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**Appendix. Defining chronic conditions in the VA environment**

| Component | Definition | ICD codes | | Labs | Medications* | Other |
|---|---|---|---|---|---|---|
| | | | | **Details** | | |
| | | **ICD-9** | **ICD-10** | **Labs** | **Medications*** | **Other** |
| **Type 2 Diabetes Mellitus**[1-4] | (1) At least two encounters (inpatient or outpatient) with documentation of a Type 2 diabetes ICD-9/10 code (ICD-9: 250.x; ICD-10: E11.x), *or*<br><br>(2) a documented prescription for a diabetes medication other than metformin or acarbose alone, *or*<br><br>(3) at least one encounter with a diabetes ICD-9/10 code and two elevated (≥ 6.5%) glycosylated hemoglobin (Hgb A1C) lab test results<br><br>• Implausible A1C labs removed (range based on NHANES reporting)<br>• Multiple labs measured on the same day or on the same day and time were averaged if they ranged within 1%<br>• A1C labs ranging >1% were removed<br>• If only one A1C lab was available prior to cohort entry date, that lab was used.<br>• If more than one A1C lab was available, the average of the last two was taken | 250, 250.0, 250.00, 250.02, 250.1, 250.10, 250.12, 250.2, 250.20, 250.22, 250.3, 250.30, 250.32, 250.4, 250.40, 250.42, 250.5, 250.50, 250.52, 250.6, 250.60, 250.62, 250.7, 250.70, 250.72, 250.8, 250.80, 250.82, 250.9, 250.90, 250.92 | E11.00, E11.01, E11.21, E11.22, E11.29, E11.311, E11.319, E11.321, E11.3211, E11.3212, E11.3213, E11.3219, E11.329, E11.3291, E11.3292, E11.3293, E11.3299, E11.331, E11.3311, E11.3312, E11.3313, E11.3319, E11.339, E11.3391, E11.3392, E11.3393, E11.3399, E11.341, E11.3411, E11.3412, E11.3413, E11.3419, E11.349, E11.3491, E11.3492, E11.3493, E11.3499, E11.351, E11.3511, E11.3512, E11.3513, E11.3519, E11.352, E11.3521, E11.3522, E11.3523, E11.3529, E11.353, E11.3531, E11.3532, E11.3533, E11.3539, E11.354, E11.3541, E11.3542, E11.3543, E11.3549, E11.355, E11.3551, E11.3552, E11.3553, E11.3559, E11.359, E11.3591, E11.3592, E11.3593, E11.3599, E11.36, E11.37, E11.37X1, E11.37X2, E11.37X3, E11.37X9, E11.39, E11.40, E11.41, E11.42, E11.43, E11.44, | LOINC code corresponding to A1C:<br><br>• 17855-8<br>  17856-6<br>  4548-4<br>  4549-2 | Chloropropamide, glipizide, glyburide, glimepiride, metformin, repaglinide, nateglinide, tosiglitazone, pioglitazone, sitagliptin, saxagliptin, linagliptin, alogliptin, canagliflozin, dapagliflozin, acarbose, meglitol, colesevelam, insulin | - |

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| | | | E11.49, E11.51, E11.52, E11.59, E11.610, E11.618, E11.620, E11.621, E11.622, E11.628, E11.630, E11.638, E11.641, E11.649, E11.65, E11.69, E11.8, E11.9 | | | |
| **Comorbidities** | | | | | | |
| A1C[4-10] | (1) Mean and standard deviation calculated after identifying labs using LOINC codes<br><br>• Implausible A1C labs removed (range based on NHANES reporting)<br>• Multiple labs measured on the same day or on the same day and time were averaged if they ranged within 1%<br>• A1C labs ranging >1% were removed<br>• If only one A1C lab was available prior to cohort entry date, that lab was used.<br>• If more than one A1C lab was available, the average of the last two was taken | - | - | LOINC code corresponding to A1C:<br><br>• 17855-8<br>• 17856-6<br>• 4548-4<br>• 4549-2 | - | |
| BMI[11-14] | (1) Calculated as weight (Kg)/[height(m)]$^2$. Normal weight defined as BMI < 25, Overweight defined as ≥25 and <30, and Obese as ≥30<br><br>Height:<br>• Implausible values removed (range based on published literature) | - | - | - | - | Obtained by vital signs records |

