
	K59.6	Implantation of cardioverter defibrillator using three electrode leads	
	K59.7	Renewal of cardioverter defibrillator using three electrode leads	
	K59.8	Other specified cardioverter defibrillator introduced through the vein	
	K59.9	Unspecified cardioverter defibrillator introduced through the vein	

Supplement 5_online_supp: Data flow diagram

