**Prompt Engineer Cookbook**

**UC1: Summary**

**Ask an LLM to summarize a block of text and modify the summary.**

User: You are a healthcare expert, working for an insurance payer. Please summarize the full cost of having a baby in 2023 for the average American.

LLM: Costs for having a baby can greatly vary depending on a variety of factors, such as the type of delivery, location, health status of the mother, type of insurance coverage, and complications during pregnancy or delivery. However, in 2023 as a rough estimate, the cost for an uncomplicated vaginal delivery in the United States could range from $5,000 to $11,000. For a cesarean section (C-section) delivery, the cost could range from $7,500 to $14,500. These costs may not include prenatal care or postnatal care expenses, which could add an additional $2,000 to $3,500 to the total.

For prenatal care, routine check-ups may cost around $2,000, while prenatal vitamins can range from $10 to $20 per month, and screenings and tests can add up to $1,500. Postnatal care expenses, including pediatrician visits, vaccinations, and newborn screenings, can add an additional $500 to $1,000.

Even with health insurance, individuals should prepare for out-of-pocket costs. With insurance, out-of-pocket costs may include co-pays, deductibles, and uncovered expenses, which could range anywhere from $3,000 to $5,000. Some insurance plans, though, cover prenatal visits and screenings at 100%, so it's best for individuals to contact their insurance provider to determine the specifics of their plan.

Again, these costs are only estimates and will likely vary greatly. Always consult a healthcare provider or insurance payer to understand potential costs more accurately. It also helps to plan and save for these expenses ahead of time to mitigate financial stress.

User: Please rewrite the summary in list form

LLM:

- Estimated cost for an uncomplicated vaginal delivery: $5,000 - $11,000

- Estimated cost for a cesarean section (C-section) delivery: $7,500 - $14,500

- Additional costs for prenatal care, including routine check-ups, screenings, and tests: $2,000 - $3,500

- Monthly cost for prenatal vitamins: $10 - $20

- Additional costs for postnatal care, including pediatrician visits, vaccinations, and newborn screenings: $500 - $1,000

- Even with health insurance, out-of-pocket costs may include:

- Co-pays

- Deductibles

- Uncovered expenses

- Estimated range for out-of-pocket costs: $3,000 - $5,000

- Some insurance plans may cover prenatal visits and screenings at 100%

Please note, these are only rough estimates and the costs can vary. It's essential to consult a healthcare provider or insurance payer for the most accurate information. Early planning and saving can help manage these expenses more effectively.

User: Can you rewrite the summary as if it were part of a member letter going out?

LLM:

Dear Member,

We hope this letter finds you well. We understand that planning for a new addition to your family is a time full of anticipation and preparation. A significant part of this preparation is understanding the financial aspect of bringing a new life into the world.

Here is a summary of the estimated costs for childbirth services in 2023:

- An uncomplicated vaginal delivery could range from $5,000 to $11,000.

- A cesarean section (C-section) delivery could range from $7,500 to $14,500.

- Prenatal care, including routine check-ups, screenings, and tests, could add approximately $2,000 to $3,500 to your total cost.

- Prenatal vitamins might cost you an estimated $10 to $20 per month.

- Postnatal care, including pediatrician visits, vaccinations, and newborn screenings, could add about $500 to $1,000 to your total cost.

While many of these services are covered by our insurance policy, please remember that you might still incur out-of-pocket costs. These could include co-pays, deductibles, and expenses not covered by your policy, and could range from approximately $3,000 to $5,000. It's also important to note that some insurance plans cover prenatal visits and screenings at 100%.

Please remember that these are general averages and the precise costs can vary widely based on several factors. We encourage you to speak with your healthcare provider to get the most accurate estimates for your personal situation.

Early planning and saving play a crucial role in managing these expenses effectively. We are here to support you during this important journey, so please don't hesitate to contact us if you have further questions.

Best,

[Your Name]

[Your Position]

User: Can you rewrite the summary as if communicating with other payers or business providers

LLM:

Dear Fellow Providers,

As we navigate the complexities of healthcare costs in 2023, I wanted to share an outline of the projected expenses associated with childbirth. This data can assist in comprehensive policy design, strategic planning, and discussions with our respective members.

