

# **Attacking Diabetes, One HSA At A Time!**

by

**Peter A. Schickler, President**

[peters@bsi-vt.com](mailto:peters@bsi-vt.com)

**BUTTON SYSTEMS, INC.**

**2322 South Street**

**Castleton, Vermont 05735**

**802-468-2112**

**802-468-2637 Fax**

[www.bsi-vt.com](http://www.bsi-vt.com)

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
NEEDS STATEMENT .....	1
HSA PROJECT DESCRIPTION .....	2
WHY THE HSA? .....	2
SUBJECTIVE DESCRIPTION .....	3
OBJECTIVE METHODS.....	3
RECENT RESULTS IN VERMONT .....	4
<b>INSTRUMENTS AND TOOLS BEING USED.....</b>	<b>4</b>
GENERAL CAPABILITIES AND CAVEATS .....	4
<i>Technical Overview</i> .....	4
<i>Disease Basics</i> .....	5
<i>Volume of Providers</i> .....	5
<i>Site Security and HIPAA Requirements</i> .....	6
<i>HSA Local Staffing / Training Requirements</i> .....	6
<i>BSI Support and Training</i> .....	6
DATA ENTRY / UPDATING OPTIONS .....	6
<i>Manual Data Entry</i> .....	7
Patient Data .....	7
Encounter/Visit Information Form.....	8
Encounter Note.....	10
Lab Test Entry .....	11
<i>Batch Data Uploading from EMR</i> .....	13
<i>Fully Automated EMR Updating</i> .....	14
THE POWER OF THE REGISTRY – REPORTING OPTIONS .....	14
<i>DM Reporting Options</i> .....	14
<i>CVD Reporting</i> .....	15
<i>Hypertension Reporting</i> .....	17
<i>Summary and Analytical Reporting</i> .....	18
The Practice Summary Reporting .....	18
Annualized Measurement Reporting .....	20
<i>Other Reporting Options Within the Registry</i> .....	21
Medication Usage.....	21
Excel Export Options .....	22
Patient RX Profile .....	22
HSA Summary Reporting.....	23
<b>CONCLUSION - THE BSI ADVANTAGE .....</b>	<b>23</b>

## **Executive Summary**

The combination of Button Systems' chronic disease management experience, our non-traditional design approach and our extensive healthcare background allows us to present a unique and innovative approach to improving chronic disease treatment. The registry solution we are presenting exists today, in use by providers in Vermont to assist in the management of their diabetic population in both rural and urban environments.

The registry relies upon a set of key patient data elements that, when collected, form the basis of our follow-up and analytical reporting. These reports help providers identify and intervene with patients at the point-of-care who are most likely to develop costly, debilitating, diabetes-related complications. Co-morbidities such as depression, hypertension, heart disease, eye and foot complications, and kidney disease are tracked within the system to assist the provider in improving the consistency, quality, and effectiveness of diabetic patient care

## **Needs Statement**

Treating diabetes in the primary care setting is complex due to the presence of co-morbidities, potential complications, and the time constraints of the patient to provider interaction.

According to Salynn Boyles in an article in WebMD Health News:

- The cost of treating diabetes complications in the U.S. was estimated at \$22.9 billion in 2006.
- 3 out of 5 people with type 2 diabetes have at least one other serious health problem related to their disease.
- The cost of treating the complications of diabetes averages \$10,000 per patient per year, with patients paying nearly \$1,600 of that out of their own pockets.

Common complications of type 2 diabetes include heart disease, stroke, eye damage which can lead to blindness, kidney disease, and vascular (blood vessel) problems that can lead to foot amputation.

"The risk of death for people with diabetes is about twice that of people without diabetes of a similar age," said AACE spokesman Daniel Einhorn, MD, FACP.

The registry system must measure a diabetes population as well as each individual patient's resource utilization and testing compliance, including all of the key diabetes-related performance measures commonly recognized by Health Plan Employer Data and Information Set (HEDIS) and the American Diabetes Association (ADA):

The combination of laboratory evaluations, patient condition at the encounter, current medications, and a variety of self-management processes must all be examined and tracked within the new application.

In summary, the registry system must provide maximum data analysis in a concise form that allows the provider to quickly analyze the patient's current status and to determine the best

course of overall diabetes treatment. Accomplishing this will reduce the possible occurrence of diabetes complications, while improving the patient's quality of life through self-education.

### **HSA Project Description**

We propose to establish a website for each Hospital Service Area (HSA) that would allow the individual providers within that HSA to enter and maintain their diabetes population data. The goal of this approach is to have each provider enter a minimal amount of data, while reaping the maximum benefit from the extensive reporting capabilities within the website.

This website will allow each provider to see only their own patient data, and run population follow-up reports for that population. In addition, they will have the ability to run comparative reports that measure their aggregate level of care against other similar providers within their HSA area.

The application allows three types of data updating: (a) for paper practices, a manually entered subset of data elements that updates an encounter note for easy updating and tracking of a visit, (b) for practices with a single site EMR, a file upload capability for base data with the ability to manually enter specific non-EMR elements, and lastly, (c) for large multi-location practices and hospitals, a full interface for automated data uploading.

The registry site will have three levels of reporting, all based upon the base data elements entered using one of the three methods. The practice level report module contains 125 follow-up report options that analyze the practice's diabetic population, and provide a comprehensive set of data specific reports. These reports break down each facet of the diabetic's data and provide the practice with a roadmap for callbacks and lab test reminders. The practice summary reporting analyzes the entire diabetic population for the practice, providing a complete summary of the status of the practice's diabetic population. Lastly, the system provides a comparative section that measures a variety of HEDIS type measures for that practice and compares its results to the aggregate of the other practices within the HSA.

### **Why the HSA?**

The use of health care resources in the United States is highly localized. Most Americans use the services of physicians whose practices are nearby. Physicians, in turn, are usually affiliated with hospitals that are near their practices. As a result, when patients are admitted to hospitals, the admission generally takes place within a relatively short distance of where the patient lives. This is true across the United States. Although the distances from homes to hospitals vary with geography – people who live in rural areas travel farther than those who live in cities – in general most patients are admitted to a hospital close to where they live which provides an appropriate level of care.

The Medicare program maintains exhaustive records of hospitalizations, which makes it possible to define the patterns of use of hospital care. When Medicare enrollees are admitted to hospitals, the program's records identify both the patients' places of residence (by ZIP Code) and the hospitals where the admissions took place (by unique numerical identifiers). These files provide a reliable basis for determining the geographic pattern of health care use, because research shows that the migration patterns of patients in the Medicare program are similar to those for younger

patients. The geographic grouping of this data is called an HSA or hospital service area. (Extracted from the Dartmouth Atlas of Health Care)

We propose implementation of our registry within each HSA, as opposed to an overall single, statewide or corporate website. This method isolates each HSA and compares like providers in a like geographic area, as opposed to attempting to compare a rural provider to a large conglomerate of providers in different environments and communities. This approach also allows us to phase in the implementation, concentrating on each local area as opposed to a single “one size fits all” overall approach. By isolating each HSA, we reduce the complexity of interfacing each hospital lab system into the registry, thus eliminating the need to manually enter lab test results for the patients within the registry.

### ***Subjective Description***

Over half of all inpatient stays include a diagnosis for at least one chronic condition. Furthermore, hospital stays among adults diagnosed with a chronic condition are more costly and resource intensive than hospitalizations that do not involve a chronic illness (VPQHC 2009 Quality Report),

Cardiovascular diseases (CVDs) are the major causes of mortality in persons with diabetes, and many factors, including hypertension, contribute to this high prevalence of CVD. Hypertension is approximately twice as frequent in patients with diabetes compared with patients without the disease. Conversely, recent data suggest that hypertensive persons are more predisposed to the development of diabetes than are normotensive persons. (2001 AHA Hypertension. 2001;37:1053.).

Our chronic disease registry provides practices with a powerful, easy-to-use tool for effectively not only managing their diabetic population but to also draw attention to the important comorbidities of CVDs and hypertension.

### ***Objective Methods***

Vermont Program for Quality in Health Care (VPQHC) is a nonprofit organization dedicated to measurement and continuous improvement of statewide health care indices. Four years ago, they decided to expand their diabetes collaborative with an online chronic disease registry for use by their collaborative members. The hope was to provide their members with a tool to better analyze their diabetic population and then work with that population to improve the overall care for that group of chronically ill patients. Other programs and software packages were examined and discarded for being either too expensive or not robust enough for the task. VPQHC decided to have Button Systems adapt their online registry engine to create a chronic disease registry for diabetes and related diseases.

