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CHAPTER SEVEN: DEFINITIONS AND PREVALENCE OF RISK FACTORS

In this study, risk factors were defined as characteristics or conditions that probably existed at the time of admission and may have influenced patient outcomes. Three sets of risk factors were examined.

The first set includes demographic characteristics such as sex, race, and age. The second set includes hospitalization characteristics such as the source and type of admission. The third set represents clinical characteristics such as diabetes and cancer. These clinical factors include both chronic illnesses and conditions or procedures associated with the principal diagnosis (e.g., the portion of the heart involved in an AMI). All clinical risk factors were based on the diagnoses and procedures listed on discharge abstracts and coded using ICD-9-CM. Each patient discharge abstract includes a principal diagnosis and principal procedure, plus as many as 24 other diagnosis codes and as many as 20 other procedure codes.¹

DEMOGRAPHIC AND HOSPITALIZATION CHARACTERISTICS

The demographic variables available from patient discharge abstracts are sex, race, and age. Table 7.1 summarizes these characteristics of the AMI sample. Each of these three variables was tested in risk-adjustment models, as described in Chapter Eight. For analytic purposes, race was aggregated into four categories: White, African-American, Hispanic, and other.

Several measures describing the hospitalization were available from patient discharge abstracts: expected principal source of payment, source of admission, type of admission, and disposition. The first three of these variables were tested in risk-adjustment models, as described in Chapter Eight. Expected source of payment was used as a crude indicator of socioeconomic status. Source of admission may be a marker for particularly ill patients who are referred to a regional center. Type of admission reflects whether a patient was sick enough to require admission to an intensive care unit. The large number of categories for expected payment source and source of admission were aggregated into a smaller number of categories for

¹Through June 30, 1990, there were 24 other procedure codes. This changed on July 1, 1990 to make room in the data structure for 5 External Cause of Injury codes (Ecode s).

analytic purposes. Table 7.2 summarizes the hospitalization characteristics of the AMI sample.

CLINICAL CHARACTERISTICS

With the assistance of a clinical advisory panel composed of expert physicians and other health professionals, lists of potential clinical risk factors for in-hospital death after AMI were developed. The potential risk factors identified through review of recent medical literature are listed in Chapter Two. The present chapter describes how these risk factors were defined. Chapter Eight describes how the resulting sets of risk factors were analyzed and used in model development.

Method for Selecting Clinical Characteristics

The lists for AMI were adapted to ICD-9-CM by review in all volumes of ICD-9-CM; the American Hospital Association's *ICD-9-CM Coding Handbook, 1991 Revised Edition*; *Coding Clinic for ICD-9-CM*; OSHPD's *Discharge Data Review* newsletter; and other publications for coding professionals. These adaptations were reviewed by two coding experts. Finally, the number of cases and the mortality rate associated with each five-digit ICD-9-CM diagnosis were examined to ensure that no potential clinical risk factors had been omitted. During this process, many potential clinical risk factors were redefined to capture differences in risk more precisely. Similar overall criteria were used to select risk factors for each condition:

1. Prevalence.

Extremely rare conditions (e.g., less than 0.1% prevalence) were not considered as potential clinical risk factors, because it would have been impossible to estimate their contribution to patient risk. Some moderately rare conditions were considered as potential clinical risk factors but were eliminated during the model development process.

2. Ability to define using ICD-9-CM.

Risk factors for which there were no corresponding ICD-9-CM codes were not included because they could not be identified from the discharge abstract.

3. Confidence that the condition was likely to have been present when the patient was admitted to the hospital.

Conditions likely to have developed after admission, such as iatrogenic infections, were not considered as potential clinical risk factors. However, it was not always clear whether a condition was "likely to have been

present when the patient was admitted" or "likely to have developed after admission." Conditions that could have developed either before or after admission were retained for further examination.

4. Clinical importance .

Conditions were not included on this list if they seemed obviously trivial. During the model development process, risk factors that were not associated with the outcomes of interest were identified and removed.

Timing of Risk Factors

The presence or absence of each risk factor was determined by reviewing records after linking serial hospitalizations for transferred AMI patients. The discharge diagnoses from all hospitals involved in the initial episode of care were combined into a single list. In other words, a patient who was transferred from Hospital A to Hospital B but only had hypertension coded in Hospital B would be classified as hypertensive in the analysis of Hospital A's AMI outcomes. Hospitals thereby received credit for patient risk factors that they might not have had the opportunity to discover or document before transfer. Many inter-hospital transfers occur so quickly that the initial hospital cannot complete its diagnostic evaluation.

