## Suppl 1. Definition and Measurement of Covariates

| Risk factor | Fixed/time-dependent | Categorical/continuous | Identification |
| --- | --- | --- | --- |
| Age | Fixed (at CLD diagnosis) | Continuous | VINCI |
| Sex | Fixed (at CLD diagnosis) | Categorical (male/female) | VINCI |
| International normalized ratio | Time-dependent | Categorical (two categories: > 1.5, ≤ 1.5) | Laboratory value |
| Platelet count | Time-dependent | Categorical (two categories: < 50,000/µL, ≥ 50,000/µL) | Laboratory value |
| Total bilirubin | Time-dependent | Categorical (two categories: ≥ 2 mg/dL, < 2 mg/dL) | Laboratory value |
| Albumin | Time-dependent | Categorical (two categories: ≤ 3.5 mg/dL, > 3.5 mg/dL) | Laboratory value |
| Chronic kidney disease | Time-dependent | Categorical (two categories: CrCl < 30 mL/min, CrCl ≥ 30 mL/min) | Laboratory value |
| Aspirin or antiplatelet use | Time-dependent | Categorical (yes/no) | PBM |
| Prior hemorrhage | Fixed (within 5 years prior to CLD diagnosis) | Categorical (yes/no) | ICD-9/10 codes |
| Anemia | Fixed (within 12 months prior to CLD diagnosis) | Categorical (yes/no) | Laboratory value: Hgb < 10 Or ICD-9/10 codes |
| Hypertension | Fixed (within 12 months prior to CLD diagnosis) | Categorical (yes/no) | BP > 160 or ICD-9/10 codes |
| Alcohol abuse, ascites, congestive heart failure, cardiovascular disease, dementia, chronic lung disease, connective tissue disease, peptic ulcer disease, diabetes, hemi- or paraplegia, HIV | Fixed (within 12 months prior to CLD diagnosis) | Categorical (yes/no) | ICD-9/10 codes |
| Infection | Time-dependent | Categorical (yes/no) | ICD-9/10 codes for sepsis, pneumonia, urinary tract infection, peritonitis |

Time-varying variables were used to predict hemorrhage within 30 days after the abnormal value. CLD: chronic liver disease; CrCl: creatinine clearance; HIV: human immunodeficiency virus; ICD: International Classification of Diseases; PBM: pharmacy benefits management; VINCI: Veterans Informatics and Computing Infrastructure.