



**MEDQUEST**



# MedQuest

Your path to health, simplified.



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UC Berkeley



**MEDQUEST**  
DEMO

# Existing Market Solutions

01.

**IBM Watson for Health**

02.

**Epic Systems' Clinical  
Decision Support (CDS)**

03.

**Teladoc**

04.

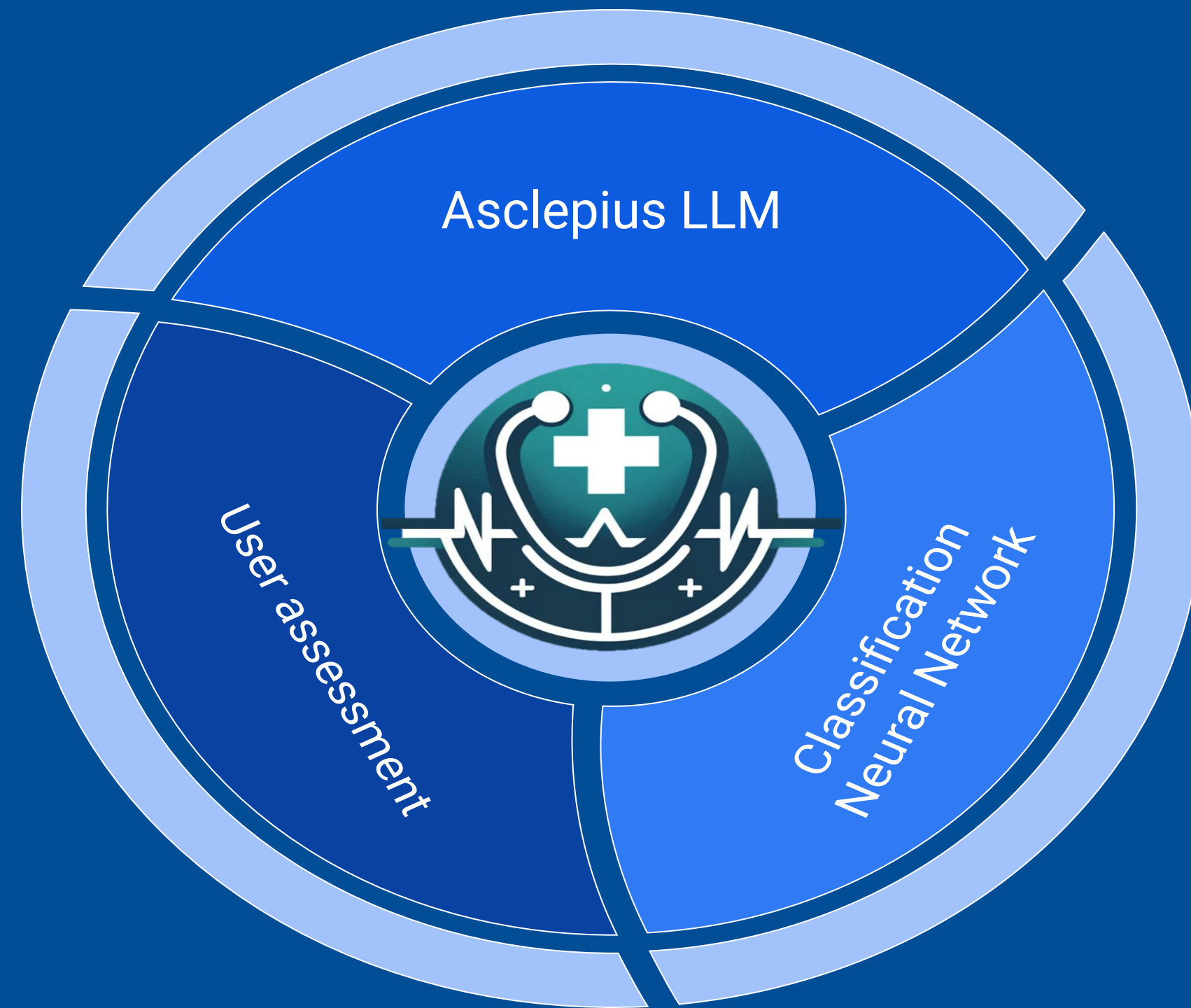
**WebMD Symptom Checker**

05.

**ADA Health Mobile App**

"The diagnostic and triage accuracy of digital and online symptom checker tools: a systematic review." *NCBI*, 17 August 2022,  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9385087/>.  
Accessed 12 April 2024.

# Medquest: Technology at your service





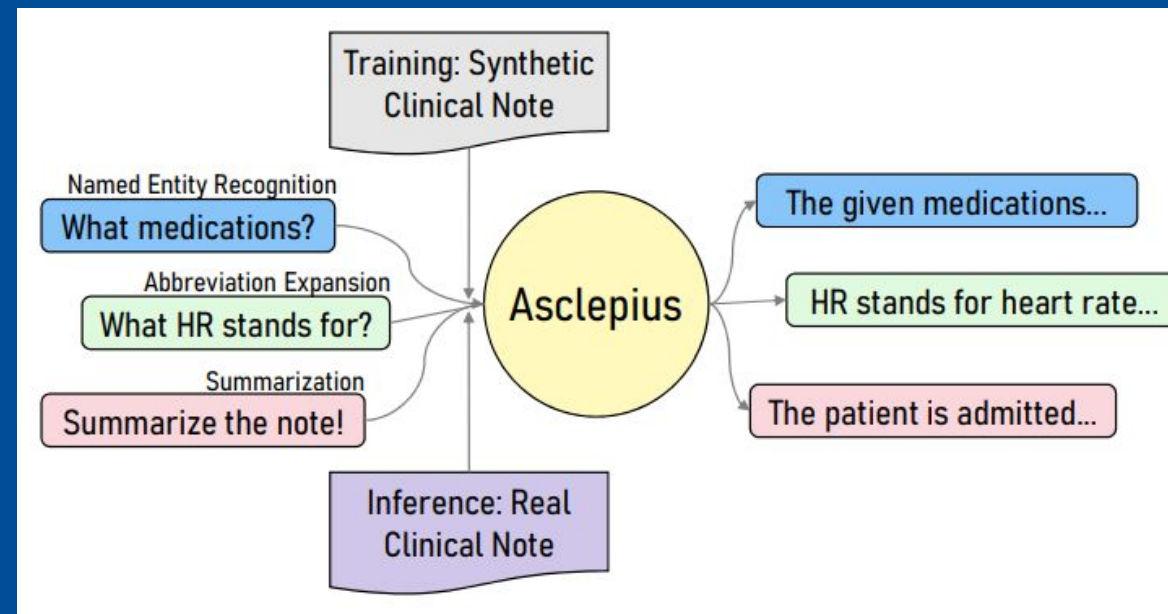


# LLM - Foundational Model



State-of-the-art Large Language Model

**Asclepius 13B**



Contains Medical knowledge and ethical considerations

**Clinical Notes**



Double purpose:

- It is the **first level** assessment
- **Self care** recommendation tool.



