

Reports and analytics: From information to insights

Introduction

With the emergence of healthcare analytics solutions in recent years, organizations have been looking to transition from their existing time-consuming report generation and analysis to more powerful insight analytics tools.^{1,2} This document is meant to provide a comparison of reporting and analytical systems and offer guidance on the appropriate role of each.

This document is designed to describe:

- 1 The features of reports and what role they play in health system operations management
- 2 The features of analytical systems and how they differ from reports
- 3 The reasons a pharmacy needs both

Feature	Reports	Analytics
Portable	X	Only on a portable device
Use in labeling items	X	
Fixed snapshot	X	
Perform data analysis	√	√
Self-learning		X
Multilayer		X
Interactive drill-down		X
Interactive with operational systems		X
Provide workflow support		X



Reports: The old standby

Reports have been part of health system operations management since their beginning. A report's job is to present data, often in great detail.³ It is then the consumer's responsibility to review the report's data, perform analysis, generate conclusions, devise an action plan and execute that plan based on the presented data. Depending on the breadth and depth of detail contained in each report, those tasks can be time consuming.

Reports represent a snapshot of data in time that *can only be refreshed by generating another report*.³ So, reports can be out of date almost as soon as they are generated.

While it is possible to create reports that summarize data, most of our reports are detailed. This means that their contents require intense review and manipulation to yield insights into the general trends they display, often requiring the use of additional tools to perform this analysis.³

The scope and layout of reports are generally fixed, which means they don't lend themselves to starting at a higher level of detail and drilling down to lower levels of detail.³ In addition, reports from individual systems can only address data from those systems. Centralized reporting may permit aggregating data across core systems but are otherwise limited to the capability of reports.³

Reports are generally designed to answer specific questions. For example, medication management scenarios might include:

- What medication supplies have gone unused for the last 30, 60 or even 90 days?
- What medications do I need to dispense to what patients?
- How many times were infusions started without benefit of dose-error reduction software (DERS) control?
- Which patient care units contain the highest number of narcotics discrepancies?

Reports can perform basic four-function calculations and some gross statistics (computing averages, standard deviations).³

To that extent, they can be analytical. Early diversion risk identification systems, for example, relied on computing mean controlled substance usage and identifying users whose usage exceeded that average by multiple standard deviations of the mean.

Historically, reports were printed, and, in many cases, still are. This is especially true when a user needs to employ the contents of the report to guide them through performance of a task. For example, an individual might use a printed copy of a report of medications that need to be dispensed to guide them through the process of acquiring, packaging and dispensing them.

Not all printed reports are on paper; labels are reports printed on small, self-adhesive pages and some computer applications print reports to the screen (virtual reports) as part of their function. More recently, reports have also been delivered as data files (e.g., comma-separated values—CSVs, Excel files, PDFs) that can be distributed and/or can be used as inputs for additional automated evaluation. In these cases, reports supply raw data to other systems that assist in analyzing their contents. Note that these other systems are generally home-grown in tools, such as a computer's spreadsheet software, which require additional time to build and deploy.

Analytics: The next step

In contrast, analytics are designed for online presentation of the results of what may be complex multipoint analyses in ways that permit the user to see the large picture and drill down into the detail as it may seem appropriate. In so doing, these systems automate the human analysis required for using reporting systems, performing an analysis in seconds that might otherwise require hours or days for a user to manipulate their reports.^{3,4} Additionally, the analytics algorithm can often display data patterns as a visual that provides insights without the requirement of lengthy data mining.^{1,3}

Analytics systems can be self-refreshing.³ They do not require human intervention to re-perform the analysis and can stay as current as the most recent data permits.