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| | • Multiple heights recorded during the same visit were averaged if they ranged within 3 inches (7.62 cm) or less<br>• Measurements ranging more than 3 inches were deleted<br>• If only one height measurement was available prior to cohort entry date, that height was used<br>• If more than one height measurement was available prior to cohort entry date, the average of the last two was taken<br><br>Weight:<br>• Implausible values removed (range based on published literature)<br>• Multiple weights recorded during the same visit were averaged if they ranged within 10 lb (4.536 Kg) or less. Measurements ranging more than 10 lb were deleted<br>• If only one weight measurement was available prior to cohort entry date, that weight was used<br>• If more than one weight measurement was available prior to cohort entry date, the average of the last two was taken | | | | | |
| Blood Pressure (BP)[15-19] | (1) Mean and standard deviation of systolic and diastolic BP calculated | - | - | - | - | Obtained by vital signs records |

|  | • Records deleted if measured at nighttime (8pm to 7am) or if diastolic BP was greater than systolic BP<br>• Only BP measured within the 2 years prior to cohort entry was included<br>• BP measured on the same day was averaged<br>• If only one BP measured was available on, or prior to, cohort entry date, it was used as the baseline BP<br>• If more than one BP was available on, or prior to, cohort entry date, the average of the last two measurements was used as the baseline BP |  |  |  |  |  |
|---|---|---|---|---|---|---|
| Hypertension (HTN)[20-24] | (1) At least one ICD-9/10 code for HTN | 401.0, 401.1, 401.9 | I10.X | - | - | - |
| Hyperlipidemia[25,26] | (1) Elevated total cholesterol (>240 mg/dL), *or*<br><br>(2) Lipid-lowering medication use, *or*<br><br>(3) at least 2 ICD-9/10 codes documenting hyperlipidemia | 272.0, 272.1, 272.2, 272.3, 272.4, 272.5, 272.6, 272.7, 272.8, 272.9 | E78, E78.0, E78.00, E78.01, E78.1, E78.2, E78.3, E78.4, E78.41, E78.49, E78.5, E78.6, E78.7, E78.70, E78.71, E78.72, E78.79, E78.8, E78.81, E78.89, E78.9 | LOINC code corresponding to Total cholesterol:<br>• 2093-3<br>• 14647-2 | Generic names for class "CV350":<br>• Atorvastatin<br>• Cholestryamin<br>• Colestipol<br>• Ezetimibe<br>• Ezetimibe/Simv-astatin<br>• Gemfibrozil<br>• Lomitapide<br>• Mipomerson<br>• Pravastatin<br>• Rosuvastatin<br>• Simvastatin | - |

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| Lipids (HDL, LDL, Triglycerides)[25-27] | (1) Mean and standard deviation calculated after identifying labs using LOINC codes<br>• Implausible values removed (range based on NHANES reporting)<br>• The median of different lab values completed at the same day was taken<br>• Lab values that are 50% > or < the median were considered outliers and removed<br>• The median of the rest of the labs was taken as the lab value for that day<br>• For all, if only one lab was available prior to the cohort entry date, that lab was used. If more than 1 lab value was available, the average of the last two was taken | - | - | LOINC codes corresponding to:<br>HDL:<br>• 2085-9<br>• 18263-4<br>• 9832-7<br><br>LDL:<br>• 13457-7<br>• 18262-6<br>• 2089-1<br>• 14155-6<br><br>Triglycerides:<br><br>• 2571-8<br>• 14927-8<br>• 12228-3<br>• 3049-4<br>• 1644-4<br>• 12951-0<br>• 3048-6 | - | - |
| Chronic Kidney Disease (CKD)[24,28,29] | (1) At least one ICD-9/10 code documenting CKD | 585.5X | N18.X | - | - | - |
| Ischemic Heart Disease[30] | (1) At least one ICD-9/10 code documenting ischemic heart disease | 410.X, 411.X, 412.X, 413.X, 414.X | I20.X, I21.X, I22.X, I23.X, I24.X, I25.X | - | - | - |
| Heart Failure[30,31] | (1) At least one ICD-9/10 code documenting heart failure | 428.X | I50.X | - | - | - |
| Peripheral Vascular Disease (PVD)[30,31] | (1) At least one ICD-9/10 code documenting PVD | 440.0, 440.1, 440.2, 440.20, 440.21, 440.22, 440.23, 440.29, 440.4, 440.8, 440.9, 443.9, 557.0, 557.1, 557.9 | I73.X | - | - | - |
| Stroke | (1) At least one ICD-9/10 code documenting stroke | 346.60, 346.61, 346.62, 346.63, 432.0, 432.1, 432.9, 433.01, 433.11, 433.21, 433.31, 433.81, 433.91, 434.0, 434.00, 434.01, 434.1, 434.10, | I63.X | - | - | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | 434.11, 434.9, 434.90, 434.91, 436.5, 430.X, 431.X | | | | |
| Agent Orange | (1) "Agent orange" flag was used to generate the number of people with this exposure | - | - | - | - | From patient problem lists |
| Hepatitis C | (1) At least one ICD-9/10 code documenting Hepatitis C | 070.54 | B18.2 | - | - | - |
| Hyperuricemia | (1) At least one ICD-9/10 code documenting Hyperuricemia | 790.6 | E79.0 | - | - | - |
| Polycystic Ovary Syndrome | (1) At least one ICD-9/10 code documenting Polycystic Ovary Syndrome | 256.4 | E28.2 | - | - | - |
| Gestational Diabetes | (1) At least one ICD-9/10 code documenting Gestational Diabetes | V12.21, 648.83 | Z86.32, 024.4X | - | - | - |
| eGFR[32,33] | (1) Mean and standard deviation calculated after identifying labs using LOINC codes<br>• Implausible eGFR values were excluded<br>• The median of eGFR measured on the same day was taken, then values more than 50% different than the median were excluded as outliers<br>• The median of the rest of the measures was taken as eGFR for that day<br>• If only one eGFR was available prior to cohort entry date, it was taken as the baseline estimate<br>• If more than one eGFR was available prior to cohort entry date, the average of the most recent two was taken as the baseline estimate | - | - | LOINC code corresponding to eGFR:<br>• 62238-1<br>• 48643-1<br>• 33914-3 | - | - |