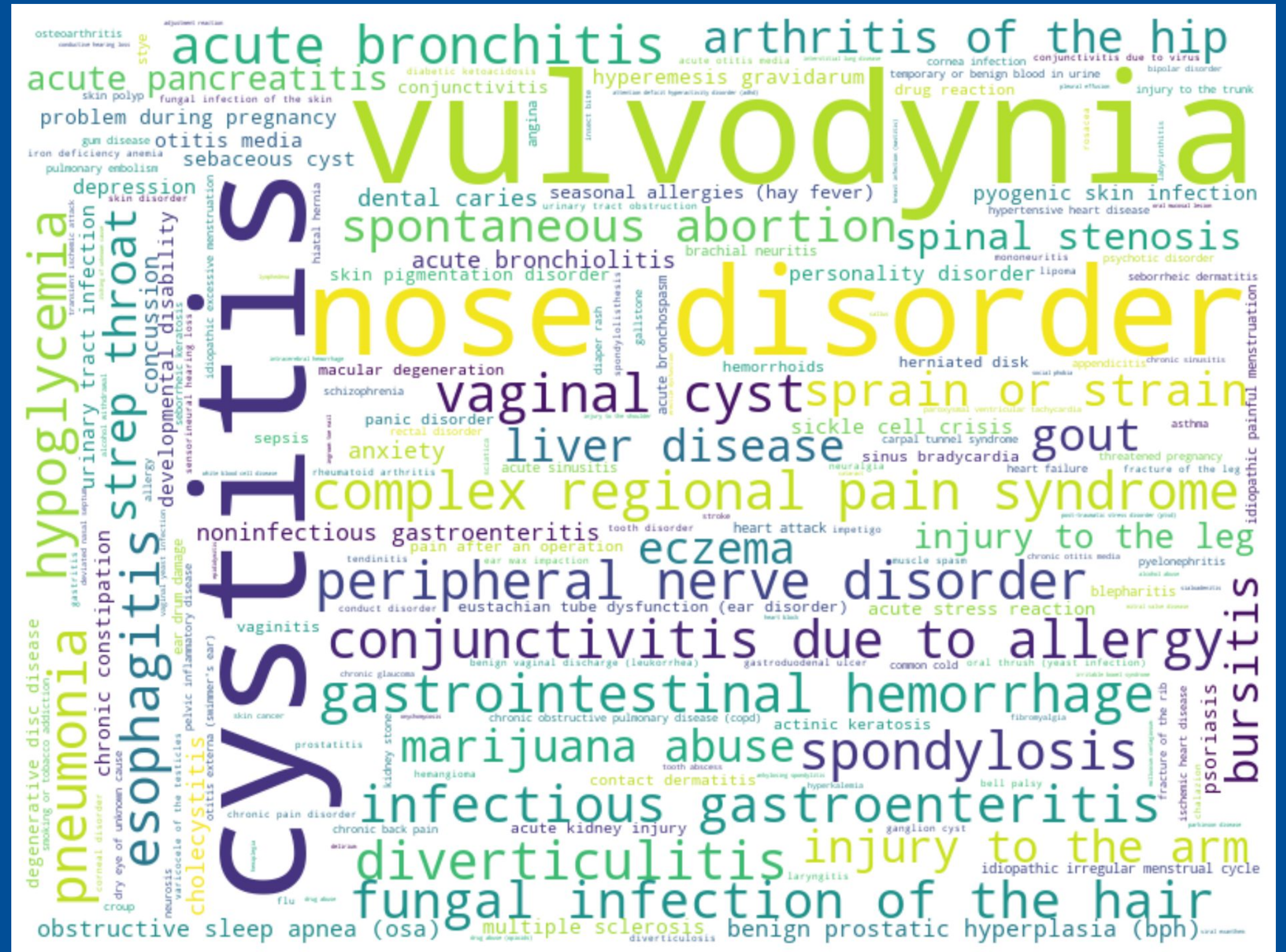
# Classification Dataset



## Disease-Symptom Dataset licensed by The World Bank

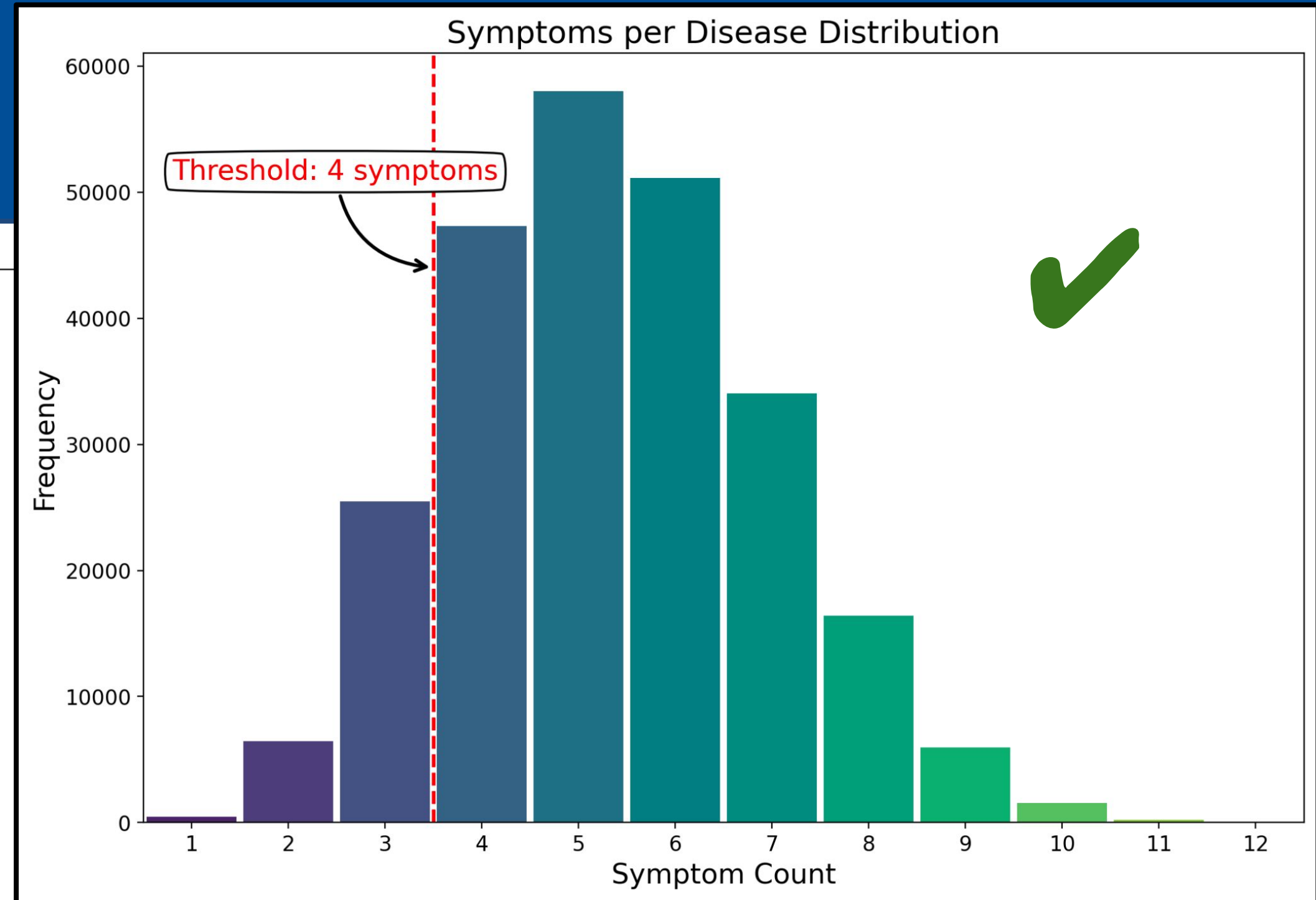
