

Supplementary Material 1: Definition of variables

1 Definitions of variables based on administrative claims data

Variable	Definition
Patient demographics	
Gender	Coded "0" if male and "1" if female
Hospital admission	
Hospital admission type	Admission types in DRG data were collapsed because of small case numbers in types "Z" and "R": 1. Emergency (type "N"); 2. Referral by physician or dentist (type "E" or "Z"); 3. Hospital transfer with pre-treatment >24h (type "V"); 4. Hospital transfer with pre-treatment < 24h or rehabilitation hospital (type "A" or "R")
Clinical characteristics of the infection	
Septic shock	ICD-10 codes in primary or secondary diagnoses: R572
Sepsis as primary diagnosis ^a	ICD-10 codes in primary diagnosis: A400; A401; A402; A403; A408; A409; A410; A411; A412; A413; A414; A4151; A4152; A4158; A418; A419; R572; R650; R651
Infection of lower respiratory tract	ICD-10 codes in primary or secondary diagnoses: J12; J13; J14; J15; J16; J17; J18; J20; J21; J22; J440; J441; J47; J86; J85; A15; A16; U6900
Infection of upper respiratory tract	ICD-10 codes in primary or secondary diagnoses: J09; J10; J11; J00; J01; J02; J03; J04; J06; J05; A36; A37
Abdominal infection	ICD-10 codes in primary or secondary diagnoses: A00; A01; A02; A03; A04; A05; A06; A07; A08; A09; K35; K37; K36; K5712; K5702; K5713; K5703; K5722; K5732; K5723; K5733; K5742; K5743; K5752; K5753; K5782; K5783; K5792; K5793; K61; K65; K67; K630; K631; K750; K751; K810

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Soft tissue and wound infections	ICD-10 codes in primary or secondary diagnoses: A46; B35; B36; B47; L03; L04; L08; L88; L05; B00
Urinary tract infection	ICD-10 codes in primary or secondary diagnoses: N10; N11; N12; N151; N159; N16; N288; N34; N30; N390; N41; N45; N51; N482; N49; N70; N71; N72; N73; N74; N75; N76; N77; N61
Infection of central nervous system	ICD-10 codes in primary or secondary diagnoses: A39; G00; G01; G02; G03; G04; G05; G06; G07; G08; A17
Infection of vascular system	ICD-10 codes in primary or secondary diagnoses: I30; I32; I33; I39; I40; I41; I80
Foreign body associated infection	ICD-10 codes in primary or secondary diagnoses: T826; T827; T835; T836; T845; T846; T847; T857
Comorbidities ^b	
CCI: Cerebrovascular disease	ICD-10 codes in primary or secondary diagnoses: G4589; G462; G4583; G4503; G4592; G4539; G4599; G460; G461; G4593; I600; G4542; G4543; G4523; G467; H340; I606; G4509; G4512; G4513; G4519; G4522; I612; I613; I601; I602; I603; I604; I605; G468; I607; I608; I609; I610; I611; I630; I631; G463; G464; G465; G466; I619; G4502; I639; I64; I650; I651; I652; I653; I658; I659; I660; I661; I662; I663; I664; I668; I669; I670; I6710; I6711; I672; I673; I674; I614; I615; I616; I618; I6788; I6200; I6201; I6202; I6209; I621; I629; I691; I692; I632; I633; I634; I635; I636; I638; I679; G4549; G4582; I682; I688; I690; G4533; I6780; G4529; G4532; I676; I681; I698; I680; I693; I677; I675; I694
CCI: Dementia	ICD-10 codes in primary or secondary diagnoses: F012; F021; F011; F001; F03; F009; F010; F051; F013; F018; F019; F023; F000; F002; F022; F024; F028; G300; G301; G308; F020; G311; G309
CCI: Mild liver disease	ICD-10 codes in primary or secondary diagnoses: B180; B181; B182; B188; B189; K746; K760; K762; K763; K764; K702; K703; K739; K768; K769; K713; K714; K715; K717; K732; K738; K700; K701; Z944; K742; K743; K709; K745; K741; K744; K731; K730; K740

