Supplementary Table 1: ICD-10 codes, which define alcohol-related hospital admission adopted Fone et al (2016)∗

| ICD-10 code | Description                                                                 | Alcohol attributable fraction** | Alcohol code group in admission | Alcohol code group in discharge |
|-------------|------------------------------------------------------------------------------|---------------------------------|---------------------------------|---------------------------------|
| F10.0       | Acute intoxication                                                           | 1                               | f100                            | F100                            |
| F10.1       | Harmful use                                                                  | 1                               | f101                            | F101                            |
| F10.2       | Dependence syndrome                                                          | 1                               | f102                            | F102                            |
| F10.3       | Withdrawal state                                                             | 1                               | f103                            | F103                            |
| F10.4       | Withdrawal state with delirium                                               | 1                               | f104-f109                       | F104-F109                       |
| F10.5       | Psychotic disorder                                                           | 1                               | f104-f109                       | F104-F109                       |
| F10.6       | Amnesic syndrome                                                             | 1                               | f104-f109                       | F104-F109                       |
| F10.7       | Residual and late-onset psychotic disorder                                   | 1                               | f104-f109                       | F104-F109                       |
| F10.8       | Other mental and behavioural disorders                                        | 1                               | f104-f109                       | F104-F109                       |
| F10.9       | Unspecified mental and behavioural disorder                                  | 1                               | f104-f109                       | F104-F109                       |
| K70.0       | Alcoholic fatty liver                                                        | 1                               | k-liver                         | K-LIVER                         |
| K70.1       | Alcoholic hepatitis                                                           | 1                               | k-liver                         | K-LIVER                         |
| K70.2       | Alcoholic fibrosis and sclerosis of liver                                    | 1                               | k-liver                         | K-LIVER                         |
| K70.3       | Alcoholic cirrhosis of liver                                                  | 1                               | k-liver                         | K-LIVER                         |
| K70.4       | Alcoholic hepatic failure                                                     | 1                               | k-liver                         | K-LIVER                         |
| K70.9       | Alcoholic liver disease, unspecified                                          | 1                               | k-liver                         | K-LIVER                         |
| K29.2       | Alcoholic gastritis                                                           | 1                               | k-non liver                     | K-NON LIVER                     |
| K85.2       | Alcohol-induced acute pancreatitis                                           | 1                               | k-non liver                     | K-NON LIVER                     |
| K86.0       | Alcohol-induced chronic pancreatitis                                         | 1                               | k-non liver                     | K-NON LIVER                     |
| E24.4       | Alcohol-induced pseudo-Cushing’s syndrome                                     | 1                               | other alcohol                   | OTHER ALCOHOL                   |
| E51.2       | Wernicke’s encephalopathy                                                    | Not known                       | other alcohol                   | OTHER ALCOHOL                   |
| G31.2       | Degeneration of nervous system due to alcohol                                | 1                               | other alcohol                   | OTHER ALCOHOL                   |
| G40.5       | Special epileptic syndromes – if paired with other alcohol code               | 0.24–0.27 (males) 0.15–0.24 (females) | N/A***                          | N/A***                          |
| G62.1       | Alcoholic polyneuropathy                                                     | 1                               | other alcohol                   | OTHER ALCOHOL                   |
| G72.1       | Alcoholic myopathy                                                            | 1                               | other alcohol                   | OTHER ALCOHOL                   |
| I42.6       | Alcoholic cardiomyopathy                                                     | 1                               | other alcohol                   | OTHER ALCOHOL                   |
| O35.4       | Maternal care for (suspected) damage to fetus from alcohol                   | 1                               | other alcohol                   | OTHER ALCOHOL                   |
| R78.0       | Finding of alcohol in blood                                                   | 1                               | other alcohol                   | OTHER ALCOHOL                   |
| T51.0       | Toxic effect: Ethanol Excl.: acute alcohol intoxication or "hangover" effects (F10.0), drunkenness (F10.0), pathological alcohol intoxication (F10.0) | 1                               | txy                             | TXY                             |
| X45.0       | Accidental poisoning by and exposure to alcohol: Occurrence at home           | 1                               | txy                             | TXY                             |
| X45.1       | Accidental poisoning by and exposure to alcohol: Occurrence in residential institution | 1                               | txy                             | TXY                             |
| X45.2       | Accidental poisoning by and exposure to alcohol: Occurrence at school other institution/public admin area | 1                               | txy                             | TXY                             |
| X45.4       | Accidental poisoning by and exposure to alcohol: Occurrence on street/highway | 1                               | txy                             | TXY                             |
| X45.5       | Accidental poisoning by and exposure to alcohol: Occurrence at trade/service area | 1                               | txy                             | TXY                             |
| X45.6       | Accidental poisoning by and exposure to alcohol: Occurrence at industrial/construction area | 1                               | txy                             | TXY                             |
| X45.8       | Accidental poisoning by and exposure to alcohol: Occurrence at other specified place | 1                               | txy                             | TXY                             |
| X45.9       | Accidental poisoning by and exposure to alcohol: Occurrence at unspecified place | 1                               | txy                             | TXY                             |
| X65.0       | Intentional self-poisoning by and exposure to alcohol: Occurrence at home     | 1                               | txy                             | TXY                             |

