



Getting to
Affordability



Technical Resource for Measurement of Total Cost of Care Using Multi-Payer Data Sets

October 11, 2016

A collaborative effort of:

Network for Regional Healthcare Improvement
APCD Council

With funding provided by:

The Robert Wood Johnson Foundation



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Executive Summary/Introduction

In the pursuit of advancing payment reform, the Network for Regional Healthcare Improvement (NRHI) is leading a multi-regional innovation initiative focused on the production, sharing and use of information about the total cost of care. With funding from the Robert Wood Johnson Foundation, five pioneering regional health improvement collaboratives (RHICs) who participated in the pilot phase of the initiative are now joined by six additional regions in a unique approach to standardizing how they report cost information. Balancing local customization with alignment to national efforts makes the information consistent, relevant, and actionable. This initiative is known as NRHI Getting to Affordability and this Technical Resource is a major component of this effort.

One of the key objectives of this work is national spread. All-Payer Claims Databases (APCDs), which already exist or are planned in many states, represent a golden opportunity to enable that expansion (to build upon, coordinate and ultimately establish a national standard model). NRHI partnered with the APCD Council to understand the strategy for using APCDs for this purpose. Together, these entities worked to translate the standardized technical specifications and lessons learned from the pilot regions into a more formal how-to guide for measuring and reporting total cost of care. This effort uses the HealthPartners National Quality Forum endorsed Total Cost of Care and Resource Use framework (TCOC).

The purpose of this Technical Resource is to give other users of APCDs the benefit of experience gained by project participants in creating TCOC on multi-payer commercial claim data. It addresses data preparation, quality assessment, and suggestions for getting the best results from the HealthPartners Standard Analytic Package.¹ It offers guidance/best practices on:

- Initial data quality checks
- Preparing the data
- Minimum data requirements
- Selection of members and claims data
- Evaluating the quality of the data to be analyzed
- Assigning risk scores
- Assessing the output of the HealthPartners software

This Technical Resource is intended to provide step-by-step instructions, along with tips drawn from the experiences of the pilot project participants, to provide entities wanting to report TCOC using a multi-contributor data source with a smoother path while increasing measurement standardization and alignment nationally.

To continue conversations, share best practices and get peer support around measurement of Total Cost of Care using multi-payer data sets, we encourage you to join the Getting To Affordability Community, an NRHI-led social learning platform designed to connect peers and stakeholders across the healthcare spectrum with the larger community. To learn more and to register, email: gettingtoaffordability@nrhi.org.

For questions for the APCD Council or to join the APCD Council Learning Network, please contact info@apcdouncil.org.

¹ See <https://www.healthpartners.com/hp/about/tcoc/toolkit/index.html> for more information.

ABOUT THE NETWORK FOR REGIONAL HEALTHCARE IMPROVEMENT (NRHI)

The Network for Regional Healthcare Improvement is a national organization representing over 35 regional multi-stakeholder groups working toward achieving the Triple Aim of better health, better care, and reduced cost through continuous improvement. NRHI and all of its members are non-profit organizations, separate from state government, working directly with physicians, hospitals, health plans, and patients using data to improve healthcare.

NRHI is a neutral, non-partisan national connector who works closely with national policymakers, including the Center for Medicare and Medicaid Services (CMS), state policymakers and a wide-range of partners to inform and engage our member organizations in the work of everyday implementation, and to give voice in the form of direct feedback from our members to policymakers on how regulations impact various stakeholders, consumers and communities. For more information about NRHI, visit www.nrhi.org.

ABOUT THE APCD COUNCIL

In 2007, the Regional All-Payer Healthcare Information Council (RAPHIC) began as a convening organization to bring together several Northeast states that had, or were developing, APCD systems.

The vision for RAPHIC was to support cross-state data harmonization and analytic activities. RAPHIC quickly expanded to include participation from states across the country to a broader set of learning network activities. In 2010, RAPHIC changed its name to the APCD Council to reflect the expanded reach. The APCD Council is a learning collaborative of government, private, non-profit, and academic organizations focused on improving the development and deployment of state-based APCDs. The APCD Council is convened and coordinated by the Institute for Health Policy and Practice (IHPP) at the University of New Hampshire (UNH) and the National Association of Health Data Organizations (NAHDO).

Since 2007, the APCD Council has helped states across the country with a variety of activities related to APCD development, including:

- Stakeholder meetings;
- Legislation review;
- Rule development;
- Vendor selection;
- Analytics support;
- Linking states to one another to find common solutions;
- Leveraging state resources to achieve common objectives.

The APCD Council maintains a map of state progress on APCD development. As of 2016, there are 12 states with existing APCDs, five in implementation, three existing voluntary efforts, and many other states with interest in developing an APCD. For more information about the APCD Council, visit www.apcdouncil.org.

ABOUT THE MEASURE DEVELOPER: HEALTHPARTNERS

HealthPartners is the largest consumer-governed, non-profit health care organization in the nation with over 22,000 team members. HealthPartners is an integrated health care organization that provides both health care services and health plan financing and administration.

HealthPartners envisions health as it could be, affordability as it must be, through relationships built on trust. As an integrated organization, HealthPartners had the advantage of having both robust clinical data and administrative claims data. In 1995, they started measuring affordability consistently across their organization. HealthPartners has contributed the Total Cost of Care Framework measures to the public

domain, free of charge, because they are a mission-driven, consumer-governed organization and they believe this offering will lead to improved healthcare affordability across the country. For more information about HealthPartners work on Total Cost of Care, visit <https://www.healthpartners.com/hp/about/tcoc/toolkit/index.html>.

ABOUT DST HEALTH SOLUTIONS, LLC

DST Health Solutions, LLC delivers contemporary healthcare technology and service solutions that enable its clients to thrive in a complex, rapidly evolving healthcare market. Supporting commercial, individual, and government sponsored health plans, health insurance marketplaces, and healthcare providers, DST Health Solutions' services including enterprise payer platforms, population health management analytics, care management, and business process outsourcing solutions, each designed to assist a company to manage the process, information, and products that directly impact quality outcomes. DST Health Solutions is a wholly-owned subsidiary of DST Systems, Inc. For more information on DST Health Solutions, visit www.dsthealthsolutions.com.

ABOUT THE ROBERT WOOD JOHNSON FOUNDATION

For more than 40 years the Robert Wood Johnson Foundation has worked to improve health and health care. We are working with others to build a national Culture of Health enabling everyone in America to live longer, healthier lives. For more information, visit www.rwjf.org. Follow the Foundation on Twitter at www.rwjf.org/twitter or on Facebook at www.rwjf.org/facebook.

NRHI's Total Cost of Care Pilot Background

In November 2013, with funding from the Robert Wood Johnson Foundation (RWJF), NRHI launched the Total Cost of Care Pilot project (The Pilot). The goal of The Pilot was to develop and produce information to enable communities to reduce the total cost of care in multiple regions with replicable, multi-stakeholder driven strategies.

The Total Cost of Care and Resource Use (TCOC) framework developed by HealthPartners was selected as the common measure set for the purpose of The Pilot. The HealthPartners TCOC measure was determined to be the most appropriate option based on the goals of The Pilot, the broad use of the measure, and the NQF endorsement following rigorous reliability and validity testing. TCOC is an analytical tool that is designed to "support affordability initiatives, to identify instances of overuse and inefficiency, and to highlight cost-saving opportunities"². HealthPartners TCOC framework was endorsed by the National Quality Forum (NQF) in January of 2012, the first endorsement of a full-population total cost of care measurement approach. More information can be found on the HealthPartners website, including white papers on the methodology. The Informatics Team at HealthPartners, led by Sue Knudson, Senior Vice President, Health Informatics, served as technical advisors during The Pilot and offered invaluable guidance and support. Regular updates and discussions regarding technical questions and issues were instrumental to achieving project goals. The Maine Health Management Coalition (MHMC) also served as a technical advisor for the project given their recent experience measuring and reporting total cost of care in Maine.

Five pilot sites participated in the initial phase of the project to report TCOC measures in their regions, and develop a benchmark approach to compare results across regions. These sites are NRHI member regional health improvement collaborative (RHICs) and included: the Center for Improving Value in

² healthpartners.com/hp/about/TCOC/

Health Care (CIVHC), the Maine Health Management Coalition (MHMC), the Midwest Health Initiative (MHI), Minnesota Community Measurement (MNCM) and the Oregon Health Care Quality Corporation (Q Corp). All four pilot goals were achieved in the pilot phase, which ended in April 2015. The achieved goals are:

- Standardized the approach to measuring total cost of care and resource use across five regions;
- Created and tested a process for benchmarking multi-payer commercial healthcare costs;
- Each RHIC produced and distributed attributed practice level reports in their communities;
- Identified physician champions in each of the 5 RHICs and provided them with support to lead change on both the local and national levels with a reporting framework, strategy and approach to affect change.

In May 2015, The Pilot was extended by RWJF through October 2016. In this new phase of work, two additional regions were brought on board, HealthInsight Utah (an NRHI member RHIC) and the Maryland Health Care Commission (MHCC, not currently an NRHI member, testing the spread of this work beyond RHICs). Four additional regions joined as Development Sites to address specific barriers they faced to test potential solutions. Development Sites included the following: The Health Collaborative (Ohio), The University of Texas Health Science Center at Houston (Texas), Washington Health Alliance (Washington), and Wisconsin Health Information Organization (Wisconsin). Compass Health Analytics was retained as the Technical Advisor. Phase II goals include the continuation and refinement of The Pilot project goals, and an expansion that includes:

- Improving data collection and analysis process;
- Advising on the inclusion of Medicare and Medicaid populations in TCOC reporting;
- Deepening stakeholder engagement;
- Demonstrating that the TCOC has national applicability, by expanding into additional regions (MHCC and HealthInsight Utah);
- Developing an instructional technical guide for APCDs and other data organizations.

The last of these expanded goals is the basis of this Technical Resource.

Technical Resource Overview

The purpose of this Technical Resource is to give other users of APCDs the benefit of experience gained by project participants in creating TCOC on multi-payer commercial claim data. It addresses data preparation, quality assessment, and suggestions for getting the best results from the HealthPartners Standard Analytic Package.³ Specifically it covers: standard quality checks, preparing the data, minimum data requirements, selection of members and claims data, evaluating the quality of the data to be analyzed, assigning risk scores, and assessing the output of the HealthPartners software.

The Technical Resource describes the process as three major phases:

1. Data preparation and validation;
2. Assignment of risk scores;
3. Use of HealthPartners software to produce TCOC measures.

In general, analytic steps leading to TCOC calculation from an APCD are:

1. Assess data at the contributor level;
2. Subset data based on quality criteria;
3. Select data based on TCOC requirements;

³ See <https://www.healthpartners.com/hp/about/tcoc/toolkit/index.html> for more information.

4. Assign risk score to patients;
5. Attribute patients to primary care practices;
6. Assign HealthPartners' Total Cost Relative Resource Value (TCRRV™) at the claim level;
7. Calculate TCOC measure set.

NOTE: This Technical Resource does not address the process of creating reports for various audiences displaying the results of the TCOC calculations. Rather, it provides guidance for the data requirements, validation, and preparation phases leading up to the production of the reports. The production of reports requires local decision making and should reflect the needs of the local audience. Examples of regional reports are included in [Appendix A](#).

Multiple routes can be taken to accomplish these steps, and no one way is right or wrong. Each section below details, when possible, a "Voices from the Field" example describing how different pilot project participants addressed specific pieces of this process. For an illustration of how different regions have used different routes to produce TCOC reports, see [Appendix B](#).

Common Terms

Throughout the Technical Resource, terms are used that can have more than one meaning depending on the reader's perspective or due to local terminology variations. In some cases, these differences can have a significant impact on the data validation and preparation process. See [Appendix C](#) for definitions of terms used within this document, specifically for the purpose of the TCOC measurement process.

Requirements

This document is addressed to entities who want to calculate TCOC measures from a data source containing commercial health insurance claims and eligibility information from multiple carriers and plans. This can be a state or regional APCD or an aggregation collected under other auspices.

Calculating the TCOC measure set has the following high-level requirements. A list of specific fields required in the claim data is shown in [Appendix D](#).

Base SAS® Software⁴ to run the HealthPartners Standard Analytic Package is recommended. HealthPartners produces documentation that would enable a user to develop a non-SAS application to assign TCRRV™ and calculate the TCOC measure set, but those who have tried it suggest that using the SAS package is preferred.

1. Information about every plan member who was eligible to receive medical benefits, in sufficient detail to determine the number of months the member was eligible during the year.
2. Information about every plan member's eligibility to receive pharmacy benefits. This information must be tied to the ability to match the pharmacy claims in the data source to the medical plan member ID.
3. Medical claim data for one year with sufficient runout (at least 3 months) to have a complete picture of that year.

⁴ http://www.sas.com/en_us/software/base-sas.html.

4. Pharmacy claim data for the same period with similar runout as #3 above.
5. Medical claim data for professional and facility outpatient claims at the healthcare service level (procedure code) with the ability to combine services to the visit level. Inpatient claim records require Medicare Severity - Diagnosis Related Group (MS-DRG) and length of stay.
6. Pharmacy claim data at the prescription level.
7. Provider identifiers on medical claims that are common across all data contributors and at a level that corresponds to the user's intention for creating reports. For example, if the user wants to create reports at the practice level, the claim data must contain either practice identifiers or individual provider identifiers that the user can combine to create practices.
8. Allowed amount (plan paid amount plus member responsibility amount) on all medical and pharmacy claims. This must be at the line (procedure code) level on medical claims, both professional and facility outpatient. For inpatient claims, it is sufficient to have it at the claim level.
9. Fully adjusted claim data (net claims).
10. A method for assigning a risk score to each member for the time period being measured.
 - a. If using the Johns Hopkins Adjusted Clinical Group (ACG)[®] System:
 - i. A license for the population to be scored;
 - ii. Sufficient memory and disk space for data storage and installation (requirements outlined in [Appendix E](#)) OR
 - iii. The capacity to create a file to send to DST for overlay scoring and the ability to read the return file.
 - b. If using another risk methodology, a file with a risk score for each member. Note that the 2012 NQF endorsement of the TCOC measure set is based on the use of ACGs.



Voices From The Field: **Maintaining Provider Directories**

Regions have unique, market specific approaches to maintaining their provider database in order to tie a provider back to their practice and/or practice group levels. Maintaining a provider database is a key step in properly attributing patients to a practice for TCOC reporting. Below are a few examples of how the project team regions manage their provider databases.

Oregon: *The Oregon Healthcare Quality Corporation (Q Corp) works with medical groups to maintain a comprehensive primary care provider directory. Semi-annually, Q Corp asks medical groups to review and update their clinic and provider information through a secure on-line web portal. In addition, Q Corp conducts periodic outreach to medical groups and clinics to audit provider information in the provider directory. This provider directory links practicing primary care providers with the clinics and medical groups where they work.*

The information is then used to attribute patients identified in claims data to the appropriate primary care provider, clinic, and medical group. Q Corp defines primary care providers as family medicine, internal medicine, general practice, and pediatric physicians (MDs/DOs/NDs), nurse practitioners (NPs), and physician assistants (PAs).

Maine: *At the Maine Health Management Coalition (MHMC), the provider directory is considered a dynamic resource. In order to maintain accuracy the following resources are used to manually update information: data feeds from the NCQA Recognition Data Exchange, MaineCare (Medicaid), and the Maine Health Data Organization are run against the existing database through SAS for discrepancies; updated listings are received from the Pathways to Excellence program, Accountable Care Organizations, and major practices and groups; announcements from practice websites and newsletters, and a news clipping service help identify changes; and sources including the NPI listings and Maine Licensing Board are used to verify provider location.*

11. A method for attributing patients to primary care providers. An example attribution method is available from HealthPartners.⁵ This topic is often sufficiently sensitive that stakeholders want input into the methodology to be used in their region.
12. A method to link provider information on claims to the practices for which the user intends to report TCOC measures. This is often the most challenging and time-consuming step because the relationships between individual providers and practices are quite dynamic and multi-faceted. Claim data from different contributors often have inconsistent ways of identifying providers.
13. A method for deciding which groups to report on. Since the nature of the TCOC is to provide comparisons, it is important that the groups included in reporting are comparable. If you are reporting on primary care practices, for example, how do you define a primary care practice? Is that any practice that provides primary care services, or any practice that has primary care as its main goal? The former might include, for example, OB/GYN practices who provide primary care for many of their patients, but are different enough from a typical primary care practice that including them in the comparison may create a skewed picture. It is possible to include groups in reporting but exclude them from the benchmark (see section on Benchmark Definition on page 16).

NOTE: It is important to be aware of any exclusions that may have been applied to your data source. For example, some sources exclude claims with diagnosis or procedure codes indicating treatment for Substance Abuse Disorder or other conditions deemed to be particularly sensitive. If it is reasonable to assume the exclusions affect all report subjects (practices) equally, or your intention is to calculate the measures without those excluded items, TCOC measures will still be useful.

Data Validation and Preparation Phases

DATA VALIDATION

APCDs present some challenges in calculating TCOC measures that accurately and fairly reflect differences among practices in the use of health care resources. Only plans with complete medical coverage should be included in the population used for calculating the measures. Those that provide limited benefits (e.g. supplement plans, catastrophic health plans, limited liability plans, behavioral health or vision carve-outs) must be excluded. Even after that selection is done, inconsistencies among data contributors in any aspect of claims, such as provider identification, number of diagnoses included per claim, or population of the HCPCS modifier field, can lead to non-comparable results.

Plans that do not reimburse providers on a fee for service basis (e.g., Kaiser-type plans where the plan is offered by a provider organization) pose particular challenges to calculating TCOC. These plans frequently do not have individual service records with allowed amounts for each healthcare service delivered. One could argue that the “cost of care” in these situations is the premium rather than the sum of the individual claims. These plans are not suitable for inclusion in TCOC calculations.

During The Pilot, great efforts were made to develop an efficient and effective way to uncover inconsistencies in the data source and help users define the appropriate population for TCOC.

STABILITY

Within each data contributor, the allowed amount per member per month (PMPM) across the 12 months of the performance period should be fairly stable. The amount may fluctuate up or down each month but

⁵ https://www.healthpartners.com/ucm/groups/public/@hp/@public/documents/documents/dev_057425.pdf and https://www.healthpartners.com/ucm/groups/public/@hp/@public/documents/documents/cntrb_031064.pdf

there should not be a major shift at a point in the year (allowing for seasonality and random variation). One factor that affects the PMPM for a given month is the number of workdays. February will generally have the lowest PMPM, and October will be much higher. Beyond that, the degree of fluctuation depends on the number of members. Small populations (< 500 people) can have peaks that are twice or more the average if a particular patient had an expensive inpatient event in that month. Every monthly allowed amount per member should be within 10-15% of the average for population counts in the tens of thousands or higher. Plans with high deductibles can show increased usage over the course of the year as members opt to schedule more healthcare once their deductible is satisfied.

