QUALITY SYSTEMS IN TRANSFUSION MEDICINE

Original article

Maturity Assessment model for Patient Blood Management to assist hospitals in improving patients' safety and outcomes. The MAPBM project

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Materials and methods - The MAPBM considers the three dimensions of a transformation effort (structure, process and outcomes) and grades these within a maturity scale matrix. Each dimension includes the various drivers of a PBM programme, and their corresponding measures and key performance indicators. The structure measures are qualitative, and obtained using a survey and structured self-assessment checklist. The key performance indicators for process and outcomes are quantitative, and based on clinical data from the hospitals' electronic medical records. Key performance indicators for process address major clinical recommendations in each PBM pillar, and are applied to six common procedures characterised by significant blood loss.

Results - In its first 5 years, the MAPBM was deployed in 59 hospitals and used to analyse 181,826 hospital episodes, which proves the feasibility of implementing a sustainable model to measure and compare PBM clinical practice and outcomes across hospitals in Spain.

<u>Conclusion</u> - The MAPBM initiative aims to become a useful tool for healthcare organisations to implement PBM programmes and improve patients' safety and outcomes.

Keywords: Patient Blood Management, patient safety, transfusion, maturity assessment, benchmarking.

INTRODUCTION

Reducing inappropriate clinical interventions and incorporating high-value practices are major goals for any health organisation. These objectives can be connected via patient blood management (PBM), an evidence-based bundle of care to improve a patient's outcomes by managing and preserving the patient's own blood¹.

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All rights reserved - For personal use only No other use without premission Several studies have reported that blood transfusion is overused in clinical practice²⁻⁵, and is an independent, dose-dependent risk factor for longer hospital stays, and higher risks of death and infection⁶. Similarly, pre-operative anaemia is an important and highly prevalent independent risk factor for peri-operative mortality and morbidity, and is thought to be present in approximately one-third of individuals undergoing major surgery⁷⁻⁹. Pre-operative anaemia is also the main risk factor for red blood cell (RBC) transfusion^{7,10}. Overuse of blood transfusions and performing elective surgery normally associated with substantial bleeding in patients with uncorrected anaemia are listed by several professional societies and "Right Care" associations as practices that should be avoided^{5,11,12}.

The PBM concept is based on three pillars: (i) optimising erythropoiesis (treatment of anaemia), (ii) minimising bleeding and blood loss, and (iii) improving the patient's condition to allow the use of a more restrictive transfusion threshold¹³⁻¹⁵ and has demonstrated its ability to address overuse and to improve patients' safety, outcomes and quality of care across many different populations^{1,16-18}.

Since 2010, the World Health Organisation (WHO) has officially been urging member states to implement PBM (WHA63.12)¹⁹, and the European Commission also recently published PBM implementation guidelines for health authorities and hospitals^{20, 21}. With the current shortage of donors and impediments to blood supply due to the Covid-19 pandemic, a "call for action" to implement PBM has been released by a group of experts²².

In Spain, since 2006 we have had a comprehensive set of clinical guidelines on blood transfusion alternatives, known as the Seville Document (currently in its 3rd edition, with a more PBM-centred perspective), which is endorsed by seven important national scientific societies²³.

Despite the known benefits of PBM, and the existence of clinical guidelines and institutional recommendations, it remains challenging to implement PBM effectively across healthcare organisations^{24,25}. The main challenges are: (i) the broad scope of PBM programmes (multidisciplinary, multimodal, and applicable to many clinical procedures), requiring a transversal strategy throughout the organisation and a concerted change-management effort by clinicians, managers, and regulators^{20,21,26}; (ii) the need to implement long-lasting attitudinal changes among healthcare professionals in dealing with blood transfusions during

a hospitalisation²⁷; and (iii) the lack of a widely accepted practical framework to implement, target, and monitor a PBM programme in a given hospital or healthcare organisation, although some general recommendations have been published²⁸.

To address these challenges and improve patients' safety, we developed a maturity assessment model to allow healthcare organisations to measure, benchmark, assess, and communicate the results of their PBM programmes. The model is implemented in Spain as the "Maturity Assessment Model in Patient Blood Management (MAPBM), www.mapbm.org".

In this paper we describe the MAPBM, its benchmarking programme, and the feasibility of implementing it nationwide in 59 hospitals in Spain.

MATERIALS AND METHODS

MAPBM Assessment Model

In 2014, the MAPBM concept was developed by a multi-profession PBM group with experts from different fields (anaesthesiology, haematology, health economics, outcomes research, clinical management, and healthcare information systems). The concept included an assessment model and a strategy for deployment in hospitals.

The assessment model consists of a scorecard that allows a hospital to map its PBM organisation, PBM care delivery pathway, and PBM-related patient outcomes, according to a set of key performance indicators (KPI). Thus, the hospital can baseline its PBM performance, assess it over time, and benchmark itself against other hospitals.

In line with the Donabedian framework, the model considers structure, process and outcomes as the three relevant dimensions of a transformation effort towards fully establishing PBM as the new standard of care^{20,29}, and grades these within a maturity scale matrix. Each dimension consists of the various drivers of a PBM programme, and their corresponding measures and KPI (**Figure 1**). KPI were selected for: (i) their adequacy in measuring the structure, process or outcomes of PBM; (ii) the feasibility of having them supported/measured by information systems; and (iii) sensitivity and relevance.

The MAPBM model includes 70 measures for structure, 14 KPI for process, and 7 KPI for outcomes. Structure measures are qualitative and are obtained using a survey and a structured self-assessment checklist. The KPI for



Figure 1 - Maturity Assessment for Patient Blood Management programme framework and maturity matrix

process and outcomes are quantitative and based on real-life clinical practice data gathered from the hospitals' electronic medical records (EMR).

Structure dimension

The structure dimension is rated by surveying the hospital's clinicians and having selected members of the hospital staff assess their PBM programme's governance and organisation, training and education, and information systems using a questionnaire. It considers eight major drivers: (i) PBM workgroup; (ii) clinical protocols; (iii) healthcare professionals' knowledge; (iv and v) PBM educational programmes for (iv) clinicians and (v) patients; (vi) availability of PBM-related computerised physician order-entry (CPOE) systems for prescribers; (vii) hospital data-reporting capabilities; and (viii) feedback to hospital staff on their PBM practices (**Figure 2**). The full questionnaire is shown in *Online Supplementary*, **Table SI**.

Process dimension

The process dimension is structured in line with standard PBM principles, known as the three pillars: (i) optimising red cell mass; (ii) minimising blood loss and bleeding; and (iii) optimising the physiological reserve of anaemia. Hence, this dimension includes KPI that measure and account for different aspects of optimisation of the patient's condition prior to surgery, consistingly mainly of the detection of pre-operative anaemia and correction of its expected progression; strategies for minimising blood loss during an intervention, such as using different types of anaesthesia or antifibrinolytic agents; and single-unit and restrictive transfusion strategies. Process KPI are listed in **Figure 3** (see *Online Supplementary* **Table SII** for details).

Outcomes dimension

The outcomes dimension consists of: (i) intermediate outcomes, namely RBC transfusion rate, transfusion index, and total transfusion index; and (ii) hard outcomes, namely in-hospital mortality, complications, length of stay, and 30-day related readmissions (**Figure 3**). Outcomes are adjusted for age, sex, and comorbidity. (see *Online Supplementary* **Table SII** for details).

Clinical procedures assessed by the MAPBM

The process and outcomes performance measures are applied to six common procedures in which significant blood loss is anticipated: total knee arthroplasty, total hip arthroplasty, colorectal cancer surgery, cardiac valve surgery, hip fracture, and gastrointestinal bleeding. Within each hospital, all episodes of care with these diagnoses/procedures are captured (ICD-10 codes in *Online Supplementary* **Table SIII**).

MAPBM benchmarking programme

Along with the MAPBM Assessment Model, we established a MAPBM programme to support the enrolment of



Figure 2 - Structure dimensions and drivers

hospitals into a benchmarking and PBM improvement network, and to simultaneously and continuously improve the model.

The programme has been running annually since 2015 and uses a standard data processing and measuring approach. Hospitals voluntarily participate in the programme, which is sponsored by senior management and usually led by a hospital core team, including a PBM clinician, an information systems specialist, and a quality and safety expert.

The implementation plan for the annual hospital benchmarking programme is structured in ten steps (**Table I**).

To assist enrolled hospitals with data files and questionnaires, we developed an online platform with user management features, approval workflows, and data validation algorithms. All data are anonymised and centrally aggregated, and risk-adjustment techniques are applied for benchmarking.

MAPBM data processing validations and risk-adjustments

Participating hospitals are provided with a specifications guideline for preparing their datasets, describing the required variables for the different database domains covered by the MAPBM. Data are reported at the patient level and time stamped, which allows the building of a consistent care pathway across all domains. This longitudinal, episode-level pathway

is the backbone of the various process and outcomes metrics.

The domains covered are: (i) patients' diagnostics, procedures, admissions, discharge status, and basic demographics such as age and sex; (ii) laboratory tests and results related to anaemia and iron deficiency; (iii) RBC transfused (iv) surgical theatre activity, use of cell salvage, antifibrinolytics and type of anaesthesia; and (v) hospital treatments for anaemia and iron deficiency. These domains are provided for inpatient episodes classified under one of the six clinical procedures assessed by the MAPBM, except for domain (i), which is provided for every inpatient captured to allow for analysis of readmissions.

All variables are sourced from each hospital's EMR. Where a hospital's EMR structure does not allow convenient data capture for a specific domain, the hospital may opt for manual data sampling. This is somewhat common in the domain of surgical theatre activity, in which case information is recovered manually from a random sample of surgical charts.

The MAPBM Analytical Platform has two sequential parts: the Validation and Uploading Platform (VP), and the Integrated Analytics Platform (IAP). All information processed by the MAPBM is first de-identified, and patients' data privacy is secured by encryption within the bounds of the contributing hospital, before being uploaded to the VP. Every domain database is manually uploaded by

PROCESS DIMENSIONS	CLIN	ICAL RECOMMENDATIONS	PROCESS KPIs	APPLICABLE FOR	DATA AVAILABILITY ⁽³⁾
	1	Assess preoperative anaemia early enough to implement the appropriated treatment	% of patients with an Hb determination 21-90 days before surgery ⁽¹⁾	В	83 %
	2	Asses preoperative iron metabolism	% of patients with a Ferritin determination 21-90 days before surgery (1)(2)	В	83 %
PILLAR I.	3	Treat preoperative anaemia	% of patients treated preoperatively 7-90 days before surgery	В	75 %
Optimize red cell mass	4	Preoperative anaemia is a contraindication for elective surgery	% of patients with anaemia prior to surgery	В	83 %
	5	Treat periprocedural anaemia	% of patients treated with IV iron during hospital stay	А	85 %
	6	Do not transfuse preoperatively	% of patients with preoperative transfusion	В	98 %
PILLAR II. Minimize blood loss and bleeding	7	Apply regional anaesthesia, whenever possible, to reduce blood loss	% of patients under spinal anaesthesia	c	88 %
	8	Minimize surgical bleeding with antifibrinolytics	% of patients treated with antifibrinolytics perioperatively	В	81 %
	9	Reuse own blood, whenever possible	% of patients with blood recovery systems preoperatively	В	80 %
PILLAR III. Harness and optimize physiological reserve of anaemia	10	Apply restrictive transfusion thresholds	Hb level prior to transfusion	A	81 %
	11	Apply restrictive transfusion thresholds	% of patients transfused with $Hb \ge 8 \text{ g/dl}$	A	81 %
	12	Single-unit red cell transfusions	% of single-unit transfused patients	A	98 %

OUTCOMES DIMENSIONS	OUTCOMES KPIs	APPLICABLE FOR	DATA AVAILABILITY ⁽³⁾
	Transfusion rate	A	98 %
INTERMEDIATE OUTCOMES	Transfusion index	A	98 %
	Total transfusion index	A	98 %
	In-hospital mortality	A	100 %
HARD	Complications	A	100 %
OUTCOMES	Length of stay	A	100 %
	30-day related readmissions	A	100 %



🛞 TKR - Total knee arthroplasty 🛱 THR - Total hip arthroplasty 🟳 CRC - Colorectal cancer surgery 🖏 CAY - Cardiac valve surgery 🦹 HIF - Hip fracture 💫 GIB - Gastrointestinal bleeding

In colorectal cancer resection 14-45 days before surgery
 Ferritin as the determination which is always used in combination with others to assess iron metabolism
 Percentage of hospitals for which KPIs were obtained in sufficient quality from the hospitals' EMR

Figure 3 - Process and Outcome dimensions, drivers and key performance indicators

Period (in quarters)	n.	Hospital ann	ual benchmarking programme steps
Q1	1	Enrolment of new hospitals	New hospitals joining the network are provided with information about the project, research protocol, technical data specifications and sign-off a participation agreement
Q2	2	Start of the annual benchmarking programme	Hospital representatives gather together in an all-hands meeting to kick-off the annual edition
Q3	3	Assessment of the hospital PBM structure	Hospital runs the internal survey to HCP and hospital project team members complete the self-assessment questionnaire about the structural elements of their PBM program
Q3	4	MBDS data extracts for selected procedures in-scope	Selection of all in-patient episodes for the given year
Q3	5	PBM clinical data extracts	Cross-extracts of laboratory, transfusions, surgery theatre and pharmacy data related to in-patient episodes
Q4	6	Benchmarking results	Hospital representatives gather together to analyse and discuss benchmarking results. Results are presented aggregated and anonymised
Q4	7	Hospital scorecard report	Hospital receives a detailed report with their scores for all MAPBM measures, in comparison with the median of the group, and evolution vs prior year
Q1 year2	8	Hospital internal communication and analysis of results	Hospital project team analyses and disseminates the year's results throughout hospital departments
Q1 year2	9	Development of PBM improvement plans	Hospital PBM teams define improvement action plans with support from hospital management
Feedback loop	10	Plan – do – check –act cycles	Deployment of PBM improvement plans and continuous re-assessment with subsequent year's results

Table I - Hospital annual benchmarking programme steps

(*) MBDS (minimum basic data set) contains patient-level data on patients' diagnostics, procedures, admissions, discharge status, and basic demographics such as age and sex

the hospital to the VP, and undergoes a validation process that flags specific warnings to the corresponding hospital team. Once the information is accepted by the IAP, all KPI are calculated in the same way for every hospital, and feed the annual scorecard, which is then returned to the hospital.

While process KPI are calculated irrespective of the population characteristics, outcomes KPI are adjusted to account for differences in risk due to various patients' characteristics, such as age, sex and comorbidities, which are known³⁰ to strongly influence transfusion utilisation, mortality risk, and length of hospital stay. Thus, outcomes are reported to the hospital as the observed standardised ratio vs expected. The expected outcomes are calculated using indirect standardisation in which the main classes are procedure group, age range, sex, and comorbidity groups, based on the Elixhauser index³¹.

MAPBM hospital scorecard

Each participating hospital receives an annual scorecard (see Online Supplementary, **Figure S1** for an example) and a reporting package with its performance for each MAPBM metric, comparison to its score against that of the previous year, and the distribution of anonymised results from all other MAPBM hospitals.

The MAPBM benchmarking programme also conducts an annual hospital ranking to recognise and publicise the results of the best performing hospitals. This ranking is based on a summary index of each hospital's results for the most relevant MAPBM metrics.

RESULTS

MAPBM implementation. Quantitative and qualitative results

In its first 5 years, MAPBM analysed 181,826 episodes in Spanish hospitals, proving the feasibility of sustainably implementing a model to measure and compare clinical PBM practice and outcomes in a network of hospitals. This demonstrates how to (i) define meaningful quantitative process KPI to comprehensively describe PBM clinical practice according to established guidelines; (ii) measure these KPI and outcomes using available information from the hospitals' EMR; (iii) do this in a common way that facilitates benchmarking and ranking; (iv) summarise this information in a hospital scorecard, and (v) scale this model nationwide.

Translating PBM clinical guidelines into Process KPI to measure clinical practice

To measure processes across each of the three PBM pillars, we used KPI for (i) optimisation of patients' condition before surgery, such as the percentage of patients screened for pre-operative anaemia; (ii) strategies to minimise blood loss during interventions, such as the percentage of patients with an indication for and use of antifibrinolytics; and (iii) adequacy of transfusion approaches, such as the percentage of patients transfused with single-unit ordering (**Figure 3**). The definition of these process KPI has proven useful and they have shown the expected statistical correlation with the corresponding intermediate outcomes (Transfusion Index).

Populating KPI with data from the hospitals' EMR

Most MAPBM process and outcomes KPI were obtained in sufficient quality from the hospitals' EMR. Where the required data were not routinely available for each in-patient episode, hospitals performed manual retrospective searches of randomly selected medical records. This strategy was only necessary for two KPI, namely "Patients treated with perioperative antifibrinolytics" and "Use of blood recovery systems".

Facilitating benchmarking results between hospitals

One critical aspect of benchmarking is to work with measures that are generated in the same way for every hospital, allowing direct comparison between hospitals. This is possible in MAPBM because all data were processed centrally, with the same KPI definitions, inclusion criteria and risk-adjustment techniques to adjust for major confounders.