When creating the design for the new registry, we collected measurement specifications and recommended treatment details from Institute for Healthcare Improvement (IHI), National Committee for Quality Assurance (NCQA), Agency for Healthcare Research and Quality (AHRQ), American Medical Association (AMA), American Diabetes Association (ADA) and Health Plan Employer Data and Information Set (HEDIS). We then collated these approaches

into a single cohesive design that allowed for minimal data entry and flexible provider level reporting.

The collaborative members participated in the overall design as well as the specification of reporting methods during their monthly meetings. This end user design participation vastly improved the initial design. These same end users were the first users of the initial website and assisted in the adjusting of the data entry and reporting options that now comprise the final product.

## **Recent Results in Vermont**

As mentioned, this chronic disease registry has been used successfully in Vermont for numerous communities around the state for over four years. In Bennington, Vermont, they implemented the registry in 14 practices, ranging from small paper practices to large, automated multi-specialty clinics. Their local hospital updated lab tests using an automated lab interface for all practices. They tracked a diabetic population of 1,200 patients over three years using this registry. To illustrate the effectiveness of the registry processing, we selected three important measures for these diabetics in this one community over the three years – diabetic self management training, timely A1C testing, and reducing the A1C test results to be under 7. Here are the results of those measures for the three year period.

Measure	2007	2008	2009
Self Management	13.49%	60.76%	71.17%
HBA1c 2 Tests/year	43.15%	71.07%	80.96%
HBA1c < 7	45.20%	59.22%	66.77%

The results have been amazing, showing drastic improvement in the overall quality of care for this diabetic population. Similar results were found throughout the state on a wide variety of diabetes measurements.

## **Instruments and Tools Being Used**

### **General Capabilities and Caveats**

The following documentation describes the capabilities of the registry system as well as presenting a snapshot of the processing steps available to all three types of provider practices. It is important to remember that this is a *registry* program that analyzes data after the fact and is not an EMR that needs immediate updating. In many instances, our end users perform once a week updates of their registry data, then run their reporting that would act against these updates. The exception to this general rule is that a paper practice may wish to be more proactive in their data updating and reporting since they would rely potentially more on the encounter level reporting than other practices. The power of this registry is in its reporting, and how it can smoothly interface into a practice's office microsystems.

### **Technical Overview**

The registry is written in VBScript (using ASP as its extension), making good use of the tools within Microsoft's Visual Studio. Data storage varies, based upon requirements of the particular

application segment being processed. In some instances, an Access database is utilized for static data while Visual FoxPro and MS SQL tables are used for more robust processing options. The registry is a self-contained website, requiring no other web presence to operate successfully. This allows the application to be very portable, having the ability to be installed on local private web servers, or national ISP locations with equal ease.

The system is fully web-based, so no hardware or software is needed at the provider location. We recommend either DSL or cable high-speed Internet connections but have actually run the application over a dial up connection.

### **Disease Basics**

As mentioned, cardiovascular diseases are the major causes of mortality in persons with diabetes, and many factors, including hypertension, contribute to this high prevalence of CVD. Hypertension is approximately twice as frequent in patients with diabetes compared with patients without the disease. Furthermore, up to 75% of CVD in diabetes may be attributable to hypertension, leading to recommendations for more aggressive treatment (ie, reducing blood pressure to <130/85 mm Hg) in persons with coexistent diabetes and hypertension (2001 AHA Hypertension. 2001;37:1053.).

The proposed registry currently covers three diseases – diabetes, cardiovascular diseases, and hypertension. The hypertension module is optional; if a provider does not wish to track his patients suffering from hypertension, they can “switch off” that option and their practice program reflects the change throughout. At any future point, the provider can opt in for using the hypertension options and reporting.

For each disease, the registry has a set of standards and goals for various quality measurements. These goals and milestone values are based upon HEDIS, NCQA, and ADA measurement values. For example, the American Diabetes Association (ADA) published Clinical Practice Recommendations in which a target level for HbA1c of 07.0% was recommended for non-pregnant adults. Other risk factors addressed included blood pressure (target 130/80 mmHg) and lipid levels (target low-density lipoprotein cholesterol 100 mg/dl, high-density lipoprotein cholesterol (HDL) 140 mg/dl and triglycerides 150 mg/dl). As a patient’s levels change, they are constantly compared with these standards and reported both on an individual patient encounter basis and aggregated provider/HSA level reports. These standard levels are stored within the system and can be easily modified by the technical support staff.

Future plans exist for adding new disease modules for both adult and childhood obesity and asthma. These additional diseases would be added in the same manner as the hypertension module – as an option for each provider to either opt in or opt out.

### **Volume of Providers**

By taking the design approach of having each provider be a separate entity unto itself, we provide the maximum of flexibility in sizing the registry. We have run this application for a large community of providers as well as a community with only two providers. It works equally well analyzing 100 diabetics as it does with 5,000.

## **Site Security and HIPAA Requirements**

Each HSA will need to sign a HIPAA Business Associate's Agreement with each practice that will participate in the registry. In addition, we would sign a BAA with the HSA. A standard SSL certificate would protect the site. Since the overall premise of the registry is that a practice can only see the patient data of their own patients, there is no need to have BAA between any of the other entities involved. There is no need to have a special HIPAA compliant permission letter between the practice and the patients, since the patient data is not being exposed to any new entities outside of the established BAA.

## **HSA Local Staffing / Training Requirements**

We recommend that a single coordinator be placed in charge of the implementation of the registry within an HSA. This person would be trained by our staff in the methods for setting up new practices, running HSA level reporting and analyses, and running the training classes for new practices.

We would provide the materials needed to run seminars at the hospital for new users ,if that is the approach the HSA prefers. Our end users have had good success using this method for starting new users. The system is very user friendly in much of its operation, so a one to two hour session has proven to be enough to get new users comfortable with the new registry application. In addition, we will provide a non-secure website that can be used by new end users to "play" with the system, adding patients and encounter data, running reports, etc. The hospital coordinator will be trained to use this play site for all training.

We suggest that the training site also be used to train outlying practices that may not be able to attend training classes at the hospital. It is a great one-on-one site for quickly acquainting a new user with the capabilities of the registry as well as how to integrate the new reporting and processing into the practice's Microsystems within their offices.

## **BSI Support and Training**

Our trainers would work with the hospital staff that will be responsible for the training of the practices. Both online and printed materials would be made available for use in this process. This training usually entails two full days of work, possibly broken up into four or five sessions. Our staff would provide both phone and online support for the end users that cannot get their question answered by the hospital staff. The hospital staff is the first line of defense and our customer support is the backup to that.

We have online capabilities to attach our customer support directly to either the hospital trainer or an end user computer and assist directly in resolving any questions or concerns. It is available 8 AM – 6 PM ET Monday through Friday. Since this application is a non-critical registry as opposed to an EMR or billing system, we feel that this timeframe is more than adequate.

## **Data Entry / Updating Options**

The concept we based the design of this registry on was "Enter as few data elements as possible, and reap the most reporting benefit." The following sections describe the various methods for

updating the registry data elements. All options are available to all providers, allowing them to customize their data updating methods to suit their particular requirements and capabilities.

One basic rule has been applied for all methods of data updating – if a new record is entered, either manually or automated, and that record previously existed, then the new data record becomes and update, field by field, of the previous record. If that record did not previously exist, then the new record is added into the system. This rule allows for easy automated updating of patient data, adding results to lab tests entered, and the like.

## Manual Data Entry

There are three basic data entry formats within the registry – patient, lab, and encounter/visit. The manual entry screens allow for adding, maintaining, and printing the three primary data tables. It is important to note that even though a practice has set themselves up for automated updating, these manual maintenance forms are always available to all users. The following sections detail the base data entry screens for manual entry.

### Patient Data

The Patient Information form is the hub of the registry. Here, you will be able to maintain all master information about the patient, such as their name, address, etc. You can also maintain their background information and basic medical references, such as their primary care physician and primary insurance carrier.

The Patient information form is divided into two sections. The first section contains the patient's contact information. The second section contains the patient's background information. The only required fields are the number, full name, zip code, race, date of birth, sex, height and primary care physician assignment.

Patient Information Form							
Clinic # 123456: ABC CLINIC							
<b>CONTACT INFORMATION</b>							
Patient ID #:							
Last Name:	First Name:	Middle Initial:	Suffix:				
Address Line 1:							
Address Line 2:							
City:	State:	Zip Code:					
Phone #:							
<b>BACKGROUND INFORMATION</b>							
Date Of Birth:	Age:	Gender:	Race:				
Height (inches):	PCP:		Pilot Pop. Ind.:				
Migrant:	Homeless:	Insurance:					
Primary Language:	Emergency Contact Name:	Emergency Contact Phone #:					
Main Menu	Print	Add	Delete	Save	Search	Encounter/Visits	Labs

At the bottom of the Patient Information form is a series of buttons. These buttons allow you to add, edit, and delete the data on the Patient Information form. You also use these buttons to navigate to other functions or back to the Main Menu. If you click the print button, your browser will open up a new window that contains a patient summary, as shown below. This optional patient handout recaps their present conditions as well as various reminders.

