Community Reception Center
Electronic Data Collection Tool (CRC eTool)
Deployment Guide

Version 1.3

12/08/2017

Version History

Version #	Implemented By	Revision Date	Comments
1.0	Sachin Agnihotri	04/07/2017	Version 1.0 of the document
1.1	David Nitschke	09/07/2017	Updates from clearance review
1.2	Ekta Choudhary	10/4/2017	Updated for eClearance
1.3	Sachin Agnihotri	11/08/2017	Additional analysis content added
1.3	David Nitschke	1/11/2018	Documentation cleared 12/08/2018; Removed draft notifications and watermarks

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1 Introduction

1.1 Purpose

In an emergency, the Community Reception Center Electronic Data Collection Tool (CRC eTool) allows authorized data collectors at community reception centers (CRCs) to enter data securely on the web. This document instructs information technology (IT) personnel how to configure the system on web and database servers.

1.2 Audience

The audience for this document includes system administrators, database administrators, and IT personnel who will be configuring the system on web and database servers.

2 System Description

2.1 Key Features

The CRC eTool enables the following functionalities on the web:

- **Web enablement:** Enables organization epidemiologists to design data collection forms in Epi Info™ 7 on the web and mobile devices.
- **Quick response time:** Can be immediately accessible via web or mobile to everyone involved in data collection during a public health event
- **Multiuser data collection:** Allows data collection by multiple users at the same time.
- **Centralized data management:** Collects and manages data in a single database.
- **Enterprise database integration:** Is configured to write data on radiation exposure in real time to Epi Info™ SQL Server database on the network used by community reception centers
- **Analysis distribution:** Can be accessed using Epi Info™ 7 or Epi Info™ Web Analytics and Visualization for real time analytics.

- **Role based access:** Enables only authorized users role-based access to the system for data collection.

2.2 Inventory

The deployment package consists of a compressed folder structure with the following parts:

1) ApplicationAndServices
2) Database
3) Documents
4) EpiInfoWebSecurity
5) CRCUtility
6) EpiInfo

2.3 Environment

Below is a list of hardware and software requirements and operational activities needed to deploy the CRC eTool.

Hardware:

- Web server: Windows 7/ Windows 10 Enterprise machine or Windows Server 2012 R2. This system has been tested only on a Windows 7 machine acting as the server.
- Database server: Windows 7/ Windows 10 Enterprise machine or Windows Server 2012 R2
- Wireless router to create wireless network
- Gigabit switch with number of ports necessary to support multiple clients (for backup in case clients cannot connect to wireless network)
- Ethernet cables to connect all the clients via the gigabit switch if they cannot connect to the web server via wireless network or if the size of the location of the CRC is so distributed which results in a weak wireless signal on client machines.

Note: For running the CRC system, we recommend configuring both web server and database server on the same machine.

Software:

- Web server:
  - Internet Information Services (IIS) 7.0/7.5/8.0/8.5

        - .NET 4.5
        - ASP.NET MVC 4
    - Database server
        - SQL Server 2012 (Use the free “SQL Express” OR your enterprise license to configure the database server.)

https://www.microsoft.com/en-us/download/details.aspx?id=29062

    - SMTP server
        - SMTP server is not required for the system to work, since all functionalities requiring email are preconfigured. If the application works on a network that can send emails, the SMTP server can be configured or the SMTP server settings can be provided in the application.
    - Epi Info™ Web Security
        - Epi Info™ Web Security utility is included in the installation package and can be installed on the machine configured to work as database and web server. The package comes preconfigured with default connection strings. If the SQL Server is not installed with default settings, Epi Info™ Web Security utility will be required to create correct connection strings.

Operational Activities:

- A system engineer / IT engineer with administrative access on the server machine configures the application on the web server (IIS).
- A system engineer / database administrator with administrative access on the server machine configures the database on the database server.

Note: ASP.NET MVC 4 is the version of ASP.NET MVC framework recommended to run the application. To enable IIS on the server machine, the IT administrator must enable all components needed to run an ASP.NET application, including common HTTP features, HTTP logging, static content compression, request filtering, .NET Extensibility 3.5/4.5, ASP.NET 3.5/4.5, ISAPI extensions and filters, and IIS Management Console. The document IIS-Installation-508.pdf provided as an appendix can be used as reference.

2.4 System Operations

The system will be used for

- collecting data using CRC eTool,
- managing the collected data using CRC eTool, and
- accessing the collected data for a SQL Server form directly in Epi Info™ for additional data management tasks or analysis using Visual Dashboard.

Ensure the machine acting as the server has sufficient memory and CPU to support web server traffic for the duration of the CRC data collection effort.

2.5 System Architecture

The CRC eTool is developed using the Epi Info™ Cloud Data Capture product and has the following components:

- **Epi Info™ Cloud Data Capture manager service**: This web service can
    - securely publish a data collection form from the Epi Info™ 7 **Form Designer**,
    - store meta-data for creation of the database, and
    - securely downloads the collected data to the Epi Info™ 7 **Enter** module for an Epi Info™ Access-based project OR immediately makes the data available for an Epi Info™ SQL Server-based project when automation is enabled.
- **Epi Info™ Cloud Data Capture web application**: The web application lets authorized users collect and manage data.
- **Epi Info™ Cloud Data Capture data service**: The data service provides the web application with the meta-data to render the data collection form, as well as collect and manage data.
- **Epi Info™ Cloud Data Capture database**: The system uses a relational database to manage
    - organizations and users within organizations,
    - data collection forms published by the organizations, and
    - data entered by authorized users.

The diagram below summarizes these components and their interactions.

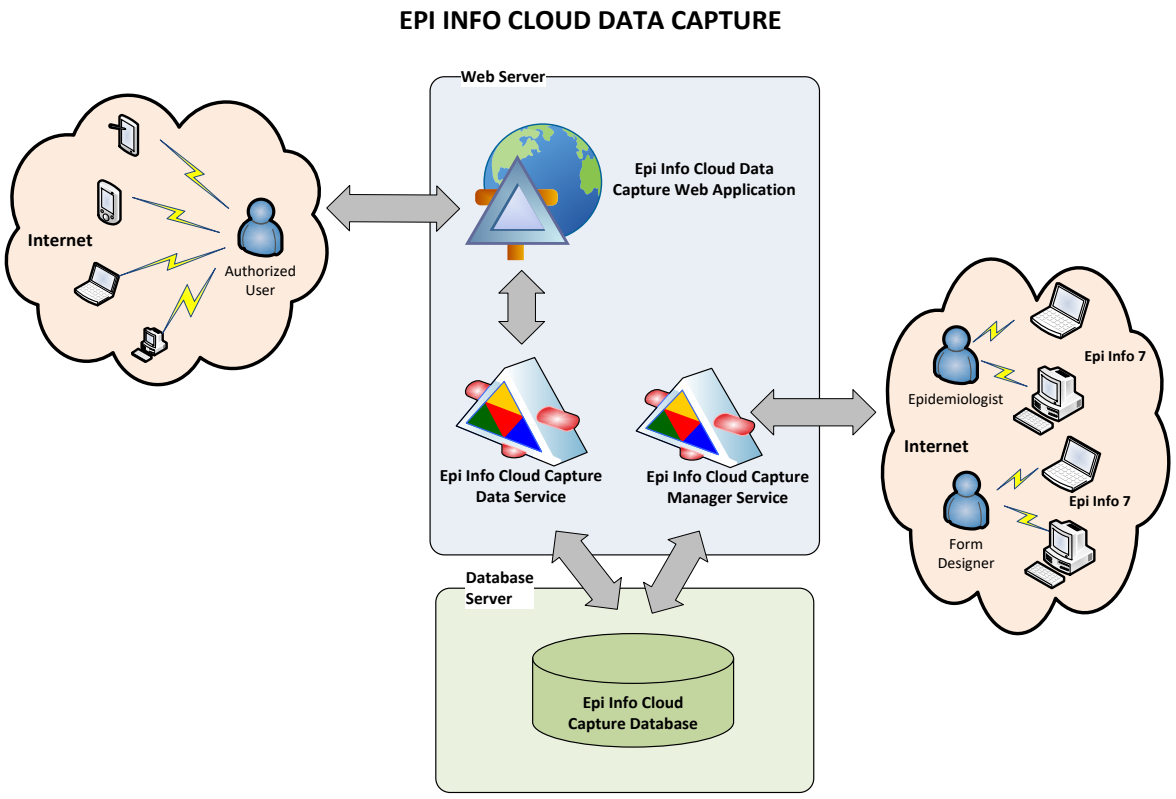

Figure 1: Overview of CRC eTool

2.6 Deployment Architecture

The CRC eTool is configured for electronic data collection during an emergency using a wireless (Wi-Fi) network or a local area network (LAN).

This deployment guide describes the steps to deploy the system. In summary, the deployment process begins when you configure a machine to act as the web server and database server. You will use a Windows laptop or a Windows Server for the machine being configured. You will configure a database server (SQL Server) and a web server (IIS) on the machine. Next, you will create the application database on the database server and configure the web application on the web server. Finally, you will create a network using a router by enabling a wireless network (Wi-Fi) or a local area network (LAN) with the server and the client machines connected to the server in a wireless or wired configuration.

The diagram below shows the layout of a wireless network with the clients communicating to the server over the Wi-Fi network enabled by the router.

