IQI, PSI, AND PDI RATES GENERATED BY THE AHRQ *WINDOWS* QI SOFTWARE
Guidance for Using the *Windows* QI Software and an Example of Output for One Hospital

Note: This tool has *not* been updated for AHRQ's new ICD-10[i] WinQI Software (v6.0), as neither the final nor a test version of the software was available at the time of this tool's revision (March 2016). Feel free to use the information in this tool if you are continuing to use an earlier version of the WinQI software.

What is the purpose of this tool? To work with the Inpatient Quality Indicators (IQIs), Patient Safety Indicators (PSIs), and Pediatric Quality Indicators (PDIs) for assessing its own performance, a hospital needs to calculate rates for these indicators, using the Windows software provided by the Agency for Healthcare Research and Quality (AHRQ). This tool provides three sets of information to help you work with the Windows software to calculate rates for your hospital and use the output from the software:

- An outline of the steps used to calculate IQI, PSI , and PDI rates.
- Notes for analysts and programmers on issues to manage in working with the Windows software.
- An example of the output from the Windows software for one hospital.

Who are the target audiences? The primary audience for this tool is the programmers or analysts who will calculate IQI, PSI, and PDI rates.

How can the tool help you? The examples and guidance provided by this tool should help you work more easily with the Windows software used to calculate the IQIs, PSIs, and PDIs for your hospital, and to read and use the output from the software.

How does this tool relate to others? This tool should be used together with the B.1 tool on *Applying the Quality Indicators to Hospital Data*, which explains the different types of rates calculated for the IQIs, PSIs, and PDIs.

[i]ICD-10 = International Classification of Diseases, 10th Revision.

Software Installation

Before installing and running the Windows QI software, you must first determine whether you have the requisite programs and permissions. Due to the security settings and firewalls on some networks, you may have trouble downloading and installing the software without support from your information technology (IT) department. In addition, you may not have the option to install and run the setup or software as an administrator; this restriction also necessitates assistance from the IT department and may delay or complicate installation and utilization of the software.

If you are unfamiliar with database structures, involve the IT department immediately. This will save you time and eliminate some frustration.

Installation instructions are available on the AHRQ QI Web site: http://www.qualityindicators.ahrq.gov/Downloads/Software/WinQI/V50/Software_Inst_WinQI_V50_May_2015.pdf.

Reading this file and following the steps listed will address many of the issues related to the software installation.

Make sure your Windows OS has the latest Service Pack and updates applied. The Windows QI software has been tested on the following configurations: Microsoft SQL Server 2005 or 2008 (if the dataset contains more than about 4.5 million discharge records, then 2008 is required). Hospitals that need to use a local networked instance of SQL Server may run into problems if the network version of SQL Server is not compatible with the QI software.

Your IT department's policies pertaining to SQL servers may affect your ability to install and use the Windows software. If so, you will need to contact your IT department's personnel for help accessing the server. Because each hospital's IT department's policies differ, we cannot effectively address all the issues that arise during this process.

Indicator Data Generated by the Windows Software

The Windows software provided by AHRQ for calculation of the IQIs, PSIs, and PDIs, as well as documentation on how to use the software, can be found on the AHRQ QI Web site: www.qualityindicators.ahrq.gov/Software/WinQI.aspx.

Once the software is installed, it will guide you through the following steps to produce the rates for the IQIs, PSIs, and PDIs:

1. Identify outcomes in inpatient records.
2. Identify populations at risk.
3. Calculate observed (raw) indicator rates.
4. Risk adjust the indicator rates (where applicable).
5. Create smoothed rates using multivariate signal extraction (where applicable).

Notes for Analysts and Programmers

The documentation provides guidance on how to set up your file and run the software. However, as is usually the case when applying new software to a data file, several issues have been identified that you will need to manage as you work with the AHRQ Windows QI software. The identified issues are discussed here, to help ease your first application of the software to your data. Once you have run the software successfully, any use of it on subsequent data should proceed smoothly.

Getting Your Data Ready

When preparing data for the Windows QI software program, you should be aware that a few steps are essential for running the program correctly.

