SUPPLEMENTARY DATA

DETAILED METHODS

PART 1 - Cohort selection

Source of data: Hospital Information System (HIS)

Inclusion criteria
All hospital admissions with a primary or secondary contributing diagnosis of cholelithiasis (International Classification of Diseases 9th Revision, Clinical Modification - ICD9-CM = 574) and a procedure code of cholecystectomy (ICD9-CM 51.22, 51.23), occurred in private and public hospitals of the Lazio Region between January 2007 and September 2008 were included, for a total of 16,432 cases. The final population, after sequential exclusions, consisted of 13,651 subjects.

Exclusion criteria
- long-term hospitalizations, rehabilitations and day-hospitals
- patients residents outside the Lazio Region
- subjects younger than 18 or older than 100 years old
- hospitalizations for delivery (MDC 14)
- hospitalizations for any type of trauma (ICD-9-CM codes ICD-9-CM 800-897)
- hospitalizations with diagnoses of cancer of the digestive system (ICD-9-CM codes150-159)
- hospitalizations with other abdominal surgical procedures (selected ICD-9-CM codes)

PART 2 - Codes to describe severity of cholelithiasis

1. Cholelithiasis of the biliary tract without complications

574.20; 574.50; 574.90

2. Cholelithiasis of the biliary tract with cholecystitis (without obstruction)

574.10; 574.40; 574.70; 575.1 AND 574.20 or 574.50 or 574.90; 574.00; 574.30; 574.60;
574.80; 575.0 AND 574.20 or 574.50 or 574.90

3. Cholelithiasis of the biliary tract with obstruction (without cholecystitis)

574.21; 574.51; 574.01; 574.91; 575.2 AND 574.20 or 574.50 or 574.90; 576.2 AND 574.20 or 574.50 or 574.90; 575.3

4. Cholelithiasis of the biliary tract with both obstruction and cholecystitis

574.01; 574.11; 574.31; 574.41; 574.61; 574.71; 574.81; 575.2 AND 574.00; 575.0 AND 574.20
575.1 AND 574.20 574.30; 575.0 AND 574.50; 575.1 AND 574.50; 574.60; 574.70; 574.80; 576.1;
576.2 AND 574.00; 575.0 AND 574.20; 575.1 AND 574.20; 574.30; 575.0 AND 574.50; 575.1
AND 574.50; 574.60; 574.70; 574.80

PART 3 - Codes to describe previous upper abdominal surgery

Codes in the index admission – post procedural states

stomach  V44.1, V45.75, V55.1; intestine V44.2, V44.4, V45.3, V45.72, V53.5, V55.2, V55.4, V42.84; liver V42.7; pancreas 42.83
Codes in the previous 2-year hospitalizations

Stomach
43.5, 43.6, 43.7, 43.8, 43.9, 44.31, 44.32, 44.33, 44.34, 44.35, 44.36, 44.37, 44.38, 44.39
Small intestine
45.31, 45.32, 45.33, 45.34, 45.35, 45.36, 45.37, 45.38, 45.39, 45.40, 45.41, 45.42, 45.43, 45.44, 45.45, 45.46, 45.47, 45.48, 45.49, 45.50, 45.51, 45.52, 45.53, 45.54, 45.55, 45.56, 45.57, 45.58, 45.59, 45.60, 45.61, 45.62, 45.63, 45.64, 45.65, 45.66, 45.67, 45.68, 45.69, 45.70, 45.71, 45.72, 45.73, 45.74, 45.75, 45.76, 45.77, 45.78, 45.79, 45.80, 45.81, 45.82, 45.83, 45.84, 45.85, 45.86, 45.87, 45.88, 45.89, 45.90, 45.91, 45.92, 45.93, 45.94, 45.95, 45.96, 45.97, 45.98, 45.99
Liver
50.2, 50.3, 50.4, 50.5, 50.6
Pancreas
52.2, 52.3, 52.4, 52.5, 52.6, 52.7, 52.8, 52.9, 52.96
Peritoneum
54.4, 54.5, 54.6, 54.7
Large intestine
45.41, 45.49, 45.5, 45.57, 45.58, 45.59, 45.60, 45.61, 45.62, 45.63, 45.64, 45.65, 45.66, 45.67, 45.68, 45.69, 45.70, 45.71, 45.72, 45.73, 45.74, 45.75, 45.76, 45.77, 45.78, 45.79, 45.80, 45.81, 45.82, 45.83, 45.84, 45.85, 45.86, 45.87, 45.88, 45.89, 45.90, 45.91, 45.92, 45.93, 45.94, 45.95, 45.96, 45.97, 45.98, 45.99
Other surgery
55.4, 55.5, 56.2, 56.3, 56.4, 56.5, 56.6, 56.7, 56.8, 56.9, 57.1, 57.6, 57.7, 57.8, 57.9, 58.1, 58.2, 58.3, 58.4, 58.5, 58.6, 58.7, 58.8, 58.9, 59.0, 59.1, 59.2, 59.3, 59.4, 59.5, 59.6, 59.7, 59.8, 59.9, 60.0, 60.1, 60.2, 60.3, 60.4, 60.5, 60.6, 60.7, 60.8, 60.9, 61.0, 61.1, 61.2, 61.3, 61.4, 61.5, 61.6, 61.7, 61.8, 61.9, 62.0, 62.1, 62.2, 62.3, 62.4, 62.5, 62.6, 62.7, 62.8, 62.9, 63.0, 63.1, 63.2, 63.3, 63.4, 63.5, 63.6, 63.7, 63.8, 63.9, 64.0, 64.1, 64.2, 64.3, 64.4, 64.5, 64.6, 64.7, 64.8, 64.9, 65.0, 65.1, 65.2, 65.3, 65.4, 65.5, 65.6, 65.7, 65.8, 65.9, 66.0, 66.1, 66.2, 66.3, 66.4, 66.5, 66.6, 66.7, 66.8, 66.9, 67.0, 67.1, 67.2, 67.3, 67.4, 67.5, 67.6, 67.7, 67.8, 67.9, 68.0, 68.1, 68.2, 68.3, 68.4, 68.5, 68.6, 68.7, 68.8