Providing a scorecard of hospital PBM performance

Each hospital's scorecard allows for monitoring of the hospital's annual performance for outcomes, process KPI and structure drivers, and for comparing its observed results against both expected and historic results. The scorecard provides numbers and graphs to facilitate the analysis, and to identify performance gaps and potential for improvement for each clinical procedure. Moreover, the Maturity Matrix adds valuable traceability that allows the hospital to link any improvement in outcomes (e.g. transfusion rate) to specific process KPI, which then can feed into their Plan-Do-Check-Act management paradigm, which otherwise is very challenging in multidimensional environments such as healthcare.

Scaling MAPBM nationwide

MAPBM implementation started in 2015 with the enrolment of eight hospitals, and by the end of 2019 it had reached a total of 59 hospitals. It has also had high recurrence, with 90% of enrolling hospitals continuing to participate during the following year (**Figure 4**). Participation in MAPBM is voluntary, so we did not select specific hospitals to create a nationally representative sample. Nonetheless, the current network covers diverse geographical regions, has a broad distribution of hospital size, and includes public, private, teaching, and non-teaching hospitals, all of which provides a solid picture of the hospital landscape in Spain (**Figure 5**).

DISCUSSION

Since its piloting in 2015, MAPBM has evolved as the standard framework for measuring PBM delivery in Spain, with a growing network of hospitals benchmarking their PBM performance annually. Over the past 5 years, it has helped a large number of hospitals in Spain to map the level of implementation of their PBM programmes and assess the results. As a tool for continuous improvement, it has allowed multi-professional PBM teams to identify gaps in terms of structure and processes in order to optimise outcomes across various populations of patients within hospitals. Benchmarking their performance against that of other hospitals also incentivises improvement throughout the hospital community. A further benefit is



Figure 4 - Maturity Assessment for Patient Blood Management implementation roadmap

BY SIZE	
Small-size general hospital (less than 200 beds)	10
Mid-size general hospital (between 200 - 400 beds)	17
Major-size general hospital (between 400 - 600 beds)	8
Major-size general hospital and at least one reference department ⁽¹⁾ (between 400 - 900 beds)	11
Large hospital with reference specialties (more than 900 beds)	13

⁽¹⁾Reference departments consider: Neurosurgery, Cardiac Surgery, Thoracic Surgery and Transplants.

BY TEACHING SERVICE	
Teaching*	43
Non-teaching	16

BY PUBLICLY FUNDED (NHS) / PRIV	/ATE
Public	55
Private	4





improved communication about PBM issues within and between hospitals, clinical teams and senior management. The growing number and continuous participation of hospitals highlights the increasing commitment of healthcare professionals and organisations in Spain to establishing PBM as a standard of care, and shows that they value the role of MAPBM in achieving this aim. This suggests that the number of participating hospitals that benefit from MAPBM will likely continue to grow, and even some hospitals from outside Spain have shown interest in using the MAPBM to start their own PBM network. In addition to the advantages of MAPBM for hospitals, it also provides information about the national status of Spain's healthcare system in terms of current PBM standards and variability in clinical practice, information that is not readily available from healthcare authorities or institutions.

Previous work in this area

Assessment models and standards are common in health care, and some have even led to accreditation requirements for healthcare organisations. They generally measure the capacity of a given resource (structure) or the use of a best-practice clinical pathway (process), and focus to a lesser extent on clinical measuring and benchmarking. Another increasingly accepted type of standard focuses on measuring outcomes, but does not address the structural and process-related aspects. MAPBM considers all three perspectives –health outcomes, clinical processes and structure– and benchmarks clinical real-life data. We consider this approach an advantage, as it allows one to explain variations in outcomes in relation to changes in the processes and activities that affect them.

In the field of PBM, between-hospital variability is generally assessed using transfusion rate. Few studies have also benchmarked other measures related to the use of PBM techniques^{10, 32}. In 2017, the European Community published recommendations for health authorities and hospitals on how to implement a PBM programme, including a list of surveillance measures and KPI²⁰ However, to our knowledge, there is no established set of KPI to assess PBM performance to date. Despite its limitations, the MAPBM is the first to provide a standard set of PBM KPI that have been effectively implemented and used as a reference by a large network of hospitals.

Limitations of the MAPBM

First, the model and its KPI were initially defined by a small group of experts. To obtain wider consensus, we did not follow a specific methodology (Delphi or similar), but rather held an annual working meeting during which the clinical leaders of participating hospitals discuss and adapt KPI, where appropriate. Second, while the model could have included many more process-related KPI, we chose those that can be feasibly measured from current EMR and structured health data in Spain. Third, we initially validated the link between the process KPI and the transfusion index using only the χ^2 test, although recent rounds of analysis use multivariate regression; we will use this more powerful analysis strategy in future reports from the MAPBM. Fourth, the health outcomes in our model only consider clinical and economic outcomes, but not patient-reported outcomes (PRO) or experience (PRE). However, there is no current PBM evidence that recommends the use of PRO/PRE. Fifth, while our benchmarking methodology includes all risk-adjustments required for proper comparison, it does not account for mixed effects, which would be necessary to distinguish inter-hospital variability due to clinical practice from that due to chance. However, this is becoming less problematic as the volume of hospitals and episodes grows³³.

Challenges we have faced

The main challenge in implementing the MAPBM has been to source patient-level data in the few hospitals without comprehensive EMR systems, even though the selected KPI for the model passed an initial test of data availability for an average hospital in Spain. The data gaps mainly affect outpatient treatments; laboratory values at certain points in the clinical pathway, especially during the interval between pre-operative treatment and admission; laboratory values immediately before a transfusion decision; and where point-of-care devices were not connected to the hospital EMR.

What this will allow us to do in the future

While the MAPBM's main purpose is to assist hospitals in adopting and improving PBM and patients' outcomes, it also creates other opportunities, some of which have already become apparent in these first 5 years. First, MAPBM scores are becoming a reference in Spain for identifying the best PBM-performing hospitals. Second, MAPBM data on current PBM clinical practice is helping healthcare authorities to oversee and audit. Third, the MAPBM's large volume of homogenous PBM measures and outcomes for nearly 60 hospitals and >180,000 episodes to date creates opportunities for research on PBM and patients' safety.

CONCLUSIONS

The MAPBM initiative translates PBM clinical recommendations and best practices, into a set of quantifiable KPI to facilitate hospitals with measuring and benchmarking their PBM clinical pathways and outcomes. Its implementation has proven to be feasible in a large and growing number of hospitals in Spain, providing them with an ongoing scorecard to assess their PBM performance. It is hoped that the MAPBM becomes a useful tool for healthcare organisations to implement PBM programmes and improve patients' safety and outcomes.

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AUTHORSHIP CONTRIBUTIONS

EB and AGC conceived the presented idea. EB, AGC, JV and CI developed the assessment concept model and the implementation programme for hospitals. CI and LG defined and ran the analytical method. EB, McB, MJC and MB clinically validated the model. AH assessed and challenged the concept and findings of this project. All authors discussed the results and contributed to the final manuscript.

DISCLOSURE OF CONFLICTS OF INTEREST

EB reports honoraria for lectures and/or travel support from Vifor Pharma, Sysmex, Takeda, OM Pharma and Zambon outside the submitted work. AGC was a Vifor Pharma employee at the time of starting to draft this manuscript. CI and LG are IQVIA employees. IQVIA was contracted by IMIM (Hospital del Mar Medical Research Institute) to support MAPBM project management, data processing and analytics. JV has nothing to disclose. McB reports having received travel support from Vifor Pharma España S.L. outside the submitted work. MB reports honoraria for lectures and travel support from Vifor Pharma outside the submitted work. MJC reports honoraria for lectures from Baxter, travel support and assistance to meetings from Vifor Pharma and CSL Bhering outside the submitted work.

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APPENDIX 1

*MAPBM Working Group (key hospital leaders' affiliations in order of years of participation and alphabetically)

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ONLINE SUPPLEMENTARY CONTENT

Structure	Structure Drivers		Structure Measures		
Components					
				There is a PBM Workgroup (PBM WG) with a specific mandate to seek for PBM development	
				There is a BBM Champion (crecentrized by the extranization	
				The DBM WG is officially authorized by bosnital management	
	-	PM Workgroup	5	There is a decision-making process in place. PBM WG recommendations are applicable to the organization	
	r	BM WOrkgroup	6	The PBM WG adopts existing national and/or international guidelines and standards to set the local recommendations and clinical	
			7	protocols	
			7	The DBM WG has dedicated time freed up	
			9	The PBM WG has budget resource allocation	
			10	There is a Preoperative anaemia management protocol in place, and it is in line with the national guidelines and standards	
			11	The Preoperative anaemia management protocol is recent/updated	
		Pillar 1.	12	The Preoperative anaemia management protocol is publicly recognized by the organization	
		Optimising red cell mass	13	Required FTEs are allocated to support the execution of the protocol	
Organization			14	Required logistics and patient accessibility is granted to support the execution of the protocol	
&			15	Required biomarkers and therapies are funded to support the execution of the protocol	
Governance			16	There is a Tranexamic protocol in place, and it is in line with the national guidelines and standards	
			1/	The Transvanic protocol is recent/updated	
			10	There is a subtransfusion (prodocation) protocol for high blooding procedurer (Escoliarie, review bio prolocoment atc.)	
	Clinical		20	The Autotransfusion protocol is recent/undated	
	Protocols	Pillar 2.	21	Required logistics and patient accessibility is granted to support the execution of the Autotransfusion protocol	
		Minimising blood loss and	22	There is an Intra-operative autotransfusion protocol (Cell saver)	
		bieeding	23	The Intra-operative autotransfusion protocol is recent/updated	
			24	The Intra-operative protocol is publicly recognized by the organization	
			25	There is a Post-operative autotransfusion protocol (Recuperadores de drenaje)	
			26	The Post-operative autotransfusion protocol is recent/updated	
			27	The Post-operative autotransfusion protocol is publicly recognized by the organization	
		Pillar 3.	28	There is a Transfusion thresholds protocol in place, and it is in line with the national guidelines and standards	
		reserve of anaemia		The Transfusion thresholds protocol is recent/updated	
			31	Do you know if there is a PBM program in your bospital?	
			32	Do you consider alternatives to avoid/minimize transfusion in your daily practice with your patients?	
			33	Are you familiar with the preoperative anaemia management protocol of your hospital?	
	Healthcare professionals' knowledge (hospital internal survey)			Are you familiar with any blood loss minimization protocol of your hospital (i.e. us of antifibrinolytics)	
				Are you familiar with the transfusion protocol (transfusion thresholds) of your hospital?	
			36	Do you consider any other factors than Hb levels for transfusion decision?	
				Do you regularly receive (or have access to) useful information of your transfusion related clinical practice?	
Professionals	ssionals		38	PBM learning courses and/or clinical sessions are regularly offered to specialists involved in transfusion risk Surgery processes	
& Training			39	PBM learning courses and/or clinical sessions are regularly offered to specialists involved in transfusion risk medical processes	
	PBM educatio	onal programs for clinicians	40	PBM learning courses and/or clinical sesions are offered to nurses	
			42	PBM learning courses and/or clinical sesions are offered to GPs	
			43	PBM learnings provide credits and certificates are issued	
				There is a continuous learning system in place with an educational program, attendance registry and individual learning history record	
			45	ID/IDA patients scheduled for surgery receive PBM information	
	PBM educati	onal programs for patients	46	Informational material is made available to patients and patients associations concerning alternatives to transfusion	
			47	There is a PBM/ alternatives to transfusion information consent form	
	PBM related co	omputerized physician order	48	Patient transitision history records are accessible in the patient clinical history	
	ent	ry (CPOE) systems	49 50	CPOE includes a cansidision risk estimation model CPOE supports clinical decision for prescribing transfusion and alternatives	
		Surveillance and monitoring		Automates follow-up of the appropriateness of RBC orders vs recommendations and clinical protocols	
			52	Transfusion rate	
			53	Transfusion index	
			54	Use of single unit	
		Patient-level KPIs (with possibility to compare	55	Use of pharamcological agents (i.e. quantity and doses of i.v. iron, erythopoietic agents, factor concentrates etc.)	
		baseline)	56	Use of cell salvage	
			57	Use of point of care (POC) coagulation testing	
Information	Reporting		58	naemoglobin concentration/naematocrit at nospital admission	
Systems			60	Transfusion related consumables and overhead	
		Activity Based consumptions	61	PBM related consumables (pharmacological agents) and overhead	
			62	In hospital mortality per clinical process, with the possibility to differentiate between transfused and non-transfused	
			63	LOS per clinical process, with the possibility to differentiate between transfused and non-transfused	
		Patient-level outcomes	64	Readmision per clinical process, with the possibility to differentiate between transfused and non-transfused	
			65	Infections per clinical process, with the possibility to differentiate between transfused and non-transfused	
			66	MACE and cerebrovascular event per clinical process, with the possibility to differentiate between transfused and non-transfused	
			67	Surveillance, monitoring and audit on adherence to protocols are periodically performed	
	U	se of Informatio	60 60	consumptions, outcomes and nexts are periodically assessed	
			70	Incentives schemes are set vs defined objectives	

Dimension	Driver	KPI		Numerator	Denominator	Clinical procedures in	
						scope	
		1	% of patients with a Hb determination 21-90 days before surgery (1)	Patients with a Hb determination between 21-90 days before surgery (1)	All patients	TKR, THR, CRC, CAV	
	Pillar 1. Preoperative	2	% of patients with an iron metabolism determination 21-90 days before surgery (1)	Patients with a Ferritin determination 21-90 days before surgery (1)(2)	All patients	TKR, THR, CRC, CAV	
		3	% of patients treated preoperatively 7-90 days before surgery	Patients who are anaemic and have an administration of intravenous iron (FeIV) and/or erythropoietin (EPO) between 90-7 days prior surgery (3)(4)	Anaemic patients between 90-7 days before surgery (4)	TKR, THR, CRC, CAV	
	Anaemia management	4	% of patients with anaemia prior to surgery	Patients who are anaemic as per the last Hb determination between 90 days and 1 hour before surgery (4)	Patients with a Hb determination between 90 days and 1 hour before to surgery	TKR, THR, CRC, CAV	
		5	% of patients treated with IV iron during hospital stay	Patients with a prescription of FelV during hospital stay	All patients	TKR, THR, CRC, CAV, HIF, GIB	
Process		6	% of patients with preoperative transfusion	Patients with a red blood cell transfusion between 21 days and 1 hour before surgery	All patients	TKR, THR, CRC, CAV	
Process		7	% of patients under spinal anaesthesia	Patients with spinal anaesthesia	Patients with informed field	TKR, THR, HIF	
	Pillar 2. Minimising blood loss and bleeding	8	% of patients treated with antifibrinolytics perioperatively	Patients with an administration of antifibrinolytics	Patients with informed field	TKR, THR, CRC, CAV	
		9	% of patients with blood recovery systems perioperatively	Patients for whom blood recovery system was used	Patients with informed field	TKR, THR, CRC, CAV	
		10	Hb level prior to transfusion	Sum of latest Hb value prior transfusion for patients transfused between 1 hour after surgery and discharge	Patients transfused between 1 hour after surgery and discharge and with a Hb determination 1 day prior transfusion	TKR, THR, CRC, CAV, HIF, GIB	
	Pillar 3. Optimising the physiological reserve of anaemia	11	% of patients transfused with Hb >= 8 g/dl	Patients transfused between 1 hour after surgery and discharge and with latest Hb value prior transfusion >= 8 g/dl	Patients transfused between 1 hour after surgery and discharge and with a Hb determination 1 day prior transfusion	TKR, THR, CRC, CAV, HIF, GIB	
		12	% of single-unit transfused patients	Single-unit transfusion events	Total of transfusion events between 1 day after surgery and discharge	TKR, THR, CRC, CAV, HIF, GIB	
		1	Transfusion Rate	Patients with a red blood cell transfusion during hospital stay	All patients	TKR, THR, CRC, CAV, HIF, GIB	
	Intermediate Outcomes	2	Transfusion Index	Total of red blood cell units transfused during hospital stay	Patients with a red blood cell transfusion during hospital stay	TKR, THR, CRC, CAV, HIF, GIB	
		3	Total Transfusion Index	Total of red blood cell units transfused during hospital stay	All patients	TKR, THR, CRC, CAV, HIF, GIB	
Outcomes	\mathbb{C}	4	In-hospital Mortality	Patients with exitus during hospital stay	All patients	TKR, THR, CRC, CAV, HIF, GIB	
	Hard Outcomes	5	Complications	Patients with a PBM-related complications	All patients	TKR, THR, CRC, CAV, HIF, GIB	
	naru outcomes	6	Lenght of stay	Sum of hospital stay days for all patients	All patients	TKR, THR, CRC, CAV, HIF, GIB	
		7	30-day related Readmissions	Patients with unscheduled 30 days related readmission	All patients	TKR, THR, CRC, CAV, HIF, GIB	

Table SII - Definitions of Process and Outcomes KPIs

In colorectal cancer resection 14-45 days before surgery
 Ferritin as the determination which is always used in combination with others to assess iron metabolism
 Only hospital use treatments are considered
 Definition of anaemic patient follows current WHO criteria: Hb <12 for women and 13 g/dL for men.
 :RC: colorectal cancer surgery, CAV: cardiac valve surgery; HIF: hip fracture; GB: gastrointestinal bleeding; TKR: total knee replacement; THR: total hip replacement.