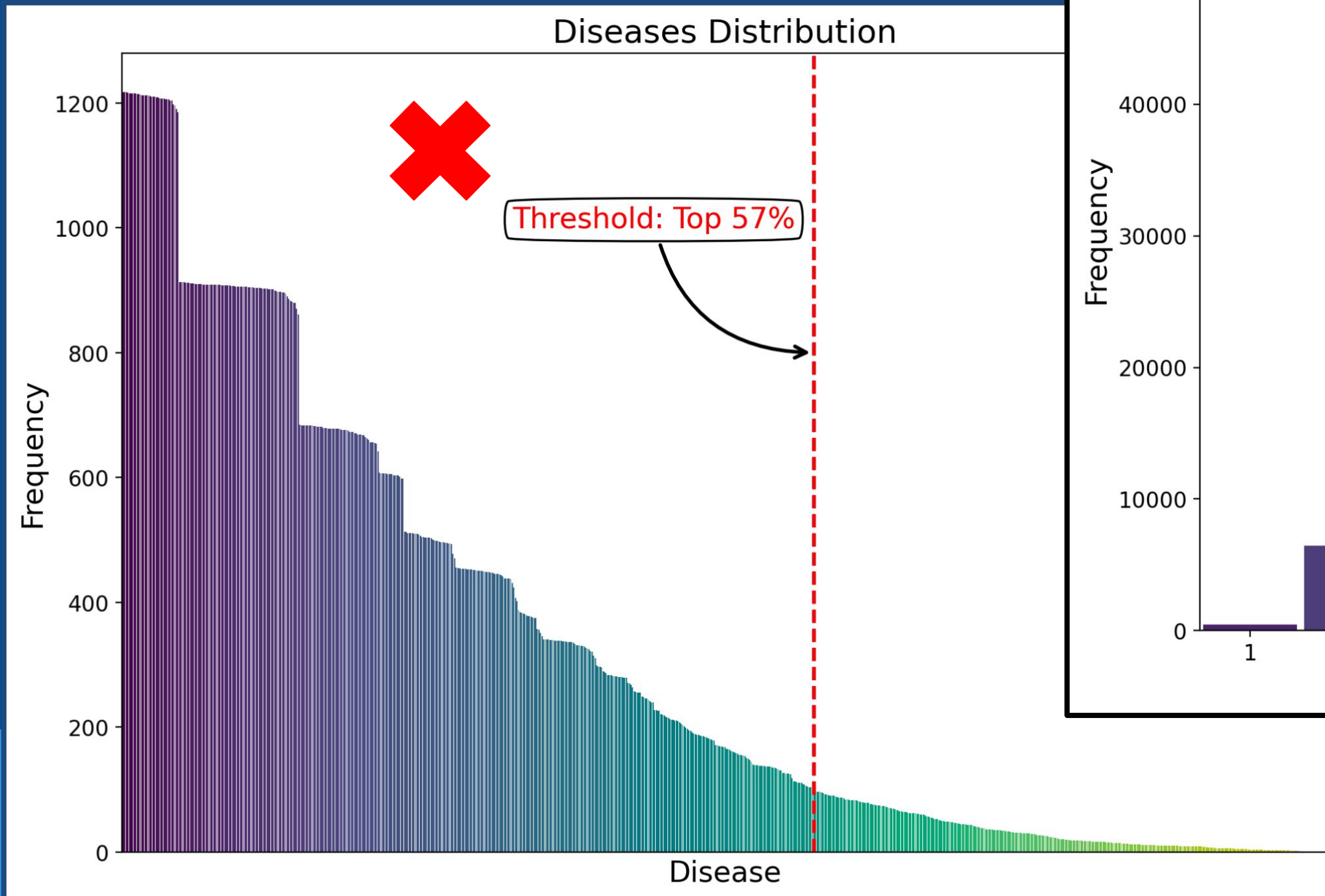
- 246,000 samples
- 772 unique diseases
- 377 unique symptoms
- Source: [Kaggle](#)

