

IQVIA Information Services Published Specifications

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Introduction

IQVIA is a leading provider of information and technology services for the healthcare industry, covering markets in 100+ countries around the world. A leader for more than 60 years, we blend industry expertise and advanced technology to deliver in-depth analytics on healthcare dynamics. We have one of the largest and most comprehensive collections of healthcare information in the world, spanning sales, prescription and promotional data, medical claims, electronic medical records and social media. We continuously innovate to keep pace with a global healthcare environment that is highly dynamic and increasingly complex and interdependent.

IQVIA information services represent a wide array of offerings reporting on various aspects of medicines and health care in countries around the world. In market research and other methods of estimating activity in the world, numbers are prepared using judgment and skill, not simply arithmetic. Further, information is initially input at the source by thousands of people, often manually, in thousands of organizations. Further still, this information is often gathered from IT systems that were designed for and serve a purpose other than measuring market activity (e.g., electronic medical records, pharmacy systems, payment systems), so the design of the data fields and the choices available to populate those fields are not intended to meet the needs of IQVIA's clients. Each of these characteristics of the underlying components of market measures has an impact on the ultimate accuracy and meaning of the final numbers.

Although there is an inclination to view numerical data as fact, IQVIA information represents an estimate of measured activity and should be treated accordingly. To use it effectively, it is important to have a sufficient understanding of how the information is sourced, processed, standardized, produced and reported. Further, proper practice involves the use of IQVIA information in combination with other information (e.g., knowledge based on skills and experience, other information and observations in the marketplace) to make decisions. To help customers obtain the most value from IQVIA information services and use the information in a manner that is consistent with its specifications, this document provides an overview of the processes employed by IQVIA to produce and report these estimates, and a list of appropriate practices in the use of such information.

We prepared this document to help you use IQVIA information services more effectively. This document provides an overview of methods we employ to source, collect, cleanse, bridge, edit and organize information. We then apply some combination of sophisticated computer processing, statistical projections, advanced analytics, forecasting methodologies and our skills and experience to provide you with answers, insights and tools. We don't use every method described in this document in every one of our hundreds of offerings; we use commercially reasonable efforts to employ many of these in each of our offerings commensurate with the nature and cost of the service in order to provide our customers with the most comprehensive and effective measures of pharmaceutical and health care markets in the world.

IQVIA Processes

Data Sourcing

IQVIA collects information from a wide variety of sources. Some of that information is collected through surveys, which may be completed by respondents as the activity occurs or completed later based on review of records or an individual's recollection, and which may be completed by the person engaged in the activity (e.g., provider) or someone else at their location (e.g., nurse, technician, administrative staff). Other information may be gathered from business records based upon fields of information that an organization is willing to provide, with the information gathered as a by-product of the business process which produces it (i.e., health records and payment systems are designed for a particular purpose, so data collection for other purposes is a secondary use of the information). Although IQVIA seeks accurate, complete and timely information from these sources, the information is frequently provided with limited assurances regarding quality and timeliness. In addition, IQVIA frequently uses pre-defined formats for responses, financial incentives, feedback reports, notification requirements for changes in data or systems, retention of back-up copies of data at the source, record layouts, contractual undertakings to avoid the blocking of data at the request of others and other approaches to encourage the delivery of high quality and timely data provided by these sources, commensurate with the nature of the data collection activity (e.g., approaches appropriate for a physician completing a monthly market research survey versus a large commercial organization providing gigabytes of transactional information on a daily basis).