During the 8 weeks before the date of AMI admission, 8.0% of AMI cases had one or more prior hospitalizations. Among these cases, prior discharge abstracts provided additional information about the timing of clinical risk factors. If a diagnosis was noted on a prior discharge abstract, then it presumably preceded the AMI of interest. For this reason, clinical risk factors were defined somewhat differently according to whether there were any prior hospitalizations:

1. Risk factors that are intrinsically chronic comorbidities, such as hypertension and diabetes, were identified from either the index AMI hospitalization or prior hospitalizations. If there were no prior hospitalizations, then the index record alone was used to identify these risk factors.
2. Risk factors that could represent either chronic comorbidities or AMI complications, such as mitral regurgitation, generally were identified only from prior hospitalizations. However, the index record was used to identify the most important of these risk factors, because 92.0% of AMI cases had no prior hospitalizations. As described in Chapter Eight, these risk factors were analyzed separately if they were based on index records and included in some, but not all, risk-adjustment models.

3. Risk factors that are likely to represent acute complications of AMI and have little clinical significance when they occur before an index AMI admission, such as hypotension, were identified only from index records regardless of whether there were any prior hospitalizations.

Table 7.3 shows definitions of the risk factors used in risk-adjustment models for AMI mortality. Table 7.4 shows the prevalence of these risk factors in the study sample with one or more prior admissions. Table 7.5 shows the prevalence of these risk factors in the study sample with no prior admissions. Table 7.6 shows additional risk factors considered but ultimately not used in the AMI risk-adjustment models, for reasons described in Chapter Nine.

Although no new risk factors were tested in 1995 that had not been tested in 1993, several were redefined. For example, the definitions of sepsis, pleural effusion, late effects of cerebrovascular disease, and chronic liver disease were expanded by adding diagnosis codes that shared similar associations with mortality. The implementation of new diagnosis codes describing gastrointestinal hemorrhage and complications of prosthetic heart valves necessitated the redefinition of those risk factors. Other atrioventricular block was split into two separate risk factors (first degree and second degree), based on input from clinical advisors. Clinical considerations also led to the redefinition of thyroid disease to represent only hypothyroidism, and the redefinition of coagulopathy to exclude hemorrhagic disorders due to anticoagulants (e.g., heparin). Finally, two risk factors (dementia and other cerebrovascular disease) were redefined to reduce variability in the associations between component diagnoses and mortality.

Table 7.1: Demographic characteristics of acute myocardial infarction cases (after exclusions)

<i>Characteristic</i>	<i>Number</i>	<i>Percent</i>
Total	68,012	100.00
Sex		
Male	42,729	62.8
Female	25,283	37.2
Race		
White	53,650	78.9
Black	4,069	6.0
Hispanic	6,279	9.2
Native American	125	0.2
Asian	3,000	4.4
Other	521	0.8
Missing/Unknown	368	0.5
Age		
Mean	67.3	48.1
StdDev	13.3	12.0

Table 7.2: Hospitalization characteristics of acute myocardial infarction cases (after exclusions)

<i>Characteristic</i>	<i>Number</i>	<i>Percent</i>
Total	68,012	100.0
AdmissionType		
Emergency	40,117	59.0
Urgent	26,106	38.4
Elective	1,778	2.6
Missing/unknown	11	0.0
AdmissionSource		
Routine	9,610	14.1
EmergencyRoom	57,970	85.2
AcuteHospital	48	0.5
IntermediateCareFacility	1	0.0
SkilledNursingFacility	7	0.1
OtherFacility	335	0.5
HomeHealth	45	0.1
Other	52	0.1
PaymentSource		
Medicare	36,065	53.0
MediCal	3,837	5.6
Worker'sComp	277	0.4
TitleV	1	0.0
OtherGovernment	492	0.7
BlueC/S	1,613	2.4
InsuranceCo	8,683	12.8
HMO/PHP	12,820	18.8
SelfPay	3,103	4.6
NoCharge	40	0.1
OtherNonGovt	235	0.3
Section17000	845	1.2
Missing/unknown	1	0.0
DischargeDisposition		
Routine	36,492	57.3
AcuteHospital	14,131	20.8
IntermediateCareFacility	84	0.1
SkilledNursingFacility	2,505	3.7
OtherFacility	895	1.3
LeftAgainstMedAdvice	656	1.0
HomeHealth	4,812	7.1
Died	8,437	12.4