\* Occurrence Possibility Preserved  
to Reflect Real World



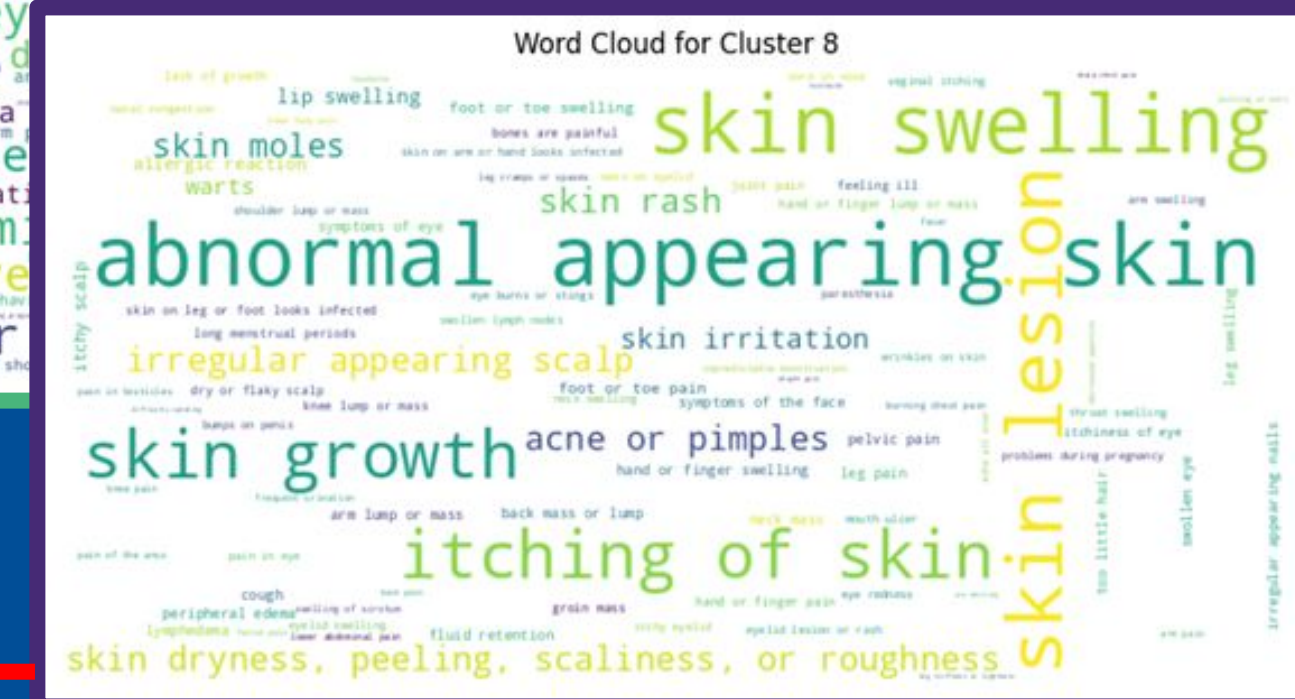