Data Receipt

IQVIA takes care to establish reasonable methods of delivery for information from hundreds of thousands of sources to support the timely and secure delivery of data to IQVIA. Following receipt of data from its sources, IQVIA employs a variety of initial quality control checks and processes to ensure data has been properly delivered to IQVIA. IQVIA also contacts sources if data is not received on a timely, complete or accurate basis as a result of these initial quality control checks (to the extent detectable). Data record statistics (e.g., record counts) accompany data delivery to ensure data shipment records match data receipt records. Further, IQVIA maintains various metrics and parameters regarding the characteristics of each individual data file received and promptly investigates discrepancies or unusual variances identified through its automated quality control processes. Data suppliers are frequently contacted to assist with resolution of these issues. IQVIA promptly performs manual adjustments to data based on acknowledgement by supplier of file issues, allowing for prompt correction of many issues prior to the start of database creation and the report production schedule. IQVIA maintains readily available back-up copies of incoming data sets in conjunction with report production in the event data processing issues are identified, providing IQVIA with the ability to rapidly re-process data.

Data Editing / Validation

In addition to the processes referenced above, IQVIA has invested significantly in the development of proprietary data cleansing, editing, and other sophisticated tools to find data issues and provide visibility to any issues as they become apparent. The benefit for IQVIA clients is our ability to proactively identify situations that may exceed standard variances. Although these quality control checks and processes will vary by data type, examples include: (a) examination of the information in various fields for each transaction to ensure the field contains a valid value, (b) maintenance of various metrics and established variances regarding the characteristics of each transaction (e.g., days' supply of product, quantity by product), (c) maintenance of various metrics and established

variances regarding the characteristics of the source, (d) analysis of historical distribution, prescribing, dispensing or other applicable patterns of measured activity, and (e) analysis of historical reporting patterns. If unusual variances are encountered, IQVIA investigates the situation or takes other appropriate actions, often working closely with the sources of the data to determine if the variances are acceptable or require corrections. Data exceeding acceptable variance ranges will not be utilized unless verified. Despite all these processes and procedures to capture data quality errors upon receipt, it is impossible to capture all errors that might exist within the boundaries of the acceptable variance levels and therefore can be a source of variability within IQVIA information.

Reference Files

To standardize data received from a wide variety of sources and allow for alignment of the data prior to projection or aggregation, IQVIA develops and maintains reference files for various types of information, including medicines, diagnoses, treatment modalities, distribution centers, health care offices, integrated health networks, insurance plans and data classification schemes. IQVIA employs a number of processes to maintain the quality of these reference files, including: (a) acquisition and integration of a significant number of reference file updates received from a variety of sources, (b) manual data validation to confirm the existence and accuracy of the reference information, (c) maintenance of linkages between IQVIA standard identifiers and industry standard identifiers, and (d) investigations of reported data discrepancies.

Data Quality Bridging

IQVIA receives data relating to tens of millions of transactions each week. To standardize data for each transaction received from a wide variety of sources (e.g., suppliers frequently use their own proprietary reference numbers) and allow for alignment of the data prior to projection or aggregation, IQVIA links key record variables to IQVIA standard reference files as applicable for the particular service. As changes occur in the marketplace (e.g., new product or a new form, pack or strength of an existing product), and these changes are reported to IQVIA, IQVIA works quickly to map these changes in data arriving from sources to IQVIA's standard reference files. IQVIA employs a number of processes to maintain the quality and results of the bridging process, including: (a) development and maintenance of algorithms for the matching / linking of supplier reference numbers with IQVIA reference files, (b) identification of new, deleted or modified supplier reference numbers for purposes of promptly linking these to IQVIA reference files, and (c) annual bridge validation for key products.

Database Management

When data has successfully passed through the processes referenced above, it is then added to the applicable IQVIA database. In connection with the movement of the information to these databases, IQVIA employs additional quality control processes, including: (a) IQVIA examines the data to ensure data file statistics match as data moves from one process to another process (e.g., number of records), and (b) all programming logic, statistical methodologies and other computer algorithms applied to the data to create these databases and the applicable reports pass through rigorous development and testing methodologies prior to implementation in the production environment.