1. Format and structure your dataset so that it matches the structure specified in the documentation. If you try to run the program without first structuring and formatting the data to the exact specifications listed, the program will not run properly. All numeric variables must be specified as numeric, and all character variables must be specified as character (string). Diagnosis codes should not have a decimal point (and they will need to be removed prior to importing). Variable names do NOT need to match those in the table.
2. The KEY variable is the unique case identifier. This variable is not required by the software but is useful for merging discharge records in the patient-level report with the input data.
3. Not all variables are required to determine your rates, but some are necessary for stratification and other analyses. See Appendix A to determine whether you have the necessary variables for your intended analyses.
4. Some users found that their datasets were too large to use with the software and their available computing capacity. These individuals found it necessary to use only a subset of their data at a time in order to run the program.
5. An APR-DRG Grouper is built into the software if your data lack APR-DRG values. Use of this grouper is optional. You may use your institution's APR-DRG values if they are available and you choose to do so.

Running the Software

If you are running the software using the Windows 7 operating system, it is important to install and run the software as an administrator. Failing to do so will result in errors.

Once your data are ready, there is an Import Wizard that will allow you to map your variables with those required by the software. This map can be saved so that you do not need to repeat this step the next time you run the program.

There is an option to check the readability of your data to ensure that every row can be read and that every row has the same number of columns.

Rows with missing data for required variables will not be included in the analysis.

Once the variables have been identified and the data have been verified, indicator flags are created by the software. Data can then be saved as a CSV file if desired and will remain until new data are uploaded. Mapping files can also be saved at this time.

The user can then use the toolbar on the left side of the screen to generate reports and rates. Below are examples of two tables that can be created. Many other report options are available in the software that your hospital may find useful, but we only illustrate two basic examples here.

Example of Windows Software Output

An example of the output from the Windows software (using WinQI v4.5) is provided on the following pages. This output was generated in November 2013 using WinQI v4.5, based on data adapted from a hospital that participated in the first field test of the QI Toolkit. The program was run on a large set of discharge records that would have the best chance of finding events for the numerators in the observed rates. Even in this case, however, you will see that zero events were found for some of the Indicators.

Note: Refer to Tool B.1, Applying the AHRQ Quality Indicators to Hospital Data, for definitions of the four types of rates.

This output consists of three tables: Quick Report provider level, Quick Report area level, and Provider Report. The Quick Report provides a summary of the numerators, denominators, and observed rates for the uploaded data. This report is generated by the software and can be saved in rich text format (RTF).

The user may customize the Provider Report to include any number of indicators (including Experimental Quality Indicators, Inpatient Quality Indicators, Neonatal Quality Indicators, Pediatric Quality Indicators, and Patient Safety Indicators). Users may also choose to stratify based on a number of variables, including hospital, age category, sex, year, quarter, payer, race, or any other custom indicator they have in their dataset. This sample Provider Report gives the observed numerator, observed denominator, observed rate, expected rate, risk-adjusted rate, and smoothed rate for the PSIs without any stratification. Data and rates generated using the Provider Report option can be saved in comma separated value (CSV) format.

Quick Report

This is a summary of the numerators, denominators, and observed rates for your currently loaded data.

Num. (numerator) refers to the number of events. Den. (denominator) refers to the number of individuals in the population at risk for the event. The rate refers to the observed rate. Pop. (population) rate refers to the population rate that is used for risk adjustment.

Filename: C:\Users\Desktop\AHRQinputFile.csv
Number of records: 11246
Has POA Flags: Y

