



## Companion – User feedback analysis

Refinement plan to incorporate user inputs and other Advance features

February 2 , 2024

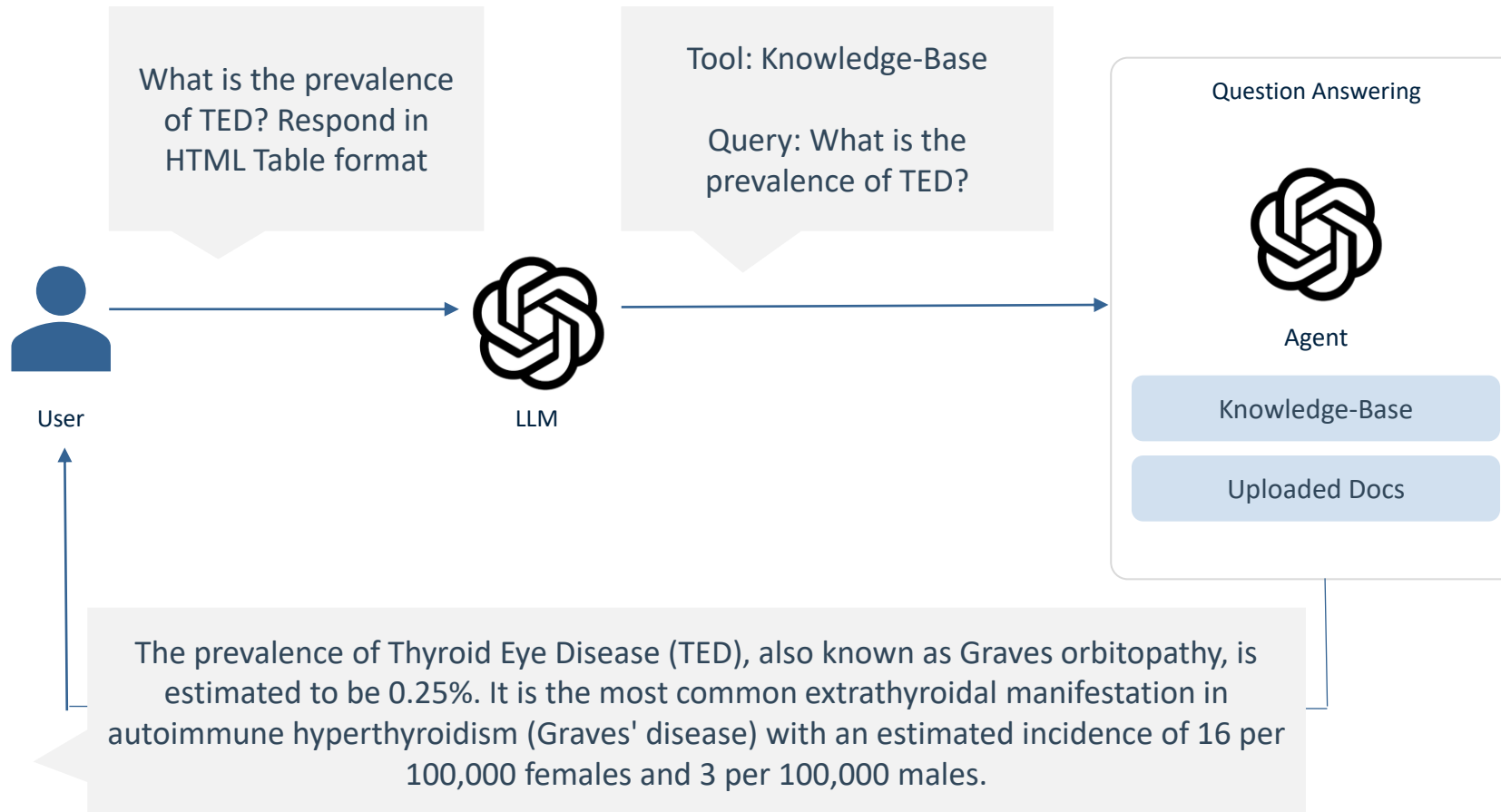


# Architectural Changes to Manager Worker Model with GPT-3.5-Turbo










Current Sprint – May End Release

# Old Architecture

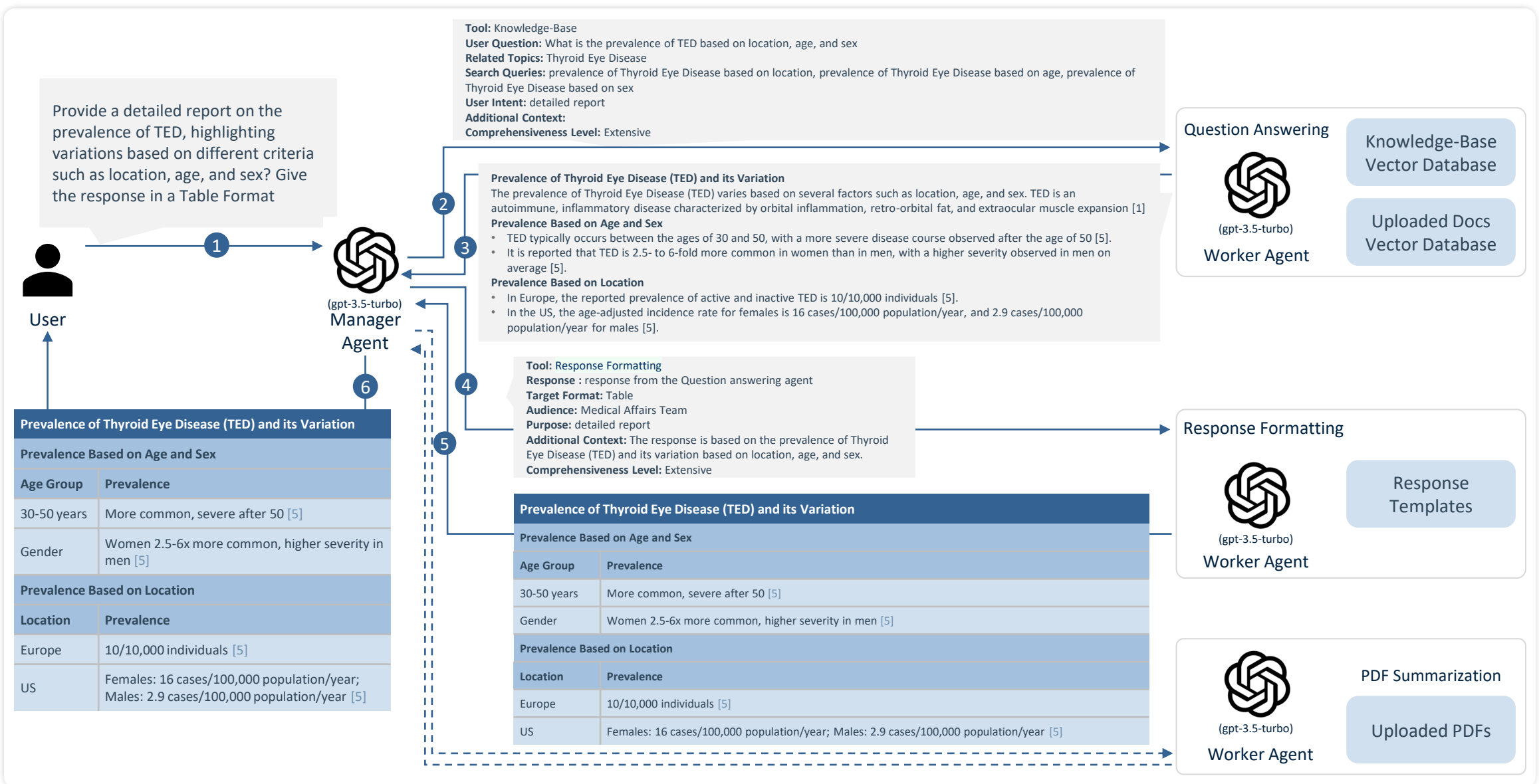
## Generative AI Architecture



# Enhancements from Old to New Architecture

- |  |   |
|--|---|
|  <b>Manual Orchestration</b>  | <ul style="list-style-type: none"><li>• Replaced LangChain with Manual Orchestration for building GenAI workflows.</li><li>• Enhances flexibility and control in architecture by avoiding prebuilt orchestration frameworks like LangChain and Llama Index.</li></ul>   |
|  <b>Error Handling and Logging</b>  | <ul style="list-style-type: none"><li>• Enhanced error handling and logging within the GenAI framework for better debugging and observability.</li></ul>  |
|  <b>Text Chunking Improvement</b>   | <ul style="list-style-type: none"><li>• Enhanced text chunking from line-break splitting to semantic completion splitting for more coherent text processing.</li></ul>  |