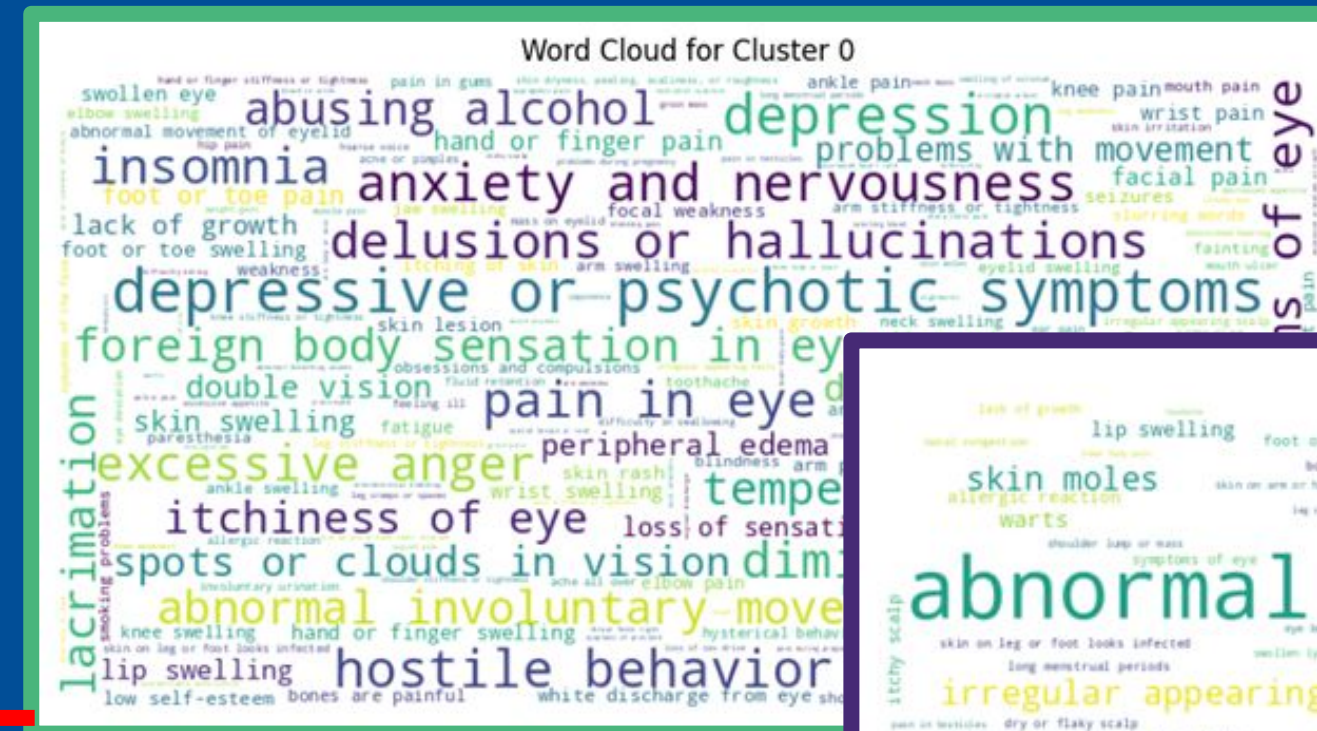
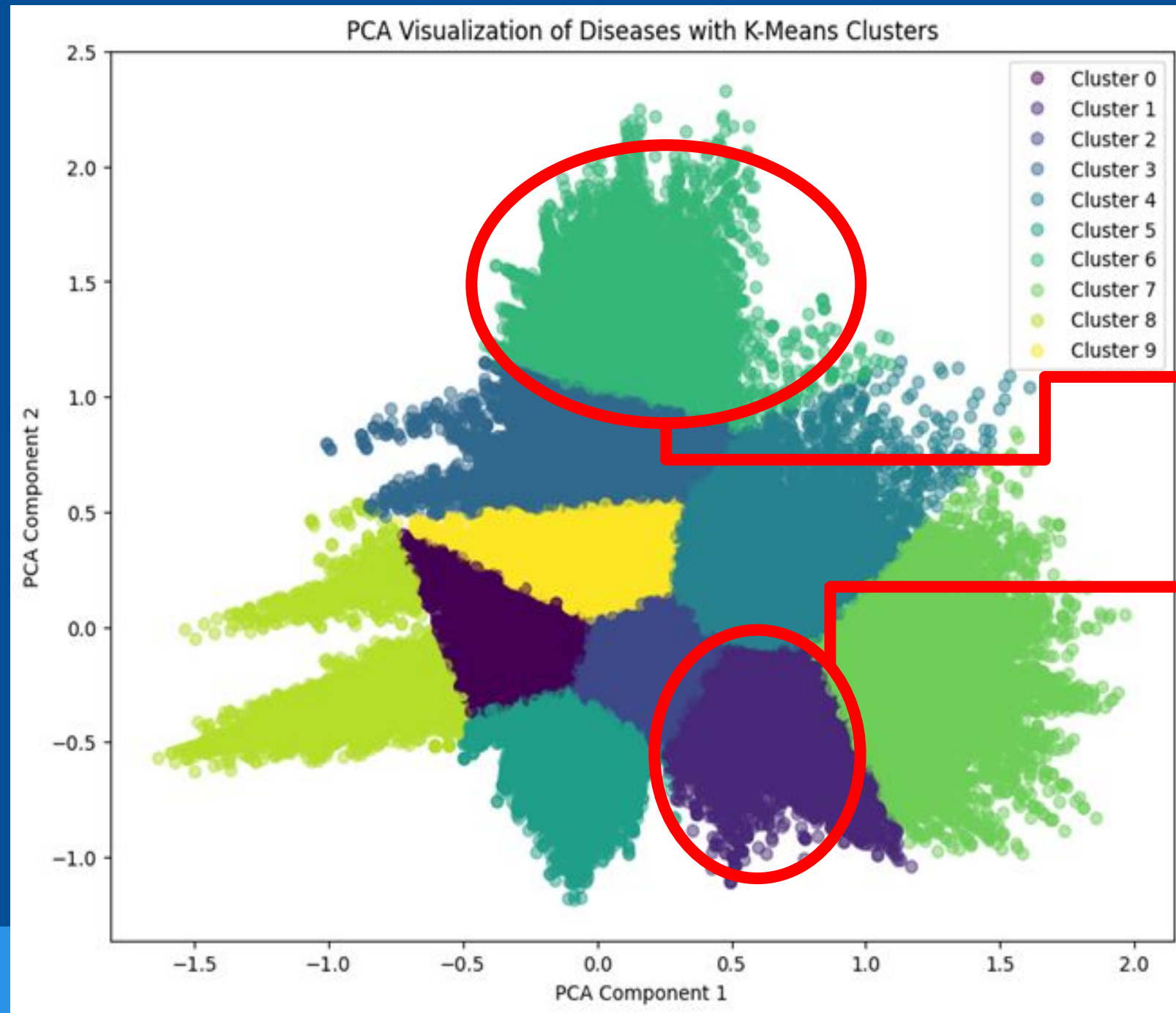