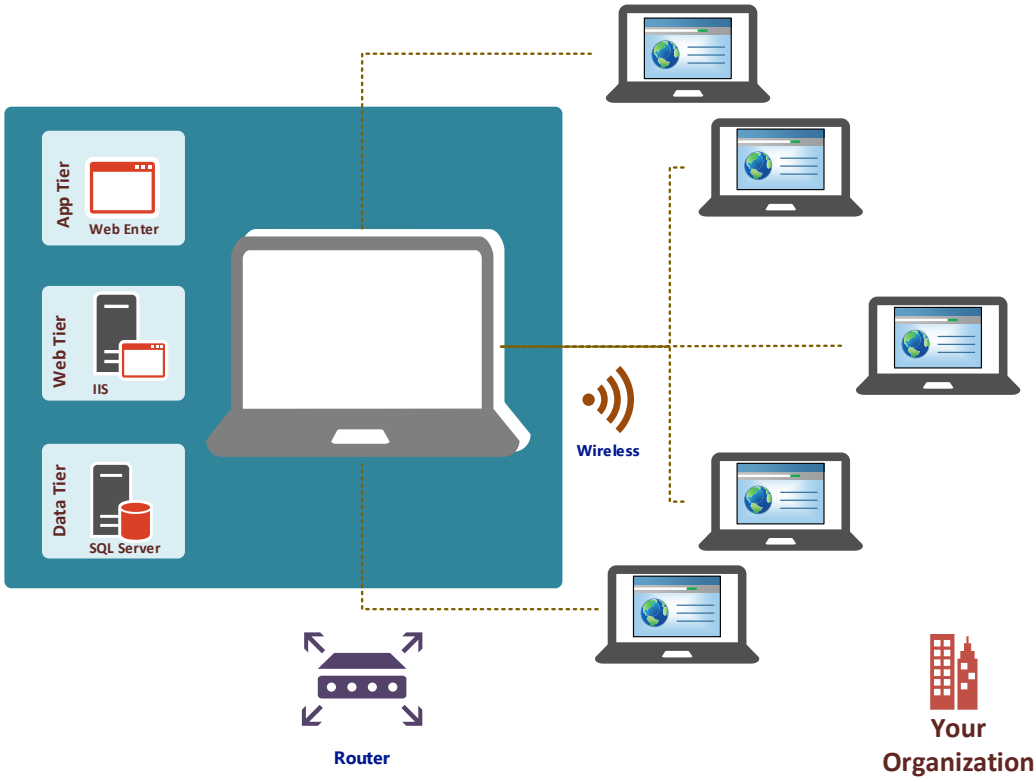

Figure 2: CRC eTool in wireless network configuration

The diagram below shows the layout of a wired network with the clients communicating to the server through Ethernet cables connected to the switch and the router.

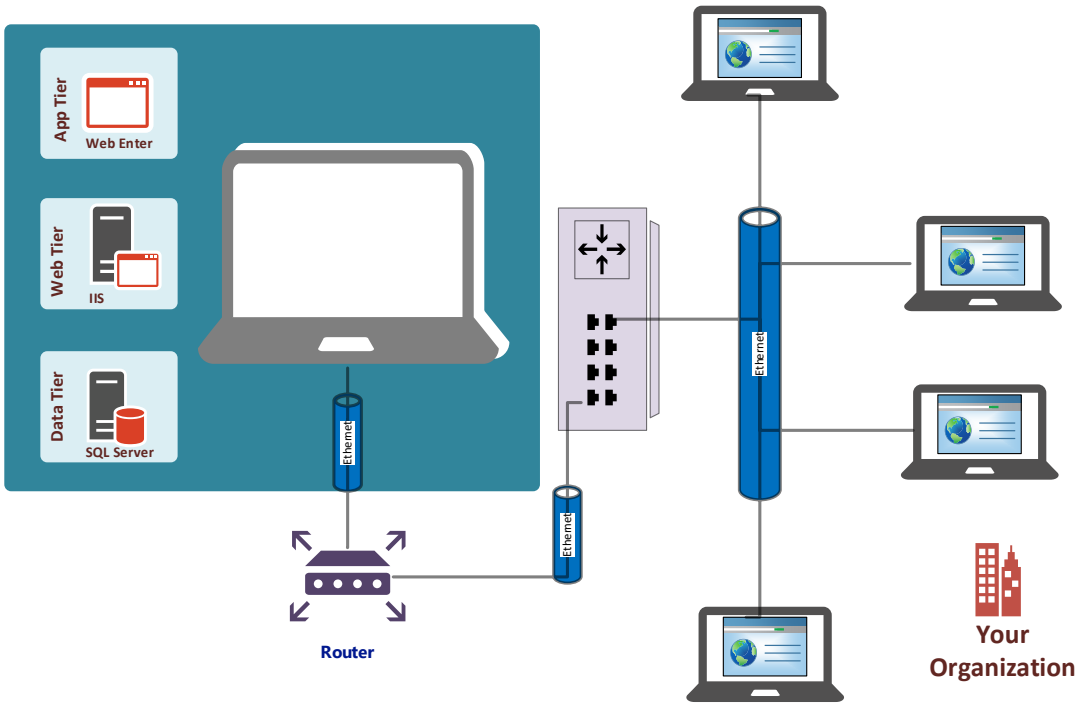

Figure 3: CRC eTool in wired network configuration

3 Application Installation

The CRC eTool uses the Epi Info™ Cloud Data Capture product. The system can be used during an emergency with or without access to the Internet. Below is an overview of the application installation process, which the rest of the document describes in detail.

The installation package consists of two databases that are preconfigured to work with the web application. On the database server, you will configure these databases and an application account to access them from the web application.

You will configure the web application on the web server. The application comes preconfigured with connection strings to access the databases, provided database (SQL Server) is installed in default configuration and needed databases are created as per instructions.

Next, you will perform a test of the connection string for application connectivity to the database.

If the connection string test is not successful, you will use the Epi Info™ Web Security utility to update the connection string of the application and then the connection string of the CRC Utility.

After the application connectivity test is successful, you will update the incident code and site number using the CRC Utility.

You will start the system to confirm that the data entry form is accessible on the web server

Finally, you will create a wired or wireless network as needed to enable data entry from client machines.

3.1 First-Time Users

The CRC eTool has preconfigured security keys used by a cryptographic algorithm. The security keys are used to encrypt the

- database connection string in web.config file,
- user passwords in the database. and
- other sensitive information in the database.

The package is provided with the above information preconfigured to reduce deployment complexity. If the system does not work after configuration, reconfigure the connection string using Epi Info™ Web Security utility. More information on Epi Info™ Web Security utility can be found in **Epi-Info-Web-Security-Utility-Help-508.pdf** provided in the installation package.

3.2 Access Controls

3.2.1 Database

If you are creating and configuring the databases, you should have full administrative access on the database server and rights and privileges to create a database, create database users, and grant access to the database.

3.2.2 Application and Services

If you are installing and configuring the application and services, you should have administrative access on the web server and should have full access and privileges to create a web application in IIS.

3.3 Installation

Install the application and services using the **EpiInfoCRC** package. The package includes the following items:

1. the database (**Database** folder)
2. the application and services (**ApplicationAndServices** folder)
3. the required documentation (**Documents** folder)

4. Epi Info™ 7 (**EpiInfo** folder)
5. utility to configure site with incident code and site number (**CRCUtility** folder)
6. the security utility (**EpiInfoWebSecurity** folder).

Section 3.4 (Configuration) describes how to use these items.

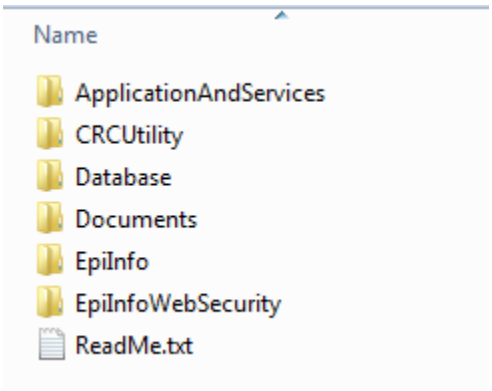

Figure 4: File systems showing components in the EpiInfoCRC package

3.4 Configuration

3.4.1 Database Configuration

The database for this application should be created on the machine/server running SQL Server 2012 database server. This system assumes that no database server already exists on the machine on which you are configuring the web and database server.

Note: Accept the default name **SQLEXPRESS** as the name of the database server during installation. The system is packaged on this assumption. Use the default name, **SQLEXPRESS**, or your deployment will be significantly more complicated. You can see the steps needed for this SQL Server installation in the **SQL-Server-Installation-508.pdf** document, but it is not a full installation guide. It is condensed for this task.

1. Install the database server using the provided 2012 SQL Server Express edition or the licensed version used by your organization. Accept the ***default name*** for the server, which is **SQLEXPRESS**. ***This is the most important step*****,** as all the connection strings shipped with the package rely on the name **SQLEXPRESS**. If you do not accept **SQLEXPRESS** as the server name**,** the connection string used in the package will need updating, which can be a complicated process that will delay operation.

2. Once SQL Server 2012 Express edition has been installed, copy the **EpiInfoCRCDBConfigure** folder to the C:/ drive of the server machine.
3. Open the **EpiInfoCRCDBConfigure** folder on the C:/ drive, and run the **DBConfigure.bat** file. Running the **DBConfigure.bat** file runs the script provided in **DBConfigure.sql** file, which in turn creates **EIWeb_EWE_CRC** and the **EpiInfoCRC** database and application user account on the SQL Server 2012 database.
4. Confirm the databases are configured on the database server with the correct user account (allowing read, write and execute access) by logging onto the database server using the following information:

   Server name: SQLEXPRESS

   Authentication: SQL Server Authentication

   Login: eiweb_appuser

   Password: h74$H4d@m23

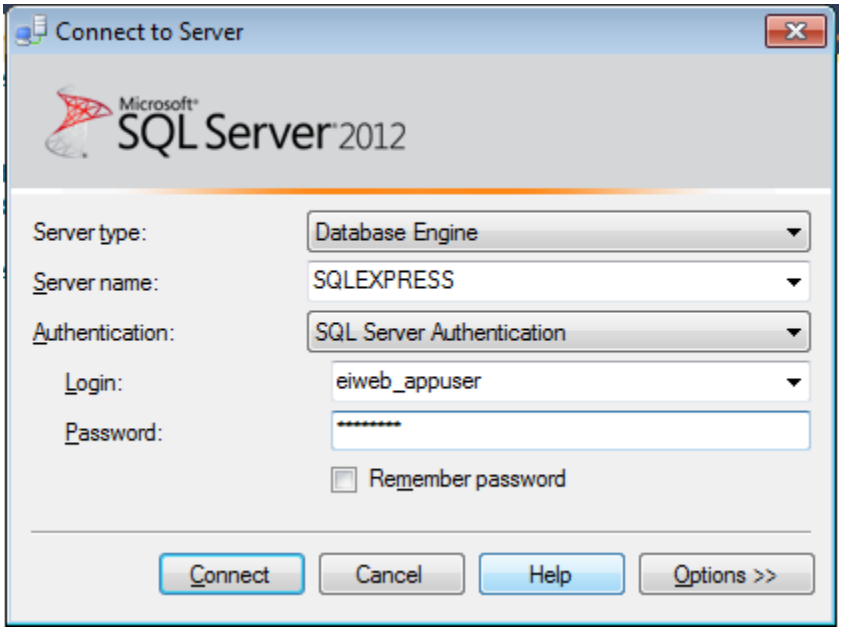

Figure 5: Connect to local SQL Server

5. Upon logging into the database server, you should see two databases: **EIWeb_EWE_CRC** and **EpiInfoCRC**

If you are **unable to log** into the database server using the information provided above, or if upon login using the server administration (**SA**) account, you **cannot see the databases,** then the scripts did not execute as intended, and you will need to create the database manually using the provided database backup files as per the steps below.