Table 7.3: ICD -9-CM codes for clinical risk factors for death after acute myocardial infarction

ICD-9-CM Code	ICD-9-CM Description	Source of Data
	Acidosis (ACIDOSI)	Index only*
276.2	Acidosis	
276.4	Mixed acid-base balanced disorders	
	Cerebrovascular disease, late effects (LATECVAB)	Index or prior
438	Late effects of cerebrovascular disease	
	Cerebrovascular disease, other (OTHCVAI)	Index only*
430	Subarachnoid hemorrhage	
431	Intracerebral hemorrhage	
432.x	Other and unspecified intracranial hemorrhage	
434.x	Occlusion of cerebral arteries	
436	Acute but ill-defined cerebrovascular disease	
437.1	Other generalized ischemic cerebrovascular disease	
	Chronic liver disease (CHRLIVEB)	Index or prior
456.0-456.2x	Esophageal varices	
571.xx	Chronic liver disease and cirrhosis	
572.2	Hepatic coma	
572.3	Portal hypertension	
573.4	Hepatorenal syndrome	
572.8	Other sequelae of chronic liver disease	
573.0	Chronic passive congestion of liver	
573.8-573.9	Other specified and unspecified disorders of liver	
	Complete atrioventricular block (COATRBLI)	Index only*
426.0	Complete atrioventricular block	
	Congestive heart failure (CHFB)	Index or prior
425.x	Cardiomyopathy	
428.x	Congestive heart failure	
	Diabetes, complicated (DBTCMPB)	Index or prior
250.1x-250.9x	Diabetes with mention of complication	
357.2	Polyneuropathy in diabetes	
362.0x	Diabetic retinopathy	
	High-risk or secondary malignant neoplasm (HRSECMAB)	Index or prior
141.x-172.x, 196.x-199.x	Primary neoplasm of GI respiratory, melanoma, or secondary malignant neoplasm	

Table 7.3: ICD -9-CM codes for clinical risk factors for death after acute myocardial infarction, continued

<i>ICD-9-CM Code</i>	<i>ICD-9-CM Description</i>	<i>Source of Data</i>
	Hyperosmolality (HYPERMOI)	Index only*
276.0 276.5 276.7	Hyperosmolality/hyponatremia Volume depletion Hyperpotassemia	
	Hypertension (HTB)	Index or prior (if
401.x 402.x0 403.x0 404.x0 405.xx	Essential hypertension Hypertensive heart disease Hypertensive renal disease Hypertensive heart and renal disease Secondary hypertension	none of the diagnoses indicative of hypertensive heart or renal failure in Table 8.6 are present)
	Hypotension (HYPOTENI)	Index only*
458.9	Hypotension	
	Infarction site, anterior wall infarction (SITE_ANT)	Index only (if no
410.0x 410.1x 410.2x 410.5x	Anterior wall Other anterior wall Inferolateral Other lateral	diagnoses indicative of subendocardial site are present)
	Infarction site, inferior wall infarction (SITE_INF)	Index only (if no
410.3x 410.4x 410.6x	Inferoposterior wall Other inferior wall Posterior wall	diagnoses indicative of subendocardial or anterior site are present)
	Infarction site, other (SITE_OI)	Index only (if no
410.8x 410.9x	Other unspecified sites Unspecified sites	diagnoses indicative of subendocardial, anterior, or inferior site are present)
	Infarction site, subendocardial infarction (SUBENDOI)	Index only
410.7x	Subendocardial	
	Mitral valvular disorders (MITVALVP)	Prior only
424.0	Mitral valvular disorders	

Table 7.3: ICD -9-CM codes for clinical risk factors for death after acute myocardial infarction, continued

