VistA

A VIReC Resource Guide

VA Information Resource Center (VIReC)
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VIReC Resource Guide: VistA

Overview

Introduction

This Resource Guide is designed to help health services researchers and others considering using data extracted from the VA's VistA system understand VistA's origins, structure, content and utility for VA research.

The Guide is a product of the VA Information Resource Center (VIReC), a national resource center of the U.S. Department of Veterans Affairs (VA) Health Services Research and Development Service.

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VistA Description

Introduction

VistA is an integrated system of software applications and data files that include patient medical records and directly support patient care at Veterans Health Administration (VHA) healthcare facilities. The name VistA was chosen to represent the Veterans Health Information Systems and Technology Architecture. VistA operates under the auspices of the Office of Information and Technology's Product Development Service Line.

VistA is comprised of both locally adapted and nationally mandated software applications, including a graphical user interface application known as the Computerized Patient Record System (CPRS).

CPRS

The Computerized Patient Record System (CPRS) is a VistA application that functions as the graphical user interface to VistA. CPRS presents data for a single patient and resembles a paper chart. CPRS enables users to review and enter information connected with a patient, support clinical decision making, and allow tracking of panels of patients.

VistA data

Each VistA application generates at least one data file. VistA data files hold the administrative data that support VA day-to-day operations. VistA files also contain clinical data, such as patients' medical and healthcare utilization histories, patient demographics, medicines, diagnoses, procedures, practitioner information etc. All patients treated at VA Medical Centers are included in the files, which are updated continuously at the point of care or as part of administrative processes.

National databases

VistA is a source of data for many VHA databases of interest to researchers, including:

- VHA Medical SAS Datasets
- VHA Decision Support System (DSS) National Data Extract
- Pharmacy Benefits Management Service (PBM) data
- Veterans Integrated Services Network (VISN) data warehouses
- Corporate Data Warehouse (CDW)

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VistA Description, Continued

How data enter VistA

Data are entered into VistA by way of manual entry, bar codes, and automated instrumentation. Some data are derived from central financial, personnel and operational systems and distributed electronically to local facilities' VistA files.

Case identifiers

In VistA data, several types of identifiers allow analysts to identify unique individuals and to link cases within VistA data with data obtained elsewhere.

Case Identifier	Definition
PatientIEN	Patient Internal Entry Number (IEN) is an individual's identification number in his/her local VistA system
PatientICN	Patient Integration Control Number (ICN) is the VHA's unique patient identification number generated by the Master Veteran Index.
Social Security Number	Unique personal identifier issued by the Social Security Administration.

Note: VistA data does not include the Scrambled Social Security Number, a VA-generated identifier applied after data has been extracted from VistA. Investigators may apply for permission to access data identified by SSN only if their investigation requires such access.

Research Utility

Introduction

Strengths of VistA data for research include its wealth of patient-level clinical and healthcare utilization information. In addition, VistA captures data not currently available in any other national data source. VistA's limitations as a research database include the fact that, like other administrative databases, VistA files are organized to promote patient care and facility management rather than research analysis.

When analyzing any healthcare claims or utilization data, the question must always be asked whether the data are sufficiently accurate and consistent to support analysis. Researchers are advised to carefully examine any VistA data to be used in their analyses for evidence of data quality problems.

Strengths

VistA data provide the most clinical detail of any VA database. VistA data include detailed information on all persons treated at a VA Medical Center, across the full spectrum of inpatient and outpatient care provided at that facility.

Furthermore, while the VA's Corporate Data Warehouse is increasing the types and amounts of VistA data available from a central source, some types of data are still only available from local VistA systems.

For example, the TIU documents data at the CDW, that is, the clinical notes data, are updated just once per year. VA studies frequently need more current clinical notes data.

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Research Utility, Continued

Limitations

As is true with all administrative databases, there are some limitations to the utility of VistA data for research analyses. The table below provides some examples of limitations.

Limitation	Description
Data format	Some VistA data exist only as text, not in a convenient, computable format.
Inconsistent data	VistA may vary from site to site. Sources of inconsistent data include: • Certain clinical data, notably results from cardiac and other imaging tests, may be created and stored outside of VistA and the software applications used to create those images can vary from site to site • Some leeway exists for local modifications in VistA software such as non-standard numbering for or the addition of codes. • Sometimes local procedural differences in the way data are collected or recorded may cause a data element to have a slightly different meaning at one site than it does at another
Suitability issues	The application of healthcare utilization data such as VistA data to healthcare policy questions requires caution. Documentation for each of VistA's software packages, available from the VistA Documentation Library on the VA Intranet, can provide clues to the context in which elements are entered into the database and consequently to their valid interpretation [1].