|  <b>Improved Architecture Flexibility in Question Answering</b>           | <ul style="list-style-type: none"><li>• Improved Companion architecture to better understand user instructions and adjust response comprehensiveness accordingly.</li></ul>   |
|  <b>Flexible Summary Generation</b>                                       | <ul style="list-style-type: none"><li>• Enhanced summary generation to allow for different types of summaries:<ul style="list-style-type: none"><li>– <a href="#">Executive Summary</a></li><li>– <a href="#">Document-wise Summary</a></li><li>– <a href="#">Focus area-specific Summary</a></li></ul></li></ul>   |
|  <b>Changed architecture to Manager-Worker/Plan-and-Execute framework</b> | <ul style="list-style-type: none"><li>• The agent acts as a planner/manager.</li><li>• Assigns tasks to worker agents (Question Answering Agent, Summarizing Agent, Response Formatting Agent).</li><li>• Can utilize multiple worker agents before responding, e.g., generating an answer and then formatting it to the user's desired format.</li></ul> |
|  <b>Prompt Engineering</b>  | <ul style="list-style-type: none"><li>• Enhanced prompt engineering to improve responses in question answering and summary generation.</li></ul>  |
|  <b>Hallucination detection mechanism using the Re-Ranker</b>           | <ul style="list-style-type: none"><li>• Detects if text chunks have relevant information for the user's query.</li><li>• Returns "Couldn't find the answer" if relevance scores are very low, reducing hallucination chances.</li></ul>   |
|  <b>Workflow Tracking and Debugging</b>                                 | <ul style="list-style-type: none"><li>• Implemented GenAI workflow tracking to enhance observability and debugging.</li></ul>   |

# New Architecture



**Tool:** Knowledge-Base

**User Question:** What is the prevalence of TED based on location, age, and sex

**Related Topics:** Thyroid Eye Disease

**Search Queries:** prevalence of Thyroid Eye Disease based on location, prevalence of Thyroid Eye Disease based on age, prevalence of Thyroid Eye Disease based on sex