<i>ICD-9-CM Code</i>	<i>ICD-9-CM Description</i>	<i>Source of Data</i>
	Paroxysmal ventricular tachycardia (PVENTACI)	Index only*
427.1	Paroxysmal ventricular tachycardia	
	Prior coronary artery bypass graft (PRCABG)	
996.03	Mechanical complication due to coronary bypass graft (unless 36.1x occurred on the same or prior admission during the same series of transfer hospitalizations)	Index or prior
V45.81	Aortic coronary bypass status (unless 36.1x occurred on a prior admission during the same series of transfer hospitalizations)	Index or prior
36.1x	Bypass anastomosis for heart revascularization	Prior only
	Pulmonary edema (PULEDEMI)	Index only*
514	Pulmonary congestion and hypostasis	
518.4	Acute edema of lung, unspecified	
518.5	Pulmonary insufficiency following trauma and surgery	
518.81	Respiratory failure	
518.82	Other pulmonary insufficiency, not elsewhere classified	
	Renal failure, acute or unspecified (ACRENALB)	Index or prior*
584.x	Acute renal failure	
586	Renal failure, unspecified	
599.0	Urinary tract infection, site not specified	
	Renal failure, chronic (CHRRENAB)	Index or prior
585	Chronic renal failure	
403.x1	Hypertensive renal disease (malignant, benign, or unspecified), with renal failure	
404.x2	Hypertensive heart and renal disease (malignant, benign, or unspecified), with renal failure	
404.x3	Hypertensive heart and renal disease (malignant, benign, or unspecified), with congestive heart and renal failure	
V45.1	Renal dialysis status	
	Seizure disorder (EPILEPB)	Index or prior*
345.xx	Epilepsy	
780.3	Convulsions	
	Shock (SHOCKI)	Index only*
785.5x	Shock without mention of trauma	

Table 7.3: ICD -9-CM codes for clinical risk factors for death after acute myocardial infarction, continued

<i>ICD-9-CM Code</i>	<i>ICD-9-CM Description</i>	<i>Source of Data</i>
	Skin ulcer (SKNULCRP)	
707.x	Chronic skin ulcer	Prior only
	Thyroid disease (THYROIDB)	
243.x-244.x	Hypothyroidism	Index or prior

Index only: variable ascertained only from index AMI hospitalizations (including linked hospitalizations when patients were transferred from one facility to another). These variables represent acute complications of AMI that may be important for risk adjustment if present on admission.

Prior only: variable ascertained only from prior hospitalizations. These variables represent conditions that may be either acute or chronic.

Index or prior: variable ascertained from either index or prior hospitalizations. These variables represent conditions that are very unlikely to occur acutely and therefore almost certainly represent comorbidities.

* These conditions may represent complications of hospital care rather than comorbidities or pre-existing diagnoses. They were therefore included only in Model B, which was specifically designed to adjust for clinical conditions that could have arisen after a patient was admitted to the hospital.

Table 7.4: Clinical characteristics of AMI patients with one or more prior admissions (N=5,442)*

<i>Characteristic</i>	<i>Number</i>	<i>Percent</i>
Acidosis	93	1.7
Cerebrovascular disease, other	91	1.7
Congestive heart failure	1,647	30.3
High risk or secondary malignant neoplasm	126	2.3
Hyperosmolarity	262	4.8
Hypertension	1,373	25.2
Infarction site		
Anterior wall	930	17.1
Inferior wall	675	12.4
Other	447	8.2
Mitral valve disorders	98	1.8
Paroxysmal ventricular tachycardia	257	4.7
Prior coronary artery bypass graft	494	9.1
Pulmonary edema	264	4.9
Renal failure, acute	228	4.2
Renal failure, chronic	385	7.1
Shock	246	4.5
Skin ulcer	65	1.2

* Characteristics in this table were ascertained from either index admissions or prior admissions or both, as noted in Table 8.3. Only variables included in the final risk -adjustment models are shown.

Table 7.5: Clinical characteristics of AMI patients with no prior admissions (N=62,570)*

<i>Characteristic</i>	<i>Number</i>	<i>Percent</i>
Acidosis	718	1.1
Cerebrovascular disease, late effects	825	1.3
Cerebrovascular disease, other	732	1.2
Chronic liver disease	204	0.3
Complete atrioventricular block	1,259	2.0
Congestive heart failure	10,996	17.6
Diabetes, complicated	2,836	4.5
High risk or secondary malignant neoplasm	298	0.5
Hyperosmolarity	1,554	2.5
Hypertension	12,637	20.2
Hypotension	2,304	3.7
Infarction site		
Anterior wall	12,759	20.4
Inferior wall	10,576	16.9
Other	2,905	4.6
Paroxysmal ventricular tachycardia	3,128	5.0
Prior coronary artery bypass graft	2,847	4.6
Pulmonary edema	2,110	3.4
Renal failure, acute	1,219	1.9
Renal failure, chronic	1,103	1.8
Seizure disorder	545	0.9
Shock	2,134	3.4
Thyroid	1,094	1.7

* Characteristics in this table were ascertained from either index admissions or prior admissions or both, as noted in Table 8.3.

