Sourcebook:
Women Veterans in the Veterans Health Administration

Volume 5: Longitudinal Trends in Sociodemographics and Utilization, including Type, Modality, and Source of Care

Online Technical Appendix

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List of Exhibits

List of Acronyms

ADR	Administrative Data Repository
ADUSH	Assistant Deputy Under Secretary for Health
AHRQ	Agency for Healthcare Research and Quality (
CBOC	Community Based Outpatient Clinic
CCN	Community Care Network
CCRS	Community Care Reimbursement System
CCS	Clinical Classification Software
CCSR	Clinical Classification Software Refined
CDM	Common Data Model
CDS	Consolidated Data Set
CDW	Corporate Data Warehouse
CHAMPVA	Civilian Health and Medical Program of the Department of Veterans Affairs
CPT	Current Procedural Terminology
CVT	Clinical Video Telehealth
DAF	Death Ascertainment File
DOB	Date of Birth
eCAMS	Electronic Claims Adjudication Management System
ED	Emergency Department
EM	Emergency Medicine
FBCS	Fee Basis Claims System
FY	Fiscal Year
GEMS	Centers for Medicare & Medicaid General Equivalence Mapping
GSSC	Geospatial Service Support Center
HCS	Health Care System
HCUP	Healthcare Cost and Utilization Project
HERC	Health Economics Resource Center
ICD-9-CM	International Classification of Diseases, Ninth Revision, Clinical Modification
ICD-10-CM	International Classification of Diseases, Tenth Revision, Clinical Modification
ICD-10-PCS	International Classification of Diseases, Tenth Revision, Procedure Coding System
IIA	Integrated Informatics & Analytics
IVC	VHA Office of Integrated Veteran Care
MCA	Managerial Cost Accounting
MH/SUD	Mental Health/Substance Use Disorder
MISSION	Maintaining Internal Systems and Strengthening Integrated Outside Networks Act of 2018
MS-DRG	Medicare Severity Diagnosis Related Groups
NDE	National Data Extracts
NDS	National Data Systems
NEPEC	Northeast Program Evaluation Center
NPCD	National Patient Care Database
OCC	VHA Office of Community Care
OMOP	Observational Medical Outcomes Partnership
PC3	Patient-Centered Community Care
PCM	Plexis Claims Manager
PERC	Program Evaluation Resource Center
PIT	Program Integrity Tool

PSSG	Planning Systems Support Group
PTF	Patient Treatment File
QUERI	Quality Enhancement Research Initiatives
RUCA	Rural Urban Commuting Area
SAS	Statistical Analysis System
SC	Service-connected
SCRSSN	Scrambled Social Security Number
TBI	Traumatic Brain Injury
VA	Veterans Affairs
VACC	VA-purchased Community Care
VAMC	VA Medical Center
VAST	VHA Site Tracking
VBA	Veterans Benefits Administration
VHA	Veterans Health Administration
VIReC	VA Information Resource Center
VISN	Veterans Integrated Service Network
VSF	Vital Status File
VSSC	VHA Support Service Center
VVC	VA Video Connect
WHEI	Women's Health Evaluation Initiative

Note- Some hyperlinks in this appendix will require government credentials to access the webpages

This technical appendix contains a description of the data sources and algorithms used to generate the results reported in *Sourcebook: Women Veterans in the Veterans Health Administration. Volume 5: Longitudinal Trends in Sociodemographics and Utilization, Including Type, Modality, and Source of Care*.[1] As the present Sourcebook is based on prior Sourcebook volumes, some text is identical to prior volumes.[2,3]

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[1] Breland JY, Frayne SM, Saechao F, Gujral K, Vashi AA, Shaw JG, Gray KM, Illarmo SS, Urech T, Grant N, Berg E, Offer C, Veldanda S, Schoemaker L, Dalton AL, Esmaeili A, Phibbs CS, Hayes PM, Haskell S. Sourcebook: Women Veterans in the Veterans Health Administration. Volume 5: Longitudinal Trends in Sociodemographics and Utilization, Including Type, Modality, and Source of Care. Women's Health Evaluation Initiative, Office of Women's Health, Veterans Health Administration, Department of Veterans Affairs, Washington DC. [June 2024] Available at: https://www.womenshealth.va.gov/WOMENSHEALTH/materials-and- resources/publications-and-reports.asp#sourcebook-v5.

[2] To request an electronic copy of Sourcebook Volume 4, please email: VHA10WWomensHealthAction@va.gov.

[3] The State of Reproductive Health Volume II report also drew on WHEI algorithms derived from VHA administrative data. As such, some text in this Technical Appendix may be identical to the Technical Appendix for that report. See: Katon JG, Tartaglione EV, Eleazer JR, Frayne SM, Haeger KO, Luo S, Schule AKR, Offer C, Phibbs CS, Rose D, Saechao F, Shankar M, Shaw J, Vinekar KS, Yano EM, Christy AY, Johnson AM. State of Reproductive Health
Volume II: VA Reproductive Health Diagnoses and Organization of Care. Office of Women's Health, Veterans Health Administration, Department of Veterans Affairs, January 2023. Available at https://www.womenshealth.va.gov/WOMENSHEALTH/docs/VHA-WH-Reproductive-Health-Report-2023.pdf.

COMMENT REGARDING THE SUPPLEMENTARY APPENDICES

Sourcebook Volume 5 includes 14 Supplemental Appendices (A-N), which are available upon request at VHA10WWomensHealthAction@va.gov.

Supplemental Appendices A-G contain full results tables for each exhibit presented in Chapters 2 - 8 of the main Sourcebook Volume 5 report.

- *A. Results Tables for Chapter 2, Temporal Changes in Sociodemographic and Geographic Characteristics*
- *B. Results Tables for Chapter 3, Temporal Changes in VHA User Status*
- *C. Results Tables for Chapter 4, Use of VHA and VACC*
- *D. Results Tables for Chapter 5, Modality of Care*
- *E. Results Tables for Chapter 6, Type of Care*
- *F. Results Tables for Chapter 7, Emergency Department and Urgent Care*
- *G. Results Tables for Chapter 8, VHA-covered Births*

Supplemental Appendices H-M contain results on the health profile of Veteran VHA users as well as the mapping materials used to create the health profile variables.

- *H. Health Profile of Veteran VHA Users, FY19*
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- *K. Mapping of ICD-10-CM Codes to Conditions and Domains for FY19 and FY20 (Version 3.0)*
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- *L. Allowed FY19 VHA Clinic Stop Codes for Conditions Algorithm*
  - List of FY19 VHA outpatient clinic stop codes that were considered to be allowed encounters in the WHEI conditions algorithm
- *M. Allowed FY19 CPT Codes for Conditions Algorithm*
  - List of FY19-allowed CPT codes and CPT plus professional component CPT modifier pairs that were considered to be allowed encounters in the WHEI conditions algorithm

Supplemental Appendix N provides the list of MCA clinic stop codes used to define the modalities and types of VHA outpatient care examined in this Sourcebook.

- *N. Clinic Stop Code for Modality of Care and Type of Care Assignments in VHA Outpatient*

Key: CPT – Current Procedural Terminology; FY – Fiscal Year; ICD-9-CM – International Classification of Diseases, Ninth Revision, Clinical Modification; ICD-10-CM – International Classification of Diseases, Tenth Revision, Clinical Modification; MCA – Managerial Cost Accounting; VACC – Veterans Affairs (VA)-purchased Community Care; VHA – Veterans Health Administration

1.0 Data Sources

Data for Sourcebook Volume 5 came from centralized Veterans Health Administration (VHA) administrative data files. The source files[4] used to create the Sourcebook database are:

Assistant Deputy Under Secretary for Health (ADUSH) Enrollment File (FY00 - FY20).[5] Monthly Veterans Affairs (VA) enrollment data files maintained by the Office of Enrollment and Forecasting, containing records of patient characteristics (sex, Veteran status, VA user status, date of birth, service-connected disability status, etc.).

Corporate Data Warehouse (CDW). The CDW is VHA's national data repository containing administrative, clinical, enrollment, financial, utilization, and Veteran benefits information, and more.[6] This report draws upon data from the following CDW domains:
  a. **Administrative Data Repository (ADR) Enrollment Domain.** The ADR Enrollment Domain contains information about Veterans' VHA enrollment, including enrollment date, status, eligibility, and priority status.
  b. **Outpatient Domain.** The Outpatient Domain contains information about outpatient encounters and outpatient visits, including details about the appointment status, location and type of care, tests and procedures performed, and conditions diagnosed during the episode of care.[7]
  c. **Patient Domain.** The Patient Domain contains patient demographic information as well as information pertaining to the patients' military service (e.g., period of service, service-connected disability rating, etc.). The Spatient.Spatient table was used in this Sourcebook to pull date of death information.

Managerial Cost Accounting (MCA)[8] National Data Extracts (NDEs) (FY00-FY20). The MCA is the cost accounting system for the Department of Veterans Affairs. The NDEs are a set of data files containing the costs of VHA-provided inpatient and outpatient encounters.
  a. **OUT.** The MCA OUT contains costs for VHA outpatient clinic encounters, as well as outpatient laboratory, pharmacy, ancillary services, prosthetics, and other services. Costs for care provided by some non-VA long-term care facilities (such as state Veterans homes) are also included.
  b. **Pharmacy File.** The MCA Pharmacy file includes information and costs of drugs used by all patients in both the outpatient and inpatient settings.

Non-VA Inpatient Stays Files (FY10-FY20). The Non-VA Inpatient File contains additional data on non-VA inpatient stays entered into the Medical Statistical Analysis System (SAS) Inpatient Datasets.

Observational Medical Outcomes Partnership Common Data Model (OMOP CDM). VA has adopted the Observational Medical Outcomes Partnership Common Data Model (OMOP CDM). OMOP CDM

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[4] Detailed descriptions of source datasets can be found on the VA Information Resource Center (VIReC) website (available at http://vaww.virec.research.va.gov/Intro/Working-with-VA-Data.htm), on the VHA Data Portal website (available at https://vaww.vhadataportal.med.va.gov/Data-Sources/Data-Sources-Overview), and on the VA Health Economics Resource Center (HERC) website (available at: http://www.herc.research.va.gov).

[5] FY20 is October 1, 2019 through September 30, 2020.

[6] VHA Data Portal (2023, Aug 9). *Corporate Data Warehouse (CDW)*. Veterans Health Administration, Department of Veterans Affairs, Washington DC. Available at: https://vaww.vhadataportal.med.va.gov/Data-Sources/CDW. Accessed January 19, 2024.

[7] M Gonsoulin & D Ramanathan. VIReC Factbook: Corporate Data Warehouse (CDW) Outpatient 2.1 Domain. Hines IL: U.S. Department of Veterans Affairs, Health Services Research & Development Service, VA Information Resource Center; September 2016. Updated July 2020.

[8] Formerly Decision Support System (DSS).

standardizes data from multiple CDW domains found in different formats into a common format allowing for "comparability and reproducible results."[9] The OMOP PERSON table contains patient demographic information (e.g., gender, date of birth, address, race, ethnicity) and linkages to healthcare information (e.g., patient's primary VA site of care, patient's primary care provider).[10]

Planning Systems Support Group (PSSG) Geocoded Enrollee File (FY10-FY20). Maintained by the Geospatial Service Support Center (GSSC), these data indicate geographic characteristics, including urban/rural status of patients' residences as well as information on users' closest VHA sites of care.

VA-purchased Community Care (VACC) Files (FY10-FY20). Care provided in the community (Non-VA settings) but paid for by VA is recorded in the VA-purchased Community Care files.[11] This report draws upon data from several of the VA-purchased Community Care files.
- a. **Purchased Care Files.**[12] Historically known as "Fee-Basis," these fiscal year files contain a record for each service reimbursed in that fiscal year, along with other information (e.g., date of service, type of service, diagnoses associated with the service, amount paid to the service provider, etc.).
    - i. **Purchased Care Outpatient Services File.** The Purchased Care Outpatient Services file reflects clinical services provided through the Purchased Care system.
    - ii. **Purchased Care Inpatient Stay Files.** The Purchased Care Inpatient Stay file contains a record for each valid invoice for an inpatient stay.
    - iii. **Purchased Care Ancillary Files.** The Inpatient Ancillary file contains records for each valid invoice for ancillary procedures as well as for physician care provided in the inpatient setting.
    - iv. **Purchased Care Inpatient Invoice Files.** The Fee Inpatient Invoice table contains information on payments associated with inpatient Fee-Basis claims.[13]
- b. **Program Integrity Tool (PIT) Files.** The PIT data collects and consolidates community care claims data from the VHA Office of Integrated Veteran Care (IVC) (formerly called Office of Community Care). PIT provides information on Veterans Access, Choice, and Accountability Act of 2014 (Choice Act) and Maintaining Internal Systems and Strengthening Integrated Outside Networks Act of 2018 (MISSION Act) utilization as well as data on all Veteran family member programs (e.g., Civilian Health and Medical Program of the Department of Veterans Affairs [CHAMPVA]).[14] PIT claims data are cumulative; data used for this report were restricted to service dates within the fiscal years of interest. The PIT claims data are organized into two main files:

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[9] VHA Data Portal (2021, Sept 15). *OMOP CDW Data*. Veterans Health Administration, Department of Veterans Affairs, Washington DC. Available at: http://vaww.vhadataportal.med.va.gov/DataSources/OMOPCDWData.aspx. Accessed May 22, 2023.

[10] VINCI. VA OMOPV5 CDM Specifications: Database Data Specifications, Version 3.0. Veterans Health Administration, Department of Veterans Affairs. Washington, DC. August 26, 2021.

[11] Detailed descriptions of the VACC files can be found on the VHA Data Portal website (available at: https://vaww.vhadataportal.med.va.gov/Data-Sources/Community-Care-Data) and on the HERC website (available at: https://www.herc.research.va.gov/include/page.asp?id=va-cc).

[12] Gidwani R, Hong J, Murrell S. Fee Basis Data: A Guide for Researchers. Menlo Park, CA. VA Palo Alto, Health Economics Resource Center; November 2015.

[13] Jones, L. & Gonsoulin, M. VIReC. VIReC Factbook: Corporate Data Warehouse (CDW) Purchased Care 1.0, Authorized. Hines IL: U.S. Department of Veterans Affairs, Health Services Research & Development Service, VA Information Resource Center; August 2019. Available at: https://vaww.virec.research.va.gov/CDW/Factbook/FB-CDW-Purchased-Care-Authorized-Domain.pdf. Accessed January 5, 2024.

[14] Health Economics Resource Center (HERC). (2021, April 16). *Community Care Data - Program Integrity Tool (PIT).* Veterans Health Administration, Department of Veterans Affairs, Washington DC. Available at: http://vaww.herc.research.va.gov/include/page.asp?id=choice-pit. Accessed January 21, 2022.

i. **PIT Professional.** The PIT Professional files generally contain health care claims submitted by individual physicians' practices.

ii. **PIT Institutional.** The PIT Institutional files generally contain claims from institutions, such as hospitals, nursing homes, rehabilitation facilities, etc.

a. **VHA Office of Integrated Veteran Care (IVC) Consolidated Data Set (CDS).** *In February 2023, the Office of Integrity and Compliance stopped PIT operations and removed access to the PIT files.*[15] The primary source for understanding VACC data has now shifted to the IVC CDS, which includes claims processed on or after October 1, 2018, from Community Care Reimbursement System (CCRS), Electronic Claims Adjudication Management System (eCAMS), Plexis Claims Manager (PCM), Fee Basis Claims System (FBCS), and the Fee domains.

b. **VACC extract files** provided by IVC containing emergency department and urgent care data were also used in this report.

VHA Medical SAS Datasets (FY00-FY18) and National Data Systems (NDS) Workload Data (FY19-FY20). These inpatient and outpatient datasets contain national administrative data on VHA patient health care encounters.

a. **VHA Outpatient Encounter Files.** The VHA Outpatient Event (SE) file contains a record for every encounter the patient has with VHA (e.g., clinic visits, telephone encounters, lab test encounters, radiology encounters); there can be more than one encounter on a given day. The VHA Outpatient Visit (SF) file rolls records of SE file encounters into one record per day of care and provides additional information about patients (e.g., sex, date of birth). Outpatient data through FY18 were extracted from the National Patient Care Database (NPCD); records for FY19 onward are now sourced from the NDS Workload Data in CDW.

b. **VHA Inpatient Stay Files.** VHA inpatient files contain a record for every admission to a VHA facility. This includes admissions to acute care settings (e.g., medical/surgical, psychiatric, etc.), observation bed stays, extended care stays, and non-VA care. They also include patient demographic data as well as information on diagnoses, procedures, and surgeries performed while an inpatient. Inpatient data are extracted from the Patient Treatment File (PTF).

VHA Station Listing (VHA Site Tracking [VAST] Quarterly Executive Summary FY10Q4 and VAST Snapshot 2 extract date 9/30/2020). The VAST site list, maintained by VHA Support Service Center (VSSC), is the official VHA list of all sites of care and includes the mappings of the individual sites to administrative parent stations and Veterans Integrated Service Networks (VISNs).

VHA Vital Status File (FY00-FY20). The VA Vital Status File (VSF) contains mortality and demographic data, including race and ethnicity data from Medicare, for all Veterans who are enrolled in VA, who received VA care since 1992, or who have received Veterans Benefits Administration (VBA) compensation or pension benefits since 2002.

NOTE: *The VSF was decommissioned as of August 2023 and replaced with the VHA Death Ascertainment File (DAF).*

All programming was performed using SAS© 9.2, and all programs were independently validated by at least two data analysts. Data presented in this Sourcebook were analyzed for program evaluation purposes.[16]

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[15] An archived PIT dataset containing claims through February 21, 2023, is available for VA research use only.
[16] These program evaluation analyses are for non-research purposes.

2.0 Cohort Creation

We first describe construction of the Women's Health Evaluation Initiative (WHEI) Master Database for each VA fiscal year, which includes one record for each person who appears in the ADUSH Enrollment File for that fiscal year (FY). We then describe how, for Sourcebook Volume 5, we selected Veteran VHA users in each fiscal year from the WHEI Master Database to create the Base Cohort of Veteran VHA patients for each fiscal year (FY10-FY20).

2.1 WHEI Master Database

We created person-level analytical files with one observation for each person found in the ADUSH Enrollment File. The resulting WHEI Master Database includes the following types of people:
- Veterans and non-Veterans
- Users and non-users of VHA care
- Women and men

Each is identified in the WHEI Master Database by scrambled Social Security Number. Various record-level files described above in Section 1.0 were used to create multiple person-level variables for each individual; variable specifications are described in subsequent sections. Year-specific variables indicate whether an individual was a VHA user or a Veteran in a given year, since these are characteristics that may change over time.

2.2 Base Cohort for Sourcebook Volume 5

To create the Base Cohort for each fiscal year (FY10-FY20), we selected Veterans[17] who, based on the ADUSH Enrollment File, used VHA for outpatient and/or inpatient care and/or VA-Purchased Community Care services and/or non-VA contract care and/or pharmacy services at least once in the years being examined, from FY10-FY20.[18] As a final step, Veterans with evidence of death prior to the start of the fiscal year are removed from the Base Cohort. These steps are outlined in detail below.