| Liver enzymes | (1) Mean and standard deviation calculated after identifying labs using LOINC codes<br>• Implausible values removed (range based on NHANES reporting)<br>• The median of different lab values completed at the same day was taken<br>• Lab values that are 50% > or < the median were considered outliers and removed<br>• The median of the rest of the labs was taken as the lab value for that day<br>For all, if only one lab was available prior to the cohort entry date, that lab was used. If more than 1 lab value was available, the average of the last two was taken | | | LOINC codes corresponding to<br>AST:<br>• 14409-7<br>• 14410-5<br>• 43822-6<br>• 88112-8<br>• 14412-1<br>• 14414-7<br>• 16412-9<br>• 1918-2<br>• 27344-1<br>• 14413-9<br>• 1917-4<br>• 1919-0<br>• 1920-8<br>• 30239-8<br>• 14411-3<br>• 44786-2<br><br>ALT:<br>• 1741-8<br>• 25302-1<br>• 54491-6<br>• 1742-6<br>• 1743-4<br>• 44785-4<br>• 16324-6<br>• 50168-4<br>• 76625-3<br>• 1744-2<br>• 54492-4<br>• 77144-4 | | Exclusions:<br><br>- Patients with hepatitis B and C (ICD-9: 070.2x, 070.3x, 070.41, 070.44, 070.51, 070.51, 070.54, 070.7x. ICD-10: B18.x)<br><br>- alcohol abuse (ICD-9: 291.x, 303.0x, 303.9x, 305.0x. ICD-10 F10.x)<br><br>- patients with other rare liver disease (ICD-9: 576.1, 275.03, 275.01, 275.1, 237.4, 571.42, 571.6, 275.09. ICD-10: 237.4, D44.0, D44.2, D44.9, 275.01, E83.110, 275.03, E83.118, E83.119, 275.09, E83.10, E83.19, 275.1, E83.00, E83.01, E83.09, 571.42, K75.4, 571.6, K74.3, K74.4, K74.5, 576.1, K83.0 |
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| Fatty liver disease[34] | At least 2 elevated ALT (≥40 U/L) at least 6 months apart within 2 years | | | | | Exclusions:<br><br>- Patients with hepatitis B and C (ICD-9: 070.2x, 070.3x, 070.41, 070.44, 070.51, 070.51, 070.54, 070.7x. ICD-10: B18.x)<br><br>- alcohol abuse (ICD-9: 291.x, 303.0x, 303.9x, 305.0x. ICD-10 F10.x)<br><br>- patients with other rare liver disease (ICD-9: 576.1, 275.03, 275.01, 275.1, 237.4, 571.42, 571.6, 275.09. ICD-10: 237.4, D44.0, D44.2, D44.9, 275.01, E83.110, 275.03, E83.118, E83.119, 275.09, E83.10, E83.19, 275.1, E83.00, E83.01, E83.09, 571.42, K75.4, 571.6, K74.3, K74.4, K74.5, 576.1, K83.0 |
|---|---|---|---|---|---|---|

\* Medications are documented prescriptions, not prescriptions filled

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