Table 7.6: ICD -9-CM codes for clinical risk factors tested but not included in final AMI models

<i>ICD-9-CM Code</i>	<i>ICD-9-CM Description</i>	<i>Source of Data</i>
	Alcohol and drug abuse (DRUGALCB)	Index or prior
V11.3	Personal history of alcoholism	
291.x	Alcoholic psychoses	
292.0	Drug withdrawal syndrome	
292.82	Drug-induced dementia	
303.xx	Alcohol dependence syndrome	
304.xx	Drug dependence	
305.0x	Alcohol abuse	
305.2x-305.9x	Nondependent abuse of drugs, other	
357.5	Alcoholic polyneuropathy	
425.5	Alcoholic cardiomyopathy	
535.3x	Alcoholic gastritis	
571.0	Alcoholic fatty liver	
571.1	Acute alcoholic hepatitis	
572.2	Alcoholic cirrhosis of liver	
571.3	Alcoholic liver damage, unspecified	
980.0	Toxic effect of alcohol, ethyl alcohol	
980.9	Toxic effect of alcohol, unspecified alcohol	
	Alkalosis (ALKAOSI)	Index only*
276.3	Alkalosis	
276.9	Electrolyte and fluid disorders NEC	
	Anemia, specified (ANEMSPB)	Index or prior
280.x	Iron deficiency anemias	
281.x	Other deficiency anemias	
282.xx	Hereditary hemolytic anemias	
283.x	Acquired hemolytic anemias	
284.x	Aplastic anemia	
285.0	Sideroblastic anemia	
285.8	Other specified anemia	
	Anemia, unspecified (ANEMNOB) (ANEMNOSP)	Index or prior* Prior only
285.9	Anemia, unspecified cause	
	Arterial embolism (ATHEREMB) (ATHEREMP)	Index or prior* Prior only*
444.x	Arterial embolism and thrombosis	
785.4	Gangrene	
	Aspiration pneumonia (ASPPNEUI)	Index only*
507.0	Aspiration pneumonia	

Table 7.6: ICD -9-CM codes for clinical risk factors tested but not included in final AMI models, continued

<i>ICD-9-CM Code</i>	<i>ICD-9-CM Description</i>	<i>Source of Data</i>
493.xx	Asthma (ASTHMAB) Asthma	Index or prior
427.31	Atrial fibrillation (ATRFIBB) (ATRFIBP) Atrial fibrillation	Index or prior* Prior only
426.11	Atrioventricular block, first degree (DEG1AVBB) First degree atrioventricular block	Index or prior
426.10 426.12 426.13	Atrioventricular block, second degree (DEG2AVBB) (DEG2AVBP) Atrioventricular block, unspecified Mobitz (Type) II atrioventricular block Other second degree atrioventricular block	Index or prior Prior only
426.3 426.4 426.51 426.52 426.53 426.54	Bundle branch block (BBLKB) (BBLKP) Other left bundle branch block Right bundle branch block Right bundle branch block and left posterior fascicular block Right bundle branch block and left anterior fascicular block Other bilateral bundle branch block Trifascicular block	Index or prior* Prior only
996.01 V45.0 V53.3 37.75	Cardiac pacemaker (PRPACE) Mechanical complication due to cardiac pacemaker (Unless 37.70 -37.74, 37.78, 37.80 -37.83, or 39.64 occurred on the same day or a prior day during the same series of transfer hospitalizations) Cardiac pacemaker in situ (Unless 37.70 -37.74, 37.78, 37.80-37.83, or 39.64 occurred on a prior day during the same series of transfer hospitalizations) Cardiac pacemaker reprogramming (Unless 37.70 -37.74, 37.78, 37.80 -37.83, or 39.64 occurred on a prior day during the same series of transfer hospitalizations) Revision of lead (electrode) (Unless 37.70-37.74, 37.78, 37.80-37.83, or 39.64 occurred on the same day or a prior day during the same series of transfer hospitalizations)	Index only

Table 7.6: ICD -9-CM codes for clinical risk factors tested but not included in final AMI models, continued