CCI: Moderate or severe liver disease	ICD-10 codes in primary or secondary diagnoses: K704; K711; K765; K767; I982; K729; K766; I864; I850; I859; I983; K721
CCI: Myocardial infarction	ICD-10 codes in primary or secondary diagnoses: I211; I212; I229; I2522; I210; I219; I2529; I221; I213; I2521; I214; I220; I228; I2520
CCI: Peptic ulcer disease	ICD-10 codes in primary or secondary diagnoses: K270; K266; K267; K289; K271; K272; K269; K264; K265; K250; K251; K252; K253; K254; K255; K256; K257; K259; K260; K261; K262; K263; K280; K281; K282; K283; K284; K285; K286; K273; K274; K275; K276; K277; K279; K287
ECI: Alcohol abuse	ICD-10 codes in primary or secondary diagnoses: F108; K703; F104; T510; I426; K700; G621; F105; T518; T511; Z502; F109; T513; K709; F103; T512; F102; E52; F107; K292; F100; T519; F101; F106
ECI: Blood loss anemia	ICD-10 codes in primary or secondary diagnoses: D500
ECI: Cardiac arrhythmias	ICD-10 codes in primary or secondary diagnoses: I459; I495; I498; I442; I471; I443; I456; I492; I489; I494; Z950; I483; I470; I479; R001; R008; I499; I441; Z4508; I480; I490; I493; R000; Z4500; I481; I472; I491; Z450; Z4501; I484; I482; T821; Z4502
ECI: Coagulopathy	ICD-10 codes in primary or secondary diagnoses: D6835; D686; D681; D6838; D6834; D691; D6832; D684; D685; D67; D680; D6952; D6833; D6821; D6824; D6825; D6820; D650; D651; D652; D659; D66; D6940; D6941; D6823; D6953; D6957; D6822; D6831; D6959; D6826; D6828; D6961; D693; D693; D6960; D6958; D689; D688
ECI: Congestive heart failure	ICD-10 codes in primary or secondary diagnoses: I4288; I4280; I5019; I427; I509; I432; I438; I430; I431; P290; I099; I5012; I5013; I5014; I420; I425; I426; I5011; I5001; I429; I5000; I255
ECI: Deficiency anemia	ICD-10 codes in primary or secondary diagnoses: D508; D512; D509; D520; D521; D528; D538; D510; D511; D529; D518; D513; D539; D532; D530; D519; D531
ECI: Depression	ICD-10 codes in primary or secondary diagnoses: F323; F328; F314; F322; F204; F315; F329; F333; F321; F432; F313; F332; F330; F331; F338; F339; F320; F334; F412; F341

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<p>ECI: Drug abuse</p>	<p>ICD-10 codes in primary or secondary diagnoses: F128; F122; F121; F134; F127; F133; F126; F131; F166; F167; F130; F160; F161; F162; F159; F125; F165; F138; F139; F129; F169; F180; F132; F144; F181; F182; F184; F135; F136; F123; F110; F111; F112; F113; F168; F115; F116; F145; F146; F147; F148; F149; F137; F164; F188; F189; F190; F114; F192; F193; F117; F118; F119; F120; F185; F124; F187; F150; F151; F152; F191; F154; F155; F194; F195; F196; F183; F198; F186; F163; F140; F141; F156; F153; F157; F197; F158; F143; F199; F142</p>
<p>ECI: Hypertension, complicated</p>	<p>ICD-10 codes in primary or secondary diagnoses: I1101; I1101; I1191; I1200; I1320; I1310; I1100; I1501; I1301; I1320; I1310; I1190; I1311; I1300; I1321; I1301; I1100; I1510; I1511; I1520; I1311; I1580; I1390; I1200; I1290; I1291; I1201; I1300; I1500; I1521; I1591; I1581; I1201; I1321; I1391; I1590</p>
<p>ECI: Hypertension, uncomplicated</p>	<p>ICD-10 codes in primary or secondary diagnoses: I1010; I1091; I1011; I1001; I1090; I1000</p>
<p>ECI: Hypothyroidism</p>	<p>ICD-10 codes in primary or secondary diagnoses: E012; E018; E011; E033; E010; E030; E000; E038; E02; E039; E009; E031; E032; E890; E001; E002; E035; E034</p>
<p>ECI: Lymphoma</p>	<p>ICD-10 codes in primary or secondary diagnoses: C845; C846; C848; C810; C849; C851; C847; C857; C817; C859; C852; C965; C966; C967; C968; C969; C826; C827; C829; C830; C831; C9030; C819; C820; C821; C822; C823; C824; C825; C864; C865; C811; C812; C813; C814; C9031; C960; C962; C964; C838; C841; C844; C8890; C8891; C9000; C9001; C9020; C9021; C8821; C8830; C8831; C860; C861; C862; C863; C840; C8801; C8820; C866; C8800; C8840; C8841; C8870; C833; C839; C835; C837; C8871</p>
<p>ECI: Metastatic cancer</p>	<p>ICD-10 codes in primary or secondary diagnoses: C793; C797; C794; C7983; C788; C791; C792; C774; C775; C795; C790; C796; C783; C778; C779; C7981; C770; C771; C772; C773; C799; C800; C809; C784; C780; C781; C782; C7984; C785; C786; C787; C7982; C7988</p>
<p>ECI: Obesity</p>	<p>ICD-10 codes in primary or secondary diagnoses: E6699; E6629; E6602; E6622; E6692; E6680; E6609; E6691; E6621; E6611; E6601; E6690; E6689; E6681; E6612; E6610; E6620; E6600; E6682; E6619</p>