1. Log into the database server using either Windows or SQL Server authentication with either Windows account or the server administration (**SA**) account with full DBO privileges.
2. Create **EIWeb_EWE_CRC** database using the **EIWeb_EWE_CRC.bak** file provided in **EpiInfoCRCDBConfigure** folder by using the **Restore Database** option available in the context menu available from **Databases** node, Browse to "**C:\EpiInfoCRCDBConfigure**" folder on the device, and choose **EIWeb_EWE_CRC.bak** file as shown in the screenshot below.

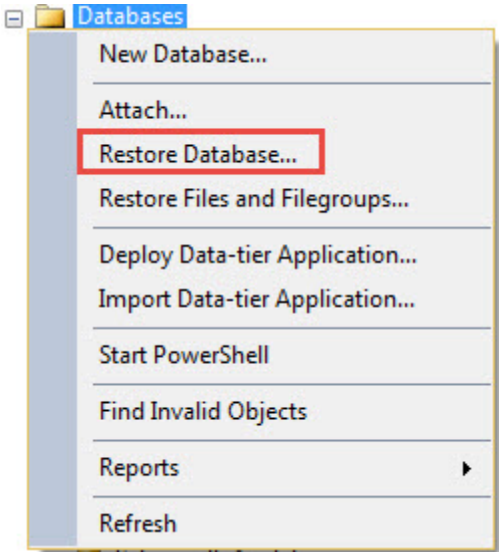

Figure 6: **Restore Database** menu item in SQL Server

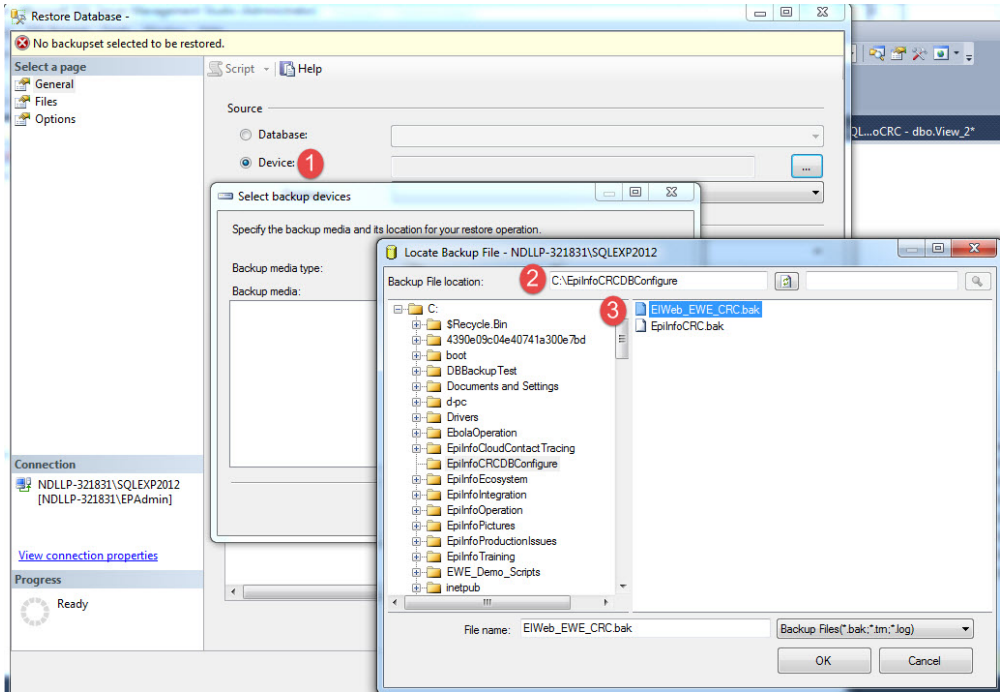

Figure 7: Restore database dialogs in SQL Server

3. Create the **EpiInfoCRC** database using **EpInfoCRC.bak** file provided in the **EpiInfoDBConfigure** folder as you created the **EIWeb_EWE_CRC** database.
4. After creating the database, execute the script provided below to create the database user for the application and granting it all the needed privileges

```
USE [EIWeb_EWE_CRC]
GO
```

```
IF  EXISTS (SELECT * FROM sys.database_principals WHERE name =
N'eiweb_appuser')

DROP USER eiweb_appuser

GO


CREATE LOGIN [eiweb_appuser] WITH PASSWORD=N'h74$H4d@m23',
DEFAULT_DATABASE=[EIWeb_EWE_CRC],
DEFAULT_LANGUAGE=[us_english], CHECK_EXPIRATION=OFF,
CHECK_POLICY=OFF

GO


CREATE USER [eiweb_appuser] FOR LOGIN [eiweb_appuser] WITH
DEFAULT_SCHEMA=[dbo]

GO


GRANT EXECUTE ON SCHEMA :: dbo TO [eiweb_appuser];

GO


EXEC dbo.sp_addrolemember @rolename=N'db_procexec',
@membername=N'eiweb_appuser'

GO


EXEC dbo.sp_addrolemember @rolename=N'db_datareader',
@membername=N'eiweb_appuser'

GO


EXEC dbo.sp_addrolemember @rolename=N'db_datawriter',
@membername=N'eiweb_appuser'

GO


USE [EpiInfoCRC]

GO
```

```
IF  EXISTS (SELECT * FROM sys.database_principals WHERE name =
N'eiweb_appuser')

DROP USER eiweb_appuser

GO


CREATE USER [eiweb_appuser] FOR LOGIN [eiweb_appuser] WITH
DEFAULT_SCHEMA=[dbo]

GO


GRANT EXECUTE ON SCHEMA :: dbo TO [eiweb_appuser];

GO


EXEC dbo.sp_addrolemember @rolename=N'db_datareader',
@membername=N'eiweb_appuser'

GO


EXEC dbo.sp_addrolemember @rolename=N'db_datawriter',
@membername=N'eiweb_appuser'

GO


EXEC dbo.sp_addrolemember @rolename=N'db_ddladmin',
@membername=N'eiweb_appuser'

GO


EXEC dbo.sp_addrolemember @rolename=N'db_owner',
@membername=N'eiweb_appuser'

GO
```

3.4.2 Application and Services Configuration

The application and services configuration documents the steps for configuring the CRC eTool on the IIS. The administrator is responsible for configuring the machine/server to install IIS with all necessary components.

Note: **IIS-Installation-508.pdf** document shows all the components to enable during IIS installation for the web application to work.

The **EpiInfoCRC** package provides the application to be installed on the web server with all the needed settings preconfigured. The only setting that may need changing is the connection string used by the application, in case the default SQL Server name was not used during SQL Server installation or the password for **eiweb_appuser** account was changed during SQL Server configuration.

The steps below assume that the Epi Info™ Community Reception Center web site is configured as an application under the default web site.

1. Copy the contents of the folder **EpiInfoCRC\ApplicationAndServices** to the **inetpub\wwwroot** folder.
2. Create an application named "**EpiInfoCRC**" in IIS.
3. Make sure that the site is configured to run on an application pool configured to use **.NET 4.0**. You can use one of the default application pools called **DefaultWebSite** or **DefaultAppPool**. This application pool uses a managed pipeline mode of **Integrated**.

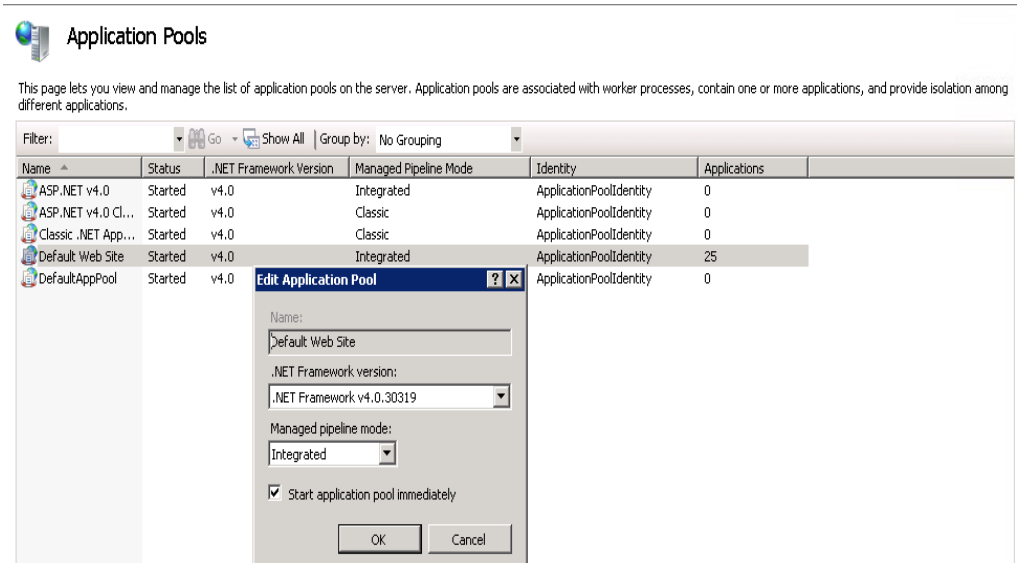

Figure 8: Application pool configured using .NET 4.0

4. Make sure the site uses **Anonymous Authentication**. This is the default setting when the site is configured in IIS. Also enable **Forms Authentication** for the default configuration.