**ABC Clinic Patient Summary Report For John A Doe As Of 7/27/2006**

<b>Chronic Conditions:</b>																															
Type I Diabetes, Metabolic Syndrome, Micro Albuminuria, CHF, NYHA Class 1																															
<b>Important Dates: (items in bold are overdue or within 30 days from becoming overdue)</b>																															
<b>Last HbA1c Test On:</b> / / _ (at least once every 6 mos.)	<b>Last Microalb/Cr Test On:</b> / / _ (at least once a year)																														
<b>Last LDL Test On:</b> / / _ (at least once a year)	<b>Last HDL Test On:</b> / / _ (at least once a year)																														
<b>Last Cholesterol Test On:</b> / / _ (at least once a year)	Last Retinal Exam On: 2/2/2006 (at least once a year)																														
<b>Last Monofilament Exam On:</b> / / _ (at least once a year)	<b>Last Foot Exam On:</b> / / _ (at least once a year)																														
<b>Last Flu Vaccination On:</b> / / _ (at least once a year)	Last PPV12 Vaccination On: 3/11/2005 (at least once every 10 yrs.)																														
<b>Items of Concern:</b>																															
<ul style="list-style-type: none"> <li>- Your Systolic BP is 0. Less than 130 is the goal for most people.</li> <li>- Your Diastolic BP is 0. Less than 80 is the goal for most people.</li> <li>- Your HBA1C is 0. Less than 7 is the goal for most people.</li> <li>- Your Urine Protein or Albumin Test is 0. Less than 30 is the goal for most people.</li> <li>- Your total Cholesterol is 0. Less than 200 is the goal for most people.</li> <li>- Your Triglyceride level is 0. Less than 150 is the goal for most people.</li> <li>- Your HDL is 0. Greater than 40 is the goal for most men.</li> <li>- Your LDL is 0. Less than 100 is the goal for most people.</li> <li>- Your Monofilament Exam is Abnormal. This indicates that you are at risk for serious foot problems including ulcers and infections.</li> <li>- Your Foot Exam is Abnormal. This indicates that you are at risk for serious foot problems including ulcers and infections.</li> <li>- You are due to review your self-management goals. This will help to control your diabetes.</li> </ul> <p><b>Controlling your diabetes decreases your risk for heart disease, stroke, kidney disease, eye diseases, and foot and leg problems.</b></p>																															
<b>Blood Pressure:</b>	<b>Weight:</b>																														
<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th>Date</th> <th>Sys</th> <th>Dia</th> </tr> </thead> <tbody> <tr> <td>Feb-06</td> <td>0</td> <td>0</td> </tr> <tr> <td>Aug-05</td> <td>132</td> <td>80</td> </tr> <tr> <td>Aug-05</td> <td>0</td> <td>0</td> </tr> <tr> <td>Apr-05</td> <td>126</td> <td>89</td> </tr> <tr> <td>Mar-05</td> <td>121</td> <td>81</td> </tr> </tbody> </table>	Date	Sys	Dia	Feb-06	0	0	Aug-05	132	80	Aug-05	0	0	Apr-05	126	89	Mar-05	121	81	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th>Date</th> <th>Weight</th> </tr> </thead> <tbody> <tr> <td>Feb-06</td> <td>22</td> </tr> <tr> <td>Aug-05</td> <td>152</td> </tr> <tr> <td>Aug-05</td> <td>100</td> </tr> <tr> <td>Apr-05</td> <td>198</td> </tr> <tr> <td>Mar-05</td> <td>197</td> </tr> </tbody> </table>	Date	Weight	Feb-06	22	Aug-05	152	Aug-05	100	Apr-05	198	Mar-05	197
Date	Sys	Dia																													
Feb-06	0	0																													
Aug-05	132	80																													
Aug-05	0	0																													
Apr-05	126	89																													
Mar-05	121	81																													
Date	Weight																														
Feb-06	22																														
Aug-05	152																														
Aug-05	100																														
Apr-05	198																														
Mar-05	197																														
<b>HBA1C:</b>	<b>LDL:</b>																														
<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th>Date</th> <th>HBA1C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	Date	HBA1C													<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th>Date</th> <th>LDL</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	Date	LDL														
Date	HBA1C																														
Date	LDL																														
<b>Your Health Goals:</b>																															
Working with your care providers on setting reasonable self-management goals will help control your diabetes.																															
<b>Notes and Reminders:</b>																															
Print	Close Report																														

## Encounter/Visit Information Form

The Encounter/Visit Information form is by far the most complex and comprehensive set of forms within the registry application. It contains vital information about the current visit, chronic conditions, family history, behaviors, and additional notes. This form is broken into multiple sections, as shown below

Encounter/Visit Information Form					
Clinic # 123456: ABC CLINIC			Patient # 12345: JOHN A. DOE		
<b>VITALS THIS VISIT</b>					
This Visit Date:	3/30/2006	Next Visit Date:	4/30/2006	First Visit Date:	1/1/2005
Height:	72	Weight (lbs):	220	BMI:	29.8
Circumference:	0	BP-Sys/Dia:	142 / 70	Pulse:	70
<b>CHRONIC CONDITIONS</b>			<b>FAMILY HISTORY</b>		
<input checked="" type="checkbox"/> Diabetes Type I	<input type="checkbox"/> Retinopathy	<input type="checkbox"/> Family Hx CHD			
<input type="checkbox"/> Diabetes Type II	<input checked="" type="checkbox"/> CAD	<input type="checkbox"/> Family Hx DM			
<input type="checkbox"/> Diabetes Type Other	<input type="checkbox"/> Post-MI	<b>BEHAVIORS</b>			
<input type="checkbox"/> Dyslipidemia	<input checked="" type="checkbox"/> PVD	<input type="checkbox"/> Self-Monitors BG			
<input type="checkbox"/> Metabolic Syndrome	<input type="checkbox"/> CVA	Exercise <input type="text" value="0"/> Hours Per Week			
<input type="checkbox"/> Hypertension	<input type="checkbox"/> CHF	Smoker Status <input type="text" value=""/>			
<input type="checkbox"/> Micro Albuminuria	NYHA Class: <input type="text" value="0"/>	<input type="checkbox"/> Daily Weighing			
<input type="checkbox"/> Nephropathy	<input checked="" type="checkbox"/> Depression	<b>NOTES</b>			
<input type="checkbox"/> Neuropathy	High Foot Risk: <input type="text" value="N"/>	<input type="text"/>			
<input type="button" value="Medications"/> Use this button to enter medication information. <input type="button" value="Referrals/Education"/> Use this button to enter in referral or educational class information.					
<input type="button" value="Print"/> <input type="button" value="Add"/> <input type="button" value="Delete"/> <input type="button" value="Save"/> <input type="button" value="Search"/> <input type="button" value="Patient Information"/> <input type="button" value="Labs"/>					

The encounter screen uses a “carry forward” method of data updating. The screens allows the end user to enter *only the items that have changed* since the prior encounter visit. This significantly reduces the time to log a visit’s information. The vast majority of the data entry is point and click options, reducing the keying required to a minimum.

There are two connector buttons that launch two additional screens for medication tracking and referrals and education options. The medication groups are used as opposed to actual medications to reduce the volume of data entry needed to capture the base information, keeping in mind that this is a registry, not an EMR. The two screens are shown below.

Medications			
Clinic # 123456: ABC CLINIC		This Visit Date: 3/30/2006	Patient # 12345: JOHN A. DOE
<input type="checkbox"/> Insulin	<input type="checkbox"/> ACE Inhibitor	<input checked="" type="checkbox"/> Statins	<input type="checkbox"/> Hydralazine
<input type="checkbox"/> Sulfonylureas	<input checked="" type="checkbox"/> ARB	<input type="checkbox"/> Niacin	<input checked="" type="checkbox"/> Antiarrhythmic
<input type="checkbox"/> Biguanide/metformin	<input checked="" type="checkbox"/> ASA/antiplatelet	<input type="checkbox"/> Fibrates	<input checked="" type="checkbox"/> Digoxin
<input type="checkbox"/> TZD/glitazone	<input checked="" type="checkbox"/> Warfarin	<input type="checkbox"/> Other Lipid Med	<input checked="" type="checkbox"/> Spironolactone
<input checked="" type="checkbox"/> Glitnides	<input checked="" type="checkbox"/> Beta Blocker	<input type="checkbox"/> Calcium Antagonist	<input checked="" type="checkbox"/> Smoke Cessation Meds
<input checked="" type="checkbox"/> Incretins	<input checked="" type="checkbox"/> Diuretic	<input type="checkbox"/> Nitroglycerine	<input checked="" type="checkbox"/> Anti-Depressant
<input checked="" type="checkbox"/> AG Inhibitor/acarbose	<input checked="" type="checkbox"/> Other BP Med	<input type="checkbox"/> Nitrates	
<input type="button" value="Encounter/Visits"/> Click this button to return to the master encounter visit information form. <input type="button" value="Referrals/Education"/> Click this button to enter referral or education information.			