Provider Level Indicators

Indicator	Name	Num.	Den.	Rate	Pop. Rate
EXP1	EXP #1 Rate of Complications of Anesthesia	0	0	-	0.00083441
EXP2	EXP #2 Obstetric Trauma Rate – Cesarean Delivery	-	0	-	-
IQI8	IQI #8 Esophageal Resection Mortality Rate	0	0	-	0.05005828
IQI9	IQI #9 Pancreatic Resection Mortality Rate	1	2	0.5	0.03403043
IQI11	IQI #11 Abdominal Aortic Aneurysm (AAA) Repair Mortality Rate	0	1	0	0.0412298
IQI12	IQI #12 Coronary Artery Bypass Graft (CABG) Mortality Rate	0	0	-	0.02580359
IQI13	IQI #13 Craniotomy Mortality Rate	3	54	0.05555556	0.05701075
IQI14	IQI #14 Hip Replacement Mortality Rate	0	17	0	0.00094701
IQI15	IQI #15 Acute Myocardial Infarction (AMI) Mortality Rate	6	52	0.11538462	0.06068963
IQI16	IQI #16 Heart Failure Mortality Rate	6	454	0.01321586	0.03330349
IQI17	IQI #17 Acute Stroke Mortality Rate	24	180	0.13333333	0.09130635
IQI18	IQI #18 Gastrointestinal Hemorrhage Mortality Rate	1	165	0.00606061	0.02411881
IQI19	IQI #19 Hip Fracture Mortality Rate	0	32	0	0.02780279
IQI20	IQI #20 Pneumonia Mortality Rate	7	175	0.04	0.04021573
IQI21	IQI #21 Cesarean Delivery Rate, Uncomplicated	0	0	-	0.30005932
IQI22	IQI #22 Vaginal Birth After Cesarean Delivery Rate, Uncomplicated	0	0	-	0.09056967
IQI23	IQI #23 Laparoscopic Cholecystectomy Rate	112	130	0.86153846	0.84380955
IQI24	IQI #24 Incidental Appendectomy in the Elderly Rate	0	55	0	0.01093251
IQI25	IQI #25 Bilateral Cardiac Catheterization Rate	0	0	-	0.0141224
IQI30	IQI #30 Percutaneous Coronary Intervention (PCI) Mortality Rate	0	0	-	0.01733385
IQI31	IQI #31 Carotid Endarterectomy Mortality Rate	0	1	0	0.00401436
IQI32	IQI #32 AMI Mortality Rate, Without Transfer Cases	4	43	0.09302326	0.06394743
IQI33	IQI #33 Primary Cesarean Delivery Rate, Uncomplicated	0	0	-	0.17947409
IQI34	IQI #34 Vaginal Birth After Cesarean (VBAC) Rate, All	0	0	-	0.08994985
IQI1	IQI #1 Esophageal Resection Volume	0	-	-	-
IQI2	IQI #2 Pancreatic Resection Volume	2	-	-	-
IQI4	IQI #4 Abdominal Aortic Aneurysm (AAA) Repair Volume	1	-	-	-
IQI5	IQI #5 Coronary Artery Bypass Graft (CABG) Volume	0	-	-	-
IQI6	IQI #6 Percutaneous Coronary Intervention (PCI) Volume	0	-	-	-
IQI7	IQI #7 Carotid Endarterectomy Volume	1	-	-	-
NQI2	NQI #2 Neonatal Mortality Rate	0	0	-	0.00214117