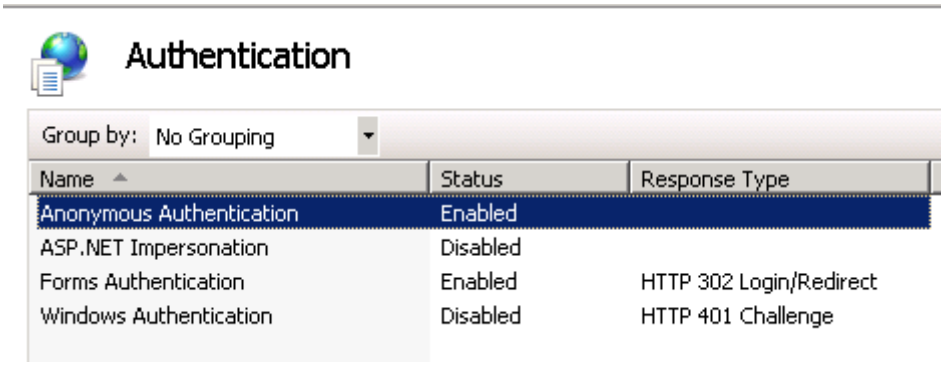

Figure 9: Application configured with **Anonymous Authentication** enabled

This completes the configuration of the **EpiInfoCRC** application on the web server. In the next sections, you will test the system to confirm a successful installation. Tests include a connection string test and starting the system.

3.5 Connectivity Tests

In this section, you will do a database test and an entity connection string test. These tests validate that the web server can communicate with the database server, and that the connection string used by the web application is correct. If either test has an error, then you must update the connection strings and re-run the tests. Section 3.6 explains how to update the connection string.

1. In the URL below, update the SERVER_NAME, highlighted in yellow, with the name of the domain name server (DNS) of the web server where the application is hosted. This is the name of the machine where you are configuring the CRC eTool.

   `http://SERVER_NAME/EpiInfoCRC/EIWST/DataService`

2. Open a browser and copy the updated URL into the browser's address bar.

When you enter the updated URL in the browser, the tests will run. You should see the result shown below which indicates that the database test and entity connection string test are a success.

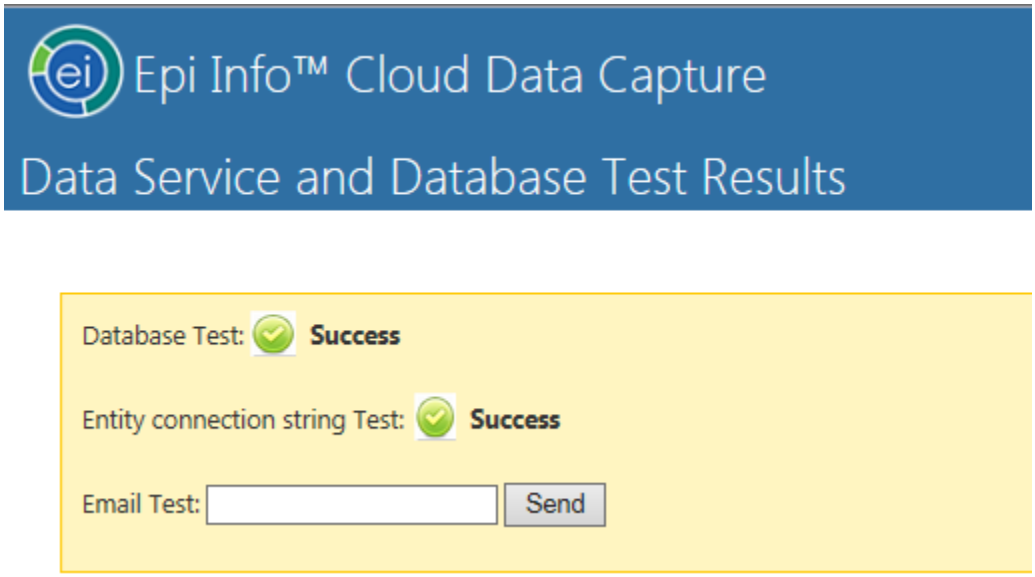

Figure 10: CRC eTool diagnostics view showing status when the connection strings are set up correctly.

3.5.1 Error in database connectivity test

The two tests described above run sequentially. The database test confirms that the web application can communicate with the database server. If this test is successful, then it runs the second test of the entity connection string. A successful database test is a prerequisite for running the entity connection string test. If the database test has an error, this means the application cannot communicate with the database server, so the second test cannot run. In this case, you may see the result shown below which indicates that the database test had an error and the entity connection string test could not be completed.

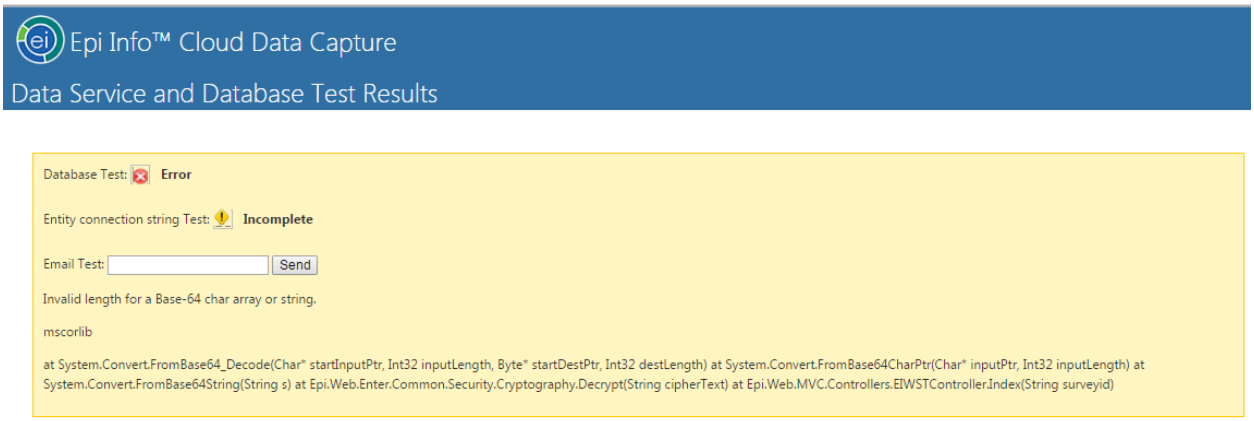

Figure 11: CRC eTool diagnostics view showing status when the application cannot communicate with the database server.

The technical information following the test result describes the cause of error and validates that something is wrong with the connection string.

Go to section 3.6 and follow the steps to update the connection string. After you complete section 3.6, run the test URL again as described at the top of this section 3.5 and confirm the database test is a success.

3.5.2 Error in entity connection string test

If the database test is a success, then the process initiated by the test URL runs the entity connection string test. If the entity connection string test has an error, you will see the result shown below.

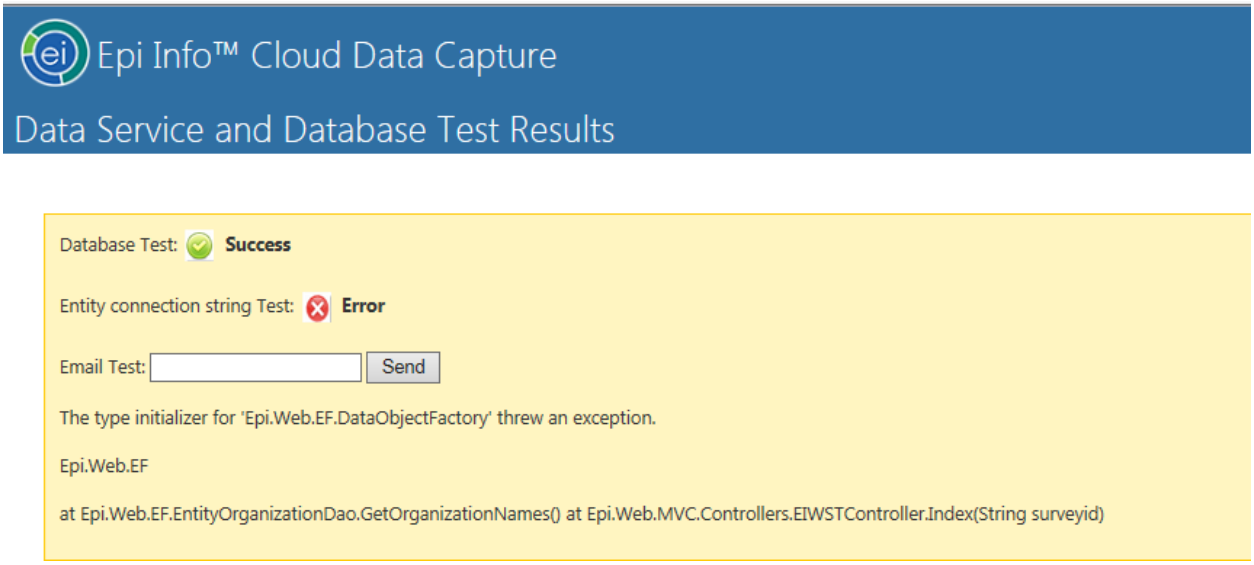

Figure 12: Diagnostics view showing status when the application can communicate with the database server, but an error exists with the entity connection string.