Moreover, the validity of using administrative codes such as ICD-9-CM and CPT-4 codes to represent the clinical status of patients continues to be the subject of debate [2,3].

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Research Utility, Continued

Data Quality

The Data Quality Program of VHA's Office of Informatics and Analytics promotes VistA data quality, fostering best practices for assuring uniformity of policy and practice [4]. Still, since few studies have been designed specifically to investigate the reliability and validity of VistA data, the quality of VistA data remains largely unexplored. Researchers who have utilized VistA data in their analyses sometimes mention in published articles some evidence of the validity or reliability observed in their data, so articles using VistA data in a researcher's area of interest may be the best place to find data quality information for a particular data element included in VistA.

For a discussion of the accuracy of diagnostic coding in general, see "Measuring Diagnoses: ICD Code Accuracy" by Kimberly J. O'Malley, PhD et al. [5].

Additional resources

The VIReC web site provides several substantive works on VistA data research utility. These include:

- A VIReC monograph, "VIReC Insights: Veterans Health Information Systems and Technology Architecture (VistA) as a Research Tool", which explores the utility of VistA data for research [6]
- A VIReC sponsored single topic issue of the Journal of Rehabilitation Research and Development on the quality and utility of secondary data for VA research that includes several articles pertaining to data that originate in VistA [7].
- In-depth analyses on selected VistA data elements like Race, Ethnicity and Mortality, available on the VIReC web site's Data Quality page [8].

Note: Investigators will want to thoroughly explore and become familiar with their data, and may find it helpful to seek technical information from Information Resources Management Services (IRM) personnel at the sites whose data is being analyzed.

Access

Introduction

Several avenues are available to access to VistA data for research. The best way to the data for a particular project will depend on factors such as the cohort size and number of study sites, discussed below.

Note: Research access to VistA data is granted only to researchers who have obtained authorization from the appropriate Institutional Review Board (IRB).

National data sets

VistA is the source for numerous national and VISN databases, many of which have well-developed procedures for data cleaning and for research access. Before attempting local VistA access, investigators will want to consider whether or not national or VISN databases can meet their data needs.

Small cohort studies – researcher's home site

For access to individual patient records at the VA researcher's own site, for example for chart reviews for a small local cohort, the local IRM can be approached regarding technical arrangements for becoming an authorized user of the local information system.

Small cohort – multi-site studies

For access to individual patient records (one patient at a time) at VA locations other than or in addition to the researcher's own site, two VistA applications are available: CAPRI and VistAWeb. To apply to use CAPRI and VistAWeb see the web site of the Health Information Access Office [9].

VIReC's web site provides concise introductions to CAPRI and VistAWeb, including the advantages of each in differing situations. On the Data Access and Request Guide page of VIReC's web site, select Veterans Health Information Systems and Technology Architecture (VistA).

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Access, Continued

Large cohort studies

For larger cohorts, patient-by-patient access is not practical. If target data are not available from a national data source, studies with large cohorts will require custom extracts from VistA data. That is, data to be analyzed must first be extracted from VistA and transferred to a different platform, since VistA includes no analytic software.

Custom extracts can be performed by a programmer experienced with one of these programming languages:

- VA Fileman database management software
- MUMPS, (Massachusetts General Hospital Utility Multi-Programming System), the primary programming language of the VistA environment
- SQL, (Structured Query Language), a programming language designed for managing data in relational databases such as the Caché® database attached to each VistA system.

Documentation

Introduction

Familiarity with VistA data files and data elements is necessary for correctly interpreting VistA data and for checking data for accuracy, consistency, duplicates, and missing data. Several sources of VistA data documentation are listed below.

Note: The VistA system grew in a decentralized fashion for multiple decades. Over that time, documentation was not captured for all VistA applications in a uniform or complete manner. Consequently, VistA data documentation is sparse in many cases, making VistA data challenging to use.