2.2.1 Identifying Veteran Status

Veteran status in each year (FY10-FY20) was identified from the ADUSH Enrollment Files using a year-specific field labeled "PRIO1_8." Because true changes in Veteran status can occur, we did not require that Veteran status for a given individual be consistent across years.

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[17] Non-Veterans who use VHA services are not included in the current Sourcebook. Previous work (Frayne SM., Yano EM, Nguyen VQ, et al. Gender disparities in Veterans Health Administration care: Importance of accounting for veteran status. *Med Care* 2008;46 (5):549-553) has found that, in FY02, nearly half the women in the SE data files were non-Veterans, and the majority of these non-Veterans were employees. Employees appear in the database primarily due to their encounters with Employee Health (e.g., for mandatory tuberculosis screening or for influenza vaccines). Other non-Veterans who use VHA services include some active duty military personnel and some eligible spouses of Veterans. They are not a focus of Sourcebook Volume 5 but represent a subgroup of women seen in primary care and other settings.

[18] Because the ADUSH Enrollment File counts use of non-VA contract care and pharmacy services as instances of VHA utilization, a small number of patients whose only use of VHA services is through non-VA contract care or outpatient pharmacy services are included in the cohort examined in Sourcebook Volume 5. In FY20, only 1.2% (n=6,543) of women Veterans who were identified as VHA users by ADUSH Enrollment Files had no utilization of VHA outpatient or inpatient care or VA-purchased Community Care (and thus were presumably VHA users by virtue of non-VA contract care or pharmacy services only). Because the analyses in Sourcebook Volume 5 do not draw upon VHA's contract care or pharmacy files, we do not explicitly characterize these types of utilization, even though those patients are included in our total counts of VHA patients.

A person is considered a Veteran in a given fiscal year if their associated PRIO1_8 value in the ADUSH Enrollment File is NOT missing.

2.2.2 Identifying VHA User Status

We applied a two-step process to identify VHA users.

- **Step 1.** The population of VHA users was first identified from the ADUSH Enrollment Files using a year-specific user field labeled "FYyy" (e.g., FY20), and the following cost fields:

  ARCCNHCOST; ARCFEECOST; ARCLTCCOST; ARCMEDCOST; ARCNVACOST; ARCOPCCOST; ARCPSYCOST; ARCSURCOST; CNHCOST; FEECOST; LTCCOST; MEDCOST; NVACOST; OPCCOST; PSYCOST; SURCOST

  A person is considered to be a VHA user in a particular fiscal year if the following are true:
  - "Fyyy=1" for the specified year[19], AND
  - The sum of all cost fields is >0 for the specified year.

- **Step 2.** Because there are instances where VHA users may have "Fyyy=1" values and non-zero costs in the fiscal year but may not be "true" users of VHA care (e.g., a record may get generated for a new VHA employee who visits Occupational Health for TB screening, for employees receiving annual influenza immunizations, or for Veterans applying for VA eligibility through a Compensation and Pension examination), we then applied an additional step of *removing* individuals whose only care in the fiscal year were for Occupational Health or Compensation and Pension visits.[20]

  At the record level, we created an indicator to identify VHA outpatient visits to Occupational Health or Compensation and Pension using the following MCA clinic stop codes in the Medical SAS/NDS workload outpatient (SE) files:
  - Occupational Health: 999
  - Compensation and Pension: 443, 444, 445, 446, 447, 448, 450

  For each VHA user, we then determined the proportion of their VHA outpatient visits within a particular fiscal year to Occupational Health or Compensation and Pension by summing all the records with a positive indicator for these visits and dividing by their total number of VHA outpatient visits in the fiscal year, e.g.,

  # Occ. Health visits + # Comp&Pen visits in FY = % Occ. Health and Comp&Pen visits
       # total VHA outpatient visits in FY

  Individuals with 100% of their VHA outpatient visits to Occupational Health or Compensation and Pension in the fiscal year were then flagged and inspected for evidence of care from the

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[19] This designation in ADUSH Enrollment Files indicates that the patient appeared in a FYyy utilization file for VHA outpatient services, VHA inpatient services, VA pharmacy services, VA-Purchased Community Care outpatient or inpatient services, or non-VA contract care.

[20] In FY20, a total of 85,315 individuals were excluded from the WHEI Master Database because their only source of VHA utilization was a visit for a Compensation and Pension disability examination or for Occupational Health services related to their VHA employment.

following VHA settings of care: VHA Inpatient Stay Files (PTF); VACC Purchased Care; VACC PIT; Non-VA Inpatient Stay; and MCA Pharmacy.

For this Sourcebook, a person is considered to be a VHA user in a particular fiscal year if:
- The criteria in Step 1 are met, AND
  - 100% of the person's VHA outpatient visits were to Occupational Health or Compensation and Pension, AND they also received care from a different VHA setting, OR
  - Less than 100% of the person's VHA outpatient visits were to Occupational Health or Compensation and Pension, regardless of whether they additionally received care in other VHA settings.

2.2.3 Identifying Decedents

A major update to the creation of the Base Cohorts for Sourcebook Volume 5 is the removal of Veteran users who had evidence of death prior to the start of the fiscal year. For example, a Veteran who was identified as a user in FY20 (per the ADUSH field, "FY20" and who had non-zero cost for FY20) but appeared to have a date of death prior to FY20 recorded in the Spatient.Spatient table would be excluded from the Base Cohort for FY20. While it is possible utilization records for a deceased Veteran may exist after a death occurrence (e.g., automatic prescription refills, pending lab results, or bereavement services for the deceased Veteran's spouse or family), we assume the majority of utilization data recorded after the date of death to be data entry errors.[21]

2.2.4 Veteran VHA Users (the Base Cohort)

The resulting cohort includes only Veterans and VHA users in each of the fiscal years, FY10-FY20. **Exhibit A** shows the number of people in the WHEI Master Database and the number in the Base Cohort (i.e., the number within the WHEI Master Database who were Veteran VHA users) for each year examined.[22]

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[21] In FY20, a total of 2,001 women (0.4%) and 64,151 men (1.2%) Veterans were removed from the FY20 Base Cohort.

[22] The definitions of variables for Veteran, VHA user, and sex are intended to replicate as closely as possible the definitions used by the VSSC in their data report cubes to maximize compatibility between data appearing in various VHA reports.

Exhibit A. Number of Individuals in WHEI Master Database and Base Cohort by Fiscal Year

Fiscal Year	WHEI Master Database: Total Number (Veterans/non-Veterans, VHA users/non-users, Women/men/missing sex)*	Base Cohort: Total Number (Veterans only, VHA users only, Women/men/missing sex)*
2010	9,216,577	5,327,357[†]
2011	9,554,370	5,475,817
2012	9,825,784	5,584,154
2013	10,060,148	5,691,658
2014	10,192,254	5,761,022
2015	10,170,824	5,858,826
2016	10,343,280	5,928,423
2017	10,476,223	5,965,702
2018	10,755,256	6,027,070
2019	10,835,229	6,102,507
2020	10,762,934	6,057,261

* These numbers include those with missing sex values. For example, in FY20, there were 6,057,261 Veteran VHA users in the WHEI Base Cohort. This is 2,639 more people than the 6,054,622 women plus men Veteran users reported in Sourcebook Volume 5 because of missing sex data. Sex was not available for 2,639 Veteran users in FY20. See Section 3.1 for information about the sex variable and for the number of patients in each year with missing sex data.

† The number of Veteran VHA users in FY10 reported in this Sourcebook (N=5,327,357) differs from the number of Veteran VHA users in FY10 reported in Sourcebook Volume 2 (N=5,354,652) and in Sourcebook Volume 4 (N=5,351,873). This is due to changes in the WHEI Veteran and user algorithms as well as changes in algorithms used to define sex and date of death; the current algorithms are described in this appendix.

3.0 Algorithms for Chapter 2: Sociodemographic Variables

The WHEI Master Database includes person-level sociodemographic indicators derived from data in the ADUSH Enrollment File (and in some cases supplemented with data from the VHA outpatient and VHA inpatient files), OMOP (supplemented with data from the VSF), and PSSG for each year from FY00–FY20. These variables include sex, age, race/ethnicity, urban/rural status, and service-connected disability rating. For all algorithms, we describe the steps taken to create the FY20 variable, unless otherwise specified. Note that for sex, date of birth, and race/ethnicity, the same value is assigned to an individual for each cohort year to which they belong (and age in the corresponding cohort year is calculated from the date of birth), whereas for urban/rural status and service-connected disability rating, a year-specific value is assigned.

3.1 Sex

The sex variable algorithm used in Sourcebook Volume 5 follows the same algorithm approach as reported in Sourcebook 4. In Volume 4, WHEI revised the sex algorithm to include the most recent sex value across the source files based on the assumption that more recent values typically reflect "corrected" values.

The sex variable incorporates sex data from the ADUSH Enrollment Files, the Medical SAS/NDS workload outpatient (SF) files, and the Medical SAS inpatient (PTF) files. Creating the multi-year sex variables involved a multi-step process.

- **Step 1.** We assigned the patient's sex, SEX_FINAL, based on the SEX_BEST value in the current year (FY20) ADUSH Enrollment File.

- **Step 2.** Individuals without a SEX_FINAL value after applying Step 1 were assigned the most recent non-missing sex value from the current year (FY20) SF file.

- **Step 3.** Individuals without a SEX_FINAL value after applying Step 2 were assigned the most recent non-missing sex value from the current year (FY20) PTF files.

- **Step 4.** For individuals without a SEX_FINAL value after applying Step 3, we repeated Steps 1-3 for FY19 and then continued to fill in missing data iteratively using the same approach by searching prior years' files in reverse year order, back to FY00.

  FY06–FY20: Identified using ADUSH Enrollment File field labeled "SEX_BEST."[23]
  FY00–FY05: Identified using ADUSH Enrollment File field labeled "SEX."

Together, steps 1-4 minimized missing sex values while relying on the most recent sex data available in the ADUSH Enrollment Files and the VHA Medical SAS Datasets/NDS Workload Data for FY00-FY20.

NOTE: *This Sourcebook uses the term "sex," but for the years examined here, we are unable to distinguish between sex assigned at birth and self-identified gender identity in the data. VHA has*

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[23] Since FY06, the VA Information Resource Center (VIReC) Vital Status Files include derived sociodemographic fields, including SEX_BEST and DOB_BEST, which incorporate information from multiple data sources and thus represent more complete/accurate data. ADUSH Enrollment Files use these fields from FY06 onward.

historically collected a single "sex" variable, potentially reflecting the sex recorded on a birth certificate or the patient's gender identity. VHA has updated the demographic fields and now collects data on both birth sex and self-identified gender, but the self-identified gender fields are not yet fully populated and therefore are not used in Sourcebook Volume 5. Please see Sourcebook Volume 5, Chapter 1 boxed text, "Comment regarding the use of the phrase 'Women Veterans'" for caveats and details related to interpretation of the sex variable used in this Sourcebook.

For each of the cohort years (FY10-FY20) examined in this Sourcebook, we used the multi-year FY00-FY20 sex variable, rather than the year-specific sex variable, because more recent sex values may reflect "more correct" values.[24] For example, for the FY20 cohort, we searched the files for sex values starting with FY20 data and continued searching in reverse order back to FY00 to fill in missing sex; for the FY10 cohort, we also started with FY20 sex data and continued searching in reverse order through FY00 data to fill in missing sex. Although this approach of using multiple years of data reduces the instances of missing sex values, there remain a number of patients in the Base Cohorts missing sex values in the ADUSH, SF, and PTF files. **Exhibit B** shows the number and proportion of patients in the Base Cohort for each of the fiscal years with missing sex values.

Exhibit B. Number and Proportion of Individuals in Base Cohort in Each Fiscal Year Missing a Sex Value in the Multi-Year Sex Variable*

Fiscal Year	Base Cohort: Total Number (Veterans only, VHA users only, women/men/missing sex)	Base Cohort Members Missing a Sex Value	
		#	%
2010	5,327,357	223	0.00
2011	5,475,817	557	0.01
2012	5,584,154	1,058	0.02
2013	5,691,658	884	0.02
2014	5,761,022	1,124	0.02
2015	5,858,826	1,028	0.02
2016	5,928,423	1,464	0.02
2017	5,965,702	1,394	0.02
2018	6,027,070	662	0.01
2019	6,102,507	1,170	0.02
2020	6,057,261	2,639	0.04

* For example, among the 5,327,357 Veterans who used VHA in FY10, there were 223 who had no instances of any sex value in any files (ADUSH, SF, PTF) in any year (FY00-FY20).

3.2 Age

Similar to the sex variable, the age variable algorithm includes the most recent date of birth (DOB) value across the source files based on the assumption that more recent values typically reflect "corrected" values. The age variable in this Sourcebook incorporates date of birth data from the ADUSH Enrollment Files, the Medical SAS/NDS workload outpatient (SF) files, and the Medical SAS inpatient (PTF) files.

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[24] Note that an unknown (but likely small) number of transgender Veterans may have arranged to have their sex value changed sometime between FY10 and FY20, the period examined herein.

Creating a definitive age variable for each person involved five steps.

- **Step 1.** We assigned a within-range[25] DOB value, DOB_FINAL, based on the DOB_BEST value in the current year (FY20) ADUSH Enrollment File.

- **Step 2.** Individuals without a DOB_FINAL value after applying Step 1 were assigned the most recent non-missing, within-range value of "DOB" from the current year (FY20) SF file.

- **Step 3.** Individuals without a DOB_FINAL value after applying Step 2 were assigned the most recent non-missing, within-range "BORNDAY" value from the current year (FY20) PTF files.

- **Step 4.** For individuals without a DOB_FINAL value after applying Step 3, we repeated Steps 1-3 for FY19 and then continued to fill in missing data iteratively using the same approach by searching prior years' files in reverse year order, back to FY00.

  FY06–FY15: Identified using ADUSH Enrollment Files field labeled "DOB_BEST."
  FY00–FY05: Identified using ADUSH Enrollment File field labeled "DOB."

Together, Steps 1-4 minimized missing DOB values, while relying on the most recent DOB data available in ADUSH Enrollment Files and the VHA Medical SAS Datasets/NDS Workload Data for FY00-FY20.

- **Step 5.** We calculated age in a given fiscal year by subtracting the DOB_FINAL (identified in Steps 1-4) from the first day of the fiscal year (in days) and then dividing the result by 365.25 to determine the age in years. When this calculation resulted in a decimal, the final age value was rounded down to the nearest integer. For example, an age of 47.788 was rounded down to 47.

For each of the cohort years (FY10-FY20) examined in this Sourcebook, we used the multi-year FY00-FY20 DOB_FINAL variable, rather than the year-specific DOB variable, because more recent DOB values may reflect "more correct" values. For example, for the FY20 cohort, we searched the files for DOB values starting with FY20 data and continued searching in reverse order back to FY00 to fill in missing DOB; for the FY10 cohort, we also started with FY20 DOB data and continued searching in reverse order through FY00 data to fill in missing DOB. Although this approach of using multiple years of data reduces the instances of missing DOB values, there remains a number of patients in the Base Cohorts missing DOB values in the ADUSH, SF, and PTF files.

Exhibit C shows the number and proportion of patients in the Base Cohort for each of the fiscal years with missing date of birth values.

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[25] Although an age younger than 18 years or older than 110 years is theoretically possible, such circumstances would be exceedingly rare. Thus, it was assumed that instances of ages <18 years or >110 years reflected data errors; these were thus considered out-of-range and were treated as missing age. Individuals with missing age were excluded from analyses that required the age variable.

Exhibit C. Number and Proportion of Individuals in Base Cohort in Each Fiscal Year Missing a Date of Birth Value in the Multi-Year DOB Variable

Fiscal Year	Base Cohort: Total Number (Veterans only, VHA users only, women/men/missing sex)	Base Cohort Members Missing a Date of Birth Value	
		#	%
2010	5,327,357	317	0.01
2011	5,475,817	629	0.01
2012	5,584,154	1,193	0.02
2013	5,691,658	1,356	0.02
2014	5,761,022	1,565	0.03
2015	5,858,826	1,429	0.02
2016	5,928,423	2,008	0.03
2017	5,965,702	1,801	0.03
2018	6,027,070	1,075	0.02
2019	6,102,507	1,673	0.03
2020	6,057,261	3,003	0.05

3.3 Race/Ethnicity

The race/ethnicity variable algorithm used in Sourcebook Volume 5 differs from the algorithm reported in Sourcebook Volume 4. Due to issues with data availability for one of the source files, WHEI changed its multi-year, multi-source race/ethnicity variable algorithm in FY16. With VA's adoption of the OMOP CDM, WHEI was able to take advantage of OMOP's rigorous algorithms that use best practices to standardize race and ethnicity data and assign a single constant race and a single constant ethnicity value for each Veteran patient.[26,27] WHEI's updated composite race/ethnicity algorithm now relies almost exclusively upon OMOP data. In the small number of instances where the OMOP Person table is missing race and/or ethnicity values for an individual patient, the algorithm is supplemented with race and ethnicity data from the VSF.

Creating the combined race/ethnicity variable involved four steps.

- **Step 1.** Using the OMOP Person table "ETHNICITY_SOURCE_VALUE" field, for individuals with a "Hispanic or Latino" value, we assigned race/ethnicity as "Hispanic."

- **Step 2.** For individuals without a race/ethnicity value after Step 1, we assigned race/ethnicity based on the value from the OMOP Person table RACE_SOURCE_VALUE" field.

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[26] VINCI. VA OMOPV5 CDM Specifications: Database Data Specifications, Version 3.0. Veterans Health Administration, Department of Veterans Affairs. Washington, DC. August 26, 2021.

[27] OMOP's PERSON table follows VIReC's best practices for race and ethnicity and prioritizes assignment of race and ethnicity based on the highest frequency self-reported values. For more information, see VINCI. VA OMOPV5 CDM Specifications: Database Data Specifications, Version 3.0. Veterans Health Administration, Department of Veterans Affairs. Washington, DC. August 26, 2021.

- **Step 3.** For individuals with an unassigned race/ethnicity value after Step 2, we assigned race/ethnicity based on "CMS_RACE"[28] values in the Vital Status File.[29]

- **Step 4.** Individuals still without a race/ethnicity value at the end of Step 3 were considered to have "Unknown" race/ethnicity.

3.4 Urban/Rural Status

Urban/rural status in this Sourcebook is derived directly from the "URH" variable in the PSSG Geocoded Enrollee Files, which indicate the urban/rural status of the last known address in the fiscal year for each enrollee. For each fiscal year cohort examined, urban/rural status came from the corresponding fiscal year of PSSG data. Therefore, an individual Veteran's urban/rural status could vary from year to year.

In FY10, "URH" had three values: "highly rural" was defined as addresses in a county with <7 residents per square mile (on average); "urban" was defined as having both 50,000 or more people in the urban nucleus and an urban core with at least 1,000 residents per square mile; and any other non-urban area was considered "rural."[30] In late FY14, PSSG updated its "URH" variable to reflect Rural Urban Commuting Area (RUCA) categories, resulting in changes to the definitions of "highly rural," "rural," and "urban." An additional category, "insular island," was also introduced. Since FY14Q4, PSSG defines "urban" as census tracts where the majority of workers commute within the urban core, or where 30-49% of workers commute to a larger urban core (RUCA scores = 1.0, 1.1); "insular island" as the U.S. Virgin Islands, Guam, American Samoa, and the Northern Mariana Island;[31] "highly rural" as the remotest occupied land areas with >10% of the workers commuting to urbanized areas or urban clusters (RUCA score = 10.0); and "rural" as all other census tracts.