**User Intent:** detailed report

**Additional Context:**

**Comprehensiveness Level:** Extensive

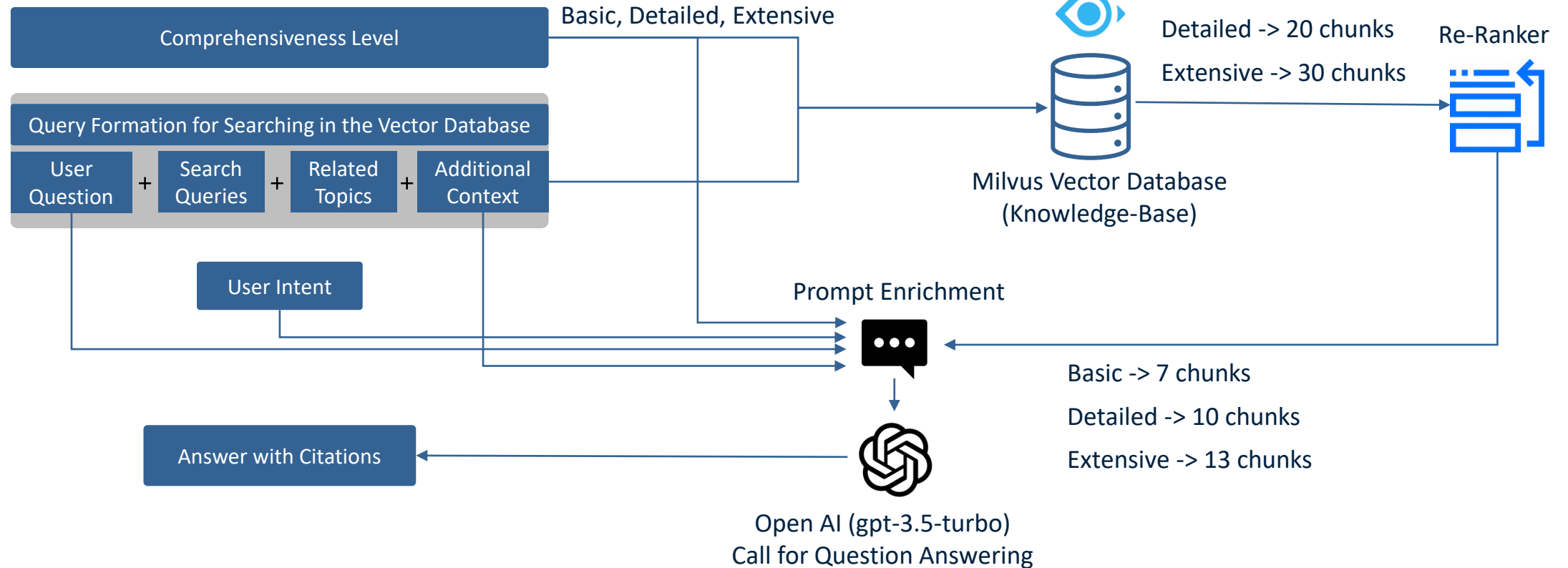
Question Answering



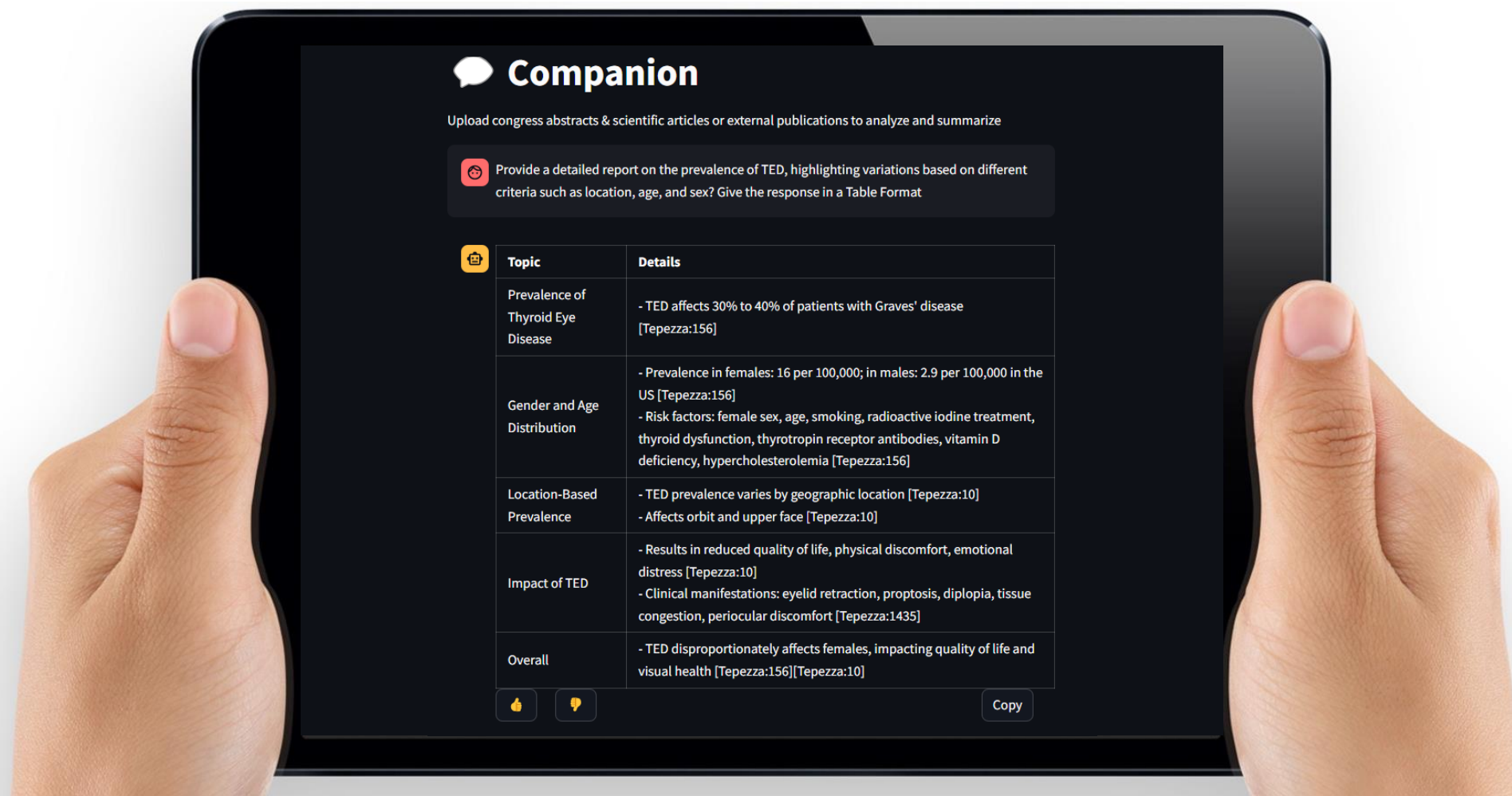
(gpt-3.5-turbo)  
Worker Agent

Knowledge-Base  
Vector Database

Uploaded Docs  
Vector Database



# Example of Complex query with formatting





# GPT-4o Analysis with Examples

Next Sprint – June End Release



# LLM Model Comparison and Model Upgrade plan



	GPT-3.5-Turbo	GPT-4-Turbo	GPT-4	GPT-4-32k	GPT-4o
Input Context Window	16,385	128,000	8,192	32,768	128,000
Max Output Tokens	4,096	4,096	4,096	4,096	4,096
Pricing – Input Tokens	\$0.50 / 1M tokens	\$10.0 / 1M tokens	\$30.0 / 1M tokens	\$60.0 / 1M tokens	\$5.0 / 1M tokens
Pricing – Output Tokens	\$1.50 / 1M tokens	\$30.0 / 1M tokens	\$60.0 / 1M tokens	\$120.0 / 1M tokens	\$15.0 / 1M tokens
Estimated Latency	~ 14 Sec	45-60 Sec	> 1 min	> 1.5 mins	~ 24 Sec
Capability	Moderate	Highest (estimated)	High	High	Highest (estimated)
Multi Modal (Images)	No	Yes	No	No	Yes
GPQA – Graduate level Google-Proof Q&A	~ 28	46.5	~ 35	~ 35	46.5
HellaSwag – Commonsense reasoning	85.5	96.0	95.3	95.3	96.0
MMLU – Multi tasking Language understanding	70.0 (5 shot)	80.4 to 86.4 (-)	86.4 (5 shot)	86.4 (5 shot)	80.4 to 86.4 (-)



# Question: Give a detailed report on Thyroid Eye Disease, also include how it affects people in different age groups, sex, location, and other aspects



## Response from GPT-3.5-Turbo

**Impact of Thyroid Eye Disease on Different Aspects**

Thyroid Eye Disease (TED), also known as Graves' orbitopathy or thyroid-associated ophthalmopathy, is a rare autoimmune condition with an incidence of 1.9 cases per 10,000 population per year [5].