CONSISTENCY

Total allowed amount per member per month at the payer level should be consistent with other commercially insured populations of a similar age distribution within the region. If the average PMPM for a payer is more than 25% above or below the average for other payers with the same average age, that payer's data should be investigated for problems, such as duplicate or orphan claims, or errors in populating the amount fields. Other considerations include the type of plan being offered (supplemental, partial year, limited liability, etc.) and the timing of the plan offering on the market (new this year, or closing after this year). Usually an explanation is found in one of these. If the data cannot be corrected and resubmitted to bring the plan PMPM within at least 25% of the average, or it is discovered that the plan has some features that make it non-comparable to other plans, the plan's data should be omitted from the population.

DISTRIBUTION BY TYPE OF SERVICE

Distribution of Outpatient and Professional claims by first character of HCPCS/CPT code should be generally consistent for all contributors. A few things to look at are:

- No contributor is missing any first characters that are present on other payers.
- Same first characters are the largest proportion of the total for each contributor.
- Percent of total represented by each character is within 5-10 percentage points of other contributors.
- If the proportion of claims with one first character is markedly lower (less than half of others), it could be an indication that a specific set of claims are largely missing (e.g., lab claims or Evaluation & Management (E&M) encounters). The proportion of Outpatient and Professional claims with no HCPCS/CPT code must be very low (less than 10% missing).



Voices From The Field: **Data Validation and Assessment**

The project team regions had varying levels of experience when it came to producing, using and sharing information on total cost of care. Some regions relied on health plans to process their own data and submit the results for aggregation. Other regions had a process in place and needed to make changes to align their methods for a standardized approach. Still others were new to cost reporting and worked with multiple vendors to pull together the resources required in the process. Here are a few thoughts from some of the team members on data validation and quality assessment:

CIVHC – *You need to have a high degree of confidence in the completeness and quality of your data. It can be difficult to anticipate issues, particularly when you are aggregating data across multiple sources and utilizing multiple vendors in the process. When you're working with multiple sources and vendors, your data may need to move or change hands multiple times, which can impact completeness and accuracy. Being able to compare your results with what other regions are seeing can help you identify issues early. Don't underestimate the level of time and effort this work takes; at the end of the day it is worth it given what you will learn about your data.*

MHMC - *You need complete claims data. Complete has at least two dimensions, it needs to be representative of the population and it needs to be complete in terms of fields. Additionally, you need to have the ability to correctly handle data, put it in a structured warehouse to be able to use it for productive purposes. An APCD acts as a repository for information, and what is submitted to an APCD has varying levels of completeness and consistency. To produce these reports you need to have access to the granular, field and record level data, and have a powerful tool such as SAS to parse out the usable and required information for accurate reports.*

ORPHAN CLAIMS

The proportion of claims that fail to match to an eligible member in the month in which the claim was incurred (i.e., orphans) should be less than 2%.

DRGS

DRGs on inpatient claims must be validated as MS-DRGs from CMS. Several different DRG systems are in use; the same code can mean different things depending on which system is being used. Because this field is not used or supplied consistently across commercial payers, data sources with multiple contributors will likely need to have this field added through an MS-DRG assignment application.

DIAGNOSIS CODES

The primary diagnosis code should be populated on 100% of medical claims. A contributor who does not meet this standard should be omitted from the TCOC population and encouraged to resubmit historical data to the APCD. In addition, the analytic team should determine the number of diagnosis code fields reliably populated by all contributors. For consistency within the population, only the number of codes populated by all contributors should be used in calculating risk scores.

DATA PREPARATION

After going through the quality assessment steps above, the analytic team will make decisions about which data contributors to include in the population. The HealthPartners TCOC methodology places additional restrictions on members and claims. The information in this document is intended to supplement, not replace, the documentation and instructions in the HealthPartners Standard Analytic Package (see <https://www.healthpartners.com/hp/about/tcoc/toolkit/>). Please refer to that documentation throughout this Technical Resource.

STEP 1A. SELECTION OF DATA CONTRIBUTORS

The first requirement for including data from a contributor in the TCOC population is that inclusion of the data will improve the accurate representation of the healthcare occurring in the commercial market. It must not distort the picture or artificially under- or over-state per population delivery or cost of services.



Voices From The Field:

Data Validation and Assessment (cont.)

MHI – *It's important to ensure that every data element is squeaky clean. Data is never perfect and there are always opportunities to make it better, particularly when you have the opportunity to talk and share ideas with others who are working toward the same goal. When we first looked at our results we were uncertain if it was correctly reflecting reality or if there may be some data issues impacting the results. We used outside sources to verify what we were seeing, for example we looked at the Health Care Cost Institute for comparative pricing on procedures, and we looked at our utilization rates to see if they were in line with what we see elsewhere. Additional resources included health plan partners, national employer partners and the brokers and consultants they trust, and even insurance filings – all to get a better sense of how our results stacked up against surrounding areas.*

MNCM - *Using a decentralized model, each payer submits TCOC data for aggregation which requires comparable processes run in multiple health plans. This means that you don't just have to talk to your programmer, you need to talk to all the programmers involved at each of the payers who are submitting data. You need to talk with them early in the process so that you are all running the data in exactly the same way. The advantage of the distributed model is by using the expertise of the health plan analysts and programmers, you can account for the unique aspects that exist in each health plan data warehouse.*

Q Corp - *Working together and being able to share and discuss issues that others were having with their data, and to be able to create a checklist with our technical advisor to review our data for quality, was invaluable. It moved us along much more quickly.*

The analytic team might also consider how well the mix of included contributors reflects aspects of the market such as fully-insured compared to self-insured; metal levels of exchange plans; HMO, PPO, POS and other network configurations; high-deductible plans; etc.

TCOC measures increase in reliability with larger populations, so the team should aim to include as many contributors as possible within the considerations above.

STEP 1B. SELECTION OF MEMBERS

HealthPartners TCOC specification⁶ requires that the population be limited to members with certain characteristics. In addition, for an APCD it is important to exclude members whose claims in the data source do not fairly represent the total cost of their healthcare.

SELECT MEASUREMENT PERIOD

1. TCOC is measured on a 12-month period of incurred claims with at least 3 months of runout in the data source (all claims with dates of service in the measurement period and paid through the 3rd month after the end of the measurement period).
2. The population should include all plan members eligible for at least 9 months during the measurement period, whether or not they had claims.
3. All claims incurred during the measurement period that have a net allowed amount greater than zero should be included.

SELECT MEMBERS BASED ON MEMBER DEMOGRAPHICS

1. If developing the measure for a particular geographic area of interest (e.g., state), exclude members that have a zip code (or other geographic indicator if zip code is not available) outside of the geographic area of interest.
2. Exclude members whose age in the measurement period is unknown.
3. Exclude members whose sex is unknown.
4. Exclude members who have not passed their first birthday by the end of the measurement period.
5. Exclude members who have passed their 65th birthday at the end of the measurement period.

⁶ https://www.healthpartners.com/ucm/groups/public/@hp/@public/documents/documents/dev_057425.pdf



Voices From The Field: **Distributed Data Model**

Minnesota Community Measurement employed a distributed data model where each individual health plan followed the same technical specifications and submitted aggregated files to the RHIC for data quality checks and final aggregation. The steps in this guide are written assuming multi-payer data at the claim level is housed in a single location.



Voices From The Field: **Dental Claims**

One region found that the data source contained dental claims, which did not have diagnosis information. This caused the contributor to fail the test of 100% population of primary diagnosis. Eliminating these claims brought the contributor up to the standard. Dental claims can be identified either by an indicator in the data source (preferable) or a HCPCS code starting with the letter "D" (for example, D1110).

SELECT MEMBER WITH SUFFICIENT COVERAGE

1. Calculate medical and pharmacy eligibility in number of months during the measurement period.
 - a. If you have specific dates of eligibility on each member, determine eligibility during the month on a consistent day of the month (e.g., must be eligible on the 15th of the month to be considered eligible during the month).
 - b. If you only have monthly indicators, use those.
2. Select members who have 9 or more months of medical coverage during the measurement period.
3. Further exclude members who can be identified as having dual eligibility between a commercial plan and either Medicare or Medicaid. If a member is eligible for more than one commercial plan:
 - a. Exclude duplicate eligibility so the member is counted only once.
 - b. **NOTE:** Include all claims for that member where the payer on the claim is primary. As noted in #3 below, do not include claims from secondary payers or where the Coordination of Benefit (COB) amount is not zero.
4. Identify all members who do not have a pharmacy benefit for their entire medical enrollment period. Exclude the pharmacy eligibility and pharmacy claims for these members. In other words, if a member has any months in the measurement period with medical eligibility but no Rx benefit coverage, the member is treated as if s/he had no pharmacy benefit at all and no pharmacy claims for the measurement period.
5. Also exclude any pharmacy eligibility outside of the medical eligibility period; that is, exclude pharmacy eligibility and claims in months during which the member has no medical eligibility. If a member has no medical eligibility at all, exclude that member as indicated above.
6. Exclude any members known to have capitated lab or any other capitated service where the claims for that service would not appear in the data or would not have appropriate allowed amounts.

STEP 1C. SELECTION OF CLAIMS

Select claims for the analytic data set using the following criteria.

SELECT CLAIMS DATA

1. Include only the claims associated with the members selected above and incurred in the measurement period.
2. Exclude denied claims and any claims with zero total allowed amount at the encounter/visit/inpatient event level. Do not exclude individual service lines with zero allowed amount if the total encounter/visit had a positive allowed amount.
3. Exclude claims with any amount other than zero in the COB field or an indication that this claim record is being submitted by a secondary payer. These are assumed to be from a secondary payer and would consequently duplicate payment information from the primary payer.

ASSIGNMENT OF RISK SCORES

The TCOC measures are adjusted for the morbidity of the patients in each panel. Morbidity is measured by the risk score, a number representing the expected cost of each patient, given that patient's acute and chronic conditions as evidenced in claims, compared to the average. Several methods are available for assigning a risk score to patients based on claims and demographics. The TCOC measure set is NQF-endorsed only when the Johns Hopkins Adjusted Clinical Groups[®] risk adjuster is used⁷ but the HealthPartners Standard Analytic Package accepts other risk scores. Details for assigning ACG categories follow.

⁷ <http://acg.jhsph.org/>

STEP 1A. ASSIGNING ACG CATEGORY

ACG categories can be assigned to a set of patients in one of two ways: 1) installing and running the ACG® System on measurement period claims and eligibility information; 2) preparing data extracts and sending them to an outside vendor (for example, DST Health Solutions). [Appendix E](#) outlines the steps for acquiring and installing the software, as well as the instructions for preparing and loading the file to be used with the ACG® System.

Consider the following when preparing the data for the ACG® System:

1. Only the number of diagnosis fields determined to be available from all included contributors should be used.
2. Exclude from ACG® System scoring any claim with zero total allowed amount. Note that following the instructions above these claims have already been removed.

NOTE: The ACG® System is set up to exclude claims with certain CPT codes because diagnoses associated with these procedures can be “rule out” or potential diagnoses rather than actual diagnoses. This requires that the procedure code be supplied along with the diagnosis codes.

NOTE: The Johns Hopkins ACG® System Supporting Documentation/User’s Guide in [Appendix E](#) addresses how to choose the model calculation options for a commercial population.

STEP 1B. EVALUATING ACG ASSIGNMENT

The process of assigning ACG categories, whether through software or vendor service, will produce a Summary Statistics page that reflects the results of running the ACG® System on your data. [Appendix E](#) shows a sample report.

The following may be helpful in reviewing the Summary Statistics report of the ACG® System:

- a. The combined proportion of the population assigned the ACGs 5110 and 5200 should be between 12% and 19%
- b. There should be an immaterial number (e.g., <10) members assigned the ACG 9900
- c. Number of diagnosis fields found on medical services file should be the same as intended
- d. Number of diagnosis fields with data on medical services file should be the same as intended
- e. These measures should be between 5 and 10:
 - i. Average number of unique diagnoses per patient
 - ii. Of those with a diagnosis, the average number of unique diagnoses per patient
- f. These measures should be < 1% of the population:
 - i. Unknown diagnoses encountered
 - ii. Patients with unknown diagnoses encountered
- g. These measures should be zero:
 - i. Patients with unsupported diagnosis code sets encountered
 - ii. Patients with unsupported procedure code sets encountered
 - iii. Patients with unsupported revenue code sets encountered

If the report suggests problems with the data, the user should examine the reasons and resolve the issues before proceeding. It may take several attempts at data preparation to get the file in the exact format required by the software. If issues with extract preparation are ruled out, and the problem is found to be in the data source itself, it may be necessary to ask for resubmissions or eliminate data contributors whose information is inadequate to support ACG assignment.

Note that ACG assignment works independently for each patient. If the analytic team decides to exclude some patients from the population, it is not necessary to rerun the ACG assignment.

STEP 1C. ASSIGNING RISK SCORES

When you have a file identifying the ACG category for each patient in the population, the actual risk score for each patient can be determined in one of two ways:

1. Use the national risk weight for each category. These weights are calibrated on a very large national sample and are available from the ACG software or from the vendor service.
2. Calculate the relative cost of each ACG cell in the population being used to calculate TCoC measures.

The choice between the two depends on the goals and priorities of the stakeholders in the TCoC process. National weights are based on a large population, probably much larger than in any one APCD, so are likely more stable and reliable. Local weights reflect the actual period being measured and can therefore more accurately pick up the cost impact of emerging therapies. Local weights can also be calculated separately by service category. For example, the relative Inpatient cost of an ACG cell might be different from the relative Professional cost of that cell. If you choose to calculate local weights, simply divide the average cost of the members in each ACG cell by the overall average cost. All the patients in a single ACG cell receive the same risk score.

RUNNING THE HEALTHPARTNERS STANDARD ANALYTIC PACKAGE⁸

At the time of this publication, HealthPartners offers five analytic packages for implementing Total Cost of Care and Resources Use free of charge.⁹ This Technical Resource refers to the Standard Analytic Package, which consists of SAS software and data tables as well as documentation on how to run the steps. The documentation can be accessed online prior to acquiring the package.¹⁰

This Technical Resource is intended to supplement, not replace, the HealthPartners Standard Analytic Package documentation.



Voices From The Field: **Data Assessment Tips**

Through collaboration - asking questions, sharing ideas, trouble shooting, and establishing quality checks with the technical advisors – the project team has gained a number of insights as to what sort of data issues may drive results that fall outside of the guidelines above. Some of their insights are shared below.

- *Do not assume that corrections to previous rounds of data have been carried forward to current data submissions, double check that all past corrections have been maintained.*
- *It is helpful to compare your data to 'typical' sample results to see where there is variation – some differences are appropriate and explainable, others are curious and need further exploration, and still others indicate an obvious submission or data processing error that requires follow up.*
- *Having some knowledge about the plan submitting the data can be helpful in identifying issues – some may have more variation than others and appear to be an outlier when in fact it may be a managed Medicaid or Medicare Advantage plan that was not identified as non-commercial.*
- *If the volume of claims or the PMPM value trails off toward the end of the 12 month period, there may be an issue with claims run-out.*

⁸ https://www.healthpartners.com/ucm/groups/public/@hp/@public/documents/documents/cntrb_039627.pdf

⁹ https://www.healthpartners.com/ucm/groups/public/@hp/@public/documents/documents/cntrb_042113.pdf

¹⁰ https://www.healthpartners.com/ucm/groups/public/@hp/@public/documents/documents/dev_057642.pdf (or Google "HealthPartners Standard Analytic Package")

STEP 1A. ASSIGNING TCRRV™

Year: The Standard Analytic Package contains 3 years of TCRRV™ lookup tables. Select the year that corresponds to the intended measurement period. If the measurement period contains portions of 2 calendar years, claims files can be separated into two pieces and run through the TCRRV™ process separately, specifying the appropriate year of TCRRV™ for each piece.

Billed Amount: The HealthPartners methodology makes use of the billed amount on each claim to judge whether the TCRRV™ is appropriate. If you do not have billed amount in your data, you can calculate a billed amount from the allowed amount and a general sense of the discount rate for each service type (IP, OP, Professional and Rx) in the market represented by the population.

Claim structure: The TCRRV™ methodology expects the data to be organized into claims (encounters) with each service on a separate line. All services in the same encounter have the same encounter ID, with a separate line field to differentiate the services within an encounter. If the software detects duplicate line numbers within the same Encounter ID, it will stop running and generate an error message to that effect.

Paid amount: When the HealthPartners documentation refers to paid amount they are referring to what is termed 'allowed amount' in the Technical Resource.

Software updates: HealthPartners updates TCRRV™ values yearly and methodology as needed. Check their website¹¹ for the latest information.

STEP 1B. EVALUATING TCRRV™ ASSIGNMENT

The TCRRV™ SAS code will assign a TCRRV™ value to each claim line in the submitted file. One output of the system is a report showing the count of claims found to be NORMAL (that is, the billed amount was within the range expected based on the identifying information such as DRG, procedure code, or NDC, along with LOS, unit count or quantity and considering place of service, and type of claim) and the count of claims falling into several non-normal categories (HIGH, meaning the billed amount was much higher than expected; LOW, meaning the billed amount was much lower than expected; NO MATCH, meaning the software could not find a match in its tables for the procedure code on the claim; etc.) About 95% of the claims within each service category should have a NORMAL flag. If the proportion of NORMAL is significantly lower, some adjustment may be needed to the input data.

TCRRV™ is run separately for IP, OP, Professional and Rx claims. When all 4 service categories are complete, it may be helpful to run the following comparison of actual allowed with assigned TCRRV™: Calculate the sum of the TCRRV™ and allowed amount by IP, OP, Prof and Rx. [See sample tables in Appendix F.](#)

Overall, the total TCRRV™ is expected to be about the same as the total allowed amount. Differences from 1.0 in the Ratio are supposed to reflect relative pricing in the region to which TCOC is being applied. If the results of the above comparison show something substantially different from 1.0 that is not explained by common knowledge about prices in the region, there may be a problem occurring in the assignment process due to a discrepancy between the software expectation and the data being supplied.

STEP 1C. ATTRIBUTION

HealthPartners Standard Analytic Package produces cost and resource utilization scores for groups indexed to the average for all groups. The package accepts any grouping the user wishes to compare, but the original intent and most common application is provider groups (practices, practice locations, hospital systems, etc.).

¹¹ <https://www.healthpartners.com/hp/about/tcoc/toolkit/>

The scores for each group are based on the set of patients who belong to that group. The process of determining which provider group each patient belongs to is called attribution.

The Standard Analytic Package includes code that will perform attribution. See HealthPartners documentation¹² for a description of the methodology.