3.5 Service-Connected (SC) Disability Rating

The service-connected (SC) disability rating variable used in this Sourcebook is based on the variable "SCPER" in the ADUSH Enrollment File for the corresponding fiscal year. SCPER can potentially change across years for legitimate reasons, e.g., if the individual's SC disability rating changes. If the SCPER variable was populated in ADUSH for the fiscal year being examined, we assigned the ADUSH SCPER value to the individual for that fiscal year. If the SCPER variable was missing for that fiscal year, we counted the individual as not having an SC disability status, i.e., we considered the individual to be a non-SC Veteran in that fiscal year. We created a variable indicating whether the individual had an SC disability rating in the fiscal year being examined (yes/no). For those who did have an SC disability rating in the fiscal year, we also created a variable indicating the level of the SC disability rating in that fiscal year: 0-49 percent disability rating[32], 50-99 percent disability rating, or 100 percent disability rating.

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[28] Although labeled as "race" the "CMS_RACE" field contains values for both race and ethnicity. The full set of values includes Asian, Black, Hispanic, North American Native, Other, White, and Unknown.

[29] After applying this step, the proportion of Veteran VHA users in FY20 with missing race/ethnicity reduced from 6.7% (after Step 2) to 3.1% (after Step 3).

[30] Spoont M, Greer N, Su J, Fitzgerald P, Rutks I, and Wilt TJ. Rural vs. Urban Ambulatory Health Care: A Systematic Review. VA-ESP Project #09-009;2011.

[31] US Department of Veterans Affairs Information Resource Center. VIReC Research User Guide: PSSG Geocoded Enrollee Files, 2015 Edition. Hines IL: US Department of Veterans Affairs, Health Services Research & Development Service, Information Resource Center; May. 2016.

[32] Note that "0 percent" refers to a patient who does have SC disability rating, but whose severity rating is 0 (zero) percent; a 0 percent disability rating is distinct from no SC disability rating.

3.6 Geographic Distribution

Sourcebook Volume 5 includes characterization of the geographic distribution of women Veterans across the United States and its territories over time. As of the end of FY20, VHA was organized into 18 distinct Veterans Service Integrated Networks (VISNs), that represent broad geographic administrative areas of the United States. Each VISN is comprised of multiple Health Care Systems (HCSs), which usually contain a flagship VA Medical Center (VAMC) and several Community-Based Outpatient Clinics (CBOCs). This Sourcebook examines the distribution of women Veterans at the HCS-level in FY10 and in FY20.

The geographic distribution variables are derived from utilization recorded in the VHA administrative data files. We next describe the phases involved in creating the geographic distribution variables.

3.6.1 Phase 1: Mapping of Health Care Systems Over Time

Over the 11-year period, VHA expanded to better accommodate the needs of Veterans and provide greater access for Veterans. Some of the expansion efforts involved the opening of new HCSs, merging of VHA sites into other HCSs, and closure of HCSs.[33]

The VAST Snapshot database maintains an official list of all VHA sites of care.

To be able to compare HCS-level changes in patient populations from FY10 to FY20, we needed to create a master list of HCSs that could be applied to both FY10 data and FY20 data. As a first step, we created the FY20 WHEI master list of HCSs to match the FY20Q4 VAST list of 141 HCSs (or administrative parent stations[34]), except that the WHEI master list merged the Bath VA Medical Center (station 528A6) with the Canandaigua VA Medical Center (station 528A5) into one HCS to reflect the integration of these HCSs that occurred during FY20 to become Finger Lakes Health Care System (station 528A6). This change resulted in 140 HCSs in FY20.

The FY10Q4 VAST report lists 148 unique HCSs in FY10.[35] For FY10, WHEI applied the HCS mapping approach developed for the FY20 HCS list.

- Eight parent stations that were present in FY10 were no longer considered HCSs in FY20.[36] For cross-year comparability, when reporting the number of women Veterans per HCS in FY10, Sourcebook Volume 5 mapped all women who attended one of these sites to the corresponding FY20 HCS.
  - Brockton VAMC (Brockton, MA; station 523A5) was mapped to Boston, MA HCS (Jamaica Plain, MA; station 523).
  - Upstate New York HCS - Batavia (Batavia, NY; station 528A4) was mapped to Western New York HCS (Buffalo, NY; station 528).

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[33] In addition to such fluctuations at the HCS level, some CBOCs likewise may have opened, closed, or merged with other CBOCs or with other HCSs during the 11-year time period from FY10-FY20.

[34] Administrative parent is defined as "a collection of all the points of service that a leadership group (Medical Facility Director, Deputy Medical Facility Director, Chief of Staff, Associate or Assistant Director, and Nurse Executive) manages. The points of service can include any institution where health care is delivered. All of the data that originate from these points of service roll up to a single station number representing the administrative parent for management and programmatic activities." Source: Department of Veterans Affairs. VHA Handbook 1006.02: VHA Site Classifications and Definitions. 2013: Washington, DC. Department of Veterans Affairs, VHA.

[35] The FY10Q4 VAST report lists 185 unique parent stations. After removing 37 parent stations that had 7-digit station numbers, 148 parent stations remained.

[36] Four Health Care Systems (Brockton MA, Mattoon IL, Del Rio TX, and Seguin TX) consisted of only one site in the FY10Q4 VAST list, the main parent station site.

- o Charleston (Coles County) (Mattoon, IL; station 550GF) was mapped to Danville, IL HCS (Danville, IL; station 550).
  - o Black Hills HCS - Hot Springs (Hot Springs, SD; station 568A4) was mapped to Black Hills, SD HCS (Fort Meade, SD; station 568).
  - o Eastern Kansas HCS - Leavenworth Division (Leavenworth, KS; station 589A6) was mapped to Eastern Kansas HCS (Topeka, KS; station 589A5).
  - o Central AR. Veterans HCS NLR (North Little Rock, AR; station 598A0) was mapped to Little Rock, AR HCS (Little Rock, AR; station 598).
  - o Del Rio (Del Rio, TX; station 671GC) was mapped to San Antonio, TX HCS (San Antonio, TX; station 671).
  - o Seguin (Guadalupe County) (Seguin, TX; station 671GN) was mapped to San Antonio, TX HCS (San Antonio, TX; station 671).
- Bath NY and Canandaigua NY were listed as two separate HCSs in FY10 but had merged into a single HCS in FY20.[37]
- There were two VAMCs at the Lexington VA Healthcare System, Lexington-Cooper Dr (station 596A4) and Lexington-Leestown (station 596). In FY10, the parent station was Lexington-Cooper Dr, but by FY20, the parent station had changed to Lexington-Leestown. For the FY10 HCS list, we applied the FY20 mapping and assigned Lexington-Leestown (station 596) as the parent station for the Lexington VA Healthcare System.

One new HCS that was not present in FY10 had opened by FY20: VA Texas Valley Coastal Bend Health Care System (Harlingen TX). This HCS is included on the FY20 list but not on the FY10 list of HCSs. As a result, the final list of unique HCSs was 138 in FY10 and 139 in FY20.

NOTE: *Some Veterans did receive the majority of their care in Manila, Philippines, but Manila was not included in the HCS list in either year.*

Exhibit D provides the final list of Health Care Systems, and whether Sourcebook Volume 5 counted it as a Health Care System in FY10 and in FY20.

Exhibit D. List of Health Care Systems in FY10 and FY20

VISN	Station Number	Location Descriptive Name (Common Name, VAST FY20)	State (VAST, FY20)	FY10	FY20
1	402	Togus	Maine	Yes	Yes
1	405	White River Junction	Vermont	Yes	Yes
1	518	Bedford	Massachusetts	Yes	Yes
1	523	Jamaica Plain	Massachusetts	Yes	Yes
1	608	Manchester	New Hampshire	Yes	Yes
1	631	Central Western Massachusetts	Massachusetts	Yes	Yes
1	650	Providence	Rhode Island	Yes	Yes
1	689	West Haven	Connecticut	Yes	Yes
2	526	Bronx, New York	New York	Yes	Yes
2	528	Buffalo, New York	New York	Yes	Yes
2	528A6	Bath, New York	New York	Yes	Yes

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[37] Bath NY and Canandaigua NY merged in FY20 to become Finger Lakes Health Care System (station 528A6).

VISN	Station Number	Location Descriptive Name (Common Name, VAST FY20)	State (VAST, FY20)	FY10	FY20
2	528A7	Syracuse	New York	Yes	Yes
2	528A8	Albany, New York	New York	Yes	Yes
2	561	East Orange	New Jersey	Yes	Yes
2	620	Montrose, New York	New York	Yes	Yes
2	630	Manhattan	New York	Yes	Yes
2	632	Northport, New York	New York	Yes	Yes
4	460	Wilmington, Delaware	Delaware	Yes	Yes
4	503	Altoona	Pennsylvania	Yes	Yes
4	529	Butler	Pennsylvania	Yes	Yes
4	542	Coatesville	Pennsylvania	Yes	Yes
4	562	Erie	Pennsylvania	Yes	Yes
4	595	Lebanon	Pennsylvania	Yes	Yes
4	642	Philadelphia, Pennsylvania	Pennsylvania	Yes	Yes
4	646	Pittsburgh	Pennsylvania	Yes	Yes
4	693	Wilkes-Barre	Pennsylvania	Yes	Yes
5	512	Baltimore, Maryland	Maryland	Yes	Yes
5	517	Beckley, West Virginia	West Virginia	Yes	Yes
5	540	Clarksburg, West Virginia	West Virginia	Yes	Yes
5	581	Huntington, West Virginia	West Virginia	Yes	Yes
5	613	Martinsburg	West Virginia	Yes	Yes
5	688	Washington, District of Columbia	District of Columbia	Yes	Yes
6	558	Durham	North Carolina	Yes	Yes
6	565	Fayetteville, North Carolina	North Carolina	Yes	Yes
6	590	Hampton	Virginia	Yes	Yes
6	637	Asheville	North Carolina	Yes	Yes
6	652	Richmond, Virginia	Virginia	Yes	Yes
6	658	Salem, Virginia	Virginia	Yes	Yes
6	659	Salisbury	North Carolina	Yes	Yes
7	508	Atlanta, Georgia	Georgia	Yes	Yes
7	509	Augusta Downtown	Georgia	Yes	Yes
7	521	Birmingham, Alabama	Alabama	Yes	Yes
7	534	Charleston, South Carolina	South Carolina	Yes	Yes
7	544	Columbia, South Carolina	South Carolina	Yes	Yes
7	557	Dublin	Georgia	Yes	Yes
7	619	Montgomery	Alabama	Yes	Yes
7	679	Tuscaloosa	Alabama	Yes	Yes
8	516	Bay Pines	Florida	Yes	Yes
8	546	Miami	Florida	Yes	Yes
8	548	West Palm Beach	Florida	Yes	Yes
8	573	Gainesville	Florida	Yes	Yes
8	672	San Juan	Puerto Rico	Yes	Yes

VISN	Station Number	Location Descriptive Name (Common Name, VAST FY20)	State (VAST, FY20)	FY10	FY20
8	673	Tampa	Florida	Yes	Yes
8	675	Orlando	Florida	Yes	Yes
9	596	Lexington-Leestown	Kentucky	Yes	Yes
9	603	Louisville	Kentucky	Yes	Yes
9	614	Memphis	Tennessee	Yes	Yes
9	621	Mountain Home, Tennessee	Tennessee	Yes	Yes
9	626	Nashville	Tennessee	Yes	Yes
10	506	Ann Arbor, Michigan	Michigan	Yes	Yes
10	515	Battle Creek	Michigan	Yes	Yes
10	538	Chillicothe, Ohio	Ohio	Yes	Yes
10	539	Cincinnati, Ohio	Ohio	Yes	Yes
10	541	Cleveland, Ohio	Ohio	Yes	Yes
10	552	Dayton	Ohio	Yes	Yes
10	553	Detroit, Michigan	Michigan	Yes	Yes
10	583	Indianapolis, Indiana	Indiana	Yes	Yes
10	610	Marion, Indiana	Indiana	Yes	Yes
10	655	Saginaw, Michigan	Michigan	Yes	Yes
10	757	Columbus, Ohio	Ohio	Yes	Yes
12	537	Chicago, Illinois	Illinois	Yes	Yes
12	550	Danville, Illinois	Illinois	Yes	Yes
12	556	North Chicago	Illinois	Yes	Yes
12	578	Hines	Illinois	Yes	Yes
12	585	Iron Mountain	Michigan	Yes	Yes
12	607	Madison	Wisconsin	Yes	Yes
12	676	Tomah	Wisconsin	Yes	Yes
12	695	Milwaukee, Wisconsin	Wisconsin	Yes	Yes
15	589	Kansas City, Missouri	Missouri	Yes	Yes
15	589A4	Columbia, Missouri	Missouri	Yes	Yes
15	589A5	Topeka	Kansas	Yes	Yes
15	589A7	Wichita	Kansas	Yes	Yes
15	657	St. Louis John Cochran	Missouri	Yes	Yes
15	657A4	Poplar Bluff	Missouri	Yes	Yes
15	657A5	Marion, Illinois	Illinois	Yes	Yes
16	502	Alexandria, Louisiana	Louisiana	Yes	Yes
16	520	Biloxi	Mississippi	Yes	Yes
16	564	Fayetteville, Arkansas	Arkansas	Yes	Yes
16	580	Houston, Texas	Texas	Yes	Yes
16	586	Jackson, Mississippi	Mississippi	Yes	Yes
16	598	Little Rock, Arkansas	Arkansas	Yes	Yes
16	629	New Orleans	Louisiana	Yes	Yes
16	667	Shreveport	Louisiana	Yes	Yes

VISN	Station Number	Location Descriptive Name (Common Name, VAST FY20)	State (VAST, FY20)	FY10	FY20
17	504	Amarillo	Texas	Yes	Yes
17	519	Big Spring	Texas	Yes	Yes
17	549	Dallas, Texas	Texas	Yes	Yes
17	671	San Antonio, Texas	Texas	Yes	Yes
17	674	Temple	Texas	Yes	Yes
17	740	Harlingen, Texas	Texas	No	Yes
17	756	El Paso	Texas	Yes	Yes
19	436	Fort Harrison	Montana	Yes	Yes
19	442	Cheyenne	Wyoming	Yes	Yes
19	554	Aurora Rocky Mountain	Colorado	Yes	Yes
19	575	Grand Junction, Colorado	Colorado	Yes	Yes
19	623	Muskogee	Oklahoma	Yes	Yes
19	635	Oklahoma City	Oklahoma	Yes	Yes
19	660	Salt Lake City	Utah	Yes	Yes
19	666	Sheridan	Wyoming	Yes	Yes
20	463	Anchorage	Alaska	Yes	Yes
20	531	Boise	Idaho	Yes	Yes
20	648	Portland, Oregon	Oregon	Yes	Yes
20	653	Roseburg	Oregon	Yes	Yes
20	663	Seattle	Washington	Yes	Yes
20	668	Spokane	Washington	Yes	Yes
20	687	Walla Walla	Washington	Yes	Yes
20	692	White City	Oregon	Yes	Yes
21	358	Manila	Philippines	No	No
21	459	Honolulu	Hawaii	Yes	Yes
21	570	Fresno	California	Yes	Yes
21	593	North Las Vegas	Nevada	Yes	Yes
21	612A4	Sacramento	California	Yes	Yes
21	640	Palo Alto, California	California	Yes	Yes
21	654	Reno	Nevada	Yes	Yes
21	662	San Francisco	California	Yes	Yes
22	501	Albuquerque	New Mexico	Yes	Yes
22	600	Long Beach, California	California	Yes	Yes
22	605	Loma Linda, California	California	Yes	Yes
22	644	Phoenix, Arizona	Arizona	Yes	Yes
22	649	Prescott	Arizona	Yes	Yes
22	664	San Diego, California	California	Yes	Yes
22	678	Tucson	Arizona	Yes	Yes
22	691	West Los Angeles	California	Yes	Yes
23	437	Fargo	North Dakota	Yes	Yes
23	438	Sioux Falls	South Dakota	Yes	Yes

VISN	Station Number	Location Descriptive Name (Common Name, VAST FY20)	State (VAST, FY20)	FY10	FY20
23	568	Fort Meade, South Dakota	South Dakota	Yes	Yes
23	618	Minneapolis, Minnesota	Minnesota	Yes	Yes
23	636	Omaha, Nebraska	Nebraska	Yes	Yes
23	636A6	Des Moines, Iowa	Iowa	Yes	Yes
23	636A8	Iowa City, Iowa	Iowa	Yes	Yes
23	656	St. Cloud, Minnesota	Minnesota	Yes	Yes

3.6.2 Phase 2: Assigning a Person-Level Home Facility

To assign a Veteran VHA user to their home Health Care System, we first determined the site where they received the majority of their care and then mapped that site to the official Health Care System as listed in VAST. The entire process involved seven steps.

NOTES ABOUT TERMINOLOGY: *There are several common nomenclatures for a VHA Health Care System and its entities. In this section, we refer to "home" as the location where a Veteran VHA user received the preponderance of their care, "home facility" as the specific Health Care System where the preponderance of that care occurred, and "home site" as the specific site (e.g., a five-digit CBOC, a five-digit VAMC, or a three-digit VAMC) where the preponderance of that care occurred. Herein, both "parent station" and "facility" are used synonymously with "Health Care System."*

- **Step 1.** We first created a hierarchy for type or setting of care to indicate a site where a VHA user could potentially establish their care, starting with VHA outpatient primary care since the majority of VHA users have at least one primary care encounter annually. Next in the hierarchy was specialty care (e.g., Mental Health/Substance Use Disorder [MH/SUD], Emergency Department, Urgent Care, etc.), followed by other types of in-person outpatient care with a clinician (e.g., Clinical Pharmacy, Physical Therapy, Social Work, Chaplain Service, etc.), then telehealth, VA Video Connect (VVC), and telephone or secure messaging encounters, etc. In total, we identified 16 different levels for types of care derived from eight different source files, as shown in **Exhibit E.**

Exhibit E. Type of Care Hierarchy for Home Site Algorithm

Level	Type of Care/Setting	Data Source
1	Primary Care	VHA Outpatient Encounter
2	Specialty Care	VHA Outpatient Encounter
3	Other In-Person with a Clinician	VHA Outpatient Encounter
4	Telehealth - Patient Site or Home Telehealth	VHA Outpatient Encounter
5	VVC	VHA Outpatient Encounter
6	Telephone or Secure Messaging	VHA Outpatient Encounter
7	Purchased Care Outpatient	Purchased Care Outpatient Services
8	VHA Inpatient Stay	VHA Inpatient Stay
9	Purchased Care Inpatient	Purchased Care Inpatient
10	Purchased Care Ancillary	Purchased Care Ancillary
11	Non-VA Inpatient Stay	Non-VA Inpatient Stays
12	MCA Pharmacy	MCA Pharmacy
13	MCA Outpatient	MCA OUT
14	Miscellaneous Non-Clinician	VHA Outpatient Encounter
15	Telehealth - Provider Site	VHA Outpatient Encounter
16	Employee Health or Compensation & Pension	VHA Outpatient Encounter

- **Step 2.** Next, we created specifications for each level listed in **Exhibit E**. In the VHA outpatient setting, visits are characterized by VHA MCA three-digit clinic "stop codes," which identify the clinical setting in which the patient received care.[38] **Exhibit F** provides the clinic stop codes used to identify the type of care in the VHA outpatient encounter file for all levels that use VHA outpatient data. For all other levels, use for an individual was defined as presence of a record in the corresponding file for that level, in the fiscal year of interest.