You may get this error if you update the database connection string as described in section 3.6.1, but incorrectly or incompletely updated the entity connection string

as described in section 3.6.2. You may need to repeat section 3.6 to update the connection string. Be sure to use the relevant pieces of the plain text connection string to update the **EWEEntitites** section of the web.config file.

Note: You cannot do an email test unless an SMTP server is available. This application assumes that an SMTP server is not available and the functionality requiring an email account has been preconfigured.

After you complete section 3.6, run the test URL again as described at the top of this section 3.5 and confirm the database test is a success and the entity connection string test is a success. If both are successful, continue with section 3.7 to test running the system.

3.6 Update Connection Strings

This section is only needed if either test in section 3.5 resulted in an error. If both tests are a success, you can skip to section 3.7.

If the database test had an error or the entity connection string test had an error, you will need to update the connection strings. The package comes with a default connection string that should work if the SQL Server was installed with the default configuration. Determine the reason why the default connection string does not work and update the connection string accordingly. Below are possible reasons:

1. If the SQL Server was installed with the default configuration, it used the server name **SQLEXPRESS**. If the SQL Server was installed with a custom configuration and a different server name other than **SQLEXPRESS** was used, then update the data source value where the instructions show DATABASE_SERVER_NAME highlighted in yellow with the custom server name that was used to install the SQL Server.
2. If the databases were not created successfully or were created manually and the password for the **eiweb_appuser** account was changed during database creation, then create the connection string using the updated password.

3.6.1 Update the database connection string

The connection strings are stored in the web.config file as an encrypted series of letters, numbers, and symbols. Since it contains the data needed to initiate a connection to the database and server, it must be encrypted.

This section explains how you will determine the plain text, unencrypted, connection string needed for your setup. Using the **Epi-Info-Web-Security-Help-508.pdf** as a guide, you will encrypt the plain text connection string with the Epi Info™ Web Security utility. Finally, you will use this encrypted connection string in the web.config file.

To update the database connection string, follow the steps below:

1. Determine the connection string needed for your setup. Use the plain text connection string shown below as a guide.

```
Data Source=DATABASE_SERVER_NAME;Persist Security
Info=True;User
ID=APPLICATION_ACCOUNT;Password=PASSWORD_FOR_ACCOUNT;Initial
Catalog=DATABASE_NAME;
```

This connection string has the following placeholders highlighted in yellow that need to be changed to match your setup:

- DATABASE_SERVER_NAME is the name of the database server. If the default configuration was used to install the SQL Server, the server name is **SQLEXPRESS.**
- APPLICATION_ACCOUNT is the name of the user account that the system uses to connect to the database. If the database was configured as described in section 3.4.1, then the application account is **eiweb_appuser**.
- PASSWORD_FOR_ACCOUNT is the password corresponding to the application account. If the database was configured as described in section 3.4.1, then the password for the **eiweb_appuser** account is **h74$H4d@m23**
- DATABASE_NAME: the name of the database on the SQL Server that the system will use. If you created the database as described in section 3.4.1, then the database name will be **EIWeb_EWE_CRC**.

In the plain text connection string shown above, substitute the yellow placeholder text with the values needed for your setup. Below is the plain text connection string included in the package.

```
Data Source=(local)\SQLEXPRESS;Persist Security Info=True;User
ID=eiweb_appuser;Password=h74$H4d@m23;Initial
Catalog=EIWeb_EWE_CRC;
```

2. After determining the plain text connection string needed for your setup, encrypt the connection string using the Epi Info™ Web Security utility. Section 5 of **Epi-Info-Web-Security-Help-508.pdf** describes how to use the utility to do an ad hoc encryption of the connection string.

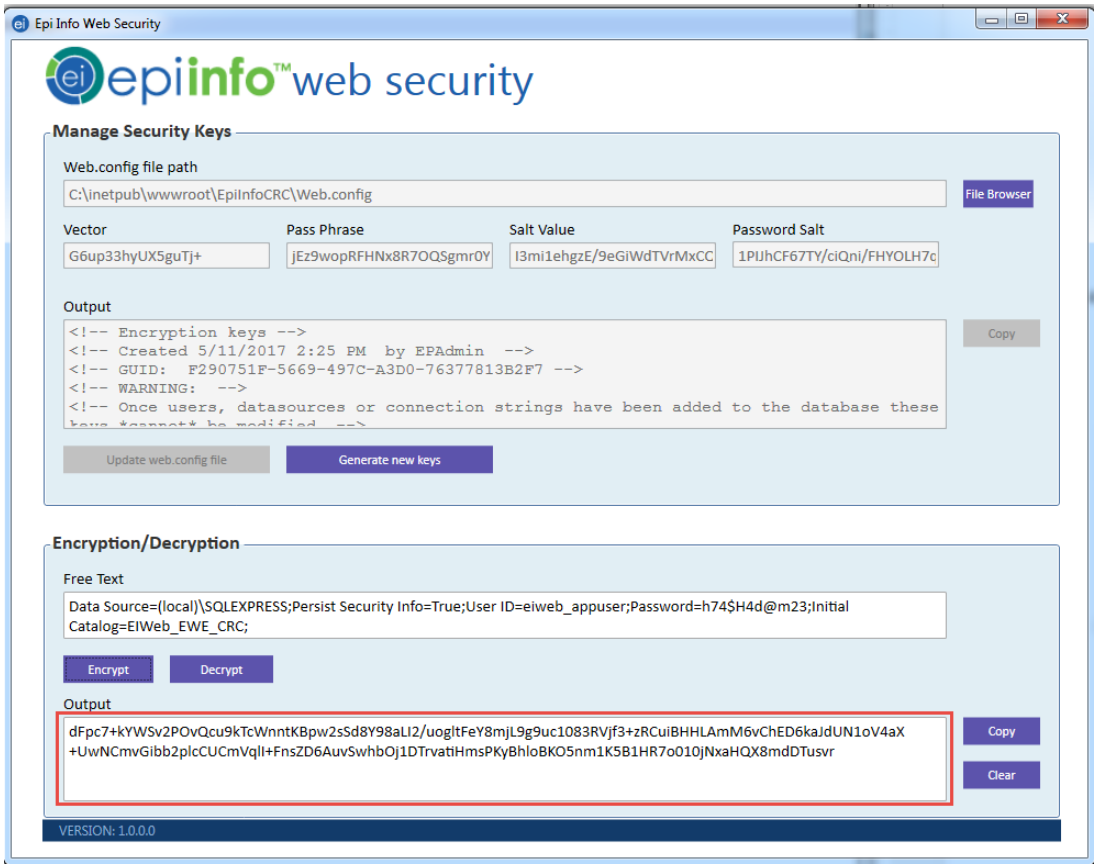

Figure 13: Epi Info™ Web Security utility encrypting connection string.

The default security keys used by the system to encrypt and decrypt needed information are shown below. Use these security keys and do not alter them in any way. The following four keys are packaged in the provided web.config file:

```
<add key="KeyForUserPasswordSalt"
value="1PIJhCF67TY/ciQni/FHYOLH7q+bNajOm3gaHMl34dlYTauD9vBQpfI4
uLM+4sz1t8o1LVVO0y6e9PaGPRkLZpr3d+2ubEmrMuNQihMcxXdOATDkulmiYhj
H8l55mEQEMozPjw==" />

<add key="KeyForConnectionStringPassphrase"
value="jEz9wopRFHNx8R7OQSgmr0Ye6xBb9nPKKDZAydJ6fmp2/jFJPEYDnz33
TQqXz+/qXjoYhWh5QD9MG/BBzDrjAskF2XaJX44LwceZC3yiuR5/CPI013gYuff
EsCPeTuo0VHeqxQ==" />

<add key="KeyForConnectionStringSalt"
value="I3mi1ehgzE/9eGiWdTVrMxCQPWHgkOGVg9mZuIcF1XSnxG6dOOAtnbze
YsrnQHvSD1zh3V1eVBLuypTGP0vNw7lEo6FXCpnICGXy+yNH57i+JnT9MTBZuRc
5BrBbQTPF64vANg==" />

<add key="KeyForConnectionStringVector"
value="G6up33hyUX5guTj+" />
```

Note: In the connection string, the phrases “Data Source”, “Initial Catalog”, “Persist Security Info” and “User ID” all have a single space between the words.

3. Copy the encrypted connection string from the output of the Epi Info™ Web Security utility and paste it into a text file to use in the next step.
4. In a text editor, open the web.config file in the **EpiInfoCRC** folder.

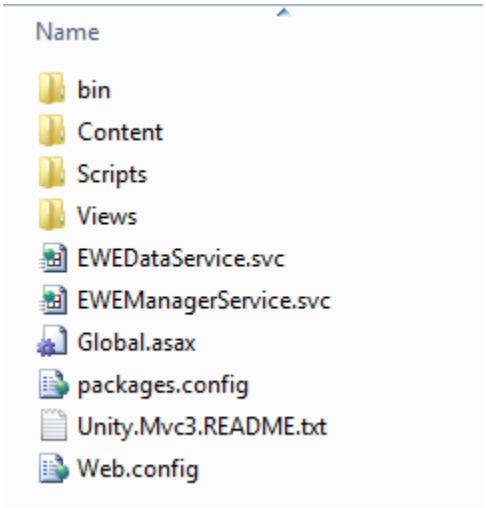

Figure 14: Web.config file for an integrated application

5. In the web.config file, the database connection string is stored with the name **EWEADO**. Locate the text that begins with
" `<add name="EWEADO" connectionString=…` "
The portion that follows “connectionString=” is the actual encrypted connection string that you will update. Replace this with the encrypted connection string you saved to the text file in step 3 above. The part to be replaced is highlighted in yellow below. Notice that the encrypted connection string is contained within quotes.

```
<add name="EWEADO" connectionString="
dFpc7+kYWSv2POvQcu9kTcWnntKBpw2sSd8Y98aLI2/uogltFeY8mjL9g9uc1083RVjf3+zRCuiBH
HLAmM6vChED6kaJdUN1oV4aX+UwNCmvGibb2plcCUCmVqlI+FnsZD6AuvSwhbOj1DTrvatiHmsPKy
BhloBKO5nm1K5B1HR7o010jNxaHQX8mdDTusvr"/>
```

6. After the **EWEADO** connection string is updated, use the test URL in from section 3.5 to test and confirm that the database connection string is valid.