**Impact on Age and Gender**

Age and gender play a significant role in influencing the severity of thyroid-associated ophthalmopathy. A study of 101 patients revealed that both factors influence the disease's severity [6].

Women are more commonly affected by TED, with the initial clinical characteristics varying based on age and sex [12].

**Impact on Location**

Studies have shown that the incidence of Graves' ophthalmopathy varies across different regions, with specific risk factors contributing to the development of TED [10].

**Other Aspects**

- Autoantibodies targeting the thyrotropin receptor and the insulin-like growth factor I receptor (IGF-IR) are involved in the pathogenesis of TED, leading to inflammation, edema, and expansion of extraocular muscle and adipose tissue [5].
- Immunomodulatory agents can reduce inflammation in active TED but have limited effects on long-term sequelae, such as disfigurement and disability, which impact quality of life [5].
- Teprotumumab, an IGF-IR inhibitor, has shown efficacy in blocking pathologic immune responses in active TED [5].

## Response from GPT-4O

**Detailed Report on Thyroid Eye Disease (TED)**

**Introduction**

Thyroid Eye Disease (TED), also known as Graves' Ophthalmopathy, Graves' Orbitopathy, and Thyroid-Associated Ophthalmopathy, is a complex autoimmune disorder characterized by orbital inflammation and subsequent tissue remodeling and fibrosis [2][7]. TED is most commonly associated with Graves' disease (GD), but it can also occur with hypothyroidism, euthyroidism, and Hashimoto's thyroiditis [2][9]. The disease can lead to proptosis, strabismus, corneal ulceration, and optic neuropathy [2]. TED is a debilitating condition that can result in significant physical and emotional morbidity, impacting patients' quality of life (QoL) and mental health [5][9][10].