Here are the estimated averages based on current data:

1. Uncomplicated vaginal delivery could range from $5,000 to $11,000.

2. Cesarean section (C-section) delivery could be in the ballpark of $7,500 to $14,500.

3. Prenatal care costs, which encompass routine check-ups, various screenings, and tests, may add around $2,000 to $3,500 to the total cost.

4. Prenatal vitamins have an estimated monthly cost ranging from $10 to $20.

5. Postnatal care that includes pediatrician visits, vaccinations, and newborn screenings could add up to $500 to $1,000 in total costs.

It's crucial to inform our members that even with our coverage, out-of-pocket costs could apply. These might include co-pays, deductibles, and any uncovered expenses, projected to range from $3,000 to $5,000. I would also like to note that some plans may cover prenatal visits and screenings at 100%.

While these figures provide a broad picture, actual costs can vary significantly based on individual circumstances. It's advisable to communicate with the respective members and remind them of the importance of discussing these costs with their healthcare providers for more personalised and accurate estimates.

I hope this information proves valuable in your planning and communication efforts. Looking forward to continued collaboration as we serve our communities.

Best Regards,

[Your Name]

[Your Position]

**UC02: Intent**

***Ask an LLM to analyze the intent of the author of a block of text.***

User:

You are an expert at intent analysis. Please provide a short intent of the following text:

"Hello, I'm reaching out to inquire about a recent claim I submitted for a medical procedure. I noticed that the claim was partially denied, and I'm unclear about the reason for this. Can you provide specific details on why certain services weren't covered under my policy? Also, I'd like to understand more about my deductible and how much of it has been met this year. Lastly, I am interested in knowing if there are any additional benefits or coverage options available for similar procedures in the future. Your guidance on these matters would be greatly appreciated. Thank you."

LLM:

The intent of this text is to seek clarification about a partially denied insurance claim related to a medical procedure. The person also seeks to understand the status of their deductible, gain information about any additional benefits or coverage options for future procedures, and request guidance on these topics.

User: please rewrite the intent in one word

LLM: Inquiry

User: can you try rewriting the text in less than 5 words?

LLM: Seeking clarification on insurance claim

**UC3: Ideation (Guided Example)**

***This example uses a common prompting technique called “Role Task Format”***

User:

You are a health insurance expert. Generate an example healthcare taxonomy. Please include Maternity and outpatient mental health services. Limit to two nodes.

LLM:

Sure, here is a sample healthcare taxonomy with two nodes, focusing on Maternity Care and Outpatient Mental Health Services:

1. Maternity Care

1.1 Prenatal Care

1.1.1 First Trimester Prenatal Checkups

1.1.2 Second Trimester Prenatal Checkups

1.1.3 Third Trimester Prenatal Checkups

1.2 Labor & Delivery

1.2.1 Natural Birth

1.2.2 Cesarean Section

1.3 Postnatal Care

1.3.1 Postpartum Checkups

1.3.2 Lactation Support

2. Outpatient Mental Health Services

2.1 Psychotherapy

2.1.1 Individual Therapy

2.1.2 Group Therapy

2.2 Psychiatric Services

2.2.1 Medication Evaluation & Management

2.3 Specialized Treatments

2.3.1 Cognitive Behavioral Therapy (CBT)

2.3.2 Dialectical Behavior Therapy (DBT)

2.4 Support Services

2.4.1 Community-based Support Groups

2.4.2 Crisis Intervention Services

Hope this is helpful.

