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Using Health Factors Data for VA Health Services Research

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Abstract

Background. The Department of Veterans Affairs (VA) has adopted performance measures for assessment and treatment of tobacco use. Facilities have used clinical reminders software to prompt clinicians to provide these services. Data generated by clinical reminders software have been consolidated into a national health factors database.

Methods. Heterogeneous entries from the VA clinical reminders package were standardized to identify current tobacco users, former users, and never users. Assessments were compared to the total patient population to determine the portion of patients whose assessments were captured in the health factors database. Persons with a tobacco status assessment record from fiscal year 2009 were followed to determine how many had a follow-up assessment of tobacco use status recorded in this dataset.

Results. Over the three fiscal years 2009-2011, the health factors database included tobacco use assessments of 5.0 million patients in 14.4 million encounters. Among 5.7 million users of VA care in fiscal year 2011, 4.0 million (70.3%) had a timely tobacco use status assessment in the health factors dataset. At the facility-level, health factors data completeness ranged from a low of 26.4% to a high of 90.6%.

Among persons with a tobacco use assessment in fiscal year 2009, a follow-up assessment was available within 24 month for 88% of those initially assessed as a current user and for 86% of those initially assessed as having quit within the last 7 years. The follow-up assessment found that 12.3% of those initially determined to be a tobacco user had quit. The follow-up of former users of tobacco found that relapse was more common among those who, at the time of their initial assessment, had quit for a shorter period. The proportion of former users who had relapsed was 34.3% of those who had quit for less than a year, 11.5% of those who had quit for between one and seven years, and 2.4% of those who had quit for more than seven years.

Conclusions. The health factors database is a useful source of information on tobacco use status of Veterans Health Administration (VHA) patients, providing timely information on tobacco use status on slightly more than 70% of 5.7 million users of VHA care in fiscal year 2011. It has longitudinal follow-up data on changes in tobacco status among current tobacco users and recent quitters. Since repeated assessments are not required for never users or long-term quitters, is not a good source for studies of tobacco use prevalence. It provides less complete information than chart review on screening activities, and is not a good source of information on facility or provider performance in meeting screening guidelines. Health factors data on tobacco pharmacotherapy is inferior to other sources. At some point in the future, VHA health factors data will be replaced by a dedicated database of tobacco screening and cessation services. In the interim, these data are a useful source of information for long-term follow-up and epidemiologic studies.

1. Introduction

1.1. Background

Tobacco use, chiefly cigarette smoking, is the leading cause of preventable mortality in the United Sates. Smoking prevalence among Veterans of U.S. military services is higher than in the general U.S. adult population.[1, 2] The Veterans Health Administration (VHA) has implemented a number of tobacco cessation programs, including screening, brief advice, and pharmacotherapy.[3]

This report evaluates the health factor data generated by clinical reminders and other prompts in the VHA electronic medical records system. Starting in 1996, VHA adopted performance measures to encourage provider assessment of tobacco use by patients. As early as 2000, VHA began to use the clinical reminders software to prompt providers to conduct this screening. The VHA Public Health Strategic Health Care Group developed a template for these reminders. Many sites adopted or adapted this template in order to improve their performance in screening patients for tobacco use.

The clinical reminders package prompts providers to undertake periodic tasks, keeping track of the previous actions for each patient. When a provider responds to a prompt from a clinical reminders script, a record is generated in the health factors database in the VHA electronic medical records package, the Veterans Health Information Systems and Technology Architecture (VistA). These records contain information needed to determine when future clinical reminders may be needed. One or more records may be generated in a single encounter. Each record includes a 40 character text field, information on the patient, the date of the encounter, the location of care, and the identity of the provider. For example, a tobacco use assessment that determines that the patient is a current tobacco user can be used to generate another clinical reminder within the year. The assessment that the patient is a lifetime never user would result in no further reminders.

Tobacco clinical reminders were implemented uniquely by each facility. Facilities that had already been recording tobacco use status had local developed health factor entries that differed from the national template. Other facilities modified the national template or used a locally developed reminder script. As a result, there is considerable variation in the values in the 40 character field used to record tobacco use status and treatment activities.

Health factors data from all Veterans Affairs (VA) sites have now been extracted and uploaded into the national VHA Corporate Data Warehouse (CDW). A previous study found good correlation between smoking status in the tobacco health factors data and the self-reported smoking status in a longitudinal study of VHA patients including those with HIV infection.[4] We are unaware of any other published findings from this national dataset of tobacco use assessments.

1.2. Study objectives

We obtained all records from the health factors dataset of the VA CDW regarding assessment of tobacco use and tobacco cessation treatment activities for the three years ending September 30, 2011.

Our objective was to determine if these data could be used to characterize tobacco use status of VHA patients, with a focus on their use as a potential source of follow-up information on tobacco use status of participants in VHA tobacco cessation programs. We wished to learn the proportion of current users and recent quitters (those quit less than one year ago) that were reassessed. This follow-up information could facilitate the evaluation of efforts by the VA Quality Enhancement Research Initiative (QUERI) to improve the quality of smoking cessation services. Secondary goals were to determine if the data could be used to identify tobacco use status of VHA patients for use as a risk factor in health outcomes studies.

2. Tobacco health factors data extract

2.1. Selection of records

We obtained an extract of records from Health Factors data in the CDW that pertained to tobacco screening or treatment.   We requested records that had the character strings "TOB" or "SMO" in the field that characterizes the source of data (the health factor category), the health factor entry itself (the health factor type), or in a field that had an alternate description of the health factor (HealthFactorTypeSynonym). The request excluded text entries pertaining to environmental exposure to smoke and other unrelated health factors. The full database query that generated the extract of the dataset for this study appears as Appendix 1.

2.2. Data extract

We obtained an extract that contained 28.98 million records. There were 5.48 million unique combinations of person and primary medical center. These records represented information on 4.99 million persons seen at 129 unique VA medical centers during the three Federal Fiscal Years ending on September 30, 2011. This report uses the standard designation of a Federal Fiscal Year (FY), the period from October 1 to September 30 of the indicated year.

In FY11, one of these 129 medical centers was split into two facilities. Some care provided at VA San Antonio (station 671) was now recoded as provided by the VA Texas Valley Coastal Bend Health Care System (station 740), and it was no longer possible to distinguish care provided by these two sites. (See the January 2011 VIREC Data Issues Brief.) We ignored this recoding, and evaluated this as a single site over the three years of this study, reporting the results from 129 distinct facilities.

2.3. Evaluation of fields

Table 1 lists the variables that were provided in the extract.

Table 1: Variables in Health Factors Data Extract

Variable	Type Length	Description
Comments	Char 100	Comment of provider
DateofBirth	Char 40	Birth date
DateofDeath	Char 40	Date of death
DisplayOnHealthSummaryFlag	Char 1	Indicates value can be used in summary report
EncounterStaffIEN	Char 40	Local internal entry number (IEN) of provider completing assessment
EncounterStaffSID	Char 40	National surrogate identification number (SID) of provider completing assessment
EntryType	Char 1	Health factor: either F (factor) or C (category)
GenderSpecific	Char 1	Gender that the health factor applies to
HealthFactorCategory	Char 60	Local description of type of health factor data
HealthFactorCategorySID	Char 40	National surrogate identification number (SID) of source of health factor data
HealthFactorDateTime	Char 40	Date and time when assessment was completed
HealthFactorIEN	Char 40	Local internal entry number (IEN) of this health factor record
HealthFactorSID	Char 40	National surrogate identification number (SID) of this health factor record
HealthFactorType	Char 40	Locally assigned name of health factor entry
HealthFactorTypeSID	Char 40	National surrogate identification number (SID) of health factor entry
HealthFactorTypeSynonym	Char 40	Alternate description of health factor entry
LevelSeverity	Char 40	Level of severity of health factor entry
LowerAge	Char 3	Lower limit of age the applies to this health factor
PatientICN	Char 40	National unique person ID
PatientIEN	Char 40	Local internal entry number (IEN) of patient
PatientSID	Char 40	National surrogate identification number (SID) of patient
ScrSSN	Char 40	Scrambled social security number of patient
Sta3n	Char 40	Station identifier
UpperAge	Char 3	Upper limit of age the applies to this health factor
VisitDateTime	Char 40	Date and time of encounter
VisitIEN	Char 40	Local internal entry number (IEN) of visit
VisitPrimaryStopCode	Char 10	Primary clinic stop code (DSS identifier)
VisitSecondaryStopCode	Char 10	Secondary clinic stop code (DSS identifier)
VisitSID	Char 40	National surrogate identification number (SID) of visit
VisitVistaDate	Char 40	Date of encounter in VistaA date time format

IEN denotes "Internal Entry Number." This is the record number in the local VistA database of the specific facility. There are IENs for patients, providers, visits, and for the health factor

records themselves. The IEN is unique at the medical center level, but it does not have a unique value in the national database, as the same number may be used by multiple medical centers. Thus the same patient IEN may represent entirely different individuals.