3.6.2 Update the entity connection string

After validating the database connection string as described in section 3.5, create the entity connection string. The entity connection string points to the web application database.

1. Determine the entity connection string needed for your setup. Use the plain text connection string shown below as a guide.

```
metadata=res://*/Epi.Web.Model.csdl|res://*/Epi.Web.Model.ssdl|
res://*/Epi.Web.Model.msl;provider=System.Data.SqlClient;provid
er connection string= 'Data Source=DATABASE_SERVER_NAME;Initial
Catalog=DATABASE_NAME;Persist Security Info=True;User
ID=APPLICATION_ACCOUNT;Password=PASSWORD_FOR_ACCOUNT
;MultipleActiveResultSets=True'
```

This connection string has the same placeholders highlighted in yellow as described in last section and need to be changed to match your setup:

- DATABASE_SERVER_NAME is the name of the database server. If the default configuration was used to install the SQL Server, the server name is **SQLEXPRESS.**
- APPLICATION_ACCOUNT is the name of the user account that the system uses to connect to the database. If the database was configured as described in section 3.4.1, then the application account is **eiweb_appuser**.
- PASSWORD_FOR_ACCOUNT is the password corresponding to the application account. If the database was configured as described in section 3.4.1, then the password for the **eiweb_appuser** account is **h74$H4d@m23**
- DATABASE_NAME: the name of the database on the SQL Server that the system will use. If you created the database as described in section 3.4.1, then the database name will be **EIWeb_EWE_CRC**.

In the plain text connection string shown above, substitute the yellow placeholder text with the values needed for your setup. Below is the plain text connection string included in the package.

```
metadata=res://*/Epi.Web.Model.csdl|res://*/Epi.Web.Model.ssdl|
res://*/Epi.Web.Model.msl;provider=System.Data.SqlClient;provid
er connection string="Data Source= (local)\SQLEXPRESS;Initial
Catalog=EIWeb_EWE_CRC;Persist Security Info=True;User
ID=eiweb_appuser;Password=
h74$H4d@m23;MultipleActiveResultSets=True"
```

Note:

- The entire block, starting from **metadata** and ending with **=True'** comprises the connection string. Use the complete string provided above and not just the part that says “connection string.”
- The connection string part is wrapped in double quotes. In other words, the phrase **connection string=** is followed by an opening double quote and the closing double quote is at the end of the connection string part following **=True** .
- Copying this connection string from the PDF document to your chosen editor may create additional spaces at line breaks which makes the application unable to communicate with the database. In particular, please note that there

are no spaces in the three metadata element strings which are separated by a vertical bar or pipe symbol (**|**) as shown in Figure 15.

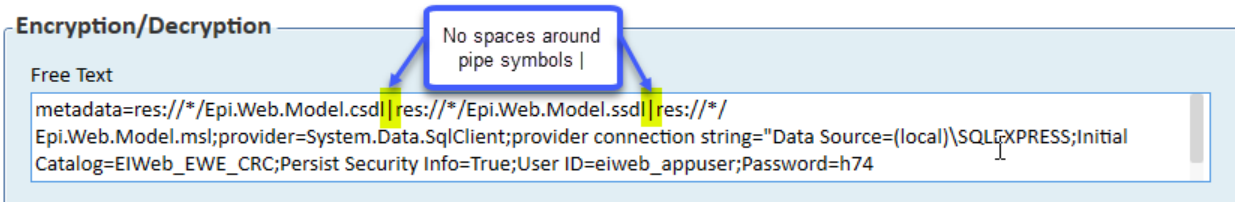

Figure 15: Ensure no extra spaces are added when copying from a PDF.

- In the connection string, the phrases **Data Source**, **Initial Catalog**, **Persist Security Info**, and **User ID** all have a single space between the words.

2. After determining the plain text connection string needed for your setup, encrypt the connection string using the Epi Info™ Web Security utility. Section 5 of **Epi-Info-Web-Security-Help-508.pdf** describes how to use the utility to do an ad hoc encryption of the connection string.
3. Copy the encrypted connection string from the output of the Epi Info™ Web Security utility and paste it into a text file to use in the next step.
4. In a text editor, open the web.config file in the **EpiInfoCRC** folder.

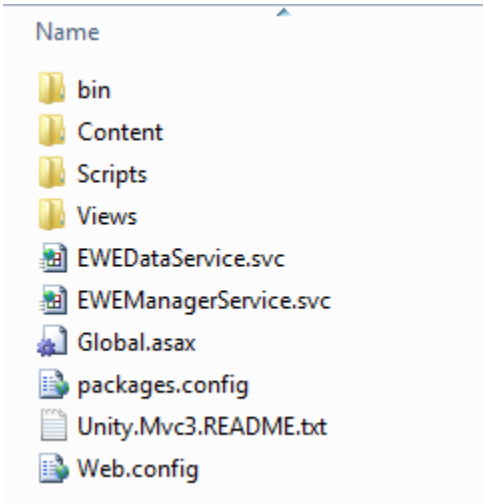

Figure 16: Web.config file for an integrated application

5. In the web.config file, the entity connection string is stored with the name **EWEEntities**. Locate the text that begins with
   `<add name="EWEEntities" connectionString=… "`
   The portion that follows "connectionString=" is the actual encrypted connection string that you will update. Replace this with the encrypted connection string you saved to the text file in step 3 above. The part to be replaced is highlighted in yellow below. Notice that the encrypted connection string is contained within quotes.

```
<add name="EWEEntities" connectionString="
9w0hu3bgfWowe8GtMYgzr/iYnEJaGWRG4eMh1Rh8Tj3IwTRwun0EAwV6dGUG9NbvwGvekpWGXwTRi
pZabIEbVbqiqHVNn+0efWj0i5JXtBlekIBMK1uVMo0FXr2Re2JJFQ21rx0igB3L9z8goKKQkoFC4H
7THyPKzI78VbfHAus/L3ibAbAAaQf1gf8keiphIIvtgda+2twG7e670Bhjz63Kjf1oGkYdCcn4vBT
2WErLah/weAJfAiT9OKmdm+JzH2j6KAC//Ggz5QZ/R/G43dLI40DnSU5ULZv1LwZse7xnlK3shmuo
//VEA6Oi8bEkztyjqhUo0Hp6Du5OV/SXDuqGludxkM26ubqm+eSJp96c1dqOC2jr3hR5aCl5WyjBl
60kcLAlqGv9bftrPMuWUeAyDS8fGBvgJdYlisDK2Uc="/>
```

6. After the **EWEEntities** connection string is updated, use the test URL in from section 3.5 to test and confirm that the entity connection string is valid.

3.7 Updating incident code and site number

The system comprises two databases which have a default incident code and site number. We recommend updating both the incident code and site number in the system prior to entering any data. You will do this using the CRC utility.

1. Copy the entire **CRCUtility** folder provided in the **EpiInfoCRC** package to the C:\ drive or the computer desktop.

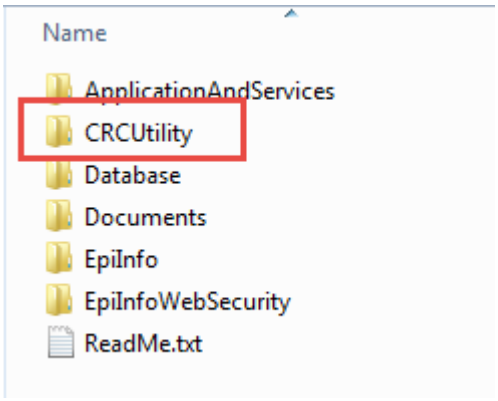

Figure 17: File systems showing **CRCUtilty** component in the **EpiInfoCRC** package

2. If the connection string test for the web application was **successful,** perform step 3 immediately. If the test was **not successful,** perform the steps below to update the connection string of the CRC utility.
   a. Determine the connection string needed for your setup. Use the plain text connection string shown below as a guide.

```
Data Source=DATABASE_SERVER_NAME;Persist Security
Info=True;User
ID=APPLICATION_ACCOUNT;Password=PASSWORD_FOR_ACCOUNT;Initial
Catalog=EIWeb_EWE_CRC;
```

   Notice the name of the database is **EIWeb_EWE_CRC**.

   This connection string has the following placeholders highlighted in yellow that need to be changed to match your setup:

- DATABASE_SERVER_NAME is the name of the database server. If the default configuration was used to install the SQL Server, the server name is **SQLEXPRESS.**
- APPLICATION_ACCOUNT is the name of the user account that the system uses to connect to the database. If the database was configured as described in section 3.4.1, then the application account is **eiweb_appuser**.
- PASSWORD_FOR_ACCOUNT is the password corresponding to the application account. If the database was configured as described in section 3.4.1, then the password for the **eiweb_appuser** account is **h74$H4d@m23**

  In the plain text connection string shown above, substitute the yellow placeholder text with the values needed for your setup. Below is the plain text connection string included in the package.

```
Data Source=(local)\SQLEXPRESS;Persist Security Info=True;User
ID=eiweb_appuser;Password=h74$H4d@m23;Initial
Catalog=EIWeb_EWE_CRC;
```

b. After determining the plain text connection string needed for your setup, encrypt the connection string using the Epi Info™ Web Security utility. Section 5 of **Epi-Info-Web-Security-Help-508.pdf** describes how to use the utility to do an ad hoc encryption of the connection string.