<i>ICD-9-CM Code</i>	<i>ICD-9-CM Description</i>	<i>Source of Data</i>
37.76	Replacement of transvenous atrial and/or ventricular lead(s) (electrode) (Unless 37.70 -37.74, 37.78, 37.80 -37.83, or 39.64 occurred on the same or a prior day during the same series of transfer hospitalizations)	
37.77	Removal of lead(s) (electrode) without replacement (Unless 37.70 -37.74, 37.78, 37.80 -37.83, or 39.64 occurred on the same or a prior day during the same series of transfer hospitalizations)	
37.79	Revision or relocation of pacemaker pocket (Unless 37.70-37.74, 37.78, 37.80 -37.83, or 39.64 occurred on the same or a prior day during the same series of transfer hospitalizations)	
37.85	Replacement of any type pacemaker device with single-chamber device, not specified as rate responsive (Unless 37.70 -37.74, 37.78, 37.80 -37.83, or 39.64 occurred on the same or a prior day during the same series of transfer hospitalizations)	
37.86	Replacement of any type pacemaker device with single-chamber device, rate responsive (Unless 37.70 -37.74, 37.78, 37.80 -37.83, or 39.64 occurred on the same or a prior day during the same series of transfer hospitalizations)	
37.87	Replacement of any type pacemaker device with dual-chamber device (Unless 37.70 -37.74, 37.78, 37.80 -37.83, or 39.64 occurred on the same or a prior day during the same series of transfer hospitalizations)	
37.89	Revision or removal of pacemaker device (Unless 37.70-37.74, 37.78, 37.80 -37.83, or 39.64 occurred on the same or a prior day during the same series of transfer hospitalizations)	
429.3	Cardiomegaly (CARDMEGB) (CARDMEGP) Cardiomegaly	Index or prior* Prior only
330.x 340 341.x 331.1-336.x	Central nervous system disease (CNSDISB) Cerebral degeneration usually manifest in childhood Multiple sclerosis Other central nervous system demyelinating diseases Parkinson's disease	Index or prior
	Cerebrovascular disease, other (OTHCVAP)	Prior only
430	Subarachnoid hemorrhage	
431	Intracerebral hemorrhage	

Table 7.6: ICD -9-CM codes for clinical risk factors tested but not included in final AMI models, continued

<i>ICD-9-CM Code</i>	<i>ICD-9-CM Description</i>	<i>Source of Data</i>
432.x 433.x 434.x 436 437.0 437.1 437.8 437.9	Other and unspecified intracranial hemorrhage Occlusion and stenosis of pre-cerebral arteries Occlusion of cerebral arteries Acute but ill-defined cerebrovascular disease Cerebral atherosclerosis Other generalized ischemic cerebrovascular disease Other cerebrovascular disease Unspecified cerebrovascular disease	
491.xx 492.x 494 496 500-505	Chronic obstructive pulmonary disease (COPD) Chronic bronchitis Emphysema Bronchiectasis Chronic airway obstruction, NEC Pneumoconioses and other lung diseases due to external agents	Index or prior
416.x	Chronic pulmonary heart disease (CHRPUBHB) Chronic pulmonary heart disease	Index or prior
286.0-286.4 286.6 286.7 286.9 287.x	Coagulation defects (COAGULB) (COAGULP) Congenital factor deficiencies, von Willebrand's disease Defibrination syndrome Acquired coagulation factor deficiency Other and unspecified coagulation defects Purpura and other hemorrhagic conditions	Index or prior* Prior only
710.x 714.xx	Collagen vascular disease (COLLVASB) Diffuse diseases of connective tissue Rheumatoid arthritis and other inflammatory polyarthropathies	Index or prior
425.x 428.x	Congestive heart failure (CHF) (CHFP) Cardiomyopathy Heart failure	Index only Prior only
290.xx 294.x 310.x 331.0	Dementia (DEMENTB) Senile and presenile organic psychotic conditions Other organic psychotic conditions Specific nonpsychotic mental disorders due to organic brain damage Alzheimer's disease	Index or prior

Table 7.6: ICD -9-CM codes for clinical risk factors tested but not included in final AMI models, continued