Most regions participating in the The Pilot had previously worked with stakeholders in their respective communities to agree on a methodology for attributing patients to primary care practices. The option to change to a consistent methodology across regions to enable comparison of cost measures was evaluated. It was determined that the value offered by consistency did not outweigh the challenge associated with standardizing the method across regions. Users may find strong opinions about attribution in other regions, affecting whether they can use the version found in the HealthPartners code or have to find another way of creating the grouping file.

Regardless of the methodology used, the process should result in a file that will identify the single set within a grouping to which each member belongs. The software accepts up to 3 groupings per patient, but these must be distinct groupings (e.g., age and zip code) not two sets within the same group (e.g., Practice 1 and Practice 2).

STEP 1D. CREATE TCOC MEASURE FILE

The last step in the process brings together the member and claims information, the TCRRV™ results, attribution (or other grouping), and risk scores. The HealthPartners documentation describes how to run the SAS programs to produce the final file which creates measures at the grouping level compared to the population of all groups.

BENCHMARK DEFINITION

The group scores in the output of the TCOC measure process are indexes, meaning that each group's result is a number that reflects the group's performance relative to a benchmark. That benchmark by default is the performance of all groups combined. For example, the TCI (Total Cost Index) is the ratio of the risk-adjusted cost per member month for each group to the cost per member month of all the panels combined. A TCI of .95 means that the group cost 5% less than average (the benchmark); a TCI of 1.08 means that the group cost 8% more than average.

It is possible to define the benchmark differently. If you choose to do this, you will have to make changes to the HealthPartners SAS programs.

¹² https://www.healthpartners.com/ucm/groups/public/@hp/@public/documents/documents/dev_057642.pdf



Voices From The Field: **Selecting Benchmark Population**

Each region needs to decide locally on which patients and clinics to include in the benchmark comparison. Q Corp in Oregon included all patients attributed to clinics that were eligible to receive a report, and excluded two types of clinics that have very different patient profiles: women's health clinics and immediate care clinics.

Maine Health Management Coalition separated practices for whom reports are generated from those who are included in the benchmark for the calculation of TCI. This allows for keeping the benchmark to just those practices who are likely practicing in similar ways, and which therefore provide a valid comparison against which the cost data is indexed. At the same time, those practices who are curious to see how they compare to a standard primary care practice can be engaged through reporting, without impacting the benchmark

Note that the output of the process is a file with the group level results. Creating publications that convey the information appropriately to various audiences is the responsibility of the user.

Pilot project participants used a variety of reports and websites to present TCOC information.

Summary

This Technical Resource contains information that may be helpful to those trying to calculate the HealthPartners TCOC measure set on an All-Payer Claim Database (APCD). A multi-contributor data source presents particular challenges to a process that relies on consistent and complete information to produce comparable results. Building a provider linkage file from the identifiers on claims to the groups the user wants to report on also requires significant investment of time and money and is a critical step to ensure accurate attribution.

APCDs offer a robust source of information that can enable reporting about how providers practice, and how the decisions they make affect the cost of healthcare. This feedback is invaluable to both providers and the community they serve. This Technical Resource is offered to help smooth the path and make it easier to produce that information.

To continue conversations, share best practices and get peer support around measurement of Total Cost of Care using multi-payer data sets, we encourage you to join the Getting To Affordability Community, an NRHI-led social learning platform designed to connect peers and stakeholders across the healthcare spectrum with the larger community. To learn more and to register, email gettingtoaffordability@nrhi.org.

For questions for the APCD Council or to join the APCD Council Learning Network, please contact info@apcdouncil.org.

Questions and feedback may be directed to:

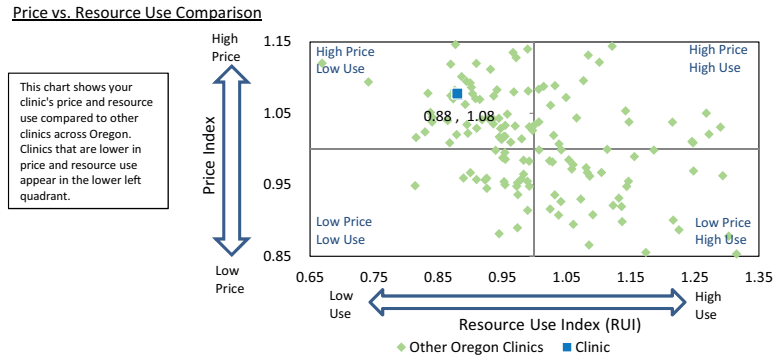
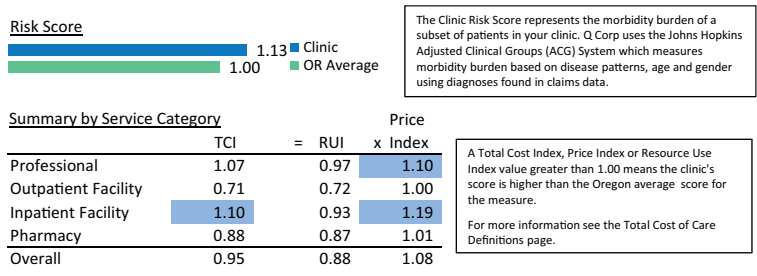
Ellen Gagnon
Executive Director TCOC and Project Management Collaboration
Network for Regional Healthcare Improvement
gettingtoaffordability@nrhi.org

APPENDIX A: PRIVATE REPORTING SAMPLES

All regions who participated in The Pilot reported TCOC information privately, and some also reported results publicly. Reporting styles and methods vary and must meet local needs. The project team agreed that consistency for multi-region comparisons must be balanced with customizations which maximize local impact. Common reporting elements include patient demographics, risk score, TCI and RUI by service setting, and a Regional Practice Comparison Scatter Plot.

Sample image is an excerpt from Q Corp's practice reporting package:

Some key findings from ABC Clinic's report:

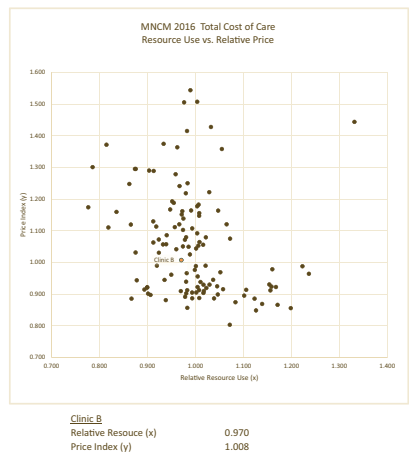
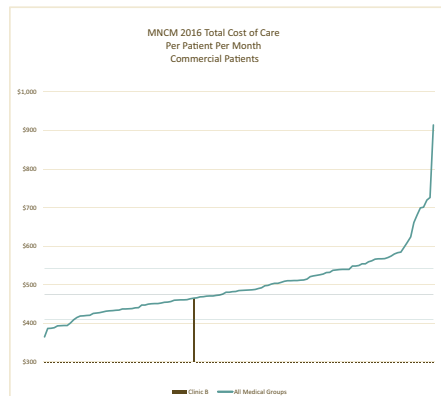


Sample image is an excerpt from MNMCM's practice reporting package; MNMCM also provides public reporting via their website, visit www.MNHealthScores.org for more:

MN Community Measurement: 2016 Commercial Cost and Utilization Report Suite

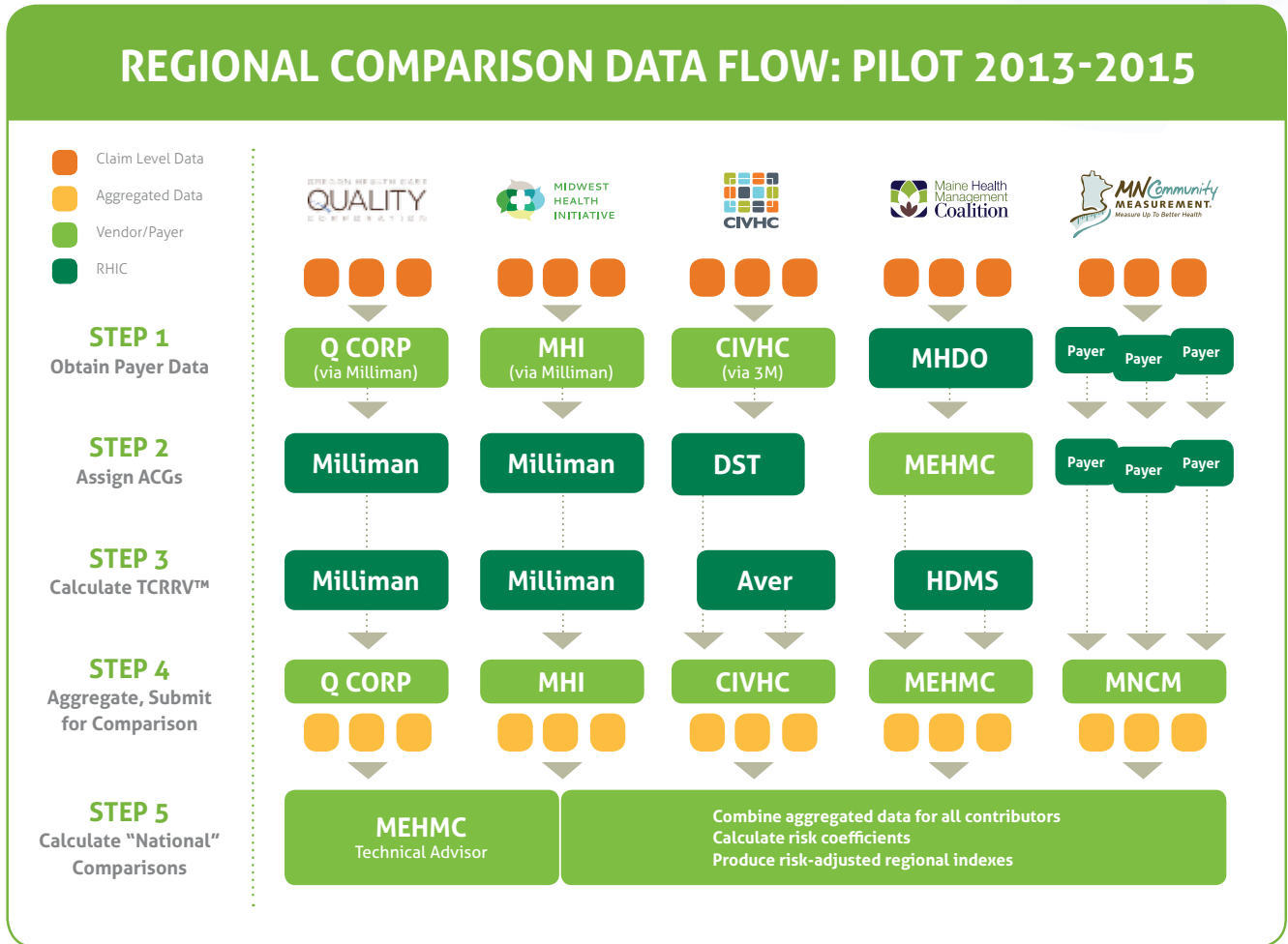


Group No:	Tax ID Number(s):	Date of Service Range:	Adult	Pediatric	Total	Definition
Clinic B		1/1/15 - 12/31/15				
			\$542	\$241	\$465	Cost per patient per month, adjusted for patient risk.
			\$558	\$238	\$476	Market average for all medical groups in measure.
			0.972	1.014	0.978	Relative Cost of medical group compared to market. 1.0 = average
			39 out of 112	47 out of 73	51 out of 125	Rank from lowest Total Cost Index to highest Total Cost Index.
			Average	Average	Average	Rating to be displayed on MNHealthScores.org
			1.008	0.964	0.970	Amount of resources used per patient, relative to medical groups in the market, adjusted for patient severity. 1.0 = Average
			1.008	1.006	1.008	Relative pricing compared to market (1.0 = Average). Calculation = TCI/TCRRV™ Index



APPENDIX B: BENCHMARK DATA FLOW FROM TCOC PILOT

As part of The Pilot, participants took the additional step of creating regional comparisons. This diagram illustrates the multiple pathways taken during the initial pilot to calculating the aggregated data for regional comparison.



APPENDIX C: DEFINITIONS

ALLOWED AMOUNT – The allowed amount is technically the negotiated payment amount between an insurance plan and a provider for each service. For claims analysis it is generally accepted to be calculated as the sum of the amount the plan paid and the amount the member paid through copay, coinsurance and/or deductible.

ATTRIBUTION – Attribution is the process of examining medical claims to assign a patient to the provider who was most likely serving as the patient’s Primary Care Provider (PCP) during a measurement period.

EXCLUDE/EXCLUSION – Measuring provider performance accurately using administrative claims data depends on finding the appropriate subset of information that reflects the provider most clearly, avoiding distortions associated with unusual events or incomplete information about patients. For example, the TCoC process selects patients by age range and eligibility span. This document recommends some additional selection/exclusion of data from APCDs to further the goal of reflecting provider practice patterns clearly. These recommendations apply specifically to the TCoC process; the data should be excluded only from this process, not deleted from the APCD.

MEDICAL PRACTICE/PRACTICE/PROVIDER GROUP – A medical practice, practice, or provider group, is a group of individuals with healthcare credentials (physicians, nurses, nurse practitioners, physician assistants, chiropractors, physical therapists, etc.) who provide health care services and are affiliated in some way. Generally, they have a practice or system name so that the public perceive them to be associated with each other, although on some occasions the association can be less obvious. In practices and groups, the participating providers likely have common financial interests.

MULTI-PAYER – Multi-payer, as described in this Technical Resource, refers to the aggregation of administrative claims data from multiple entities who adjudicate claims for either fully-insured plans (where the processing entity also is at financial risk for the claims) or self-insured plans (where another entity, such as a large employer, is at financial risk and contracts with the processing entity to receive the claims and send appropriate payment to the providers). Because each processing entity has distinct rules and data storage arrangements, the APCD must work to ensure that conformance with a common data design represents all the contributors’ data in a comparable way.

THE PILOT – As it relates to this Technical Resource, The Pilot refers to the NRHI Total Cost of Care (TCoC) Pilot project.

APPENDIX D: DATA FIELDS REQUIRED IN SOURCE DATA

Field	Purpose of data element	Notes
Patient Id	Necessary to link all claims and eligibility for the same individual	Within the database the ID must be consistent. However, this can be anonymized such that the value is meaningless outside the database used for TCOC.
Patient age	ACG calculation as well as limits for TCOC	
Patient sex	ACG calculation	
Claim type	Separate claims into Facility (UB 04) or Professional (CMS 1500) for TCRRV™ processing	
Claim or encounter number	Group service lines of the same claim for TCRRV™ processing	This may come from the data supplier or may be constructed by the user or vendor.
Claim or encounter line number	Differentiate service lines of the same claim	Need line level detail on facility claims.
Admission number	Group all claims related to the same inpatient admission so each is counted only once	Usually is constructed by user, not available on data submissions.
Service Begin Date/ Service End Date	Used to select claims for all calculations	For one day services (most professional and outpatient facility claims) begin and end dates will be the same so it doesn't matter which is used. For Inpatient stays, decide whether to include those with admission dates in the relevant time period or discharge dates in that time period.
ICD9 / ICD10 diagnosis codes	ACG calculation	The number of code positions per claim varies by data source. Primary diagnosis should be available on 100% of claims. Secondary and subsequent diagnoses are not required on all claims, but should be populated on some. For TCOC purposes, identify the fewest positions that any one payer populates and use only that number of diagnoses per claim across all payers.
Bill type code	Separate inpatient and outpatient claims for TCRRV™ assignment	Only available on facility claims (UB04).
Revenue code	Separate acute from non-acute Inpatient records for TCRRV™ process	Only available on facility claims (UB04).
Place of service	TCRRV™ assigns different amounts to professional claims depending on where the service was delivered (Facility or Office)	Only available on professional claims (CMS 1500).
Units of service for HCPCS Code	Multiplies the unit TCRRV™ for the HCPCS code	

APPENDIX D: DATA FIELDS REQUIRED IN SOURCE DATA (CONT.)

Field	Purpose of data element	Notes
HCPCS/CPT code	Basis of assigning TCRRV™, also necessary for attribution and filtering claims used in ACG assignment	Make sure this is available on both professional claims and on services lines of Outpatient facility claims. At least 90% of Outpatient facility claim lines should have a HCPCS/CPT code. Inpatient service lines do not need them and are not likely to have them.
HCPCS/CPT code modifier	Used in assigning TCRRV™	Many data sources have more than one modifier. Only the first one is used in TCRRV™ processing.
Allowed amount	Part of Total Cost of Care measure. Also used as a test of reasonableness in the TCRRV™ process	Allowed amount is the sum of the plan paid and member contributions (coinsurance, copay and deductible). This is required at the line level.
Billed amount	Used in TCRRV™ process	Can be calculated/estimated from allowed amount if not available in original data source. This is required at the line level.
MS-DRG	Used as the basis of TCRRV™ for inpatient claims	There are several different DRG systems in use; the same code can mean different things depending on which system is being used. Because this field is not used or supplied consistently across commercial payers, data sources with multiple contributors will likely need to have this field added through an MS-DRG assignment application.
Length of stay	First and subsequent days of inpatient stay are assigned different values as part of calculating the TCRRV™ for inpatient claims	
Servicing/Rendering provider ID	Attribution	The NPI is the most useful and consistent way of identifying providers. All data sources should be able to supply NPI.
Servicing provider practice affiliation	Attribution	For consistency, this should come from a common source across all data contributors. This often requires that a database linking providers to practices and/or systems (any desired subjects of TCOC reporting) be constructed and maintained.
Servicing provider specialty	Attribution	This may appear on the claims data source, or it can be supplied by a reference file. Data contributors often use different systems to identify provider specialty. It will be necessary to either write the system to accommodate the different values or create a common variable by either mapping individual contributor values to a common set or mapping the provider ID to a specialty in a database such as the NPES. ¹
NDC	Basis of TCRRV™ for pharmacy claims	
Drug quantity	Multiplies the unit TCRRV™ for the NDC	This field is also called pill count.

¹ NPES is the National Plan and Provider Enumeration System. Downloads of all NPIs with demographic information are available here http://download.cms.gov/nppes/NPI_Files.html

APPENDIX E: JOHNS HOPKINS ACG® SYSTEM SUPPORTING DOCUMENTATION

ACG INSTRUCTIONS FROM MNCM/ACG SUMMARY STATISTICS

Data Requirements

OVERVIEW

This appendix provides an overview of the general data requirements for the ACG® System Software and its subsequent applications. The appendix is intended for the analysts and programmers who will be planning and performing ACG-based analyses.