Referrals and Education							
Clinic # 123456: ABC CLINIC		This Visit Date: 3/15/2005			Patient # 12345: JOHN A. DOE		
REFER/EDUCATION	Rec. Date	Referred	Declined	VACCINATIONS	Rec. Date	Referred	Declined
DM Education:	3/1/2005	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	PPV12:	3/11/2005	<input checked="" type="checkbox"/>	<input type="checkbox"/>
CVD Education:		<input type="checkbox"/>	<input type="checkbox"/>	Flu Vaccination:		<input type="checkbox"/>	<input type="checkbox"/>
Self-Mgmt. Goals:	3/2/2005	<input checked="" type="checkbox"/>	<input type="checkbox"/>	HOSPITALIZATION & PROCEDURES	Date	Referred	Declined
Nutrition Education:		<input type="checkbox"/>	<input type="checkbox"/>	Hospitalization:		<input type="checkbox"/>	<input type="checkbox"/>
Dental Exam:		<input type="checkbox"/>	<input type="checkbox"/>	Coronary Artery (CABG/Angioplasty):		<input type="checkbox"/>	<input type="checkbox"/>
Retinal Exam:		<input type="checkbox"/>	<input type="checkbox"/>	Carotid Endarterectomy:		<input type="checkbox"/>	<input type="checkbox"/>
Smoke Cessation:		<input type="checkbox"/>	<input type="checkbox"/>	Peripheral Vascular Procedure:		<input type="checkbox"/>	<input type="checkbox"/>
Podiatry Refer:		<input type="checkbox"/>	<input type="checkbox"/>	Other Revasc:		<input type="checkbox"/>	<input type="checkbox"/>
Depress. Scrs:		<input type="checkbox"/>	<input type="checkbox"/>				
Sub. Abuse Scrs:		<input type="checkbox"/>	<input type="checkbox"/>				
Med. SM Training:		<input type="checkbox"/>	<input type="checkbox"/>				
Cardiac Rehab:		<input type="checkbox"/>	<input type="checkbox"/>				
Encounter/Visits		Click this button to return to the master encounter visit information form.					
Medications		Click this button to enter medication information.					

**Encounter Note**

If the end user clicks the print button on the bottom of the main encounter screen, the browser will open up a new window that contains an encounter note report. This report shows all encounter/visit information for the currently displayed visit, as well as the most recent lab and diagnostic test results the patient may have had. The encounter note report is designed to be used as a quick reference and as an input form for the next visit by that patient. Paper practices clip this form into the patient folder in preparation for that next visit.

The encounter note report also contains a feature that alerts physicians and patients about abnormal or missing readings. These readings will be highlighted in yellow and displayed in bold red text. These items are compared against a series of acceptable values for various lab test results. Also, if tests are overdue, the same highlighting is performed. The following example shows various items highlighted for attention.

## Patient Encounter Note

123456: ABC Clinic

Vitals:	Last Visit	This Visit	Patient Information For Patient Number: 12345											
Date:	3/30/2006		Name: JOHN A. DOE			Age: 38		DOB: 6/15/1967						
Weight (lbs):	220		Address: 123 WHICH WAY			Phone: (555) 555-5555			Sex: M					
Height:	72		PCP: DRAKE D'REMORE			Pilot Pop. Ind:			Language: ENGLISH					
Waist Circum:	0		Migrant: N			Homeless: N			Insurance: MEDICARE					
BMI: **	29.8		Emergency Contact: JANE DOE			Emergency Contact Phone: (555) 555-5556			Race: AMERICAN INDIAN/ALASKA NATIVE					
Pulse:	70													
BP-Sys/Dia: **	142 / 70													

Chronic Conditions:	Dx	Add	D/C	Lab Test Results:	Value	Date	Ord	New Value	New Ord	Refer/Edu:	Date	P Ref	Rec Date	Ref	Dec
Diabetes Type I	Y			HbA1C	**					DM Edu.	10/05				
Diabetes Type II				Microalb/Cr	**					CVD Edu.					
Diabetes Type Other				24 Hr. Ur. Protein						Self-Mgmt. Goal	**	10/05			
Dyslipidemia				Creatinine						Nutrition Edu.	10/05				
Metabolic Syndrome				Cholesterol						Dental Exam	10/05				
Hypertension				Triglycerides						Retinal Exam	**	10/05			
Micro Albuminuria				HDL						Smoke Cess.	10/05				
Nephropathy				LDL	**					Podiatry Refer.					
Neuropathy				ALT						Depression Scrn.					
Retinopathy				AST						Sub. Abuse Scrn.					
CAD	Y			Potassium						Med. SM Training					
Post-MI				Fast Glucose						Cardiac Rehab.					
PVD	Y			Other Diagnostic Test Results:						Hospitalization & Procedures:		Date		New Date	
CVA				Monofilament Exam						Hospitalization					
CHF				Foot Exam	**					Coronary Artery (CABG/Angioplasty)					
NYHA Class	0			ECHO						Carotid Endarterectomy					
Depression	Y			LVEF						Peripheral Vascular Procedure					
High Foot Risk	N			EKG						Other Revasc					
Medications:	Dx	Add	D/C	Cardio Stress Test						Notes:					
Smoke Cessation Meds	Y			Perfusion Imaging						New Note:					
Anti-Depressant	Y			Dx Cardiac Cath.						Next Visit Date:					
Insulin				Vaccinations:		Date	P Ref	Rec Date	Ref	Dec					
Sulfonyleureas				PPV12	**										
Biguanide/metformin				Flu Vac.	**										
TZD/glitazone				Family History:											
Glitnides	Y			Family Hx CHD		Dx	Add	D/C							
Incretins	Y			Family Hx DM											
AG Inhibitor/acarbose	Y			Behaviors:											
ACE Inhibitor				Self-Monitors BG											
ARB	Y			Exercise x/wk		0									
ASA/antiplatelet	Y			Smoker Status	**										
Warfarin	Y			Daily Weighing											
Beta Blocker	Y														
Diuretic	Y														
Other BP Med	Y														
Statins	Y														
Niacin															
Fibrates															
Other Lipid Med															
Calcium Antagonist															
Nitroglycerine															
Nitrates															
Hydralazine															
Antiarrhythmic	Y														
Digoxin	Y														
Spironolactone	Y														

NOTE: Results with either an empty or abnormal value have been highlighted in yellow and denoted with \*\*

Print Report Close Report

### Lab Test Entry

The Lab and Diagnostic Test Information form has been designed to allow you to enter new, or modify or delete existing lab tests in one operation. It displays the prior results for each test on the left and allows data entry of new data on the right. These tests were selected as the basis for the most prevalent tests for the diseases being tracked.

Lab and Diagnostic Test Information										
Clinic # 123456: ABC CLINIC					Patient # 12345: JOHN A. DOE					
Click the Delete button to delete the latest test on the left. Click the Change button to modify the latest test on the left. To add a new lab test, type the new information in the New/Revised Tests section.										
Latest Lab Tests On Record						New/Revised Tests				
Test Type	Date	Results	Order	Lab #		Date	Results	Order	Lab #	
HBA1C	None	0	N		<-Delete <-Change					<input type="checkbox"/>
MICROALB/CR	None	0	N		<-Delete <-Change					<input type="checkbox"/>
24 HR. URINE PROTEIN	None	0	N		<-Delete <-Change					<input type="checkbox"/>
CREATININE	None	0	N		<-Delete <-Change					<input type="checkbox"/>
POTASSIUM	None	0	N		<-Delete <-Change					<input type="checkbox"/>
FAST GLUCOSE	None	0	N		<-Delete <-Change					<input type="checkbox"/>
MONOFIL. EXAM	None	0	N		<-Delete <-Change					<input type="checkbox"/>
FOOT EXAM	None	0	N		<-Delete <-Change					<input type="checkbox"/>
<b>Lipid Panel Tests</b>										
HDL	None	0	N		<-Delete <-Change					<input type="checkbox"/>
LDL	None	0	N		<-Delete <-Change					<input type="checkbox"/>
CHOLESTEROL	None	0	N		<-Delete <-Change					<input type="checkbox"/>
TRIGLYCERIDES	None	0	N		<-Delete <-Change					<input type="checkbox"/>
<b>Liver Function Tests</b>										
ALT	None	0	N		<-Delete <-Change					<input type="checkbox"/>
AST	None	0	N		<-Delete <-Change					<input type="checkbox"/>
<b>Other Tests</b>										
ECHO	None	0	N		<-Delete <-Change					<input type="checkbox"/>
LVEF	None	0	N		<-Delete <-Change					<input type="checkbox"/>
EKG	None	0	N		<-Delete <-Change					<input type="checkbox"/>
CARD. STRESS TEST	None	0	N		<-Delete <-Change					<input type="checkbox"/>
PERF. IMAGING	None	0	N		<-Delete <-Change					<input type="checkbox"/>
DX CARD. CATH.	None	0	N		<-Delete <-Change					<input type="checkbox"/>
Save						Print		Patient Information		Encounter/Visits

If you click the print button, the system will display the screen shown below. This screen allows you to print a listing of all lab and diagnostic test records for the given patient. The report will be printed showing all the patient's labs in wither test type or test date order.