Table SIII - ICD10 Codes

TOTAL KNEE REPLACEMENT (TKR) CODES

Scheduled episodes (Circ. Admission = Scheduled) with knee replacement procedure. Episodes that also have a knee prosthesis removal procedure are excluded (since spare parts are excluded from the analysis).

Knee replacement procedure codes

0SRC0.19 Replace of R Knee Jt with Synth Sub, Cement, Open Approach **OSRCOJA** Replace of R Knee Jt with Synth Sub, Uncement, Open Approach 05RC017 Replacement of R Knee Jt with Synth Sub, Open Approach 0SRC0L9 Replace of R Knee Jt with Med Unicnd, Cement, Open Approach **OSRCOLA** Replace R Knee Jt w Med Unicnd, Uncement, Open **OSRCOLZ** Replacement of R Knee Jt with Med Unicnd, Open Approach 0SRC07Z Replacement of R Knee Jt with Autol Sub, Open Approach **OSRCOKZ** Replacement of R Knee Jt with Nonaut Sub, Open Approach 0SRD0.J9 Replace of L Knee Jt with Synth Sub, Cement, Open Approach **OSRDOJA** Replace of L Knee Jt with Synth Sub, Uncement, Open Approach 0SRD0.17 Replacement of Left Knee Joint with Synth Sub, Open Approach 0SRD0L9 Replace of L Knee Jt with Med Unicnd, Cement, Open Approach **OSRDOLA** Replace L Knee Jt w Med Unicnd, Uncement, Open **OSRDOLZ** Replacement of L Knee Jt with Med Unicnd, Open Approach 0SRD07Z Replacement of Left Knee Joint with Autol Sub, Open Approach **0SRD0KZ** Replacement of L Knee Jt with Nonaut Sub, Open Approach 0SRT0J9 Replace R Knee Jt, Femoral w Synth Sub, Cement, Open **OSRTOJA** Replace R Knee Jt, Femoral w Synth Sub, Uncement, Open **OSRTOJZ** Replace of R Knee Jt, Femoral with Synth Sub, Open Approach 0SRT077 Replace of R Knee Jt, Femoral with Autol Sub, Open Approach 0SRT0K7 Replace of R Knee Jt, Femoral with Nonaut Sub, Open Approach 0SRU0J9 Replace L Knee Jt, Femoral w Synth Sub, Cement, Open **OSRUOJA** Replace L Knee Jt, Femoral w Synth Sub, Uncement, Open 0SRU0JZ Replace of L Knee Jt, Femoral with Synth Sub, Open Approach 0SRU07Z Replace of L Knee Jt, Femoral with Autol Sub, Open Approach 0SRU0KZ Replace of L Knee Jt, Femoral with Nonaut Sub, Open Approach 0SRV0.J9 Replace R Knee Jt, Tibial w Synth Sub, Cement, Open 0SRV0JA Replace R Knee Jt, Tibial w Synth Sub, Uncement, Open **OSRVOJZ** Replace of R Knee Jt, Tibial with Synth Sub, Open Approach 0SRV07Z Replace of R Knee Jt, Tibial with Autol Sub, Open Approach 0SRV0KZ Replace of R Knee Jt, Tibial with Nonaut Sub, Open Approach 0SRW0 19 Replace L Knee Jt, Tibial w Synth Sub, Cement, Open 0SRW0JA Replace L Knee Jt, Tibial w Synth Sub, Uncement, Open **OSRWOJZ** Replace of L Knee Jt, Tibial with Synth Sub, Open Approach 0SRW07Z Replace of L Knee Jt, Tibial with Autol Sub, Open Approach **OSRWOKZ** Replace of L Knee Jt, Tibial with Nonaut Sub, Open Approach

Knee replacement removal procedure codes

0SPC07Z Removal of Autol Sub from R Knee Jt, Open Approach **OSPCOJC** Removal of Synth Sub from R Knee Jt, Patella, Open Approach 0SPC0JZ Removal of Synth Sub from R Knee Jt, Open Approach 0SPC0KZ Removal of Nonaut Sub from R Knee Jt, Open Approach 0SPC37Z Removal of Autol Sub from R Knee Jt, Perc Approach 0SPC3JC Removal of Synth Sub from R Knee Jt, Patella, Perc Approach 0SPC3JZ Removal of Synth Sub from R Knee Jt, Perc Approach 0SPC3KZ Removal of Nonaut Sub from R Knee Jt, Perc Approach 0SPC47Z Removal of Autol Sub from R Knee Jt, Perc Endo Approach 0SPC4JC Remove Synth Sub from R Knee Jt. Patella, Perc Endo Removal of Synth Sub from R Knee Jt, Perc Endo Approach 0SPC4.17 0SPC4K7 Removal of Nonaut Sub from R Knee Jt, Perc Endo Approach 0SPD07Z Removal of Autol Sub from L Knee Jt, Open Approach 0SPD0JC Removal of Synth Sub from L Knee Jt, Patella, Open Approach **OSPDOJZ** Removal of Synth Sub from L Knee Jt, Open Approach 0SPD0K7 Removal of Nonaut Sub from L Knee Jt, Open Approach Removal of Autol Sub from L Knee Jt, Perc Approach 0SPD377 0SPD3JC Removal of Synth Sub from L Knee Jt, Patella, Perc Approach 0SPD3JZ Removal of Synth Sub from L Knee Jt, Perc Approach 0SPD3KZ Removal of Nonaut Sub from L Knee Jt, Perc Approach 0SPD47Z Removal of Autol Sub from L Knee Jt, Perc Endo Approach 0SPD4.IC Remove Synth Sub from L Knee Jt Patella Perc Endo Removal of Synth Sub from L Knee Jt, Perc Endo Approach 0SPD4JZ 0SPD4KZ Removal of Nonaut Sub from L Knee Jt, Perc Endo Approach **OSPTOJZ** Removal of Synth Sub from R Knee Jt, Femoral, Open Approach 0SPT3JZ Removal of Synth Sub from R Knee Jt, Femoral, Perc Approach 0SPT4JZ Remove Synth Sub from R Knee Jt, Femoral, Perc Endo

05PU017 Removal of Synth Sub from L Knee Jt, Femoral, Open Approach 0SPU3JZ Removal of Synth Sub from L Knee Jt, Femoral, Perc Approach 0SPU4JZ Remove Synth Sub from L Knee Jt, Femoral, Perc Endo 0SPV0JZ Removal of Synth Sub from R Knee Jt, Tibial, Open Approach 0SPV3JZ Removal of Synth Sub from R Knee Jt, Tibial, Perc Approach 0SPV4JZ Remove Synth Sub from R Knee Jt. Tibial, Perc Endo 0SPW0JZ Removal of Synth Sub from L Knee Jt, Tibial, Open Approach 0SPW3JZ Removal of Synth Sub from L Knee Jt, Tibial, Perc Approach 0SPW4JZ Remove Synth Sub from L Knee Jt, Tibial, Perc Endo

TOTAL HIP REPLACEMENT (THR) CODES

Scheduled episodes (Circ. Admission = Scheduled) with hip replacement procedure. Episodes that also have hip fracture as primary diagnostic and/or hip prosthesis removal procedure are excluded (since spare parts are excluded from the analysis).

Hip replacement procedure codes

0SR9019 Replacement of R Hip Jt with Metal, Cement, Open Approach 0SR901A Replacement of R Hip Jt with Metal, Uncement, Open Approach 0SR901Z Replacement of Right Hip Joint with Metal, Open Approach 0SR9029 Replace R Hip Jt w Metal on Poly, Cement, Open 0SR902A Replace R Hip Jt w Metal on Poly, Uncement, Open 0SR902Z Replacement of R Hip Jt with Metal on Poly, Open Approach 0SR9039 Replacement of R Hip Jt with Ceramic, Cement, Open Approach 0SR903A Replace of R Hip Jt with Ceramic, Uncement, Open Approach 0SR903Z Replacement of Right Hip Joint with Ceramic, Open Approach Replace R Hip Jt w Ceramic on Poly, Cement, Open 0SR9049 05R904A Replace R Hip Jt w Ceramic on Poly, Uncement, Open 0SR904Z Replacement of R Hip Jt with Ceramic on Poly, Open Approach 0SR90J9 Replace of R Hip Jt with Synth Sub, Cement, Open Approach 0SR90JA Replace of R Hip Jt with Synth Sub, Uncement, Open Approach 0SR90JZ Replacement of Right Hip Joint with Synth Sub, Open Approach 0SR907Z Replacement of Right Hip Joint with Autol Sub, Open Approach 0SR90KZ Replacement of R Hip Jt with Nonaut Sub, Open Approach 0SRB019 Replacement of L Hip Jt with Metal, Cement, Open Approach 0SRB01A Replacement of L Hip Jt with Metal, Uncement, Open Approach 0SRB01Z Replacement of Left Hip Joint with Metal, Open Approach 0SRB029 Replace L Hip Jt w Metal on Poly, Cement, Open Replace L Hip Jt w Metal on Poly, Uncement, Open 0SRB02A 0SRB02Z Replacement of L Hip Jt with Metal on Poly, Open Approach 0SRB039 Replacement of L Hip Jt with Ceramic, Cement, Open Approach 0SRB03A Replace of L Hip Jt with Ceramic, Uncement, Open Approach 0SRB03Z Replacement of Left Hip Joint with Ceramic, Open Approach 0SRB049 Replace L Hip Jt w Ceramic on Poly, Cement, Open 0SRB04A Replace L Hip Jt w Ceramic on Poly, Uncement, Open 0SRB047 Replacement of L Hip Jt with Ceramic on Poly, Open Approach 0SRB0J9 Replace of L Hip Jt with Synth Sub, Cement, Open Approach 0SRB0JA Replace of L Hip Jt with Synth Sub, Uncement, Open Approach 0SRB0JZ Replacement of Left Hip Joint with Synth Sub, Open Approach 0SRB077 Replacement of Left Hip Joint with Autol Sub, Open Approach 0SRB0K7 Replacement of Left Hip Joint with Nonaut Sub, Open Approach 0SRR019 Replace R Hip Jt, Femoral w Metal, Cement, Open 0SRR01A Replace R Hip Jt, Femoral w Metal, Uncement, Open 0SRR01Z Replacement of R Hip Jt, Femoral with Metal, Open Approach Replace R Hip Jt, Femoral w Ceramic, Cement, Open 0SRR039 0SRR03A Replace R Hip Jt, Femoral w Ceramic, Uncement, Open 0SRR03Z Replacement of R Hip Jt, Femoral with Ceramic, Open Approach 0SRR0J9 Replace R Hip Jt, Femoral w Synth Sub, Cement, Open **OSRROJA** Replace R Hip Jt, Femoral w Synth Sub, Uncement, Open **OSRROJZ** Replace of R Hip Jt, Femoral with Synth Sub, Open Approach 0SRS019 Replace L Hip Jt, Femoral w Metal, Cement, Open 0SRS01A Replace L Hip Jt, Femoral w Metal, Uncement, Open 0SRS01Z Replacement of L Hip Jt, Femoral with Metal, Open Approach 0SRS039 Replace L Hip Jt, Femoral w Ceramic, Cement, Open Replace L Hip Jt, Femoral w Ceramic, Uncement, Open 0SRS03A 0SRS03Z Replacement of L Hip Jt, Femoral with Ceramic, Open Approach 0SRS0J9 Replace L Hip Jt, Femoral w Synth Sub, Cement, Open 0SRS0JA Replace L Hip Jt, Femoral w Synth Sub, Uncement, Open 0SRS0JZ Replace of L Hip Jt, Femoral with Synth Sub, Open Approach 0SRA009 Replace R Hip Jt, Acetab w Polyeth, Cement, Open 0SRA00A Replace R Hip Jt, Acetab w Polyeth, Uncement, Open 0SRA00Z Replacement of R Hip Jt, Acetab with Polyeth, Open Approach 0SRA019 Replace R Hip Jt, Acetab w Metal, Cement, Open

0SRA01A	Replace R Hip Jt, Acetab w Metal, Uncement, Open
0SRA01Z	Replacement of R Hip Jt, Acetab with Metal, Open Approach
0SRA039	Replace R Hip Jt, Acetab w Ceramic, Cement, Open
0SRA03A	Replace R Hip Jt, Acetab w Ceramic, Uncement, Open
0SRA03Z	Replacement of R Hip Jt, Acetab with Ceramic, Open Approach
0SRA0J9	Replace R Hip Jt, Acetab w Synth Sub, Cement, Open
0SRA0JA	Replace R Hip Jt, Acetab w Synth Sub, Uncement, Open
0SRA0JZ	Replace of R Hip Jt, Acetab with Synth Sub, Open Approach
0SRA07Z	Replace of R Hip Jt, Acetab with Autol Sub, Open Approach
0SRA0KZ	Replace of R Hip Jt, Acetab with Nonaut Sub, Open Approach
0SRE009	Replace L Hip Jt, Acetab w Polyeth, Cement, Open
0SRE00A	Replace L Hip Jt, Acetab w Polyeth, Uncement, Open
0SRE00Z	Replacement of L Hip Jt, Acetab with Polyeth, Open Approach
0SRE019	Replace L Hip Jt, Acetab w Metal, Cement, Open
0SRE01A	Replace L Hip Jt, Acetab w Metal, Uncement, Open
0SRE01Z	Replacement of L Hip Jt, Acetab with Metal, Open Approach
0SRE039	Replace L Hip Jt, Acetab w Ceramic, Cement, Open
0SRE03A	Replace L Hip Jt, Acetab w Ceramic, Uncement, Open
0SRE03Z	Replacement of L Hip Jt, Acetab with Ceramic, Open Approach
0SRE0J9	Replace L Hip Jt, Acetab w Synth Sub, Cement, Open
0SRE0JA	Replace L Hip Jt, Acetab w Synth Sub, Uncement, Open
0SRE0JZ	Replace of L Hip Jt, Acetab with Synth Sub, Open Approach
0SRE07Z	Replace of L Hip Jt, Acetab with Autol Sub, Open Approach
0SRE0KZ	Replace of L Hip Jt, Acetab with Nonaut Sub, Open Approach

Femur fracture diagnosis codes

Fracture of unsp part of neck of right femur, init S72 001A S72.001B Fx unsp part of neck of r femur, init for opn fx type I/2 \$72.001C Fx unsp part of neck of r femur, init for opn fx type 3A/B/C Fracture of unsp part of neck of left femur, init S72.002A S72.002B Fx unsp part of neck of left femur, init for opn fx type I/2 S72.002C Fx unsp part of neck of l femur, init for opn fx type 3A/B/C Fracture of unsp part of neck of unsp femur, init S72.009A S72.009B Ex unsp part of neck of unsp femur, init for opn fx type I/2 Fx unsp part of nk of unsp femr, init for opn fx type 3A/B/C \$72.009C S72.011A Unsp intracapsular fracture of right femur, init for clos fx S72.011B Unsp intracap fx right femur, init for opn fx type I/2 S72.011C Unsp intracap fx right femur, init for opn fx type 3A/B/C \$72.012A Unsp intracapsular fracture of left femur, init for clos fx Unsp intracap fx left femur, init for opn fx type I/2 S72.012B Unsp intracap fx left femur, init for opn fx type 3A/B/C \$72.012C S72.019A Unsp intracapsular fracture of unsp femur, init for clos fx S72.019B Unsp intracap fx unsp femur, init for opn fx type I/2 S72.019C Unsp intracap fx unsp femur, init for opn fx type 3A/B/C S72.021A Disp fx of epiphysis (separation) (upper) of r femur, init S72.021B Disp fx of epiphy (separation) (upper) of r femr, 7thB Disp fx of epiphy (separation) (upper) of r femr, 7thC S72.021C \$72.022A Disp fx of epiphysis (separation) (upper) of l femur, init S72.022B Disp fx of epiphy (separation) (upper) of l femr, 7thB Disp fx of epiphy (separation) (upper) of l femr, 7thC S72.022C S72.023A Disp fx of epiphy (separation) (upper) of unsp femur, init Disp fx of epiphy (separation) (upper) of unsp femr, 7thB S72 023B Disp fx of epiphy (separation) (upper) of unsp femr, 7thC S72.023C S72.024A Nondisp fx of epiphy (separation) (upper) of r femur, init S72.024B Nondisp fx of epiphy (separation) (upper) of r femr, 7thB \$72.024C Nondisp fx of epiphy (separation) (upper) of r femr, 7thC S72.025A Nondisp fx of epiphy (separation) (upper) of l femur, init S72 025B Nondisp fx of epiphy (separation) (upper) of l femr, 7thB \$72.025C Nondisp fx of epiphy (separation) (upper) of l femr, 7thC S72.026A Nondisp fx of epiphy (separation) (upper) of unsp femr, init S72.026B Nondisp fx of epiphy (separation) (upper) of unsp femr, 7thB \$72.026C Nondisp fx of epiphy (separation) (upper) of unsp femr, 7thC Displaced midcervical fracture of right femur, init \$72.031A \$72.031B Displaced midcervical fx r femur, init for opn fx type I/2 S72.031C Displ midcervical fx r femur, init for opn fx type 3A/B/C S72.032A Displaced midcervical fracture of left femur, init Displaced midcervical fx l femur, init for opn fx type I/2 S72.032B S72.032C Displ midcervical fx l femur, init for opn fx type 3A/B/C S72.033A Displaced midcervical fracture of unsp femur, init Displ midcervical fx unsp femur, init for opn fx type I/2 S72.033B \$72.033C Displ midcervical fx unsp femur, init for opn fx type 3A/B/C S72.034A Nondisplaced midcervical fracture of right femur, init S72.034B Nondisp midcervical fx right femur, init for opn fx type I/2 \$72.034C Nondisp midcervical fx r femur, init for opn fx type 3A/B/C \$72.035A Nondisplaced midcervical fracture of left femur, init