The ACG® System Software is designed to operate using data typically retained in machine-readable health insurance claims or encounter data files. In addition, member enrollment files detailing age, gender, and other demographics for each unique patient (not just the subscriber to the insurance policy) are generally required. Assignment of risk assessment variables can be accomplished by constructing a minimal data set composed of at least the minimum following data elements:

- A unique identifier for every member eligible to use services during the study period
- The age or date of birth
- The gender of each member
- All relevant International Classification of Disease (ICD) diagnosis codes assigned by providers for all encounters during the risk assessment time period in question

If ICD diagnosis information is available, the software will assign all of the following:

- Aggregated Diagnosis Groups (ADGs™, the 32 morbidity markers)
- Adjusted Clinical Groups (ACGs, the actuarial cells)
- Concurrent weights for each ACG category based on national reference data
- Resource Utilization Bands (ACGs collapsed into six categories from very low to very high resource use)

Selecting Relevant Diagnoses for Input to the ACG Software

In the United States and elsewhere, healthcare providers of all types record diagnostic codes on insurance claim forms and other types of administrative records. These diagnoses are generally reasonably accurate and have proven quite useful in understanding the case-mix of various populations. However, there is a series of coding-related issues and analytic approaches that is discussed here to help the user maximize the accuracy of the ACG assignment by preprocessing the International Classification of Disease (ICD) stream input into the ACG grouper.

ANALYSIS TIME FRAME

The ACG® System is calibrated to use one year of data with an appropriate run-out period. For example, the data required to perform a retrospective profiling analysis on calendar year 2011 should include all diagnosis and demographic information collected between 01-01-2011 and 12-31-2011 after allowing for run-out/claims lag.

EXCLUDING LAB AND X-RAY CLAIMS

Most health plans collect claims information from clinical laboratory, diagnostic imaging, and durable medical equipment providers that include diagnosis information. These claims **should not** be used to determine morbidity. The diagnoses on these claims often, and perhaps even primarily, represent rule-out, suspected, or provisional codes. The inclusion of such diagnoses could result in many false positives. For example, all women receiving a blood test for pregnancy will likely be classified as pregnant if the assignment is based on this lab service claim. Therefore, when identifying ICD codes to input to the ACG grouper, selecting diagnoses from all service claims within a specified time frame, **excluding durable medical equipment, lab and x-ray**, is the recommended approach.

It is recommended that the input files be pre-screened and lab, x-ray, and other provisional diagnoses be excluded in accordance with the rules below. **Table 1: Typical Place of Service Codes to Exclude and Procedure Code Ranges to Exclude** provides a listing of the typical place of service codes and procedure code ranges to exclude.

TABLE 1: TYPICAL PLACE OF SERVICE CODES TO EXCLUDE AND PROCEDURE CODE RANGES TO EXCLUDE

Typical Place of Service Codes to Exclude	Procedure Code Ranges to Exclude
'12' /* private residence/home */	36415 - 36416 /* drawing blood */
'31' /* skilled nursing facility */	70000 - 76999 /* x-ray and ultrasound */
'32' /* nursing home */	78000 - 78999 /* imaging */
'33' /* custodial care */	80000 - 87999 /* lab tests */
'34' /* hospice */	88000 – 88099 /* autopsy */
'41' /* ambulance - land */	88104 - 88299 /* cytopathology */
'42' /* ambulance - other */	88300 - 88399 /* surgical pathology */
'65' /* renal dialysis */	88720 – 88741 /* in vivo */
'81' /* independent lab */	92551 - 92569 /* hearing tests */
'99' /* unknown */	93000 - 93350 /* ECG and ultrasound */
'00' /* non-CMS code for pharmacy */	99000 - 99001 /* specimen handling */
	G0001 /* drawing blood (HCPCS) */
	E0100-E9999 /* durable medical equipment */
	L0100 – L4599 /* Orthotics */
	L5000 – L9900 /* Prosthetics */
	P2028 – P9999 /* Pathology and Lab */
	R0070 – R0076 /* Radiology */
These place of service codes may be unreliable sources for morbidity information. Diagnoses from these claims are used when they are accompanied by an evaluation and management procedure (99201 – 99499) that indicates a face-to-face visit with a practitioner. All other instances of these place-of-service codes should be excluded from morbidity assignments.	

INPUT FILE LAYOUTS

Before using the ACG® System, source data text files must be extracted from the claims or administrative system. This document lists the recommended source data files required as input for ACG® System processing, as well as general extraction rules that apply to all source data files. Data from source data text files are imported into the ACG® System using the **File New** menu option. Source data files are text files and can be assigned any filename. Text files extracted from the claims system must follow pre-determined formatting requirements. The requirements are specific to the type of data each table will contain, and are outlined below.

GENERAL EXTRACTION RULES

The source text files MUST be in ASCII text format. Each row must contain a carriage return line feed indicator (CRLF in Windows). The default patient data file format is a tab-delimited, optionally quote enclosed, text file (sometimes called a tab-delimited data file) with the following columns in order. An optional, comma-delimited, quote-enclosed text file can also be used. These formats are directly supported by Microsoft Excel®, Microsoft Access®, and a variety of other tools. The organization is required to select whether or not the file contains a header record with column names. Each table should follow source text file rules with respect to formatting and data type. For most fields, the ACG® System does not require fixed field lengths and can adapt most columns to the length of the data provided. Any exceptions to this are noted in the specific file requirements. In the typical ACG application, a twelve-month period of incurred claims experience is extracted.

PATIENT DATA FORMAT

This file contains one row per Patient ID only. The only required columns in this file are patient_id, age, and sex (**Table 2: Patient Data Forms**).

TABLE 2: PATIENT DATA FORMAT

Column Name	Column Description	Data Type	Example
patient_id	A unique string to identify this individual member.	Text	9567213984-01
age	The patient's age (in years) as of the end of the observation/reporting period.	Number	25
sex	A single character or digit to indicate whether the patient is a Male or Female. The software will use F or 2 to identify a Female, all other values indicate Male.	Text	M

MEDICAL SERVICES DATA FORMAT

The default medical services data file format is a tab-delimited or comma-delimited, optionally quote enclosed, text file with the following columns in order (**Table 3: Medical Services Data Format**). This format is directly supported by Microsoft Excel and Microsoft Access and a variety of other tools.

This file should contain all diagnosis codes that were experienced (incurred) for each patient during the observation period. There can be zero, one, or more rows per Patient ID. The patient_id and dx_cd_1 columns are required. The organization can optionally provide ICD codes 2 through 4 for each row. For purposes of this project, only 4 diagnoses will be utilized per record for consistency across data contributors. Duplicating diagnosis codes to accommodate multiple procedures is expected and will not influence the output of the ACG® System. Refer to the discussion above on "Selecting Relevant Diagnoses for Input to the ACG Software."

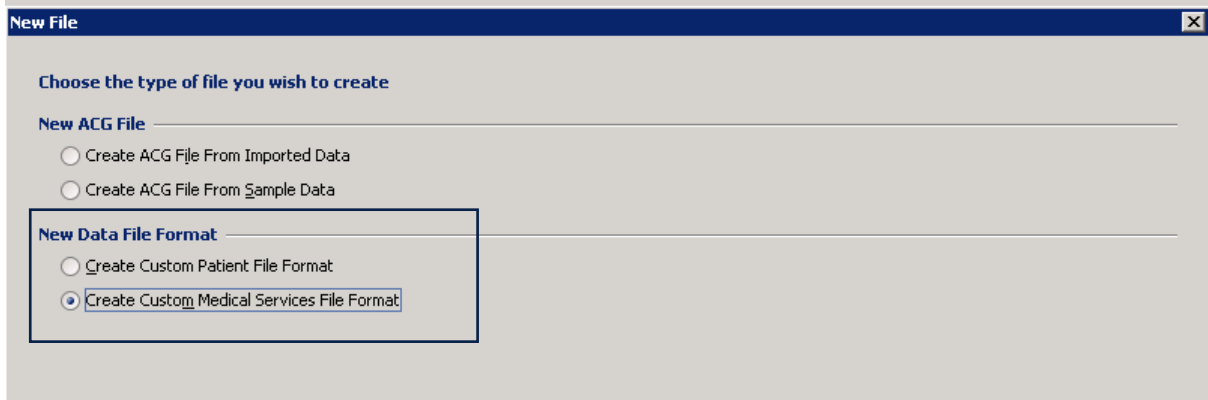
Column Name	Column Description	Data Type	Example
patient_id	A unique string to identify this individual patient.	Text	9567213984-01
dx_version_1	The code set of the diagnosis code in dx_cd_1. The ACG grouping logic currently supports ICD versions 9, 10 and 10-CM. Additional diagnosis coding systems may be supported. Check with the software distributor.	Text	9
dx_cd_1	The diagnosis code. In ICD coding, this code cannot be longer than seven characters. Optionally an explicit decimal can be included. If a decimal is not included, then the ICD code cannot be longer than six characters.	Text	070.22
dx_version_2	The code set for the related dx_cd_2 column.	Text	9
dx_cd_2	The diagnosis code.	Text	070.22
dx_version_3	The version for the related dx_cd_3 column.	Text	9
dx_cd_3	The diagnosis code.	Text	070.22
dx_version_4	The version for the related dx_cd_4 column.	Text	9
dx_cd_4	The diagnosis code.	Text	070.22
dx_version_5	The version for the related dx_cd_5 column.	Text	9
dx_cd_5	The diagnosis code.	Text	070.22
Service_begin_dt	The from date on the claim.	CCCC-YY-MM	2014-05-13
Service_end_dt	The to date on the claim.	CCCC-YY-MM	2014-05-15
Provider_id	ID of the provider	Text	12345
Provider_specialty	Specialty code of the provider	Text	IM
Provider-specialty_standard	Taxonomy code	Text	207Q00000X
service_place	The place of service in a format that segments inpatient (IP), emergency department (ED) and outpatient (OP) settings for medical services. A recommended format is the (CMS) place of service coding.	Text	IP or 21 (the CMS code for acute care inpatient hospital)
Revenue_code	Revenue code	Text	
procedure_code	The procedure performed by the servicing provider. The recommended format is CPT4 ¹ and / or HCPCS.	Text	99201 (a CPT code copyright AMA)

You can either construct the file to the above specifications, or alter the expectations of the software as shown below.

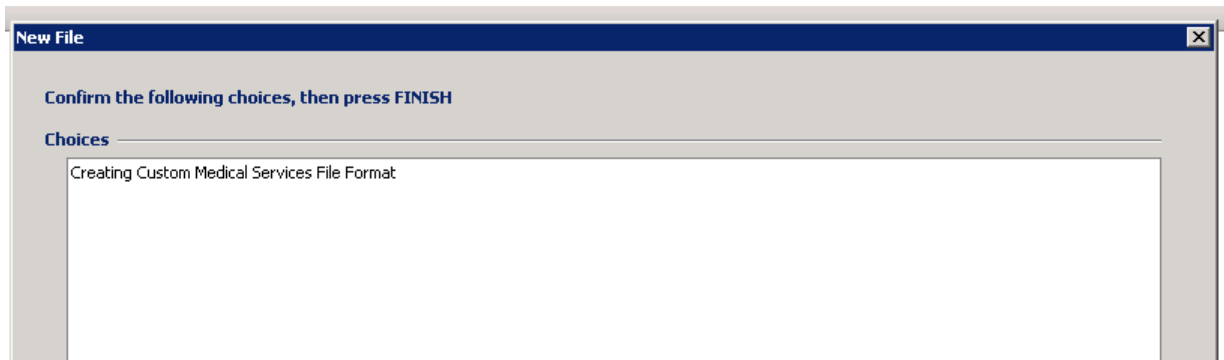
¹ CPT codes copyright 2009 American Medical Association. All rights reserved. CPT is a trademark of the AMA.

To tell the ACG software what your layout is:

Select File Select New

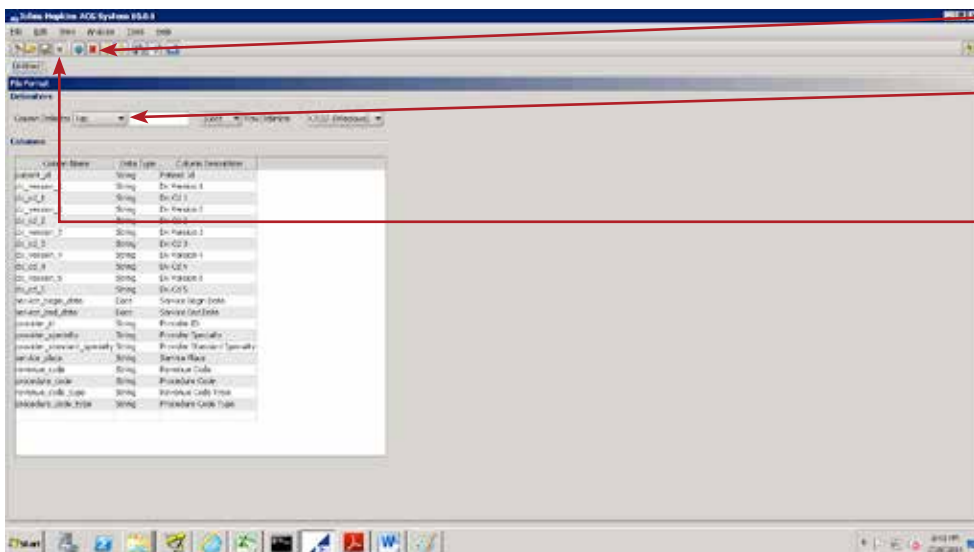


From the New File window, click the **Create Custom Medical Services File Format** radio button, then click **Next**.



Do not make any changes to this screen, just click **Finish**.

The software will bring up the default layout of the medical services file for you to edit. See the notes on the screen shot below for editing tips.



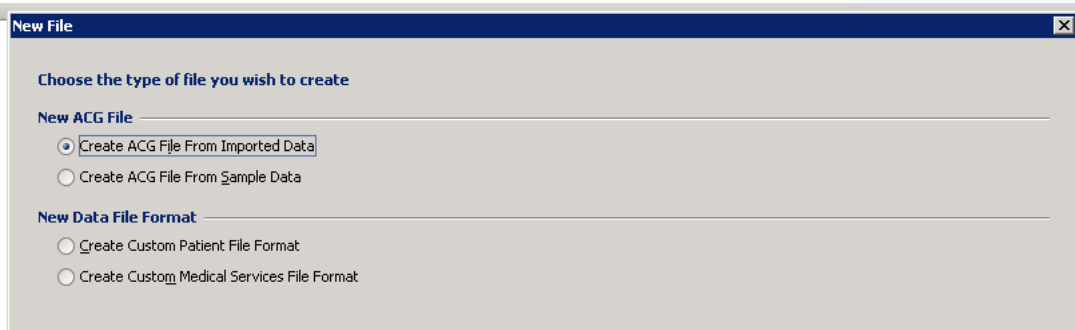
First highlight the field you want to remove, then **click the red x**.

If you are using a .csv file, change the default column delimiter here.

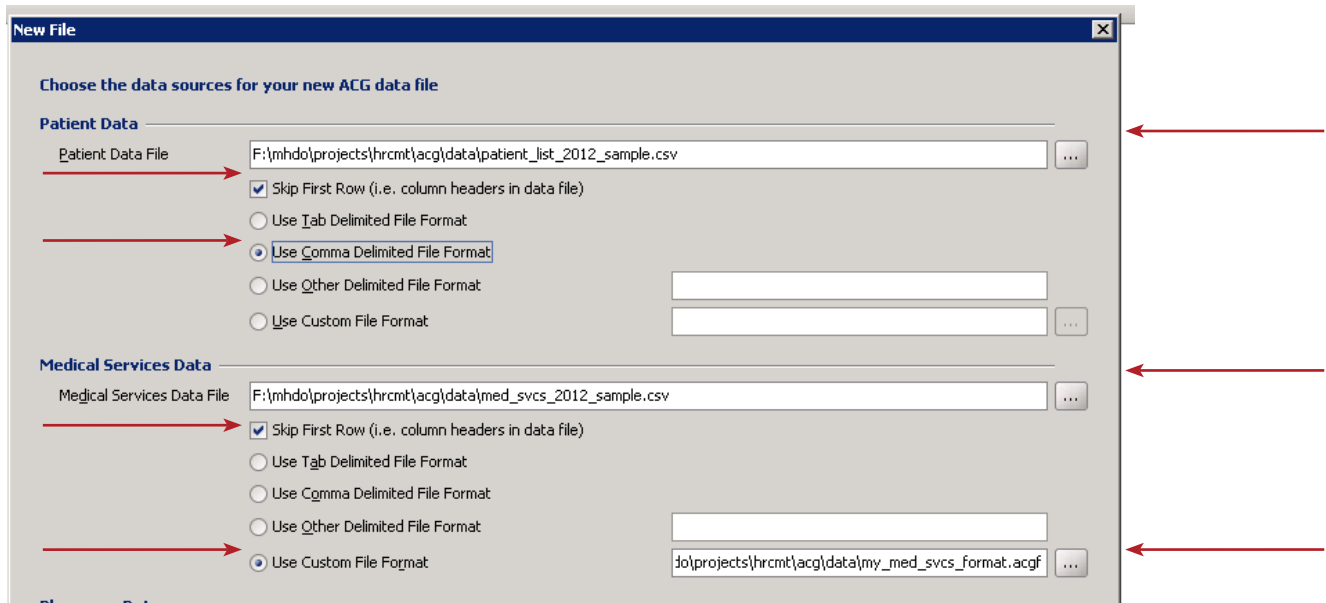
When you are done making changes, and the resulting field list matches the layout of the file you are planning to submit, click **File** then **Save as** and give your format a name.

After saving, **click the black x** (two boxes to the left of the red x) to close out of the editing process.

Now that you have saved your format, start again with **File** then **New**



This time choose the default radio button, **Create ACG File From Imported Data**. Then click **Next**.



The arrows above show places where you might need to make changes depending on exactly what you are using. If you use .csv files for both the Patient Data and the Medical Services Data, and you constructed a Medical Services File in the format you saved above as my_med_svcs_format.acgf, the screen would look like this.

LICENSE CONSTRAINTS

There are license constraints that may limit availability of specific analytical methods. For this project, the license is limited to producing ADGs, Major ADG Count, ACGs, RUBs, reference concurrent weights and age bands.

Installing the ACG Software

The central element of the Johns Hopkins University ACG® System Release 10.0 is a Windows-based reporting application intended to facilitate implementation of the ACG® System within health care settings.

SYSTEM REQUIREMENTS

The Johns Hopkins ACG® System is built to handle relatively large data volumes and processing requirements. The performance of the software is very much based upon the speed and memory of your computer.

Operating System The following versions of Windows are supported:

Windows XP Professional, with Service Pack 1 or greater

Windows XP Home

Windows Vista (32-bit)

Windows Vista (64-bit)

Windows 7 (32-bit)

Windows 7 (64-bit)

CENTRAL PROCESSING UNIT (CPU)

Any Intel® 32- or 64-bit compatible CPU is supported. A Pentium® 4 at 2.0 GHz or faster is recommended.

