



**NordDRG AI Assistant**



Discussing with your CaseMix  
specification with natural  
language:

How to make Large Language  
Models (LLM) understand  
NordDRG logic?

Tapio Pitkäranta

2024-05-31



# Let's ask AI About the Author...



**Tapio Pitkäranta**

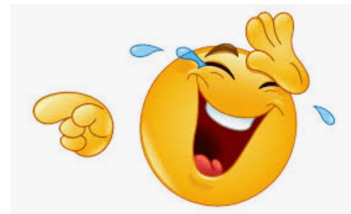
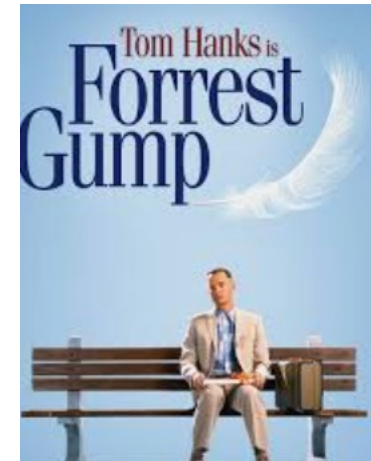


Tapio Pitkäranta was born in Finland. What would he have been called if he would have been born in the USA (English name)?

If Tapio Pitkäranta were born in the USA and had an English name, it might be adapted as follows:

- **Tapio:** This Finnish name could be adapted to **Forrest**, reflecting the nature-inspired meaning of the original name.
- **Pitkäranta:** This Finnish surname, which means "long shore," could be translated to **Longshore**.

Thus, if Tapio Pitkäranta were born in the USA, his English name might be **Forrest Longshore**.



Tapio Pitkäranta = Forrest Longshore!!





What would you like to ask “**CaseMix / DRG AI Assistant**”?

Take your  
mobile phone  
and show  
camera



Help to improve  
AI study!



**NordDRG AI Assistant**

- <https://forms.gle/hTRkKGo3gFemB4yY7>

# Content of this presentation

## Objectives, Research Questions

### Objectives & Research Questions

- Objectives**
  - Build an AI Assistant, that is able to answer CaseMix questions for different stakeholders
  - Avoid technical complexity if possible
- Research Questions**
  - What are possible AI design patterns implementing AI Assistant?
- Summary: Materials & Methods**
  - As **Materials** we use NordDRG as the CaseMix system that is used in many countries (Finland, Sweden, Norway, Iceland, Denmark...)
  - Technical Methods used:**
    - All we use table of the art LLMs: GPT 3.5, GPT4, GPT4o
    - We evaluate state of the art design patterns: LLM, Custom GPT, RAG, LLM, Multi-Agent system



NordDRG AI Assistant

## Artificial Intelligence Background and Related work

### What is RAG?

**Overview**

- RAG = Retrieval Augmented Generation
- RAG uses traditional IR methods (information retrieval) together with LLM
- With RAG you can "ground your LLM to the truth"

[https://python.langchain.com/docs/use\\_cases/question\\_answering/](https://python.langchain.com/docs/use_cases/question_answering/)

## Materials and Methods used in the study

**Material**

- NordDRG specifications**
  - Contains information about 20 tables, 1000000+ codes, 100000+ terms, 100000+ procedures and 100000+ diagnoses, etc.
- Use LLM models**
  - OpenAI GPT-3.5, GPT-4, GPT-4o
- High Level Architectures and AI Design Patterns**
  - Retrieval Augmented Generation (RAG)
  - Multi-Agent System
  - Custom GPT

## Experimental Evaluation of the AI Architectures with NordDRG Use Cases

### Materials: NordDRG Specifications

**Use Case: DRG Names**

- How well does the LLM understand CaseMix group names?