\$72.035B Nondisp midcervical fx left femur, init for opn fx type I/2 S72.035C Nondisp midcervical fx l femur, init for opn fx type 3A/B/C S72.036A Nondisplaced midcervical fracture of unsp femur, init S72.036B Nondisp midcervical fx unsp femur, init for opn fx type I/2 S72.036C Nondisp midcervical fx unsp femr, 7thC Disp fx of base of neck of right femur, init for clos fx S72.041A S72.041B Disp fx of base of neck of r femur, init for opn fx type I/2 S72.041C Disp fx of base of nk of r femr, init for opn fx type 3A/B/C \$72.042A Disp fx of base of neck of left femur, init for clos fx S72.042B Disp fx of base of neck of l femur, init for opn fx type I/2 \$72.042C Disp fx of base of nk of l femr, init for opn fx type 3A/B/C Disp fx of base of neck of unsp femur, init for clos fx S72 043A S72 043B Disp fx of base of nk of unsp femr, init for opn fx type I/2 S72.043C Disp fx of base of nk of unsp femr, 7thC \$72.044A Nondisp fx of base of neck of right femur, init for clos fx S72.044B Nondisp fx of base of nk of r femr, init for opn fx type I/2 S72.044C Nondisp fx of base of nk of r femr. 7thC \$72.045A Nondisp fx of base of neck of left femur, init for clos fx S72.045B Nondisp fx of base of nk of l femr, init for opn fx type I/2 S72.045C Nondisp fx of base of nk of l femr, 7thC \$72.046A Nondisp fx of base of neck of unsp femur, init for clos fx S72.046B Nondisp fx of base of nk of unsp femr, 7thB S72.046C Nondisp fx of base of nk of unsp femr. 7thC \$72.051A Unsp fracture of head of right femur, init for clos fx S72.051B Unsp fx head of right femur, init for opn fx type I/2 S72.051C Unsp fx head of right femur, init for opn fx type 3A/B/C \$72.052A Unsp fracture of head of left femur, init for clos fx S72.052B Unsp fx head of left femur, init for opn fx type I/2 \$72.052C Unsp fx head of left femur, init for opn fx type 3A/B/C \$72.059A Unsp fracture of head of unsp femur, init for clos fx S72.059B Unsp fx head of unsp femur, init for opn fx type I/2 \$72.059C Unsp fx head of unsp femur, init for opn fx type 3A/B/C S72.061A Displaced articular fracture of head of right femur, init S72.061B Displaced artic fx head of r femur, init for opn fx type I/2 \$72.061C Displ artic fx head of r femur, init for opn fx type 3A/B/C S72.062A Displaced articular fracture of head of left femur, init S72.062B Displaced artic fx head of I femur, init for opn fx type I/2 \$72.062C Displ artic fx head of l femur, init for opn fx type 3A/B/C \$72.063A Displaced articular fracture of head of unsp femur, init S72.063B Displ artic fx head of unsp femur, init for opn fx type I/2 S72.063C Displ artic fx head of unsp femr, 7thC S72.064A Nondisplaced articular fracture of head of right femur, init S72.064B Nondisp artic fx head of r femur, init for opn fx type I/2 \$72.064C Nondisp artic fx head of r femr, init for opn fx type 3A/B/C \$72.065A Nondisplaced articular fracture of head of left femur, init S72.065B Nondisp artic fx head of l femur, init for opn fx type I/2 S72.065C Nondisp artic fx head of l femr, init for opn fx type 3A/B/C S72.066A Nondisplaced articular fracture of head of unsp femur, init \$72.066B Nondisp artic fx head of unsp femr, init for opn fx type I/2 \$72.066C Nondisp artic fx head of unsp femr, 7thC \$72.091A Oth fracture of head and neck of right femur, init S72 091B Oth fx head/neck of right femur, init for opn fx type I/2 S72.091C Oth fx head/neck of right femur, init for opn fx type 3A/B/C S72.092A Oth fracture of head and neck of left femur, init S72.092B Oth fx head/neck of left femur, init for opn fx type I/2 S72.092C Oth fx head/neck of left femur, init for opn fx type 3A/B/C S72.099A Oth fracture of head and neck of unsp femur, init S72 099B Oth fx head/neck of unsp femur, init for opn fx type I/2 S72.099C Oth fx head/neck of unsp femur, init for opn fx type 3A/B/C S72.101A Unsp trochanteric fracture of right femur, init for clos fx S72.101B Unsp trochan fx right femur, init for opn fx type I/2 \$72.101C Unsp trochan fx right femur, init for opn fx type 3A/B/C Unsp trochanteric fracture of left femur, init for clos fx S72.102A S72.102B Unsp trochan fx left femur, init for opn fx type I/2 S72.102C Unsp trochan fx left femur, init for opn fx type 3A/B/C \$72.109A Unsp trochanteric fracture of unsp femur, init for clos fx S72.109B Unsp trochan fx unsp femur, init for opn fx type I/2 S72.109C Unsp trochan fx unsp femur, init for opn fx type 3A/B/C S72.111A Disp fx of greater trochanter of right femur, init Disp fx of greater trochanter of r femr, 7thB S72.111B \$72.111C Disp fx of greater trochanter of r femr, 7thC \$72.112A Disp fx of greater trochanter of left femur, init S72.112B Disp fx of greater trochanter of l femr, 7thB S72.112C Disp fx of greater trochanter of I femr. 7thC S72.113A Disp fx of greater trochanter of unsp femur, init

\$72.113C Disp fx of greater trochanter of unsp femr, 7thC S72.114A Nondisp fx of greater trochanter of right femur, init Nondisp fx of greater trochanter of r femr, 7thB S72.114B Nondisp fx of greater trochanter of r femr, 7thC S72.114C Nondisp fx of greater trochanter of left femur, init S72.115A S72 115B Nondisp fx of greater trochanter of l femr, 7thB \$72.115C Nondisp fx of greater trochanter of l femr, 7thC S72.116A Nondisp fx of greater trochanter of unsp femur, init S72.116B Nondisp fx of greater trochanter of unsp femr, 7thB \$72.116C Nondisp fx of greater trochanter of unsp femr, 7thC Disp fx of lesser trochanter of right femur, init S72 121A S72 121B Disp fx of less trochanter of r femr. 7thB S72.121C Disp fx of less trochanter of r femr, 7thC Disp fx of lesser trochanter of left femur, init for clos fx \$72.122A S72.122B Disp fx of less trochanter of l femr, 7thB Disp fx of less trochanter of l femr_7thC S72 122C Disp fx of lesser trochanter of unsp femur, init for clos fx S72 123A S72.123B Disp fx of less trochanter of unsp femr, 7thB S72.123C Disp fx of less trochanter of unsp femr, 7thC \$72.124A Nondisp fx of lesser trochanter of right femur, init S72.124B Nondisp fx of less trochanter of r femr, 7thB Nondisp fx of less trochanter of r femr, 7thC S72 124C \$72.125A Nondisp fx of lesser trochanter of left femur, init S72.125B Nondisp fx of less trochanter of l femr, 7thB S72.125C Nondisp fx of less trochanter of l femr, 7thC Nondisp fx of lesser trochanter of unsp femur, init S72 126A S72.126B Nondisp fx of less trochanter of unsp femr, 7thB \$72.126C Nondisp fx of less trochanter of unsp femr. 7thC \$72.131A Displaced apophyseal fracture of right femur, init S72.131B Displaced apophyseal fx r femur, init for opn fx type I/2 S72.131C Displaced apophyseal fx r femur, init for opn fx type 3A/B/C S72.132A Displaced apophyseal fracture of left femur, init \$72.132B Displaced apophyseal fx left femur, init for opn fx type I/2 \$72.132C Displaced apophyseal fx I femur, init for opn fx type 3A/B/C \$72,133A Displaced apophyseal fracture of unsp femur, init S72.133B Displaced apophyseal fx unsp femur, init for opn fx type I/2 Displ apophyseal fx unsp femur, init for opn fx type 3A/B/C \$72.133C S72.134A Nondisplaced apophyseal fracture of right femur, init Nondisp apophyseal fx right femur, init for opn fx type I/2 \$72.134B \$72.134C Nondisp apophyseal fx r femur, init for opn fx type 3A/B/C S72.135A Nondisplaced apophyseal fracture of left femur, init S72.135B Nondisp apophyseal fx left femur, init for opn fx type I/2 \$72.135C Nondisp apophyseal fx l femur, init for opn fx type 3A/B/C S72.136A Nondisplaced apophyseal fracture of unsp femur, init \$72.136B Nondisp apophyseal fx unsp femur, init for opn fx type I/2 Nondisp apophyseal fx unsp femr, init for opn fx type 3A/B/C S72.136C S72.141A Displaced intertrochanteric fracture of right femur, init S72.141B Displaced intertroch fx r femur, init for opn fx type I/2 S72.141C Displaced intertroch fx r femur, init for opn fx type 3A/B/C Displaced intertrochanteric fracture of left femur, init \$72.142A S72 142B Displaced intertroch fx left femur, init for opn fx type I/2 S72.142C Displaced intertroch fx l femur, init for opn fx type 3A/B/C S72.143A Displaced intertrochanteric fracture of unsp femur, init Displaced intertroch fx unsp femur, init for opn fx type I/2 S72.143B S72.143C Displ intertroch fx unsp femur, init for opn fx type 3A/B/C S72.144A Nondisplaced intertrochanteric fracture of right femur, init S72 144B Nondisp intertroch fx right femur, init for opn fx type ${\rm I}/2$ S72.144C Nondisp intertroch fx r femur, init for opn fx type 3A/B/C S72.145A Nondisplaced intertrochanteric fracture of left femur, init S72.145B Nondisp intertroch fx left femur, init for opn fx type I/2 \$72.145C Nondisp intertroch fx l femur, init for opn fx type 3A/B/C \$72.146A Nondisplaced intertrochanteric fracture of unsp femur, init S72.146B Nondisp intertroch fx unsp femur, init for opn fx type I/2 S72.146C Nondisp intertroch fx unsp femr, init for opn fx type 3A/B/C S72.21XA Displaced subtrochanteric fracture of right femur, init S72.21XB Displaced subtrochnt fx r femur, init for opn fx type I/2 S72.21XC Displaced subtrochnt fx r femur, init for opn fx type 3A/B/C S72.22XA Displaced subtrochanteric fracture of left femur, init S72.22XB Displaced subtrochnt fx left femur, init for opn fx type I/2 \$72.22XC Displaced subtrochnt fx l femur, init for opn fx type 3A/B/C Displaced subtrochanteric fracture of unsp femur, init \$72.23XA S72.23XB Displaced subtrochnt fx unsp femur, init for opn fx type I/2 \$72.23XC Displ subtrochnt fx unsp femur, init for opn fx type 3A/B/C \$72.24XA Nondisplaced subtrochanteric fracture of right femur, init

Disp fx of greater trochanter of unsp femr, 7thB

S72.24XB	Nondisp subtrochnt fx right femur, init for opn fx type I/2
S72.24XC	Nondisp subtrochnt fx r femur, init for opn fx type 3A/B/C
\$72.25XA	Nondisplaced subtrochanteric fracture of left femur, init
S72.25XB	Nondisp subtrochnt fx left femur, init for opn fx type I/2
\$72.25XC	Nondisp subtrochnt fx l femur, init for opn fx type 3A/B/C
\$72.26XA	Nondisplaced subtrochanteric fracture of unsp femur, init
S72.26XB	Nondisp subtrochnt fx unsp femur, init for opn fx type I/2
S72.26XC	Nondisp subtrochnt fx unsp femr, init for opn fx type 3A/B/C
Hip Replac	ement Removal Procedure Codes
0SP907Z	Removal of Autol Sub from R Hip Jt, Open Approach
0SP90BZ	Removal of Resurfacing Device from R Hip Jt, Open Approach
0SP90JZ	Removal of Synthetic Substitute from R Hip Jt, Open Approach
0SP90KZ	Removal of Nonaut Sub from R Hip Jt, Open Approach
0SP937Z	Removal of Autol Sub from R Hip Jt, Perc Approach
0SP93JZ	Removal of Synthetic Substitute from R Hip Jt, Perc Approach
0SP93KZ	Removal of Nonaut Sub from R Hip Jt, Perc Approach
0SP947Z	Removal of Autol Sub from R Hip Jt, Perc Endo Approach
0SP94JZ	Removal of Synth Sub from R Hip Jt, Perc Endo Approach
0SP94KZ	Removal of Nonaut Sub from R Hip Jt, Perc Endo Approach
0SPA0JZ	Removal of Synth Sub from R Hip Jt, Acetab, Open Approach
0SPA3JZ	Removal of Synth Sub from R Hip Jt, Acetab, Perc Approach
0SPA4JZ	Remove Synth Sub from R Hip Jt, Acetab, Perc Endo
0SPB07Z	Removal of Autol Sub from L Hip Jt, Open Approach
0SPB0BZ	Removal of Resurfacing Device from L Hip Jt, Open Approach
0SPB0JZ	Removal of Synthetic Substitute from L Hip Jt, Open Approach
0SPB0KZ	Removal of Nonaut Sub from L Hip Jt, Open Approach
0SPB37Z	Removal of Autol Sub from L Hip Jt, Perc Approach
0SPB3JZ	Removal of Synthetic Substitute from L Hip Jt, Perc Approach
0SPB3KZ	Removal of Nonaut Sub from L Hip Jt, Perc Approach
0SPB47Z	Removal of Autol Sub from L Hip Jt, Perc Endo Approach
0SPB4JZ	Removal of Synth Sub from L Hip Jt, Perc Endo Approach
0SPB4KZ	Removal of Nonaut Sub from L Hip Jt, Perc Endo Approach
0SPE0JZ	Removal of Synth Sub from L Hip Jt, Acetab, Open Approach
0SPE3JZ	Removal of Synth Sub from L Hip Jt, Acetab, Perc Approach
0SPE4JZ	Remove Synth Sub from L Hip Jt, Acetab, Perc Endo
0SPR0JZ	Removal of Synth Sub from R Hip Jt, Femoral, Open Approach
0SPR3JZ	Removal of Synth Sub from R Hip Jt, Femoral, Perc Approach
0SPR4JZ	Remove Synth Sub from R Hip Jt, Femoral, Perc Endo
0SPS0JZ	Removal of Synth Sub from L Hip Jt, Femoral, Open Approach
0SPS3JZ	Removal of Synth Sub from L Hip Jt, Femoral, Perc Approach
0SPS4JZ	Remove Synth Sub from L Hip Jt, Femoral, Perc Endo

OPEN COLORECTAL CANCER SURGERY (CRC)

Scheduled episodes (Circ. Admission = Scheduled) with primary diagnosis of colon and rectal neoplasia and with open colon and rectal procedure. Those episodes that also have a secondary diagnosis of metastasis are excluded.