SID denotes "Surrogate Identifier." This is the record identifier assigned by the CDW. There is an SID for patients, providers, visits, health factor entries, source of health factor data, and for each health factor record. The SID has a unique value in the national database. SID represents the key field used to relate different datasets (tables) in the CDW.

The health factors data have also been documented by the VA Informatics and Computing Infrastructure (VINCI) center. These may be accessed by persons with access to the VA private network at: http://vaww.vinci.med.va.gov/vincicentral/Data_Health_Factors.html.

2.4. Detailed information on variables in the health factors dataset

2.4.1   Comments

The comments variable had a value in very few records.

2.4.2   DateofBirth

Patient birth date. We converted this character variable to a SAS date variable as follows:

```
if DateofBirth_ ne "" then DateofBirth=mdy(input(substr(DateofBirth_,6,2),2.),
   input(substr(DateofBirth_,9,2),2.),
   input(substr(DateofBirth_,1,4),4.) );
```

Date of birth was missing in .003% of observations.

2.4.3   DateofDeath

Patient death date, if available. We converted this character variable using the same SAS functions used for DateofBirth.

2.4.4   DisplayOnHealthSummaryFlag

Indicates whether or not the health factor is included in summary reports that can be viewed on the Computerized Patient Record System (CPRS).

2.4.5   EncounterStaffIEN

The locally assigned internal entry number (IEN) of the provider who generated the health factor record. EncounterStaffIEN was available for 20.2 million (69.6%) of the records. It had a value of missing in 5.9 million (20.3%) of the records, and a value of "-1" in another 2.9 million (10.1%) of the records.   A brief evaluation found that the EncounterStaffIEN was sometimes the same as the provider ID number found in the corresponding record in the VA outpatient visits file (the SE file), but this was not always the case.

2.4.6   EncounterStaffSID

The CDW assigned record surrogate identifier (SID) of the provider who generated the health factor record. EncounterStaffSID was available for 20.2 million (69.6%) of the records. It had a value of "-1" in 5.9 million (20.3%) of the records, and a value of missing in another 2.9 million (10.1%) of the records.

2.4.7   EntryType

No information available.

2.4.8   GenderSpecific

GenderSpecific was missing in 99.99% of observations.

2.4.9   HealthFactorCategory

A locally assigned optional name for the type of health factor data. This variable was used in this study as a method of identifying health factor data on tobacco use and treatment. Most selected records had a value for this variable that included the word tobacco. Entries included tobacco clinical reminders, tobacco status, or tobacco screening. Other selected values included reminder factors, preventive health, patient annual review, hypertension screening, diabetes screening, and nursing admission intake.

2.4.10   HealthFactorCategorySID

The CDW assigned surrogate identifier (SID) of the Health Factor Category.

2.4.11   HealthFactorDateTime

The date and time that the health factor was entered. Values for this variable were the same as VisitDateTime in 99.8% of the records. When the values differed, the most common amount of the difference was the visit date preceding the health factors date by one day. More rarely, the health factor data preceded the visit date. A few anomalous records had much greater differences.

HealthFactorDateTime was missing in 35,261 (0.122%) of observations. The dataset included two records with HealthFactorDateTime in FY08 (before October 1, 2008) and some records with HealthFactorDateTime in FY12 (after September 30, 2011).

2.4.12   HealthFactorIEN

The locally assigned internal entry number (IEN) of this health factor record.

2.4.13   HealthFactorSID

The CDW assigned surrogate identifier (SID) of this health factor record.

2.4.14 HealthFactorType

A 40 character entry that characterizes a finding in the health factor encounter. In this study, the text contains information on tobacco use status and tobacco cessation treatment. The text entry is locally developed, sometimes according to the guidance from the national clinical reminders template.

2.4.15 HealthFactorTypeSID

The CDW assigned surrogate identifier (SID) of the Health Factor Type.

2.4.16 HealthFactorTypeSynonym

HealthFactorTypeSynonym was missing in 93.9% of observations.

2.4.17 LevelSeverity

Level Severity was missing in 99.6% of observations.

2.4.18 LowerAge

LowerAge was missing in all observations.

2.4.19 PatientICN

A nationally assigned unique patient identification number. There were five instances in which a single patient Integration Control Number (ICN) was associated with at least two different ScrSSNs. There were more frequent examples of a single patient (as identified by ScrSSN) having multiple ICNs. This occurred in about 0.43% of the patients.

2.4.20 PatientIEN

The locally assigned internal entry number (IEN) for the patient. This identifier is unique only to the local facility; the same number may be used by another facility to represent a different patient, and a patient who receives care from multiple facilities will have a number for each.

2.4.21 PatientSID

The CDW assigned surrogate identifier (SID) of the patient. This identifier uniquely identifies a patient, but a patient who receives care from multiple facilities will have a SID associated with each.

2.4.22 ScrSSN

Scrambled social security number. The VA encrypted social security number is a unique national patient identifier. There were eight records in our extract that were coded with the value "*."

2.4.23 Sta3n

The three digit code that identifies the parent facility.

2.4.24 UpperAge

UpperAge was missing in all observations.

2.4.25 VisitDateTime

The date and time of the visit associated with this health factor record. Values for this variable were the same as the value of HealthFactorDateTime in 99.8% of the records. See description of the comparison in the entry for HealthFactorDateTime, above.

VisitDateTime was missing in .153% (44,098 observations).

2.4.26 VisitIEN

The locally assigned internal entry number (IEN) for the visit. This is not the same number as the encounter identifier in the VA outpatient visits file (SE file).

2.4.27 VisitPrimaryStopCode

The three digit code for the ambulatory care setting for the visit associated with this health factor entry. Stop codes are also known as DSS identifiers. The value for this variable was missing in 1,929,948 (6.66%) of observations. We determined that most of the missing observations involved health factor entries that took place during an inpatient stay.

2.4.28 VisitSecondaryStopCode

The three digit modifier code for the ambulatory care setting for the visit associated with this health factor entry. The value was missing in 69.1% of observations. Only 19,573 records were assigned a value for smoking cessation clinic (707).

2.4.29 VisitSID

The CDW assigned surrogate identifier (SID) for the visit associated with this health factor entry.

2.4.30 VisitVistaDate

The date of the visit associated with the health factor entry. This seven digit variable coded the data in the format YYYMMDD, where MM is a number representation of the month of the year, DD is the day of the month, and YYY is a three digit code for year. The three digits for year are the number of years since 1700. Thus the year 2009 is represented as 309, (309=2009-1700).

There were no missing values for VisitVistaDate, but some records had missing elements for day of the month, or month of the year that were filled with the characters "00." There were about

40,000 records in which the day of the month had the value of "00." Of these, another 1,000 records had the month value "00."

3. Processing health factor records on tobacco use status

This section describes methods used to determine tobacco use status based on the health factor entries. Section 8 of this report describes records pertaining to tobacco cessation services.

3.1. Preliminary standardization of values in HealthFactorType variable

To simplify the analysis and reduce the number of trivial differences between values of the HealthFactorType variable, we conducted a preliminary standardization. All characters were converted to uppercase. Many values of the HealthFactorType variable differed by inclusion of a few initial characters that did not pertain to tobacco status or tobacco treatment, such as the VISN number, facility number, or other information. These character strings were removed.