# Dataset Manipulation





# Symptoms & Diseases EDA



Diseases in Cluster 0
Substance use
Anxiety
Delusions
Depression
Developmental disability

Diseases in Cluster 8
Fungal infection of the hair
Eczema
Skin pigmentation disorder
Skin polyp
Seborrheic keratosis



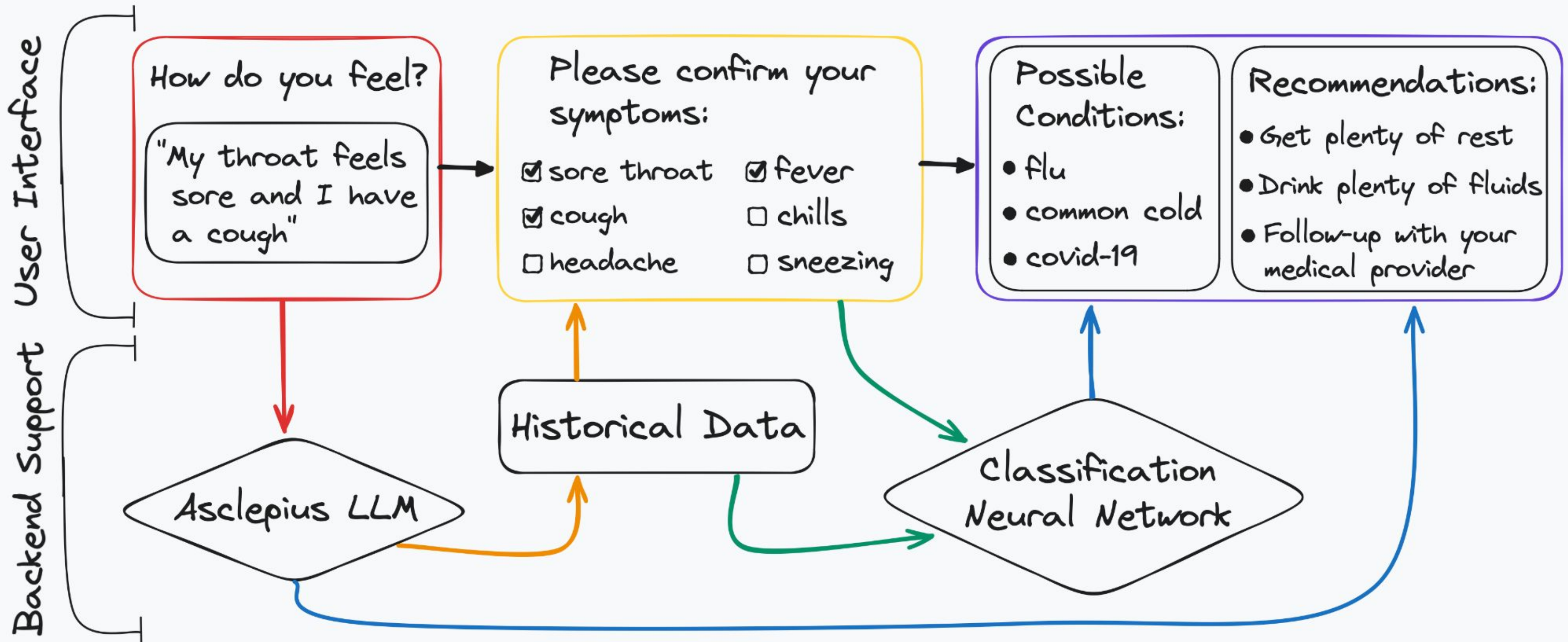
# Classification Evaluation

Model	Precision	Recall	F1 Score
K-means	-	-	0.40
Random Forest	0.84	0.84	0.83
SVC	0.84	0.84	0.83
XGBoost	0.86	0.85	0.85
Naive Bayes	0.86	0.86	0.85
Logistic Regression	0.88	0.87	0.87