MEMORY (RAM)

512 megabytes (MB) RAM is recommended. The application will immediately utilize 256 MB upon startup and expand up to 512 MB RAM as necessary.

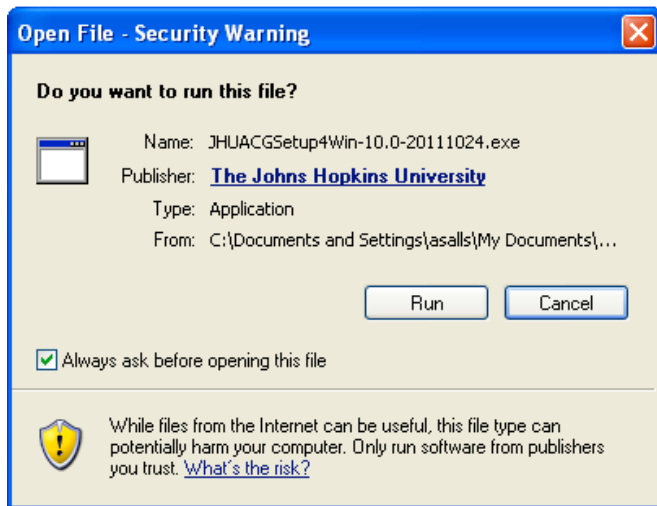
DISK SPACE

The application itself consumes approximately 165 MB of hard drive space. The temporary space required to build an ACG data file is approximately four to five times the size of the import data files. An ACG data file can consume anywhere from five to 100 megabytes per 100,000 patients (depending on the length of member ID, number of diagnoses, etc.). One to ten gigabytes of free disk space is typically sufficient to handle one million patients.

INSTALLING THE SOFTWARE

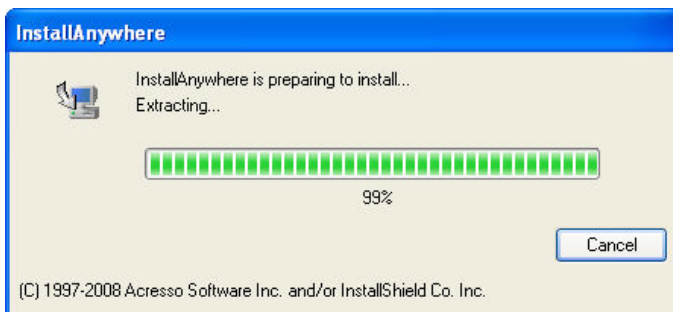
The ACG application is most commonly delivered via FTP. Once the application is downloaded, use Windows Explorer to navigate to the **JHUACGSetup** executable file and double-click to begin installation. If you received an installation CD, insert the CD into your CD-ROM drive. If the installation screen does not automatically appear, choose **Start, Run** from the Windows taskbar, browse to the CD-ROM drive and select the **JHUACGSetup** executable file. The software uses a standard Windows Setup Wizard to install the software into the default or user-defined destination location and will optionally add program shortcuts to the Start Menu Folder. The software installation uses a digital signature to identify The Johns Hopkins University as the publisher of the software. If your software does not identify The Johns Hopkins University, contact your distributor to verify the application's authenticity. Once you verify the publisher, select **Run** to continue with the installation

FIGURE 1: FIRST SETUP SCREEN



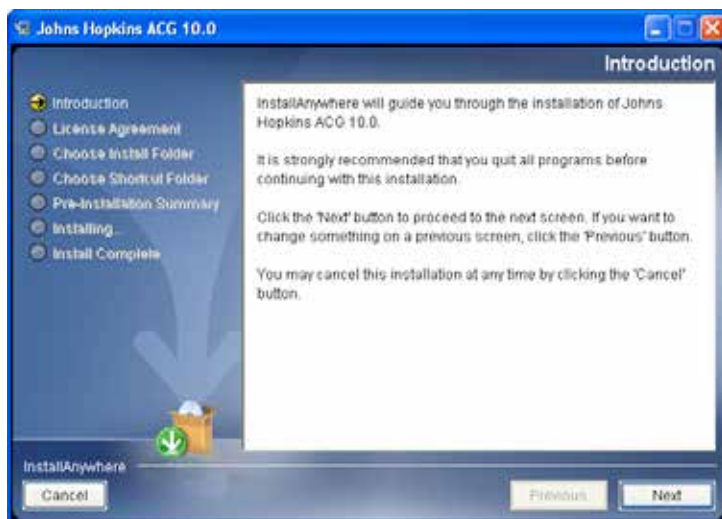
The software will begin extracting files for installation and will present a status screen during this step.

FIGURE 2: EXTRACTION STATUS



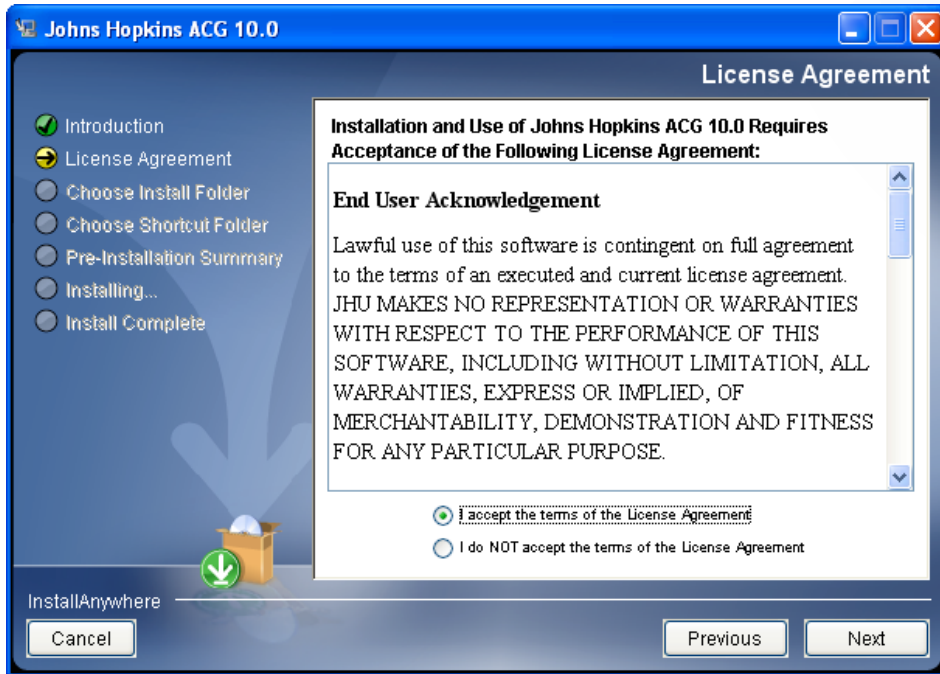
The installation wizard will then begin a guided setup for installing the software. Select **Next** to pick your installation options.

FIGURE 3: GUIDED SETUP



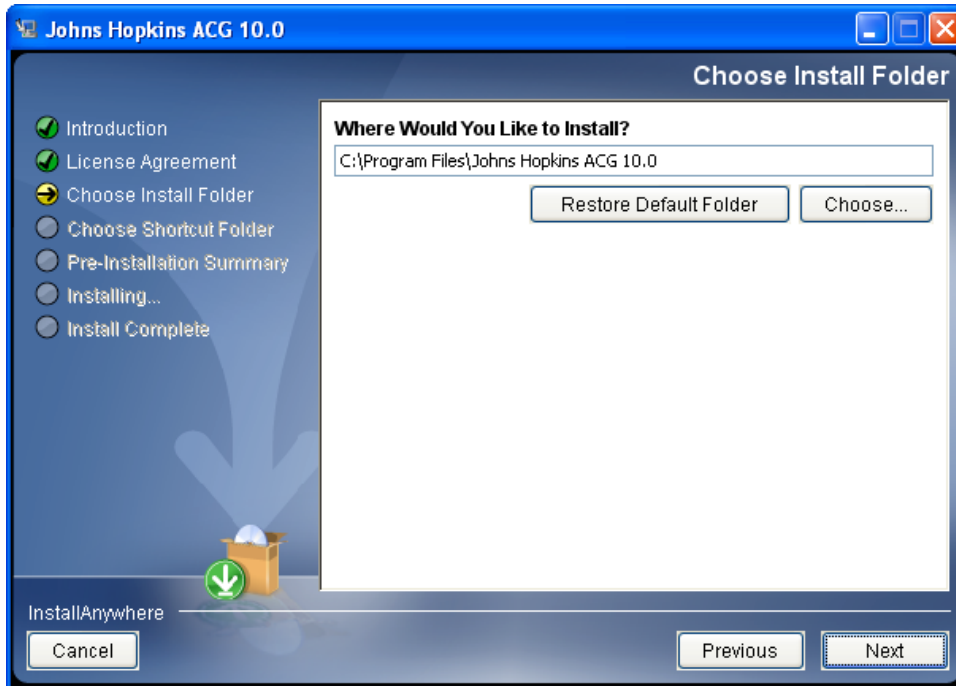
The installation will prompt you to reaffirm your license terms. You must select "I accept the terms of the License Agreement" for the installation to proceed.

FIGURE 4: LICENSE AGREEMENT



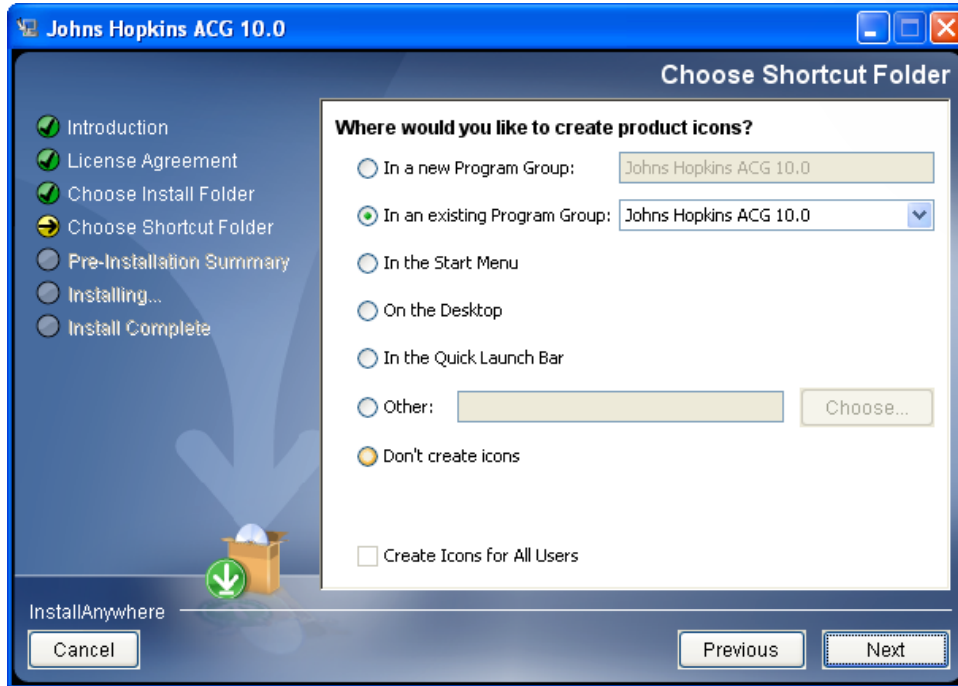
The installation will present a default folder for installation. You may accept the default by selecting **Next**, or you may choose an alternate location for the installation.

FIGURE 5: SELECT DESTINATION LOCATION



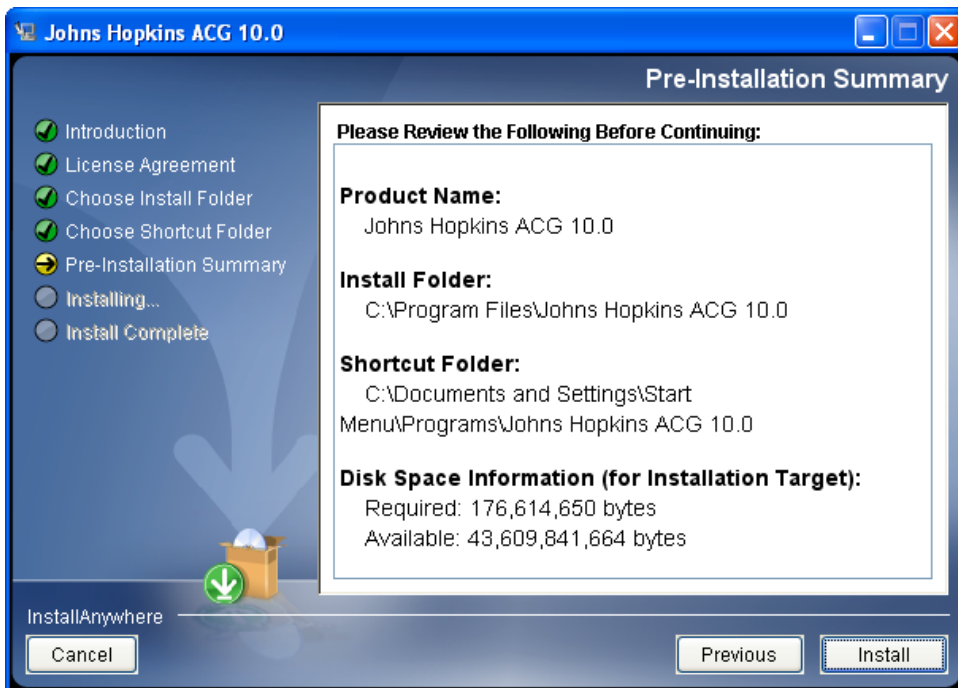
The application will create a shortcut folder with the icons for the application, documentation and reference data in the location of your choice. To accept the program default, select **Next**.

FIGURE 6: CHOOSE SHORTCUT FOLDER



The installation wizard will confirm that there is sufficient free disk space and then present a pre-installation summary for review prior to installing the application. Click **Install** to begin the process of copying files and installing the application.

FIGURE 7: PRE-INSTALLATION SUMMARY



Tip: If you have a previous version of the ACG® System installed and you wish to retain it, be sure to install the new version of the software into a separate folder / directory.

The application will present installation status and the current step.

FIGURE 8: INSTALLATION STATUS

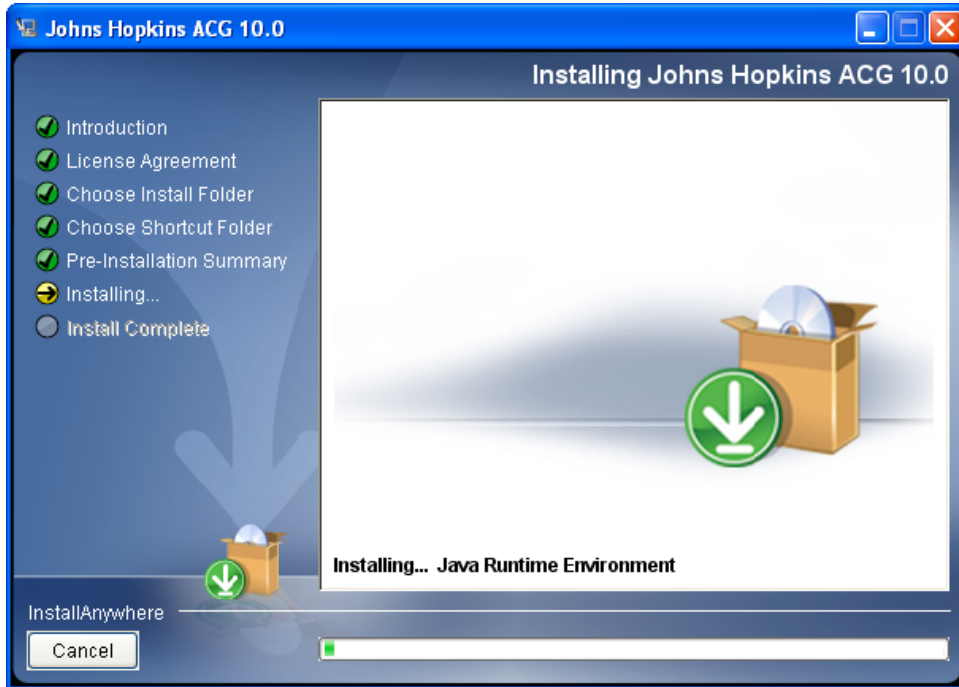
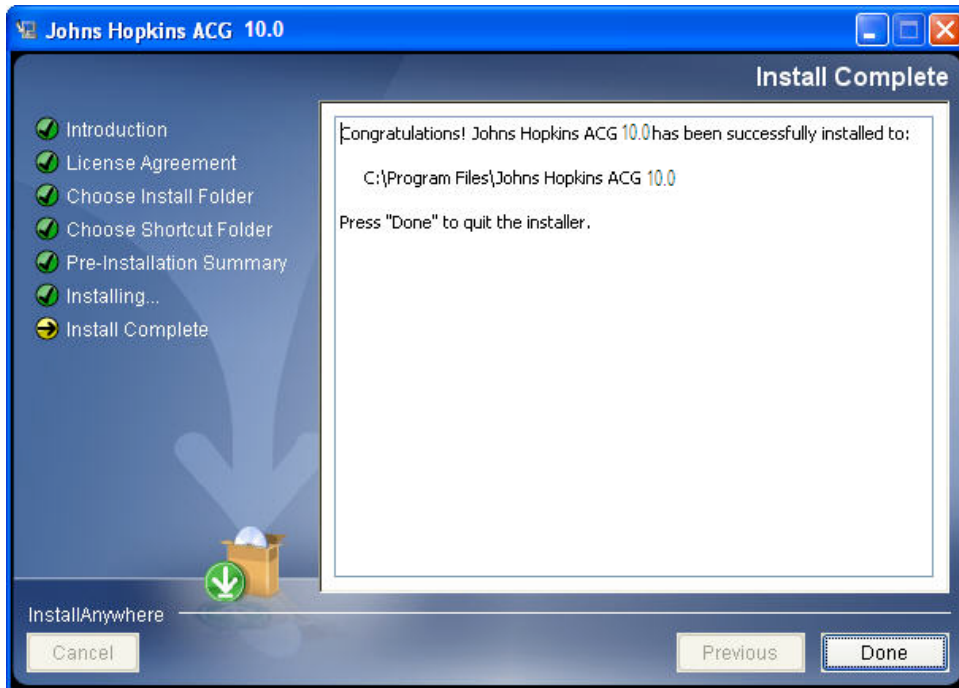
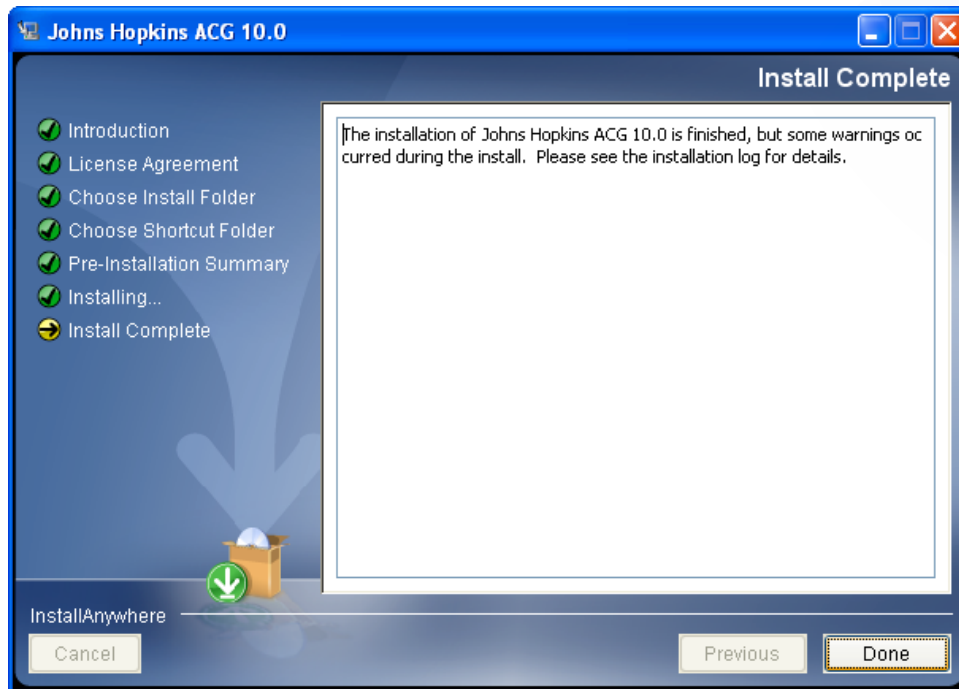


FIGURE 9: INSTALL COMPLETE



If errors are encountered during installation, the user may get a message to review the installation log. This log file can be found in the installation folder; by default this folder is C:\Program Files\Johns Hopkins ACG 10.0. The log file is named Johns_Hopkins_ACG_10.0_InstallLog.log and is a text file that can be opened and reviewed in any text editor. Please provide the log file to your technical support representative to determine next steps.