**Epidemiology**

The prevalence of Graves' disease is approximately 2% to 3% in women and 0.2% in men [8]. About 15% to 30% of patients with GD will experience clinically significant TED [8]. The onset of TED typically occurs between 30 and 50 years of age, with the disease course being more severe after age 50 [2]. TED often occurs within 18 months following a GD diagnosis, although it can be diagnosed simultaneously or even before the diagnosis of GD [2][9].

In Europe, the reported prevalence of active and inactive TED is 10/10,000 individuals [2]. In the United States, the age-adjusted incidence rate for females is 16 cases per 100,000 population per year, and 2.9 cases per 100,000 population per year for males [2]. TED is 2.5 to 6 times more common among women than men, but it is generally more severe in men [2].

**Clinical Characteristics and Impact**

TED presents with varying degrees of orbital inflammation and tissue expansion. Early signs and symptoms include periorbital inflammation, retrobulbar pain, visual disturbance, diplopia, and proptosis [5]. As the disease progresses, patients may experience chronic sequelae such as ocular pain, vision disturbances, and facial disfigurement [3]. The disease follows a characteristic course with an active inflammatory phase lasting 6 to 18 months, followed by an inactive phase where inflammation subsides but residual symptoms may persist [6][8].

The severity of TED can be classified into mild, moderate, and severe stages, with symptoms ranging from dry eyes and excessive tearing to strabismus, double vision, and optic neuropathy [4]. The disease can severely impact patients' quality of life, leading to difficulties in daily activities, reduced self-confidence, and social interaction [9]. In severe cases, TED can result in vision-threatening complications such as optic neuropathy or corneal exposure [8].

**Demographic Impact**

- **Age:** TED typically affects individuals between 30 and 50 years of age, with more severe disease observed in those over 50 [2].
- **Sex:** TED is more common in women, with an incidence rate of 16 cases per 100,000 females per year compared to 2.9 cases per 100,000 males per year [2][6]. However, the disease tends to be more severe in men [2].
- **Geographic Location:** The prevalence and incidence rates of TED vary by region. In Europe, the prevalence is reported as 10/10,000 individuals, while in the United States, the incidence rates are 16 cases per 100,000 females and 2.9 cases per 100,000 males per year [2].

**Risk Factors and Pathogenesis**

Risk factors for developing TED include tobacco smoking, life stressors, and a family history of orbitopathy [1]. The pathogenesis of TED involves the loss of immune tolerance to thyroid-stimulating hormone receptor (TSH-R) and overexpression of the insulin-like growth factor 1 receptor (IGF-1R) in orbital fibroblasts [5][9]. This leads to inflammation, tissue remodeling, and fibrosis, contributing to the clinical manifestations of the disease [5][9].

**Conclusion**

Thyroid Eye Disease is a complex and debilitating autoimmune disorder with significant physical and emotional impacts. It predominantly affects women and typically presents between the ages of 30 and 50. The disease follows a characteristic course with an active inflammatory phase followed by an inactive phase. Understanding the epidemiology, clinical characteristics, and risk factors of TED is crucial for timely diagnosis and effective management to improve patients' quality of life [2][5][9].

## Observations

1. Good implementation of the given instructions
2. More Detailed Responses
3. Better structuring with respect to sections and subsection in the response
4. Can digest more information as it has more context window.



# Tasks, Efforts, and Experimentations

## Manual Orchestration

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## Error Handling and Logging

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## Text Chunking Improvement

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## Companion Architecture Flexibility in Question Answering

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- Enhanced summary generation to allow for different types of summaries:
  - Executive Summary
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  - Focus area-specific Summary

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## **Prompt Engineering**

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- Detects if text chunks have relevant information for the user's query.
- Returns "Couldn't find the answer" if relevance scores are very low, reducing hallucination chances.

## **Workflow Tracking and Debugging**

- Implemented GenAI workflow tracking to enhance observability and debugging.