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[38] "Stop codes" are clinic type codes, which are used to identify outpatient clinical workload in VHA. Each type of clinic has a unique three-digit code. The codes are entered into the local VHA VISTA system for each patient encounter (e.g., a clinic visit, a radiology procedure, a clinical telephone encounter). The data gathered through VISTA are aggregated into the national CDW outpatient workload datasets.

Exhibit F. VHA Outpatient Clinic Stop Codes for Home Site Algorithm

Level	Type of Care	Clinic Stop Codes
1	Primary Care*	170, 171, 172, 178, 301, 318, 322, 323, 326, 338, 342, 348, 350, 704, 160322, 160323, 310322, 310323
2	Specialty Care[†]	110, 130, 131, 135, 144, 149, 153, 156, 157, 158, 195, 197, 199, 201, 210, 211, 224, 225, 231, 302, 303, 304, 305, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 320, 321, 325, 327, 329, 331, 333, 335, 337, 339, 340, 344, 345, 346, 347, 349, 352, 353, 354, 356, 369, 394, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 413, 414, 415, 418, 419, 420, 424, 427, 428, 430, 432, 434, 435, 436, 441, 457, 481, 486, 487, 488, 489, 490, 491, 502, 509, 510, 513, 514, 516, 519, 523, 524, 525, 527, 528, 529, 533, 534, 535, 536, 538, 539, 542, 545, 546, 550, 552, 560, 562, 564, 565, 567, 568, 573, 574, 575, 576, 577, 579, 582, 583, 584, 586, 587, 591, 592, 593, 596, 597, 598, 599, 697, 718
3	Other In-Person with a Clinician	116, 117, 118, 119, 120, 121, 123, 124, 125, 139, 142, 159, 160, 162, 165, 166, 167, 168, 169, 173, 174, 175, 176, 177, 180, 181, 183, 184, 185, 186, 187, 188, 190, 191, 192, 196, 198, 202, 203, 204, 205, 206, 207, 208, 209, 213, 214, 215, 216, 217, 218, 220, 221, 222, 229, 230, 240, 241, 250, 317, 328, 330, 332, 334, 336, 351, 370, 372, 373, 425, 429, 437, 438, 439, 440, 443, 449, 504, 507, 508, 511, 522, 530, 531, 555, 556, 566, 602, 603, 604, 606, 607, 608, 611, 651, 652, 656, 658, 680, 681, 701, 706, 707, 708, 710, 713, 714, 720, 721, 722, 723, 724
4	Telehealth – Patient Site or Home Telehealth	136, 371, 644, 646, 683, 684, 685, 686, 690, 694, 901, 111694
5	VVC	179
6	Telephone or Secure Messaging	103, 147, 148, 182, 324, 719, 801, 802, 803
14	Miscellaneous Non-Clinician	104, 105, 106, 107, 108, 109, 111, 115, 126, 128, 143, 145, 150, 151, 155, 212, 341, 391, 392, 417, 421, 423, 449, 474, 669, 673, 674, 682, 703, 717
15	Telehealth – Provider Site	137, 189, 645, 647, 648, 679, 692, 693, 695, 696, 698, 699
16	Employee Health or Compensation & Pension	444, 445, 446, 447, 448, 450, 999

* The six-digit codes indicate clinic stop code pairs where the first three digits represent the primary stop code (in the CL field), and the last three digits indicate the secondary stop code (in the CLC field).

† We applied a broad definition here to identify specialty care clinic stop codes. These codes include stop codes for Emergency Department, Urgent Care, and MH/SUD clinic, which are not included in the "specialty care" definition described in Section 7.0 "Algorithms for Chapter 6: Type of Care" of this Technical Appendix.

- **Step 3.** Using the hierarchy established in Step 1 and the specifications created in Step 2, we ran each VHA user through an algorithm to identify the site where they received the preponderance of VHA care in the fiscal year. This is broken into two stages.

- o In Stage 1, we identified the first level for which the Veteran had any utilization records. To do this, we searched for encounter records starting with the first level, primary care. For example, for each Veteran VHA user, we searched for records in the fiscal year with any of the primary care stop codes listed in **Exhibit F** above. If no primary care encounters were found, we then searched for any specialty encounters, and if none, then other in-person with a clinician encounters. We continued this iterative process searching for encounters through each of the 16 levels.
- o In Stage 2, within the first level for which the Veteran had any utilization records, we used a macro to assign the Veteran to the sites associated with the largest number of encounters within that level of care, or, in case of a tie, the site with the most frequent most recent encounters. For example, if the Veteran had any records at the first level (primary care), we identified all the sites where the Veteran had a primary care encounter in the fiscal year. There are three scenarios for processing sites, as shown in **Exhibit G**.

Exhibit G. Three Scenarios for Assigning a Home Site

Scenario	Site Examples	Home Site Assigned
A. Greater than 50% of all encounters in level occurs at one site	Example #1. 640A0, 640A0, 640A0 Example #2. 640A0, 640A0, 640A0, 640BY, 640BY	640A0
B. 50% of all encounters in level occurs at one site and remaining 50% occurs at another site	Example #3. 640A0, 640A0, 640BY, 640BY (most recent visit day)	640BY
C. Less than 50% of all encounters in level occurs at 3 or more sites	Example #4. 640A0, 640BY, 640GC (most recent visit day) Example #5. 640A0, 640A0, 662, 662 (most recent visit day of the most frequent sites), 640BY (most recent day)	662

- ▪ In Scenario A, if all the encounters at the highest level of care in the fiscal year occurred at exactly one site, then that site would be assigned as the home site for that Veteran (example #1). Or, if the Veteran had visits at multiple sites, but the proportion of records was 50% or greater at one site, then that site would be assigned as the home site for that Veteran (example #2).
- ▪ In Scenario B, if the proportion of records at the highest level of care were split evenly between two sites, then the site with the most recent visit would be assigned as the home site for that Veteran (example #3).
- ▪ In Scenario C, if at the highest level of care there is no site with at least half of the encounters, the most recently used site is selected as the home site if all sites were used with equal frequency (example #4). Or, if there is a tie, then the most frequently visited site with the most recent visit would be assigned as the home site for that Veteran (example #5, where 640BY is not selected even though it is the most recently visited because 662 was more frequently visited).

Each Veteran was assigned to a single home site where they received the preponderance of VHA care, based upon the highest level of care that applied to the Veteran. **Exhibit H** lists the date variable and location variable used for each data source.

Exhibit H. Date and Location Variables for Each Data Source in the Home Site Algorithm

Level(s)	Data Source	Date Variable Used	Location Variable Used	Notes
1-6, 14-16	VHA Outpatient Encounter	VIZDAY	STA5A	Unique records across variables "SCRSSN," "STA5A," "VIZDAY," "CL," and "CLC" were included to address duplicate records and ensure stop codes are accurately counted for each VHA user.
7	Purchased Care Outpatient Services	TREATDAY	STA6A	This was restricted to the Purchased Care Outpatient Services (Fee-basis) files because PIT data did not appear to have consistently reliable facility data.
8	VHA Inpatient Stay	ADMITDAY, DISDAY	STA6A	Both "ADMITDAY" and "DISDAY" were used to identify records for Veterans with a VHA inpatient stay during the fiscal year. "DISDAY" was used as the visit day.
9	Purchased Care Inpatient	TREATDAYF, TREATDAYTO	STA6A	The number of records were elongated based upon the number of days between the "TREATDAYF" and "TREATDAYTO" values. A new record with a "VIZDAY" variable was created to indicate each date within that date range.
10	Purchased Care Ancillary	TREATDAYF, TREATDAYTO	STA6A	The number of records was elongated based on the number of days between the "TREATDAYF" and "TREATDAYTO" values. A new record with a "VIZDAY" variable was created to indicate each date within that date range.
11	Non-VA Inpatient Stays	DISDAY	STA6A	
12	MCA Pharmacy	VIZDAY	STA6A	
13	MCA OUT	VIZDAY	STA6A	

- **Step 4**. If a VHA user still did not have a home site assigned after all levels of care had been exhausted (see **Exhibit E**), we then supplemented location information with the PSSG Geocoded Enrollee File.
  - o Step 4a. Among remaining VHA users with an unassigned home site after Step 3, we assigned home site based on the "CLOSESTPCSITE" value in PSSG.
  - o Step 4b. For individuals still without a home site after Step 4a, we then assigned home site based the "CLOSESTSCSITE" value in PSSG.
  - o Step 4b. Finally, for individuals still without a home site after Step 4b, we assigned home site based the "CLOSESTTCSITE" value in PSSG.

- **Step 5.** We next processed the HCS list to create a mapping of sites to HCSs using the VAST Snapshot. To generate a comprehensive listing and capture sites that may have closed or were newly opened during the fiscal year, we created four extract files for the start of each quarter within the fiscal year. We created a master annual VAST HCS list by stacking all four quarters of VAST data in a given fiscal year. The file was sorted by site number in ascending order and then by VAST quarter in descending order so that the more recent site-to-HCS mappings were prioritized. Finally, duplicate records across site numbers were deleted. The final fiscal year VAST HCS mapping file included variables for site number, site name, parent station number, parent station name, and quarter from which the VAST record was pulled.

- **Step 6.** We then assigned a home facility to each VHA user by matching the individual's home site number at the conclusion of Step 4 with the home site number in the master VAST file and pulling the parent station associated with that site from the Step 5 crosswalk. This HCS was assigned as the home facility for that VHA user.

- **Step 7.** In cases where the home site number did not exist in the master VAST HCS for the fiscal year,[39] we assigned home facility to the three-digit stem of the home site number. For example, if the home site was "554DS" (indicating a non-VA hospital associated with 554, Aurora Rocky Mountain), then the home facility was assigned to "554, Aurora Rocky Mountain." [40]

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[39] These are mainly Non-VA Hospitals, VA Domiciliaries, Community Nursing Homes, Community Living Centers, etc.

[40] At the end of this step, only 327 Veteran VHA users in the FY20 Base Cohort did not have a home facility assignment.

4.0 Algorithms for Chapter 3: User Type

Chapter 3 presents data on patterns of VHA use over time, both prospectively and retrospectively. First, we categorized Veterans in a given fiscal year as *new users*, *returning users*, or *intermittent users*. These three user types in aggregate represent all Veterans who used VHA services in a given fiscal year. A fourth category, *non-returners*, was created to quantify VHA users who did not return the following year for care; non-returners in a particular fiscal year are members of the *prior* fiscal year's cohort. Second, we describe subsequent VHA use between FY10 and FY20 among Veterans newly enrolled in VHA in FY10. The subsections below detail the process of creating these variables.

4.1 VHA User Types

For purposes of this Sourcebook, the four user types are defined as:
- **New users** are Veterans who used VHA services in a given fiscal year, but who did not use VHA in any of the prior ten fiscal years.
- **Returning users** are Veterans who used VHA services in a given fiscal year and in the prior fiscal year. They may or may not have also used VHA in years earlier than the prior fiscal year.
- **Intermittent users** are Veterans who used VHA services in a given fiscal year and at least one of the prior ten fiscal years, but who did not use VHA services in the immediately preceding fiscal year.
- **Non-returners** in a given fiscal year are Veterans who received care in the immediately preceding year but who did not use VHA in the year being examined. In other words, for purposes of Sourcebook Volume 5, non-returners in a particular year are a subset of the users from the immediately preceding year. They may or may not return to VHA for care in subsequent years. Being a non-returner in a particular year may reflect infrequent use (less than once a year), attrition from VHA care, institutionalization, or death.

To create these user types, we created an indicator (0/1) for each year a Veteran user appeared in the Base Cohort from FY00 to FY20. Data from as early as FY00 was needed to determine new users and intermittent users in the FY10 Base Cohort. **Exhibit I** depicts various fictitious patterns of VHA use and the user type assignment for the FY20 Base Cohort, where a "0" indicates no VHA use in the corresponding fiscal year and a "1" indicates VHA use in the corresponding fiscal year.

Exhibit I. Example Patterns of VHA Use for Each User Type in the FY20 Base Cohort

User	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	User Type
A	0	0	0	0	0	0	0	0	0	0	1	New user
B	1	0	0	1	1	0	1	1	1	1	1	Returning user
C	0	0	0	0	0	0	0	0	0	1	1	Returning user
D	0	1	0	0	1	0	0	1	1	0	1	Intermittent user
E	1	1	1	1	1	1	1	1	1	0	1	Intermittent user
F	0	0	0	0	0	0	0	0	0	1	0	Non-returner
G	1	1	1	1	1	1	1	1	1	1	0	Non-returner

4.2 Subsequent VHA Use Among FY10 New Enrollees

Sourcebook Volume 5 also explores health service use between FY10 and FY20 among the cohort of women and men who were new enrollees in FY10 and still alive at the end of FY20. Unlike the utilization patterns described in Section 4.1, this section starts with an earlier cohort of VHA *enrollees* and looks *forward* at their subsequent use.

Enrollees were identified from the ADREnrollHistory table from the ADR Enrollment Domain. A Veteran is considered to be a new VHA enrollee in FY10 if the following are true:
1. The earliest "EnrollStartDate" value falls within FY10 (October 1, 2009 – September 30, 2010), and
2. "EnrollStatusName" = 'Verified'

We additionally limited the cohort of FY10 new VHA enrollees to those who were still alive at the end of FY20 using date of death data from the Spatient.Spatient table. VHA use in each year was determined by the presence in the Base Cohort in each year from FY10-FY20.

5.0 Algorithms for Chapter 4: VA-purchased Community Care (VACC) Utilization and Conditions Seen in VACC Settings

In this report, Non-VA care paid for by VA is referred to as "VA-purchased Community Care" (VACC). VACC utilization and diagnosis variables were derived using both the Purchased Care and the PIT data files. To determine VACC use and conditions seen in VACC settings, we first had to process the Purchased Care and PIT data files.

5.1 Processing of the VACC files for Utilization

5.1.1 Purchased Care Files

This Sourcebook reports the proportion of Veteran users who had at least one outpatient service and/or inpatient stay reimbursed through Purchased Care and/or PIT in the fiscal year. For the Purchased Care files, in some cases, a stay or service *reimbursed* in a particular year actually reflects care *received* in a previous year. For example, the FY19 Purchased Care Outpatient Services file includes only services that were reimbursed by VHA in FY19. **Exhibit J** shows three possible combinations of the year in which a service was provided and the year in which that care was reimbursed (and thus appeared in Purchased Care data).

- *Scenario 1* shows a service both provided and reimbursed in FY19.
- *Scenario 2* shows a service provided in FY18, but which appeared in the FY19 Purchased Care file rather than the FY18 Purchased Care file due to a lag between service provision and service reimbursement and therefore considered an "extra" service in the FY19 Purchased Care file. There similarly could be services provided earlier than FY18 which appear in the FY19 Purchased Care files.
- *Scenario 3* shows a service provided in FY19 but reimbursed in FY20; this service appears in the FY20 Purchased Care file but not in the FY19 file, and thus was considered "excluded" from the FY19 Purchased Care file. Services provided in FY19 similarly could appear in Purchased Care files even later than FY20.

Exhibit J. Three Scenarios Observed in FY19 Purchased Care Data

Scenario	FY18	FY19	FY20
1. Service provided in FY19 and appears in FY19 Purchased Care file.		▼ ●	
2. Service provided in FY18 and appears in FY19 Purchased Care file ("extra").	▼	●	
3. Service provided in FY19 and appears in FY20 Purchased Care file ("excluded").		▼	●

● Record reimbursement date, indicating the FY of Purchased Care file in which record appears.

▼ Fiscal year in which service occurred.

For simplicity, WHEI decided to create Purchased Care utilization variables based on care reimbursed in FY19 with two justifications. First, for administrative purposes, it may be useful to track the volume of services that were reimbursed in FY19, rather than the services that were provided in FY19. Second, for program evaluation purposes, the volume of services reimbursed in FY19 appears to be an acceptable proxy for services provided in FY19. WHEI estimates that the number of "extra" services in the FY19 file (those provided prior to FY19 but reimbursed in FY19) will approximately compensate for the "excluded" services in the FY19 file (those provided in FY19 but reimbursed after FY19).

5.1.2 PIT

To account for Community Care claims being increasingly captured in PIT (as of the time of Sourcebook variable development), we additionally incorporated PIT claims data into the "VACC utilization" algorithm. For the FY19 cohort, we used a static extract of PIT data with service dates from October 1, 2018, through September 30, 2019, that we pulled on July 11, 2022, (PIT Professional) and July 14, 2022, (PIT Institutional). Pulling data long after the fiscal year ended helps to mitigate the issue of claims that are submitted late or with initial inaccuracies, and thus is expected to produce a data set that is more complete and accurate.

Following guidance established by the VA Health Economics Resource Center (HERC)[41] and from discussions with IVC and other data experts, we limited PIT records to service dates[42] within FY19 and considered records as "valid" if they had the following values for two PIT data fields:
- **CurrentFlag** = "Y," AND
- **ClaimStatus** = "Accepted," "ACCEPTED," "Approved," "In Payment," or "Paid"

5.1.3 Generating an Indicator for Any VACC Use

The WHEI Master Database contains a person-level (yes/no) variable indicating that the Veteran had at least one VACC encounter in FY19 if they had at least one service reimbursed in the Purchased Care outpatient, inpatient stay, and/or ancillary file in FY19 (even if that service was provided prior to FY19), or if they had at least one service provided in FY19 in the PIT Professional and/or Institutional files.

5.2 Algorithm for Condition Diagnoses

The condition diagnoses described in this report are based on the health profile algorithm previously described in the Technical Appendix of Sourcebook Volume 4[43] and then more recently revised to accommodate the transition of International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes to International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes that occurred on October 1, 2015. WHEI's approach for mapping ICD-10-CM codes to conditions is described in detail in the Technical Appendix of the State of Reproductive

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[41] Health Economics Resource Center (HERC). (2021, April 16). *Community Care Data - Program Integrity Tool (PIT).* Veterans Health Administration, Department of Veterans Affairs, Washington DC. Available at: http://vaww.herc.research.va.gov/include/page.asp?id=choice-pit. Accessed January 21, 2022.

[42] Using the date fields "StatementFromDate" and "StatementToDate" in the PITInstitutionalClaim file and "ServiceFromDate" and "ServiceToDate" in the PITProfessionalClaimDetails file.

[43] Frayne SM, Phibbs CS, Saechao F, Friedman SA, Shaw JG, Romodan Y, Berg E, Lee J, Ananth L, Iqbal S, Hayes PM and Haskell S. Sourcebook: Women Veterans in the Veterans Health Administration. Volume 4: Longitudinal Trends in Sociodemographics, Utilization, Health Profile, and Geographic Distribution. Women's Health Evaluation Initiative, Women's Health Services, Veterans Health Administration, Department of Veterans Affairs, Washington DC. February 2018.