Analytical systems are subject to software quality assurance processes.¹ This means that there are recorded test results demonstrating that the analyses are being performed as specified.^{1,2}

Analytics can access data from the entire panoply of core medication management systems, and they are not limited to the data of one core system. Analytics can also capture data from related systems that may be useful, such as some diversion analytics systems capturing time and attendance data, or medication administration information from an EMR.³

The analyses performed by these systems can include sophisticated and self-learning processes that allow them to respond automatically to changing conditions as described by their data.^{4,5}

Because these systems are hosted, they can be interfaced back to the core systems that generated the data to not only recommend action but permit the user to implement that action. For example, an inventory management analytics system could not only prioritize areas where PAR levels require modification, but also transmit user-approved changes to those levels back to the source inventory systems for immediate implementation.

An additional benefit of these systems being hosted is that they can include workflow processes that guide the user through system suggested actions. For example, a diversion analytics system might include a workflow that identifies users of concern for possible diversion in prioritized order based on analysis of many signals. The system would then guide the users through the investigative process, supplying relevant details that support each of the indications that this person might be diverting controlled substances.

Authors

- Dennis Tribble, PharmD, FASHP
- Craig Greszler, PharmD, MBA
- Doina Dumitru, PharmD, MBA, FASHP

References

- 1 Nelson SD, Walsh CG, Olsen CA, et al. Demystifying artificial intelligence in pharmacy. *Am J Health Syst Pharm*. 2020:zxaa218. doi:10.1093/ajhp/zxaa218
- 2 Drees J, Dyrda L, Adams K. 10 big advancements in healthcare tech during the pandemic. *Becker's Hospital Review*. July 6, 2020. Accessed March 11, 2021. www.beckershospitalreview.com/digital-transformation/10-big-advancements-in-healthcare-tech-during-the-pandemic.html
- 3 Bigsby C. Reports vs analytics: what's the difference? *Visier*. Accessed March 11, 2021. www.visier.com/clarity/reports-vs-analytics-the-difference/
- 4 Machine learning. IBM. Accessed March 11, 2021. www.ibm.com/analytics/machine-learning?p1=Search&p4=43700050436721077&p5=e&cm_mmc=Search_Google_-_1S_1S_-_WW_NA_-_machine_learning_e&cm_mmca7=71700000060812519&cm_mmca8=kwd-59020306&cm_mmca9=Cj0KCQjw28T8BRDbARIsAEOMBcwfB-VptW5BjTmGgosRRRLCrkrKbSjJXTihksv8vx8VGopt8PQqfY4aAmgBEALw_wcB&cm_mmca10=407020396491&cm_mmca11=e&gclid=Cj0KCQjw28T8BRDbARIsAEOMBcwfB-VptW5BjTmGgosRRRLCrkrKbSjJXTihksv8vx8VGopt8PQqfY4aAmgBEALw_wcB&gclid=aw.ds
- 5 Deep learning. IBM. Accessed March 22, 2021. www.ibm.com/cloud/deep-learning?p1=Search&p4=43700050328272152&p5=e&cm_mmc=Search_Google_-_1S_1S_-_WW_NA_-_deep_learning_e&cm_mmca7=71700000060940837&cm_mmca8=aud-309367918490:kwd-907504622&cm_mmca9=Cj0KCQjw28T8BRDbARIsAEOMBcwm5OrhPipehSFgchw_J95LBlyskI3rnr7CjThyqwhqSGzBZoLEeiAaAp_FEALw_wcB&cm_mmca10=406185642131&cm_mmca11=e&gclid=Cj0KCQjw28T8BRDbARIsAEOMBcwm5OrhPipehSFgchw_J95LBlyskI3rnr7CjThyqwhqSGzBZoLEeiAaAp_FEALw_wcB&gclid=aw.ds

Conclusion

- 1 Both reports and analytics can be useful tools for health system operations management.
- 2 Reports are useful tools to present information, serve as working tools to help users perform physical tasks and label items dispensed to patients.
- 3 Analytics provide users with summary information as a result of often complex analyses beyond the capability of reports. This enhances the ability to drill down into information, prioritize data that is action oriented, implement actions on behalf of users within the analytics system and guide users through workflows to standardize and document processes.