Projection Methodologies

Most IQVIA offerings are derived from the use of statistically representative samples, not a census of activity. More than one hundred statisticians support the development of sample designs and projection methodologies to estimate activities to achieve a high degree of accuracy on a cost effective basis. IQVIA frequently employs higher coverage rates than statistically necessary for many of its offerings to properly reflect key aspects of the pharmaceutical and health care markets.

Nevertheless, sample designs, projection methodologies and coverage rates all have an impact on the degree of accuracy of IQVIA information. Information regarding confidence intervals and other measures of accuracy are available to IQVIA customers.

Imputation Methodologies & Temporary Replacement Data

On occasion, IQVIA employs data imputation methodologies that allow IQVIA for a short period of time to impute data for a supplier or facility location if data supply is interrupted or severe data quality issues are uncovered. By using imputation methodologies for missing data, analysis has shown that IQVIA offerings are more accurate and not prone to trending spikes caused by issues in the data flow process (i.e. enabling analysis of true trends based on marketplace activities).

Client Report Creation

Certain IQVIA reports involve customization based on customer supplied report parameters (e.g., market definitions and geographic reporting specifications). IQVIA employs methods to verify the customer supplied parameters and ensure these have been properly entered into IQVIA report production systems. These customized reports undergo validation procedures in an effort to ensure these parameters have been applied correctly.

Data Availability

IQVIA provides the most comprehensive set of market measures in the world. However, numerous factors can potentially impact the acquisition and/or usability of such information, including: (a) contractual restrictions from sources of data on the use, types of customers, applications and publication of information, (b) legal restrictions, (c) data origination (e.g., data entry errors; system coding issues), (d) data suppliers (e.g., variations in processing), (e) market events, and (f) natural disasters. IQVIA works hard to avoid data variability in these circumstances and find reasonable solutions to account for the impact of these issues on IQVIA information.

Appropriate Uses of IQVIA Information

Applications using IQVIA information should be designed to accommodate the unique characteristics of the information. As noted above, there are a multitude of people, sources, systems, laws, methodologies and other issues that can impact the quality and nature of this information. Users of IQVIA information should design applications that leverage strengths and minimize weaknesses of such information to avoid application errors or flawed decision-making. These design considerations include:

- Use confidence intervals: Confidence intervals are expressed in terms of a range of values around the sample-based estimate associated with a particular probability, or level of confidence, that the true value is contained within that range.
- Account for normal variations in trends over historic periods of time: Incorporate tolerance ranges into analysis to identify data points which fall outside of normal variations. Look for industry events or other known causes which might account for the unexpected deviation. Examples might include significant weather events, product manufacturing issues affecting inventory, etc.
- Use similar historic periods when using data: Apply historical trends in tandem when viewing market share for a reasonability test (e.g., holiday periods, seasonality).

- Manage expectations: Set expectations within your organization and with your vendors so normal variation is understood to avoid incorrect decision-making, poorly designed applications or a loss of confidence in IQVIA information.
- Vendor selection: Be sure each of your vendors working with IQVIA data understands the related healthcare markets and the underlying characteristics associated with the data.
- Anticipate greater variability for low volume or more granular estimates: Recognize that using data on low volume products or extracting data of increasing granularity (e.g. smaller groups of prescribers or smaller geographic areas) increases the variability of the data estimations.
- Market share versus volume: Use market share for more consistency than volume. While individual product volume estimations are desirable to report product sales trends, those estimations are subject to the variability noted in this document. By viewing product trends in the context of an entire market (market shares), whereby each product is estimated with a similar degree of variability, the resulting calculations may improve the overall consistency of the market measure.

Summary

IQVIA information is gathered from a wide variety of data sources using many different methods. The data are complex, non-standard, and can be inherently variable when submitted to IQVIA. We use sophisticated tools and business practices to gather, validate, standardize, project, and report such information. As such, IQVIA information represents an estimate of measured activity and should be treated accordingly. We encourage customers to apply the considerations provided above, and to use the tools and guidance materials provided from IQVIA in order to use IQVIA information effectively.