ECI: Other neurological disorders	ICD-10 codes in primary or secondary diagnoses: G130; G934; G328; G350; G112; G131; G129; G931; G369; G319; G138; G121; G122; G132; G128; G210; G211; G119; G213; G214; G2000; G212; G118; G3521; G120; G3531; G359; G2091; G3188; G320; G10; G110; G111; G113; G2001; G2010; G3520; G375; G378; G379; G3530; G4001; G4002; G360; G361; G370; G371; G372; G373; G374; G406; G407; G408; G4000; G410; G411; G4008; G4009; G401; G402; G403; G404; G405; G218; G219; G22; G409; G2020; G2021; G3182; G412; G418; G419; R470; G3510; G3511; G114; G312; G2090; G2011; G255; G368; R560; R568; G3181; G254
ECI: Paralysis	ICD-10 codes in primary or secondary diagnoses: G8212; G8266; G833; G8211; G8263; G8264; G8267; G831; G832; G8265; G8201; G8341; G8349; G8200; G041; G8261; G8233; G8239; G8240; G8213; G8219; G819; G830; G811; G8340; G8203; G8209; G839; G8210; G8260; G8262; G8221; G8241; G8242; G114; G8229; G8222; G8250; G8202; G8220; G8230; G8232; G802; G8223; G8269; G810; G8231; G8259; G8252; G8253; G8249; G801; G8251; G8243
ECI: Peripheral vascular disorders	ICD-10 codes in primary or secondary diagnoses: I7021; I7020; I7103; I7104; I738; I7023; I7102; I731; I792; I739; I771; I790; I709; I7100; I7101; I719; I701; I700; I7024; I7105; I7022; I7107; Z9580; I7025; I708; I7029; I714; Z9581; Z9588; Z959; K559; I711; I712; I7106; I713; I715; I716; I7026; K5588; K551; K5581; I718; K5582
ECI: Psychoses	ICD-10 codes in primary or secondary diagnoses: F24; F239; F220; F238; F232; F230; F233; F251; F252; F202; F203; F259; F208; F209; F28; F200; F231; F312; F228; F258; F250; F204; F205; F315; F29; F302; F201; F229; F206
ECI: Pulmonary circulation disorders	ICD-10 codes in primary or secondary diagnoses: I288; I2720; I2728; I280; I278; I260; I269; I271; I270; I289; I279
ECI: Renal failure	ICD-10 codes in primary or secondary diagnoses: N250; Z490; Z491; Z492; N19; Z940; N181; N182; N183; N184; N185; N1880; N1889; N189; Z992
ECI: Solid tumor without metastasis	ICD-10 codes in primary or secondary diagnoses: C07; C080; C068; C069; C161; C154; C155; C158; C159; C160; C248; C081; C088; C089; C090; C166; C091; C169; C001; C002; C003; C004; C005; C006; C162; C163; C164; C165; C021; C022; C023; C024; C028; C029; C030; C031; C039; C040; C041; C048; C049; C221;