Sources

Documentation useful when analyzing VistA data can be obtained from each of these sources:

- The **Data Architecture Repository (DAR)** is an enterprise-wide metadata repository available on the VA Intranet. One division of the DAR is the **VistA Metadata Repository,** a VistA data dictionary with a convenient search function for finding information by data element name, VistA file name or file number [10].
  - **Note:** The DAR reflects the content of the official, VistA Platinum version of VistA maintained by the Standards and Compliance Office within the Office of Enterprise Development. Local sites' data will vary from that version in some instances.
- The **VistA-HealtheVet Monograph,** published in 2008-2009 and available online, describes the business purpose for each VistA application [11].
- The **Corporate Database Monograph**, created by National Data Systems, catalogs VHA national electronic databases with a brief summary of the business purpose and significant attributes of each database, including its data source. VistA is the source of many of the listed databases. The Monograph is available from the DAR on the VA Intranet [12].

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Documentation, Continued

Sources (continued)

- **The VistA Documentation Library** provides user manuals for current VistA applications [13].
- The **CDW SharePoint site** on the VA Intranet [14] offers
  - A Metadata Report for each CDW domain. These reports display the VistA Parent file name and file description where the data originate and the VistA File and VistA Field of origin for each data element.
  - A VistA to CDW crosswalk, a convenient tool for locating the VistA file and/or CDW domain holding information of interest to a researcher. On the CDW SharePoint's Community tab, select NDS, then select "VistA-CDW Xwalk" in the left banner.
- **Web sites of code set stewards** offer information regarding their code sets. VistA uses standard coding for much of its data, including ICD-9, CPT, DSM-III, LOINC, and other universal and standards-based coding methodologies.
- The **VIReC Technical Report** *VIReC Insights: Veterans Health Information Systems and Technology Architecture (VistA) as a Research Tool* describes the strengths and some very important limitations to the use of VistA data for research [6].
- A **detailed historical overview** of VistA is provided by *VistA-U.S. Department of Veterans Affairs national-scale HIS* by Dr. Steven Brown [15].

Training Opportunities

Introduction	The Veterans Health Administration offers training opportunities of several types, described below
VeHU	The VA eHealth University (VeHU) periodically hosts a conference to introduce new software developed for the VHA's health information systems. Between conferences, many VeHU courses are available online [16]. In April 2011, the VA launched MyVeHUCampus, a pilot program for CPRS training also available online [17].
Local IRMs	Local medical centers' IRM Chiefs are usually responsible for training programs for clinicians and clerical staff. Contact your facility IRM office to find out who is responsible for local VistA training and regarding training types and schedules.
VA Fileman manuals	VA FileMan is a database management program that can be used to access and manage VistA data. VA FileMan user manuals, both beginners' and advanced, are available on the Internet from the VistA Documentation Library [18]. Fileman tutorials are available on the VA Intranet [19]. (Select "Documentation" in the left bar then select the manual you want to review.)

Additional Resources

Introduction

The VistA system is large and complex. For help identifying data appropriate to your study, contact the resources listed below.

Clinical Application Coordinators

Departments that are responsible for entering data into any part of VistA have Clinical Application Coordinators, called CACs, who are authorities on the local installation of the software packages employed by their departments. CACs often have an understanding of the format and contents of data files and insights into the meaning and utility of the data. A CAC for the primary medical service of interest to your study can offer insight on what data will be useful. For CAC contact information, contact IRM at your target VistA site. For IRM contact information, see the Facility and Leadership Directory on the VA Intranet [20].

VIReC

VIReC provides information and referral to experts regarding VistA and other databases and information systems being utilized for VA research. Email questions to the VIReC Help Desk.

VIReC Contact Method	Contact Information
Help Desk Email	virec@va.gov
Help Desk Phone	708-202-2413
Internet website	http://www.virec.research.va.gov
Intranet website	http://vaww.virec.research.va.gov
Physical Address	VA Information Resource Center (151V) Health Services Research and Development Service Department of Veterans Affairs Edward Hines, Jr. VA Hospital 5000 South 5th Avenue Hines, IL 60141