Health Volume II report.[44] Post publication of these reports, WHEI's health profile algorithm has been further revised to apply additional mapping updates. To provide a comprehensive, synthesized description of the health profile algorithm, some text herein may be identical to text in the technical appendices of these prior reports.

Although Chapter 4 of this Sourcebook only describes conditions diagnosed during VACC-based health care encounters (and does *not* describe prevalence of conditions), the Technical Appendix sections that follow more broadly describe WHEI's algorithm for identifying conditions in both VHA and VACC settings, outpatient and inpatient. Supplemental Appendix H contains data on the prevalence of all 202 health conditions and 17 domains among women and men Veterans across all VHA/VACC settings of care.[45]

5.2.1 Overview

To characterize the medical and mental health conditions of women Veterans, we used ICD-10-CM diagnosis codes appearing in VHA outpatient/inpatient files and in VACC outpatient/inpatient files. In the outpatient setting, the clinician records the ICD-10-CM diagnosis/diagnoses addressed at the visit on an encounter form, which is then incorporated into the patient's administrative records. In the inpatient setting, coders typically abstract admitting diagnoses and discharge diagnoses appearing in the patient's medical record, which are then incorporated as ICD-10-CM codes into the patient's administrative records. To capitalize on these existing clinical data, we aggregated the individual diagnosis codes into 202 clinically meaningful "conditions," and then grouped conditions into 17 broad "domains." This section describes all the phases of variable creation completed initially for Sourcebook Volume 3 (ICD-9-CM era) and includes subsequent updates made for Sourcebook Volume 5 (ICD-10-CM era).

- Phase 1 involved developing a rule for mapping ICD-9-CM codes to conditions for FY15.
- Phase 2 involved developing a rule for mapping conditions to domains.
- Phase 3 involved developing a process for mapping ICD-10-CM codes to conditions for FY18.
- Phase 4 involved updating the mapping of ICD-10-CM codes to conditions for FY19 and FY20.
- Phase 5 involved database processing to generate person-level indicators for presence of each condition within each data source and across data sources, applying an algorithm for identification of presence/absence of each condition for each patient.
- Phase 6 generated patient-level variables indicating, for each domain, whether or not the patient had at least one condition falling within the domain. For analyses specifically identifying conditions diagnosed in a VACC setting, source files in Phase 5 were limited to VACC files, whereas for condition prevalence described in Supplemental Appendix H, all data sources (VHA and VACC) were used.

Detailed description of these phases follows.

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[44] The algorithm is also described in detail in the Technical Appendix of the State of Reproductive Health Report Volume II. See: Katon JG, Tartaglione EV, Eleazer JR, Frayne SM, Haeger KO, Luo S, Schule AKR, Offer C, Phibbs CS, Rose D, Saechao F, Shankar M, Shaw J, Vinekar KS, Yano EM, Christy AY, Johnson AM. State of Reproductive Health Volume II: VA Reproductive Health Diagnoses and Organization of Care. Office of Women's Health, Veterans Health Administration, Department of Veterans Affairs, January 2023.

[45] Available upon request at: VHA10WWomensHealthAction@va.gov.

5.2.2 Phase 1: Mapping ICD-9-CM Codes to Conditions for FY15 (Version 1.0)

Note that Phase 1 and Phase 2 involved ICD-9-CM codes; it was not until Phase 3 that ICD-10-CM codes were applied.

There are two major reasons for the decision to map ICD-9-CM codes to broader "conditions." First, attempting to present the frequency of each individual ICD-9-CM diagnosis code would be more confusing than illuminating, as there are well over 15,000 ICD-9-CM diagnosis codes. Second, in many cases, a clinician coding the diagnosis responsible for the patient's visit or hospital stay could legitimately apply one of several ICD-9-CM codes to reflect the presenting condition. For example, if the clinician identifies migraine headache as the patient's diagnosis at a visit, then the clinician could code the reason for that visit as ICD-9-CM 346.00 ("migraine with aura, without mention of intractable migraine"), as ICD-9-CM 346.90 ("migraine, unspecified, without mention of intractable migraine"), or as ICD-9-CM 784.0 ("headache"), among other options, all to describe the same clinical presentation. Similarly, a clinician seeing a patient for diabetes mellitus might correctly code the reason for the visit as ICD-9-CM 250.60 ("diabetes type II or unspecified type, with neurological manifestations"), as ICD-9-CM 250.90 ("diabetes type II or unspecified type, with unspecified complication"), or as ICD-9-CM 357.2 ("polyneuropathy in diabetes"), among other options. In other words*, to present data from a single ICD-9-CM diagnosis code may be to apply a higher level of granularity of results than typical clinician coding practices would support.* Therefore, it is necessary to aggregate ICD-9-CM codes into groupings meaningful to the purpose of the work being pursued.

Fortunately, a widely used approach to aggregating ICD-9-CM codes exists. The Agency for Healthcare Research and Quality (AHRQ) sponsors the Healthcare Cost and Utilization Project (HCUP) to develop Clinical Classification Software (CCS) that categorizes all ICD-9-CM diagnosis codes into a set of clinically meaningful groups, each reflecting a single condition.[46] The CCS approach serves as the foundation for the WHEI strategy for mapping ICD-9-CM codes to conditions; the multi-step process WHEI used to tailor the CCS approach to the needs of the Sourcebook reports is described next.

- **Step 1.** WHEI used an existing mapping strategy as a starting point. Specifically, starting with the 2008 version of CCS,[47] a prior research study[48] made modifications to CCS's mapping strategy based upon clinical input, to enhance its suitability for describing burden of illness in women Veteran VHA patients; some ICD-9-CM codes (e.g., pediatric illnesses, congenital conditions, E codes, and codes reflecting a procedure rather than a diagnosis) were not mapped to a condition in that prior work.[49] The 237 conditions (222 medical conditions plus 15 mental health conditions[50]) from this prior work constituted the Step 1 working list of conditions.

- **Step 2.** The Office of Women's Health Cardiovascular Health Workgroup—composed of cardiologists, primary care providers, policymakers, and women's health researchers—carefully reviewed the Step 1 working list and through an iterative group consensus process refined the

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[46] HCUP Tools and Software. Healthcare Cost and Utilization Project (HCUP). December 2017. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/tools_software.jsp.

[47] Healthcare Cost and Utilization Project (HCUP) Clinical Classification Software (CCS). Agency for Healthcare Research and Quality. Rockville, MD; 2008.

[48] VA HSR&D SHP 08-161 (PI: Rachel Kimerling PhD; Co-PI: Susan Frayne MD, MPH)

[49] Frayne SM, Chiu VY, Iqbal S, et al. Medical care needs of returning veterans with PTSD: their other burden. Journal of General Internal Medicine 2011;26(1):33-39. Also see that manuscript's On-Line Appendix 2 for a complete list of all 222 conditions.

[50] The mapping strategy for mental health conditions used in that study—similarly representing a modified version of the CCS mapping strategy—additionally drew upon mapping algorithms developed for other prior studies: VA HSR&D IIR 04-248, and NIDDK 1 R01 DK071202.

cardiovascular conditions on that list. Careful development of these conditions was considered a high priority, given that cardiovascular disease remains the leading cause of death for women. Their work is described in a report on women Veterans' cardiovascular health.[51]

- **Step 3.** Office of Women's Health Reproductive Health Workgroup—composed of gynecologists, primary care providers, policymakers, and women's health researchers—similarly reviewed the Step 1 working list and used an iterative group consensus process, combined with review of the American College of Obstetrics & Gynecology coding guidelines,[52] to refine the reproductive health conditions on that list. Careful development of these conditions was considered a priority because female-specific reproductive health conditions are unique to women and require a specialized health care delivery infrastructure, falling under the purview of the Office of Women's Health. The work of the Reproductive Health Workgroup is described in a reproductive health report.[53]

- **Step 4.** The WHEI team resolved any overlap between condition lists generated by these two workgroups. For example, "Hypertension in Pregnancy" appeared on both the Cardiovascular Health Workgroup list and the Reproductive Health Workgroup list. This resulted in a working list of 268 conditions at the end of Step 4.

- **Step 5.** A VHA primary care women's health provider/researcher (SMF) reviewed all of the CCS 2008 ICD-9-CM codes (and their associated CCS conditions) that had not been incorporated into our Step 1 working list of conditions. (These represented mostly childhood conditions, congenital abnormalities, E codes, and medical procedures that do not reflect a diagnosis.) We either mapped these codes to the corresponding CCS condition or, in consultation with VHA women's health clinicians and experts from Steps 2 and 3, we mapped the code to one of our Step 4 conditions. There were 316 conditions at the end of Step 5.

- **Step 6.** A VHA primary care women's health provider/researcher (SMF) reviewed all of the CCS 2012 ICD-9-CM codes (and their associated CCS conditions) that had not been mapped by the end of Step 5. (These represented new ICD-9-CM codes that had not been in existence in 2008.) As in Step 5, our default was to map these ICD-9-CM codes to the corresponding CCS condition, but the clinical reviewer queried other clinicians with relevant expertise for any potentially controversial mappings.

- **Step 7.** A VHA primary care women's health provider/researcher (SMF) conducted a global consistency review of the ICD-9-CM codes mapped to each condition as of the end of Step 6. This review was intended to confirm that our mapping had yielded clinically meaningful groups of ICD-9-CM codes and that the grouping logic was consistent across conditions—if not, any necessary adjustments were made. The review also identified conditions that needed to be

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[51] Maher NH, Whitehead AM, Duvernoy C, Davis M, Safdar B, Frayne SM, Saechao F, Lee J, Hayes PM, Haskell SG. The State of Cardiovascular Health in Women Veterans. Volume 2: Risk Factors, Diagnoses, and Procedures in Fiscal Year (FY) 2014. Women's Health Evaluation Initiative, Women's Health Services, Veterans Health Administration, Department of Veterans Affairs, July, 2017.

[52] American College of Obstetricians & Gynecologists. OB/GYN Coding Manual: Components of Correct Procedural Coding. American Medical Association, 2010. Print.

[53] Zephyrin LC, Katon J, Hoggatt KJ, Balasubramanian V, Saechao F, Frayne SM, Mattocks KM, Feibus K, Galvan IV, Hickman R, Hayes PM, Haskell SG, Yano EM. State of Reproductive Health In Women Veterans – VA Reproductive Health Diagnoses and Organization of Care. Women's Health Services, Veterans Health Administration, Department of Veterans Affairs, February 2014.

"lumped" with other conditions and conditions that needed to be "split" into more than one condition. To facilitate lumping and splitting, the reviewer referred to existing nosologies (such as the CCS nosology, the ICD-9-CM nosology, and the nosologies defined by the table of contents structure of major medical textbooks). To further guide this process and inform decisions about lumping versus splitting, for every ICD-9-CM code, we also determined the number of women who had at least one instance of that code in FY12 in the VHA outpatient file, the VHA inpatient files, the Purchased Care outpatient file, and the Purchased Care inpatient file. The reviewer additionally consulted these ICD-9-CM code-level frequencies when making decisions about lumping or splitting: ICD-9-CM codes with particularly high frequency were inspected to assess whether they merited inclusion in a new condition, and conversely, if a condition contained only very low-frequency ICD-9-CM codes, the condition was assessed for possible lumping with another condition. The reviewer also considered the codes numerically close to the ICD-9-CM code being examined, assessing whether or not the code should be grouped with codes close to it in the ICD-9-CM hierarchy. For difficult grouping decisions, the reviewer also consulted with clinical experts, textbooks, and other reference materials.

- **Step 8.** We checked our mapping against other sources. Our intention was to make a particular effort to maximize the consistency of our approach to condition mapping with the approaches used by other national VHA program offices and VHA Quality Enhancement Research Initiatives (QUERI), to the extent possible. On occasion, this was not possible. For example, in some cases, the algorithm of one office differed from that of another office—in that case, we attempted to rely on the algorithm of the office primarily responsible for oversight of care for that condition. Likewise, in some cases the algorithm of an office involved mapping a single ICD-9-CM code to more than one condition—because our approach, like that of CCS, required that an ICD-9-CM code be mapped uniquely to a single condition, we converted such double-mappings to single-mappings. We received detailed condition specification algorithms from the following: VA Mental Health's Northeast Program Evaluation Center (NEPEC) (for a number of the major mental health conditions examined in this Sourcebook); the Military Sexual Trauma Support Team, the Program Evaluation Resource Center (PERC), and the Substance Use Disorder QUERI (for additional checks of mental health and substance use disorder conditions); Office of Geriatrics and Extended Care (for dementia); Polytrauma and Blast-Related Injuries QUERI (for Traumatic Brain Injury, TBI); Chronic Heart Failure QUERI (for heart failure), and Spinal Cord Injury QUERI (for Spinal Cord Injury). We also reviewed key publications of the Diabetes QUERI (for diabetes mellitus[54]) and the Stroke QUERI (for stroke[55]). Several investigators also generously shared their ICD-9-CM mapping algorithms for specific conditions with us. Cross-checking against these various sources led to final adjustments to our algorithm for mapping ICD-9-CM codes to conditions, yielding 234 conditions at the end of Step 8.

- **Step 9.** We pruned the list of conditions to include only those relevant to the Sourcebook. While the final list of conditions available at the end of Step 8 mapped every ICD-9-CM code to a condition, not all of these conditions are of interest to this report. We deleted "conditions" representing E codes because they describe a mechanism of injury or type of accident rather than a condition—an additional ICD-9-CM code should accompany the E code to specify the type of injury sustained, and that is the code retained for this report. We deleted "conditions"

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[54] Miller DR, Safford MM, Pogach LM. Who has diabetes? Best estimates of diabetes prevalence in the Department of Veterans Affairs based on computerized patient data. Diabetes Care 2004;27(Suppl 2):B10-21.
[55] Reker DM, Rosen AK, Hoenig H, et al. The hazards of stroke case selection using administrative data. Med Care 2002;40(2):96-104.

representing neonatal codes because our focus is on the mother and not the newborn. We also deleted "conditions" that did not represent the presence of a medical condition, many of which were composed of V codes.[56] For example, in general, we deleted "conditions" reflecting receipt of a medical procedure; these conditions contained ICD-9-CM codes such as V70.0 "routine general medical examination at a health care facility" or V54.89 "other orthopedic aftercare" or V76.10 "breast screening unspecified" or V57.1 "care involving other physical therapy." One exception to this approach is that we did count contraceptive counseling (which is technically a medical preventive/counseling code rather than a clinical diagnosis) as one of the conditions reported in this Sourcebook, because of its particular relevance to the medical care of women. We also deleted other "conditions" not indicating presence of a medical condition, such as conditions containing ICD-9-CM codes describing family history (e.g., V17.1 "family history of stroke [cerebrovascular]") or non-disease clinical observations (e.g., 795.5 "nonspecific reaction to tuberculin skin test without active tuberculosis").

The resulting list included a total of 12,912 ICD-9-CM codes mapped to one of 202 conditions. See Supplemental Appendix I for the complete mapping of ICD-9-CM codes to conditions and domains for FY15, as reported in Sourcebook Volume 4.[57]

5.2.3 Phase 2: Mapping Conditions to Domains

Applying clinical expertise and drawing upon the broad groupings developed by CCS, a panel of VHA women's health primary care providers and researchers grouped these 202 conditions into 17 broad "domains" that primarily represent organ systems. Each condition received a primary mapping to a single domain. Some conditions also were secondarily mapped to another domain; in that case, the condition was counted both toward the frequency of the primary domain and toward the frequency of the secondary domain. The conditions with secondary mappings are listed below, by domain (with their primary domain mapping in parentheses). The 17 domains are as follows.

1. **Infectious Disease domain.** Systemic infections and unspecified infections receive primary mapping to Infectious Disease. Infections of a specific organ system are primarily mapped to that organ system and secondarily mapped to Infectious Disease. For example, the condition "Hepatitis C" is primarily mapped to the Gastrointestinal domain, and secondarily mapped to the Infectious Disease domain.[58] The conditions secondarily mapped to Infectious Disease for total Infectious Diseases counts were the following:
   - Pneumonia (primary domain: Respiratory)
   - Respiratory System Infections - Other (primary domain: Respiratory)

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[56] While the majority of V codes were mapped to conditions not included in this Sourcebook, some were mapped to conditions that were included, because these ICD-9-CM codes indicated presence of a medical condition. Illustrative examples include: V07.4 "hormone replacement therapy (postmenopausal)" was mapped to Menopausal Disorders; V10.05 "personal history of malignant neoplasm of large intestine" was mapped to Cancer - Colorectal; V15.41 "personal history of physical abuse" was mapped to Psychosocial Factors – Other; V22.1 "supervision of other normal pregnancy" was mapped to Pregnancy or Delivery - Normal; V25.09 "other general counseling and advice on contraceptive management" was mapped to Contraceptive Care Management; V41.2 "problems with hearing" was mapped to Hearing Problems; V43.3 "heart valve replaced by other means" was mapped to Valvular Disease; V58.11 "encounter for antineoplastic chemotherapy" was mapped to Cancer - Other and Unspecified Primary; V60.0 "lack of housing" was mapped to Housing Insufficiency; V62.82 "bereavement uncomplicated" was mapped to Psychosocial Factors – Other; V69.0 "lack of physical exercise" was mapped to Residual Codes; V85.35 "body mass index 35.0-35.9, adult" was mapped to Overweight/Obesity.

[57] Available upon request at: VHA10WWomensHealthAction@va.gov.

[58] In a limited number of instances (specified here), conditions were counted toward the total domain count of more than one domain. However, individual ICD diagnosis codes were not counted toward more than one condition.

- Hepatitis C (primary domain: Gastrointestinal)
- Urinary Tract Infection (Cystitis/Urethritis/Pyelonephritis) (primary domain: Urinary)
- Sexually Transmitted Infections (primary domain: Reproductive Health)
- Vaginitis and Other Pelvic Inflammatory Conditions (primary domain: Reproductive Health)
- Osteomyelitis/Infectious Arthritis (primary domain: Musculoskeletal)
- Skin Infection (primary domain: Dermatologic)

2. **Endocrine/Metabolic/Nutritional domain.** Endocrine, metabolic, and nutritional disorders are primarily mapped to this domain. Conditions secondarily mapped to this domain were the following:
   - Pregnancy Complicated by Diabetes Mellitus (primary domain: Reproductive Health)
   - Cancer – Thyroid (primary domain: Cancer)

3. **Cardiovascular domain.** This refers to conditions that affect the heart and other parts of the cardiovascular system, including cerebrovascular and peripheral vascular conditions. One condition was secondarily mapped to this domain.
   - Pregnancy Complicated by Hypertension (primary domain: Reproductive Health)

4. **Respiratory domain.** This includes conditions that affect the lungs and upper respiratory tract. One condition was secondarily mapped to this domain.
   - Cancer – Bronchopulmonary (primary domain: Cancer)

5. **Gastrointestinal domain.** This refers to conditions that affect the digestive system. Conditions secondarily mapped to this domain are as follows:
   - Cancer – Esophagus (primary domain: Cancer)
   - Cancer – Gastric (primary domain: Cancer)
   - Cancer – Colorectal (primary domain: Cancer)
   - Cancer – Anal (primary domain: Cancer)
   - Cancer – Hepatobiliary (primary domain: Cancer)
   - Cancer – Pancreatic (primary domain: Cancer)

6. **Urinary domain.** This refers to conditions of the kidneys, bladder, or other parts of the urinary system. Conditions secondarily mapped to this domain are as follows:
   - Cancer – Renal (primary domain: Cancer)
   - Cancer – Bladder (primary domain: Cancer)

7. **Reproductive Health domain.** This encompasses genital tract conditions, pregnancy-related conditions, and other conditions related to reproductive health. Conditions secondarily mapped to this domain are as follows:
   - Cancer – Cervical (primary domain: Cancer)
   - Cancer – Uterine (primary domain: Cancer)
   - Cancer – Ovarian (primary domain: Cancer)
   - Cancer – Female Reproductive – Other (primary domain: Cancer)
   - Carcinoma in Situ – Cervical (primary domain: Cancer)
   - Carcinoma in Situ – Female Reproductive – Other (primary domain: Cancer)
   - Cancer – Prostate (primary domain: Cancer)
   - Cancer – Testicular (primary domain: Cancer)

8. **Breast domain.** This includes breast conditions and abnormal breast findings. Conditions secondarily mapped to this domain are as follows:
   - Cancer – Breast (primary domain: Cancer)
   - Carcinoma in Situ – Breast, Ductal, or Lobular (primary domain: Cancer)

9. **Cancer domain.** All cancer diagnoses and all carcinoma in situ diagnoses[59] are primarily mapped to the Cancer domain. Whenever applicable, cancers are secondarily mapped to the organ system to which they refer.