**Summary of the Experimental Results**

Use Case	LLM Model	Result
Use Case: DRG Names	GPT-3.5	Low
	GPT-4	Medium
Use Case: DRG Names	GPT-4o	High
	GPT-4o	High

**Use Case: DRG Names**

- On high-level LLM understand what CaseMix system is about and its general structure

## NordDRG AI Assistant



NordDRG AI Assistant

Which tables are included in the NordDRG definiti...

Understanding 'Patient Group' in NordDRG.

Could you list all DRG groups where it seems that a...

Could you list all DRG groups that are related to...

## Results

### Results

- LLMs are getting better all the time
  - During lifecycle of this paper the efficient way to get some results changed. First we needed to use LLM + RAG however new enhanced LLM achieved some results without RAG
- Differences between LLMs
  - General reasoning capability in best models starts to be useful for CaseMix Systems
- Getting good results requires:
  - Going through relevant use cases and having "right answers"
  - Conducting prompt engineering to teach the AI
- LLMs have issues with small languages such as Finnish
  - Important to have English clinical terms mapped in specification level
- Advanced methods such as RAG are no silver bullet
  - Embedding search as vector model might do the damage already

## Conclusions

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## Future Work



### NordDRG AI Assistant

By TalentAdore

AI Assistant for NordDRG Definition Tables

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# Objectives, Research Questions

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- Build an AI Assistant, that is able to answer CaseMix questions for different stakeholders
- Avoid technical complexity if possible

### Research Questions

- What are possible AI design patterns implementing AI Assistant?

### Summary: Materials & Methods

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NordDRG AI Assistant



# This study: Objectives & Research Questions

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**NordDRG AI Assistant**

Materials: NordDRG Specifications



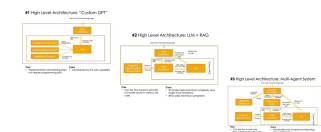
Model

- GPT-4o  
Newest and most advanced model
- GPT-4  
Advanced model for complex tasks
- GPT-3.5  
Great for everyday tasks

①



High Level Architectures and AI Design Patterns



# Artificial Intelligence Background and Related work

## General AI / Common Purpose AI

- LLM (Large Language Model) is perhaps misleading term
- General AI / Common Purpose AI:
  - ...can be used in wide variety of applications
  - ...might be comparable to the invention of the WWW



- With RAG you can "ground your LLM to the truth"

## Overview

The pipeline for converting your unstructured data into a QA chain looks like this:

1. Loading: First we need to load our data. Use the langchain integration hub to browse the full set of loaders.
2. Splitting: Text splitters break documents into splits of specified size.
3. Storage: Storage (e.g., when a vectorstore will house and often embed the splits).
4. Retrieval: The app retrieves splits from storage (e.g., often with similar embeddings to the input question).
5. Generation: An LLM produces an answer using a prompt that includes the question and the retrieved data.

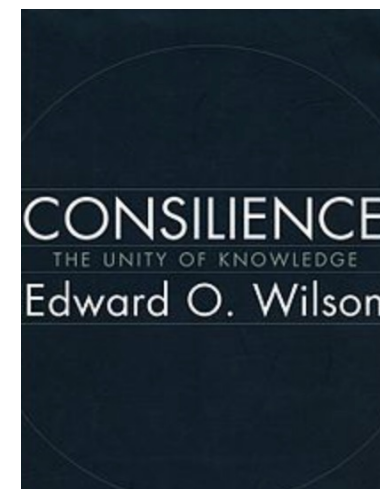


- [https://python.langchain.com/docs/use\\_cases/question\\_answering/](https://python.langchain.com/docs/use_cases/question_answering/)



# Background & Related Work

- Long history of AI science
  - Machine Learning, Agents, MAS, Neural Networks, ...
- LLMs glue tech together in new ways
  - “Consilience” started from “**Attention is all you need**” (2017)
    - (Book by Edward O. Wilson)
  - LLMs, RAG, ...