Colon and rectal neoplasia diagnostic codes

C18.0	Malignant neoplasm of cecum
C18.1	Malignant neoplasm of appendix
C18.2	Malignant neoplasm of ascending colon
C18.3	Malignant neoplasm of hepatic flexure
C18.4	Malignant neoplasm of transverse colon
C18.5	Malignant neoplasm of splenic flexure
C18.6	Malignant neoplasm of descending colon
C18.7	Malignant neoplasm of sigmoid colon
C18.8	Malignant neoplasm of overlapping sites of colon
C18.9	Malignant neoplasm of colon, unspecified
C19	Malignant neoplasm of rectosigmoid junction
C20	Malignant neoplasm of rectum
C21.0	Malignant neoplasm of anus, unspecified
C21.1	Malignant neoplasm of anal canal
C21.2	Malignant neoplasm of cloacogenic zone
C21.8	Malig neoplasm of ovrlp sites of rectum, anus and anal canal
C7A.020	Malignant carcinoid tumor of the appendix
C7A.021	Malignant carcinoid tumor of the cecum
C7A.022	Malignant carcinoid tumor of the ascending colon
C7A.023	Malignant carcinoid tumor of the transverse colon
C7A.024	Malignant carcinoid tumor of the descending colon
C7A.025	Malignant carcinoid tumor of the sigmoid colon
C7A.026	Malignant carcinoid tumor of the rectum
C7A.029	Malignant carcinoid tumor of the lg int, unsp portion

S72 113B

Open color	and rectum procedure codes
0DTE0ZZ	Resection of Large Intestine, Open Approach
0DTF0ZZ	Resection of Right Large Intestine, Open Approach
0DTG0ZZ	Resection of Left Large Intestine, Open Approach
0DTH0ZZ	Resection of Cecum, Open Approach
0DTJ0ZZ	Resection of Appendix, Open Approach
0DTK0ZZ	Resection of Ascending Colon, Open Approach
0DTL0ZZ	Resection of Transverse Colon, Open Approach
0DTM0ZZ	Resection of Descending Colon, Open Approach
0DTN0ZZ	Resection of Sigmoid Colon, Open Approach
0DTP0ZZ	Resection of Rectum, Open Approach
0DTQ0ZZ	Resection of Anus, Open Approach
0DBE0ZZ	Excision of Large Intestine, Open Approach
0DBF0ZZ	Excision of Right Large Intestine, Open Approach
0DBG0ZZ	Excision of Left Large Intestine, Open Approach
0DBH0ZZ	Excision of Cecum, Open Approach
0DBJ0ZZ	Excision of Appendix, Open Approach
0DBK0ZZ	Excision of Ascending Colon, Open Approach
0DBL0ZZ	Excision of Transverse Colon, Open Approach
0DBM0ZZ	Excision of Descending Colon, Open Approach
0DBN0ZZ	Excision of Sigmoid Colon, Open Approach
0DBP0ZZ	Excision of Rectum, Open Approach
0DBQ0ZZ	Excision of Anus, Open Approach

Metastasis diagnostic codes

C77.0 Sec and unsp malig neoplasm of nodes of head, face and neck C77.1 Secondary and unsp malignant neoplasm of intrathorac nodes C77.2 Secondary and unsp malignant neoplasm of intra-abd nodes Sec and unsp malig neoplasm of axilla and upper limb nodes C77.3 C77.4 Sec and unsp malig neoplasm of inguinal and lower limb nodes C77.5 Secondary and unsp malignant neoplasm of intrapelv nodes C77.8 Sec and unsp malig neoplasm of nodes of multiple regions Secondary and unsp malignant neoplasm of lymph node, unsp C77.9 Secondary malignant neoplasm of unspecified lung C78.00 C78.01 Secondary malignant neoplasm of right lung C78.02 Secondary malignant neoplasm of left lung Secondary malignant neoplasm of mediastinum C78.1 C78.2 Secondary malignant neoplasm of pleura Secondary malignant neoplasm of unsp respiratory organ C78.30 Secondary malignant neoplasm of other respiratory organs C78.39 C78.4 Secondary malignant neoplasm of small intestine C78.5 Secondary malignant neoplasm of large intestine and rectum Secondary malignant neoplasm of retroperiton and peritoneum C78.6 C78.7 Secondary malig neoplasm of liver and intrahepatic bile duct Secondary malignant neoplasm of unspecified digestive organ C78.80 C78.89 Secondary malignant neoplasm of other digestive organs C79.00 Secondary malignant neoplasm of unsp kidney and renal pelvis C79.01 Secondary malignant neoplasm of r kidney and renal pelvis Secondary malignant neoplasm of left kidney and renal pelvis C79.02 C79.10 Secondary malignant neoplasm of unspecified urinary organs Secondary malignant neoplasm of bladder C79 11 Secondary malignant neoplasm of other urinary organs C79.19 C79.2 Secondary malignant neoplasm of skin C79.31 Secondary malignant neoplasm of brain Secondary malignant neoplasm of cerebral meninges C79.32 Secondary malignant neoplasm of unsp part of nervous system C79.40 Secondary malignant neoplasm of oth parts of nervous system C79 49 Secondary malignant neoplasm of bone C79.51 C79.52 Secondary malignant neoplasm of bone marrow C79.60 Secondary malignant neoplasm of unspecified ovary C79.61 Secondary malignant neoplasm of right ovary Secondary malignant neoplasm of left ovary C79.62 C79.70 Secondary malignant neoplasm of unspecified adrenal gland C79.71 Secondary malignant neoplasm of right adrenal gland C79.72 Secondary malignant neoplasm of left adrenal gland C79.81 Secondary malignant neoplasm of breast C79.82 Secondary malignant neoplasm of genital organs C79.89 Secondary malignant neoplasm of other specified sites Secondary malignant neoplasm of unspecified site C79.9 C80.0 Disseminated malignant neoplasm, unspecified Malignant (primary) neoplasm, unspecified C80.1 C80.2 Malignant neoplasm associated with transplanted organ C7B.00 Secondary carcinoid tumors, unspecified site C7B.01 Secondary carcinoid tumors of distant lymph nodes

C7B.02	Secondary carcinoid tumors of liver	
C7B.03	Secondary carcinoid tumors of bone	
C7B.04	Secondary carcinoid tumors of peritoneum	
C7B.09	Secondary carcinoid tumors of other sites	
C7B.1	Secondary Merkel cell carcinoma	
C7B.8	Other secondary neuroendocrine tumors	

LAPAROSCOPIC COLORECTAL CANCER SURGERY (CRC)

Scheduled episodes (Circ. Admission = Scheduled) with primary diagnosis of colon and rectal neoplasia and with laparoscopic colon and rectal procedure. Those episodes that also have a secondary diagnosis of metastasis are excluded.

Colon and r	ectal neoplasia diagnostic codes
C18.0	Malignant neoplasm of cecum
C18.1	Malignant neoplasm of appendix
C18.2	Malignant neoplasm of ascending colon
C18.3	Malignant neoplasm of hepatic flexure
C18.4	Malignant neoplasm of transverse colon
C18.5	Malignant neoplasm of splenic flexure
C18.6	Malignant neoplasm of descending colon
C18.7	Malignant neoplasm of sigmoid colon
C18.8	Malignant neoplasm of overlapping sites of colon
C18.9	Malignant neoplasm of colon, unspecified
C19	Malignant neoplasm of rectosigmoid junction
C20	Malignant neoplasm of rectum
C21.0	Malignant neoplasm of anus, unspecified
C21.1	Malignant neoplasm of anal canal
C21.2	Malignant neoplasm of cloacogenic zone
C21.8	Malig neoplasm of ovrlp sites of rectum, anus and anal canal
C7A.020	Malignant carcinoid tumor of the appendix
C7A.021	Malignant carcinoid tumor of the cecum
C7A.022	Malignant carcinoid tumor of the ascending colon
C7A.023	Malignant carcinoid tumor of the transverse colon
C7A.024	Malignant carcinoid tumor of the descending colon
C7A.025	Malignant carcinoid tumor of the sigmoid colon
C7A.026	Malignant carcinoid tumor of the rectum
C7A.029	Malignant carcinoid tumor of the lg int, unsp portion
	5 5 7 11
Laparoscop	vic colon and rectum procedure codes
ODTE4ZZ	Resection of Large Intestine, Perc Endo Approach
0DTE7ZZ	Resection of Large Intestine. Via Opening
0DTE8ZZ	Resection of Large Intestine, Endo
0DTF4ZZ	Resection of Right Large Intestine, Perc Endo Approach
0DTF7ZZ	Resection of Right Large Intestine, Via Opening
0DTF8ZZ	Resection of Right Large Intestine, Endo
0DTG4ZZ	Resection of Left Large Intestine. Perc Endo Approach
0DTG7ZZ	Resection of Left Large Intestine, Via Opening
0DTG8ZZ	Resection of Left Large Intestine. Endo
0DTH4ZZ	Resection of Cecum, Percutaneous Endoscopic Approach
0DTH7ZZ	Resection of Cecum, Via Natural or Artificial Opening
0DTH8ZZ	Resection of Cecum, Endo
0DTJ4ZZ	Resection of Appendix, Percutaneous Endoscopic Approach
0DTJ7ZZ	Resection of Appendix, Via Natural or Artificial Opening
0DTJ8ZZ	Resection of Appendix, Endo
0DTK4ZZ	Resection of Ascending Colon, Perc Endo Approach
0DTK7ZZ	Resection of Ascending Colon, Via Opening
0DTK8ZZ	Resection of Ascending Colon, Endo
0DTL4ZZ	Resection of Transverse Colon, Perc Endo Approach
0DTL7ZZ	Resection of Transverse Colon, Via Opening
0DTL8ZZ	Resection of Transverse Colon, Endo
0DTM4ZZ	Resection of Descending Colon, Perc Endo Approach
0DTM7ZZ	Resection of Descending Colon, Via Opening
0DTM8ZZ	Resection of Descending Colon, Endo
0DTN4ZZ	Resection of Sigmoid Colon, Percutaneous Endoscopic Approach
0DTN7ZZ	Resection of Sigmoid Colon, Via Opening
0DTN8ZZ	Resection of Sigmoid Colon, Endo
0DTP477	Resection of Rectum Percutaneous Endoscopic Approach

- 0DTP7ZZ Resection of Rectum, Via Natural or Artificial Opening
- 0DTP8ZZ Resection of Rectum, Endo
- 0DTQ4ZZ Resection of Anus, Percutaneous Endoscopic Approach
- 0DTQ7ZZ Resection of Anus, Via Natural or Artificial Opening
 - 0DTQ8ZZ Resection of Anus, Endo
 - 0DBE3ZZ Excision of Large Intestine, Percutaneous Approach

0DBE4ZZ	Excision of Large Intestine, Perc Endo Approach
0DBE7ZZ	Excision of Large Intestine, Via Opening
0DBE8ZZ	Excision of Large Intestine, Endo
0DBF3ZZ	Excision of Right Large Intestine, Percutaneous Approach
0DBF4ZZ	Excision of Right Large Intestine, Perc Endo Approach
0DBF7ZZ	Excision of Right Large Intestine, Via Opening
0DBF8ZZ	Excision of Right Large Intestine, Endo
0DBG3ZZ	Excision of Left Large Intestine, Percutaneous Approach
0DBG4ZZ	Excision of Left Large Intestine, Perc Endo Approach
0DBG7ZZ	Excision of Left Large Intestine, Via Opening
0DBG8ZZ	Excision of Left Large Intestine, Endo
0DBH3ZZ	Excision of Cecum, Percutaneous Approach
0DBH4ZZ	Excision of Cecum, Percutaneous Endoscopic Approach
0DBH7ZZ	Excision of Cecum, Via Natural or Artificial Opening
0DBH8ZZ	Excision of Cecum, Endo
0DBJ3ZZ	Excision of Appendix, Percutaneous Approach
0DBJ4ZZ	Excision of Appendix, Percutaneous Endoscopic Approach
0DBJ7ZZ	Excision of Appendix, Via Natural or Artificial Opening
0DBJ8ZZ	Excision of Appendix, Endo
0DBK3ZZ	Excision of Ascending Colon, Percutaneous Approach
0DBK4ZZ	Excision of Ascending Colon, Perc Endo Approach
0DBK7ZZ	Excision of Ascending Colon, Via Opening
0DBK8ZZ	Excision of Ascending Colon, Endo
0DBL3ZZ	Excision of Transverse Colon, Percutaneous Approach
0DBL4ZZ	Excision of Transverse Colon, Perc Endo Approach
0DBL7ZZ	Excision of Transverse Colon, Via Opening
0DBL8ZZ	Excision of Transverse Colon, Endo
0DBM3ZZ	Excision of Descending Colon, Percutaneous Approach
0DBM4ZZ	Excision of Descending Colon, Perc Endo Approach
0DBM7ZZ	Excision of Descending Colon, Via Opening
0DBM8ZZ	Excision of Descending Colon, Endo
0DBN3ZZ	Excision of Sigmoid Colon, Percutaneous Approach
0DBN4ZZ	Excision of Sigmoid Colon, Percutaneous Endoscopic Approach
0DBN7ZZ	Excision of Sigmoid Colon, Via Natural or Artificial Opening
0DBN8ZZ	Excision of Sigmoid Colon, Endo
0DBP3ZZ	Excision of Rectum, Percutaneous Approach
0DBP4ZZ	Excision of Rectum, Percutaneous Endoscopic Approach
0DBP7ZZ	Excision of Rectum, Via Natural or Artificial Opening
0DBP8ZZ	Excision of Rectum, Endo
0DBQ3ZZ	Excision of Anus, Percutaneous Approach
0DBQ4ZZ	Excision of Anus, Percutaneous Endoscopic Approach
0DBQ7ZZ	Excision of Anus, Via Natural or Artificial Opening
0DBQ8ZZ	Excision of Anus, Endo

Metastasis diagnostic codes

C77.0	Sec and unsp malig neoplasm of nodes of head, face and neck
C77.1	Secondary and unsp malignant neoplasm of intrathorac nodes
C77.2	Secondary and unsp malignant neoplasm of intra-abd nodes
C77.3	Sec and unsp malig neoplasm of axilla and upper limb nodes
C77.4	Sec and unsp malig neoplasm of inguinal and lower limb nodes
C77.5	Secondary and unsp malignant neoplasm of intrapelv nodes
C77.8	Sec and unsp malig neoplasm of nodes of multiple regions
C77.9	Secondary and unsp malignant neoplasm of lymph node, unsp
C78.00	Secondary malignant neoplasm of unspecified lung
C78.01	Secondary malignant neoplasm of right lung
C78.02	Secondary malignant neoplasm of left lung
C78.1	Secondary malignant neoplasm of mediastinum
C78.2	Secondary malignant neoplasm of pleura
C78.30	Secondary malignant neoplasm of unsp respiratory organ
C78.39	Secondary malignant neoplasm of other respiratory organs
C78.4	Secondary malignant neoplasm of small intestine
C78.5	Secondary malignant neoplasm of large intestine and rectum
C78.6	Secondary malignant neoplasm of retroperiton and peritoneum
C78.7	Secondary malig neoplasm of liver and intrahepatic bile duct
C78.80	Secondary malignant neoplasm of unspecified digestive organ
C78.89	Secondary malignant neoplasm of other digestive organs
C79.00	Secondary malignant neoplasm of unsp kidney and renal pelvis
C79.01	Secondary malignant neoplasm of r kidney and renal pelvis
C79.02	Secondary malignant neoplasm of left kidney and renal pelvis
C79.10	Secondary malignant neoplasm of unspecified urinary organs
C79.11	Secondary malignant neoplasm of bladder
C79.19	Secondary malignant neoplasm of other urinary organs
C79.2	Secondary malignant neoplasm of skin
C79.31	Secondary malignant neoplasm of brain
C79.32	Secondary malignant neoplasm of cerebral meninges

C79.40	Secondary malignant neoplasm of unsp part of nervous system
C79.49	Secondary malignant neoplasm of oth parts of nervous system
C79.51	Secondary malignant neoplasm of bone
C79.52	Secondary malignant neoplasm of bone marrow
C79.60	Secondary malignant neoplasm of unspecified ovary
C79.61	Secondary malignant neoplasm of right ovary
C79.62	Secondary malignant neoplasm of left ovary
C79.70	Secondary malignant neoplasm of unspecified adrenal gland
C79.71	Secondary malignant neoplasm of right adrenal gland
C79.72	Secondary malignant neoplasm of left adrenal gland
C79.81	Secondary malignant neoplasm of breast
C79.82	Secondary malignant neoplasm of genital organs
C79.89	Secondary malignant neoplasm of other specified sites
C79.9	Secondary malignant neoplasm of unspecified site
C80.0	Disseminated malignant neoplasm, unspecified
C80.1	Malignant (primary) neoplasm, unspecified
C80.2	Malignant neoplasm associated with transplanted organ
C7B.00	Secondary carcinoid tumors, unspecified site
C7B.01	Secondary carcinoid tumors of distant lymph nodes
C7B.02	Secondary carcinoid tumors of liver
C7B.03	Secondary carcinoid tumors of bone
C7B.04	Secondary carcinoid tumors of peritoneum
C7B.09	Secondary carcinoid tumors of other sites
C7B.1	Secondary Merkel cell carcinoma
C7B.8	Other secondary neuroendocrine tumors

CARDIAC VALVE SURGERY

Scheduled episodes (Circ, Admission = Scheduled) with open surgery. Episodes that also have a heart transplant or bypass procedure are excluded.