We also wrote out abbreviations. The abbreviation for TOB was written out as the character string TOBACCO. The abbreviation PT was written out as PATIENT. We standardized the hyphenation, so that the characters "NON TOBACCO" and "NON SMOKER" were always represented as "NON-TOBACCO" and "NON-SMOKER." This modest standardization reduced the number of unique entries for the variable HealthFactorType from 1,123 to 1,071.

3.2. Type of tobacco information

We characterized each health factor type by the type of information that it contained. Table 2 provides the number of unique health factor entries and the number that we assessed as containing information on tobacco use status, tobacco cessation treatment, or both types of information. It indicates the number of health factor entries that appeared to have information on tobacco status or treatment, from which no useful information could be cleaned. It also lists the number of records that we determined were not relevant to tobacco status or treatment.

There were 1.55 million records that were excluded from further analysis as the health factor type was not related to tobacco status or treatment, or could not be interpreted.

Table 2: Number of Entries and Number of Records by Type of Tobacco Information

Type of Tobacco Information	Number of Unique Health Factor Entries	Number of Health Factor Records in Extract
Tobacco status assessment	452	17,240,674
Tobacco treatment	507	9,874,946
Tobacco status and treatment	28	311,103
Ambiguous factors with status or treatment	68	334,649
Not related to tobacco status or treatment	16	1,216,246
Total	1,071	28,977,618

3.3. Characterization of patients and encounter date

3.3.1 Exclusions

We excluded eight records that had a value of "*" for the patient scrambled social security number. We excluded an additional 1,090 records because it was not possible to assign a date to the encounter using any of the three date variables in the dataset (VisitDateTime, HealthFactorDateTime, or VisitVistaDate).

3.3.2 Imputation of encounter date

We characterized the date of each tobacco health factor as the visit date (VisitDateTime). This variable provided information on the date of the encounter for almost all of the records (99.85% or 28,933,520 out of 28,977,618).

For the 44,098 observations that were missing a value for VisitDateTime, we were able to fill 43,008 records using information from the other variables, as follows.

- The date value of the VisitVistaDate, if it was complete (19 records).

- The date value from the variable HealthFactorDateTime, if it provided the same year and month as the VisitVistaDate, and VisitVistaDate had a value of "00" for day of the month (379 records).

- The date value from the variable HealthFactorDateTime, if the VisitVistaDate had a value of "00" for day of the month and "00" for month of the year (1,914 records).

- When VisitVistaDate had a value of "00" for day of the month, valid values for the year and the month of the year, and no other fields had valid dates, we assumed that the visit occurred on the 15th day of the month (40,696 records).

This method of imputing dates affected status assessment records and rarely affected records of tobacco use cessation services. Status records accounted for 42,694 (99.3%) of the 43,008 tobacco health factor records in which date were imputed. These 42,694 status records represented 41,765 unique visits, or about 0.3% of the total of 14.4 million visits in which tobacco use status was assessed.

3.4. Method of characterizing tobacco use status

We developed a method for characterizing the information in the health factor type field to determine tobacco use status during an encounter. Our goal was to assign records to one of five tobacco use categories: current user, quit within last year, quit one to seven years ago, quit more than seven years ago, and never user.

We reviewed the factors and identified common words, text and themes in the health factor type field that could be associated with one of the status values. All values were reviewed and explicit

assignments made whenever needed. For example, the word "current" was often found as part of entries indicating current use of tobacco; however, this word also appeared in some entries for former user, e.g. CURRENT NON-TOBACCO USER <1 YR. Table 3 lists many of the words, text and themes used to assign each tobacco status value.

We viewed the national clinical reminders template for both Tobacco Use Screen FY09 and Tobacco Counseling for FY09. These templates provide the prompts that generated many entries, often helping to provide indication of their meaning.

Entries that indicated history of tobacco use with a length of time were assumed to represent status as former user with the time since the patient stopped using tobacco.

Some of the entries provided too little information to assign the record to one of the five standard categories. We created additional categories to represent status with as much information as was available.

For former users, additional categories were created for those who had quit more than one year ago, less than seven years ago, and those who were former users with no information on the time since they had quit.

Some entries indicated that the individual did not currently use tobacco, but did not indicate if they had every used it. These records were assigned to the category "never or former user" of tobacco.

There were also entries that identified individuals who had used tobacco, but did not indicate their current tobacco use status. These were assigned to the category "current or former user" of tobacco. Included in this category were entries that mentioned a history of tobacco use without a duration of time.

A final category included records in which the tobacco status was unknown. Health factors assigned these values included text indicating that screening occurred or did not occur but without any indication of the individual's current tobacco use status.

Table 4 provides information on the number of records assigned to each tobacco use status. This table only characterizes the number of records in the database. There may be more than a single health factor record generated in an encounter and individuals have multiple encounters over time. For this reason, Table 4 does not represent the prevalence of tobacco use.

Table 3: Words Associated with Standard Values for Tobacco Use Status

Standard Value for Tobacco Use Status	Words, Text and Themes in Health Factor Entry
Current user	current, positive, smoker, smokes; health factor entry notes ability to hold or extinguish a tobacco product, notes advise to reduce or quit; notes issues with burns, sleep or other; notes preparation or willingness to quit; notes use, continued use or relapse
Never user	lifelong, lifetime, never
Former user, time since quit was unknown	ex, former, long-term, no longer, past, prev, prior, quit, recent, refrain, stopped
Former user, quit less than 1 year ago	health factor entry includes the text cessation, current non, ex, former, no, non, prev or quit AND variations of timeframe text for example one month, past 3 months, within last year, within past year, less than 12 months, < 1 year, <= 12 months
Former user, quit more than 1 year ago	health factor entry includes the text cessation, current non, former, history, no, non, previous or quit AND variations of timeframe text for example more than one year, > 12mths, >= 12 m, for 1 year, within past 13 months, > 13 months, 3 years ago, > three years, 4 years ago, 1-5 years, 5-10 years, >5 yrs
Former user, quit 1-7 years ago	health factor entry includes the text cessation, ex, former, history, hx, no, non or quit AND variations of timeframe text for example 1-7 years, >12mo & <7yrs or >1y <7y
Former user, quit less than 7 years ago	health factor entry includes the text cessation, current non, former or hx AND variations of timeframe text for example <7 years or use within 7yrs
Former user, quit more than 7 years ago	health factor entry can include the text cessation, former, hx, or quit AND variations of timeframe text for example >7, over 7 yrs, 7 years, no use within 7yrs, >10 years
Failed to screen	delay tobacco, screen not done
Refused screening	health factor entry includes the text screen AND declines or refused
Screened	reassessed; health factor entry includes the text screen AND completed, done or performed
Never or former user	health factor entry notes patient does not use tobacco; notes patient has never used tobacco or not in last seven years; notes patient does not use tobacco with a timeframe of seven or more years listed
Current or former user	health factor entry notes history of tobacco use without a timeframe; notes tobacco use in past year; notes type of tobacco used

Table 4: Number of Records by Assignment to Tobacco Use Status

Tobacco Use Status	Number of Records	Percent of Records
Current user	6,374,995	36.3%
Former user, quit less than 1 year ago	487,665	2.8%
Former user, quit 1-7 years ago	689,337	3.9%
Former user, quit more than 7 years ago	2,314,787	13.2%
Never user	4,316,002	24.6%
Former user, quit more than 1 year ago	1,056,179	6.0%
Former user, quit less than 7 years ago	104,977	0.6%
Former user, time since quit was unknown	401,111	2.3%
Non-user (never or former user)	1,370,134	7.8%
Status unknown	435,793	2.5%
Total number of records	17,550,980	100.0%

3.5. Site queries

We queried sites about entries that we initially characterized as ambiguous that were used to characterize more than 20,000 visits at a single site. We initially contacted five sites. Another site was later contacted to provide supplemental information. The clinical applications coordinator at three sites provided supplemental information that allowed us to resolve ambiguities. Table 5 lists the health factors entry and the interpretation of the entry provided by the site. Note that this interpretation of these text entries is specific to these sites. The same text entry may have a different meaning at other sites.