PART 4 - Codes to describe coexisting conditions

On the basis of previous 2-year hospitalizations (following a validated coding algorithm – enhanced Elixhauser AHRQ-Web-ICD-9-CM - see reference n. 17 cited in the text).

diabetes 250.xx; hypertension 401-405; obesity 280.0, ischemic disease 410-414, 429.7, previous revascularization V45.81, V45.82, procedures 36.0, 36.1, heart failure 428, other cardiac disease 093.2, 391, 393-398, 420-425, 429, 745, 746.3-646.6, V15.1, V42.2, V43.2, V43.3, V45.0 arrhythmia / conduction disorders 426-427, cerebrovascular disease 430-438, vascular disease 440-448, 557, hematologic disorders 280-285, 286, 287.1, 287.3-287.5, 288, 289, chronic respiratory disease 490-496, 518.81, 518.82, chronic liver disease / pancreas 571, 572, 577.1, 577.9, chronic renal disease 582-583, 585-588, V42.0, V45.1m V56, cancer 140-208.9

PART 5 - Codes to describe outcomes

A) Surgical-related complications (within 30 day after the surgery)

in the index or in the subsequent hospitalizations (excluding hospitalizations for trauma ICD-9-CM 800-897) and delivery (MDC 14)

at least one of the following:
998.1 Hemorrhage or hematoma or seroma complicating a procedure; 998.2 Accidental puncture or laceration during a procedure; 998.3 Disruption of wound; 998.4 Foreign body accidentally left during a procedure; 998.5 Postoperative infection; 998.6 Persistent postoperative fistula; 998.7 Acute reaction to foreign substance accidentally left during a procedure; 998.81 Emphysema (subcutaneous) (surgical) resulting from a procedure; 998.83 Non-healing surgical wound; 998.89 Other specified complications; 997.4 Digestive system complications; 998.9 Unspecified complication of procedure, not elsewhere classified
Only in the subsequent hospitalizations

at least one of the following:

567 Peritonitis and retroperitoneal infections; 575.4 Perforation of gallbladder; 575.5 Fistula of gallbladder; 576.0 Postcholecystectomy syndrome; 576.3 Perforation of bile duct; 576.4 Fistula of bile duct; 570 Acute and subacute necrosis of liver; 789.0 Abdominal pain

B) Sistemic complications (within 30 day after the surgery)

in the index or in the subsequent hospitalizations (excluding hospitalizations for trauma ICD-9-CM 800-897) and delivery (MDC 14)

at least one of the following:

997.0 Nervous system complications; 997.1 Cardiac complications; 997.3 Respiratory complications; 998.0 Postoperative shock; 410 Acute myocardial infarction; 415.1 Pulmonary embolism and infarction; 431 Intracerebral haemorrhage; 433.x1 Occlusion and stenosis of precerebral arteries with infarction; 434.x1 Occlusion of cerebral arteries with infarction; 436 Acute, but ill-defined, cerebrovascular disease; 480-486 Pneumonia; 513.0 Abscess of lung

518.4 Acute edema of lung, unspecified; 518.5 Pulmonary insufficiency following trauma and surgery; 785.5 Shock without mention of trauma; 788.2 Retention of urine

Only in the subsequent hospitalizations

038 Septicemia