10. **Hematologic/Immunologic domain.** This refers to disorders of the blood or immune system. Conditions secondarily mapped to this domain are as follows:
    - Lymphomas (primary domain: Cancer)
    - Leukemias (primary domain: Cancer)
    - Multiple Myeloma (primary domain: Cancer)

11. **Musculoskeletal domain.** This includes rheumatologic and musculoskeletal conditions. One condition is secondarily mapped to this domain.
    - Cancer – Bone/Connective Tissue (primary domain: Cancer)

12. **Neurologic domain.** This refers to conditions of the brain and nervous system. Conditions secondarily mapped to this domain are as follows:
    - Cerebrovascular Accident/Transient Ischemic Attack (primary domain: Cardiovascular)
    - Cancer – Brain/Nervous System (primary domain: Cancer)

13. **Mental Health/Substance Use Disorder (MH/SUD) domain.** This domain consists of mental health conditions, substance use disorders, and nonspecific psychiatric disorders. Note that general psychosocial factors and Tobacco Use Disorder are mapped to the Other domain, not to the MH/SUD domain.

14. **Sense Organs domain.** This includes conditions that affect the eyes or ears.

15. **Dental domain.** This refers to dental disorders.
    NOTE: *Most Veteran VHA patients are not eligible to receive dental care by a VHA provider; therefore, frequencies of dental disorders among Veteran VHA patients may represent an under-count of true condition prevalence.*

16. **Dermatologic domain.** This refers to conditions affecting the skin. One condition is secondarily mapped to this domain.
    - Melanoma (primary domain: Cancer)

17. **Other domain.** This domain includes miscellaneous diagnoses not mapped to other domains, such as symptoms, conditions due to external causes, and psychosocial factors.

5.2.4 Phase 3: Mapping ICD-10-CM Codes to Conditions for FY18 (Version 2.0)

On October 1, 2015, VHA transitioned to ICD-10-CM for medical coding as mandated by the U.S. government.[60] The original Version 1.0 WHEI condition mapping of all diagnosis codes into 202 health conditions was completed in the ICD-9-CM code era; thus, it was necessary to convert this mapping to ICD-10-CM codes. This section describes WHEI's process of mapping over 70,000 ICD-10-CM codes to the 202 health conditions for FY18.

- Step 1. Using the Centers for Medicare & Medicaid General Equivalence Mapping (CMS GEMS, hereafter referred to as GEMS) for 2018,[61] WHEI applied a backward mapping approach,

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[59] Carcinoma in Situ can in some cases represent a condition managed as cancer (e.g., ductal breast carcinoma in situ) and in other cases can represent a non-cancer condition (e.g., cervical carcinoma in situ). However, because the latter is serious and on the pathway toward cancer, all carcinoma in situ is grouped within the Cancer domain.

[60] U.S. Centers for Disease Control and Prevention, National Center for Health Statistics. (2015, November 6). *International Classification of Diseases (ICD-10-CM/PCS) Transition—Background.* Available at: https://www.cdc.gov/nchs/icd/icd10cm_pcs_background.htm. Accessed January 24, 2024.

[61] U.S. Centers for Medicare & Medicaid Services. (2021, December 1). *2018 ICD-10 CM and GEMS.* U.S. Centers for Medicare & Medicaid Services. Baltimore, MD. Available at: https://www.cms.gov/Medicare/Coding/ICD10/2018-ICD-10-CM-and-GEMs. Accessed January 21, 2022.

mapping every ICD-10-CM code to an ICD-9-CM code. The majority of these resulted in one-to-one mappings (88%, or 63,461 out of 72,157 ICD-10-CM codes), meaning the ICD-10-CM code mapped to one unique ICD-9-CM code. For these, the WHEI condition that was originally mapped to the corresponding ICD-9-CM code was also applied to the equivalent ICD-10-CM code.

- Step 2. Next, we turned to the 7,961 ICD-10-CMs that mapped to more than one ICD-9-CM code (e.g., one-to-many mapping).

  - If all the ICD-9-CM codes in the grouping mapped to the same WHEI condition, the WHEI condition was applied to the ICD-10-CM code (n=4,378 ICD-10-CM codes).
  - When GEMs had a one-to-many translation resulting in *ambiguous* WHEI condition assignment, the highest frequency-diagnosed ICD-9-CM among women Veterans in FY15 (ICD-9-CM era) guided the condition assignment. Two primary care providers/researchers (SMF/JGS) performed targeted manual review of this approach and manually re-assigned ICD-10-CMs if the initial condition assignment resulted in a discordant condition (n=3,583 ICD-10-CM codes).

- Step 3. Lastly, the physicians also manually assigned a small number of ICD-10-CMs (n=735) that did not have equivalent ICD-9-CM mapping in GEMS.

NOTE FOR INTERPRETATION: *With the conversion of diagnosis codes from ICD-9-CM to ICD-10-CM, there was a change in the specificity of coding for some conditions. Most notably, changes in ICD code specificity for mental health-related diagnoses had substantial impact on the absolute counts of the two related conditions, "Depression, Possible" and "Major Depressive Disorder," with a large drop in the absolute count for the former, accompanied by a large increase in the latter.*

The resulting list included a total of 54,980 ICD-10-CM codes mapped to one of 202 conditions.[62] See Supplemental Appendix J for the complete mapping of ICD-10-CM codes to conditions for FY18, as reported in State of Reproductive Health Volume II report.[63,64]

5.2.5 Phase 4: Mapping of ICD-10-CM Codes to Conditions and Domains for FY19 and FY20 (Version 3.0)

Since ICD-10-CMs are updated every fiscal year, it was thus necessary to update our FY18 mapping of ICD-10-CM codes to WHEI condition for FY19 and FY20. Comparing our list of Version 2.0 ICD-10-CM codes to the CMS 2020 ICD-10-CM file, there were a total of 552 new ICD-10-CM codes that needed to be mapped to a WHEI condition.[65] In addition to mapping new codes, WHEI also reviewed the ICD-10-CM definitions for select domains and consulted with other national VHA program offices to ensure alignment of our condition specification algorithm with other offices. The multi-step process WHEI used

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[62] Of the 72,157 ICD-10-CM codes that WHEI mapped, 17,177 did not map to one of WHEI's 202 health conditions of interest. See Step 9 of Section 5.2.2 for a description of these types of excluded "conditions."

[63] Available upon request at: VHA10WWomensHealthAction@va.gov.

[64] Katon JG, Tartaglione EV, Eleazer JR, Frayne SM, Haeger KO, Luo S, Schule AKR, Offer C, Phibbs CS, Rose D, Saechao F, Shankar M, Shaw J, Vinekar KS, Yano EM, Christy AY, Johnson AM. State of Reproductive Health
Volume II: VA Reproductive Health Diagnoses and Organization of Care. Office of Women's Health, Veterans Health Administration, Department of Veterans Affairs, January 2023.

[65] There were no new ICD-10-CM codes from the CMS 2019 ICD-10-CM file that were not already included in the CMS 2020 ICD-10-CM file.

to develop the Version 3.0 mapping of FY20 ICD-10-CM codes to conditions for WHEI program purposes, including this report, is described next.

- **Step 1**. To minimize the manual effort needed to map new ICD-10-CM codes annually, WHEI developed an algorithm to automatically assign new ICD-10-CM codes to a WHEI condition. **Exhibit K** shows the programming levels and the number of ICD-10-CM codes assigned and unassigned at each level.

Exhibit K. Process for Automating Assignment of WHEI Conditions to 552 New ICD-10-CM Codes Using SAS

Level	Description of Program Level	# ICD-10-CM Codes Assigned	# ICD-10-CM Codes Unassigned
0	Starting point: New ICD-10-CM Codes needing to be assigned to a WHEI condition	-	552
1	Within the same 3-digit ICD-10-CM stem, if two ICD-10-CM codes have identical descriptions, and one ICD-10-CM code has a condition already assigned, apply the same condition to the unmapped ICD-10-CM code.	10	542
2	Within the same 3-digit ICD-10-CM stem (that all have the same condition assignment when present), if a set of ICD-10-CM codes have the same description stem as an unmapped ICD-10-CM code, but the description for the unmapped code is longer (i.e., more descriptive or specific), then assign that unmapped ICD-10-CM code to the same condition.	17	525
3	Within the same 3-digit ICD-10-CM stem, if the number of mapped ICD-10-CM codes is greater than the number of unmapped codes AND if all the mapped codes are assigned to one WHEI condition, then assign the same condition to the unmapped ICD-10-CM code(s).	281	244
4	Within the same 4-digit ICD-10-CM stem, if the number of mapped ICD-10-CM codes is greater than the number of unmapped codes AND if all the mapped codes are assigned to one WHEI condition, then assign the same condition to the unmapped ICD-10-CM code(s).	24	220
5	Within the same 5-digit ICD-10-CM stem, if the number of mapped ICD-10-CM codes is greater than the number of unmapped codes AND if all the mapped codes are assigned to one WHEI condition, then assign the same condition to the unmapped ICD-10-CM code(s).	0	220

- **Step 2**. At the end of Step 1, 220 new ICD-10-CM codes still did not have a WHEI condition assignment. All remaining codes were then reviewed and manually assigned to a WHEI condition by a clinical psychologist/researcher (JYB) and an internal medicine physician/researcher (SMF). To help guide the mapping process, we referred to the Clinical

Classifications Software Refined (CCSR)[66] and the list of non-billable ICD-10-CM codes.[67] To further guide this process and inform decisions about mapping new ICD-10-CM code to an existing WHEI condition, we also determined the number of women who had at least one instance of that code in FY20 across the VHA inpatient and outpatient files, the Purchased Care inpatient and outpatient files, and the PIT Professional and Institutional files.

- **Step 3**. After assigning all new ICD-10-CM codes to a condition, we additionally performed a review of select domains of interest (i.e., MH/SUD and Reproductive Health) to be sure that our ICD-10-CM mapping to conditions aligned with the condition specifications from other national VHA program offices. Specifically, we consulted with PERC and reviewed their classification of MH/SUD diagnoses. This resulted in reassignment of some ICD-10-CM codes from the Neurologic domain to the MH/SUD domain, and vice versa. We additionally consulted with gynecologists, primary care providers, policymakers, and women's health researchers regarding the conditions under the Reproductive Health domain. After careful consideration, we decided to lump two conditions together, rename two conditions, and create one completely new condition. Individual ICD-10-CM codes were also re-mapped to these conditions at this step. The list below describes the condition-level changes made in Step 3.
    - o Reproductive Health domain:
        - "Male Genital Disorders" and "Female Reproductive Organ Disorders – Other" were merged into a new condition, "Reproductive Organ Disorders – Other."
        - A new condition, "Pelvic Pain" was created.
        - "Menopausal Disorders" was renamed as "Menopausal Disorders/Hormone Replacement Therapy."
    - o MH/SUD domain:
        - "Anxiety Disorders - Other" was renamed as "Anxiety Disorders."

The resulting list included a total of 55,412 ICD-10-CM codes mapped to one of 202 conditions.[68] Note that the mapping of conditions to domains remained unchanged from that reported in Phase 2 above. See Supplemental **Appendix K** for the complete mapping of the Version 3.0 ICD-10-CM codes to conditions and domains for FY19 and FY20.[69]

5.2.6 Phase 5: Generating Condition Variables Within and Across Data Sources
We next processed raw record-level data from the source files with a goal of generating person-level indicator variables for each WHEI condition for each source file in the fiscal year of interest.

The source files used for database processing were:
1. VHA Outpatient Encounter file
2. VHA Inpatient Stay files
3. Purchased Care Outpatient Services file
4. Purchased Care Inpatient Stay file
5. Purchased Care Ancillary file

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[66] Clinical Classifications Software Refined (CCSR) for ICD-10-CM Diagnoses. Healthcare Cost and Utilization Project (HCUP). December 2022. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/toolssoftware/ccsr/dxccsr.jsp.
[67] ICD List. *2022 Non-Billable ICD-10-CM Codes.* Available at: https://icdlist.com/icd-10/tags/non-billable. Accessed November 1, 2021.
[68] Of the 72,709 ICD-10-CM codes that WHEI mapped for the Version 3.0 (FY20) update, 17,297 did not map to one of WHEI's 202 health conditions of interest. See Step 9 of Section 5.2.2 for a description of these types of excluded "conditions."
[69] Supplemental Appendices are available upon request at VHA10WWomensHealthAction@va.gov.

6. PIT Professional file
7. PIT Institutional file

Creating these person-level variables involved modifying the raw record-level files as described next.

Step 1: Retain only records for which the diagnosis code is expected to reflect a diagnosis made by a clinician.
The first step of the record-level data processing involved excluding records that did not represent an encounter with a clinician, such as Laboratory encounters and most Radiology encounters.[70,71]

In the VHA outpatient files, the records to retain were identified via clinic stop codes.[72] In the Purchased Care Outpatient Services, Purchased Care Ancillary, and PIT Professional files, the records to retain were identified via Current Procedural Terminology (CPT) codes and/or a combination of pairings of CPT codes with select professional component CPT modifiers.[73,74]

In the PIT Institutional file, we accepted diagnoses from all records that had a valid Medicare Severity Diagnosis Related Group (MS-DRG) code[75] and from records that had one of our allowed CPT codes or CPT plus professional component modifier code pairs.

This step was not applied for the VHA and Purchased Care inpatient[76] files because all inpatient stays were considered to be encounters with a clinician.

NOTES FOR INTERPRETATION: *In Sourcebook Volume 5 (compared to prior volumes), adjustments were made to the types of encounters from which a diagnosis code was accepted. For example, diagnoses coded as a reason for a VHA telephone encounter and diagnoses associated with the professional component of a radiologic study are accepted in Sourcebook Volume 5 but were not in Sourcebook Volume 4. Therefore, counts of medical conditions reported in Sourcebook Volume 5 cannot be directly compared to counts of conditions for prior years reported previously in Sourcebook Volume 4.*

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[70] Upon examination of the FY15 VHA outpatient file, 89% of all records with a laboratory clinic stop code and 66% of all records with a radiology clinic stop were missing ICD-9-CM codes across all diagnosis fields. WHEI assumed these percents to be stable across years even with the transition to the ICD-10-CM coding system, and therefore applied the same exclusion to records with these types of clinic stop codes.

[71] Some Radiology encounters were considered face-to-face encounters with a clinician, such as invasive radiology procedures that require a Radiologist evaluation (and thus a clinical diagnosis) prior to performing the procedure.

[72] See Supplemental **Appendix L** for the complete list of FY19 VHA outpatient clinic stop codes that were considered to be allowed encounters in the conditions algorithm.

[73] See Supplemental **Appendix M** for the complete list of FY19-allowed CPT codes and CPT plus professional component CPT modifier pairs that were considered to be allowed encounters in the conditions algorithm.

[74] For example, a mammography technologist, who performs the mammogram, may generate one record, which would indicate the technical component, and the radiologist who reads the mammogram may generate another record, which would indicate the professional service. The approach was to exclude the records that indicated only a technical component (e.g., the mammography technologist record) but include records with the radiologist's diagnosis.

[75] DRG codes 1-997.

[76] In the VA and Purchased Care inpatient files, we were confident that most claims represented true inpatient or nursing home stays, based on presence of MS-DRGs and data checks to confirm that the length of stay was greater than 1 day; therefore, we did not exclude records from these files.

Exhibit L summarizes the restrictions applied to the data sources used to identify diagnoses.

Exhibit L. Records Restriction by Data Source

Data Source	Records Restriction Applied
VHA Outpatient	Limit to records with allowed clinic stop codes
VHA Inpatient	None (all records included)
Purchased Care Outpatient	Limit to records with allowed CPT codes or with a pairing of select CPT code plus professional component CPT modifier
Purchased Care Inpatient	None (all records included)
Purchased Care Ancillary	Limit to records with allowed CPT codes or with a pairing of select CPT code plus professional component CPT modifier
PIT Professional	Limit to records with allowed CPT codes or with a pairing of select CPT code plus professional component CPT modifier
PIT Institutional	Limit to records with a valid MS-DRG code, or with allowed CPT codes or with a pairing of select CPT code plus professional component CPT modifier

Step 2: Elongate the record-level file.
To address the fact that a single utilization record may contain more than one ICD diagnosis field (and that the number of diagnosis fields differs in different source files[77]), we created an elongated file with one non-missing ICD diagnosis code per record. For instance, a single record with 25 diagnoses in the raw data file was elongated into 25 records, each with a single diagnosis code, while all other fields remained constant.

This step was completed for the VHA outpatient, VHA inpatient, and the Purchased Care inpatient files. All other files have only one diagnosis field per record.

Step 3: Create person-level variables for each condition *within* data sources.
For each of the 202 conditions, we generated eight person-level variables. Seven of these variables indicated whether an ICD-10-CM code mapping to the condition appeared at least once in each of the following types of records: VHA outpatient (yes/no), VHA inpatient (yes/no), Purchased Care outpatient (yes/no), Purchased Care inpatient (yes/no), Purchased Care ancillary (yes/no), PIT Professional (yes/no), and PIT Institutional (yes/no).

Step 4: Create aggregate person-level variable for each condition across data sources. Finally, to generate the final aggregate person-level variable for each of the 202 conditions, we created an across-file condition indicator variable (yes/no for presence of the condition) that synthesized information from the within-file person-level condition variables.

Women Veterans were considered to have a diagnosis of a given condition if they had a count ≥1 for any diagnostic code for a specific condition in the fiscal year from any of the seven utilization files from that year.

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[77] The VHA outpatient and VHA inpatient files contain fields for up to 25 separate diagnosis codes while the Purchased Care inpatient stay file contains fields for up to 26 diagnosis codes for a single stay.