Note: In the connection string, the phrases “Data Source”, “Initial Catalog”, “Persist Security Info” and “User ID” all have a single space between the words.

c. Copy the encrypted connection string from the output of the Epi Info™ Web Security utility and paste it into a text file to use in the next step.

d. Open the **CRCUtility.exe.config** file with a text editor.

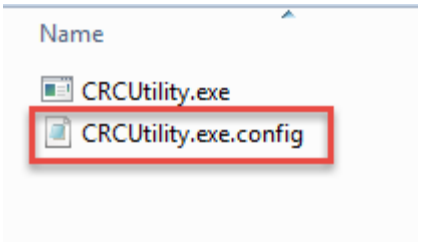

Figure 18: **CRCUtilty** configuration file in **EpiInfoCRC** package

e. In the **CRCUtility.exe.config** file, locate the text that begins with
" `<add name="EIWeb_EWE_CRC" connectionString=…` "
The portion that follows “connectionString=” is the actual encrypted connection string that you will update. Replace this with the encrypted connection string you saved to the text file in step c above. The part to be replaced is highlighted in yellow below. Notice that the encrypted connection string is contained within quotes.

```
<add name="EIWeb_EWE_CRC" connectionString="
dFpc7+kYWSv2POvQcu9kTcTwiHElIg4PZRYEDP2vvmFqiCEnZfDMURxazon0VS5bLGQc4Xr5Ha1Za
zSDqkPUMUjbpQ9VVZLxL2LvV5H3RwMM3+zWF51vdh4TSmQ7gZoWJKNlkg/gQJixI6NDOn2jc9Ieh3
h11Ku92ciEqta0oazy20QOcZNEo0IW2fx9FTwb"/>
```

f. Save the changes to the **CRCUtility.exe.config** file.

g. Create another connection string by replacing the value of the text highlighted in yellow with the appropriate value in the plain text connection string provided below.

```
Data Source=DATABASE_SERVER_NAME;Persist Security
Info=True;User
ID=APPLICATION_ACCOUNT;Password=PASSWORD_FOR_ACCOUNT; Initial
Catalog=EpiInfoCRC;
```

Notice the name of the database is **EpiInfoCRC**.

h. Encrypt the connection string using Epi Info Web Security utility.

i. In the **CRCUtility.exe.config** file, locate the text that begins with "`<add name="EpiInfoCRC" connectionString=…`" The portion that follows "connectionString=" is the actual encrypted connection string that you will update. Replace this with the encrypted connection string you saved to the text file in step c above. The part to be replaced is highlighted in yellow below. Notice that the encrypted connection string is contained within quotes.

```
<add name="EpiInfoCRC" connectionString="
dFpc7+kYWSv2POvQcu9kTcWnntKBpw2sSd8Y98aLI2/uogltFeY8mjL9g9uc1083RVjf3+zRCuiBH
HLAmM6vChED6kaJdUN1oV4aX+UwNCnL245BD6KKa5B4AEK8YblORLlJylryIGkGmxbCfR6FqFIW8W
fKfJLikHNvG/KbjK1C2YKJNPYNg9BK6CaC9Ryd"/>
```

j. Save and close the updated CRCUtility.exe.config file.

3. Double click the **CRCUtility.exe** to launch the utility.

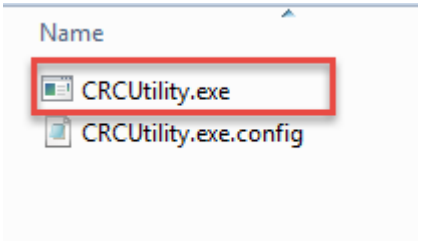

Figure 19: CRCUtilty executable in EpiInfoCRC package

4. Provide the incident code and site number in CRCUtility.

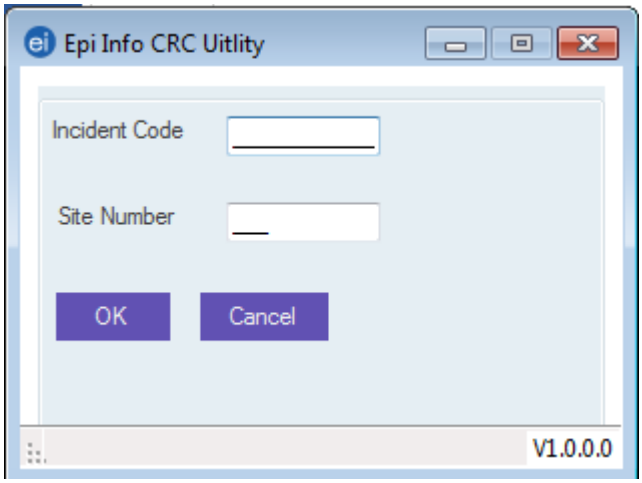

Figure 20: CRCUtilty user interface

5. Click OK to commit the incident code and site number.
6. After receiving confirmation, close the application.

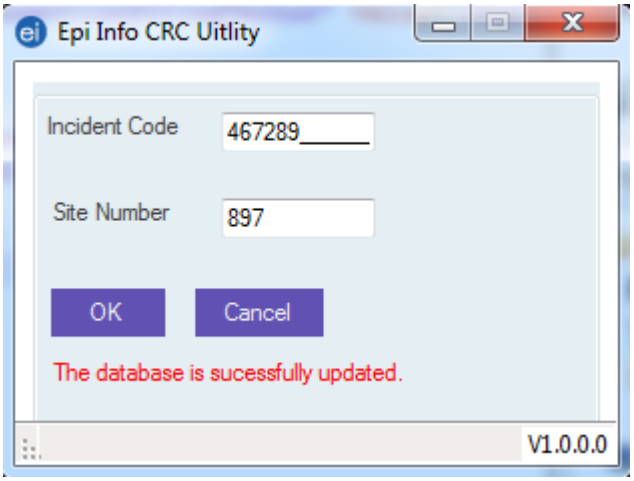

Figure 21: Updating incident code and site number using the CRCUtility

3.8 Starting the System

To start the system, perform the following steps:

1. If the connection string test is successful, navigate to the system's URL on the server machine: `http://<SERVER_NAME>/EpiInfoCRC/Login`
7. Update the <SERVER_NAME> highlighted in yellow in the value for the URL. The server name is the name of the domain name server (DNS) of the web server hosting the application. This is the name of the machine you are using.
2. Enter **admin@crc.gov** in the email text box on the login page.

3. Use the password provided for **admin@crc.gov** in a separate document and log into the system.
4. You will see **CRC_Forms** listed in left-hand navigation.
5. With this system configuration on the web server and database, the server is complete.

3.9 Create network for data collection

During an emergency, if there is no internet connectivity allowing the data entry personnel to reach the web server, you can create a wireless or wired network to enable data entry from client machines using the web application running from the machine configured as the web and database server.

Note: A wired network is more reliable than a wireless network.

3.9.1 Setting up a wireless network

If all the client machines, the server, and the router are in relatively close proximity, such as in a small room, the system should work by creating a wireless network and connecting all the client machines to the wireless network. The speed and reliability of the system is limited by the signal strength. Therefore, the further away the machines are located, the speed of page requests is diminished.

To set up a wireless network, follow these steps:

1. Turn on the wireless router.
2. Connect the server machine to the wireless network enabled by the router before connecting any client machine.
3. Assign a static IP address to the server machine through the administration portal of the wireless router. For example, you can access the admin portal on a Linksys router using **`http://192.168.1.1`**. We recommend assigning a static IP address like **`http://192.168.1.100`**, which will make the site accessible using the following URL from client machines for data entry: **`http://192.168.1.100/EpiInfoCRC/Login`**. If a static IP is not assigned or router is not configured properly, we recommend accessing the server by its machine name, similar to what you did during the connecting string test, i.e. **`http://<SERVER_NAME>/EpiInfoCRC/Login`**.
4. Connect the client machine that will be used for data entry to the wireless network.
5. From the client machines, connect to CRC system with a Chrome, Firefox, or Internet Explorer browser using the URL configured for the application in step 3. The site works best in Chrome. If you use Internet Explorer, you may need to turn off compatibility mode for the site to render properly.
6. Provide each of the client machines a unique username and password from the preconfigured user accounts.

7. Each data entry user can log into the CRC eTool to perform data entry using the username and password provided.

3.9.2 Setting up a wired network

If the server and the client machine are unable to connect to a wireless network or the room is too large, you can create a wired network using the router, gigabit switch, and Ethernet cables.

To create a wired network, follow these steps:

1. Turn on the router.
2. Connect the server machine to the router via an Ethernet cable before connecting any client machine to the network.
3. Assign a static IP address to the server machine through the administration portal of the router. For example, you can access the admin portal on a Linksys router using **`http://192.168.1.1`**. We recommend assigning a static IP address like **`http://192.168.1.100`**, which will make the site accessible using the following URL from client machines for data entry: **`http://192.168.1.100/EpiInfoCRC/Login`**. If a static IP is not assigned or the router is not configured properly, we recommend accessing the server by its machine name similar to what you did during the connecting string test, i.e. **`http://<SERVER_NAME>/EpiInfoCRC/Login`**.
4. Connect the gigabit switch to an available port on the router via an Ethernet cable
5. Connect the client machine that will be used for data entry to the gigabit switch to create a wired network.
6. From a client machine, connect to the CRC system using a Chrome, Firefox, or Internet Explorer browser using the URL configured for the application in step 3.
7. Provide each of the client machines a unique username and password from the preconfigured user accounts.
8. Each data entry user can log into CRC eTool to enter data using a username and password provided.

3.10 Using Epi Info™ to perform analysis (Visual Dashboard)

Epi Info™ Visual Dashboard can be used to analyze the collected data on the server machine. To work with Epi Info™, copy the **Epi_Info_7** package provided in the **EpiInfoCRC/EpiInfo** folder to the desktop or **C:** drive on the server machine.