Table 5: Site Specific Interpretation of Entries

Site Name	Station Code (Sta3n)	Health Factor Entry	Site Specific Interpretation of Entry
Houston	580	CURRENT TOBACCO USER IN PAST YEAR	Current tobacco user
Washington DC	688	DATE LAST SMOKED	Former tobacco user
Detroit	553	WHEN DID YOU LAST USE TOBACCO	Never or former tobacco user

3.6. Type of tobacco used

We used the text in the health factor type to create a categorical variable to represent the type of tobacco used. These standard entries included cigarettes, cigars, pipe, smokeless, smoking unspecified, or else an unspecified type of tobacco. Table 6 indicates the terms and text identified in the entries used to assign a standard value for tobacco type. Entries with variations of the word smoke, or implications that tobacco use involved burning, were assigned the standard value smoking unspecified. Tobacco use status entries that did not indicate the type of tobacco used were assigned the standard value of unspecified type of tobacco.

Table 6: Words Associated with Standard Values for Tobacco Type

Standard Value for Tobacco Type	Words and Text in Health Factor Entry
Cigarettes	cig, pack, pk
Cigars	cigar
Pipe	pipe
Smokeless	chew, smokeless, snuff
Smoking unspecified	burn, extinguish, sc, smok

Few of the values for health factor type contained information on the type of tobacco used. We determined that just 1,067,517 (17.3%) of records pertaining to current tobacco use status contained this information. Among these records, 32,454 records had a value that included a mention of cigarettes, 1,998 records mentioned cigars, 45,406 records mentioned smokeless tobacco, and 366 records mentioned pipe smoking.

4. Characteristics of encounters assessing tobacco use status

4.1. Method of defining encounters

There was often more than one health factor type record for a given patient on a single day. We defined an encounter as all tobacco use records that had the following variables in common person (ScrSSN), site (Sta3n primary medical center code), locally assigned visit identifier (VisitIEN), and visit date (derived from VisitDateTime, HealthFactorDateTime, and VisitVistaDate).

In encounters with more than one record, if there was one record that provided more definitive information that did not conflict with other records, we used the more definitive record. For example, if the visit was characterized by a record indicating that tobacco was not used (former or never user) and another record indicated that the patient was a former tobacco user who had quit using between 1 and 7 years previously, we used the more specific information with the length of quit.

About 2% of visits had health factors entries that could not be interpreted. In most cases, the 40 character health factor entry did not identify the tobacco use status. In a small number of encounters, there were multiple records with conflicting information. For example, one record indicated that the patient was a current tobacco user and another record for that same patient on the same date indicated tobacco had never been used.

Table 7 provides information on tobacco use status assigned in 14.4 million assessments conducted during the three year study period. More than one-third identified the patient as a current user.

Table 7: Number of Visits by Assignment to Tobacco Use Status (FY09-FY11)

Tobacco Use Status	Number of Visits	Percent of Visits
Current user	5,090,443	35.3%
Former user, quit less than 1 year ago	406,799	2.8%
Former user, quit 1-7 years ago	550,254	3.8%
Former user, quit more than 7 years ago	1,920,057	13.3%
Never user	3,547,025	24.6%
Former user, quit more than 1 year ago	928,851	6.4%
Former user, quit less than 7 years ago	53,923	0.4%
Former user, time since quit was unknown	349,582	2.4%
Non-user (unknown if ever used tobacco)	1,289,761	8.9%
Status unknown	288,882	2.0%
Total number of visits	14,425,577	100.0%

4.2. Treatment setting of tobacco use assessment encounters

We assigned each encounter in which tobacco use status was assessed to a treatment setting. We grouped settings into the following categories: (1) outpatient primary care, (2) outpatient mental health, (3) inpatient, (4) other outpatient care, (5) missing.

4.2.1 Definition of outpatient settings

We identified the location of outpatient care using the DSS Identifier (clinic stop code) of the visit (VisitPrimaryStopCode) associated with the health factor entry. The codes used to characterize the setting as a primary care or mental health clinic are given in Table 8. There was negligible use of the secondary clinic stop code for Tobacco Cessation Clinic (707) or of the codes for telephone care. As a result, we did not define settings based on these codes.

Table 8: DSS Identifiers (Clinic Stop Codes) Used to Identify Outpatient Settings

Setting	Clinic Stop Number
Primary care clinic	301, 322, 323, 324, 338, 350
Specialty mental health clinic	Outpatient psychiatry codes: 156, 157, 501, 502, 504-506, 509, 510, 512, 515, 516, 520-522, 524-540, 542, 546, 550-554, 557-559, 561-584, 589-592, 731
	Outpatient substance use treatment codes: 507, 508, 513, 514, 517-519, 523, 543-545, 547, 548, 555, 556, 560, 588, 593-599, 707

4.2.2 Definition of Inpatient setting

We considered care to have been provided in the inpatient setting if the date of the visit was between the admission and discharge date of an inpatient stay recorded in the VA discharge dataset, the Patient Treatment File (PTF).

4.2.3 Distribution of tobacco use assessment encounters by setting

During the three years of the study, there were 14.43 million encounters with health factor records regarding tobacco use status. Most of these encounters (70.7%) took place in the primary care setting (Table 9). These encounters also took place in outpatient mental health settings (9.4%), in the inpatient setting (6.1%), and in other outpatient treatment settings (11.8%). Information on setting was missing in 2.0% of visits.

There were few trends over time, except for a slight increase in the number of encounters that generated health factor records that occurred in outpatient mental health settings. This accounted for 8.7% of screening visits in FY09 and 10.1% of screening visits in FY11.

Table 9: Distribution of Tobacco Status Encounters by Setting

	FY09		FY10		FY11	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Inpatient setting	285,983	6.1%	299,261	6.1%	293,461	6.0%
Outpatient primary care	3,358,125	71.5%	3,436,892	70.6%	3,403,228	70.0%
Outpatient mental health	409,565	8.7%	454,463	9.3%	489,359	10.1%
Other outpatient care	546,387	11.6%	580,339	11.9%	577,258	11.9%
Location information missing	96,008	2.0%	96,200	2.0%	99,048	2.0%
Total	4,696,068	100.0%	4,867,155	100.0%	4,862,354	100.0%

Table 10 provides a breakdown of the number of tobacco status visits among the most significant of the clinics that were characterized by the category "other outpatient care."

Table 10: Number of Visits to Other Types of Clinics

DSS Identifier	Clinic Name	Number of Visits
102	Admit Screening	31,672
120	Health Screening	11,431
130	Emergency	49,184
131	Urgent Care	28,415
147	Telephone	9,018
160	Clinical Pharmacy	6,211
171	HBPC	15,091
172	HBPC	7,191
210	SCI	7,811
303	Cardiology	37,311
304	Dermatology	11,468
305	Endocrinology	15,762
306	Diabetes	12,766
307	GI	14,816
308	Hematology	7,243
310	Infectious Diseases	7,016
312	Pulmonology	21,251
313	Renal	12,039
314	Rheumatology	11,162
316	Oncology	15,127
	Other clinics not listed	245,273
Total visits		577,258

5. Summary of tobacco use status by patient

5.1. Method

Over the three years, patients' tobacco use status were assessed 2.9 times. We summarize these multiple assessments of tobacco status. We tabulated the number of individuals who had unchanged tobacco use status and the number whose status changed over the three years studied. We also determined the mean number of times patients in each of these groups had their tobacco use status assessed over the three year study period.

5.2. Findings

Over the three years studied, health factors data document 14.43 million screening visits in 4.96 million patients screened with an average of 2.9 screening visits over three years, or once a year.

Table 11 characterizes the tobacco use status of these 4.96 million patients. Status was consistent at all assessments for 76.1% of patients. This group included 1.19 million current tobacco users (24.0% of the population), 1.33 million (26.7%) former users, and 1.26 million (25.4%) lifetime never users.