User:

Can you add a third layer of depth? It should give a brief explanation of the node one up the tree

LLM:

Absolutely, expanding on the previous taxonomy:

1. Maternity Care (Comprehensive healthcare before, during, and after pregnancy)

1.1 Prenatal Care (Healthcare provided in the period leading up to childbirth)

1.1.1 First Trimester Prenatal Checkups (Regular health checks in the first three months of pregnancy)

- Nutritional advice

- First prenatal visit & establishing gestational age

1.1.2 Second Trimester Prenatal Checkups (Health checks in the fourth to sixth months of pregnancy)

- Routine follow-ups

- Structural scan & fetal anomaly screening

1.1.3 Third Trimester Prenatal Checkups (Health checks in the last three months of pregnancy)

- Monitoring fetal growth

- Preparing for labor

19.2 Labor & Delivery (The process of childbirth)

1.2.1 Natural Birth (Childbirth without medical intervention)

- Labor and birthing positions

- Breathing techniques

1.2.2 Cesarean Section (Surgical delivery of the baby)

- Procedure preparation

- Post-operative care

1.3 Postnatal Care (Care provided after the baby is born)

1.3.1 Postpartum Checkups (Health checks after childbirth)

- Physical recovery monitoring

- Mental health assessment

1.3.2 Lactation Support (Help with breastfeeding)

- Breastfeeding techniques

- Dealing with common breastfeeding problems

2. Outpatient Mental Health Services (Professional care for patients experiencing mental health issues outside of a hospital setting)

2.1 Psychotherapy (Therapy to address mental health conditions)

2.1.1 Individual Therapy (One-on-one counseling sessions with a therapist)

- Cognitive-Behavior Therapy

- Psychodynamic therapy

2.1.2 Group Therapy (Treatment in a group of people with similar issues)

- Support groups

- Group dynamics therapy

2.2 Psychiatric Services (Medical treatment for mental health conditions)

2.2.1 Medication Evaluation & Management (Assessing the effectiveness of psychiatric drugs)

- Medication adherence assessment

- Side effect management

2.3 Specialized Treatments (Specific treatment methodologies)

2.3.1 Cognitive Behavioral Therapy (CBT) (Therapy to identify and change destructive thought patterns)

- Managing harmful thinking

- Psycho-education

2.3.2 Dialectical Behaviour Therapy (DBT) (Therapy to improve emotional regulation)

- Mindfulness

- Distress tolerance strategies

2.4 Support Services (Holistic care and assistance services)

2.4.1 Community-based Support Groups (Local groups providing support and shared experiences)

- Local meetings

- Peer sharing sessions

2.4.2 Crisis Intervention Services (Immediate assistance in a mental health crisis)

- Emergency counseling

- Referral to inpatient facilities

This additional depth allows for a further understanding of each area and the specific components that fall under each category.

**UC4: Sentiment**

User:

You are an expert at sentiment analysis. Can you assess the sentiment of the following and classify is one of [angry, concerned, neutral, happy, anxious]:

"I'm quite frustrated with the handling of my recent insurance claim. My medical procedure, which I thought was covered, has been denied. Can you explain why and clarify the discrepancies in my deductible? Your prompt attention to this matter is crucial and highly appreciated."

LLM:

The sentiment of this text can be classified as 'frustrated', which can be associated with 'angry'.

**UC5: Classification**

**Ask an LLM to classify a block of text.**

User:

Please classify the information in the given text into the specified categories. Provide a brief summary or label for each category you identify. If a category is not applicable or the information is unclear, indicate so in your response.

Categories: Medical Conditions, Treatment Methods,Procedural Information,Pharmaceuticals,Healthcare Providers,Insurance and Billing, Preventive Measures,Patient Instructions

The patient has a COPD exacerbation, marked by worsened cough and sputum changes. Continue bronchodilators, start corticosteroids, and consider pulmonary rehabilitation. Monitor for respiratory distress and adjust oxygen therapy as needed. Emphasize smoking cessation and regular follow-up

LLM:

1. Medical Conditions: The patient has a COPD (Chronic Obstructive Pulmonary Disease) exacerbation, marked by a worsened cough and changes in sputum.

2. Treatment Methods: The treatment methods are bronchodilators, corticosteroids, pulmonary rehabilitation, and possible adjustment of oxygen therapy.

3. Procedural Information: Not specifically mentioned in the text but can be inferred to be the adjustments of oxygen therapy and the possible initiation of pulmonary rehabilitation.