Cardiac valve procedure codes (open surgery)

02QF0ZJ	Repair Aortic Valve created from Trunc Vlv, Open Approach
02QF0ZZ	Repair Aortic Valve, Open Approach
02QG0ZE	Repair Mitral Valve created from L AV Vlv, Open Approach
02QG0ZZ	Repair Mitral Valve, Open Approach
02QH0ZZ	Repair Pulmonary Valve, Open Approach
02QJ0ZG	Repair Tricuspid Valve created from R AV Vlv, Open Approach
02QJ0ZZ	Repair Tricuspid Valve, Open Approach
02RF07Z	Replacement of Aortic Valve with Autol Sub, Open Approach
02RF08Z	Replacement of Aortic Valve with Zooplastic, Open Approach
02RF0JZ	Replacement of Aortic Valve with Synth Sub, Open Approach
02RF0KZ	Replacement of Aortic Valve with Nonaut Sub, Open Approach
02RG07Z	Replacement of Mitral Valve with Autol Sub, Open Approach
02RG08Z	Replacement of Mitral Valve with Zooplastic, Open Approach
02RG0JZ	Replacement of Mitral Valve with Synth Sub, Open Approach
02RG0KZ	Replacement of Mitral Valve with Nonaut Sub, Open Approach
02RH07Z	Replacement of Pulmonary Valve with Autol Sub, Open Approach
02RH08Z	Replacement of Pulm Valve with Zooplastic, Open Approach
02RH0JZ	Replacement of Pulmonary Valve with Synth Sub, Open Approach
02RH0KZ	Replacement of Pulm Valve with Nonaut Sub, Open Approach
02RJ07Z	Replacement of Tricuspid Valve with Autol Sub, Open Approach
02RJ08Z	Replacement of Tricusp Valve with Zooplastic, Open Approach
02RJ0JZ	Replacement of Tricuspid Valve with Synth Sub, Open Approach
02RJ0KZ	Replacement of Tricusp Valve with Nonaut Sub, Open Approach

Heart transplant procedure codes

02YA0Z0	Transplantation of Heart, Allogeneic, Open Approach
02YA0Z1	Transplantation of Heart, Syngeneic, Open Approach
02YA0Z2	Transplantation of Heart, Zooplastic, Open Approach

Bypass procedure codes

0210083 Bypass 1 Cor Art from Cor Art with Zooplastic, Open Approach 0210088 Bypass 1 Cor Art from R Int Mammary w Zooplastic, Open 0210089 Bypass 1 Cor Art from L Int Mammary w Zooplastic, Open 021008C Bypass 1 Cor Art from Thor Art w Zooplastic, Open 021008F Bypass 1 Cor Art from Abd Art with Zooplastic, Open Approach 021008W Bypass 1 Cor Art from Aorta with Zooplastic, Open Approach Bypass 1 Cor Art from Cor Art with Autol Vn, Open Approach 0210093 0210098 Bypass 1 Cor Art from R Int Mammary w Autol Vn, Open 0210099 Bypass 1 Cor Art from L Int Mammary w Autol Vn, Open 021009C Bypass 1 Cor Art from Thor Art with Autol Vn, Open Approach Bypass 1 Cor Art from Abd Art with Autol Vn, Open Approach 021009F 021009W Bypass 1 Cor Art from Aorta with Autol Vn, Open Approach

Bypass 1 Cor Art from Cor Art with Autol Art, Open Approach 02100A3 02100A8 Bypass 1 Cor Art from R Int Mammary w Autol Art, Open 02100A9 Bypass 1 Cor Art from L Int Mammary w Autol Art, Open 02100AC Bypass 1 Cor Art from Thor Art with Autol Art, Open Approach 02100AF Bypass 1 Cor Art from Abd Art with Autol Art, Open Approach 02100AW Bypass 1 Cor Art from Aorta with Autol Art, Open Approach 02100.13 Bypass 1 Cor Art from Cor Art with Synth Sub, Open Approach 02100J8 Bypass 1 Cor Art from R Int Mammary w Synth Sub, Open 02100J9 Bypass 1 Cor Art from L Int Mammary w Synth Sub, Open 02100JC Bypass 1 Cor Art from Thor Art with Synth Sub, Open Approach 02100JF Bypass 1 Cor Art from Abd Art with Synth Sub, Open Approach 02100JW Bypass 1 Cor Art from Aorta with Synth Sub, Open Approach 02100K3 Bypass 1 Cor Art from Cor Art with Nonaut Sub, Open Approach 02100K8 Bypass 1 Cor Art from R Int Mammary w Nonaut Sub, Open 02100K9 Bypass 1 Cor Art from L Int Mammary w Nonaut Sub, Open 02100KC Bypass 1 Cor Art from Thor Art w Nonaut Sub, Open 02100KF Bypass 1 Cor Art from Abd Art with Nonaut Sub, Open Approach 02100KW Bypass 1 Cor Art from Aorta with Nonaut Sub, Open Approach 0210073 Bypass 1 Cor Art from Cor Art, Open Approach 02100Z8 Bypass 1 Cor Art from R Int Mammary, Open Approach 02100Z9 Bypass 1 Cor Art from L Int Mammary, Open Approach 02100ZC Bypass 1 Cor Art from Thor Art, Open Approach Bypass 1 Cor Art from Abd Art, Open Approach 02100ZF 0210344 Bypass 1 Cor Art from Cor V w Drug-elut Intra, Perc 02103D4 Bypass 1 Cor Art from Cor V with Intralum Dev, Perc Approach 0210444 Bypass 1 Cor Art from Cor V w Drug-elut Intra, Perc Endo 0210483 Bypass 1 Cor Art from Cor Art w Zooplastic, Perc Endo 0210488 Bypass 1 Cor Art from R Int Mammary w Zooplastic, Perc Endo Bypass 1 Cor Art from L Int Mammary w Zooplastic, Perc Endo 0210489 021048C Bypass 1 Cor Art from Thor Art w Zooplastic, Perc Endo 021048F Bypass 1 Cor Art from Abd Art w Zooplastic, Perc Endo Bypass 1 Cor Art from Aorta w Zooplastic, Perc Endo 021048W 0210493 Bypass 1 Cor Art from Cor Art w Autol Vn, Perc Endo 0210498 Bypass 1 Cor Art from R Int Mammary w Autol Vn, Perc Endo 0210499 Bypass 1 Cor Art from L Int Mammary w Autol Vn. Perc Endo 021049C Bypass 1 Cor Art from Thor Art w Autol Vn, Perc Endo 021049F Bypass 1 Cor Art from Abd Art w Autol Vn, Perc Endo 021049W Bypass 1 Cor Art from Aorta w Autol Vn, Perc Endo 02104A3 Bypass 1 Cor Art from Cor Art w Autol Art, Perc Endo 02104A8 Bypass 1 Cor Art from R Int Mammary w Autol Art, Perc Endo 02104A9 Bypass 1 Cor Art from L Int Mammary w Autol Art, Perc Endo 02104AC Bypass 1 Cor Art from Thor Art w Autol Art, Perc Endo 02104AF Bypass 1 Cor Art from Abd Art w Autol Art, Perc Endo 02104AW Bypass 1 Cor Art from Aorta w Autol Art, Perc Endo 02104D4 Bypass 1 Cor Art from Cor V w Intralum Dev, Perc Endo 02104J3 Bypass 1 Cor Art from Cor Art w Synth Sub, Perc Endo 02104J8 Bypass 1 Cor Art from R Int Mammary w Synth Sub, Perc Endo 02104J9 Bypass 1 Cor Art from L Int Mammary w Synth Sub, Perc Endo 02104JC Bypass 1 Cor Art from Thor Art w Synth Sub, Perc Endo 02104JF Bypass 1 Cor Art from Abd Art w Synth Sub, Perc Endo 02104JW Bypass 1 Cor Art from Aorta w Synth Sub, Perc Endo 02104K3 Bypass 1 Cor Art from Cor Art w Nonaut Sub, Perc Endo 02104K8 Bypass 1 Cor Art from R Int Mammary w Nonaut Sub, Perc Endo 02104K9 Bypass 1 Cor Art from L Int Mammary w Nonaut Sub, Perc Endo 02104KC Bypass 1 Cor Art from Thor Art w Nonaut Sub, Perc Endo 02104KF Bypass 1 Cor Art from Abd Art w Nonaut Sub, Perc Endo 02104KW Bypass 1 Cor Art from Aorta w Nonaut Sub, Perc Endo 0210473 Bypass 1 Cor Art from Cor Art, Perc Endo Approach 02104Z8 Bypass 1 Cor Art from R Int Mammary, Perc Endo Approach 02104Z9 Bypass 1 Cor Art from L Int Mammary, Perc Endo Approach 02104ZC Bypass 1 Cor Art from Thor Art, Perc Endo Approach 02104ZF Bypass 1 Cor Art from Abd Art, Perc Endo Approach 0211083 Bypass 2 Cor Art from Cor Art with Zooplastic, Open Approach 0211088 Bypass 2 Cor Art from R Int Mammary w Zooplastic, Open 0211089 Bypass 2 Cor Art from L Int Mammary w Zooplastic, Open 021108C Bypass 2 Cor Art from Thor Art w Zooplastic, Open 021108F Bypass 2 Cor Art from Abd Art with Zooplastic, Open Approach 021108W Bypass 2 Cor Art from Aorta with Zooplastic, Open Approach 0211093 Bypass 2 Cor Art from Cor Art with Autol Vn, Open Approach 0211098 Bypass 2 Cor Art from R Int Mammary w Autol Vn, Open 0211099 Bypass 2 Cor Art from L Int Mammary w Autol Vn, Open 021109C Bypass 2 Cor Art from Thor Art with Autol Vn, Open Approach 021109F Bypass 2 Cor Art from Abd Art with Autol Vn, Open Approach 021109W Bypass 2 Cor Art from Aorta with Autol Vn, Open Approach 02110A3 Bypass 2 Cor Art from Cor Art with Autol Art, Open Approach

0211048 Bypass 2 Cor Art from R Int Mammary w Autol Art, Open 02110A9 Bypass 2 Cor Art from L Int Mammary w Autol Art, Open 02110AC Bypass 2 Cor Art from Thor Art with Autol Art, Open Approach 02110AF Bypass 2 Cor Art from Abd Art with Autol Art, Open Approach 02110AW Bypass 2 Cor Art from Aorta with Autol Art, Open Approach Bypass 2 Cor Art from Cor Art with Synth Sub, Open Approach 02110.J3 02110.18 Bypass 2 Cor Art from R Int Mammary w Synth Sub, Open 02110J9 Bypass 2 Cor Art from L Int Mammary w Synth Sub, Open 02110JC Bypass 2 Cor Art from Thor Art with Synth Sub, Open Approach 02110JF Bypass 2 Cor Art from Abd Art with Synth Sub, Open Approach 02110JW Bypass 2 Cor Art from Aorta with Synth Sub, Open Approach 02110K3 Bypass 2 Cor Art from Cor Art with Nonaut Sub, Open Approach 02110K8 Bypass 2 Cor Art from R Int Mammary w Nonaut Sub, Open 02110K9 Bypass 2 Cor Art from L Int Mammary w Nonaut Sub, Open 02110KC Bypass 2 Cor Art from Thor Art w Nonaut Sub, Open 02110KF Bypass 2 Cor Art from Abd Art with Nonaut Sub, Open Approach 02110KW Bypass 2 Cor Art from Aorta with Nonaut Sub, Open Approach 0211073 Bypass 2 Cor Art from Cor Art, Open Approach 02110Z8 Bypass 2 Cor Art from R Int Mammary, Open Approach 02110Z9 Bypass 2 Cor Art from L Int Mammary, Open Approach 02110ZC Bypass 2 Cor Art from Thor Art, Open Approach 02110ZF Bypass 2 Cor Art from Abd Art, Open Approach 0211344 Bypass 2 Cor Art from Cor V w Drug-elut Intra, Perc 02113D4 Bypass 2 Cor Art from Cor V with Intralum Dev, Perc Approach 0211444 Bypass 2 Cor Art from Cor V w Drug-elut Intra, Perc Endo 0211483 Bypass 2 Cor Art from Cor Art w Zooplastic, Perc Endo 0211488 Bypass 2 Cor Art from R Int Mammary w Zooplastic, Perc Endo 0211489 Bypass 2 Cor Art from L Int Mammary w Zooplastic, Perc Endo Bypass 2 Cor Art from Thor Art w Zooplastic, Perc Endo 021148C 021148F Bypass 2 Cor Art from Abd Art w Zooplastic, Perc Endo 021148W Bypass 2 Cor Art from Aorta w Zooplastic, Perc Endo 0211493 Bypass 2 Cor Art from Cor Art w Autol Vn, Perc Endo Bypass 2 Cor Art from R Int Mammary w Autol Vn, Perc Endo 0211498 0211499 Bypass 2 Cor Art from L Int Mammary w Autol Vn, Perc Endo 021149C Bypass 2 Cor Art from Thor Art w Autol Vn. Perc Endo 021149E Bypass 2 Cor Art from Abd Art w Autol Vn, Perc Endo 021149W Bypass 2 Cor Art from Aorta w Autol Vn, Perc Endo 02114A3 Bypass 2 Cor Art from Cor Art w Autol Art, Perc Endo 02114A8 Bypass 2 Cor Art from R Int Mammary w Autol Art, Perc Endo 02114A9 Bypass 2 Cor Art from L Int Mammary w Autol Art, Perc Endo 02114AC Bypass 2 Cor Art from Thor Art w Autol Art, Perc Endo 02114AF Bypass 2 Cor Art from Abd Art w Autol Art, Perc Endo 02114AW Bypass 2 Cor Art from Aorta w Autol Art, Perc Endo 02114D4 Bypass 2 Cor Art from Cor V w Intralum Dev, Perc Endo 02114J3 Bypass 2 Cor Art from Cor Art w Synth Sub, Perc Endo 02114J8 Bypass 2 Cor Art from R Int Mammary w Synth Sub, Perc Endo 02114J9 Bypass 2 Cor Art from L Int Mammary w Synth Sub, Perc Endo 02114JC Bypass 2 Cor Art from Thor Art w Synth Sub, Perc Endo 02114JF Bypass 2 Cor Art from Abd Art w Synth Sub, Perc Endo 02114JW Bypass 2 Cor Art from Aorta w Synth Sub, Perc Endo 02114K3 Bypass 2 Cor Art from Cor Art w Nonaut Sub, Perc Endo 02114K8 Bypass 2 Cor Art from R Int Mammary w Nonaut Sub, Perc Endo 02114K9 Bypass 2 Cor Art from L Int Mammary w Nonaut Sub, Perc Endo 02114KC Bypass 2 Cor Art from Thor Art w Nonaut Sub, Perc Endo 02114KF Bypass 2 Cor Art from Abd Art w Nonaut Sub, Perc Endo 02114KW Bypass 2 Cor Art from Aorta w Nonaut Sub, Perc Endo 02114Z3 Bypass 2 Cor Art from Cor Art, Perc Endo Approach 0211478 Bypass 2 Cor Art from R Int Mammary, Perc Endo Approach 02114Z9 Bypass 2 Cor Art from L Int Mammary, Perc Endo Approach 02114ZC Bypass 2 Cor Art from Thor Art, Perc Endo Approach 02114ZF Bypass 2 Cor Art from Abd Art, Perc Endo Approach 0212083 Bypass 3 Cor Art from Cor Art with Zooplastic, Open Approach 0212088 Bypass 3 Cor Art from R Int Mammary w Zooplastic, Open 0212089 Bypass 3 Cor Art from L Int Mammary w Zooplastic, Open 021208C Bypass 3 Cor Art from Thor Art w Zooplastic, Open 021208F Bypass 3 Cor Art from Abd Art with Zooplastic, Open Approach 021208W Bypass 3 Cor Art from Aorta with Zooplastic, Open Approach 0212093 Bypass 3 Cor Art from Cor Art with Autol Vn, Open Approach 0212098 Bypass 3 Cor Art from R Int Mammary w Autol Vn, Open 0212099 Bypass 3 Cor Art from L Int Mammary w Autol Vn, Open 021209C Bypass 3 Cor Art from Thor Art with Autol Vn, Open Approach 021209F Bypass 3 Cor Art from Abd Art with Autol Vn, Open Approach 021209W Bypass 3 Cor Art from Aorta with Autol Vn, Open Approach 02120A3 Bypass 3 Cor Art from Cor Art with Autol Art, Open Approach 02120A8 Bypass 3 Cor Art from R Int Mammary w Autol Art, Open