Works Cited

1. U.S. Department of Veterans Affairs, Office of Information and Technology, Product Development Service Line. "VA Software Document Library." (See Appendix A for VA Intranet URL.) Accessed May 16, 2012. http://www.va.gov/vdl/default.asp
2. Gandhi SK, Salmon W, Kong SX, Zhao SZ. *Administrative databases and outcomes assessment: An overview of issues and potential utility.* Managed Care Pharm. 1999 May;5(3): 215-222.
3. Sarrazin MS, Rosenthal, GE. *Finding pure and simple truths with administrative data*. JAMA. 2012 Apr 4;307(13):1433-5.
4. U.S. Department of Veterans Affairs, VHA Office of Informatics and Analytics, Data Quality Program. "Data Quality Program Home Page." (See Appendix A for VA Intranet URL.) Accessed May 16, 2012.
5. O'Malley KJ, Cook KF, Price MD, Wildes KR, Hurdle JF, Ashton CM. *Measuring diagnoses: ICD Code accuracy.* Health Serv Res. 2005 October; 40(5 Pt 2): 1620–1639.
6. Hynes DM, Joseph, G, and Pfeil, C. *Veterans Health Information Systems and Technology Architecture (VistA) as a Research Tool*. VIReC Insights. 2002;3(1): 1-8.
7. Noël PH, Copeland LA, Perrin RA, Lancaster AE, Pugh MJ, Wang C-P, Bollinger MJ, Hazuda HP. *VHA Corporate Data Warehouse height and weight data: Opportunities and challenges for health services research.* J Rehabil Res Dev. 2010;47(8):793-50.
8. U.S. Department of Veterans Affairs, VHA Office of Research and Development, Health Services Research and Development Service, VA Information Resource Center. "Data Quality". http://www.virec.research.va.gov/DataQuality/Overview.htm. (Accessed June 28, 2012.)
9. U.S. Department of Veterans Affairs, Office of Informatics and Analytics, Health Information Governance, National Data Systems, Health Information Access Office. "Health Information Access – HIA." (See Appendix A for VA Intranet URL.) Accessed May 16, 2012.
10. U.S. Department of Veterans Affairs, Office of Information and Technology, Product Development Service Line. "VistA Metadata Repository." (See Appendix A for VA Intranet URL.) Accessed May 16, 2012.
11. U.S. Department of Veterans Affairs, Office of Information and Technology, Product Development Service Line. "VistA Monograph." http://www.va.gov/vista_monograph/. Accessed May 16, 2012.

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Works Cited, Continued

12. U.S. Department of Veterans Affairs, Office of Informatics and Analytics, Health Information Governance, National Data Systems. "Corporate Database Monograph." (See Appendix A for VA Intranet URL.) Accessed May 16, 2012.
13. U.S. Department of Veterans Affairs, Office of Information and Technology, Product Development Service Line. "VistA Documentation Library." (See Appendix A for VA Intranet URL.) Accessed May 16, 2012.
14. U.S. Department of Veterans Affairs, Office of Information and Technology, Business Intelligence Service Line, "Metadata." (See Appendix A for VA Intranet URL.) Accessed May 16, 2012.
15. Brown SH, Lincoln MJ, Groen PJ, and Kolodner RM, *VistA-U.S. Department of Veterans Affairs national-scale HIS.* Int J Med Inf. 2003 Mar;69(2-3):135-56.
16. U.S. Department of Veterans Affairs, Office of Health Information. "VeHU-VA's Training Resource for the Electronic Health Record." http://www.vehu.va.gov/. Accessed May 16, 2012.
17. U.S. Department of Veterans Affairs, Office of Health Information. "MyVeHUCampus." www.myvehucampus.com. Accessed May 16, 2012.
18. U.S. Department of Veterans Affairs, Office of Information and Technology, Product Development Service Line. "FileMan" http://www.va.gov/vdl/application.asp?appid=5. Accessed May 16, 2012.
19. U.S. Department of Veterans Affairs, Office of Information and Technology, Product Development Service Line. "VA FileMan Home." (See Appendix A for VA Intranet URL.) Accessed May 16, 2012.
20. U.S. Department of Veterans Affairs, Veterans Health Administration. "Facility Locator and Leadership Directory." (See Appendix A for VA Intranet URL.) Accessed May 16, 2012.

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Appendix A

The Intranet URLs for these references are available from the VA Intranet version of this guide or through the VIReC Help Desk (virec@va.gov).

Table A1. VA Intranet Web sites referenced in this Guide.

Ref #	Date Accessed	Name of Reference
4	May 16, 2012	"Data Quality Program Home Page" Web page
9	May 16, 2012	"Health Information Access – HIA" Web page
10	May 16, 2012	"VistA Metadata Repository" database
12	May 16, 2012	"Corporate Database Monograph" database
13	May 16, 2012	"VistA Documentation Library" Web page
14	May 16, 2012	"Metadata" Web page
19	May 16, 2012	"VA FileMan Home" Web page
20	May 16, 2012	"Facility Locator and Leadership Directory" Web page