**Lab Report Options**

Please Select the Reporting Sequence That You Wish to Order Lab Data By

Sequence:  ▼

Click the Proceed Button to Continue

Back Proceed

Button sets on the lab screen are at both top and bottom for easy navigation back to the other data entry screens within the registry.

### Batch Data Uploading from EMR

For practices that have an EMR in-house that has export ability, we provide a method within the registry to upload batches of data to drastically reduce the amount of duplicate data entry. We provide a simple record layout that can be easily entered into any EMR export program. These periodic files of patient data and lab results can then be bulk uploaded into the registry. Once a file is uploaded, an audit report is generated that details the error records encountered during the update. In all cases, if a record already exists matching the uploaded record, the newer record replaces the old values. If no match is found, a new record is generated into the table.

The following screens show the upload process and the audit report selection and sample.

**Upload Batch File**

**Batch Record Update Audit Report: 1/1/2001 - 1/20/2006**

Date: 12/8/2005 File Name: VHRTESTPATS-ERRORS.CSV  
Clinic Number: 123456  
Clinic Name: ABC Clinic  
From: VHR Administrator Central Processing Hub

**3 Record(s) Rejected**  
**1 Record(s) Updated Properly**

**\*\*\* THE RECORD BATCH IMPORTED CONTAINED ERRORS AS SHOWN BELOW.  
PLEASE MAKE THE APPROPRIATE CORRECTIONS AND RESUBMIT THIS RECORD BATCH. \*\*\***

Patient	File Type	Rec	Fld	Value	Message
	Patient				- 1 Missing Clinic Cds - 1 Missing Patient Cds - 1 Missing DOB
111901	Patient	2	clinic cd	Empty	
0	Patient	3	Patient cd	Empty	
149601	Patient	4	DOB	Empty	

Date: 12/8/2005 File Name: VHRLABS12\_07\_05.CSV  
Clinic Number: 123456  
Clinic Name: ABC Clinic  
From: VHR Administrator Central Processing Hub

**3 Record(s) Rejected**  
**1 Record(s) Updated Properly**

**\*\*\* THE RECORD BATCH IMPORTED CONTAINED ERRORS AS SHOWN BELOW.  
PLEASE MAKE THE APPROPRIATE CORRECTIONS AND RESUBMIT THIS RECORD BATCH. \*\*\***

Patient	File Type	Rec	Fld	Value	Message
	Lab				- 1 Missing Clinic Cds - 1 Missing Patient Cds - 1 Missing Lab Dates
117701	Lab	1	Test Date	Empty	
0	Lab	3	Patient cd	Empty	
149601	Lab	4	clinic cd	Empty	

Print Go Back

## Fully Automated EMR Updating

For larger EMR users, where there are multiple providers within the same clinic, we suggest using our fully automated update option. This option fully interfaces our registry with the particular EMR. For example, we built an interface with Allscripts that accepts data from the EMR not only for patient and lab tables, but also for the complete set of encounter and visit data as well. We accept detailed medication prescription data and provide look-ups to properly match these medications with the registry medication groups. The clinics using this automated interface update their registry data twice a month, on the first and 15<sup>th</sup> of the month. It should be noted that there is additional programming charges for assistance in setting the initial interface for this option.

## The Power of the Registry – Reporting Options

The real power of the registry is within its flexible reporting options. There are four basic reporting groups that comprise the main reporting options – DM reporting, CVD reporting, Hypertension Reporting and Summary Analysis Reporting.

## DM Reporting Options

The diabetes reporting options are a series follow-up “tickler” type reports that analyze the current status of the individual practice’s diabetic population. Each report has numerous reporting options that a practice can specify each time a report is run.

For example, suppose a practice wishes to start helping its diabetics reduce their A1C values. They can request a list of all diabetics whose last A1c is over 9. A report is generated containing the patient name and phone number and the last test result. This is then used to call patients into the office for counseling on how to reduce their A1c level. Once that list is completed, a new list can be drawn, requesting all patients with A1c over 8, and so on. This stepped approach allows the practice to drill down into their population without having to pull a file or search through folders.

**DM Report Selection Options**  
Clinic # 123456: ABC CLINIC  
(Please select a report that you would like run)

--PLEASE CHOOSE ONE OF THE REPORTING OPTIONS BELOW--

- DM 1 DM Patients With No Visits Within The Last XX Days
- DM 2 DM Patients With Last HbA1C Value Over XXX
- DM 3 DM Patient With No HbA1c In Last XX Days
- DM 4 DM Patients With Pre-Post HbA1C Change >=1
- DM 5 DM Patient's Smoking Status
- DM 6 DM Patients With No Self-Management Goal In Last XX Days
- DM 7 DM Patients With No Lipid Tests In Last XX Days
- DM 8 DM Patient's Last Blood Pressure >[Systolic] Or <[Diastolic]
- DM 9 DM Patients Last LDL Value Over XXX
- DM10 DM Patients With No Dental Exam Within The Last XX Days
- DM11 DM Patients With No Retinal Exam Within The Last XX Days
- DM12 DM Patients With No Foot Check Exam Within The Last XX Days
- DM13 DM Patients With No MicroAlb/Creat Within Last XX Days
- DM14 DM Patients With No Flu Vaccination Within Last XX Days
- DM15 DM Patients With No Pneumonia Vaccination Within The Last XX Days
- DM16 DM Patients With No Diabetes Education Within The Last XX Days
- DM17 DM Patients With No Nutrition Education Within The Last XX Days
- DM18 DM Patients With No Depression Screen Within The Last XX Days
- DM19 DM Patients With Last BMI >= YY Within Last XX Days
- DM20 DM Patients With Next Visit Date Before XX Days

Please select one of the DM reports from the selection list to the left. Enter your report parameters below, then click the Proceed button to view or print the selected report.

All PCP's    Specific PCP (Choose One)  
 Never Had Test

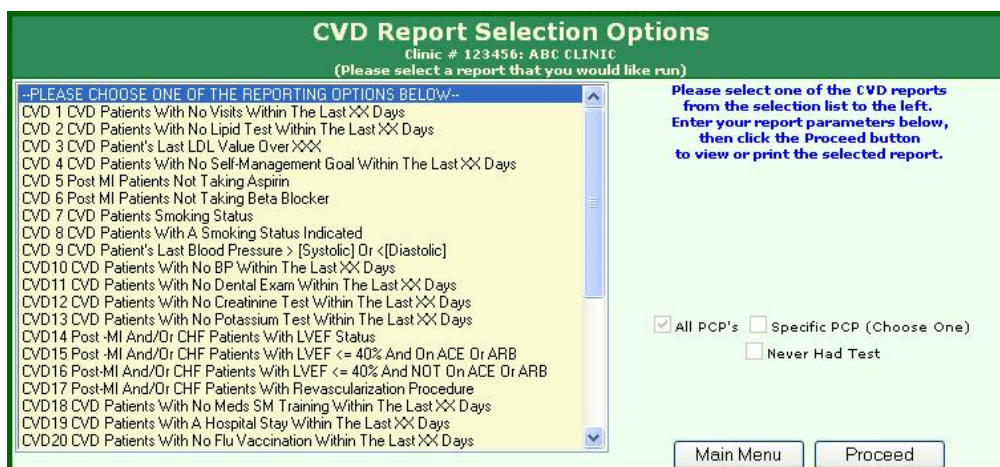
Main Menu   Proceed

This reporting option has been enhanced to allow you to view information for all primary care physicians within the clinic, or to select a specific PCP. There are 26 diabetes-specific reports that you can select. All reports refer to the latest lab value or exam a patient has on file. The reports are as follows:

1. **DM Patients with No Visits Within the Last XX Days**
2. **DM Patients with Last HbA1c Value Over.**
3. **DM Patients with No HbA1c in the Last XX Days.**
4. **DM Patients with Pre-Post HbA1c  $\geq$  1**
5. **DM Patients Smoking Status**
6. **DM Patients with No Self-Management Goal In the Last XX Days**
7. **DM Patients with No Lipid Tests Within the Last XX.**
8. **DM Patients with Last Blood Pressure Above XX Systolic Value or Below YY Diastolic**
9. **DM Patients Last LDL Value Over XX**
10. **DM Patients with No Dental Exam Within the Last XX.**
11. **DM Patients with No Retinal Exam Within the Last XX.**
12. **DM Patients with No Foot Check Exam Within the Last XX**
13. **DM Patients with No MicroAlb/Creat Within the Last XX.**
14. **DM Patients with No Flu Vaccination Within the Last XX**
15. **DM Patients with No Pneumonia Vaccination Within the Last XX**
16. **DM Patients with No Diabetes Education Within the Last XX**
17. **DM Patients with No Nutrition Education Within the Last XX**
18. **DM Patients with No Depression Screen Within the Last XX**
19. **DM Patients with Last BMI  $\geq$  XX Within the Last YY**
20. **DM Patients with Next Visit Date Before XX Days**
21. **DM Patients  $\geq$  40 Years Old and Not Taking.**
22. **Listing of All DM Patients With Metabolic.**
23. **Listing of All DM Patients With Microalbuminuria.**
24. **DM Patients with No Monofilament Exam Within the Last XX**
25. **DM Patients with High Foot Risk Not Seen Within the Last XX.**
26. **Listing of All DM Patients With Last Fast Glucose Between 100 and 125**

### **CVD Reporting**

Clicking the CVD Reporting button on the main menu allows the end user to print or view a set of cardiovascular disease-specific reports that displays information in real-time. This follows the same rules as the DM Report Options discussed earlier. Each report option displays its own report options to the right of the report selection. This report selection form is shown below:



This reporting option allows the user to view information for all primary care physicians within your clinic, or to select a specific PCP. There are 34 diabetes-specific reports that the end user can select. All reports refer to the latest lab value or exam a patient has on file. These reports are as follows:

1. **CVD Patients with No Visits Within the Last XX .**
2. **CVD Patients with No Lipid Tests Within the Last XX.**
3. **CVD Patient's Last LDL Value Over XX**
4. **CVD Patients with No Self-Management Goal Within the Last XX Days.**
5. **Post-MI Patients Not Taking Aspirin .**
6. **Post-MI Patients Not Taking Beta Blocker**
7. **CVD Patients Smoking Status**
8. **CVD Patients with a Smoking Status Indicated**
9. **CVD Patient's Last Blood Pressure Above XX Systolic Value or Below YY Diastolic Value**
10. **CVD Patients with No BP Within the Last XX Days.**
11. **CVD Patients with No Dental Exam Within the Last XX Days .**
12. **CVD Patients with No Creatinine Test Within the Last XX Days.**
13. **CVD Patients with No Potassium Test Within the Last XX Days.**
14. **Post-MI and/or CHF Patients with LVEF Status.**
15. **Post-MI and/or CHF Patients with LVEF <=40% and on ACE or ARB**
16. **Post-MI and/or CHF Patients with LVEF <=40% and Not on ACE or ARB**
17. **Post-MI and/or CHF Patients with Revascularization Procedure**
18. **CVD Patients with No Meds SM Training Within the Last XX Days.**
19. **CVD Patients with A Hospital Stay Within the Last XX Days.**
20. **CVD Patients with No Flu Vaccination Within the Last XX Days**
21. **CVD Patients with No Pneumonia Vaccination Within the Last XX Days**
22. **CVD Patients with No CVD Education Within the Last XX Days**
23. **CVD Patients with No Nutrition Education Within the Last XX Days**
24. **CVD Patients with No Depression Screen Within the Last XX Days**
25. **CVD Patients with Last BMI >= XX Within the Last YY Days**
26. **CVD Patients Whose Next Visit Date Is Before XX**

27. Listing of all CAD Patients
28. Listing of all PVD Patients
29. Listing of all CVA Patients
30. Listing of all Post-MI Patients.
31. Listing of all CHF Patients.
32. Listing of all CVD Patients with Metabolic Syndrome.
33. Listing of all CVD Patients with Microalbuminuria.
34. Listing of all CVD Patients with Last Fast Glucose Between 100 and 125

## Hypertension Reporting

Clicking the Hypertension Reporting button on the main menu allows the end user to print or view a set of hypertension-specific reports that displays information in real-time. This follows the same rules as the DM and CVD Report Options discussed earlier. This form is shown below:

**Hypertension Report Selection Options**  
Clinic: ABC CLINIC  
(Please select a report that you would like run)

--CHOOSE ONE--  
HYP1: Without DM Or Renal Disease  
HYP2: Without DM Or Renal Disease With BP < 140/90 And 2 Or More Visits  
HYP3: Without DM Or Renal Disease With BP >= 140/90 And 2 Or More Visits  
HYP4: With DM Or Renal Disease  
HYP5: With DM Or Renal Disease With BP < 130/80 And 2 Or More Visits  
HYP6: With DM Or Renal Disease With BP >= 130/80 And 4 Or More Visits  
HYP7: With DM Or Renal Disease With BP < 130/80  
HYP8: Without DM Or Renal Disease With BP < 140/90  
HYP9: With DM Or Renal Disease With BP < 130/80 -OR- Without DM Or Renal Disease...  
HYP10: Newly Diagnosed With A Series Of Lab Tests Within First 6 Months Of Diagnosis  
HYP11: Newly Diagnosed Missing Certain Lab Tests Within First 6 Months Of Diagnosis  
HYP12: With DM Or Renal Disease With BP > 130/80  
HYP13: Without DM Or Renal Disease With BP > 140/90  
HYP14: Without Diabetes Or Renal Disease Who Has Not Had A Visit Within XX Days  
HYP15: With Diabetes Or Renal Disease Who Has Not Had A Visit Within XX Days

Please Select A Reporting Option

Please select one of the hypertension reports from the selection list to the left. Click the Proceed button below to generate the selected report.

Optional: Please Select A Practitioner

Within the Last # of Days: 00

Never Had Test or Visit

Main Menu Proceed

There are 15 hypertension-specific reports that you can select. All reports refer to the latest lab value or exam a patient has on record. The reports are as follows:

1. **Patients with Hypertension and without Diabetes or Renal Disease .**
2. **Patients with Hypertension and without Diabetes or Renal Disease with a BP < 140/90 and 2 or More Visits within the Last 12 Months –.**
3. **Patients without Diabetes or Renal Disease with a BP >= 140/90 and 2 or More Visits within the Last 12 Months**
4. **Patients with Hypertension and with Diabetes or Renal Disease.**
5. **Patients with Hypertension and with Diabetes or Renal Disease with a Blood Pressure Below 130/80 Who Have Had 2 or More Visits within 12 Months.**
6. **Patients with Hypertension and with Diabetes or Renal Disease with a Blood Pressure Equal or Above a Systolic of 130 and/or Diastolic of 80 Who Have Had 4 or More Visits within 12 Months**
7. **Patients with Hypertension and with Diabetes or Renal Disease with Blood Pressure Below 130/80.**

8. **Patients with Hypertension and without Diabetes or Renal Disease with Blood Pressure Below 140/90**
9. **Patients with Hypertension with Diabetes or Renal disease with Blood Pressure Below 130/80 and Patients with Hypertension and without Diabetes and Renal Disease with Blood Pressure Below 140/90**
10. **Newly Diagnosed Patients with Hypertension with Urinalysis, Blood Glucose, Hematocrit, Lipid Panel, Serum Potassium, TSH, Creatinine and Calcium Done within the First 6 Months of Diagnosis.**
11. **Newly Diagnosed Patients with Hypertension and Missing Urinalysis, Blood Glucose, Hematocrit, Lipid Panel, Serum Potassium, TSH, Creatinine or Calcium within the First 6 Months of Diagnosis.**
12. **All Patients with Hypertension and Diabetes or Renal Disease with a Blood Pressure Greater Than 130/80.**
13. **All Patients with Hypertension and without Diabetes or Renal Disease with a Blood Pressure Greater Than 140/90.**
14. **Patients with Hypertension and without Diabetes or Renal Disease Who Has Not Had a Visit within XX Days**
15. **Patients with Hypertension and with Diabetes or Renal Disease Who Has Not Had a Visit within XX Days.**

## Summary and Analytical Reporting

Clicking the Standard Reporting button on the main menu allows the end user to periodically run a set of standardized summary reports. The form is shown below:

**Standard Report Selection Options**  
Clinic: ABC CLINIC  
(Please select a report that you would like run)

-CHOOSE ONE-

- SR 1 Practice Summary Report
- SR 2 Practitioner Summary Report
- SR 3 HbA1c Testing
- SR 4 HbA1c Control
- SR 5 LDL Testing
- SR 6 LDL Control
- SR 7 Blood Pressure Control
- SR 8 Self Management Goal Setting
- SR 9 Aspirin Or Other Antithrombotic Agent Treatment
- SR10 ACE Inhibitor Or ARB Medication
- SR11 Statin Medication
- SR12 Smoking Cessation - Documented Status
- SR13 Smoking Cessation - Offered Cessation Help
- SR14 Dilated Eye Exam
- SR15 Foot Exam
- SR16 Microalbuminuria Screening

Please Select A Reporting Option

Please Select A Practitioner

Please select one of the standard reports from the selection list to the left. Select either DM or CVD where applicable. Click the Proceed button below to generate the selected report.