NOTES FOR INTERPRETATION: *Using this methodology, women Veterans could have multiple occurrences of a single ICD-10-CM code or separate occurrences of multiple ICD-10-CM codes within one of the larger groups of conditions. Thus, for acute potentially recurrent conditions, such as STI, we were unable to estimate the incidence of infection. Similarly, we were unable to identify and enumerate individual pregnancies; for example, a woman Veteran may have had a miscarriage followed by a full-term normal pregnancy within the fiscal year, but she would only appear once in the numerator for pregnancy-related diagnoses. Therefore, when this report presents the percent of women Veterans with a particular condition domain (such as "Urinary Conditions") and also presents the percentages of the more granular subsets of that condition domain (such as "UTI," "Urinary Incontinence," etc.), the sum of the frequencies for the individual conditions may be greater than the frequency of the overarching condition domain.*

Some women Veterans receive part of their medical care outside of the VA system (e.g., through private insurance, Medicare, Medicaid, or out-of-pocket). Conditions were identified based on the presence of ICD-10-CM codes in the VA and VACC utilization data. Therefore, the data do not fully capture diagnoses occurring outside the VA system. Additionally, only conditions that are diagnosed and then coded are captured in these databases. Thus, the data likely underestimate the true burden of health conditions in this population. This may be particularly true for specific types of conditions, such as pregnancy, for which some women Veterans may choose care outside of the VA system (and outside of the VACC system).

Finally, while the mapping of diagnosis codes to WHEI conditions drew upon literature review and expert clinical knowledge, diagnoses were not confirmed through examination of other clinical data. This limitation may be particularly relevant to certain types of conditions like gynecologic cancers and breast cancers, which for maximum validity would require review and adjudication of clinical, procedural, and pathology data to confirm diagnoses.

5.2.7 Phase 6: Generating Final Person-Level Variables for Each Domain

Finally, using the person-level condition variables generated in Phase 5 and applying the mapping strategy described in Phase 2, for each of the 17 domains we created a person-level indicator variable (yes/no) indicating whether the patient had at least one condition falling within that domain.

6.0 Algorithms for Chapter 5: Modality of Care

New in Sourcebook Volume 5 is the characterization of women Veterans' VHA outpatient utilization by modality of care (e.g., in-person, telephone, video telehealth). Unlike the prior chapter (Section 5.1) that describes algorithms for utilization in a VA-purchased Community Care setting, this chapter describes the algorithm for identifying the *modality* of care that occurred in an outpatient setting in a VHA medical facility. Outpatient utilization variables are derived from the NDS workload outpatient (SE) files.

The steps taken to create the VHA modality of care variables, including specifications for the modalities of VHA outpatient care reported in this Sourcebook, are described next.

6.1 Mapping Clinic Stop Codes to a Modality of Care

Visits are characterized by modality using MCA clinic stop codes. Each encounter recorded in the SE files includes up to two clinic stop codes, a primary stop code (CL), and a secondary stop code (CLC). Using a list of active MCA stop codes in the fiscal year, a VHA internal medicine physician/researcher (SMF) and a health care economist/researcher (KG) mapped stop codes for the following four modalities[78]:

- **Telephone** care can be scheduled calls (e.g., in lieu of an in-person visit) or unscheduled calls (e.g., to discuss and provide clinical plans related to a laboratory result or to respond to a callback request from a Veteran for a symptom or concern).
- **Video Telehealth** can occur through the *Clinical Video Telehealth* (CVT) system or through *VA Video Connect* (VVC).
  - In CVT, the clinician is at one VHA location, such as the main VA Medical Center, and the Veteran is at a remote VHA location, such as a VA CBOC; VHA staff at the remote connection assist the Veteran in connecting with the clinician via video conferencing and assist with elements of the physical exam, such as holding a stethoscope to the Veteran so the clinician can listen to the Veteran's heart and lungs remotely.
  - In VVC, the Veteran is at home or any other location on a personal or VA-issued smartphone, tablet, or computer; the clinician (who can be onsite at VHA or another location) and the Veteran connect through secure videoconferencing software.
- **Store-and-Forward Telehealth** involves asynchronous care, where clinical data are transmitted to the clinician for the clinician's subsequent review. For example, skin photographs might be transmitted to a dermatologist or retina images might be transmitted to an ophthalmologist.
- **Home Telehealth** clinicians assist Veterans with chronic disease monitoring and self-management; Home Telehealth may include technologies like home scales or home blood pressure cuffs that transmit readings to the VHA Home Telehealth clinician.

All remaining clinic stop codes were then assigned to an **In-Person**[79] modality, where In-Person care occurs face-to-face, in an individual or group visit. [80]

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[78] Secure electronic messages between VHA care teams and Veterans are another element of clinical management, and the stop code for secure messaging was also mapped in this step. However, because secure messaging encounters are not recorded consistently in encounter databases, they are not included as a modality of care examined in this Sourcebook.

[79] In this section, "In-Person" is capitalized when it refers to the specific set of encounter types that were mapped to the "In-Person" category for this Sourcebook.

[80] Note: The algorithm first assigns the modality for Telephone, Video Telehealth, Store-and-Forward Telehealth, Home Telehealth, and Secure Messaging encounters. The resulting unassigned stop codes are presumed to represent "In-Person" encounters.

Exhibit M shows the final mapping of clinic stop codes to each modality of care for FY20.[81]

Exhibit M. Modality of Care Clinic Stop Code Specifications

Modality of Care	Clinic Stop Codes
Telephone	103, 147, 148, 169, 178, 181, 182, 199, 216, 221, 224, 229, 324, 325, 326, 338, 424, 425, 428, 441, 527, 528, 530, 536, 542, 545, 546, 579, 584, 597, 611, 801, 802, 803
Video Telehealth	136, 137, 179, 225, 440, 444, 445, 446, 447, 490, 491, 644, 645, 648, 679, 690, 692, 693, 699, 708, 723, 724, 901
Store-and-Forward Telehealth	111, 189, 646, 647, 694, 695, 696, 698, 718
Home Telehealth	371, 683, 684, 685, 686
In-Person	104, 105, 106, 107, 108, 109, 110, 115, 116, 117, 118, 119, 120, 121, 123, 124, 125, 126, 128, 130, 131, 135, 139, 142, 143, 144, 145, 149, 150, 151, 153, 155, 156, 157, 158, 159, 160, 162, 165, 166, 167, 168, 170, 171, 172, 173, 174, 175, 176, 177, 180, 183, 184, 185, 186, 187, 188, 190, 191, 192, 195, 196, 197, 198, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 217, 218, 220, 222, 230, 231, 240, 241, 250, 301, 302, 303, 304, 305, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 320, 321, 322, 323, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 339, 340, 341, 342, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 356, 369, 370, 372, 373, 391, 392, 394, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 413, 414, 415, 417, 418, 419, 420, 421, 423, 427, 429, 430, 432, 434, 435, 436, 437, 438, 439, 443, 448, 449, 450, 457, 474, 481, 486, 487, 488, 489, 499, 502, 504, 507, 508, 509, 510, 511, 513, 514, 516, 519, 522, 523, 524, 525, 529, 531, 533, 534, 535, 538, 539, 550, 552, 555, 556, 560, 562, 564, 565, 566, 567, 568, 573, 574, 575, 576, 577, 582, 583, 586, 587, 591, 592, 593, 596, 598, 599, 602, 603, 604, 606, 607, 608, 651, 652, 656, 658, 669, 673, 674, 680, 681, 682, 697, 701, 703, 704, 706, 707, 710, 713, 714, 717, 720, 721, 722, 999

6.2 Assigning a Modality to a VHA Outpatient Encounter

We created a record-level data set of all encounters for all patients, with records unique by person, visit day, HCS, site, primary stop code (CL), and secondary stop code (CLC) among the Base Cohort (Veteran VHA users) in the fiscal year. Of note, while we exclude duplicate records (encounters by the same person on the same day at the same site to the same clinic stop code pair), we do allow more than one encounter for a patient on a single day. This is because more than one encounter may legitimately occur on a single day. For example, a patient may visit a primary care clinic, cardiology clinic, podiatry clinic, and outpatient laboratory all on the same day. It is important to capture all visits occurring on each day (rather than simply counting total number of days on which care was received) because some patients try to schedule as much care as possible on a single day (e.g., to minimize travel to the care setting or to minimize time away from work or caregiving).

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[81] See the Supplemental **Appendix N** for the complete list of clinic stop codes, the modality of care, and type of care assignments.

To determine the modality of the encounter, we next applied the following rules based on stop code pair (CL-CLC pair):

1. If the **CL** contains a stop code that maps to a Telephone, Video Telehealth, Store-and-Forward Telehealth, Home Telehealth, or Secure Messaging clinic stop code, then assign modality as "Telephone," "Video Telehealth," "Store-and-Forward Telehealth," "Home Telehealth," or "Secure Messaging," respectively.
2. Among the remaining unassigned encounters, if the **CLC** contains a stop code that maps to a Telephone, Video Telehealth, Store-and-Forward Telehealth, Home Telehealth, or Secure Messaging clinic stop code, then assign modality as "Telephone," "Video Telehealth," "Store-and-Forward Telehealth," "Home Telehealth," or "Secure Messaging," respectively.
   a. In rare scenarios, there could be instances in which both stop code fields map to two different modalities, e.g., a Video Telehealth stop code in the CL position with a Home Telehealth stop code in the CLC position, or a Telephone stop code in the CL position with a Video Telehealth in the CLC position. For these instances, we established a hierarchy for assigning the modality to the encounter, regardless of stop code position.
      i. Home Telehealth
      ii. Video Telehealth
      iii. Telephone
      iv. Store-and-Forward Telehealth
      v. Secure Messaging
   b. For example, using the established hierarchy, if an encounter had both a Video Telehealth stop code and a Home Telehealth stop code, then the encounter would be assigned to the Home Telehealth modality.
3. Among the remaining unassigned encounters, assign modality as In-Person.

NOTE: Although our algorithm goes through the process of assigning Secure Messaging encounters, they are not included as a modality of care examined in this Sourcebook because Secure Messaging encounters are not recorded consistently in encounter databases.

6.3 Processing Duplicate Virtual Encounters to Generate Encounter Counts

In addition to removing duplicate encounters for an individual on the same day at the same HCS and site with the same stop code pair, it was also necessary to identify records for encounters that generate *pairs* of records in the data, such as site-to-site telehealth encounters. For example, a patient meeting a provider through the CVT system will generate two records: one for the provider and one for the patient. Note that although these records may not have the same site and same CL-CLC pairs, they still indicate the same encounter if they occur for the same individual on the same day, e.g., one record has CLC = 690, Real Time Clinical Video Telehealth - Patient Site and an equivalent record has CLC = 692, Real Time Clinical Video Telehealth - Provider Site (Same Division/Station). To avoid double counting these types of encounters on a single day, only one record contributed towards the count of encounters for the Veteran VHA user by modality.

For each modality of care, the WHEI Master Database contains a count of the total number of unique encounters occurring for a patient in one fiscal year.

7.0 Algorithms for Chapter 6: Type of Care

Similar to the prior section, we concurrently classified each clinic stop code into a *type* of care. The steps taken to create the type of care variables, including specifications for the types of VHA outpatient care reported in this Sourcebook, are described next.

NOTE FOR INTERPRETATION: *Results by type of care in this Sourcebook cannot be compared directly to those reported in previous Sourcebook volumes due to changes in the algorithms used to identify type of care. In previous volumes, type of care (e.g., primary care) was identified based on the clinic stop in the primary CL position, with few exceptions.[82] See Section 7.2 for more information on the algorithm used to identify type of care for this Sourcebook.*

7.1 Mapping Clinic Stop Codes to a Modality of Care

Using a list of active MCA stop codes in the fiscal year, a VHA internal medicine physician/researcher (SMF) and a health care economist/researcher (KG) mapped stop codes for the following three types of care:

- *Primary care* includes primary care delivered in general primary care clinics[83] and primary care delivered in Women's Clinics,[84] as well as primary care delivered in special settings (home-based primary care and specialty Patient Aligned Care Teams that provide primary care).
- *Mental health/substance use disorder (MH/SUD) care* visits include general mental health services (evaluation, consultation, and/or treatment), specialized mental health services, and substance use disorder services.[85]
- *Specialty care* includes gynecology, cardiology, ophthalmology, orthopedics, clinical pharmacy, and other similar visits; specialty MH/SUD care is included in the MH/SUD care grouping.

All remaining clinic stop codes were then assigned to *"Other"* which includes a mix of encounter types, such as ancillary services (like laboratory and radiology services), emergency department visits, physical therapy sessions, etc.

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[82] In previous Sourcebook volumes, primary care encounters were also identified by the following clinic stop code pairs: 160322, 160323, 310322, and 310323.

[83] General Primary Care Clinic refers to primary care received in a general medical clinic or equivalent setting. In addition to providing preventive care and care for gender-neutral conditions, such clinics may also provide gender-specific care to women (such as cervical cancer screening and breast exams).

[84] Women's Health Clinic refers to primary care services received in a clinic designed specifically for women. Such clinics provide comprehensive primary care services to women (i.e., preventive health care, care for gender-neutral conditions, and care for gender-specific conditions).

[85] Mental Health/Substance Use Disorder (MH/SUD) Care refers to care received in mental health or substance use disorder clinics (e.g., psychiatry visits, psychology visits, individual or group therapy, substance use disorder treatment, and MH/SUD rehabilitation treatment programs). It also includes visits with mental health providers embedded in primary care settings. Note: This category does not include services provided by primary care providers for mental health conditions or substance use disorders. Screening for these conditions occurs in primary care settings, and patients may receive pharmacotherapy or brief interventions for these conditions from primary care providers as well. Also note that the MH/SUD category does not include services provided in Social Work Clinic, if a MH/SUD clinic stop code did not appear in the primary CL position.

Exhibit N shows the final mapping of clinic stop codes to each type of care for FY20.[86]

Exhibit N. Type of Care Clinic Stop Code Specifications

Type of Care	Clinic Stop Codes
Primary Care*	170, 171, 172, 178, 301, 318, 322, 323, 326, 338, 342, 348, 350, 704, 160322, 160323, 310322, 310323
MH/SUD	156, 157, 502, 509, 510, 513, 514, 516, 519, 523, 524, 525, 527, 528, 529, 533, 534, 535, 536, 539, 542, 545, 546, 550, 552, 560, 562, 564, 565, 567, 568, 573, 574, 575, 576, 577, 579, 582, 583, 584, 586, 587, 591, 592, 593, 596, 597, 598, 599
Specialty Care	110, 135, 144, 149, 153, 158, 195, 197, 199, 201, 210, 211, 224, 225, 231, 302, 303, 304, 305, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 320, 321, 325, 327, 329, 331, 333, 335, 337, 339, 340, 344, 345, 346, 347, 349, 352, 353, 354, 356, 369, 394, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 413, 414, 415, 418, 419, 420, 424, 427, 428, 430, 432, 434, 435, 436, 441, 457, 481, 486, 487, 488, 489, 490, 491, 538, 697, 718
Other†	103, 104, 105, 106, 107, 108, 109, 111, 115, 116, 117, 118, 119, 120, 121, 123, 124, 125, 126, 128, 130, 131, 136, 137, 139, 142, 143, 145, 147, 148, 150, 151, 155, 159, 160, 162, 165, 166, 167, 168, 169, 173, 174, 175, 176, 177, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 196, 198, 202, 203, 204, 205, 206, 207, 208, 209, 212, 213, 214, 215, 216, 217, 218, 220, 221, 222, 229, 230, 240, 241, 250, 317, 324, 328, 330, 332, 334, 336, 341, 351, 370, 371, 372, 373, 391, 392, 417, 421, 423, 425, 429, 437, 438, 439, 440, 443, 444, 445, 446, 447, 448, 449, 450, 474, 499, 504, 507, 508, 511, 522, 530, 531, 555, 556, 566, 602, 603, 604, 606, 607, 608, 611, 644, 645, 646, 647, 648, 651, 652, 656, 658, 669, 673, 674, 679, 680, 681, 682, 683, 684, 685, 686, 690, 692, 693, 694, 695, 696, 698, 699, 701, 703, 706, 707, 708, 710, 713, 714, 717, 719, 720, 721, 722, 723, 724, 801, 802, 803, 901, 999

*   The primary care definition also included four clinic stop code pairs (160322, 160323, 310322, 310323) where the first three digits represent the primary stop code (in the CL field) and the last three digits indicate the secondary stop code (in the CLC field).

†   The algorithm first assigns the type of care for primary care, MH/SUD, and specialty care encounters. The resulting unassigned stop codes are presumed to be "Other" type of care encounters.

7.2 Assigning a Type of Care to a VHA Outpatient Encounter

Each encounter recorded in the SE files includes up to two clinic stop codes, a primary stop code (CL) and a secondary stop code (CLC). As described in Section 6.2, we created a record-level data set of all encounters unique by person, visit day, HCS, site, CL, and CLC among the Base Cohort (Veteran VHA users) in the fiscal year. Of note, while we exclude duplicate records (encounters by the same person on the same day at the same site to the same clinic stop code pair), we do allow more than one encounter for a patient on a single day. This is because more than one encounter may legitimately occur on a single day.

To determine the type of care for the encounter, we applied the following rules based on stop code pair (CL-CLC):

1.   If the stop code pair is one of the following: 160322, 160323, 310322, 310323, then assign type of care as "primary care."

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[86] See Supplemental **Appendix N** for the complete list of clinic stop codes and the modality of care and type of care assignments.

2. Among the remaining unassigned encounters, if the **CL** contains a stop code that maps to a primary care, MH/SUD care, or specialty care clinic stop code, then assign type of care as "primary care," "MH/SUD care," or "specialty care," respectively.
3. Among the remaining unassigned encounters, if the **CLC** contains a stop code that maps to a primary care, MH/SUD care, or specialty care clinic stop code, then assign type of care as "primary care," "MH/SUD care," or "specialty care," respectively.
4. Among the remaining unassigned encounters, assign type of care as "Other."

For each type of care, the WHEI Master Database contains a count of the total number of unique encounters occurring for a patient in one fiscal year, by type and modality of care.

8.0 Algorithms for Chapter 7: Emergency Department and Urgent Care

Sourcebook Volume 5 is the first volume to report on ED visits in VA and VACC settings, as well as Urgent Care visits in VACC. Utilization and primary diagnosis information were derived from the CDW Outpatient domain as well as VACC ED claims data sets provided by the IVC Integrated Informatics & Analytics (IIA) group in May 2022.

8.1 Emergency Department (ED) Visits

8.1.1 Identifying VHA Facilities with Active EDs

To identify active VHA EDs, we first examined the frequency of ED visits, defined as VA clinic stop code 130[87] (code description: Emergency Department) recorded in the primary CL position of the MCA stop code pair in the CDW Outpatient domain across all VAMCs. We applied a threshold of at least 1,000 ED visits recorded in a fiscal year to identify an eligible set of VHA facilities. Then, we used VA Emergency Medicine (EM) survey data,[88,89] communications with VA EM personnel, and the grey literature to identify any VA EDs that converted to an urgent care clinic during a fiscal year. An ED was eligible if there was no indication of conversion during the fiscal year or if the ED provided services for at least three months of the fiscal year before converting to an urgent care clinic. We identified 111 VAMCs with an active ED in FY19 and 110 VAMCs in FY20. **Exhibit O** lists the VAMCs with active EDs.