If the connection string test was successful for the web application without needing to update the connecting string, you should be able to open the Visual Dashboard module and open the packaged dashboard for data analysis. If the connection string test was not successful, you will need to create an updated connection string for the EpiInfoCRC project.

1. To update the connection string, follow the guidance provided in **Make-A-Project-File-508.pdf** referenced in Appendix A: References.
2. Keep the name of the project file the same as the existing file (**EpiInfoCRC.prj**), and save the file to the **EpiInfoCRC** project located at **Epi_Info_7\Epi Info 7\Projects\EpiInfoCRC**.
3. After updating the connection string, navigate to the **Epi_Info_7\Epi Info 7\Projects\EpiInfoCRC** folder and open the **EpiInfoCRC.prj** file in the editor of your choice. Also open the **CRCReport.cvs7** file in the editor.
4. Copy the value of **connectionString** from the **EpiInfoCRC.prj** file and use it to replace the value between the **<connectionString>** and **</connectionString>** tags in the **CRCReport.cvs7** file.

With the correct connection string in place, you can launch the Visual Dashboard module of Epi Info™ 7 to see the preconfigured dashboard.

1. Launch Epi Info™ by clicking on **Launch Epi Info 7.exe** found under **Epi_Info_7** folder.
2. Click **Visual Dashboard** from Epi Info™ 7 main menu to launch the module.
3. Click the **Open** icon (fourth icon in the header).
4. Click **Browse**. In the Open file dialog, navigate to the location where Epi Info™ 7 was copied. Drill down to the Epi Info 7\Projects\EpiInfoCRC folder.
5. Select **CRCReport.cvs7** and click **Open** to open the preconfigured dashboard.

The preconfigured dashboard has been created using pre-identified fields. Below is the list of fields available for analysis and used in creating the dashboard:

CRCForms:

A04d_Age: Table with bars

A04d_Year_Month: Bar graph

A11a_High_Contam: Pie chart

SectionBRadiationContaminationScreeningStation

B05_Contamination_result: Pie chart

SectionDFirstAidStation

D06_FA_Open_Wound_Contam: Frequencey (Table with bars)

D07_FA_Burn_Contam: Frequency (Table with bars)

SectionERegistration

E07_Registrant_Sex: pie chart

E08_Registrant_Pregnant: Bar graph

E16_Registrant_In_Area: Pie chart

E22_Symptom_Fever: Bar graph

SectionFRadiationDoseAssessment

F02_Risk: Bar graphs

SectionGDischarge

G01a_Post_CRC: Bar graph

If you have different analysis needs, a new dashboard can be created using one of the following techniques:

1. **Modify the existing view (Recommended)**: The package provides a preconfigured dashboard that is created using a custom view in the **EpiInfoCRC** database called **vw_CRCReport**. This view pulls in fields from all of the Epi Info™ related forms provided in the package. The view can be customized if there is a need to add additional fields. Follow the steps below to customize the view:
   a. Connect to the EpiInfoCRC database server using the SQL Server Management Studio provided in the installation package. The value for Server name, Database name, Login and Password are provided below if the connection string was not changed:

      Server name: (local)\SQLEXPRESS

      Database name: EpiInfoCRC

      Authentication: Use SQL Server Authentication

      Login: eiweb_appuser

      Password: h74$H4d@m23

   b. Navigate to the Views folder in the EpiInfoCRC database and open vw_CRCReport in design mode.

   c. Add additional fields by choosing the desired fields from any of the available tables in the diagram pane.

   d. Save the changes once the design changes are final.

   e. Launch Epi Info™ Visual Dashboard.

f. You can open the dashboard provided and expand the dashboard using the newly added fields OR to create new dashboard perform the next set of steps.

g. Start by setting up a new data source—click the Set Data Source icon (third icon from the left).

h. Choose Microsoft SQL Server Database as the database type.

i. Open a connection to the **EpiInfoCRC** database on the database server using information provided in Step (a).

j. Choose the **vw_CRCReport** view in the Data Source Explorer and click OK.

k. The empty dashboard canvas is now ready for analysis using the fields made available through the custom view.

l. Right-click the canvas and select **Add Analysis Gadget** to add a gadget to the canvas.

m. Save the dashboard canvas to preserve your work.

2. **Related data source**: A new dashboard can be created using a related data source to analyze data for one of the station specific forms.

   a. Launch Epi Info™ Visual Dashboard.

   b. Start by setting up a new data source—click the Set Data Source icon (third icon from the left).

   c. Choose Epi Info™ 7 Project as the ‘Database Type’.

   d. Navigate to the EpiInfoCRC project in the ‘Data Source’.

   e. Choose CRC_Forms.

   f. Right click in the empty canvas and click on ‘Add related data source’

   g. Choose the station specific form from in ‘Data Source Explorer’ under ‘Select Data Source’.

   h. Choose GlobalRecordId field for ‘Parent Key Field’.

   i. Choose FKEY for ‘Child Key Field’ and click OK.

   j. Fields from both Parent ‘CRC_Form’ and the station specific form will be available for analysis.

   k. Right-click the canvas and select **Add Analysis Gadget** to add a gadget to the canvas. The list of variables in the gadget properties will include the fields from both forms.

   l. Save the newly created dashboard canvas to preserve your work.

3. **SQL Queries in Advanced mode**: SQL queries can be created in Epi Info™ Visual Dashboard to perform analysis. Only SELECT queries are permitted.
   a. Launch Epi Info™ Visual Dashboard.
   b. Start by setting up a new data source—click the Set Data Source icon (third icon from the left).
   c. Choose Microsoft SQL Server Database as the database type.
   d. Open a connection to EpiInfoCRC database on the database server. The value for Server name, Database name, Login and Password are provided below if the connection string was not changed:

      Server name: (local)\SQLEXPRESS

      Database name: EpiInfoCRC

      Authentication: Use SQL Server Authentication

      Login: eiweb_appuser

      Password: h74$H4d@m23
   e. Click on the Advanced button.
   f. In the Set Data Source dialog provide the SELECT query that you want to use for analysis and click OK.
   g. The empty dashboard canvas is now ready for analysis using the fields chosen in the SELECT query.
   h. Save the newly created dashboard canvas to preserve your work.

4. **Create a custom view**: Custom views can be created directly in the EpiInfoCRC database to meet any custom analysis needs.
   a. Connect to the EpiInfoCRC database server using the SQL Server Management Studio provided in the installation package. The value for Server name, Database name, Login and Password are provided below if the connection string was not changed:

      Server name: (local)\SQLEXPRESS

      Database name: EpiInfoCRC

      Authentication: Use SQL Server Authentication

      Login: eiweb_appuser

      Password: h74$H4d@m23
   b. Create a new view that will have all your fields and any computed variables and save the view by providing a name that is meaningful.
   c. Launch Epi Info™ Visual Dashboard.

d. Start by setting up a new data source—click the Set Data Source icon (third icon from the left).

e. Choose Microsoft SQL Server Database as the database type.

f. Open a connection to the EpiInfoCRC database on the database server using the information provided in Step (a).

g. Choose the newly created view in Data Source Explorer and click OK.

h. The empty dashboard canvas is now ready for analysis using the fields made available through the custom view.

i. Right-click the canvas and select **Add Analysis Gadget** to add a gadget to the canvas. The list of variables in the gadget properties will include the fields from the new view.

j. Save the newly created dashboard canvas to preserve your work.

3.11 Using Epi Info™ to access data

Perform data entry and data management tasks using the CRC eTool web application. The CRC eTool was configured using the Epi Info™ 7 desktop tools. The form available for data entry through the web application was designed in the Epi Info™ 7 Form Designer module. The data collected using the web application is available for browsing in the Epi Info™ 7 Enter module if you want to see the data using a desktop tool. You do not need to open the Enter module for performing any data entry.

3.12 Aggregating data from multiple CRCs

When several CRC centers are collecting data, you may want to consolidate the data from the different centers into a central database or command center CRC for analysis. This can be done with the Epi Info™ Data Packager and Data Unpackager. The document **EpiInfo7UserGuide-Chapter7-DataPackager.pdf** has detailed step by step instructions for using the Data Packager and Data Unpackager.

The general process is as follows:

1. The data collection CRC runs the Epi Info™ Data Packager to create a data package. The resulting data package is an encrypted file with an **.edp7** filename extension.
2. The data collection CRC sends the **.edp7** data package to the data manager of the central database or command center CRC.
3. The data manager of the command center CRC receives the **.edp7** data package and saves the file to a computer on the central CRC eTool network.

4. The data manager of the command center CRC runs the Epi Info™ Data Unpackager to import the data into the central CRC eTool database.

   Note: Some efficiencies may be gained when several **.edp7** files must be imported. In this case, you can do a batch import of multiple **.edp7** files simultaneously. Save all **.edp7** files into a single folder, and use this folder as the source location for the import. The Data Unpackager proceeds through each **.edp7** file contained in the folder and imports their data. If a password was used to protect the files when they were created, all **.edp7** files must have been created **using the same password** in order to take advantage of this batch import process.

4 Appendix A: References

The following table summarizes the documents referenced in this guide:

Document Name	Purpose	Location
Epi-Info-Web-Security-Help-508.pdf	This document describes the Epi Info™ Web Security utility used to configure system security keys and encrypt connection strings.	/EpiInfoCRC/Documents
Make-A-Project-File-508.pdf	This document describes how a project file can be create for an Epi Info™ SQL Server project	/EpiInfoCRC/Documents
Attachment.docx	This document contains information critical to using the system	/EpiInfoCRC/Documents
SQL-Server-Installation-508.pdf	This document contains steps and screenshots of SQL Server 2012 installation	/EpiInfoCRC/Documents
IIS-Installation-508.pdf	This document contains steps and screenshots necessary for IIS installation	/EpiInfoCRC/Documents
EpiInfo7UserGuide-Chapter7-DataPackager.pdf	This document is from the Epi Info™ 7 User Guide and explains the Data Packager tool.	/EpiInfoCRC/Documents