<i>ICD-9-CM Code</i>	<i>ICD-9-CM Description</i>	<i>Source of Data</i>
250.x	Diabetes, uncomplicated (DBTUNCMB) Diabetes, uncomplicated	Index or prior (if DBT CMPB=0 in Table 8.3)
	Gastrointestinal hemorrhage (GIHEMORI)	Index only*
531.0x	Acute gastric ulcer, with hemorrhage	
531.2x	Acute gastric ulcer, with hemorrhage and perforation	
531.4x	Chronic or unspecified gastric ulcer, with hemorrhage	
531.6x	Chronic or unspecified gastric ulcer, with hemorrhage and perforation	
532.0x	Acute duodenal ulcer, with hemorrhage	
532.2x	Acute duodenal ulcer, with hemorrhage and perforation	
532.4x	Chronic or unspecified duodenal ulcer, with hemorrhage	
532.6x	Chronic or unspecified duodenal ulcer, with hemorrhage and perforation	
533.0x	Acute peptic ulcer, with hemorrhage	
533.2x	Acute peptic ulcer, with hemorrhage and perforation	
533.4x	Chronic or unspecified peptic ulcer, with hemorrhage	
533.6x	Chronic or unspecified peptic ulcer, with hemorrhage and perforation	
534.0x	Acute gastrojejunal ulcer, with hemorrhage	
534.2x	Acute gastrojejunal ulcer, with hemorrhage and perforation	
534.4x	Chronic or unspecified gastrojejunal ulcer, with hemorrhage	
534.6x	Chronic or unspecified gastrojejunal ulcer, with hemorrhage and perforation	
535.1x	Atrophic gastritis, with/ without hemorrhage	
537.83	Angiodysplasia of stomach and duodenum with hemorrhage	
562.02	Diverticulosis of small intestine with hemorrhage	
562.03	Diverticulitis of small intestine with hemorrhage	
562.12	Diverticulosis of colon with hemorrhage	
562.13	Diverticulitis of colon with hemorrhage	
569.85	Angiodysplasia of intestine with hemorrhage	
578.x	Gastrointestinal hemorrhage	
	Hyperlipidemias (HYPERLIB)	Index or prior
272.0	Pure hypercholesterolemia	
272.1	Pure hyperglyceridemia	
272.2	Mixed hyperlipidemia	
272.3	Hyperchylomicronemia	
272.4	Other and unspecified hyperlipidemia	

Table 7.6: ICD -9-CM codes for clinical risk factors tested but not included in final AMI models, continued

<i>ICD-9-CM Code</i>	<i>ICD-9-CM Description</i>	<i>Source of Data</i>
402.x1 404.x1 404.x3	Hypertensive heart failure (HTHRTFB) Hypertensive heart disease (malignant, benign, or unspecified), with congestive heart failure Hypertensive heart and renal disease (malignant, benign, or unspecified) with congestive heart failure Hypertensive heart and renal disease (malignant, benign, or unspecified) with congestive heart and renal failure	Index or prior
403.x1 404.x2 404.x3	Hypertensive renal failure (HTRENALB) Hypertensive renal disease (malignant, benign, or unspecified), with renal failure Hypertensive heart and renal disease (malignant, benign, or unspecified), with renal failure Hypertensive heart and renal disease (malignant, benign, or unspecified), with congestive heart and renal failure	Index or prior
276.1 276.6 276.8	Hyposmolality (HYPOSMOI) Hyposmolality/hyponatremia Fluid overload Hypopotassemia	Index only*
411.1	Intermediate coronary syndrome (INCORSYI) Intermediate coronary syndrome	Index only*
V10.00-V10.82, V10.84-V10.9	Malignant neoplasm history (HISMALIB) Personal history of malignant neoplasm, except of skin	Index or prior (if HRSECMAB=0, in Table 8.3)
174.x -195.x, 200.x -208.x	Malignant neoplasm, low -risk primary (LRPMALIB) Primary malignancy, other malignancy, including lymphoma	Index or prior
424.0	Mitral valvular disorders (MITVALVB) Mitral valvular disorders	Index or prior
582.x 583.81	Nephritis (CHRBLOMB) Chronic glomerulonephritis Nephritis and nephropathy, not specified as acute or chronic, in disease classified elsewhere	Index or prior

Table 7.6: ICD -9-CM codes for clinical risk factors tested but not included in final AMI models, continued