FIGURE 10: INSTALLATION ERRORS



USING THE SOFTWARE

The ACGs for Windows software is a standard Windows application initiated from the Start menu. Follow these steps to access the software:

1. Click the **Start Menu**.
2. Select **Programs**.
3. Select **Johns Hopkins ACG 10.0**.

Tip: To create a shortcut to the ACG Software on your desktop, simply right-click and drag a copy of the ACG icon to make a shortcut to the software on your desktop.

The Johns Hopkins ACGs subfolder in the Start Menu also contains links to the *Installation and Usage Guide*, *Technical Reference Guide* and the *Applications Guide*, three important pieces of reference material intended to assist you in your implementation of Release 10.0.

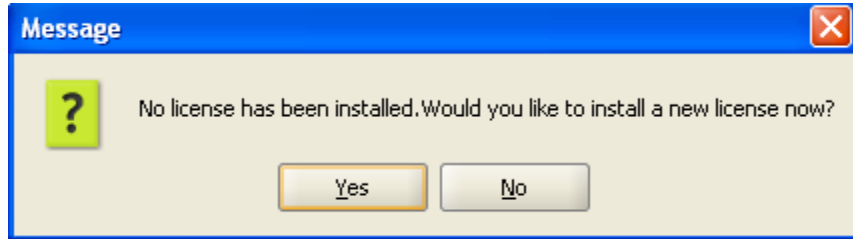
For almost all reports available in the software, results for a Commercial and Medicare reference data set for the under age 65 working age population as well as the over age 65 Medicare eligible population are available electronically as an Excel template which may be accessed via the pull down menu of the Johns Hopkins ACG 10.0 start menu. Users are encouraged to produce their own reports and use this reference comparison data as a benchmark.

The ACGs for Windows application includes an uninstall utility. It is recommended that this uninstall utility be used to remove the ACGs for Windows application to ensure that all aspects of the installation are removed. This can be accessed by using Windows Control Panel, Add / Remove Programs.

ACG LICENSE FILE

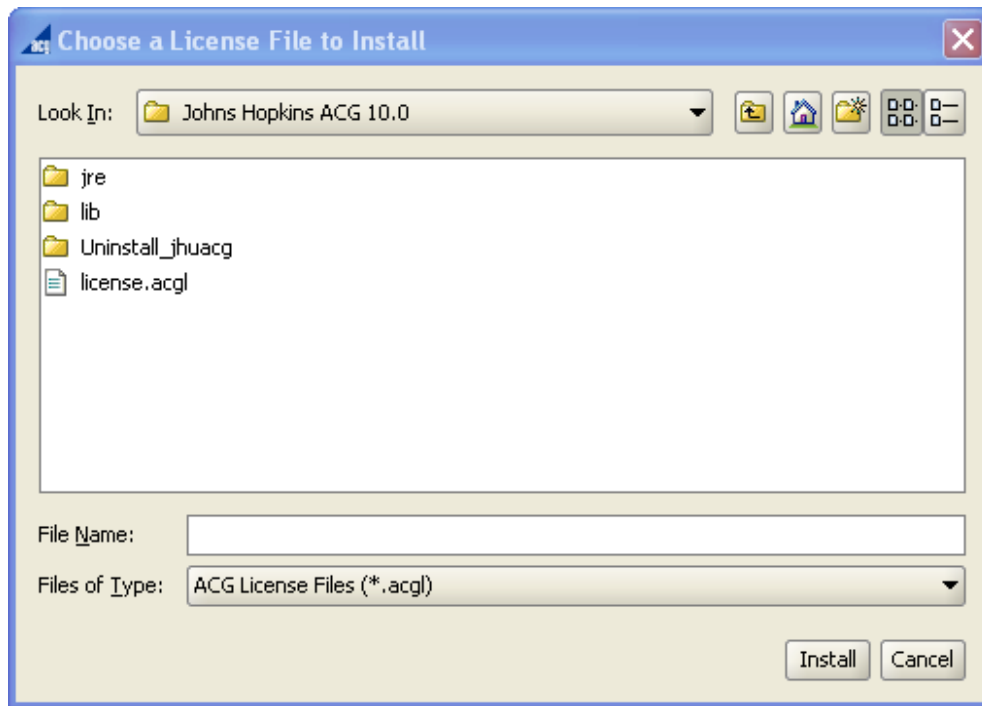
Upon the first initiation of the software, you are asked to install a license file. Each license file is specific to your contract period/licensing terms. If your license expires prior to receiving an update, please contact your software vendor. A standard Windows Wizard guides you through the installation of the new license file.

FIGURE 11: INSTALL THE LICENSE FILE



Click **Yes** to go to the next window (**Figure 12: Choose the License File**).

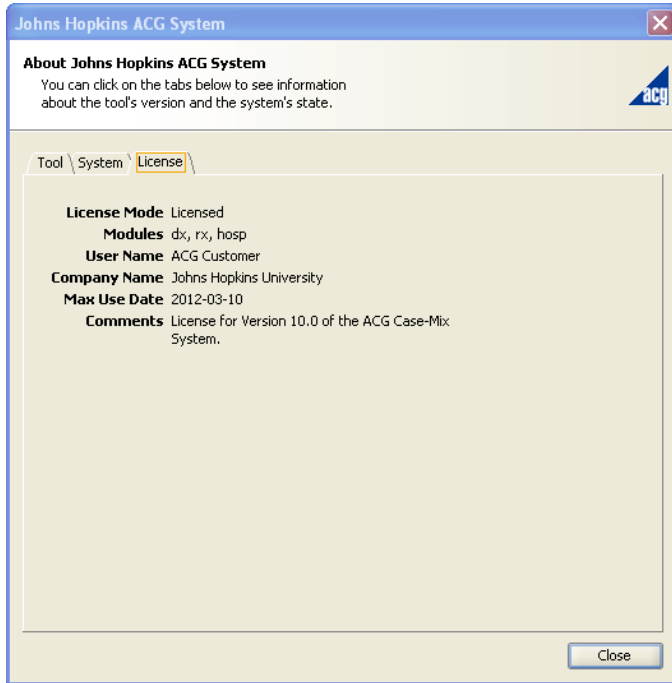
FIGURE 12: CHOOSE THE LICENSE FILE



Click the **My Documents** button to search the desktop for the appropriate file, which is provided via e-mail or with the software installation CD.

Tip: ACG license files have the .acgl extension. If you are having difficulty finding this file, you can use the search function of Internet Explorer to search your desktop for files with this extension, or call your software vendor for additional support. Occasionally this file may be e-mailed to you, so it may be necessary to first save the file from your e-mail program to the desktop before beginning the search using the **My Documents** button.

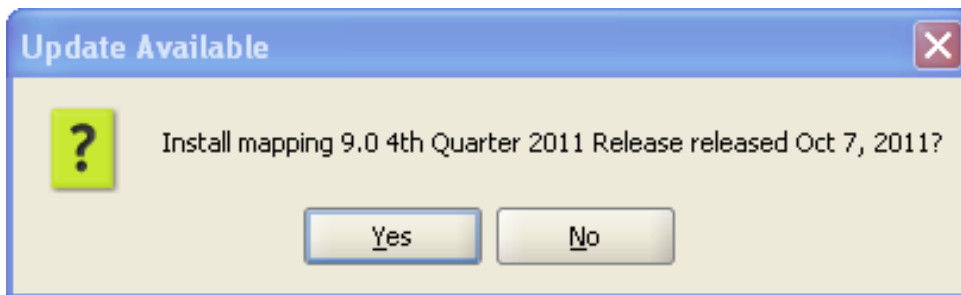
FIGURE 13: VIEW THE INSTALLED LICENSE



UPDATING THE DIAGNOSES MAPPING FILES

The ACG application uses a mapping file to determine the use of diagnosis codes within the system. The ACG® System installation includes a current mapping file. The mapping file will be updated from time-to-time to reflect new codes or groupings and reference data values. When the application is first opened, there will be a prompt asking if you would like to look for an updated mapping file. If you confirm with a yes, the software will attempt to connect to the ACG website to look for an updated mapping file. If a more recent file is available, you will be provided with the date of update and asked if you want to install the updated mapping file.

FIGURE 14: INSTALL UPDATED MAPPING FILE



The ACG® System will attempt to connect to the internet to look for updates periodically and you will be prompted to install the update. You can deny any particular update and return at a later time to manually initiate the update process. This process is started by selecting **Manage** mappings from the **Tools** menu. Click **Check for Updates** to connect to the ACG website..

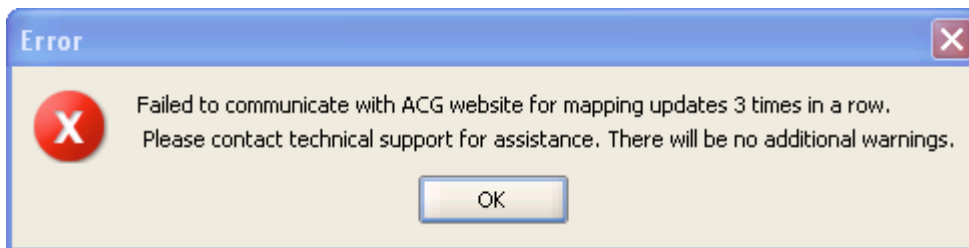
FIGURE 15: MAPPING FILE MANAGER



If the ACG® System fails to connect to the ACG website on three consecutive tries, you will receive a message letting you know that it was unable to connect. If you are unable to connect to the internet for updates, you can receive a mapping file directly from your software vendor. Mapping files will be recognized by the ACG® System when they are installed. This process is initiated by selecting **Manage mappings** from the Tools menu. Then click **Install File** and select your ACG mapping file using the file chooser. ACG mapping files will have a .acgm extension

Tip: You may not be able to connect to the ACG Website if your internet connection uses a proxy server. Contact your designated support person to receive updated mapping files.

FIGURE 16: MAPPING FILE COMMUNICATION ERROR



Operating the Software

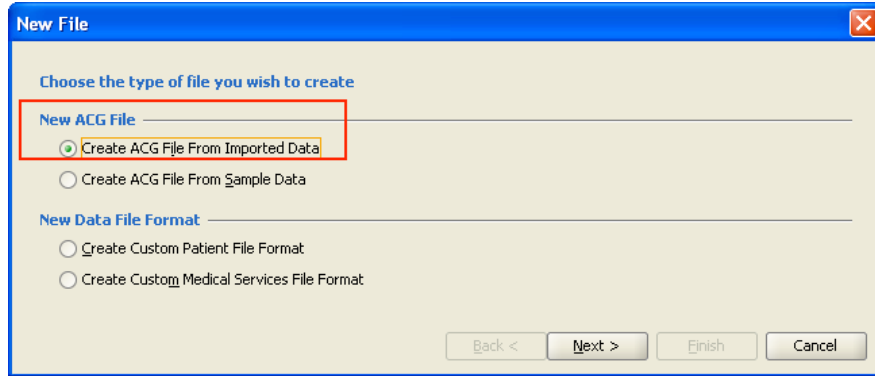
LOAD YOUR OWN DATA

All input data files are required to be delimited. The user has the choice of tabs or commas as standard delimiters. Custom delimiters, such as "|", are also supported.

Use the following steps to process new input data:

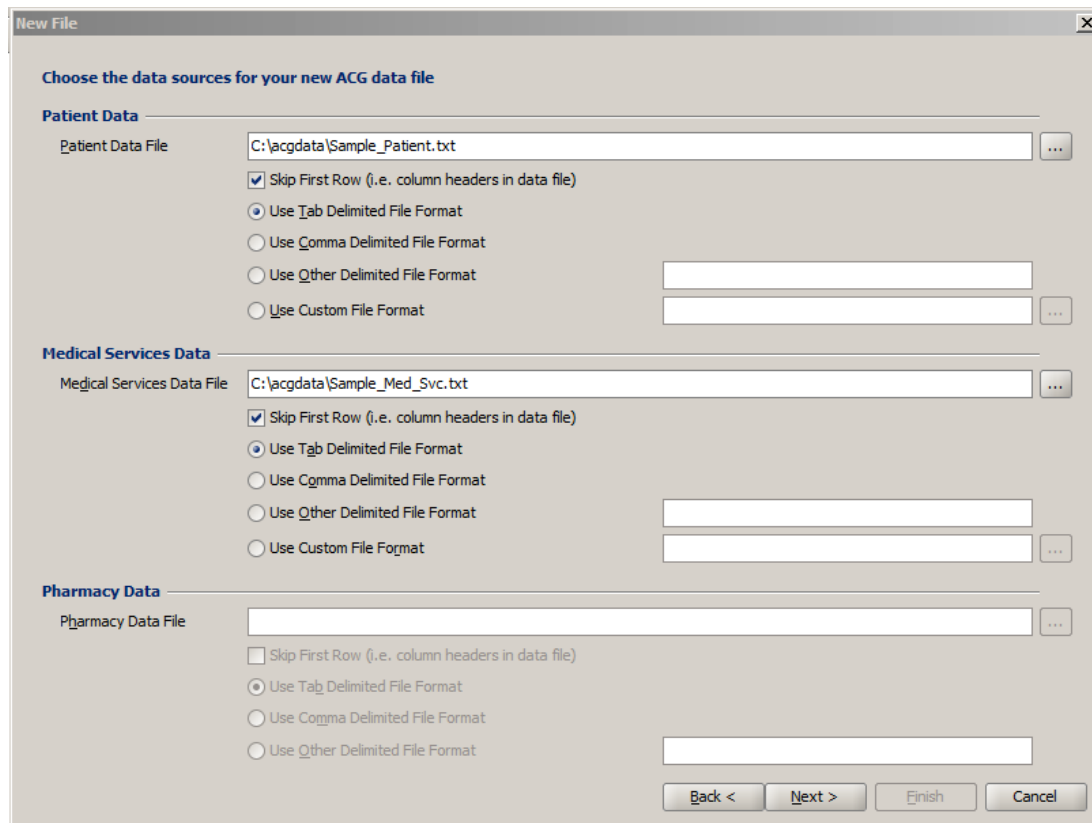
1. To import data, select **File**.
2. Select **New**.

STEP 1 - LOAD YOUR OWN DATA



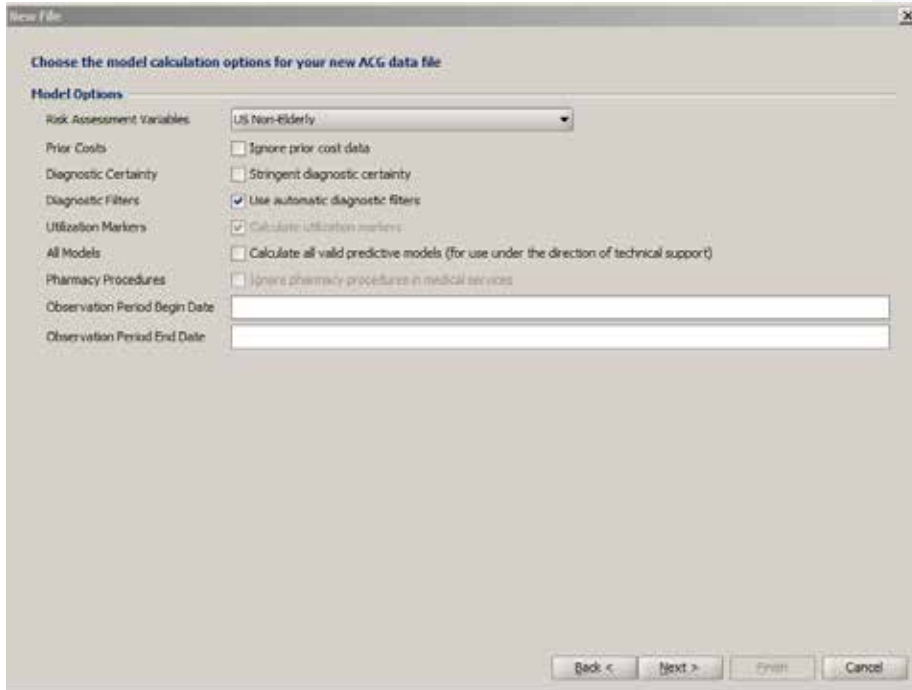
From the New File window, click the **Create ACG File from Imported Data** radio button, and then click **Next**. **Step 2 – Load Your Own Data**, on the following page, appears.

