

# FLAN-T5 Medical AI

## Confusion Matrix Analysis Report

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### Executive Summary

This report presents a comprehensive confusion matrix analysis of the FLAN-T5 medical AI model's diagnostic classification performance. The model was evaluated on 50 test cases across 11 disease categories. **Key Findings:**

- Overall Classification Accuracy: 58.0%
- Correct Predictions: 29/50
- Average Inference Time: 0.079 seconds
- Best Performing Category: Mental\_Health
- Lowest Performing Category: Emergency

### Model Information

Property	Value
Model Type	FLAN-T5
Model Path	models\flan_t5_diagnosis_20251018_205708
Total Parameters	247,577,856
Model Size	944.4 MB
Device	cuda
PyTorch Version	2.5.1+cu121

### Classification Performance Summary

Category	Precision	Recall	F1-Score	Support	Accuracy
Cardiovascular	0.400	0.800	0.533	5	0.800
Emergency	0.000	0.000	0.000	5	0.000
Endocrine	0.800	0.800	0.800	5	0.800
Gastrointestinal	0.000	0.000	0.000	5	0.000

Infection	0.500	1.000	0.667	5	1.000
Mental_Health	0.833	1.000	0.909	5	1.000
Musculoskeletal	1.000	0.800	0.889	5	0.800
Neurological	1.000	0.600	0.750	5	0.600
Other	0.000	0.000	0.000	0	0.000
Preventive	0.000	0.000	0.000	5	0.000
Respiratory	0.667	0.800	0.727	5	0.800

## Detailed Confusion Matrix Analysis

The confusion matrix reveals how well the model distinguishes between different disease categories. Diagonal elements represent correct classifications, while off-diagonal elements show misclassifications. **Key Observations:**

- Best classified category: Infection (100.0%)
- Most challenging category: Preventive (0.0%)
- Most common misclassification: Gastrointestinal → Other (4 cases)

## Sample Predictions Analysis

### ■ *Correct Classifications (Sample):*

1. **Question:** I have fever, cough, and sore throat

**Response:** infection...

**Category:** Infection ■

2. **Question:** What are symptoms of pneumonia?

**Response:** pneumonia...

**Category:** Infection ■

3. **Question:** How to treat viral infection?

**Response:** infection...

**Category:** Infection ■

4. **Question:** Bacterial vs viral infection differences

**Response:** infection...

**Category:** Infection ■

5. **Question:** When to use antibiotics for infection?

**Response:** infection...

**Category:** Infection ■

### ■ *Misclassifications (Sample):*

1. **Question:** I have chest pain and shortness of breath

**Response:** bronchitis...

**Expected:** Cardiovascular | **Predicted:** Respiratory ■

2. **Question:** Breathing difficulty at night

**Response:** anxiety...

**Expected:** Respiratory | **Predicted:** Mental\_Health ■

3. **Question:** Dizziness and balance problems

**Response:** stroke...

**Expected:** Neurological | **Predicted:** Cardiovascular ■

4. **Question:** Early signs of stroke recognition

**Response:** stroke...

**Expected:** Neurological | **Predicted:** Cardiovascular ■

5. **Question:** Persistent nausea and vomiting

**Response:** ulcer...

**Expected:** Gastrointestinal | **Predicted:** Other ■