Table 11: Tobacco Use Status of Persons with a Health Factor Entry (FY09-FY11)

Summary Tobacco Use Status Category	Number of Individuals	Percent of Individuals	Mean Number of Assessment Encounters per Patient
Always current user	1,188,894	24.0%	3.1
Always former user	1,326,177	26.7%	2.1
Always never user	1,262,035	25.4%	2.2
Current-former	324,120	6.5%	4.8
Current-never	82,108	1.7%	4.6
Former-never only	656,288	13.2%	3.7
Current-former-never and Unclassifiable	121,200	2.4%	6.1
Total number of individuals	4,960,822	100.0%	2.9

The tobacco use status of the remaining patients changed over the course of the three years. Patients assessed as a lifetime never user and as a former user accounted for 13.2% of the individuals in the study. Patients assessed as a current user and a former user made up 6.5% of the study cohort. Patients assessed as a lifetime never user of tobacco who had another visit in which they were assessed to be a current user accounted for 1.7% of the cohort.

A few patients had all three types of assessment. They were reported as being a current, former, and never user. Other patients were unclassifiable.

This tabulation does not report the order of these status assessments. It does not distinguish users who quit from quitters who relapsed. Since users may quit and relapse several times, we used a different approach to evaluate these patterns. Section 7 evaluates follow-up data on cohorts defined by tobacco use status at the first tobacco use assessment in FY09. It presents information on the quit rates among users and the relapse rates among former users.

6. Completeness of health factors tobacco use data

We evaluated the completeness of health factors tobacco use data by considering the number of persons in the data relative to the number of persons receiving VHA care. This comparison was done at both the national level, and by facility.

We considered data to be complete if screening was timely. We considered screening as timely if current and recent users of tobacco were asked about tobacco use in the most recent year, and if never users or those who had quit for at least seven years were screened sometime in the previous three years. U.S. guidelines for tobacco use cessation recommend that all patients be screened for tobacco use, but do not specify how often screening should occur, or whether certain patients deserve more intensive follow-up [5]. VA recommends that clinicians screen patients in the primary care setting three times a year, and one time a year in specialty care settings [6]. Exempt from this recommendation are patients who are documented as a lifetime non-user of tobacco and those who quit using tobacco for at least seven years.

6.1. Method

We developed a health factors completeness measure with the number of users documented as having a timely tobacco use screening (numerator) by the count of persons receiving services (denominator). We studied completeness for FY11.

6.1.1   Number of patients who received care (denominator)

We used as the denominator the count of unique individuals who used a health care service in FY11. This was the number of unique individuals identified in the VA ambulatory care events (SE) dataset or the VA hospital discharge dataset (the patient treatment file, or PTF). The denominator is a count of the number of patients who had at least one encounter with a VA health care provider during the year.

6.1.2   Number screened (numerator)

Individuals were considered to have a timely health factor tobacco use record if either of the following was true:

•   The person had an encounter that generated a health factor record with tobacco status at the site in FY11

         OR

•   The person used VHA services in FY11 and they had a health factor record for tobacco status in FY09 or FY10 with a status that did not require follow-up. (They were a never user or a former user having quit more than seven years earlier.)

We included in the numerator those who were assessed as long-term quitters or never users in the prior two years, but only if they had utilization in FY11. An individual could contribute to the numerator only if they were included in the denominator (by having FY11 utilization).

Note that our numerator excludes some persons who had timely health factor data. Lifetime never users and long-term quitters could have a health factor record from before FY09, and thus have met the criteria for a timely record in FY11. We did not have these earlier data, and our estimate of completeness represents a lower bound. The three years of data did include repeated assessments of many lifetime users and long-term quitters. (See the analysis of follow-up rates, Section 7.)

6.2. Data completeness at the national level

We found 5.68 million users of VHA care identified in the outpatient visits (SE file) or inpatient discharge (PTF) in FY11. Of these, 4.00 million (70.3%) had a health factor entry on tobacco use that was timely.

6.3. Data completeness at the facility-level

We also characterized the completeness of health factors data on tobacco use by facility. Table 12 characterizes the number of facilities meeting different thresholds of data completeness. Facility-level completeness varied from a low of 26.4% to a high of 90.6%.

Table 12: Rate of Data Completeness by Facility (FY11)

Percent of Patients with a Timely Tobacco Use Health Factor Entry	Number of Facilities
20-30%	1
30-40%	5
40-50%	32
50-60%	12
60-70%	15
70-80%	31
80-90%	32
90-100%	1
Total number of facilities	129

7. Longitudinal data on tobacco use status

7.1. Method

We evaluated the value of health factors data as a source of follow-up data on tobacco use status. We identified individuals with a tobacco status assessment in FY09. The date of this assessment defined the beginning of a 24 month long follow-up period. We determined how many persons had a health factors data entry with their tobacco use status during this period, and how this varied by initial tobacco use status.

Six different cohorts were defined according to initial tobacco status: (1) current users, (2) former users who quit less than one year previously, (3) former users who quit one to seven years previously, (4) former users who quit more than seven years previously, (5) lifetime never users, and (6) persons with another index status. The "other" index status included all individuals whose initial assessment in FY09 did not fit into one of the five standard categories. The other category consisted of a heterogeneous group of persons who were "never or former user," and former tobacco users with an uncertain length of time since quit. We did not evaluate longitudinal data on 33,434 patients whose index status was missing or characterized by conflicting records.

We determined the length of interval (in days) between the index screening and the next subsequent assessment for tobacco use. We categorized whether follow-up screening occurred with 12 months, and whether it occurred within 24 months.

We characterized the results of the follow-up assessment. We determined quit rates in current users, and the relapse rates in former users. We also determined the percentage of never users who were assessed as current tobacco users at the follow-up visit.

7.2. Evaluation of follow-up of tobacco use status

The health factors data included tobacco use status of 3.1 million unique VHA patients who were assessed in FY09. Table 13 indicates the distribution of these patients by their status at the time of their initial assessment during that year.

Table 13: Distribution of Persons by Index Tobacco Use Status (FY09)

Index Tobacco Use Status	Number of Persons	Percent of Persons
Current user	1,020,510	32.7%
Former user, quit less than 1 year ago	73,114	2.3%
Former user, quit 1-7 years ago	131,450	4.2%
Former user, quit more than 7 years ago	557,356	17.8%
Never user	837,525	26.8%
Other	503,657	16.2%
Total	3,123,612	100.0%

Table 14 reports the mean length of time (in days) between the index screening and the first subsequent screening. It also reports the percentage of patients who had a follow-up screening within 12 months, and the percentage with follow-up that occurred within 24 months of the index screening visit.

A follow-up assessment was available within 24 months for 88% of current users and for 86% of those who had quit within the last 7 years. A majority of those who quit more than 7 years ago and a majority of lifetime never users were also followed, even though this is not required by screening guidelines.

Table 14: Rates of Follow-up Assessments by Index Tobacco Use Status

Index Tobacco Use Status	Mean Length of Time to First Subsequent Assessment (Days)	Percent with Follow-up Assessment within 12 Months	Percent with Follow-up Assessment within 24 Months
Current user	279	62.5%	88.2%
Former user, quit less than 1 year ago	310	56.5%	86.4%
Former users, quit 1-7 years ago	352	48.0%	86.9%
Former user, quit more than 7 years ago	360	34.0%	61.5%
Never user	354	37.5%	72.1%
Other	310	50.4%	85.2%
Total	318	48.0%	78.5%

We evaluated follow-up data by facility. A follow-up assessment within 24 months was available for at least 70% of current users and recent quitters at 85 (65.9%) of the 129 facilities. The distribution of facility-level follow-up data is characterized in Table 15. It reports the number of facilities meeting different thresholds at 12 month and 24 month follow-up.