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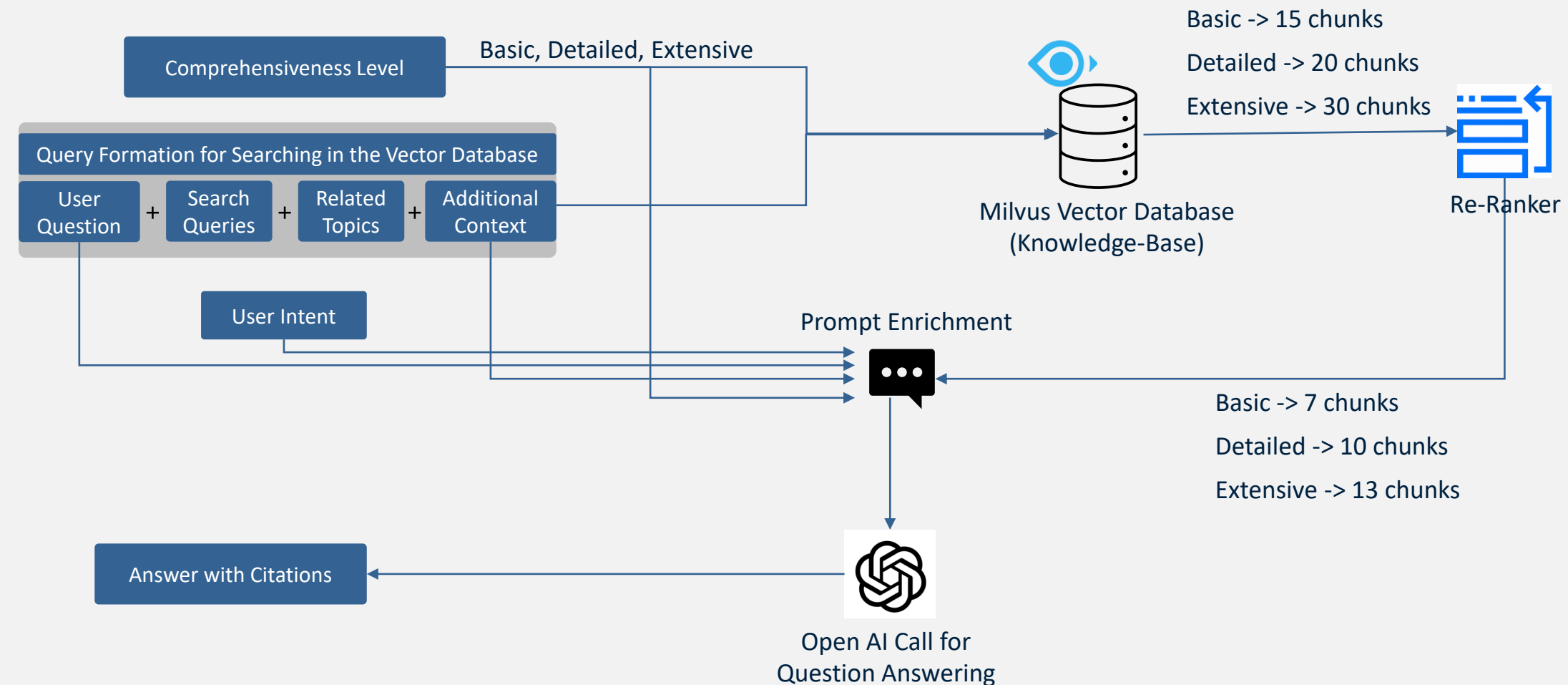
Question Answering




Worker Agent


Knowledge-Base  
Vector Database

Uploaded Docs  
Vector Database



 Provide a detailed report on the prevalence of TED, highlighting variations based on different criteria such as location, age, and sex? Give the response in a Table Format

 Topic	Details
Prevalence of Thyroid Eye Disease	TED is associated with Graves' disease, affecting 15% to 30% of Graves' disease patients [Tepezza:1638].
Age and Sex Distribution	- Mean age of TED patients: 58 years, range: 21 to 92 years [Tepezza:799].
	- Female patients: 77% of cases [Tepezza:799].
	- Male patients: 23% of cases [Tepezza:799].
Duration and Severity	- Median duration of TED: 12 months, range: 0.75 to 360 months [Tepezza:799].
	- Active phase lasts 12 to 24 months, followed by inactivity [Tepezza:1638].
	- Recurrence rate: 15% to 22% [Tepezza:1638].
Impact on Quality of Life	- TED can significantly impact quality of life, symptoms may persist post-quiescence [Tepezza:812].
	- Mental health issues like anxiety and depression reported in some cases [Tepezza:876].
Diagnosis and Treatment	- Diagnosis involves assessing clinical signs like proptosis, strabismus, diplopia, lid retraction, and exposure keratoconjunctivitis [Tepezza:812].
	- Treatment includes restorative surgery post-inactivity, systemic glucocorticoids, and surgery like orbital decompression for severe cases [Tepezza:1623].