NQI3	NQI #3 Neonatal Blood Stream Infection Rate	0	0	-	0.02316064
NQI1	NQI #1 Neonatal Iatrogenic Pneumothorax Rate	0	0	-	0.00019247
PDI5	PDI #5 Iatrogenic Pneumothorax Rate	0	0	-	0.00013748
PDI6	PDI #6 RACHS-1 Pediatric Heart Surgery Mortality Rate	0	0	-	0.03771004
PDI8	PDI #8 Perioperative Hemorrhage or Hematoma Rate	0	0	-	0.00462178
PDI9	PDI #9 Postoperative Respiratory Failure Rate	0	0	-	0.01018098
PDI10	PDI #10 Postoperative Sepsis Rate	0	0	-	0.01602384
PDI11	PDI #11 Postoperative Wound Dehiscence Rate	0	0	-	0.00105441
PDI12	PDI #12 Central Venous Catheter-Related BSI Rate	0	0	-	0.0006572
PDI1	PDI #1 Accidental Puncture or Laceration Rate	0	0	-	0.00053522
PDI2	PDI #2 Pressure Ulcer Rate	0	0	-	0.00013297
PDI3	PDI #3 Retained Surgical Item/Unretrieved Device Fragment Count	0	-	-	-
PDI7	PDI #7 RACHS-1 Pediatric Heart Surgery Volume	0	-	-	-
PDI13	PDI #13 Transfusion Reaction Count	0	-	-	-
PSI2	PSI #2 Death Rate in Low-Mortality DRGs	8	132	0.06060606	0.00028197
PSI3	PSI #3 Pressure Ulcer Rate	0	47	0	0.00040548
PSI4	PSI #4 DeathRateSurgInpatientswSeriousTreatableComplications	0	0	-	0.11737129
PSI6	PSI #6 Iatrogenic Pneumothorax Rate	0	207	0	0.00043869
PSI7	PSI #7 Central Venous Catheter-Related BSI Rate	0	140	0	0.00040896
PSI8	PSI #8 Postoperative Hip Fracture Rate	0	0	-	0.00003151
PSI9	PSI #9 Perioperative Hemorrhage or Hematoma Rate	0	0	-	0.00573977
PSI10	PSI #10 Postop Physiologic and Metabolic Derangement Rate	0	0	-	0.00046997
PSI11	PSI #11 Postop Respiratory Failure Rate	0	0	-	0.0083228
PSI12	PSI #12 Periop Pulmonary Embolism or DVT Rate	0	0	-	0.00437031
PSI13	PSI #13 Postoperative Sepsis Rate	0	0	-	0.01180386
PSI14	PSI #14 Postoperative Wound Dehiscence Rate	0	346	0	0.00186825
PSI15	PSI #15 Accidental Puncture or Laceration Rate	0	211	0	0.00242796
PSI17	PSI #17 Birth Trauma Rate – Injury to Neonate	0	0	-	0.00210694
PSI18	PSI #18 Obstetric Trauma Rate – Vaginal Delivery With Instrument	0	0	-	0.13992235
PSI19	PSI #19 Obstetric Trauma Rate – Vaginal Delivery WO Instrument	0	0	-	0.02254185
PSI5	PSI #5 Retained Surgical Item/Unretrieved Device Fragment Count	0	-	-	-
PSI16	PSI #16 Transfusion Reaction Count	0	-	-	-

Provider indicator population rates used in risk adjustment are based on the pooled discharges from the 2010 SID database. Population rates are only included for those indicators that use these rates in risk adjustment. One year empirical rates for indicators that are not risk adjusted may be found in the QI documentation.

Area Level Indicators

Indicator	Name	Num.	Pop. Rate
IQI26	IQI #26 Coronary Artery Bypass Graft (CABG) Rate	0	0.00152831942
IQI27	IQI #27 Percutaneous Coronary Intervention (PCI) Rate	0	0.00407135623
IQI28	IQI #28 Hysterectomy Rate	64	0.00300267371
IQI29	IQI #29 Laminectomy or Spinal Fusion Rate	11	0.0025957707
PDI14	PDI #14 Asthma Admission Rate	0	0.00123957363
PDI15	PDI #15 Diabetes Short-Term Complications Admission Rate	0	0.00026405267
PDI16	PDI #16 Gastroenteritis Admission Rate	0	0.00065731304
PDI17	PDI #17 Perforated Appendix Admission Rate	0	0.30621781707
PDI18	PDI #18 Urinary Tract Infection Admission Rate	0	0.00037248541
PDI90	PDI #90 Pediatric Quality Overall Composite	0	0.00160807621
PDI91	PDI #91 Pediatric Quality Acute Composite	0	0.00051610106
PDI92	PDI #92 Pediatric Quality Chronic Composite	0	0.00109197514
PQI1	PQI #1 Diabetes Short-Term Complications Admission Rate	77	0.00062060368
PQI2	PQI #2 Perforated Appendix Admission Rate	27	0.29773959496
PQI3	PQI #3 Diabetes Long-Term Complications Admission Rate	99	0.0011595108
PQI5	PQI #5 COPD or Asthma in Older Adults Admission Rate	176	0.00496390238
PQI7	PQI #7 Hypertension Admission Rate	21	0.0005913537
PQI8	PQI #8 Heart Failure Admission Rate	373	0.00342729734
PQI9	PQI #9 Low Birth Weight Rate	0	0.0623977499
PQI10	PQI #10 Dehydration Admission Rate	49	0.00121113493
PQI11	PQI #11 Bacterial Pneumonia Admission Rate	117	0.00296807473
PQI12	PQI #12 Urinary Tract Infection Admission Rate	98	0.00189089735
PQI13	PQI #13 Angina Without Procedure Admission Rate	19	0.00018884478
PQI14	PQI #14 Uncontrolled Diabetes Admission Rate	3	0.00018757573
PQI15	PQI #15 Asthma in Younger Adults Admission Rate	21	0.00052645244
PQI16	PQI #16 Lower-Extremity Amputation - Patients With Diabetes Rate	14	0.00015702575
PQI90	PQI #90 Prevention Quality Overall Composite	1059	0.01556071253
PQI91	PQI #91 Prevention Quality Acute Composite	264	0.00607010637
PQI92	PQI #92 Prevention Quality Chronic Composite	795	0.00949090839
PSI21	PSI #21 Retained Surgical Item/Unretrieved Device Fragment Rate	0	-
PSI22	PSI #22 Iatrogenic Pneumothorax Rate	0	-
PSI23	PSI #23 Central Venous Catheter-Related BSI Rate	0	-
PSI24	PSI #24 Postoperative Wound Dehiscence Rate	0	-
PSI25	PSI #25 Accidental Puncture or Laceration Rate	0	-
PSI26	PSI #26 Transfusion Reaction Rate	0	-
PSI27	PSI #27 Perioperative Hemorrhage or Hematoma Rate	13	-

