
hr | ReFlex rules for LabPiQture are now available through life insurers' existing connection to ExamOne

# hr | ReFlex Select for LabPiQture

## LabPiQture overview

ExamOne's LabPiQture is a data product comprised of clinical lab results and diagnosis history. It is the largest network of both in-patient and outpatient clinical lab results with approximately two-thirds of all US laboratory records included in the dataset. Due to the volume of data and the data structure, with LabPiQture returning results represented by LOINC (Logical Observation Identifiers Names and Codes), it is a valuable tool for the life underwriting industry in assessing and stratifying mortality risk.

There are several approaches to LabPiQture data interpretation. One approach is manual, with direct human review of the raw data. This approach is effective, but at times may not be scalable for today's underwriting environment. With automation at the forefront of underwriting innovation in the life market, rules-based systems and predictive models are leading methods of interpreting complex data. A rules-based system is one that uses rules developed by underwriters, medical directors or other individuals with the relevant background to assess the relationship between test results and expected mortality. These systems are flexible and rules may be written and applied directly from underwriting guidelines. In addition to a rules-based approach, predictive models are an emerging trend in the industry. Rather than relying on expert written rules, predictive models are built using various statistical and machine-learning techniques drawing on empirical evidence or historical underwriting decisions.

## hr | ReFlex Select – Underwriting Rules for LabPiQture

Recently, Hannover Re collaborated with ExamOne to develop a rules-based solution that enables life insurers to automate the use of LabPiQture's comprehensive, real-time clinical laboratory records to enhance accelerated underwriting programs and support data interpretation challenges. The solution is now available as a standard part of hr | ReFlex, Hannover Re's automated underwriting solution. The rules are also available to carriers through a new automated underwriting solution from Hannover Re called hr | ReFlex Select. hr | ReFlex Select is an API based solution that enables carriers to use hr | ReFlex rules for LabPiQture irrespective of their current underwriting engine.

hr | ReFlex Select for LabPiQture is available to all insurers via their existing connection to ExamOne's LabPiQture data.

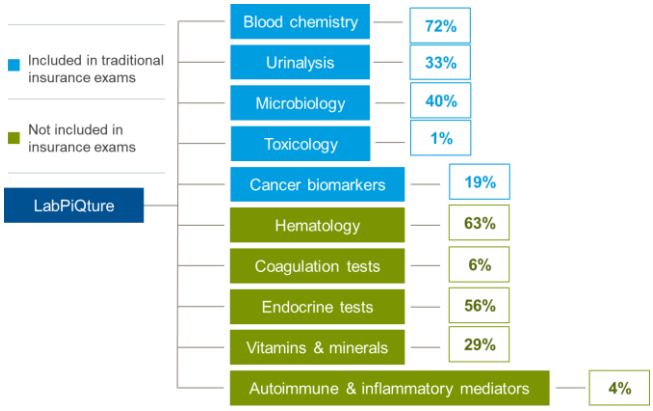
The solution consists of rules developed for over 2,300 LOINCs, including complex rule combinations and hierarchical rules. It covers 90 percent of LabPiQture data, including the most important and frequently encountered results in an insurance context. Additionally, the hit rate is approximately 55% with an automated underwriting decision for the LabPiQture data on more than 90 percent of people with LabPiQture results.

The distribution of test results available through LabPiQture include data that would be available through a traditional insurance exam as well as tests that are not included in insurance exams but that have a mortality impact. With LabPiQture returning an average of three to four separate values per test, it demonstrates additional value compared to an insurance exam which only captures an applicant's health status at a single point in time. As Hannover Re set out to develop rules for LabPiQture, it was evident that a comprehensive solution would need to

include rules for both categories of tests, those currently found in insurance exams and those not included, thus maximizing the value of LabPiQture data.

Exhibit 1 shows the hit frequency for each test category, illustrating that over half of the hits in the "not included in insurance exam" category are results related to hematology and endocrine tests. Being able to extract the protective value from these types of tests was a critical component of the rule development process. Additionally, tests that have low frequency but high severity such as toxicology or autoimmune categories were another important focus of rule development. A key benefit in Hannover Re's solution for LabPiQture data is that the rules can be applied to test results not commonly found in insurance exams and with which individual underwriters have less familiarity. It is also well suited to cases where multiple results for a given test are present.

### Exhibit 1 – Hit frequencies for each test category




## Rule building philosophy & considerations

Hannover Re's rules for LabPiQture are firmly grounded in the hr | Ascent underwriting manual. This includes rules for commonly found tests such as glucose metabolism, renal function, liver function, serum protein status and cardiac risk. The Hannover Re solution also features rule sets that can handle cases where there is more complexity. This includes when hierarchical rules are introduced as well as combinations of rules sets.