Continued
| ICD-10 code | Description                                                                 | Alcohol attributable fraction* | Alcohol code group in admission | Alcohol code group in discharge |
|-------------|------------------------------------------------------------------------------|--------------------------------|--------------------------------|--------------------------------|
| X65.1       | Intentional self-poisoning by and exposure to alcohol: Occurrence in residential institution | 1                              | txy                            | TXY                            |
| X65.2       | Intentional self-poisoning by and exposure to alcohol: Occurrence at school other institution/public admin area | 1                              | txy                            | TXY                            |
| X65.4       | Intentional self-poisoning by and exposure to alcohol: Occurrence on street/highway | 1                              | txy                            | TXY                            |
| X65.5       | Intentional self-poisoning by and exposure to alcohol: Occurrence at trade/service area | 1                              | txy                            | TXY                            |
| X65.6       | Intentional self-poisoning by and exposure to alcohol: Occurrence at industrial/construction area | 1                              | txy                            | TXY                            |
| X65.8       | Intentional self-poisoning by and exposure to alcohol: Occurrence at other specified place | 1                              | txy                            | TXY                            |
| X65.9       | Intentional self-poisoning by and exposure to alcohol: Occurrence at unspecified place | 1                              | txy                            | TXY                            |
| Y15.0       | Poisoning by and exposure to alcohol, undetermined intent: Occurrence at home | 1                              | txy                            | TXY                            |
| Y15.2       | Poisoning by and exposure to alcohol, undetermined intent: Occurrence at school other institution/public admin area | 1                              | txy                            | TXY                            |
| Y15.4       | Poisoning by and exposure to alcohol, undetermined intent: Occurrence on street/highway | 1                              | txy                            | TXY                            |
| Y15.8       | Poisoning by and exposure to alcohol, undetermined intent: Occurrence at other specified place | 1                              | txy                            | TXY                            |
| Y15.9       | Poisoning by and exposure to alcohol, undetermined intent: Occurrence at unspecified place | 1                              | txy                            | TXY                            |
| Y90.0       | Blood alcohol level of less than 20 mg/100 ml                               | 1                              | txy                            | TXY                            |
| Y90.1       | Blood alcohol level of 20–39 mg/100 ml                                      | 1                              | txy                            | TXY                            |
| Y90.2       | Blood alcohol level of 40–59 mg/100 ml                                      | 1                              | txy                            | TXY                            |
| Y90.3       | Blood alcohol level of 60–79 mg/100 ml                                      | 1                              | txy                            | TXY                            |
| Y90.4       | Blood alcohol level of 80–99 mg/100 ml                                      | 1                              | txy                            | TXY                            |
| Y90.5       | Blood alcohol level of 100–119 mg/100 ml                                    | 1                              | txy                            | TXY                            |
| Y90.6       | Blood alcohol level of 120–199 mg/100 ml                                    | 1                              | txy                            | TXY                            |
| Y90.7       | Blood alcohol level of 200–239 mg/100 ml                                    | 1                              | txy                            | TXY                            |
| Y90.8       | Blood alcohol level of 240 mg/100 ml or more                                | 1                              | txy                            | TXY                            |
| Y90.9       | Presence of alcohol in blood, level not specified                           | 1                              | txy                            | TXY                            |
| Y91.0       | Mild alcohol intoxication                                                   | 1                              | txy                            | TXY                            |
| Y91.1       | Moderate alcohol intoxication                                                | 1                              | txy                            | TXY                            |
| Y91.2       | Severe alcohol intoxication                                                  | 1                              | txy                            | TXY                            |
| Y91.3       | Very severe alcohol intoxication                                             | 1                              | txy                            | TXY                            |
| Y91.9       | Alcohol involvement, not otherwise specified                                | Not known                      | N/A***                         | N/A***                         |
| Z50.2       | Alcohol rehabilitation                                                       | Not known                      | N/A***                         | N/A***                         |
| Z71.4       | Alcohol abuse counselling and surveillance                                   | Not known                      | N/A***                         | N/A***                         |
| Z72.1       | Alcohol use                                                                  | Not known                      | N/A***                         | N/A***                         |