Area indicator population rates used in risk adjustment are based on the pooled discharges from the 2007 SID database. Population rates are only provided for those indicators that use these rates for risk adjustment. One year empirical rates for indicators that are not risk adjusted may be found in the QI documentation. The rates displayed are without SES decile adjustment.

You may view observed rates for Area-level indicators by selecting the appropriate population and stratification options in the Report Wizard.

Provider Level Report

Report from 11/25/2013 11:21:59 AM
Provider report created 11/25/2013 11:22:21 AM
Report from 11/25/2013 11:21:59 AM
Rates Per case

Name	Observed Numerator	Observed Denominator	Observed Rate	Expected Rate	O-E Ratio	Reference Pop Rate	Risk Adjusted Rate	Smoothed Rate
PSI #2 Death Rate in Low-Mortality Diagnosis Related Groups (DRGs)	8	132	0.060606	0.001046	57.95983	0.000282	0.016343	0.007641
PSI #3 Pressure Ulcer Rate	0	47	0	0.000832	0	0.000405	0	0.000379
PSI #4 Death Rate among Surgical Inpatients with Serious Treatable Complications						0.117371		
PSI #5 Retained Surgical Item or Unretrieved Device Fragment Count								
PSI #6 Iatrogenic Pneumothorax Rate	0	207	0	0.000251	0	0.000439	0	0.000436
PSI #7 Central Venous Catheter-Related Blood Stream Infection Rate	0	140	0	0.000743	0	0.000409	0	0.000347
PSI #8 Postoperative Hip Fracture Rate						3.15E-05		
PSI #9 Perioperative Hemorrhage or Hematoma Rate						0.00574		
PSI #10 Postoperative Physiologic and Metabolic Derangement Rate						0.00047		
PSI #11 Postoperative Respiratory Failure Rate						0.008323		

PSI #12 Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate						0.00437		
PSI #13 Postoperative Sepsis Rate						0.011804		
PSI #14 Postoperative Wound Dehiscence Rate	0	346	0	0.001265	0	0.001868	0	0.001665
PSI #15 Accidental Puncture or Laceration Rate	0	211	0	0.001144	0	0.002428	0	0.002309
PSI #16 Transfusion Reaction Count								
PSI #17 Birth Trauma Rate - Injury to Neonate						0.002107		
PSI #18 Obstetric Trauma Rate - Vaginal Delivery With Instrument						0.139922		
PSI #19 Obstetric Trauma Rate - Vaginal Delivery Without Instrument						0.022542		