The following lipid example exemplifies the solution's capabilities. By enriching the LabPiQture 0-5-10 heuristic score, the hr | ReFlex Select rules for LabPiQture provide a finer cut of ratings that extends the range of actionable underwriting outcomes.

Exhibit 2 illustrates this for a 45-year-old male applicant with LOINC 2093-3 for total cholesterol. The range of underwriting outcomes spans from refer to underwriter (RTU) to decline and includes best and preferred classes. Compared to the standard LabPiQture score of 0-5-10, in which 25 percent of applicants have a score of zero and 75 percent have a score of either 5 or 10 that would be declined or RTU, the hr | ReFlex Select rules enables an automated decision on the LOINC results 100 percent of the time. These decisions mirror a traditional underwriting thought process as they are aligned with the hr | Ascent underwriting manual.

### Exhibit 2 – hr | ReFlex rules versus LabPiQture score

In addition to the tests common to insurance exams, Hannover Re developed substantial guidance on tests that are frequently encountered in LabPiQture hits, but not found in insurance exams. In developing these rules, Hannover Re's medical underwriting team evaluated test result reference ranges and applied well-validated insurance reference ranges to the gender and age breakdowns. Simply using accepted clinical ranges resulted in an unnecessary amount of RTU cases. As an example, LOINC 718-7 (hemoglobin), which is a test often found in LabPiQture hits, uses clinical reference ranges which were not optimal for underwriting purposes. Using data analytics, evidence-based research and guidance from hr | Ascent, Hannover Re developed rules that take a granular approach to evaluating hemoglobin test results allowing automated decisions even when the results fell outside the clinically accepted ranges.

This rule development process was completed for hundreds of LOINCs and as a result, life insurers will be able to deploy the hr | ReFlex Select rules for LabPiQture to streamline decisions and reduce manual underwriter review without compromising underwriting outcomes. In addition to rules for handling decisions for test results common insurance exams tests and those not found in a typical insurance exam, the hr | ReFlex Select rules effectively handle several other scenarios.

## Single verses multiple test values

LabPiQture hits often return multiple test results over time for the same test. The hr | ReFlex Select rules for LabPiQture include rules to handle such cases and when to focus on the most recent test, take an average of test results or determine trends versus isolated findings. Two examples to consider are cholesterol and White Blood Cell (WBC) Count (which forms part of a Complete Blood Count panel). For cholesterol, the rules consider the average when multiple tests are present and make decisions based on hr | Ascent guidance. For WBC, the rules can discern trends verses isolated findings so that debits are applied judiciously.

## Age of test results

The life insurance industry typically considers tests results from between 12 and 24 months old. The hr | ReFlex Select rules for LabPiQture take into account the severity of the test results and how recent they are in order to enable decisions on data without losing protective value or causing unnecessary RTUs.

## Related test results

With the abundance of data available via LabPiQture, underwriting test results that could apply the same or overlapping mortality debits is a significant challenge. One example is glucose metabolism which has multiple tests that are similar in nature and where adverse findings from overlapping test results could result in a significant number of debits. In order to resolve that, Hannover Re has developed combination and hierarchical rules that refer to the same impairment and ultimately make an underwriting decision that mirrors how the tests would be evaluated in a traditional underwriting process.

## Conclusion

LabPiQture is an extremely value tool that life insurers can use in a multitude of ways. Adding hr | ReFlex Select rules for LabPiQture supports carriers use of the data to make automated decisions, reduce manual review and improve the efficiency and consistency of manual review without negatively effecting mortality. hr | ReFlex Select rules can be seamlessly integrated into life insurers' process through their existing LabPiQture connection. The Hannover Re rules solution features data clean up that happens behind the scenes, normalizing data and removing data errors. Hannover Re went through an extensive collaboration process with the underwriting and hr | ReFlex teams working to ensure that rules are consistent with the way an underwriter would make decisions in production. As new data and trends emerge, Hannover Re will continue to iterate and refine rule sets to ensure that hr | ReFlex Select for LabPiQture reflects an up to date underwriting philosophy guided by the hr | Ascent underwriting manual.

For more information on how to access hr | ReFlex Select for LabPiQture, contact your LabPiQture representative. For more information on hr | ReFlex rule development, please contact Hannover Re.

## Additional resources

1. ExamOne & Hannover Re: LabPiQture Collaborative Study – June 2020
2. Hannover Re US collaborates with ExamOne to incorporate LabPiQture into hr | ReFlex platform – August 2021
3. hr | ReFlex + LabPiQture: An Interview with Kevin Oldani and Heather Haslam – November 2021

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