DM  CVD

Main Menu Proceed

## The Practice Summary Reporting

The Practice Summary Report and Practitioner Summary Report will calculate and display data in real-time for the individual clinic. A sample of the two pieces of the Practice Summary Report are shown below:

Monthly Practice Summary Report For Clinic: 123456 BSI TEST CLINIC		Month: June, 2005	
Demographics, Visit Data and Medications			
<b>1. Patient Information</b>		<b>11. Encounter/Visit Information</b>	
174	529 a. Registry & # of Visits	1	0.57% a. Diabetes Type 1
5	2.87% b. Pats w/ 0 Visits	168	96.55% b. Diabetes Type 2
49	28.16% c. Pats w/ 1-2 Visits	0	0.00% c. Diabetes Type Other
115	66.09% d. Pats w/ 3-5 Visits	0	0.00% d. Dyslipidemia
5	2.87% e. Pats w/ 6+ Visits	0	0.00% e. Metabolic Syndrome
<b>2. Gender</b>		1	0.57% f. Hypertension
89	51.14% a. Female	0	0.00% g. Micro Albuminuria
85	48.85% b. Male	1	0.57% h. Nephropathy
0	0.00% c. Unspecified	0	0.00% i. Neuropathy
<b>3. Age</b>		0	0.00% j. Retinopathy
0	0.00% a. Age Unspecified	0	0.00% k. CAD
0	0.00% b. <=14	0	0.00% l. Post-MI
19	10.91% c. 15-44	0	0.00% m. PVD
65	37.35% d. 45-64	0	0.00% n. CVA
90	51.72% e. >=65	1	0.57% o. CHF
<b>4. Ethnicity</b>		0	0.00% p. NYHA Class
152	87.36% a. White	1	0.57% q. Depression
2	1.15% b. Black	1	0.00% r. High Foot Risk
0	0.00% c. American Indian	0	0.00% s. Family Hx CHD
3	1.72% d. Asian	0	0.00% t. Family HX CM
7	4.02% e. Hispanic	2	1.14% u. Self-Monitors BG
10	5.75% f. Other/Unspecified	1	0.57% v. Avg. Exercise/Wk
<b>5. Insurance</b>		67	38.51% wa. Non Smoker
79	45.40% a. Insurance Indicated	53	30.46% wb. Present
30	17.24% b. Commercial	21	12.07% wc. Past
17	9.77% c. Medicaid	33	18.97% wd. Unknown
21	12.07% d. Medicare	0	0.00% x. Daily weighing
10	5.75% e. Other	<b>13a. Referrals and Education</b>	
17	9.77% f. None	1	0.57% a. DM Education
<b>6. Special Population</b>		0	0.00% b. CVD Education
1	0.57% a. Migrant	1	0.57% c. Self-Mgmt Goals
3	1.72% a. Homeless	1	0.57% d. Nutrition Education
<b>7. BMI</b>		3	1.71% e. Dental Exams
172	98.85% a. BMI Calculated	0	0.00% f. Retinal Exams
83	48.26% b. <=24	0	0.00% g. Smoke Cessation
77	44.77% c. 25-29	0	0.00% h. Podiatry Refer
12	6.97% d. >=30	0	0.00% i. Depression Scrn.
<b>8. Blood Pressure</b>		0	0.00% j. Sub. Abuse Scrn.
168	96.55% a. Pats w/ BP Checked	0	0.00% k. Med. SM Training
136	72 b. Avg. Sys & Avg. Dia	0	0.00% l. Cardiac Rehab
52	29.88% c. Pats BP >= 135/85	<b>13b. Vaccinations</b>	
12	6.89% d. Pats BP >= 140/90	1	0.57% m. PPV12
49	28.16% e. Pats BP < 135/85	0	0.00% n. Flu Vaccination
		<b>13c. Hospitalizations and Procedures</b>	
		0	0.00% o. Hospitalization
		0	0.00% p. Coronary Artery
		0	0.00% q. Carotid Endarterectomy
		0	0.00% r. Periph. Vasc. Proc.
		0	0.00% s. Other Revasc.
<b>12. Medications</b>		2	1.14% a. Insulin
0	0.00% b. Sulfonylureas	0	0.00% c. Biguanide/metformin
0	0.00% d. TZD/glitazone	0	0.00% e. Glitinides
0	0.00% f. ACE Inhibitor/acarbose	1	0.57% f. AG Inhibitor/acarbose
59	33.90% g. ACE Inhibitor	0	0.00% h. ARB
0	0.00% h. ARB	5	2.87% i. ASA/antiplatelet
1	0.57% j. Warfarin	1	0.57% j. Warfarin
0	0.00% k. Beta Blocker	0	0.00% k. Beta Blocker
0	0.00% l. Diuretic	0	0.00% l. Diuretic
0	0.00% m. Other BP med	0	0.00% m. Other BP med
0	0.00% n. Statins	0	0.00% n. Statins
0	0.00% o. Niacin	0	0.00% o. Niacin
0	0.00% p. Fibrates	0	0.00% p. Fibrates
0	0.00% q. Other Lipid Med	0	0.00% q. Other Lipid Med
0	0.00% r. Calcium Antagonist	0	0.00% r. Calcium Antagonist
0	0.00% s. Nitroglycerine	0	0.00% s. Nitroglycerine
0	0.00% t. Nitrates	0	0.00% t. Nitrates
0	0.00% u. Hydralazine	0	0.00% u. Hydralazine
0	0.00% v. Antiarrhythmic	0	0.00% v. Antiarrhythmic
0	0.00% w. Digoxin	0	0.00% w. Digoxin
0	0.00% x. Spironolactone	0	0.00% x. Spironolactone
0	0.00% y. Smoke Cess. Meds	0	0.00% y. Smoke Cess. Meds
0	0.00% z. Anti-Depressant	0	0.00% z. Anti-Depressant

Run Date: 6/13/2005

[\[view lab tests\]](#)

Page 1 of 2

Print

Close Report

Monthly Practice Summary Report For Clinic: 123456 BSI TEST CLINIC		Month: June, 2005
Laboratory Tests		
<b>14. HbA1c</b>		
166	a. Patients with Test	
7,9940	b. Avg. HbA1c	
65	39.15% c. < 7.0	
37	22.28% d. 7.0 to 7.9	
28	16.86% e. 8.0 to 8.9	
19	11.44% f. 9.0 to 9.9	
23	13.85% g. 10+	
30	18.07% h. 9.5	
<b>15. Microalb/Cr</b>		
51	a. Patients w/ Test	
31	60.78% b. Normal (<=30)	
20	39.22% c. Abnormal (>30)	
<b>16. Creatinine</b>		
24	a. Patients w. Test	
8	33.33% b. < 1.5	
0	0.00% c. 1.5 - 2.5	
16	66.67% d. > 2.5	
<b>17. ALT</b>		
0	a. Patients w/ Test	
0.00	b. Avg. ALT	
<b>18. AST</b>		
0	a. Patients w/ Test	
0.00	b. Avg. AST	
<b>19a. Cholesterol</b>		
8	a. Patients w/ Test	
192.78	b. Avg. Cholesterol	
5	62.50% c. >= 200	
<b>19b. Triglycerides</b>		
4	a. Patients w/ Test	
203.26	b. Avg. Triglycerides	
3	75.00% c. >= 200	
<b>19c. HDL</b>		
6	a. Patients w/ Test	
37.67	b. Avg. HDL	
3	50.00% c. < 35	
<b>19d. LDL</b>		
166	a. Patients w/ Test	
143.43	b. Avg. LDL	
34	20.48% c. < 100	
32	19.27% d. 100-129	
108	65.06% e. >=130	
66	39.75% e. <130	
<b>20. 24 Hr. Urine Protein</b>		
0	a. Patients w/ Test	
0.00	b. Avg. Urine Protein	
<b>21. Potassium</b>		
0	a. Patients w/ Test	
<b>22. Fast Glucose</b>		
163	93.67% a. < 100 Normal	
6	3.44% b. 100-125 Pre Diabetic	
5	2.87% c. > 125 Diabetic	
<b>23. ECHO</b>		
0	a. Patients w/ Test	
<b>24. LVEF</b>		
0	a. Patients w/ Test	
<b>25. EKG</b>		
0	a. Patients w/ Test	
<b>26. Cardio Stress Test</b>		
0	a. Patients w/ Test	
<b>27. Perfusion Imaging</b>		
0	a. Patients w/ Test	
<b>28. Dx Cardiac Cath.</b>		
0	a. Patients w/ Test	
<b>29. Monofilament Exam</b>		
0	a. Patients w/ Test	
<b>30. Foot Exam</b>		
0	a. Patients w/ Test	
Run Date: 6/13/2005		Page 2 of 2
<a href="#">[view demographic, visit, and medication data]</a>		
<input type="button" value="Print"/> <input type="button" value="Close Report"/>		

### Annualized Measurement Reporting

The monthly graphic reports within the standard report option allow the clinic to see a given measurement reporting element for their clinic in real-time for the current month, compared against point-in-time (first of the month) benchmarks for all clinics within the hospital service area registry covering the last 12 months.