*Fone D, Morgan J, Fry R, et al. Change in alcohol outlet density and alcohol-related harm to population health (CHALICE): a comprehensive record-linked database study in Wales. Public Health Res 2016; 4(3): 1–222.

**Jones L, Bellis MA. Updating England-Specific Alcohol-Attributable Fractions. Liverpool: Center for Public Health, Faculty of Education Health & Community, Liverpool John Moores University; 2014.

***The ICD-10 codes, which either had alcohol attributable fraction <1 (G40.5) or were not known (E51.2, .Z50.2,Z71.4,Z72.1) were found as part of the review of available, but considered out of scope of this study.

Other alcohol, OTHER ALCOHOL: ICD-10 alcohol codes others.
k-liver, K-LIVER: ICD-10 alcohol codes, started by “K” related to liver disease.
k-non liver, K-NON LIVER: ICD10-10 alcohol codes related to non-liver disease.
txy, TXY: ICD-10 alcohol codes started by “T” or “X” or “Y”. 
Supplementary Table 2: Cross tabulation of first found diagnostic- and group of diagnostic codes at admission and discharge of alcohol-related hospital admissions. These hospital admissions had at least 2 episodes, happened between 2006 and 2011 in Wales. (<5 is shown where Information Governance Disclosure Control rules were not allowed to publish number)

| Admission codes | F100 | F101 | F102 | F103 | F104-F109 | K-LIVER | K-NON LIVER | TXY | OTHER ALCOHOL |
|-----------------|------|------|------|------|-----------|---------|-------------|-----|---------------|
| f100            | 1,452| 30   | 107  | 38   | <5        | 19      | <5          | <5  | <5            |
| f101            | 8    | 3,360| 32   | 48   | 12        | 102     | 16          | <5  | <5            |
| f102            | 10   | 35   | 4,544| 114  | 20        | 212     | 38          | <5  | <5            |
| f103            | 6    | 7    | 35   | 2,367| 11        | 38      | 8           | <5  | <5            |
| f104-f109       | <5   | <5   | 7    | <5   | 423       | <5      | <5          | <5  | <5            |
| k-liver         | <5   | 14   | 21   | 27   | <5        | 7,538   | 9           | <5  | <5            |
| k-non liver     | <5   | <5   | 6    | <5   | <5        | 784     | <5          | <5  | <5            |
| txy             | <5   | 20   | 36   | <5   | <5        | 7       | <5          | 1,828| <5            |
| other alcohol   | <5   | <5   | 9    | <5   | <5        | 14      | <5          | <5  | 486           |

f100/F100, f101/F101, f102/F102, f103/F103: F10.0, F10.1, F10.2, F10.3 alcohol-related ICD-10 diagnostic codes, respectively
f104-f109, F104-F109: F10.4, F10.5, F10.6, F10.7, F10.8, F10.9 alcohol-related ICD-10 diagnostic codes
k-liver, K-LIVER: K70.0, K70.1, K70.2, K70.3, K70.4, K70.9 alcohol-related, liver disease ICD-10 diagnostic codes
k-non liver, K-NON LIVER: K29.2, K85.2, K86.0 alcohol-related, non-liver disease ICD-10 diagnostic codes
other alcohol, OTHER ALCOHOL: E24.4, G31.2, G62.1, G72.1, I42.6, O35.4, R78.0 alcohol-related ICD-10 diagnostic codes
txy, TXY: T51.0, X45.0, X45.1, X45.2, X45.4, X45.5, X45.6, X45.8, X45.9, X65.0, X65.1, X65.2, X65.4, X65.5, X65.6, X65.8, X65.9, Y15.0, Y15.2, Y15.4, Y15.8, Y15.9, Y90.0, Y90.1, Y90.2, Y90.3, Y90.4, Y90.5, Y90.6, Y90.7, Y90.8, Y90.9, Y91.0, Y91.1, Y91.2, Y91.3, Y91.9 alcohol-related ICD-10 diagnostic codes.