Table 15: Completeness of Follow-up on Current Users and Recent Quitters by Facility

Percent of Current Users and Recent Quitters	Number of Facilities	
	With this Level of Follow-up Assessment within 12 Months	With this Level of Follow-up Assessment within 24 Months
0-10%	1	0
10-20%	3	0
20-30%	13	0
30-40%	25	2
40-50%	40	4
50-60%	25	12
60-70%	14	26
70-80%	4	20
80-90%	3	53
90-100%	1	12
Total number of facilities	129	129

We also evaluated the availability of follow-up assessments by the setting where the initial assessment took place. Table 16 reports the percentage of current users and recent quitters who had health factor follow-up data, according to the treatment setting where the index assessment took place. The follow-up assessment did not necessarily occur in the same setting. Patients initially assessed in the inpatient or mental health settings were somewhat more likely to have a follow-up assessment.

Table 16: Setting where Follow-up of Current Users and Recent Quitters took Place

Setting of Screening of Index Tobacco Use Status	Mean Length of Time to First Subsequent Screening (Days)	Percent Assessed within 12 Months	Percent Assessed within 24 Months
Inpatient setting	164	69.5%	81.6%
Outpatient primary care	338	44.7%	77.8%
Outpatient mental health	258	64.0%	85.1%
Other outpatient care	250	58.3%	78.4%
Location information missing	224	65.8%	85.3%

7.3. Tobacco use at follow-up assessment

We determined the tobacco use status of patients whose initial screening was followed by an assessment within 24 months of the subsequent tobacco use status. Table 17 reports the distribution of patients by their tobacco use status at follow-up, for groups of patients defined by their index assessment.

Table 17: Tobacco Status at Follow-up, by Index Status

Index Tobacco Use Status	Tobacco Use Status at Follow-up					
	Current User	Quit < 1 Year	Quit > 1 Year	Never User	Other	Total
Current user	86.5%	4.5%	5.3%	2.5%	1.2%	100.0%
Former user, quit < 1 year	34.3%	17.9%	38.1%	7.7%	2.0%	100.0%
Former user, quit 1-7 years ago	11.5%	3.6%	70.0%	11.5%	3.5%	100.0%
Former user, quit > 7 years	2.4%	0.5%	78.9%	16.2%	2.0%	100.0%
Never user	2.9%	0.4%	15.9%	75.7%	5.1%	100.0%
Other	4.1%	0.4%	10.9%	14.0%	70.6%	100.0%

The category "Other" includes individuals assigned the status "never or former user" and the categories where the length of time since quit was uncertain (former user, former user - quit more than one year ago and former user – quit less than seven years ago).

7.3.1 Quit rates among current users

Among those who were current tobacco users at the index assessment, 12.3% were assessed as not using tobacco after an average of 279 days follow-up. Among those not using tobacco at follow-up were individuals whose health factor entry was interpreted as a lifetime never user, a status that was not consistent with their index status.

7.3.2 Relapse rates among former users

Follow-up assessments also provide information on relapse to tobacco use among former users. Relapse was less likely for those who had quit for a longer period of time, as indicated in Table 17. Among those who had quit for less than one year, 34.3% were found to be using tobacco at follow-up. Among those who had quit for more than one year, but less than seven, 11.5% were current users at follow-up. Among those who had quit for more than seven years, 2.4% had relapsed.

7.3.3 Tobacco use status of never users at follow-up

Among those reported as never users at the index assessment, 2.9% reported tobacco use at the follow-up visit. Some follow-up assessments of the never users reported a status having quit more than 7 years ago. This no doubt reflects the problem of distinguishing never users from persons who had previously tried tobacco but used too little to meet the definition of having "ever used tobacco."

8. Health factors data on tobacco cessation services

We evaluated the potential use of the health factors data to characterize tobacco cessation services. We were interested in whether the health factors data documented cessation services that were not documented in VA utilization databases.

We created standard values to characterize health factor entries for tobacco cessation services. There were two characteristics for each service: the **type of action** and the **nature of the service**. The type of action distinguished services that were provided from other actions in which no service was provided, for example, a recommendation, referral, or refusal.

8.1. Type of cessation actions

Health factor records describe smoking cessation services. Standard values were defined to characterize the type of action reported in the health factor entries. Smoking cessation service records were assigned to the following categories: provided, contraindicated, refused, pending, not provided, or not applicable. Table 18 lists many of the words, text and themes used to assign each treatment action a value. In some cases, it was not possible to distinguish services that were ordered from those that were provided.

Table 18: Words Associated with Standard Values for Cessation Treatment

Standard Value for Treatment Action	Words, Text and Themes in Health Factor Entry
Contraindicated	contra
Not applicable	na, not app
Not provided	delay, exclusions, no, outstanding, pre-contemplative, suspend, unable; health factors that had the text not AND the following: given, indicated, met, now, offered, ordered, prescribed, receive
Pending	accept (except in entries with pharmacotherapy), consult, contemplative, desire, evaluate, interest, need, non provider, not begun, nrt preparation, offer, pending, refer, referral, request, scheduled, wants
Provided	accept (in entries with pharmacotherapy only), active, addressed, advise, already, approved, arranged, assisted, attending, changed, complet, counseled, did receive, discussed, documented, done, encouraged, enrolled, follow up, given, in, informed, last visit, medication referral, monitoring, on, ongoing, order (in entries with pharmacotherapy), prescribed, previous, provided, receives, recommended, reinforced, reviewed, taking, use; health factor entries that list nouns only; health factor entries described short talking points or problems with varenicline
Refused	decline, no longer desires, not interested, refuse, resists

We examined 9,889,389 records from the data extract and identified 10,001,081 actions pertaining to tobacco use cessation services. Because some records indicated two treatment actions, the number of actions exceeds the number of records.

Table 19 characterizes tobacco use cessation service records by the type of action involved. Most records (46.9%) represent plans to provide services. Another 23.9% of the actions indicate patient refusal of treatment. There were 2.6 million documented treatment actions (25.7% of total actions) recorded in the data.

Table 19: Number of Cessation Service Actions by Type of Action (FY09-FY11)

Treatment Action	Number of Actions	Percent
Provided	2,571,698	25.7
Contraindicated	25,040	0.3
Not applicable	96,636	1.0
Not provided	224,019	2.2
Pending	4,694,137	46.9
Refused	2,389,551	23.9
Total	10,001,081	100.0

8.2. Type of tobacco use cessation service

Standardized values were also developed to characterize services. Pharmacotherapy was characterized as well as more detailed values for bupropion, varenicline and nicotine replacement therapy. There were also values developed for non-pharmacological interventions: cessation services, counseling, discussion, education, group, handout, quitline and video. In addition, a value was included for treatments by a non-VA source. Table 20 lists many of the words, text and themes used to assign each treatment type value.

Some health factors entries that appeared to be ambiguous used very similar words as entries that could be unambiguously assigned to a treatment. We assumed that former entries had the same meaning. For example, we determined that the health factor TOBACCO OFFERED STOP SMOKING (PROVIDER) was referring to a stop smoking clinic after viewing six other health factor entries that included the text TOBACCO OFFERED STOP SMOKING CLINIC.

Table 20: Words Associated with Standard Values for Treatment Type

Standardized Value for Treatment Type	Words, Text and Themes in Health Factor Entry
Bupropion	bu, bupropion
Varenicline	chantix, varen
Nicotine Replacement Therapy (NRT)	nicotine, nrt, repl
Pharmacotherapy	med, otc, pharma, prescription, rx
Cessation services	attend, class, clinic, consult, enroll, program, refer, referral, sess, visit
Counsel	counsel, therapy
Discussion	address, advice, advise, discuss, inform, review; health factors described short talking points for example challenges, goal, harms, options, quitting, remove products, strategies, support
Education	educ
Group	group
Handout	brochure, handout, literature
Quitline	free & clear, phone, quit line, quit now, telequit
Video	video
Unspecified	cessation, quit tobacco u, sc, treatment
Non-VA	free & clear, non va, outside, quit now

Some records indicated that two or more services were provided. When two services were provided in a single encounter, some sites recorded this using two different health factor records. Other sites characterized the two services in a single health factor record. To make the data comparable, we characterized services provided on a single day to a single patient at a single medical center. We defined all services provided on a single date as a tobacco services encounter, with each encounter involving one or more treatment types. For this reason, the sum of the treatment types totals to more than the number of encounters.