 Provide a detailed report on the prevalence of TED, highlighting variations based on different criteria such as location, age, and sex? Give the response in a Table Format

 Category	Details
Prevalence of Thyroid Eye Disease	TED is an autoimmune, inflammatory condition affecting retro-orbital fat and extraocular muscles, impacting quality of life [4].
Demographic Characteristics	- Comparable age distribution in inflammatory and non-inflammatory TED patients (mean age ~50 years) [18]. - Higher proportion of females in both groups (64-66%) [18]. - Varied smoking status among patients (11-15% current smokers, 33-35% former smokers) [5].
Impact on Quality of Life (QOL)	- Inflammatory TED patients experience higher QOL impact than non-inflammatory TED patients [18]. - Differences in work/school attendance, social functioning, daily activities, and driving between inflammatory and non-inflammatory TED patients [18]. - Mental health issues like anxiety and depression reported with varying prevalence rates across TED categories [18].
Duration and Severity of TED	- Varied disease duration exceeding 3 years in some patients [18]. - Severe TED more prevalent in inflammatory TED patients [18]. - Need for systemic glucocorticoid treatment and orbital decompression surgery in TED patients, especially those with inflammatory TED [19].
Overall Impact of TED	TED is a complex disease affecting individuals of different ages and genders, influencing various aspects of daily life and mental well-being [10].

Upload your TED risk data to this page

Drag and drop files here:  
or click here to upload

Browse files

new value

update

cancel & discard

change condition

## Companion

Upload companion abstracts & scholarly articles on external publications to analyze and summarize

Provide a detailed report on the prevalence of TED, highlighting variations based on different effects such as location, age, and/or sex. Use this template to create a table format.

## Prevalence of Thyroid Eye Disease (TED) Based on Location, Age, and Sex

This report provides a detailed overview of the prevalence of Thyroid Eye Disease (TED) with variations based on location, age, and/or sex. The data is presented in a table format for easy reference.

### Prevalence Based on Location

Location	Prevalence
Europe	10.5% (10,000 individuals)
United States (New York)	15.2% (15,000 population)
United States (Texas)	2.8% (100,000 population)

The prevalence of TED in Europe is reported to be 10.5% (10,000 individuals). In the United States, the age-adjusted prevalence rate for females is 15.2% (15,000 population) and for males, it is 2.8% (100,000 population).

### Prevalence Based on Age

Age Group	Prevalence
10-19 years	Higher prevalence
Above 50 years	Lower prevalence

The onset of TED typically occurs between 30 and 50 years of age, with the disease severity being more common after age 50.

### Prevalence Based on Sex

Sex	Prevalence
Female	10%
Male	2%

TED is more common among females, with 10% of the patients being female, and 2% being male. TED is 2.5 to 3 times more common among females than males, but it is not clear if the prevalence is higher in males.

### Additional Patient Characteristics

Characteristic	Value
Female age	40 years
TED duration	10 years
Smoking status	40% never smoked, 30% former smokers, 30% current smokers

The mean age of patients with TED is 40 years, and the average duration of TED is 10 years. Regarding smoking status, 40% of patients have never smoked, 30% are former smokers, and 30% are current smokers.

### Prevalence Based on Disease Activity

Disease Activity	Prevalence
Active TED	10% of the overall TED population
Inactive TED	Less than 10% of the overall TED population

About 10% of the overall TED population has active disease at any one time. Inactive TED is less than 10% of the overall TED population.

### Summary

In summary, the prevalence of TED varies significantly based on location, age, and sex. It is more common in females and tends to be more severe in males. The onset typically occurs between 30 and 50 years of age, with a more severe disease course after age 50. The prevalence also varies based on the activity level of the disease, with active TED being more common than inactive TED in the overall TED population at any given time.

Save

Source:

Add the patient about your documents