4. Pharmaceuticals: The medications involved in the treatment are bronchodilators and corticosteroids.

5. Healthcare Providers: Not specifically mentioned in the text.

6. Insurance and Billing: Not specifically mentioned in the text.

7. Preventive Measures: The preventive measure mentioned in the text is smoking cessation.

8. Patient Instructions: The patient needs to quit smoking and attend regular follow-up appointments. The patient should also monitor for respiratory distress.

**UC6: Expansion**

***Given limited text, e.g., barely comprehensible benefits notes, expansion means the process of filling in the gaps and making the text more understandable. In the example below, we provide responses from three different LLMs. As expected, GPT-4 gives the best response. This example illustrates the danger of hallucination.***

User:

You are a healthcare expert who understands medical codes (CPT, ICD, HCPCS). You serve as a customer services rep. You take calls from external personas such as members and providers. I am going to give you notes from the interaction between you and the external persona.

Here is the text from the notes:

Dr. Smith called re: prior auth for pt. Jones for J1234; advised under review, 48 hr. timeline, discussed alt meds; asked to check portal

Action : I want you to 1) Make the notes human readable along with a detailed explanation of any codes. 2) Brainstorm on why the caller had to call. 3) Provide alternatives to the call (e.g., a website they can go to in the future)

LLM:

1) Human-readable notes:

Dr. Smith called regarding getting prior authorization for patient Jones for a medication coded as J1234 in the Healthcare Common Procedure Coding System (HCPCS). I informed Dr. Smith that the request is currently being reviewed. I advised him that the process typically takes around 48 hours, within which he should expect a decision. We also discussed alternative medications that could potentially be used. Lastly, I suggested that Dr. Smith check our online portal for any updates or additional information.

2) Possible reasons for the call:

Dr. Smith might have called for a few reasons:

- To inquire about the status of the prior authorization request for the medication coded as J1234.

- To understand the details of the review process and how long it typically takes.

- To discuss alternative medication options for patient Jones in case the authorization for J1234 is not granted.

- To find out how he can stay informed about updates regarding the prior authorization, which resulted in guiding him to the portal.

3) Alternatives to the call:

While phone calls are frequently used, there are also other methods to acquire such information:

- Dr. Smith could use our online portal to submit prior authorization requests, check their status, and read up on alternative medications. This could be less time-consuming than making a call each time he needs information.

- Email updates on the status of the authorization request could be sent to him directly.

- Frequently Asked Questions (FAQs) section or resources on our website could also provide immediate answers to common concerns like process timelines.

**UC07: Keywords**

***Ask an LLM to extract keywords from a block of text.***

User:

You are a healthcare expert. Please extract top 5 most significant keywords from the following:

We're introducing significant updates to our health insurance policy's physical therapy coverage, benefiting policyholders. Key enhancements include an increase in the annual limit of covered physical therapy sessions from 20 to 25, making more extensive treatment accessible. We're also reducing the co-pay for each session to $15, down from $20, to lessen the financial impact on our members.

Additionally, we've broadened the scope of treatments covered by including specialized therapies like aquatic therapy, which previously required additional authorization, now readily available under standard coverage. For out-of-network services, we've enhanced the benefits to make them more affordable, though they still require prior authorization.

These changes are designed to provide more comprehensive and cost-effective physical therapy options for our members. It's important to note that these enhancements do not alter the annual deductible contributions;

LLM:

1. Physical therapy coverage

2. Increase in the annual limit

3. Reduction in co-pay

4. Inclusion of specialized therapies

5. Enhancement of out-of-network services benefits

User:

Can you extract keywords? Please organize in a hierarchical fashion such that it maintains context?

LLM:  
1. Health Insurance Policy

- Physical Therapy Coverage

- Annual Limit Increase

- Coverage from 20 sessions to 25 sessions

- Co-pay Reduction

- From $20 to $15 per session

- Inclusion of Specialized Therapies

- Aquatic therapy inclusion

- Enhancement of Out-of-network Services Benefits

- More affordable but still need prior authorization

- Annual Deductible Contributions

- No alterations in this section