STEP 2 – LOAD YOUR OWN DATA



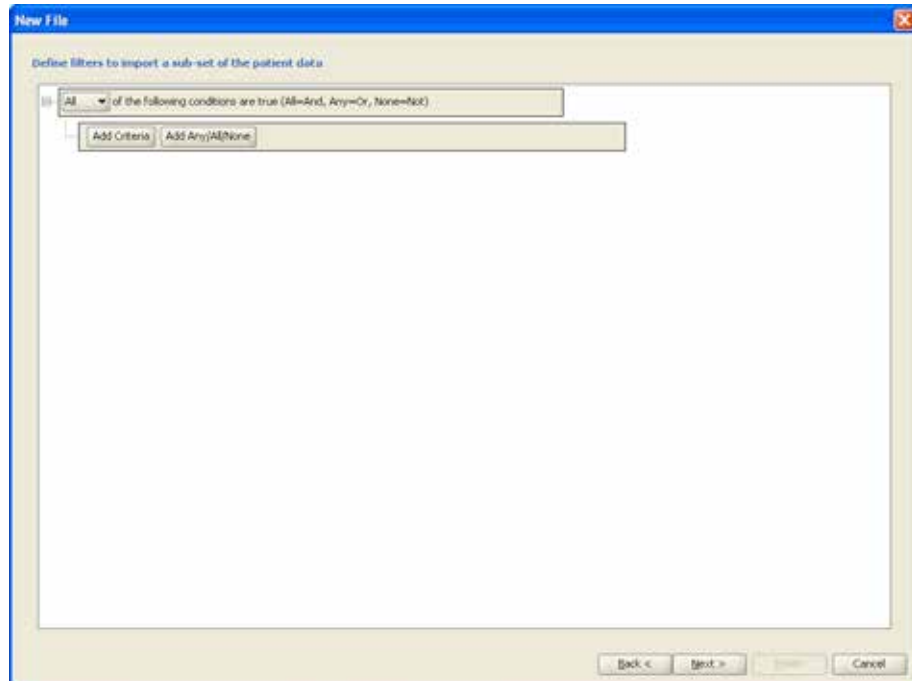
In the second step of importing your own data, you must provide the names of your patient data file and specify the file format; provide the location of the medical services data file and specify the file format. All of the options on this screen are simple point and click windows commands. Click the radio button, or the area of interest, or click on the **File Selection** button (...) to activate Windows Explorer to find and highlight the requested file(s). Click **Next** to specify processing options. **Step 3 – Load Your Own Data** shows the options available to control the application of the ACG® System to your data.

STEP 3 – LOAD YOUR OWN DATA



For purposes of this project, the recommendation is to elect to use the default settings for this option screen as shown above.

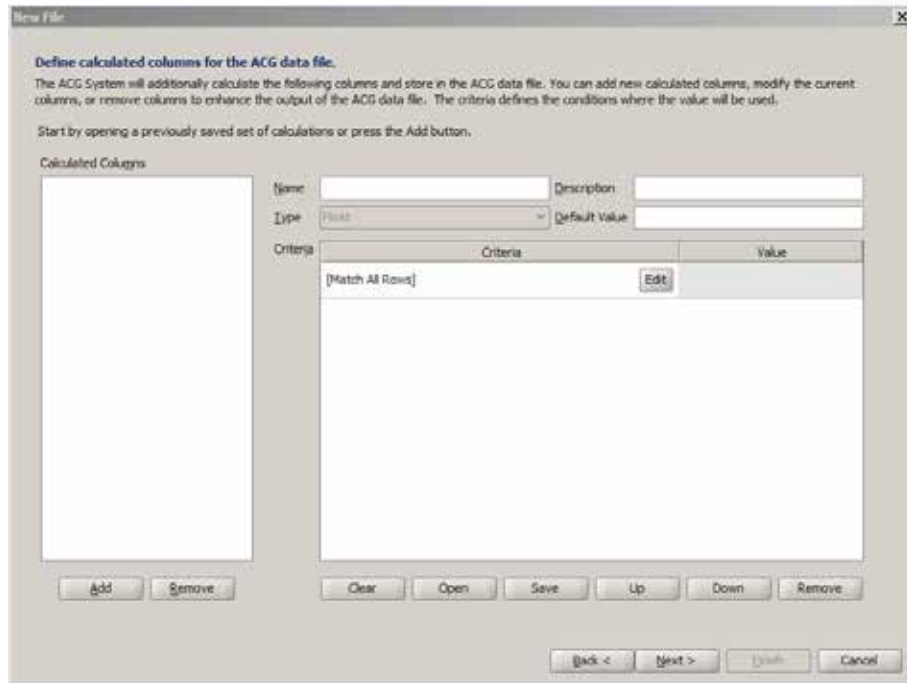
STEP 4 – LOAD YOUR OWN DATA



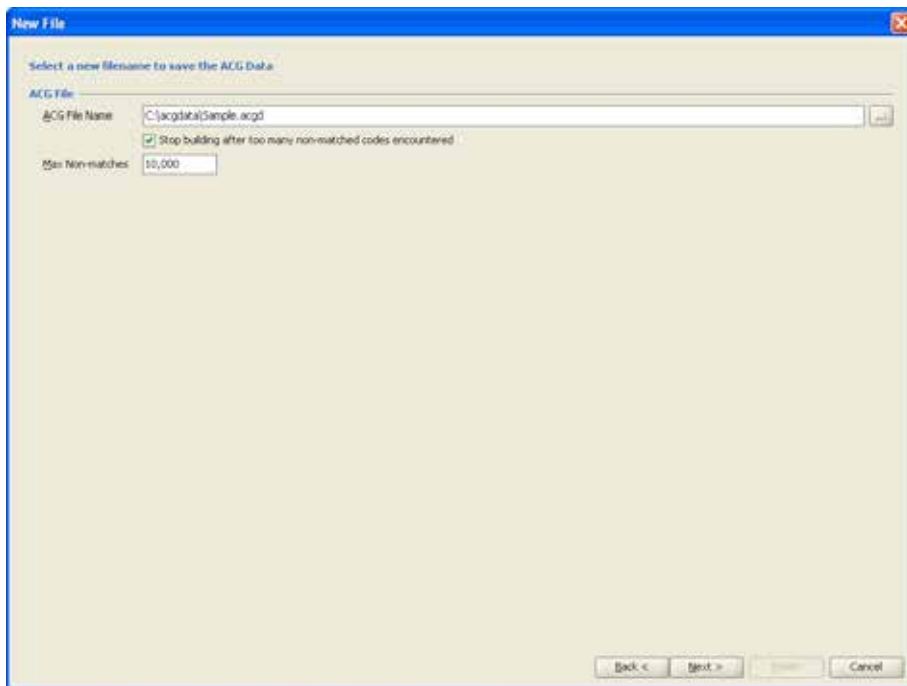
The ACG® System can filter records on import. For this project, it is recommended that all filtering be performed prior to creation of the files for the ACG Software, in accordance with the project protocol. Click **Next** to move to the next screen.

The next screen offers the opportunity to have the system calculate additional columns to be placed on the patient results file. This functionality will not be needed for this project. Click **Next** to move to the next screen.

STEP 5 - LOAD YOUR OWN DATA

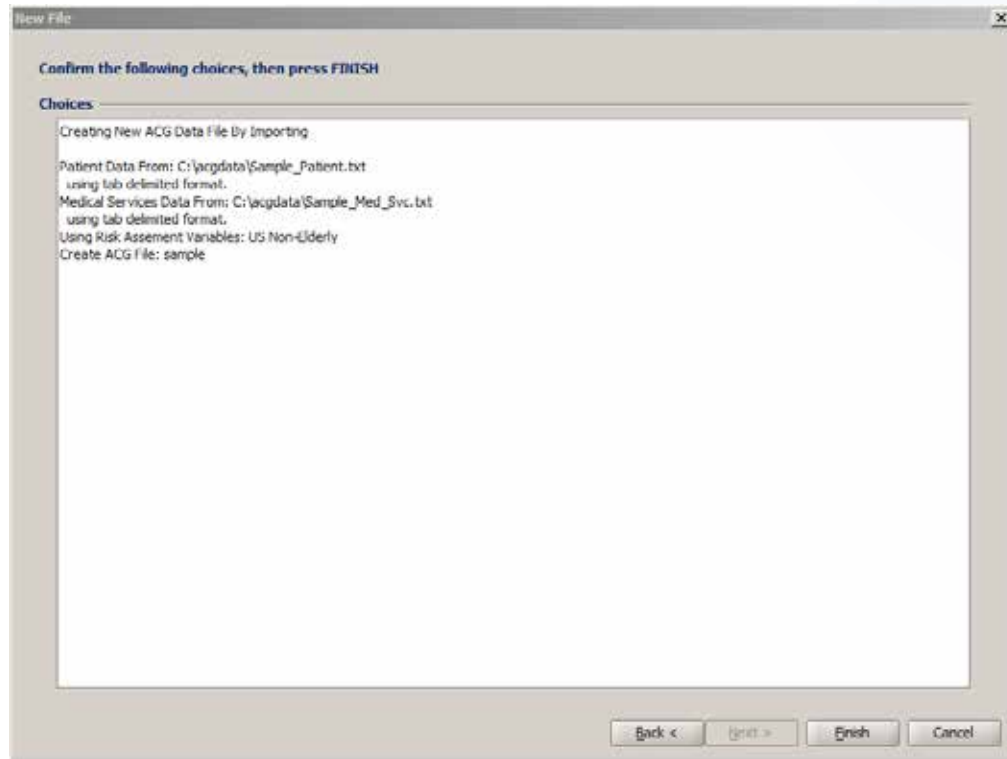


STEP 6 - LOAD YOUR OWN DATA



As shown in **Step 6 – Load Your Own Data**, you must type the name and location of the files to which the ACG database will be saved. If you are uncertain as to the quality or source of diagnosis or pharmacy codes, you can enforce a maximum number of unmatched codes. When checked, if the ACG® System encounters non-matched codes (either diagnosis or pharmacy) in excess of the typed threshold, the application will stop processing with an error message. By default, the application will process all records regardless of the number of non-matched codes encountered.

FINAL STEP – LOAD YOUR OWN DATA



You will be given one last opportunity to confirm your file selections before the ACG assignment process begins. Click **Finish** to begin processing files. Upon completion, you will be presented with a screen of summary statistics to validate the ACG Process.

Johns Hopkins ACG System 10.0.1

File Edit View Analyze Tools Help

sample.acgd

ACG Data File (sample.acgd)

Summary Statistics Patient Sample Local Weights Age/Gender Dist Total Cost Risk Dist Hospitalization Risk Dist Build Options

Description	Value
Patients processed	14336
Patients processed 65 years and older	0
Diagnosis fields found on medical services file	5
Diagnosis fields with data on medical services file	4
Diagnoses processed	610813
First Medical Service Date	2011-01-01
Last Medical Service Date	2011-12-31
Unique diagnoses encountered	6710
Average number of unique diagnoses per patient	7.9
Of those with a diagnosis, Average number of unique diagnoses per patient	9.53
Unique unknown diagnoses encountered	1558
Percentage of diagnoses that were unknown	6.4
Unknown diagnoses encountered	33217
Patients with unknown diagnoses encountered	1670
Percent of unique diagnoses used	93.6
Unique matched diagnosis code sets encountered	1
Unique unknown diagnosis code sets encountered	1

FILE MENU

The File menu is for opening / saving ACG data files. These are files created by the ACG for Windows software and are appended with the .acgd extension. These files are working databases containing summary information on each member processed through the software. **Note:** It is not necessary to re-run your claims data each time you open the software; rather, ACG assignments can be stored in the *.acgd file for later use. For your convenience, the last five files opened will be shown from the File menu.


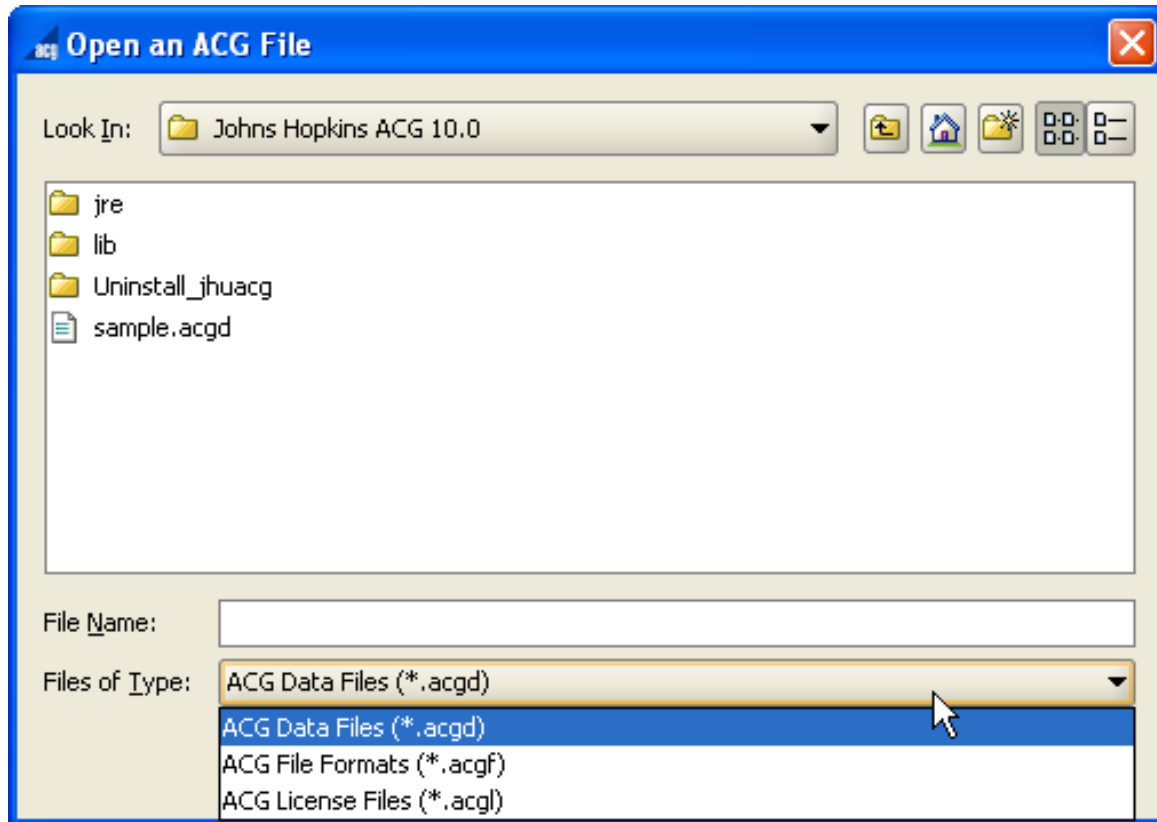
To open an ACG data file,  select from the toolbar or select **File, Open** from the menu. At the top of the screen, the user can navigate the file system as shown in **Figure 2: Open an ACG® System File**.

FIGURE 2: OPEN AN ACG® SYSTEM FILE

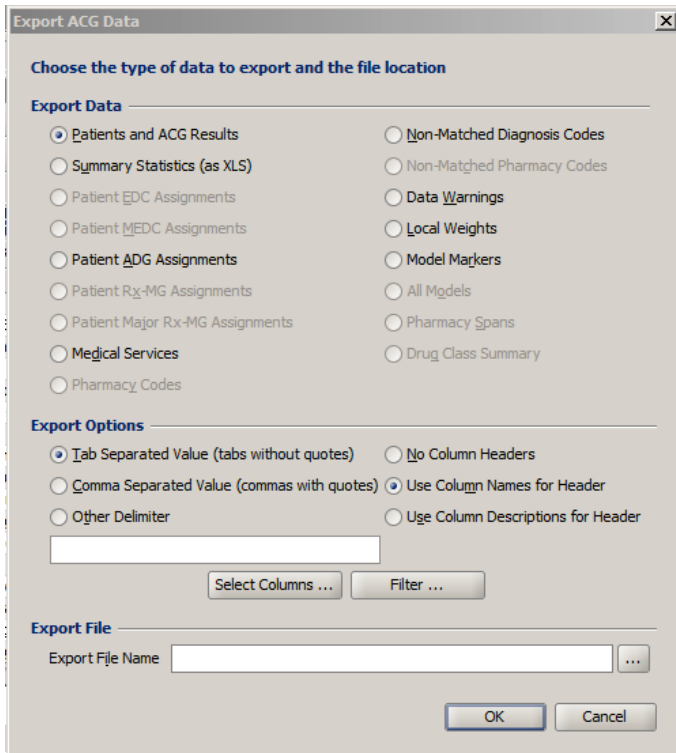


EXPORT DATA FILES

From an active data file tab it is possible to export the entire data file to another application. The Export ACG Data option will create a tab-delimited text file from your ACG data. This data format is directly supported by Microsoft Excel, Microsoft Access, and many other mainstream databases and statistical applications.

Using the **Tools -Export**  or menu button, simply click the **File Selection** button (...) and choose a filename in which to save the exported data. Click **OK** on the Export ACG Data window to begin the export.

FIGURE 10: EXPORT DATA FILES



All of the underlying ACG data elements that are used throughout the ACG® System are exportable through this option. When the Export ACG Data options are displayed, you must choose one of the data sets to export. For this project, the relevant data is stored in **Patients and ACG Results**. By default, this data file contains all of the data elements from your original patient import file, with any missing default columns added as blanks, and all of the ACG calculated fields. The columns in this export file are the same columns (in the same order) as shown in the Patient Sample section of the ACG Data File. The output file can be customized by selecting the “Select Columns...” button on the Export ACG Data screen. For purposes of this project, the Patient ID and corresponding ACG Code are the only fields necessary to support the analysis.

FIGURE 11: SELECT COLUMNS



APPENDIX E: JOHNS HOPKINS ACG® SYSTEM SUPPORTING DOCUMENTATION

ACG SUMMARY STATISTICS

Description	Value
Patients processed	1,234,576
Patients processed 65 years and older	0
Diagnosis fields found on medical services file	5
Diagnosis fields with data on medical services file	5
Diagnoses processed	8,876,601
Medical services excluded per user-defined observation period	0
First Medical Service Date	
First Medical Service Date	
Unique diagnoses encountered	12,345
Average number of unique diagnoses per patient	7.19
Of those with a diagnosis, average number of unique diagnoses per patient	8.66
Unique unknown diagnoses encountered	596
Percentage of diagnoses that were unknown	0.1
Unknown diagnoses encountered	12,345
Patients with unknown diagnoses encountered	12,345
Percent of unique diagnoses used	99.9
Unique matched diagnosis code sets encountered	1
Percentage of procedure codes that were unknown	0.0
Percentage of revenue codes that were unknown	0.0
Percentage of ICD procedure codes that were unknown	0.0
Percentage of DRG codes that were unknown	
Unique matched procedure code sets encountered	0
Unique matched revenue code sets encountered	0
Unique matched ICD procedure code sets encountered	0
Unique matched DRG code sets encountered	
Unique unknown diagnosis code sets encountered	0
Unique unknown procedure code sets encountered	0
Unique unknown revenue code sets encountered	0
Unique unknown ICD procedure code sets encountered	0
Unique unknown DRG code sets encountered	
Patients with unsupported diagnosis code sets encountered	0
Patients with unsupported procedure code sets encountered	0

APPENDIX E: JOHNS HOPKINS ACG® SYSTEM SUPPORTING DOCUMENTATION

ACG SUMMARY STATISTICS (CONT.)