Neural Network	0.91	0.90	0.90

Note: weighted metrics shown



# Advanced Hybrid Model Assessment



# Future Work

01.

## Web Hosting

- Not available publicly to users due to cost constraints

02.

## More User Interaction

- Add back-and-forth with chatbot
- “Other” symptom fill-in-the-blank option
- Help button

03.

## Model Improvements

- Add more data to neural network
- Switch Asclepius to GPT



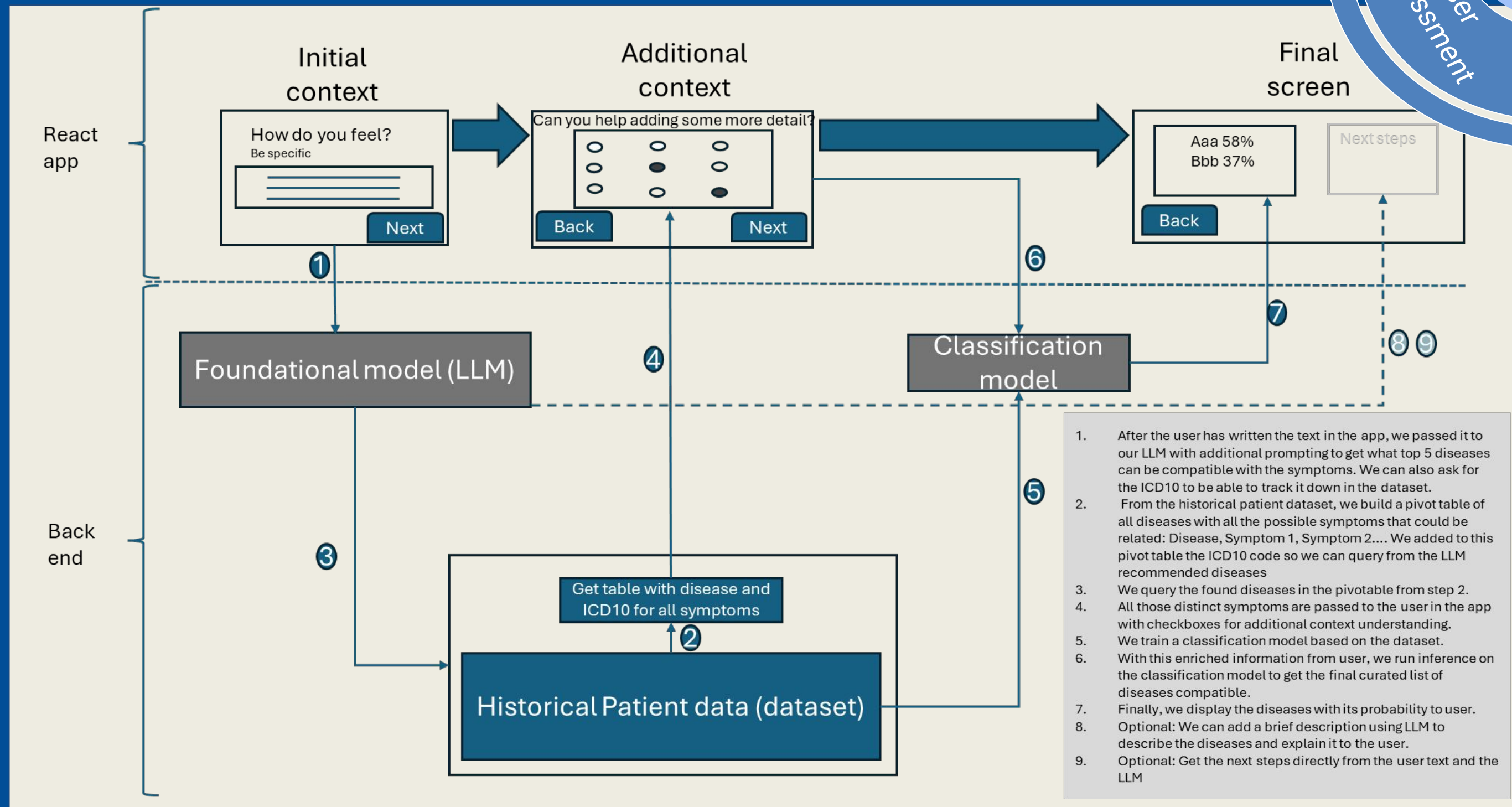
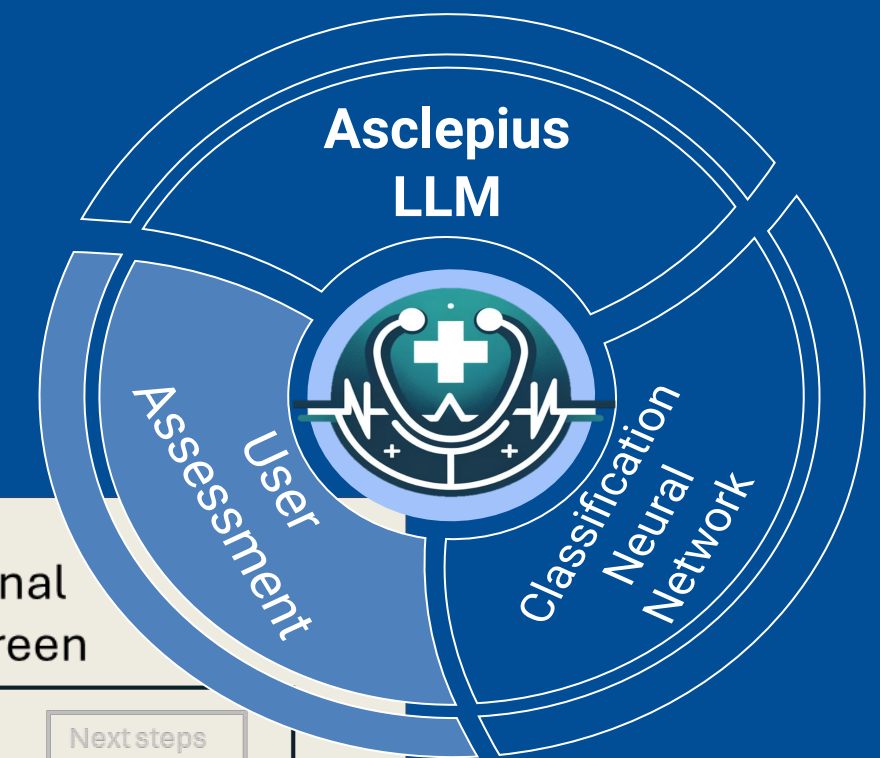


