



Independent physician review found Symptom Checker to be over 92% accurate

- Type: Private healthcare provider
- Location: USA
- Product: Symptom Checker/Infermedica API

About the provider

The medical group unites over 500 providers on the east coast of the USA. The company focuses on providing exquisite medical services that often exceed national standards. It serves over 300,000 patients, providing them with primary and specialty care services in more than 30 specialties.

500

providers

>300k

patients

>30

specializations

The need:

Clinical validation of digital health solutions before investment

The company wanted to add a symptom checking component to their suite of digital front door tools. They sought a solution that would support their end-users with medical guidance and connect them to appropriate health services, available through the health platform. This included pre-populating known patient data from the EHR, recommendations for care, scheduling visits, and building SOAP notes which could be loaded back into the EHR. The company tested several solutions and validated their medical content, triage, and diagnostic accuracy. One of the tested solutions was Infermedica's [Symptom Checker](#).

Before deciding which product to use, the company ran an extensive clinical evaluation of its medical content. Necessary requirements were set at a minimum level of 90% accuracy for symptom checker results and triage recommendations, with testing conducted on their side.

The solution:

More than 400 test cases carried out

To meet the requirements, Infermedica shared time-limited access to its platform. The company then ran its own tests whose objectives, design, setting, and results are presented below.

Objectives

Between April - June 2021, the company's team of medical doctors performed a clinical content evaluation and validation of Symptom Checker functionalities.

Design

Patient vignette/real case documentation in clinical testing.

Setting

The company’s team of 10 clinicians performed 407 patient interviews using the evaluation tool connected with Symptom Checker, provided by Infermedica. The target condition was provided for each patient at the beginning of the interview, and the physician running the test would then add the related symptoms, risk factors, and other medical information, just like patients would. The clinicians were asked to enter their expected triage level for that particular case prior to revealing Symptom Checker’s results. **The clinicians’ opinions were not used to inform Symptom Checkers’ decisions in any way.**

Intervention/Comparator

Condition and triage estimations provided by the clinicians were compared with the outcomes presented by Symptom Checker.

The results

Various metrics were observed, but two were crucial: **triage rating** and **correctness**.

Triage accuracy above 92%

Triage rating provides information about the safety and appropriateness of the triage level advised by Symptom Checker. Infermedica's tools assess triage along a 5-point scale: self-care, consultation, consultation within 24h, emergency, and emergency ambulance. **The clinicians and Symptom Checker’s triage recommendations were aligned in 92.87% of cases.**

Triage rating	# of interviews	% of interviews
Correct	378	92.87%
Overtriage	27	6.63%
Undertriage	2	0.49%
Total	407	100%

Summary of Symptom Checker’s triage accuracy results.

Recommended triage level safety at 99.5%

Reviewing the triage level allowed the clinicians to see if the patients' symptoms were assessed safely and if they were directed to the appropriate level of medical care. 6.63% of all cases were overtriaged. Although this situation is not perfect, this errors on the side of safety and will ultimately be better for patients than being under triaged. Any doubts in triage can be confirmed through a teleconsultation.

Based on these findings, we can conclude that Symptom Checker provides safe triage recommendations 99.51% of the time.

Clinical correctness above 93%

Another key metric is clinical correctness, which compares the clinician's opinion of the case to the Symptom Checker's result. The metric is complex and encompasses the quality and number of medical questions asked, the interview flow, the interview length, and adequate, clear communication of complicated medical concepts. Each patient test case interview was judged by the clinicians. Symptom Checker achieved an overall 93.61% clinical accuracy when compared to the expert's opinions.

Correctness (marked by clinicians)	# of interviews	% of interviews
Correct	381	93.61%
Incorrect	24	5.90%
Critically incorrect	2	0.49%
Total	407	100%

Summary of Symptom Checker's clinical correctness.

It is worth noting that although, in some cases, the interview was rated incorrect (the expected condition wasn't determined), **the triage level was deemed appropriate**. A patient in such a scenario would still receive adequate care. In addition, all of these cases became high-priority tasks for the medical team to improve for future use.

Expected condition (clinician)	Found condition (SC)	Correctness (clinicians)	Triage level (clinicians)	Triage level (SC)	Triage rating (clinicians)
Endometrial cancer	Endometrial polyp	incorrect	consultation	consultation	correct

Example of the incorrect case scenario with correct triage.

In one example, the testing physician expected to find a major skin injury, but Symptom Checker's final result was femur fracture. However, the triage level of emergency ambulance determined by the inference engine was accepted by the testing physician.

In the end, these key results were satisfactory for the company. "At Infermedica, we're quite curious about the external validation results. We knew that the clinicians would use difficult cases," comments Alicja Heyduk, VP of Customer Success at Infermedica. "We were thrilled to see that throughout the thorough testing process, all metrics were so robust," she adds.

While this process provided validation by using test cases, general feedback about the product was also collected to contribute to Infermedica's Feedback Loop. This helps Infermedica verify its medical knowledge base and will be used in the continuous process of improving Infermedica's technologies.

Along with the positive results of this clinical validation study, the process helped form a partnership with Infermedica. Both companies will continue cooperating together to provide the best experience and medical guidance to their patients.