Table 21 reports encounters in which a treatment action was "provided" and that are without the designation "non-VA."

Table 21: Cessation Services Recorded in Health Factors Data (FY09-FY11)

Treatment Type	Number of Encounters	Percent of Encounters
Bupropion	384	0.02%
Varenicline	7,303	0.33%
Nicotine Replacement Therapy (NRT)	31,583	1.42%
Pharmacotherapy	375,940	16.96%
Cessation services	22,635	1.02%
Counsel	1,149,131	51.83%
Discussion	170,515	7.69%
Education	386,965	17.46%
Group	701	0.03%
Handout	3,836	0.17%
Quitline	7,003	0.32%
Video	1,689	0.08%
Unspecified	59,222	2.67%
Total number of visits *	2,216,907	100.0%

* Total sums to more than 100%

Analysis of VA pharmacy data found that VA dispensed 411 thousand nicotine replacement prescriptions to 204 unique patients in FY08, and that the use of this therapy had been increasing.[3] This same study found that 183 thousand prescriptions of bupropion were dispensed to 46 thousand unique patients in FY08. The pharmacy data appear to be more complete and detailed than the information about pharmacotherapy recorded in the health factors data.

8.3. Number of tobacco cessation visits and persons receiving treatment

The count of encounters per person in which a treatment action was "provided" without the designation "non-VA" is provided in Table 22. This table provides the number of persons with a tobacco cessation service visit, indicating the number with one visit, two visits, three visits, or four or more visits, and the mean number of visits per person. A person may appear in the annual data for more than one year. 731,808 unique individuals received treatment in any of the three fiscal years.

Table 22: Number of Tobacco Cessation Visits in Health Factors Data (FY09-FY11)

	FY09	FY10	FY11	Three Years (FY09-FY11)
Persons with one visit	243,850	254,223	262,752	279,223
Persons with two visits	71,147	83,441	97,580	170,445
Persons with three visits	27,750	25,777	35,85	114,213
Persons with four or more visits	32,598	32,621	35,603	167,927
Total number of persons with a visit	375,345	396,062	431,791	731,808
Mean number of visits	1.8	1.8	1.9	1.8

8.4. Non-VA services

There were 87,433 visits involving 43,514 patients in which it was recorded that a tobacco cessation service had been obtained from a non-VA source. These numbers are detailed by fiscal year in Table 23. Some patients were noted as having received a non-VA service in more than one fiscal year. For this reason, the total number of patients who received a service in any of the three years is less than the sum of the number receiving services in each of the three years.

Table 23: Tobacco Cessation Services from Non-VA Sources

Period	Patients	Visits
FY09	21,308	27,759
FY10	20,683	31,645
FY11	17,552	28,029
All 3 FYs	43,514	87,433

9. Conclusions

9.1. Review of findings

Over the three fiscal years 2009-2011, health factors data characterized the tobacco use status of 5.0 million patients evaluated in 14.4 million encounters. According to these data, 24.0% of patients were assessed as a current user at all assessments, 25.4% were lifetime never users and 26.7% were former users. The remainder were assessed with a change in status during the three years.

Among 5.7 million users of VA care in FY11, health factors data documented a timely assessment of tobacco use status in 4.0 million (70.3%). At the facility-level, the documentation of tobacco use status in health factors data varied from a low of 26.4% to a high of 90.6%.

Among 1.0 million persons determined to be current users in FY09, health factors data documented that 62.5% were screened again within 12 months, and that 88.2% were screened again within 24 months. The follow-up assessment found that 12.3% of patients initially determined to be a tobacco user had quit.

Among persons with a tobacco use assessment in FY09, a follow-up assessment was available within 24 months for 86% of those initially assessed as having quit within the last 7 years. Relapse occurred in 34.3% of those who had quit in the prior year, in 11.5% of those who had quit for more than one year but less than seven years, and 2.4% among those who had quit for more than seven years.

This study demonstrated that tobacco health factors data can be used to identify the tobacco use status of most VA patients. It may also be used to follow smoking status of current users and recent quitters. There are a number of limitations to this data source.

9.2. Limitations

VA clinicians can assesses tobacco use status and provide smoking cessation services generating a health factors entry in the electronic medical record. For this reason, the tobacco health factors are incomplete. Additionally, some records are difficult or even impossible to interpret. In some cases, entries from a single visit are in conflict. Health factors entries may also be limited by the way smoking status questions are asked of patients.

9.2.1 Health factors less complete than chart review

Medical records review found much higher rates of tobacco use assessment by VHA providers than are documented in the health factors data.

VHA contracted with the External Peer Review Program (EPRP) to evaluate tobacco use screening by VA providers. EPRP conducted a random sample of medical records. According to the VA Office of Quality and Performance (now called the VA Office of Analytics and

Business Intelligence), this review determined that 99% of eligible patients were screened for tobacco use in the outpatient setting in FY10 and FY11. The EPRP medical records audits thus found more comprehensive rates of tobacco screening than are documented in health factors data.

9.2.2 Lack of standardization of health factors entries

The usefulness of health factors data is limited by the lack of standardization in how tobacco use status and tobacco cessation services are recorded. The 40 character health factors name field did not always give unambiguous information on patient's use of tobacco. Five sites had large numbers of health factor records that were not interpretable. These sites accounted for 37.4% of the problem records that we found nationally.

Health factors entries from many other sites were not easy to interpret. Data would be more useful if entries were standardized using descriptions that had unambiguous meaning.

There were also instances in which there were conflicting health factor entries generated during a single assessment. The data entry interface could be designed so that providers could not generate entries that we not internally consistent.

Another important limitation is the lack of documentation of how health factor entries were generated. It is not possible to see the actual prompts that generated a specific health factor entry. Although there is a national template for a tobacco use assessment clinical reminder, individual sites may have modified, omitted or replaced prompts. Considerable effort would be required to identify the actual prompts used at specific sites that generate each health factor entry on tobacco. This task is made even more difficult by changes in prompts over time, and the use of more than one prompt to generate any given health factor entry.

9.2.3 Data reflect limitations in clinical processes

There may also be limitations to the way in which tobacco use status is assessed. Even if the prompts from the clinical reminder package were standardized, this does not mean that clinicians are using that exact wording when soliciting information from patients. Other studies have found that providers do not ask screening questions in a standard way, deviating from the survey questions, for example, the VA implementation of screening for hazardous use of alcohol with the AUDIT-C [7].

There may also be issues with respect to the accuracy of data entry. VA adopted a performance measure that required assessments be conducted, but without any concomitant check of data quality. In some cases, data entry did not occur at the time of the visit. We noted cases in which the health factor data were entered a day or more after the encounter with the patient, suggesting that providers were relying on a recollection of patient responses. These issues deserve further investigation, with specific focus on records in which follow-up assessments are inconsistent with previous assessments.

9.2.4 Methodological limitations of this study

There are limitations to our method of processing the health factors text. We had one rater conduct an evaluation of text and assign each entry to a value. Future studies will want to employ the preferred practice of having two independent raters make this linkage, and then reconcile any differences.

Our assessment underestimates the completeness of health factors data on tobacco use status in FY11. We did not evaluate data before FY09. Lifetime never users and long-term quitters who were assessed before FY09 should have been regarded as having received a timely tobacco use assessment. As we did not have data on these assessments, our estimate represents the lower bound of data completeness. Despite this potential limitation, never users and long-term quitters who were in the three years of data were usually assessed more than once.

9.3. Trends in data quality

There was no clear trend in the proportion of health factor records that are difficult or impossible to interpret. We did not observe any trends in the percentage of health factor visits with conflicted records, by facility, over the three years of the study. 1.6% of visits were characterized with health factor entries that were in conflict. These problems were concentrated at a few sites.

9.4. Future work

Health factors data may be linked to other VA datasets to characterize the providers and patients who received tobacco use assessments. Health factors data share common fields with the VA outpatient encounter dataset (SE file), including patient identifier, visit identifier variable (VisitIEN), and provider identifier variable (EncounterStaffIEN). Health factor records may be combined with other VA datasets to characterize tobacco assessments, and the relationship between tobacco use, health services use, and diagnosis.