Description	Value
Patients with unsupported revenue code sets encountered	0
Patients with unsupported ICD procedure code sets encountered	
Patients with unsupported DRG code sets encountered	
Diagnosis code sets used	9
Procedure code sets used	
Revenue code sets used	
ICD Procedure code sets used	
DRG code sets used	
Pharmacy codes processed	0
Pharmacy services excluded per user-defined observation period	0
First Pharmacy Fill Date	
Last Pharmacy Fill Date	
Unique pharmacy codes encountered	0
Unique unknown pharmacy codes encountered	0
Percentage of pharmacy codes that were unknown	0.0
Unknown pharmacy codes encountered	0
Patients with unknown pharmacy codes encountered	0
Unique matched pharmacy code sets encountered	0
Unique unknown pharmacy code sets encountered	0
Patients with unsupported pharmacy code sets encountered	0
Pharmacy code sets used	
Number of EDCs assigned	12,345,678
Number of MEDCs assigned	1,234,567
Number of ADGs assigned	2,345,578
Number of Rx-MGs assigned	0
Population average CSA	
Population average MPR	
Percentage of patients with total cost > \$100 and no diagnoses	0.0
Percentage of patients with pharmacy cost > \$100 and no pharmacy codes	0.0
Number of patients with diagnosis information and no pharmacy codes	
Number of patients with pharmacy codes and no diagnoses	0
Number of data warnings	3617

APPENDIX E: JOHNS HOPKINS ACG® SYSTEM SUPPORTING DOCUMENTATION

ACG SUMMARY STATISTICS (CONT.)

Description	Value
Number of patients with data warnings	3346
Total cost on medical services file	\$0
Total cost on pharmacy services file	
Minutes To load data	22
Predicted total cost model selected	Dx-PM - lenient dx -> total cost
Predicted pharmacy cost model selected	Dx-PM - lenient dx -> rx cost
Total concurrent cost model selected	Dx-PM - lenient dx -> total conc cost
Hospitalization model selected	
Date loaded	2016-05-25
Created with ACG version	11.0.1
Created with Risk Assessment Variables	US Non-Elderly
Created with ACG mapping version	11.0 2nd Quarter 2016 Release
Created with ACG mapping release date	2016-03-31
Prior Total Cost Present	NO
Prior Pharmacy Cost Present	NO
Date of Birth Present	NO
Pregnant Present	NO
Delivered Present	NO
Low Birthweight Present	NO
Dialysis Service Present	NO
Nursing Service Present	NO
Major Procedure Present	NO
Cancer Treatment Present	NO
Psychotherapy Service Present	NO
Mechanical Ventilation Present	NO
CAL SSA Present	NO
Emergency Visits Present	NO
Outpatient Visits Present	NO
Inpatient Hospitalizations Present	NO
Inpatient Days Present	NO
All Cause Inpatient Hospitalizations Present	NO

APPENDIX E: JOHNS HOPKINS ACG® SYSTEM SUPPORTING DOCUMENTATION

ACG SUMMARY STATISTICS (CONT.)

Description	Value
Unplanned Readmissions 30 day Present	NO
Readmissions 30 day Present	NO
Unplanned Readmissions 30 day Present	NO
Place of Service Present	NO
Service From Date Present	NO
Service Thru Date Present	NO
Procedure Code Present	NO
Pharmacy Medical Procedure Code Present	NO
Revenue Code Present	NO
ICD Procedure Code Present	NO
DRG Code Present	NO
Inpatient Service Present	NO
Provider ID Present	NO
Provider Specialty Present	NO
Provider Standard Specialty Present	NO
Type of Bill Code Present	NO
Medical Service Cost Present	NO
Fill Date Present	NO
Days Supply Present	NO
Pharmacy Service Cost Present	NO

APPENDIX F: VERIFICATION OF TCRRV™ ASSIGNMENT

Building on documentation from HealthPartners, the pilot work expanded these guidelines to include some parameters around data quality issues. For each service type, do a frequency count on the TCRRV™ flag. The results should look something like the following tables:

A. IP

Flag Value	Desired % of records	Possible problems
Normal	> 95%	
No LOS/No Billed	< 1%	Missing data from supplier
No Match	< 2%	Problem with DRG assignment
Low or High (combined)	< 5%	Problem with paid amounts

B. OP

Flag Value	Desired % of records	Possible problems
Normal	> 95%	
Incidental	< 2%	Missing CPT codes
No Billed/No Units	< 1%	Problem with units field from supplier
No Match	< 2%	Problem with CPT codes
Low or High (combined)	< 5%	Problem with paid amounts

C. Prof

Flag Value	Desired % of records	Possible problems
Normal	> 95%	
No Code	< 2%	Missing CPT codes
No Billed/No Units	< 1%	Problem with units field from supplier
No Match	< 2%	Problem with CPT codes
Low or High (combined)	< 5%	Problem with paid amounts

D. Rx

Flag Value	Desired % of records	Possible problems
Normal	> 95%	
No Days	< 1%	Missing data from supplier
No Match	< 1%	Bad NDC
Low or High (combined)	< 5%	Problem with paid amounts

APPENDIX F: VERIFICATION OF TCRRV™ ASSIGNMENT (CONT.)

E. Sum the TCRRV™ and allowed amount for measurement year by IP, OP, Prof and Rx

Type of Claim	Sum of Allowed Amount	Sum of TCRRV™	Ratio
IP			
OP			
Prof			
Rx			

F. The ratio of TCRRV™ to allowed amount should be approximately 1.0. HealthPartners is recalibrating the TCRRV™ to match allowed amount

APPENDIX G: DATA QUALITY ASSESSMENT: POPULATION ALLOWED PMPM

POPULATION	MONTH	ALL MEDICAL										ALL PHARMACY				
		NUMBER OF MEMBERS W/ MED ELIG	AVERAGE AGE	MEDICAL CLAIM COUNT	MEDICAL CLAIM ALLOWED AMOUNT \$	MEDICAL CLAIM ALLOWED AMOUNT \$/ ELIG MEMBERS	% MEMBERS W/ NO MEDICAL CLAIMS IN THE MONTH	MEDICAL CLAIM ALLOWED AMOUNT \$/MEDICAL CLAIM COUNT	NUMBER OF MEMBERS W/ RX ELIG	RX CLAIM COUNT	RX CLAIM ALLOWED AMOUNT \$	RX ALLOWED AMOUNT \$/ ELIG MEMBERS	% MEMBERS W/ NO RX CLAIMS IN THE MONTH	P RX CLAIMS ALLOWED AMOUNT \$/RX CLAIM COUNT		
Plan A HMO	201301															
Plan A HMO	201302															
Plan A HMO	201303															
Plan A HMO																
Plan A HMO	201411															
Plan A HMO	201412															
PLAN B PPO	201201															
PLAN B PPO	201202															
PLAN B PPO	201203															
PLAN B PPO																
PLAN B PPO	201411															
PLAN B PPO	201412															

Calculate eligibility counts by month and claims by incurred month separately for each data contributor.

Show 3 years of history if available to get context for measurement year numbers.

PMPM \$ shown in the yellow highlighted columns.

Look for a plan or submitter with \$ PMPM distinctly different from the others not explained by a difference in age. Look for a dramatic change in PMPM \$ from one month to the next within a population.

Look for a large portion of members with no claims in a population or month.



APPENDIX G: DATA QUALITY ASSESSMENT: POPULATION PLAN PAID PMPM

POPULATION	MONTH	NUMBER OF MEMBERS W MED ELIG	MEDICAL CLAIM COUNT	MEDICAL CLAIM PLAN PAID AMOUNT \$	MEDICAL CLAIM PLAN PAID AMOUNT \$/ELIG MEMBERS	% MEDICAL CLAIMS WITH \$0 PLAN PAID	NUMBER OF MEMBERS W RX ELIG	RX CLAIM COUNT	RX CLAIM PLAN PAID AMOUNT \$	RX PLAN PAID AMOUNT \$/ ELIG MEMBERS	% RX CLAIMS WITH \$0 PLAN PAID
Plan A HMO	201201										
Plan A HMO	201202										
Plan A HMO	201203										
Plan A HMO											
Plan A HMO	201411										
Plan A HMO	201412										
PLAN B PPO	201201										
PLAN B PPO	201202										
PLAN B PPO	201203										
PLAN B PPO											
PLAN B PPO	201411										
PLAN B PPO	201412										

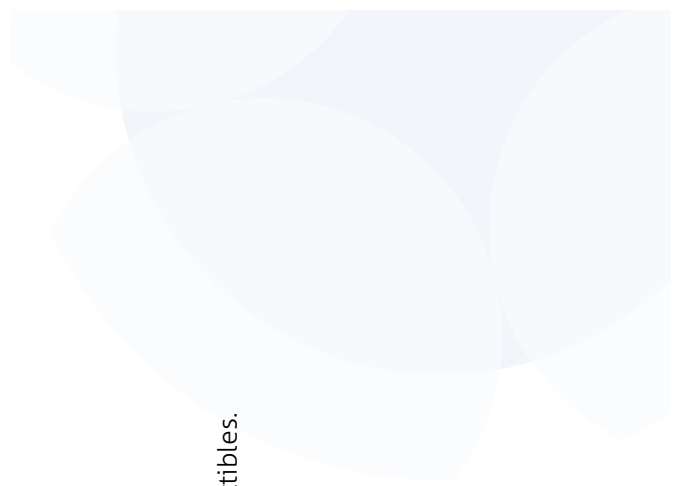
Calculate eligibility counts by month and claims by incurred month separately for each data contributor.

Show 3 years of history if available to get context for measurement year numbers.

Look for a plan or submitter with \$ PMPM distinctly different from the others not explained by a difference in age.

Look for a dramatic change in PMPM \$ from one month to the next within a population.

Look for a large portion of claims with \$0 plan paid. % might decrease from Jan to Dec in a year as members hit their deductibles.



APPENDIX G: DATA QUALITY ASSESSMENT: POPULATION BEHAVIORAL HEALTH PMPM

POPULATION	MONTH	NUMBER OF MEMBERS W/ MED ELIG	MENTAL HEALTH ¹			SUD ²			MENTAL HEALTH \$ PMPM			SUD \$ PMPM				
			IP ALLOWED AMOUNT \$	OP ALLOWED AMOUNT \$	PROF ALLOWED AMOUNT \$	IP ALLOWED AMOUNT \$	OP ALLOWED AMOUNT \$	PROF ALLOWED AMOUNT \$	IP ALLOWED AMOUNT \$ / NUMBER OF MEMBERS W/ MED ELIG	OP ALLOWED AMOUNT \$ / NUMBER OF MEMBERS W/ MED ELIG	PROF ALLOWED AMOUNT \$ / NUMBER OF MEMBERS W/ MED ELIG	IP ALLOWED AMOUNT \$ / NUMBER OF MEMBERS W/ MED ELIG	OP ALLOWED AMOUNT \$ / NUMBER OF MEMBERS W/ MED ELIG	PROF ALLOWED AMOUNT \$ / NUMBER OF MEMBERS W/ MED ELIG		
Plan A HMO	201301															
Plan A HMO	201302															
Plan A HMO	201303															
Plan A HMO																
Plan A HMO	201411															
Plan A HMO	201412															
PLAN B PPO	201201															
PLAN B PPO	201202															
PLAN B PPO	201203															
PLAN B PPO																
PLAN B PPO	201411															
PLAN B PPO	201412															

Calculate eligibility counts by month and claims by incurred month separately for each data contributor.

Show 3 years of history if available to get context for measurement year numbers.

PMPM \$ shown in the last 6 columns.

1. Codes to define mental health claims in document mental_health_claims_for_qc.docx
2. Codes to define SUD (Substance Use Disorder) claims in document Substance Abuse Claims Filtering.docx



APPENDIX G: DATA QUALITY ASSESSMENT: ORPHANS

POPULATION	MONTH	TOTAL MED CLAIM COUNT	TOTAL MED CLAIM ALLOWED AMOUNT \$	# ORPHAN-MED CLAIMS	% MED CLAIMS ORPHANED	ALLOWED AMOUNT \$ OF ORPHAN MED CLAIMS	% TOTAL MEDICAL ALLOWED AMOUNT \$ ORPHANED	TOTAL RX CLAIM COUNT	TOTAL RX CLAIM ALLOWED AMOUNT \$	# ORPHAN RX CLAIMS	% RX CLAIMS ORPHANED	ALLOWED AMOUNT \$ ORPHAN RX CLAIMS	% TOTAL RX ALLOWED AMOUNT \$ ORPHANED
Plan A HMO	201201												
Plan A HMO	201202												
Plan A HMO	201203												
Plan A HMO													
Plan A HMO	201411												
Plan A HMO	201412												
PLAN B PPO	201201												
PLAN B PPO	201202												
PLAN B PPO	201203												
PLAN B PPO													
PLAN B PPO	201411												
PLAN B PPO	201412												

Calculate claim counts and allowed amounts by incurred month of claim separately for each data contributor.

Orphan Claims are claims where there is no matching eligibility record for the member in the month when the claim was incurred.

Look for rate of orphan claims > 1%.



APPENDIX G: DATA QUALITY ASSESSMENT: CPT GROUP

POPULATION	YEAR	HCPCS/CPT CODE 1ST CHARACTER/DIGIT	CLAIM COUNT	% TOTAL CLAIMS	CLAIM ALLOWED AMOUNT \$	% CLAIMS WITH \$0 OR \$NULL ALLOWED	\$/CLAIM
Plan A HMO	2012	1					
Plan A HMO	2012	2					
Plan A HMO	2012	3					
Plan A HMO							
Plan A HMO	2013	1					
Plan A HMO	2013	2					
Plan A HMO	2013	3					
Plan A HMO							
Plan A HMO	2014	1					
Plan A HMO	2014	2					
Plan A HMO	2014	3					
Plan A HMO							
Plan B PPO	2012	1					
Plan B PPO	2012	2					
Plan B PPO	2012	3					
Plan B PPO							
Plan B PPO	2013	1					
Plan B PPO	2013	2					
Plan B PPO	2013	3					
Plan B PPO							
Plan B PPO	2014	1					
Plan B PPO	2014	2					
Plan B PPO	2014	3					
Plan B PPO							

Look for a CPT code group with very different \$/claims in one population.

Look for a CPT code group with too few claims in one population.

Look for a CPT code group with too many \$0 (or null value) claims.

Look at increase over time in codes starting with D due to oral health inclusion in Essential Health Benefits.

APPENDIX G: DATA QUALITY ASSESSMENT: IP OP PROF RX

POPULATION	YEAR	CLAIM TYPE	CLAIM COUNT	% TOTAL CLAIMS	CLAIM ALLOWED AMOUNT \$	% CLAIMS WITH \$0 OR \$NULL ALLOWED	ALLOWED AMOUNT \$/CLAIM
Plan A HMO	2012	IP					
Plan A HMO	2012	OP					
Plan A HMO	2012	Prof					
Plan A HMO	2012	Rx					
Plan A HMO	2013	IP					
Plan A HMO	2013	OP					
Plan A HMO	2013	Prof					
Plan A HMO	2013	Rx					
Plan A HMO	2014	IP					
Plan A HMO	2014	OP					
Plan A HMO	2014	Prof					
Plan A HMO	2014	Rx					
Plan B PPO	2012	IP					
Plan B PPO	2012	OP					
Plan B PPO	2012	Prof					
Plan B PPO	2012	Rx					
Plan B PPO	2013	IP					
Plan B PPO	2013	OP					
Plan B PPO	2013	Prof					
Plan B PPO	2013	Rx					
Plan B PPO	2014	IP					
Plan B PPO	2014	OP					
Plan B PPO	2014	Prof					
Plan B PPO	2014	Rx					

APPENDIX G: DATA QUALITY ASSESSMENT: DIAGNOSIS CODES

		% NON-MISSING VALUES			
POPULATION	YEAR	Dx1	Dx2	Dx3	Dx4
Plan A HMO	2012				
Plan A HMO	2013				
Plan A HMO	2014				
Plan B PPO	2012				
Plan B PPO	2013				
Plan B PPO	2014				

Likely to show

98-100%

80-90%

45-55%

25-35%

Verify that some portion of Dx4 is populated.

APPENDIX G: DATA QUALITY ASSESSMENT: SURGICAL PROCEDURE CODES

		% NON-MISSING VALUES		
POPULATION	YEAR	ICD 9 SURGICAL PROCEDURE 1	ICD 9 SURGICAL PROCEDURE 2	ICD 9 SURGICAL PROCEDURE 3
Plan A HMO	2012			
Plan A HMO	2013			
Plan A HMO	2014			
Plan B PPO	2012			
Plan B PPO	2013			
Plan B PPO	2014			

APPENDIX G: DATA QUALITY ASSESSMENT: PROF POS

POPULATION	YEAR	POS	CLAIM COUNT
Plan A HMO	2014	01	
Plan A HMO	2014	02	
Plan A HMO	2014	03	
Plan A HMO			
Plan A HMO	2014	99	
Plan B PPO	2014	01	
Plan B PPO	2014	02	
Plan B PPO	2014	03	
Plan B PPO			
Plan B PPO	2014	99	

APPENDIX G: DATA QUALITY ASSESSMENT: IP MS-DRG

POPULATION	YEAR	MS-DRG	ADMISSION COUNT
Plan A HMO	2014	001	
Plan A HMO	2014	002	
Plan A HMO	2014	003	
Plan A HMO			
Plan A HMO	2014	999	
Plan B PPO	2014	001	
Plan B PPO	2014	002	
Plan B PPO	2014	003	
Plan B PPO			
Plan B PPO	2014	999	

Compare distribution of admissions by MS-DRG among data contributors. The same MS-DRG values should be prominent in all contributors. If one contributor looks very different, they may be using a different DRG system.

APPENDIX H: HEALTHPARTNERS DOCUMENTATION

TCOC TOOLKIT

The Total Cost of Care and Resource Use (TCOC) framework provides a robust, scalable measurement system for both cost and resource use. The TCOC analytical reporting suite supports multiple levels of analysis—which easily and systematically pinpoints savings opportunities at the population, provider, and condition levels. This versatility is what allows TCOC to identify problem areas and to produce actionable results. HealthPartners offers two licensing agreements to external users implementing TCOC in their organizations for SAS users and non-SAS users.

ANALYTIC PACKAGES

To access the HealthPartners packages, go to <http://www.healthpartners.com/public/TCOC/toolkit/>.