<i>ICD-9-CM Code</i>	<i>ICD-9-CM Description</i>	<i>Source of Data</i>
260-263.x 799.4	Nutritional disorders (NUTRITB) Nutritional deficiencies Cachexia	Index or prior
278.0	Obesity (OBESITYB) Obesity	Index or prior
715.xx 274.xx	Osteoarthritis (OSTARTH B) Osteoarthritis and allied disorders Gout	Index or prior
440.x 441.x 442.xx 443.1 443.8x 443.9 447.1	Peripheral vascular disease (ATHEROSB) Atherosclerosis Aortic aneurysm Other aneurysm Thromboangiitis obliterans (Buerger's disease) Other specified peripheral vascular diseases Peripheral vascular disease, unspecified Stricture of artery	Index or prior
511.1 511.8 511.9	Pleural effusion (PLEUREFI) Pleurisy, with effusion, with mention of bacterial cause other than tuberculosis Other specified forms of effusion Unspecified pleural effusion	Index only*
480.x-487.0	Pneumonia (PNEUMONI) Pneumonia	Index only*
412	Previous myocardial infarction (OLDAMIB) Old myocardial infarction	Index or prior
295.xx 296.xx 297.x 298.x 299.xx	Psychosis (PSYCHOSB) Schizophrenic disorder Affective psychoses Paranoid states Other nonorganic psychoses Psychoses with origin specific to childhood	Index or prior
584.x 586	Renal failure, acute or unspecified (ACRENALP) Acute renal failure Renal failure, unspecified	Prior only

Table 7.6: ICD -9-CM codes for clinical risk factor tested but not included in final AMI models, continued

<i>ICD-9-CM Code</i>	<i>ICD-9-CM Description</i>	<i>Source of Data</i>
345.xx 780.x	Seizure disorder (EPILEPP) Epilepsy Convulsions	Prior only
038.x 112.5 790.7	Sepsis (SEPSIS) Sepsis Disseminated candidiasis Bacteremia	Index only*
707.x	Skin ulcer (SKNULCRB) Chronic skin ulcer	Index or prior*
427.0 427.2 427.32 427.89 427.9	Supraventricular tachycardia (SUPVTAVB) (SUPVTACP) Paroxysmal supraventricular tachycardia Paroxysmal tachycardia, unspecified Atrial flutter Other cardiac dysrhythmias Cardiac dysrhythmia, unspecified	Index or prior* Prior only
780.2	Syncope (SYNCOPEI) Syncope	Index only*
531.0x-531.3x, 531.9 532.0x-532.3x, 532.9 533.0x-533.3x, 533.9 534.0x-534.3x, 534.9	Ulcer disease, acute/unspecified (ACULCERB) (ACULCERP) Gastric ulcer, acute or unspecified Duodenal ulcer, acute or unspecified Peptic ulcer, site unspecified, acute or unspecified Gastrojejunal ulcer, acute or unspecified	Index or prior* Prior only
531.4x-531.7x 532.4x-532.7x 533.4x-533.7x 534.4x-534.7x	Ulcer disease, chronic (CHULCERB) Gastric ulcer, chronic or unspecified Duodenal ulcer, chronic or unspecified Peptic ulcer, site unspecified, chronic or unspecified Gastrojejunal ulcer, chronic or unspecified	Index or prior
590.1x 590.2 590.8x	Urinary tract infection (URINTRCI) Acute pyelonephritis Renal and perinephric abscess Other pyelonephritis or pyonephrosis	Index only*

Table 7.6: ICD -9-CM codes for clinical risk factors tested but not included in final AMI models, continued

<i>ICD-9-CM Code</i>	<i>ICD-9-CM Description</i>	<i>Source of Data</i>
590.9 595.0 595.9 599.0	Infection of kidney, unspecified Acute cystitis Cystitis, unspecified Urinary tract infection	
394.x-397.x 424.1-424.9x	Valve disorders, other (OTHVALVE) Rheumatic valve disorders Nonrheumatic disorders involving valves other than mitral	Index only Index only
V42.2, V42.3	Organ or tissue replaced by transplant, heart or heart valve	Prior
V42.2, V42.3	Organ or tissue replaced by transplant, heart or heart valve (unless 35.2 occurred on a prior day during the same series of transfer hospitalizations)	Index
996.02	Mechanical complication due to heart valve prosthesis	Prior
996.02	Mechanical complication due to heart valve prosthesis (unless 35.2 occurred on the same day or a prior day during the same series of transfer hospitalizations)	Index
996.71	Other complications due to heart valve prosthesis	Prior
996.71	Other complications due to heart valve prosthesis (unless 35.2 occurred on the same day or a prior day during the same series of transfer hospitalizations)	Index
35.2x	Replacement of heart valve	Prior only
427.6x	Ventricular premature beats (PREBEATB) (PREBEATP) Ventricular premature beats	Index or prior* Prior only

* These conditions may represent complications of hospital care rather than comorbidities or pre-existing diagnoses. They were considered only in Model B, which was specifically designed to adjust for clinical conditions that could have arisen after a patient was admitted to the hospital.