0212049 Bypass 3 Cor Art from L Int Mammary w Autol Art, Open 02120AC Bypass 3 Cor Art from Thor Art with Autol Art, Open Approach 02120AF Bypass 3 Cor Art from Abd Art with Autol Art, Open Approach 02120AW Bypass 3 Cor Art from Aorta with Autol Art, Open Approach 02120J3 Bypass 3 Cor Art from Cor Art with Synth Sub, Open Approach Bypass 3 Cor Art from R Int Mammary w Synth Sub, Open 02120, J8 02120.19 Bypass 3 Cor Art from L Int Mammary w Synth Sub, Open 02120JC Bypass 3 Cor Art from Thor Art with Synth Sub, Open Approach 02120JF Bypass 3 Cor Art from Abd Art with Synth Sub, Open Approach 02120JW Bypass 3 Cor Art from Aorta with Synth Sub, Open Approach 02120K3 Bypass 3 Cor Art from Cor Art with Nonaut Sub, Open Approach 02120K8 Bypass 3 Cor Art from R Int Mammary w Nonaut Sub, Open 02120K9 Bypass 3 Cor Art from L Int Mammary w Nonaut Sub, Open 02120KC Bypass 3 Cor Art from Thor Art w Nonaut Sub, Open 02120KF Bypass 3 Cor Art from Abd Art with Nonaut Sub, Open Approach 02120KW Bypass 3 Cor Art from Aorta with Nonaut Sub, Open Approach 0212073 Bypass 3 Cor Art from Cor Art Open Approach 0212078 Bypass 3 Cor Art from R Int Mammary, Open Approach 02120Z9 Bypass 3 Cor Art from L Int Mammary, Open Approach 02120ZC Bypass 3 Cor Art from Thor Art, Open Approach 02120ZF Bypass 3 Cor Art from Abd Art, Open Approach 0212344 Bypass 3 Cor Art from Cor V w Drug-elut Intra, Perc 02123D4 Bypass 3 Cor Art from Cor V with Intralum Dev. Perc Approach 0212444 Bypass 3 Cor Art from Cor V w Drug-elut Intra, Perc Endo 0212483 Bypass 3 Cor Art from Cor Art w Zooplastic, Perc Endo 0212488 Bypass 3 Cor Art from R Int Mammary w Zooplastic, Perc Endo 0212489 Bypass 3 Cor Art from L Int Mammary w Zooplastic, Perc Endo 021248C Bypass 3 Cor Art from Thor Art w Zooplastic, Perc Endo 021248F Bypass 3 Cor Art from Abd Art w Zooplastic, Perc Endo 021248W Bypass 3 Cor Art from Aorta w Zooplastic, Perc Endo 0212493 Bypass 3 Cor Art from Cor Art w Autol Vn, Perc Endo Bypass 3 Cor Art from R Int Mammary w Autol Vn, Perc Endo 0212498 0212499 Bypass 3 Cor Art from L Int Mammary w Autol Vn, Perc Endo 021249C Bypass 3 Cor Art from Thor Art w Autol Vn. Perc Endo 021249F Bypass 3 Cor Art from Abd Art w Autol Vn. Perc Endo 021249W Bypass 3 Cor Art from Aorta w Autol Vn, Perc Endo 02124A3 Bypass 3 Cor Art from Cor Art w Autol Art, Perc Endo Bypass 3 Cor Art from R Int Mammary w Autol Art, Perc Endo 02124A8 02124A9 Bypass 3 Cor Art from L Int Mammary w Autol Art, Perc Endo 02124AC Bypass 3 Cor Art from Thor Art w Autol Art, Perc Endo Bypass 3 Cor Art from Abd Art w Autol Art, Perc Endo 02124AF 02124AW Bypass 3 Cor Art from Aorta w Autol Art, Perc Endo 02124D4 Bypass 3 Cor Art from Cor V w Intralum Dev, Perc Endo 02124J3 Bypass 3 Cor Art from Cor Art w Synth Sub, Perc Endo 02124J8 Bypass 3 Cor Art from R Int Mammary w Synth Sub, Perc Endo Bypass 3 Cor Art from L Int Mammary w Synth Sub, Perc Endo 02124.J9 02124JC Bypass 3 Cor Art from Thor Art w Synth Sub, Perc Endo 02124JF Bypass 3 Cor Art from Abd Art w Synth Sub, Perc Endo 02124JW Bypass 3 Cor Art from Aorta w Synth Sub, Perc Endo Bypass 3 Cor Art from Cor Art w Nonaut Sub, Perc Endo 02124K3 02124K8 Bypass 3 Cor Art from R Int Mammary w Nonaut Sub. Perc Endo 02124K9 Bypass 3 Cor Art from L Int Mammary w Nonaut Sub, Perc Endo 02124KC Bypass 3 Cor Art from Thor Art w Nonaut Sub, Perc Endo 02124KF Bypass 3 Cor Art from Abd Art w Nonaut Sub, Perc Endo 02124KW Bypass 3 Cor Art from Aorta w Nonaut Sub, Perc Endo 02124Z3 Bypass 3 Cor Art from Cor Art, Perc Endo Approach 02124Z8 Bypass 3 Cor Art from R Int Mammary, Perc Endo Approach 0212479 Bypass 3 Cor Art from L Int Mammary, Perc Endo Approach 02124ZC Bypass 3 Cor Art from Thor Art, Perc Endo Approach 02124ZF Bypass 3 Cor Art from Abd Art, Perc Endo Approach 0213083 Bypass 4+ Cor Art from Cor Art w Zooplastic, Open 0213088 Bypass 4+ Cor Art from R Int Mammary w Zooplastic, Open Bypass 4+ Cor Art from L Int Mammary w Zooplastic, Open 0213089 0213080 Bypass 4+ Cor Art from Thor Art w Zooplastic, Open 021308F Bypass 4+ Cor Art from Abd Art w Zooplastic, Open 021308W Bypass 4+ Cor Art from Aorta with Zooplastic, Open Approach 0213093 Bypass 4+ Cor Art from Cor Art with Autol Vn, Open Approach 0213098 Bypass 4+ Cor Art from R Int Mammary w Autol Vn, Open 0213099 Bypass 4+ Cor Art from L Int Mammary w Autol Vn, Open 0213090 Bypass 4+ Cor Art from Thor Art with Autol Vn, Open Approach 021309F Bypass 4+ Cor Art from Abd Art with Autol Vn, Open Approach 021309W Bypass 4+ Cor Art from Aorta with Autol Vn, Open Approach 02130A3 Bypass 4+ Cor Art from Cor Art with Autol Art, Open Approach 02130A8 Bypass 4+ Cor Art from R Int Mammary w Autol Art, Open 02130A9 Bypass 4+ Cor Art from L Int Mammary w Autol Art, Open

02130AC Bypass 4+ Cor Art from Thor Art w Autol Art Open 02130AF Bypass 4+ Cor Art from Abd Art with Autol Art, Open Approach 02130AW Bypass 4+ Cor Art from Aorta with Autol Art, Open Approach Bypass 4+ Cor Art from Cor Art with Synth Sub, Open Approach 02130J3 02130J8 Bypass 4+ Cor Art from R Int Mammary w Synth Sub, Open Bypass 4+ Cor Art from L Int Mammary w Synth Sub, Open 02130J9 02130 JC Bypass 4+ Cor Art from Thor Art w Synth Sub, Open 02130JF Bypass 4+ Cor Art from Abd Art with Synth Sub, Open Approach 02130JW Bypass 4+ Cor Art from Aorta with Synth Sub, Open Approach 02130K3 Bypass 4+ Cor Art from Cor Art w Nonaut Sub, Open 02130K8 Bypass 4+ Cor Art from R Int Mammary w Nonaut Sub, Open 02130K9 Bypass 4+ Cor Art from L Int Mammary w Nonaut Sub, Open 02130KC Bypass 4+ Cor Art from Thor Art w Nonaut Sub, Open 02130KF Bypass 4+ Cor Art from Abd Art w Nonaut Sub, Open 02130KW Bypass 4+ Cor Art from Aorta with Nonaut Sub, Open Approach 02130Z3 Bypass 4+ Cor Art from Cor Art, Open Approach 02130Z8 Bypass 4+ Cor Art from R Int Mammary, Open Approach Bypass 4+ Cor Art from L Int Mammary, Open Approach 0213079 02130ZC Bypass 4+ Cor Art from Thor Art, Open Approach 02130ZF Bypass 4+ Cor Art from Abd Art, Open Approach 0213344 Bypass 4+ Cor Art from Cor V w Drug-elut Intra, Perc 02133D4 Bypass 4+ Cor Art from Cor V w Intralum Dev, Perc Bypass 4+ Cor Art from Cor V w Drug-elut Intra, Perc Endo 0213444 0213483 Bypass 4+ Cor Art from Cor Art w Zooplastic, Perc Endo 0213488 Bypass 4+ Cor Art from R Int Mammary w Zooplastic, Perc Endo 0213489 Bypass 4+ Cor Art from L Int Mammary w Zooplastic, Perc Endo 021348C Bypass 4+ Cor Art from Thor Art w Zooplastic, Perc Endo 021348F Bypass 4+ Cor Art from Abd Art w Zooplastic, Perc Endo 021348W Bypass 4+ Cor Art from Aorta w Zooplastic, Perc Endo 0213493 Bypass 4+ Cor Art from Cor Art w Autol Vn, Perc Endo 0213498 Bypass 4+ Cor Art from R Int Mammary w Autol Vn, Perc Endo 0213499 Bypass 4+ Cor Art from L Int Mammary w Autol Vn, Perc Endo 021349C Bypass 4+ Cor Art from Thor Art w Autol Vn, Perc Endo 021349F Bypass 4+ Cor Art from Abd Art w Autol Vn. Perc Endo 021349W Bypass 4+ Cor Art from Aorta w Autol Vn, Perc Endo 02134A3 Bypass 4+ Cor Art from Cor Art w Autol Art, Perc Endo 02134A8 Bypass 4+ Cor Art from R Int Mammary w Autol Art, Perc Endo 02134A9 Bypass 4+ Cor Art from L Int Mammary w Autol Art, Perc Endo 02134AC Bypass 4+ Cor Art from Thor Art w Autol Art, Perc Endo 02134AF Bypass 4+ Cor Art from Abd Art w Autol Art, Perc Endo 02134AW Bypass 4+ Cor Art from Aorta w Autol Art, Perc Endo 02134D4 Bypass 4+ Cor Art from Cor V w Intralum Dev, Perc Endo 02134J3 Bypass 4+ Cor Art from Cor Art w Synth Sub, Perc Endo 02134J8 Bypass 4+ Cor Art from R Int Mammary w Synth Sub, Perc Endo 02134J9 Bypass 4+ Cor Art from L Int Mammary w Synth Sub, Perc Endo 02134JC Bypass 4+ Cor Art from Thor Art w Synth Sub, Perc Endo 02134JF Bypass 4+ Cor Art from Abd Art w Synth Sub, Perc Endo 02134JW Bypass 4+ Cor Art from Aorta w Synth Sub, Perc Endo 02134K3 Bypass 4+ Cor Art from Cor Art w Nonaut Sub, Perc Endo 02134K8 Bypass 4+ Cor Art from R Int Mammary w Nonaut Sub, Perc Endo 02134K9 Bypass 4+ Cor Art from L Int Mammary w Nonaut Sub, Perc Endo 02134KC Bypass 4+ Cor Art from Thor Art w Nonaut Sub. Perc Endo 02134KF Bypass 4+ Cor Art from Abd Art w Nonaut Sub, Perc Endo 02134KW Bypass 4+ Cor Art from Aorta w Nonaut Sub, Perc Endo 02134Z3 Bypass 4+ Cor Art from Cor Art, Perc Endo Approach 02134Z8 Bypass 4+ Cor Art from R Int Mammary, Perc Endo Approach 02134Z9 Bypass 4+ Cor Art from L Int Mammary, Perc Endo Approach 021347C Bypass 4+ Cor Art from Thor Art, Perc Endo Approach 02134ZF Bypass 4+ Cor Art from Abd Art, Perc Endo Approach

HIP FRACTURE (HIF)

Urgent episodes (Circ. Admission = Urgent) with main diagnosis of hip fracture that have been operated.

Femur fracture diagnosis codes

\$72.001A Fracture of unsp part of neck of right femur, init S72.001B Fx unsp part of neck of r femur, init for opn fx type I/2 \$72.001C Fx unsp part of neck of r femur, init for opn fx type 3A/B/C S72.002A Fracture of unsp part of neck of left femur, init S72.002B Fx unsp part of neck of left femur, init for opn fx type I/2 Fx unsp part of neck of l femur, init for opn fx type 3A/B/C \$72.002C S72.009A Fracture of unsp part of neck of unsp femur, init Fx unsp part of neck of unsp femur, init for opn fx type I/2 S72.009B

Fx unsp part of nk of unsp femr, init for opn fx type 3A/B/C S72 009C S72.011A Unsp intracapsular fracture of right femur, init for clos fx S72.011B Unsp intracap fx right femur, init for opn fx type I/2 \$72.011C Unsp intracap fx right femur, init for opn fx type 3A/B/C \$72.012A Unsp intracapsular fracture of left femur, init for clos fx Unsp intracap fx left femur, init for opn fx type I/2 S72.012B \$72.012C Unsp intracap fx left femur, init for opn fx type 3A/B/C S72.019A Unsp intracapsular fracture of unsp femur, init for clos fx S72.019B Unsp intracap fx unsp femur, init for opn fx type I/2 \$72.019C Unsp intracap fx unsp femur, init for opn fx type 3A/B/C \$72.021A Disp fx of epiphysis (separation) (upper) of r femur, init Disp fx of epiphy (separation) (upper) of r femr. 7thB S72.021B S72 021C Disp fx of epiphy (separation) (upper) of r femr, 7thC S72.022A Disp fx of epiphysis (separation) (upper) of l femur, init \$72.022B Disp fx of epiphy (separation) (upper) of l femr, 7thB S72.022C Disp fx of epiphy (separation) (upper) of l femr, 7thC S72 023A Disp fx of epiphy (separation) (upper) of unsp femur, init S72 023B Disp fx of epiphy (separation) (upper) of unsp femr, 7thB \$72.023C Disp fx of epiphy (separation) (upper) of unsp femr, 7thC S72.024A Nondisp fx of epiphy (separation) (upper) of r femur, init S72.024B Nondisp fx of epiphy (separation) (upper) of r femr, 7thB S72.024C Nondisp fx of epiphy (separation) (upper) of r femr, 7thC S72 025A Nondisp fx of epiphy (separation) (upper) of l femur, init Nondisp fx of epiphy (separation) (upper) of l femr, 7thB S72.025B \$72.025C Nondisp fx of epiphy (separation) (upper) of l femr, 7thC S72.026A Nondisp fx of epiphy (separation) (upper) of unsp femr, init S72.026B Nondisp fx of epiphy (separation) (upper) of unsp femr, 7thB S72.026C Nondisp fx of epiphy (separation) (upper) of unsp femr, 7thC \$72.031A Displaced midcervical fracture of right femur, init Displaced midcervical fx r femur, init for opn fx type I/2 S72.031B \$72.031C Displ midcervical fx r femur, init for opn fx type 3A/B/C S72.032A Displaced midcervical fracture of left femur, init Displaced midcervical fx l femur, init for opn fx type I/2 S72.032B \$72.032C Displ midcervical fx l femur, init for opn fx type 3A/B/C Displaced midcervical fracture of unsp femur, init \$72.033A S72.033B Displ midcervical fx unsp femur, init for opn fx type I/2 S72.033C Displ midcervical fx unsp femur, init for opn fx type 3A/B/C S72.034A Nondisplaced midcervical fracture of right femur, init S72.034B Nondisp midcervical fx right femur, init for opn fx type I/2 S72.034C Nondisp midcervical fx r femur, init for opn fx type 3A/B/C Nondisplaced midcervical fracture of left femur, init \$72.035A S72.035B Nondisp midcervical fx left femur, init for opn fx type I/2 S72.035C Nondisp midcervical fx l femur, init for opn fx type 3A/B/C \$72.036A Nondisplaced midcervical fracture of unsp femur, init S72.036B Nondisp midcervical fx unsp femur, init for opn fx type I/2 Nondisp midcervical fx unsp femr, 7thC \$72.036C S72.041A Disp fx of base of neck of right femur, init for clos fx S72.041B Disp fx of base of neck of r femur, init for opn fx type I/2 S72.041C Disp fx of base of nk of r femr, init for opn fx type 3A/B/C S72.042A Disp fx of base of neck of left femur, init for clos fx S72.042B Disp fx of base of neck of l femur, init for opn fx type I/2 S72 042C Disp fx of base of nk of l femr, init for opn fx type 3A/B/C \$72.043A Disp fx of base of neck of unsp femur, init for clos fx S72.043B Disp fx of base of nk of unsp femr, init for opn fx type I/2 S72.043C Disp fx of base of nk of unsp femr, 7thC S72.044A Nondisp fx of base of neck of right femur, init for clos fx S72.044B Nondisp fx of base of nk of r femr, init for opn fx type I/2 Nondisp fx of base of nk of r femr, 7thC S72 044C S72.045A Nondisp fx of base of neck of left femur, init for clos fx S72.045B Nondisp fx of base of nk of l femr, init for opn fx type I/2 S72.045C Nondisp fx of base of nk of l femr, 7thC S72.046A Nondisp fx of base of neck of unsp femur, init for clos fx S72.046B Nondisp fx of base of nk of unsp femr, 7thB \$72.046C Nondisp fx of base of nk of unsp femr. 7thC S72.051A Unsp fracture of head of right femur, init for clos fx S72.051B Unsp fx head of right femur, init for opn fx type I/2 S72.051C Unsp fx head of right femur, init for opn fx type 3A/B/C S72.052A Unsp fracture of head of left femur, init for clos fx Unsp fx head of left femur, init for opn fx type I/2 S72.052B Unsp fx head of left femur, init for opn fx type 3A/B/C S72.052C \$72.059A Unsp fracture of head of unsp femur, init for clos fx S72.059B Unsp fx head of unsp femur, init for opn fx type I/2 \$72.059C Unsp fx head of unsp femur, init for opn fx type 3A/B/C \$72.061A Displaced articular fracture of head of right femur, init S72.061B Displaced artic fx head of r femur, init for opn fx type I/2