Exhibit O. VHA VAMCs with Active Emergency Departments, FY19 and FY20

VISN	Station Number	Official Station Name (VAST, FY20)	Location Descriptive Name (Common Name, VAST FY20)	State (VAST, FY20)
1	402	Togus VA Medical Center	Togus	Maine
1	405	White River Junction VA Medical Center	White River Junction	Vermont
1	523A4	West Roxbury VA Medical Center	West Roxbury	Massachusetts
1	650	Providence VA Medical Center	Providence	Rhode Island
1	689	West Haven VA Medical Center	West Haven	Connecticut
2	526	James J. Peters Department of Veterans Affairs Medical Center	Bronx, New York	New York
2	528	Buffalo VA Medical Center	Buffalo, New York	New York
2	528A7	Syracuse VA Medical Center	Syracuse	New York
2	528A8	Samuel S. Stratton Department of Veterans Affairs Medical Center	Albany, New York	New York
2	561	East Orange VA Medical Center	East Orange	New Jersey
2	630	Manhattan VA Medical Center	Manhattan	New York
2	630A4	Brooklyn VA Medical Center	Brooklyn	New York

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[87] Veterans Health Administration. Emergency Medicine (VHA Directive 1101.14). Washington, DC. US Department of Veterans Affairs, 2023. Available at: https://www.va.gov/vhapublications/ViewPublication.asp?pub_ID=10205. Accessed December 13, 2023.

[88] Ward MJ, Collins SP, Pines JM, Dill C, Tyndall G, Kessler CS. Emergency medicine in the Veterans Health Administration — results from a nationwide survey. Am J Emerg Med. 2015 Jul;33(7):899-90.

[89] VA Healthcare Analysis and Information Group (HAIG). 2022 VHA Emergency Department and Urgent Care Survey. https://vaww.va.gov/HAIG/haig_pubs3_ed.asp. Accessed December 6, 2023.

VISN	Station Number	Official Station Name (VAST, FY20)	Location Descriptive Name (Common Name, VAST FY20)	State (VAST, FY20)
2	632	Northport VA Medical Center	Northport, New York	New York
4	460	Wilmington VA Medical Center	Wilmington, Delaware	Delaware
4	595	Lebanon VA Medical Center	Lebanon	Pennsylvania
4	642	Corporal Michael J. Crescenz Department of Veterans Affairs Medical Center	Philadelphia, Pennsylvania	Pennsylvania
4	646	Pittsburgh VA Medical Center-University Drive	Pittsburgh	Pennsylvania
4	693	Wilkes-Barre VA Medical Center	Wilkes-Barre	Pennsylvania
5	512	Baltimore VA Medical Center	Baltimore, Maryland	Maryland
5	517	Beckley VA Medical Center	Beckley, West Virginia	West Virginia
5	540	Louis A. Johnson Veterans' Administration Medical Center	Clarksburg, West Virginia	West Virginia
5	581	Hershel "Woody" Williams VA Medical Center	Huntington, West Virginia	West Virginia
5	613	Martinsburg VA Medical Center	Martinsburg	West Virginia
5	688	Washington VA Medical Center	Washington, District of Columbia	District of Columbia
6	558	Durham VA Medical Center	Durham	North Carolina
6	590	Hampton VA Medical Center	Hampton	Virginia
6	637	Charles George Department of Veterans Affairs Medical Center	Asheville	North Carolina
6	652	Hunter Holmes McGuire Hospital	Richmond, Virginia	Virginia
6	658	Salem VA Medical Center	Salem, Virginia	Virginia
6	659	W.G. (Bill) Hefner Salisbury Department of Veterans Affairs Medical Center	Salisbury	North Carolina
7	508	Atlanta VA Medical Center	Atlanta, Georgia	Georgia
7	509	Charlie Norwood Department of Veterans Affairs Medical Center	Augusta Downtown	Georgia
7	521	Birmingham VA Medical Center	Birmingham, Alabama	Alabama
7	534	Ralph H. Johnson Department of Veterans Affairs Medical Center	Charleston, South Carolina	South Carolina
7	544	Wm. Jennings Bryan Dorn Department of Veterans Affairs Medical Center	Columbia, South Carolina	South Carolina
7	619	Central Alabama VA Medical Center-Montgomery	Montgomery	Alabama
8	516	C.W. Bill Young Department of Veterans Affairs Medical Center	Bay Pines	Florida
8	546	Bruce W. Carter Department of Veterans Affairs Medical Center	Miami	Florida

VISN	Station Number	Official Station Name (VAST, FY20)	Location Descriptive Name (Common Name, VAST FY20)	State (VAST, FY20)
8	548	West Palm Beach VA Medical Center	West Palm Beach	Florida
8	573	Malcom Randall Department of Veterans Affairs Medical Center	Gainesville	Florida
8	573A4	Lake City VA Medical Center	Lake City, Florida	Florida
8	672	San Juan VA Medical Center	San Juan	Puerto Rico
8	673	James A. Haley Veterans' Hospital	Tampa	Florida
8	675	Orlando VA Medical Center	Orlando	Florida
9	596A4	Troy Bowling Campus	Lexington-Cooper	Kentucky
9	603	Robley Rex Department of Veterans Affairs Medical Center	Louisville	Kentucky
9	614	Memphis VA Medical Center	Memphis	Tennessee
9	621	James H. Quillen Department of Veterans Affairs Medical Center	Mountain Home, Tennessee	Tennessee
9	626	Nashville VA Medical Center	Nashville	Tennessee
10	506	Ann Arbor VA Medical Center	Ann Arbor, Michigan	Michigan
10	539	Cincinnati VA Medical Center	Cincinnati, Ohio	Ohio
10	541	Louis Stokes Cleveland Department of Veterans Affairs Medical Center	Cleveland, Ohio	Ohio
10	552	Dayton VA Medical Center	Dayton	Ohio
10	553	John D. Dingell Department of Veterans Affairs Medical Center	Detroit, Michigan	Michigan
10	583	Richard L. Roudebush Veterans' Administration Medical Center	Indianapolis, Indiana	Indiana
10	610A4	Fort Wayne VA Medical Center	Fort Wayne, Indiana	Indiana
12	537	Jesse Brown Department of Veterans Affairs Medical Center	Chicago, Illinois	Illinois
12	556	Captain James A. Lovell Federal Health Care Center	North Chicago	Illinois
12	578	Edward Hines Junior Hospital	Hines	Illinois
12	607	William S. Middleton Memorial Veterans' Hospital	Madison	Wisconsin
12	695	Clement J. Zablocki Veterans' Administration Medical Center	Milwaukee, Wisconsin	Wisconsin
15	589	Kansas City VA Medical Center	Kansas City, Missouri	Missouri
15	589A4	Harry S. Truman Memorial Veterans' Hospital	Columbia, Missouri	Missouri
15	589A5	Colmery-O'Neil Veterans' Administration Medical Center	Topeka	Kansas
15	589A6	Dwight D. Eisenhower Department of Veterans Affairs Medical Center	Leavenworth	Kansas

VISN	Station Number	Official Station Name (VAST, FY20)	Location Descriptive Name (Common Name, VAST FY20)	State (VAST, FY20)
15	589A7	Robert J. Dole Department of Veterans Affairs Medical and Regional Office Center	Wichita	Kansas
15	657	John Cochran Veterans Hospital	St. Louis John Cochran	Missouri
15	657A5	Marion VA Medical Center	Marion, Illinois	Illinois
16	520	Biloxi VA Medical Center	Biloxi	Mississippi
16	564	Fayetteville VA Medical Center	Fayetteville, Arkansas	Arkansas
16	580	Michael E. DeBakey Department of Veterans Affairs Medical Center	Houston, Texas	Texas
16	586	G.V. (Sonny) Montgomery Department of Veterans Affairs Medical Center	Jackson, Mississippi	Mississippi
16	598	John L. McClellan Memorial Veterans' Hospital	Little Rock, Arkansas	Arkansas
16	629	New Orleans VA Medical Center	New Orleans	Louisiana
16	667	Overton Brooks Veterans' Administration Medical Center	Shreveport	Louisiana
17	504	Thomas E. Creek Department of Veterans Affairs Medical Center	Amarillo	Texas
17	549	Dallas VA Medical Center	Dallas, Texas	Texas
17	671	Audie L. Murphy Memorial Veterans' Hospital	San Antonio, Texas	Texas
17	674	Olin E. Teague Veterans' Center	Temple	Texas
19	436	Fort Harrison VA Medical Center	Fort Harrison	Montana
19	442	Cheyenne VA Medical Center	Cheyenne	Wyoming
19	554	Rocky Mountain Regional VA Medical Center	Aurora Rocky Mountain	Colorado
19	575	Grand Junction VA Medical Center	Grand Junction, Colorado	Colorado
19	623	Jack C. Montgomery Department of Veterans Affairs Medical Center	Muskogee	Oklahoma
19	635	Oklahoma City VA Medical Center	Oklahoma City	Oklahoma
19	660	George E. Wahlen Department of Veterans Affairs Medical Center	Salt Lake City	Utah
20	531	Boise VA Medical Center	Boise	Idaho
20	648	Portland VA Medical Center	Portland, Oregon	Oregon
20	663	Seattle VA Medical Center	Seattle	Washington
20	653*	Roseburg VA Medical Center	Roseburg	Oregon
21	570	Fresno VA Medical Center	Fresno	California
21	593	North Las Vegas VA Medical Center	North Las Vegas	Nevada
21	612A4	Sacramento VA Medical Center	Sacramento	California
21	640	Palo Alto VA Medical Center	Palo Alto, California	California

VISN	Station Number	Official Station Name (VAST, FY20)	Location Descriptive Name (Common Name, VAST FY20)	State (VAST, FY20)
21	654	Ioannis A. Lougaris Veterans' Administration Medical Center	Reno	Nevada
21	662	San Francisco VA Medical Center	San Francisco	California
22	501	Raymond G. Murphy Department of Veterans Affairs Medical Center	Albuquerque	New Mexico
22	600	Tibor Rubin VA Medical Center	Long Beach, California	California
22	605	Jerry L. Pettis Memorial Veterans' Hospital	Loma Linda, California	California
22	644	Carl T. Hayden Veterans' Administration Medical Center	Phoenix, Arizona	Arizona
22	649	Bob Stump Department of Veterans Affairs Medical Center	Prescott	Arizona
22	664	San Diego VA Medical Center	San Diego, California	California
22	678	Tucson VA Medical Center	Tucson	Arizona
22	691	West Los Angeles VA Medical Center	West Los Angeles	California
23	437	Fargo VA Medical Center	Fargo	North Dakota
23	438	Royal C. Johnson Veterans' Memorial Hospital	Sioux Falls	South Dakota
23	568	Fort Meade VA Medical Center	Fort Meade, South Dakota	South Dakota
23	618	Minneapolis VA Medical Center	Minneapolis, Minnesota	Minnesota
23	636	Omaha VA Medical Center	Omaha, Nebraska	Nebraska
23	636A6	Des Moines VA Medical Center	Des Moines, Iowa	Iowa
23	636A8	Iowa City VA Medical Center	Iowa City, Iowa	Iowa

*The Roseburg VA Medical Center (653) did not operate an emergency department in FY20.

8.1.2 Generating a Count Variable for VHA ED Visits

If a patient had more than one VHA ED encounter recorded at the *same* VAMC on the same day, the ED visit was counted only once. Multiple VHA ED visits on the same day at *different* VAMCs, e.g., an ED visit at the Palo Alto VAMC and an ED visit at the San Francisco VAMC, were counted as independent encounters. ED visits on consecutive calendar days were also counted as independent encounters.

8.1.3 Generating a Count Variable for VACC ED Visits

VACC ED claims data sets were provided by the IVC IIA group in May 2022, which included both institutional (UB-04, previously known as UB-92)[90] and professional (HCFA 1500)[91] claims data from the

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[90] Centers for Medicare and Medicaid Services. Medicare Claims Processing Manual Chapter 25 – Completing and Processing the Form CMS1450- Data Set (rev. 10880, 08-06-21). Available at: https://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/clm104c25.pdfhttps://www.cms.gov/files/document/837I-Form-CMS-1450-MLN006926.pdf. Accessed December 13, 2023.

[91] National Uniform Claim Committee. 1500 Health Insurance Claim Form Reference Instruction Manual for Form Version 02/12 (July 2020). Available at: https://www.nucc.org/images/stories/PDF/1500_claim_form_instruction_manual_2020_07-v8.pdf. Accessed December 13, 2023.

following community care payment systems: FBCS,[92] eCAMS,[93] and CCRS.[94] The CCRS claims were sourced from PIT. Claims included those with CPT codes indicating ED services (99281-99285),[95] a revenue code of 0450 (Emergency Room – General), or a Place of Service value of 23 (Emergency Department).[96]

VACC ED visit records were identified using variables developed by the IVC IIA team, defined as "VisitCount=Y and "MatchingUB=N." We excluded records with missing scrambled social security numbers (SCRSSN; <0.1% records excluded) and missing information for variable "DX1" (ED visit primary diagnosis; <0.1% records excluded). Claims with a "FROMDOS" value on or after October 1, 2018, and on or before September 30, 2020, were analyzed. Duplicate claims records with the same SCRSSN and same visit date [determined using the variable "FROMDOS" (From Date of Service)] were collapsed.

8.2 VACC Urgent Care Visits

VACC urgent care claims data were downloaded from the IVC IIA Urgent Care PowerBI dashboard in June 2022. Data included Patient-Centered Community Care (PC3) and Community Care Network (CCN) claims. Using guidance from the IVC IIA group, we included claims starting with UC or ending in -U in the field "Preauth Number" to identify a unique UC visit/episode of care and only analyzed claims that had a value greater than $0 for the field "Paid Amount." The field "Service From Date" was used to identify urgent care services provided on or after June 6, 2019, the effective date of the MISSION Act urgent care benefit, and on or before September 30, 2020.

8.3 Diagnostic Codes Assigned to ED Encounters

8.3.1 VHA ED Visit Diagnoses

For each VHA ED clinic stop code pair, we used the CDW Outpatient table "Outpat_VDiagnosis" (column PrimarySecondary) to identify the primary ICD-10-CM diagnosis code recoded for the visit.[97] When a visit was associated with more than one primary diagnosis code (less than 0.1% of the visits), we randomly selected a diagnosis code from the codes indicated as primary.

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[92] US Department of Veterans Affairs. VA Technical Reference Model v23.11. DSS Fee Basis Claims Systems (FBCS). Available at: https://www.oit.va.gov/Services/TRM/ToolPage.aspx?tid=8604. Accessed December 13, 2023.

[93] Department of Veterans Affairs Office of Inspector General. Non-VA Emergency Care Claims Inappropriately Denied and Rejected, Report #18-00469-150, August 6, 2019. Available at: https://www.va.gov/oig/pubs/VAOIG-18-00469-150.pdf. Accessed December 13, 2023.

[94] Depart of Veterans Affairs. Privacy Impact Assessment for the Community Care Reimbursement System-(VAEC-AWS). Available at: https://department.va.gov/privacy/wp-content/uploads/sites/5/2023/05/FY22CommunityCareReimbursementSystemVAECAWSPIA.pdf. Accessed December 13, 2023.

[95] American College of Emergency Physicians. Approach to Emergency Department Coding FAQ. Available at: https://www.acep.org/administration/reimbursement/reimbursement-faqs/approach-to-emergency-department-coding-faq/. Accessed December 13, 2023.

[96] Centers for Medicare and Medicaid Services. Place of Service Code Set. Available at: https://www.cms.gov/medicare/coding-billing/place-of-service-codes/code-sets. Accessed December 13, 2023.

[97] Gonsoulin M and Ramanathan D. VIReC Factbook: Corporate Data Warehouse (CDW) Outpatient 2.1 Domain. Hines IL: U.S. Department of Veterans Affairs, Health Services Research & Development Service, VA Information Resource Center; September 2016. Updated July 2020. Available at: https://vaww.virec.research.va.gov/CDW/Factbook/FB-CDW-Outpatient-Domain.pdf. Accessed December 13, 2023.

8.3.2 VACC ED Visit Diagnoses

We used the ICD-10-CM diagnosis code recorded in field "DX1" on the VACC ED visit claim, defined as the claim record with "VisitCount=Y" and "MatchingUB=N," to identify the primary diagnosis code recorded for the visit.

9.0 Algorithms for Chapter 8: VHA-covered Births

To create the obstetric deliveries variable, WHEI adapted a validated algorithm[98,99] and applied updates to capture all births (both normal vaginal delivery and Cesarean section) covered by VHA in FY19. Several sources were used to identify VHA-covered births, including the Purchased Care Inpatient Stay file, Purchased Care Inpatient Invoice file, PIT, Non-VA Inpatient Stays file, and IVC CDS.

The VHA-covered births variable draws upon the following types of fields in the source files:
1. Current Procedural Terminology (CPT)
2. International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) diagnosis codes
3. ICD-10 Procedure Coding System (ICD-10-PCS)
4. Medicare Severity Diagnosis Related Groups (MS-DRGs) Version 36 or later

Additionally, records were excluded if there was an indication of pregnancies that were non-viable (i.e., ectopic or molar pregnancies) and/or ended in early pregnancy loss. **Exhibit P** details the specific codes used to identify VHA-covered births in FY19.

Exhibit P. Inclusion and Exclusion Criteria for VHA-covered Births in FY19

Code Type	Code*
Inclusion Criteria	
ICD-10-CM	O601%, O602%, O80, O82 Z37% (Z370, Z371, Z372, Z373, Z374, Z3750, Z3751, Z3752, Z3753, Z3754, Z3759, Z3760, Z3761, Z3762, Z3763, Z3764, Z3769, Z377, Z379) Z38% (Z3800, Z3801, Z381, Z382, Z3830, Z3831, Z384, Z385, Z3861, Z3862, Z3863, Z3864, Z3865, Z3866, Z3868, Z3869, Z387, Z388)
ICD-10-PCS	10D00Z0, 10D00Z1, 10D00Z2, 10D07Z3, 10D00Z4, 10D00Z5, 10D00Z6, 10D00Z7, 0D07Z8, 10D17ZZ, 10D18ZZ, 10E0XZZ
MS-DRG	768, 783, 784, 785, 786, 787, 788, 796, 797, 798, 805, 806, 807
CPT	59400, 59409, 59410, 59500, 59501, 59510, 59514, 59515, 59520, 59521, 59540, 59541, 59610, 59612
Exclusion Criteria	
ICD-10-CM	O00%, O01%, O02%, O03%, O04%, O07%, O08%
ICD-10-PCS	10A0%, 10D0%, 10E0XZZ

*The "%" that appears after select codes in **Exhibit P** represents a Structured Query Language (SQL) wildcard character, where when used with a LIKE operator in a WHERE clause searches for zero or more characters after the preceding string.

NOTE: *A small number of U.S. births occur out of the hospital[100] (i.e., at home, in birthing centers, Emergency Departments, or other outpatient settings), but only inpatient deliveries are reported in this Sourcebook. This could result in a small underestimation of deliveries.*

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[98] Kuklina EV, Whiteman MK, Hillis SD, et al. An enhanced method for identifying obstetric deliveries: implications for estimating maternal morbidity. *Matern Child Health J.* Jul 2008;12(4):469-477.

[99] Shaw JG, Asch SM, Kimerling R, Frayne SM, Shaw KA, Phibbs CS. Posttraumatic stress disorder and risk of spontaneous preterm birth. *Obstet Gynecol.* Dec 2014;124(6):1111-1119.

[100] For example, see https://www.cdc.gov/nchs/products/databriefs/db144.htm.