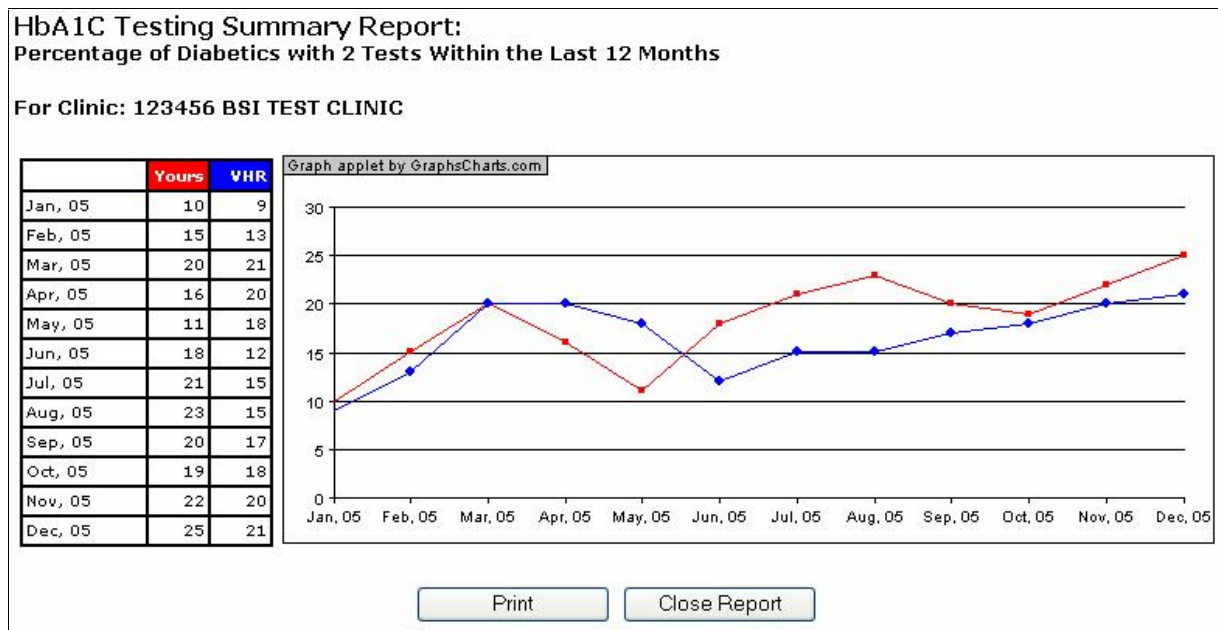
The annualized tables and graphs include:

- HBA1C Testing
- HBA1C Control
- LDL Testing
- LDL Control
- Blood Pressure Control
- Self-Management Goal Setting
- Aspirin Treatment

# Button Systems, Inc.

- ACE / ARB
- Statins
- Smoking Cessation
- Dilated Eye Exam
- Foot Exam
- Microalbuminuria Testing

A sample of the graphic summary reports is shown below:



## Other Reporting Options Within the Registry

Over time, providers have requested various specific reports that assist them in their chronic disease population management. Here is a brief view of these individual report modules:

### Medication Usage

**Medication Usage Analysis Report**  
Clinic # 123456: ABC CLINIC

This Report Will List All Patients Within Your Clinic Who Have A Current Prescription For The Medication That You Select.

Please Select A Medication To Be Analyzed

Medication To Be Analyzed:

Click the Print Button to Run This Report

Main Menu      Print

**ANTIARRHYTHMIC USAGE ANALYSIS REPORT**  
For Clinic 123456: ABC Clinic

The following patients have a current prescription for Antiarrhythmic:

PID	Patient Name	Last A1c	Result	Last LDL	Result	Last Fast. Gl.	Result	Last Micro Alb. On	Result
1	BOB ZA	2/24/2006	7.5	2/26/2006	0			2/26/2006	10
12345	JOHN A. DOE								
112234	AMERICAN B. IDOL	4/3/2006	7	4/6/2006	301	4/3/2006	130	4/3/2006	10
334455	CYRUS JORDAN								
78952436	ROSEY CHEEKS								

Run Date: 1/25/2007 Vermont Health Record

### Excel Export Options

**Excel Export Program**

THIS PROGRAM WILL ALLOW YOU TO SELECT A POPULATION WITHIN YOUR PATIENTS AND THEN SELECT A FORMAT YOU WOULD LIKE CREATED INTO AN EXCEL SPREADSHEET THAT CAN BE SAVED TO YOUR LOCAL HARD DRIVE

**Population To Select This Time:**

- All Patients (Default)
- Diabetic Patients Only
- Cardiovascular Patients Only

**Format To Create:**

- Mailing Info Only (Name and Address Only)
- Full Diabetic Information Format
- Full Cardiovascular Information Format

### Patient RX Profile

**Patient Rx Profile Report**  
Clinic # 123456: ABC CLINIC

This Report Will Print A Listing Of All Medication Classes That A Patient Is On In Addition To The One That You Select.

Please Select A Medication Class To Be Analyzed

Medication Class To Be Analyzed:

Click the Print Button to Run This Report

### **HSA Summary Reporting**

The following provides an overview of the scope and format for the monthly reporting for an HSA within the registry for diabetes and cardiovascular diseases. On a monthly basis, the registry back office system generates a set of Excel spreadsheets that report the activity within a predefined HSA. Each spreadsheet would contain multiple worksheets that summarize the detailed statistics for diabetes and cardiovascular diseases for that HSA, comparing all its practices on the one sheet for a wide variety of measures and demographics. This single Excel sheet per month provides a complete picture of the HSA practices and how they are doing with each of the important chronic disease elements. Some current users use these statistics to plot progress of each practice over time and pay out quarterly bonuses to the most improved practices as an incentive bonus.

The registry creates a predefined Excel workbook for each HSA containing a series of 5 worksheets:

1. Patient Demographic Information
2. Vital Readings and Current Medications
3. Encounter / Visit Data – Chronic Conditions
4. Education Programs and Referrals
5. Lab Test Results

For each section within a worksheet, there is a series of counts or percentages that apply to each practice that is within the practice group. For example, within the education and referral worksheet, each type of referral is listed, and each practice would have the percentage of patients that have had this referral within the past year. The total would show the average percentage for all practices, allowing the reader to compare the actual percentages for each practice to the overall average.

### **Conclusion - The BSI Advantage**

We believe that Button Systems offers distinct advantages for this project both in its experience in the subject matter and in the unique way our company works. We are submitting this proposal because of the strong fit between our experience and the project's requirements.

Button Systems has a proven ability to design and implement custom, scalable web-based information applications. We have developed and deployed centralized consumer database systems containing inquiry, referral, order, billing, and outcomes data related to consumers. We are familiar with the complexity of designing such systems using Microsoft Internet development tools and a variety of server database frameworks.

Button Systems has modeled itself differently from other consulting firms -- both in our structure and in the way we approach projects. We manage our growth judiciously, and select projects where we can succeed and provide real help to clients. We place a very high value on our relationship with our clients and on helping them to succeed in their missions. Our success is derived through continual communication and teamwork with our clients, and this participation has been critical in our success.

## Button Systems, Inc.

---

Button Systems is built around a simple model of providing very high quality expertise and experience in its staff, while maintaining an unusually streamlined overhead structure, which keeps our costs low for the industry. We have developed a cost effective resource model in everything from staff to office space, and so are able to offer an expert team for the projects we do. We maintain an active network of affiliations and partnerships with other management and consulting vendors.

In conclusion, we at BSI offer customized and flexible technology, proven abilities in an area we know well, excellent responsiveness, and we do so at a very competitive cost. We thank you for your consideration.