Displ artic fx head of r femur, init for opn fx type 3A/B/C S72 061C S72.062A Displaced articular fracture of head of left femur, init S72.062B Displaced artic fx head of l femur, init for opn fx type I/2 \$72.062C Displ artic fx head of l femur, init for opn fx type 3A/B/C \$72.063A Displaced articular fracture of head of unsp femur, init S72.063B Displ artic fx head of unsp femur, init for opn fx type I/2 S72.063C Displ artic fx head of unsp femr, 7thC S72.064A Nondisplaced articular fracture of head of right femur, init S72.064B Nondisp artic fx head of r femur, init for opn fx type I/2 \$72.064C Nondisp artic fx head of r femr, init for opn fx type 3A/B/C \$72.065A Nondisplaced articular fracture of head of left femur, init S72 065B Nondisp artic fx head of I femur, init for opn fx type I/2 S72 065C Nondisp artic fx head of l femr, init for opn fx type 3A/B/C S72.066A Nondisplaced articular fracture of head of unsp femur, init S72.066B Nondisp artic fx head of unsp femr, init for opn fx type I/2 S72.066C Nondisp artic fx head of unsp femr, 7thC S72.091A Oth fracture of head and neck of right femur, init S72.091B Oth fx head/neck of right femur, init for opn fx type I/2 S72.091C Oth fx head/neck of right femur, init for opn fx type 3A/B/C S72.092A Oth fracture of head and neck of left femur, init S72.092B Oth fx head/neck of left femur, init for opn fx type I/2 \$72.092C Oth fx head/neck of left femur, init for opn fx type 3A/B/C S72.099A Oth fracture of head and neck of unsp femur, init S72.099B Oth fx head/neck of unsp femur, init for opn fx type I/2 \$72.099C Oth fx head/neck of unsp femur, init for opn fx type 3A/B/C S72.101A Unsp trochanteric fracture of right femur, init for clos fx S72.101B Unsp trochan fx right femur, init for opn fx type I/2 \$72.101C Unsp trochan fx right femur, init for opn fx type 3A/B/C \$72,102A Unsp trochanteric fracture of left femur, init for clos fx Unsp trochan fx left femur, init for opn fx type I/2 S72.102B S72.102C Unsp trochan fx left femur, init for opn fx type 3A/B/C \$72.109A Unsp trochanteric fracture of unsp femur, init for clos fx S72.109B Unsp trochan fx unsp femur, init for opn fx type I/2 \$72.109C Unsp trochan fx unsp femur, init for opn fx type 3A/B/C \$72.111A Disp fx of greater trochanter of right femur, init S72.111B Disp fx of greater trochanter of r femr, 7thB S72.111C Disp fx of greater trochanter of r femr, 7thC S72.112A Disp fx of greater trochanter of left femur, init S72.112B Disp fx of greater trochanter of l femr, 7thB \$72.112C Disp fx of greater trochanter of l femr, 7thC Disp fx of greater trochanter of unsp femur, init S72.113A Disp fx of greater trochanter of unsp femr, 7thB S72.113B S72.113C Disp fx of greater trochanter of unsp femr, 7thC \$72.114A Nondisp fx of greater trochanter of right femur, init S72.114B Nondisp fx of greater trochanter of r femr, 7thB S72.114C Nondisp fx of greater trochanter of r femr, 7thC S72.115A Nondisp fx of greater trochanter of left femur, init S72.115B Nondisp fx of greater trochanter of l femr, 7thB \$72.115C Nondisp fx of greater trochanter of l femr, 7thC Nondisp fx of greater trochanter of unsp femur, init S72.116A S72.116B Nondisp fx of greater trochanter of unsp femr. 7thB S72 116C Nondisp fx of greater trochanter of unsp femr, 7thC Disp fx of lesser trochanter of right femur, init S72.121A S72.121B Disp fx of less trochanter of r femr, 7thB S72.121C Disp fx of less trochanter of r femr, 7thC \$72.122A Disp fx of lesser trochanter of left femur, init for clos fx S72.122B Disp fx of less trochanter of l femr, 7thB Disp fx of less trochanter of l femr, 7thC S72 122C Disp fx of lesser trochanter of unsp femur, init for clos fx S72.123A S72.123B Disp fx of less trochanter of unsp femr, 7thB \$72.123C Disp fx of less trochanter of unsp femr, 7thC \$72.124A Nondisp fx of lesser trochanter of right femur, init S72.124B Nondisp fx of less trochanter of r femr. 7thB S72.124C Nondisp fx of less trochanter of r femr, 7thC S72.125A Nondisp fx of lesser trochanter of left femur, init S72.125B Nondisp fx of less trochanter of l femr, 7thB S72.125C Nondisp fx of less trochanter of l femr, 7thC \$72.126A Nondisp fx of lesser trochanter of unsp femur, init S72.126B Nondisp fx of less trochanter of unsp femr, 7thB S72.126C Nondisp fx of less trochanter of unsp femr, 7thC S72.131A Displaced apophyseal fracture of right femur, init S72.131B Displaced apophyseal fx r femur, init for opn fx type I/2 \$72.131C Displaced apophyseal fx r femur, init for opn fx type 3A/B/C \$72,132A Displaced apophyseal fracture of left femur, init S72.132B Displaced apophyseal fx left femur, init for opn fx type I/2

Displaced apophyseal fx l femur, init for opn fx type 3A/B/C S72 132C \$72.133A Displaced apophyseal fracture of unsp femur, init S72.133B Displaced apophyseal fx unsp femur, init for opn fx type I/2 Displ apophyseal fx unsp femur, init for opn fx type 3A/B/C S72.133C S72.134A Nondisplaced apophyseal fracture of right femur, init Nondisp apophyseal fx right femur, init for opn fx type I/2 S72.134B S72 134C Nondisp apophyseal fx r femur, init for opn fx type 3A/B/C S72.135A Nondisplaced apophyseal fracture of left femur, init S72.135B Nondisp apophyseal fx left femur, init for opn fx type I/2 S72.135C Nondisp apophyseal fx l femur, init for opn fx type 3A/B/C \$72.136A Nondisplaced apophyseal fracture of unsp femur, init Nondisp apophyseal fx unsp femur, init for opn fx type I/2 S72 136B Nondisp apophyseal fx unsp femr, init for opn fx type 3A/B/C S72 136C S72.141A Displaced intertrochanteric fracture of right femur, init S72.141B Displaced intertroch fx r femur, init for opn fx type I/2 S72.141C Displaced intertroch fx r femur, init for opn fx type 3A/B/C S72 142A Displaced intertrochanteric fracture of left femur, init S72 142B Displaced intertroch fx left femur, init for opn fx type I/2 S72.142C Displaced intertroch fx l femur, init for opn fx type 3A/B/C S72.143A Displaced intertrochanteric fracture of unsp femur, init S72.143B Displaced intertroch fx unsp femur, init for opn fx type I/2 S72.143C Displ intertroch fx unsp femur, init for opn fx type 3A/B/C S72 144A Nondisplaced intertrochanteric fracture of right femur, init Nondisp intertroch fx right femur, init for opn fx type I/2 S72.144B S72.144C Nondisp intertroch fx r femur, init for opn fx type 3A/B/C S72.145A Nondisplaced intertrochanteric fracture of left femur, init S72.145B Nondisp intertroch fx left femur, init for opn fx type I/2 \$72.145C Nondisp intertroch fx l femur, init for opn fx type 3A/B/C \$72.146A Nondisplaced intertrochanteric fracture of unsp femur, init Nondisp intertroch fx unsp femur, init for opn fx type I/2 S72.146B S72.146C Nondisp intertroch fx unsp femr, init for opn fx type 3A/B/C S72.21XA Displaced subtrochanteric fracture of right femur, init Displaced subtrochnt fx r femur, init for opn fx type I/2 S72.21XB Displaced subtrochnt fx r femur, init for opn fx type 3A/B/C S72.21XC S72.22XA Displaced subtrochanteric fracture of left femur, init S72.22XB Displaced subtrochnt fx left femur, init for opn fx type I/2 S72.22XC Displaced subtrochnt fx l femur, init for opn fx type 3A/B/C S72.23XA Displaced subtrochanteric fracture of unsp femur, init S72.23XB Displaced subtrochnt fx unsp femur, init for opn fx type I/2 Displ subtrochnt fx unsp femur, init for opn fx type 3A/B/C \$72.23XC S72.24XA Nondisplaced subtrochanteric fracture of right femur, init S72.24XB Nondisp subtrochnt fx right femur, init for opn fx type I/2 S72.24XC Nondisp subtrochnt fx r femur, init for opn fx type 3A/B/C S72.25XA Nondisplaced subtrochanteric fracture of left femur, init S72.25XB Nondisp subtrochnt fx left femur, init for opn fx type I/2 Nondisp subtrochnt fx l femur, init for opn fx type 3A/B/C \$72.25XC Nondisplaced subtrochanteric fracture of unsp femur, init S72.26XA S72.26XB Nondisp subtrochnt fx unsp femur, init for opn fx type I/2 S72.26XC Nondisp subtrochnt fx unsp femr, init for opn fx type 3A/B/C

GASTROINTESTINAL BLEEDING (GIB)

Episodes with some diagnosis of gastrointestinal bleeding

Gastrointe	stinal bleeding diagnostic codes
185.01	Esophageal varices with bleeding
185.11	Secondary esophageal varices with bleeding
K22.11	Ulcer of esophagus with bleeding
K25.0	Acute gastric ulcer with hemorrhage
K25.2	Acute gastric ulcer with both hemorrhage and perforation
K25.4	Chronic or unspecified gastric ulcer with hemorrhage
K25.6	Chronic or unsp gastric ulcer w both hemorrhage and perf
K26.0	Acute duodenal ulcer with hemorrhage
K26.2	Acute duodenal ulcer with both hemorrhage and perforation
K26.4	Chronic or unspecified duodenal ulcer with hemorrhage
K26.6	Chronic or unsp duodenal ulcer w both hemorrhage and perf
K27.0	Acute peptic ulcer, site unspecified, with hemorrhage
K27.2	Acute peptic ulcer, site unsp, w both hemorrhage and perf
K27.4	Chronic or unsp peptic ulcer, site unsp, with hemorrhage
K27.6	Chr or unsp peptic ulcer, site unsp, w both hemor and perf
K28.0	Acute gastrojejunal ulcer with hemorrhage
K28.2	Acute gastrojejunal ulcer w both hemorrhage and perforation
K28.4	Chronic or unspecified gastrojejunal ulcer with hemorrhage
K28.6	Chronic or unsp gastrojejunal ulcer w both hemor and perf
K29.01	Acute gastritis with bleeding
K29.21	Alcoholic gastritis with bleeding
K29.31	Chronic superficial gastritis with bleeding
K29.41	Chronic atrophic gastritis with bleeding
K29.51	Unspecified chronic gastritis with bleeding
K29.61	Other gastritis with bleeding
K29.71	Gastritis, unspecified, with bleeding
K29.81	Duodenitis with bleeding
K29.91	Gastroduodenitis, unspecified, with bleeding
K92.0	Hematemesis
K92.1	Melena
K92.2	Gastrointestinal hemorrhage, unspecified

Example of the hospital score	ecard	- Pro	cess s	sectio	n													MA	Bm	
			Pilla	ar I. O	ptimis	se red	cell m	ass			Pilla I	r II. Mi	nimize I bleedi	blood ng	Pil phy	lar III. siolog	Harnes ical res	ss and erve o	optim f anae	iise emia
	% of patients with an Hb determination 21-	90 days before surgery	% of patients with a Ferritin determination	21-90 days before surgery	% of patients treated	preoperatively 7-90 days before surgery	% of patients treated	with IV iron during hospital stay	% of patients with	preoperative transfusion	o for the second second	spinal anesthesia	% of patients treated	with anumumory uts perioperatively	Hb level prior to	transfusion	% of patients transfilsed with	Hb > 8 g/dl	% of single-unit	transfused patients
Clinical Procedure																				
	Hosp.	Norm	Hosp.	Norm	Hosp.	Norm	Hosp.	Norm	Hosp.	Norm	Hosp	Norm	Hosp.	Norm	Hosp.	Norm	Hosp.	Norm	Hosp.	Norm
Total his replacement (N=240)	48%	51%	12%	42%	13%	16%	6%	13%	1%	1%	65%	75%	100%	52%	8,5	8,4	63%	61%	42%	33%
Total hip replacement (N=240)	•	-6%	•	-72%	•	-15%	•	-57%	•	-1%		-13%	À	94%	•	2%	•	2%		29%
Total knee replacement (N=418)	44%	48%	21%	39%	14%	17%	4%	12%	1%	0%	37%	79%	99%	54%	8,8	8,5 4%	76%	63%	58%	34%
	83%	-3% 61%	17%	39%	•	23%	10%	13%	5%	4%	F	÷.÷	74	65%	8.3	8.6	36%	64%	64%	50%
(N=29)		37%	•	-57%	•	-100%	•	-20%		-~<	O		1			-3%	•	-43%		29%
Colorectal cancer resection	74%	59%	17%	46%	0%	21%	1%	12%	٣,	7%				1	8,2	8,5	67%	67%	50%	47%
laparoscopic (N=78)		25%		-62%	•	-100%	•	-8′ 。		61%					•	-4%		-1%		6%
Cardiac valve replacement	53%	44%	20%	41%	0%	5%	11%	6%	_2%	10%			85%	82%	8,7	9,2	58%	72%	67%	53%
(N=215)		23%	•	-52%	-	'0%		79%		122%				4%	•	-6%	•	-19%		27%
Hip Fracture (N=360)							.10	25%			70%	73%	5%	12%	8,0	8,2	59%	60%	30%	43%
						/	/	-92%				-4%	•	-55%	►	-2%		-2%	•	-32%
Gastrointestinal bleeding (N=437)						\checkmark	5%	32%							7,7	7,4	34%	35%	46%	40%
								-86%			Ť				►	5%		-1%		16%

Example of the hospital scorecard - Outcomes section

MAPem

	Intermediate Outcomes							Hard Outcomes								
	Transfusion Rate Transfusion Index			Total Tra Ind (per 1.000	ansfusion dex 0 patients)	Length of Stay		In-Hospital Mortality		In-Hospital Complications		Re-admissions				
Overall (all clinical procedures)																
	Observed	Expected	Observed	Expected	Observed	Expected	Observed	Expected	Observed	Expected	Observed	Expected	Observed	Expected		
Global	38,0%	35,5%	4,38	3,52	1663,56	1247,65	14,68	9,54	7,1%	4,8%	10,5%	7,4%	4,7%	4,4%		
	Índice	1 ,07		1 ,24		▲ 1,33	Índice	1 ,54		▲ 1,48		1 ,42		1 ,06		
Clinical Procedure								/								
	Observed	Expected	Observed	Expected	Observed	Expected	Observed	Expected	Observed	Expected	Observed	Expected	Observed	Expected		
Total his replacement (N=240)	12,1%	15,8%	4,71	2,49	571,43	381,05	9,36	€ 27	0,0%	0,1%	4,8%	2,5%	0,9%	1,7%		
	Índice	▼ 0,77		1 ,89		▲ 1,50	Índi	. 1,49		▼ 0,00		1 ,89		▼ 0,54		
Total knee replacement (N=418)	5,8%	9,7%	3,05	2,11	175,34	207,10	9, 7	5,80	0,3%	0,0%	4,4%	2,0%	0,6%	1,2%		
		▼ 0,59		▲ 1,45		▼ <u>(</u>)		1,62		▲ 6,99		▲ 2,24		▼ 0,50		
Colorectal cancer resection open	37,9%	20,3%	2,64	2,66	1.000,00	ວເີ 25	17,38	12,82	0,0%	2,4%	25,0%	20,2%	8,0%	8,3%		
(N=29)		1 ,87		0,99		1,72		1 ,36		▼ 0,00		▲ 1,24		▶ 0,96		
Colorectal cancer resection	9,0%	12,0%	1,71	2,5	-53,8	317,51	7,62	8,81	1,3%	0,9%	12,8%	13,5%	9,7%	4,5%		
laparoscopic (N=78)		▼ 0,74		▼ 0,75		▼ 0,48		▼ 0,86		▲ 1,42		▼ 0,95		▲ 2,16		
Cardiac valve replacement (N=215)	64,2%	52,9%	5,60	4,19	3595,35	2269,68	19,04	14,06	4,2%	3,6%	21,1%	17,6%	6,5%	5,0%		
		1 ,21		1,34		▲ 1,58		1 ,35		1 ,16		1 ,20		1 ,30		
Hin Fracture (N=360)	56,1%	47,9%	3,04	2,54	1.705,56	1.222,07	18,23	10,98	6,9%	4,3%	8,8%	7,3%	4,6%	4,5%		
		1 ,17		1 ,19		▲ 1,40	_	▲ 1,66		1 ,60		1 ,21		▶ 1,02		
Gastrointestinal bleeding (N=437)	56,1%	53,9%	5,02	4,25	2.812,36	2.303,36	17,90	10,88	19,7%	13,2%	14,0%	8,2%	9,8%	9,5%		
		▶ 1,04		▲ 1,18		▲ 1,22		▲ 1,65		▲ 1,50		1 ,70		▶ 1,03		

Figure S1 - Hospital Scorecard Executive Report

Example of the hospital sc	MAPBM					
	Hospital	Norm	Basic	Initial	Advanced	Expert
Dverall	35%	54%		•		
			0% 25%	% 5	0% 75	5% 100%
Organisation and Governance	41%	65%		٠	•/	
PBM workgroup	55%	63%			• .•	
Clinical protocols	37%	66%			/	
Pillar I. Optimise red cell mass	50%	65%		•/		
Pillar II. Minimize blood loss and bleeding	64%	49%				
Pillar III. Optimise physiological reserve of anaemia	0%	82%	•			•
Training and Education	40%	52%			•	
HCPs Knowledge	71%	68%			••	
HCPs Training	25%	40%				
			0% 259	%	50% 75	5% 100%
Information Systems	22%	36%				
CPOE systems	25%	37%				
Reporting	41%	49%				
Surveillance and monitoring	0%	29%		•		
Patient-level KPIs	42%	50%			•	
Activity based consumptions	67%	41%		•	•	
Patient Outcomes	40%	54%		•	•	
Regular feedback to HCPs	10%	27%		•		
			0% 259	% 5	60% 75	5% 100%

Figure S1 - Hospital Scorecard Executive Report