# Thank you!

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Join us in our quest, one assessment at a time.

# Advanced Hybrid Model Assessment



1. After the user has written the text in the app, we passed it to our LLM with additional prompting to get what top 5 diseases can be compatible with the symptoms. We can also ask for the ICD10 to be able to track it down in the dataset.
2. From the historical patient dataset, we build a pivot table of all diseases with all the possible symptoms that could be related: Disease, Symptom 1, Symptom 2.... We added to this pivot table the ICD10 code so we can query from the LLM recommended diseases
3. We query the found diseases in the pivotable from step 2.
4. All those distinct symptoms are passed to the user in the app with checkboxes for additional context understanding.
5. We train a classification model based on the dataset.
6. With this enriched information from user, we run inference on the classification model to get the final curated list of diseases compatible.
7. Finally, we display the diseases with its probability to user.
8. Optional: We can add a brief description using LLM to describe the diseases and explain it to the user.
9. Optional: Get the next steps directly from the user text and the LLM

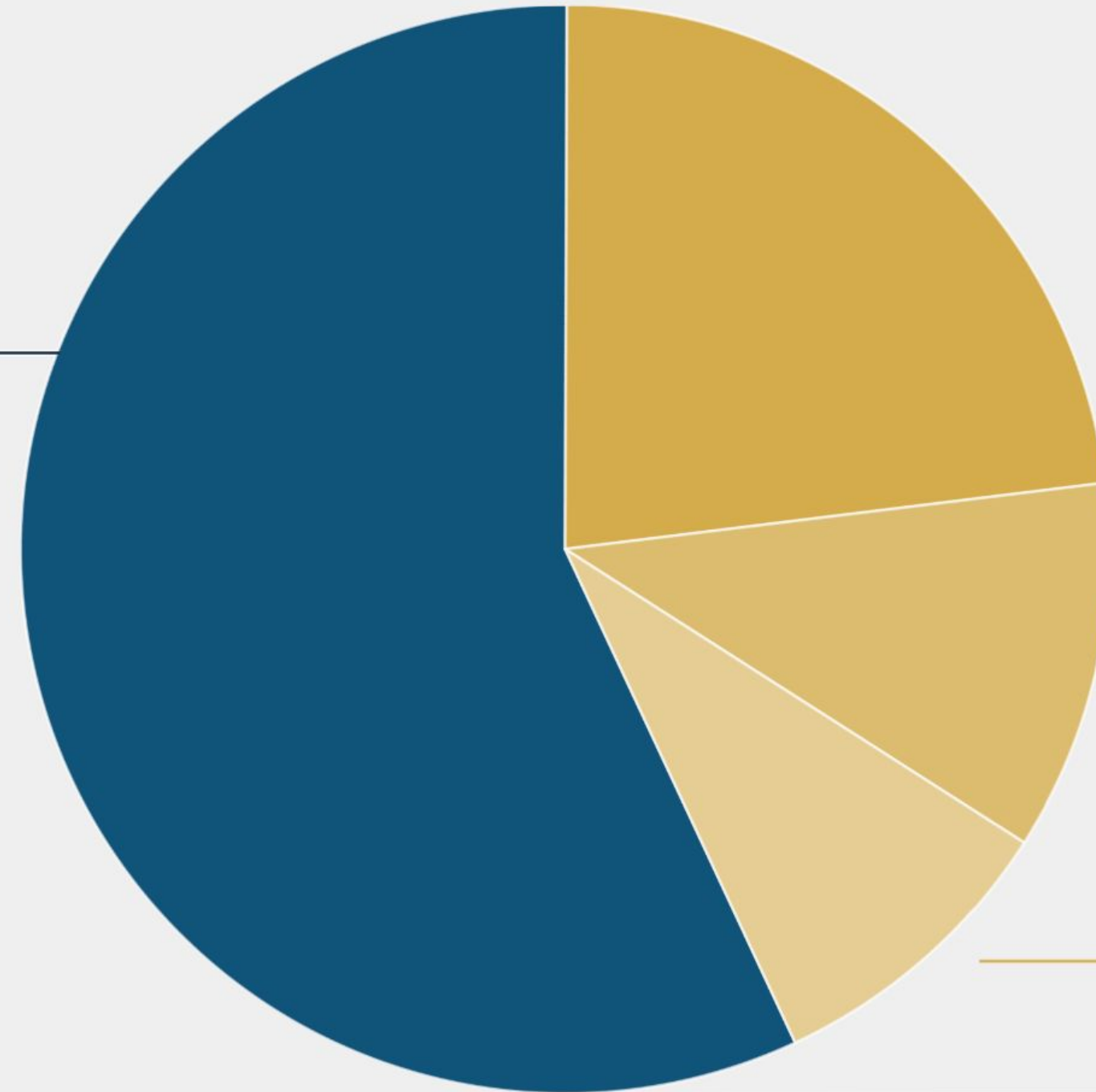


# Health Insurance Status

among working adults 19-64

57%

Insured all year,  
not underinsured



23%

Insured all year, but  
**underinsured**

11%

Insured now, with  
**coverage gap**

9%

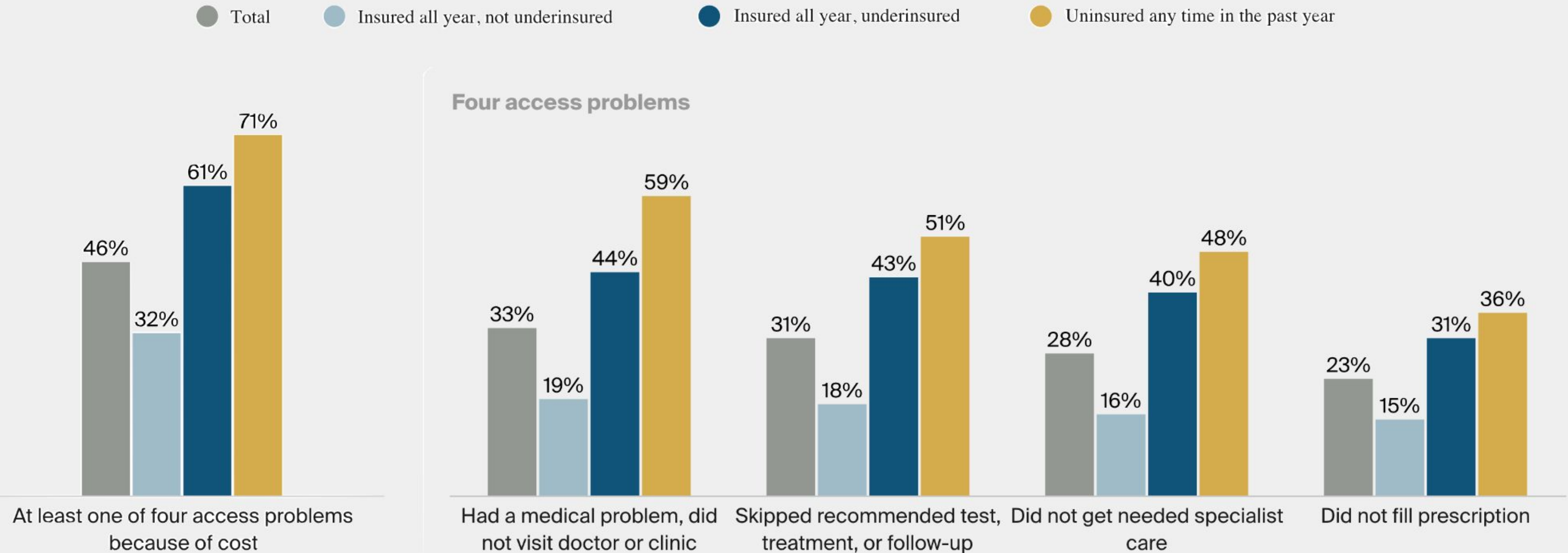
**Uninsured** now

Source: Sara R. Collins, Lauren A. Haynes, and Relebohile Masitha, *The State of U.S. Health Insurance in 2022: Findings from the Commonwealth Fund Biennial Health Insurance Survey* (Commonwealth Fund, Sept. 2022).

<https://doi.org/10.26099/73zg-3432>

# Problems Accessing Healthcare

among working adults 19-64



Source: Sara R. Collins, Lauren A. Haynes, and Relebohile Masitha, *The State of U.S. Health Insurance in 2022: Findings from the Commonwealth Fund Biennial Health Insurance Survey* (Commonwealth Fund, Sept. 2022).  
<https://doi.org/10.26099/73zg-3432>



01.

# Problem

In the US population, roughly 10% of people do not have access to healthcare, and many more are underinsured.

02.

# Target Users

Those uninsured and underinsured with difficulty accessing healthcare will be able to use MedQuest to get quick assessments and next steps.

03.

# Impact

This product would allow more people to have a basic understanding of the symptoms they are having, while also attempting to reduce the load on the ER by directing users to the appropriate medical facility as needed.

# Existing Market Solutions

01.

## IBM Watson for Health

- Target Users: Healthcare Providers
- Uses AI to analyze large volumes of data, including medical literature and patient information, to assist healthcare professionals in making more informed decisions about patient care

02.

## Epic Systems' Clinical Decision Support (CDS)

- Target Users: Healthcare Providers
- Offers real-time alerts and guidelines to physicians based on patient data, including drug interaction warnings, reminders for preventative screenings, and tailored treatment suggestions

03.

## Teladoc

- Target Users: Patients
- Telemedicine service that allows patients to consult with doctors and healthcare professionals remotely
- Patients can receive diagnoses, medical advice, and prescriptions



# Existing Market Solutions

04.

## WebMD Symptom Checker

- Target Users: Patients
- Online tool where users can input their symptoms and receive a list of potential diagnoses
- Uses an algorithm to match symptoms with medical conditions

05.

## ADA Health Mobile App

- Target Users: Patients
- Mobile app where users can input their symptoms
- Ada asks follow-up questions to narrow down the possible causes and suggests potential conditions