9.5. Recommendations

- **The health factors database is a useful source of information on tobacco use status of VHA patients.** The health factors data had timely information on tobacco use status on slightly more than 70% of 5.7 million users of VHA care in 2011.

- **The health factors database can provide longitudinal follow-up on changes in tobacco status.** Among those who were recorded as current tobacco users or recent quitters, more than 86% had a follow-up assessment within 24 months.

- **Because screening intervals reflect previous tobacco use status, it is problematic to use the health factors data to assess the prevalence of tobacco use.** The health factors database has more entries for current tobacco users and recent quitters. Screening guidelines recommend that never users and long-term quitters be screened only once.

- **Health factors tobacco data are not useful in assessing facility or provider performance with respect to screening for tobacco use.** The health factors database is not a comprehensive source of information about tobacco use screening. The results of screening assessments may be recorded in the VHA electronic medical record in a location other than the health factors database.

- **Information on tobacco cessation services in the health factors database is of limited value.** One important limitation is that the clinical reminders package is not necessarily used to document tobacco use cessation services. Information on nicotine replacement therapy and other tobacco pharmacotherapies are much more complete in VHA pharmacy databases.

9.5.1 Improvements to tobacco use data

Health factors data could be improved by standardized naming and use of health factors across sites, and by changes to clinical reminders to prevent the generation of inconsistent records from the same encounter.

In the long-run, however, health factors data will be supplanted by a portion of the VHA electronic medical record that is dedicated to documenting tobacco use screening and cessation services.

Clinical Quality Measures are specified in the Centers for Medicare and Medicaid Services Electronic Health Records Incentive Programs. These programs pay providers that make "meaningful use" of electronic health records to measure the quality of care in certain key areas, including tobacco screening and cessation services. For more information about these programs, see: http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms.

Although VHA does not qualify for the incentives in these programs, it is developing comparable ways of recording tobacco use status and tobacco cessation services in its electronic health record. When this work is complete, new data elements will supplant the tobacco records in health factors data.

References

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Appendix 1

Tobacco Health Factors SQL Query

```
INSERT INTO [vhacdwDBS03.vha.med.va.gov].[ORD_Barnett_201110013D].[Src].[HealthFactor] WITH
(TABLOCK)
  SELECT
     f.HealthFactorSID + 0 AS HealthFactorSID  --CDW key to HealthFactor table
    ,f.HealthFactorIEN
    ,f.Sta3n                                 --VistA station where the record came from
    ,t.HealthFactorType                      --text description of the type of health factor
    ,t.HealthFactorCategory
    ,f.PatientSID                            --CDW pointer to Patient record
    ,f.PatientIEN                     --VistA pointer to Patient record, must also use Sta3n
    ,p.PatientICN
    ,p.ScrSSN
    ,p.DateofBirth
    ,p.DateofDeath
    ,f.VisitVistaDate             --time that visit record was created
    ,f.VisitDateTime              --time that visit record was created
    ,f.HealthFactorDateTime       --value of EventDateTime or VisitDateTime
    ,f.LevelSeverity           --??? (no VistA documentation available)
    ,f.VisitSID                   --CDW pointer to visit record
    ,f.EncounterStaffSID          --CDW pointer to doctor that recorded observation
    ,f.Comments
    ,t.HealthFactorTypeSID        --CDW identifer of HealthFactor type
    ,t.HealthFactorCategorySID
    ,t.GenderSpecific
    ,t.LowerAge
    ,t.UpperAge
    ,t.DisplayOnHealthSummaryFlag
    ,t.HealthFactorTypeSynonym
    ,t.EntryType
    ,f.VisitIEN                   --VistA pointer to visit record, must include sta3n
    ,f.EncounterStaffIEN  --VistA pointer to doctor that recorded observation, must include sta3n
    ,v.PrimaryStopCode          AS VisitPrimaryStopCode
    ,v.SecondaryStopCode        AS VisitSecondaryStopCode

    --,f.EventDateTime       --time that health factor was created, frequently null
    --,t.HealthFactorTypeIEN   --VistA key to HealthFactor type, must include sta3n
    --,f.HealthFactorDateSID   --pointer to CDW standardized date dimension, for building cubes
    --,f.VistaCreateDate       --The date the record was captured
    --,f.VistaEditDate         --The date the record was last edited
    FROM
      --[VINCI_Datamanager].[ORD_Barnett_201110013D].[Cohort_SID] AS c WITH (NOLOCK)
      --JOIN
      [CDWWork].[HF].[HealthFactor]               AS f WITH (NOLOCK)
        --ON f.PatientSID = c.PatientSID
      JOIN
      [CDWWork].Dim.HealthFactorType              AS t WITH (NOLOCK)
        ON t.HealthFactorTypeSID = f.HealthFactorTypeSID
      JOIN
      [CDWWork].SPatient.SPatient                 AS p WITH (NOLOCK)
        ON p.PatientSID = f.PatientSID
      JOIN
      [CDWWork].Outpat.Visit                      AS v WITH (nolock)
        ON v.VisitSID = f.VisitSID

    WHERE
      f.VisitVistaDate BETWEEN '3081000' AND '3110931'
      and
      (
        (
          (t.HealthFactorType LIKE '%TOB%' OR t.HealthFactorType LIKE '%SMO%')
          OR
          (t.HealthFactorCategory LIKE '%TOB%' OR t.HealthFactorCategory LIKE '%SMO%')
          OR
```

```
        (t.HealthFactorTypeSynonym LIKE '%TOB%' OR t.HealthFactorTypeSynonym LIKE '%SMO%')
    )
)
AND
t.HealthFactorType NOT IN
    (
        'OEF/OIF EXPOS HAZ SMOKE (TRASH/FECE)'
       ,'OEF/OIF EXPOS HAZ SMOKE-OIL FIELD'
       ,'OEF/OIF SMOKE FROM BURN PITS CONCERN'
       ,'SECOND HAND SMOKE EXPOSURE'
       ,'GREG RESOLUTION TEST'
       ,'LIFE EXPECTANCY <6 MONTHS'
       ,'LIFE EXPECTANCY <6 months'
       ,'OMR COMPREHENSIVE METOBOLIC PANEL'
       ,'TFP OSMOLITE TUBE FEED'
       ,'V16 LIFE EXPECTANCY < 6 MONTHS'
       ,'NHCU Able to call for help'
       ,'NHCU Able to extinguish'
       ,'NHCU Able to move w/o assist.'
       ,'NHCU Able to move w/o assistance s/t'
       ,'NHCU assess pulmonary status'
       ,'NHCU Constant observation'
       ,'NHCU Does not have good judg/safety'
       ,'NHCU Encouragement if relapse occurs'
       ,'NHCU Gum Chewing'
       ,'NHCU Has good judgement for safety'
       ,'NHCU Judgement and insight good'
       ,'NHCU Judgement and insight not good'
       ,'NHCU Judgement and insight s/t good'
       ,'NHCU Medically stable'
       ,'NHCU Medically unstable'
       ,'NHCU Monitor patient frequently'
       ,'NHCU Normal mood and affect'
       ,'NHCU Not able to move w/o assist'
       ,'NHCU Not normal mood and affect'
       ,'NHCU Not oriented to Person, Place, Time'
       ,'NHCU Oriented to Person, Place and Time'
       ,'NHCU Snacking on carrots/celery sticks'
       ,'NHCU Sometimes able to call for help'
       ,'NHCU Sometimes has good judgement-safety'
       ,'NHCU Sometimes normal mood and affect'
       ,'NHCU Sometimes oriented to person, place'
       ,'NHCU Sucking on mints/hard candy'
       ,'NHCU Tactile stimulation'
       ,'NHCU Unable to call for help'
       ,'HOME O2 CONTINUE ON O2 NO'
       ,'HOME O2 CONTINUE ON O2 YES'
       ,'Binge Drinking'
       ,'Cage=0'
       ,'Moderate Drinker'
       ,'Non-drinker'
    )
```