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	<p>C222; C223; C224; C227; C229; C061; C062; C383; C384; C388; C390; C398; C399; C400; C168; C000; C098; C099; C100; C101; C102; C103; C008; C009; C01; C020; C111; C112; C113; C118; C119; C12; C130; C131; C132; C138; C139; C140; C142; C148; C150; C151; C152; C153; C460; C461; C462; C463; C467; C468; C469; C470; C471; C472; C401; C402; C475; C170; C171; C172; C173; C178; C104; C108; C109; C110; C183; C184; C185; C186; C187; C188; C189; C19; C20; C210; C211; C212; C218; C220; C508; C509; C510; C511; C512; C518; C519; C52; C530; C531; C538; C539; C540; C541; C473; C474; C548; C549; C55; C56; C570; C571; C572; C573; C574; C577; C578; C579; C58; C600; C601; C602; C608; C609; C61; C620; C621; C629; C630; C631; C632; C637; C638; C639; C64; C65; C66; C670; C671; C672; C673; C674; C675; C676; C677; C678; C679; C403; C408; C409; C4101; C4102; C411; C412; C4130; C4131; C4132; C414; C418; C419; C430; C431; C432; C433; C434; C435; C436; C437; C438; C439; C450; C451; C452; C457; C459; C722; C723; C724; C725; C728; C729; C73; C740; C741; C749; C750; C751; C752; C753; C754; C755; C758; C759; C760; C761; C762; C763; C764; C765; C767; C768; C495; C496; C498; C499; C500; C501; C502; C503; C504; C505; C506; C050; C051; C052; C058; C059; C060; C23; C240; C241; C269; C249; C250; C251; C542; C543; C254; C257; C258; C259; C260; C261; C268; C328; C300; C301; C310; C311; C312; C313; C318; C319; C320; C321; C322; C323; C690; C329; C33; C340; C341; C717; C718; C719; C720; C721; C37; C381; C382; C711; C691; C97; C693; C694; C695; C696; C252; C253; C680; C681; C688; C689; C479; C712; C692; C714; C715; C716; C182; C698; C699; C700; C701; C709; C710; C180; C480; C713; C179; C343; C181; C488; C342; C380; C348; C349; C476; C492; C493; C482; C481; C478; C494; C490; C491</p>
ECI: Valvular disease	<p>ICD-10 codes in primary or secondary diagnoses: A520; I3480; I3488; I349; I350; I351; Z952; Z953; Z954; I360; I361; I340; I341; I342; I370; I371; I372; I378; I379; I352; I358; I359; I392; I393; I362; I368; I369; I051; I052; I058; I059; Q230; I38; I390; I391; I069; I070; I394; I398; I050; I079; I080; I081; I082; I083; Q231; Q232; Q233; I098; I068; I071; I072; I078; I062; I088; I089; I091; I061; I060</p>
Leucemia	<p>ICD-10 codes in primary or secondary diagnoses: C901; C91; C92; C93; C94; C95</p>
Specific procedures	

Conduction of palliative care	German procedure codes: 8982; 898e
Conduction of chemotherapy	German procedure codes: 854

CCI: Charlson Comorbidity Index. ECI: Elixhauser Comorbidity Index. Variables based on ICD-10 codes, procedure codes, or medical specialty codes were given the value “1” if one of the specified codes was present, else they were given the value “0”. The string-matching of codes was based on the comparison of the 1:*n* first characters, where *n* is the number of characters in the codes specified in the table (e.g. string-matching for J12 identified all cases with diagnoses J12.0, J12.1, J12.2, J12.3, J.12.8, and J12.9).

^a Sepsis was identified by clinical and pathogen based sepsis codes. The selection of codes resembles the definition used for sepsis in the largest claims-based quality initiative in Germany – “Initiative Qualitätsmedizin” in 2016 (1).

^b Categories of the CCI, which had the same definition as corresponding categories of the ECI were excluded. If categories of CCI and ECI were not exactly identical but showed strong overlap, the category that had the stronger univariate relation to hospital mortality in the risk-model was used.

2 References

1. Mansky T, Nimptsch U, Cools A, Hellerhoff F. G-IQI | German Inpatient Quality Indicators Version 5.0 - Band 2: Definitionshandbuch für das Datenjahr 2016. Berlin: Technische Universität Berlin; 2016.