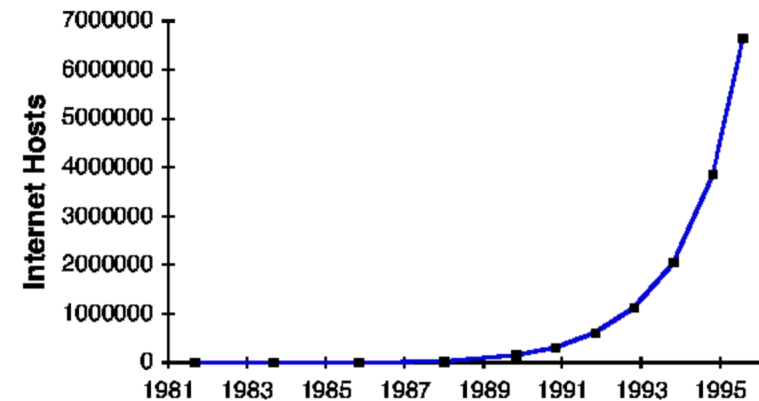
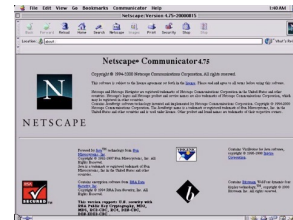
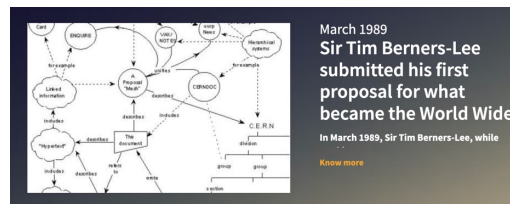


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Tim Berners-Lee, pictured at CERN (Image: CERN)

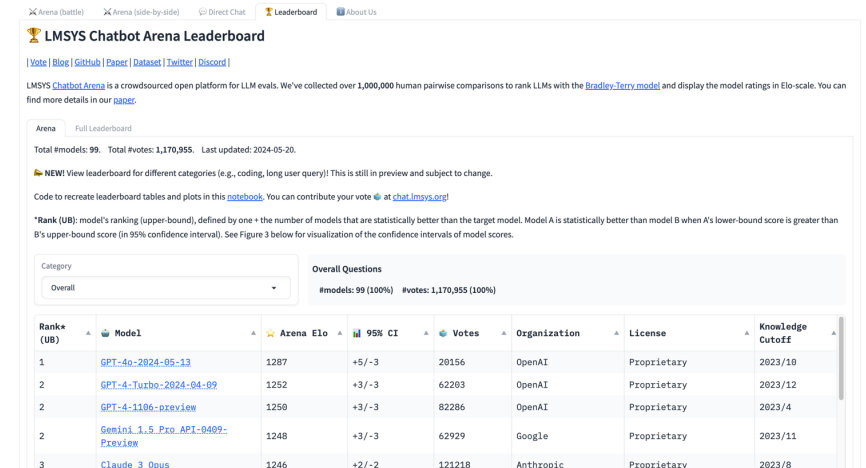


# AI LLM models competition: Vendors and Benchmarks

- **AI in Hyperscale:**
  - Training a new AI model might cost > 100 M€
- **Intense Vendor Competition:**
  - The landscape of Large Language Model (LLM) vendors is highly competitive, with numerous companies vying to produce the most advanced and efficient models. This competition drives rapid innovation, as vendors continually enhance their models' capabilities to gain market leadership.
- **Benchmarking Through Rigorous Testing:**
  - To assess the performance and quality of LLMs, vendors subject their models to a wide array of rigorous tests. These tests evaluate various aspects such as accuracy, coherence, speed, and ability to handle diverse linguistic tasks, ensuring that only the best models stand out.
- **Comparative Analysis via Leaderboards:**
  - Leaderboards play a crucial role in comparing LLMs across different metrics and benchmarks. They provide a transparent and standardized way to rank models, allowing users and developers to easily identify which models excel in specific areas, thus fostering an environment of continuous improvement and accountability.

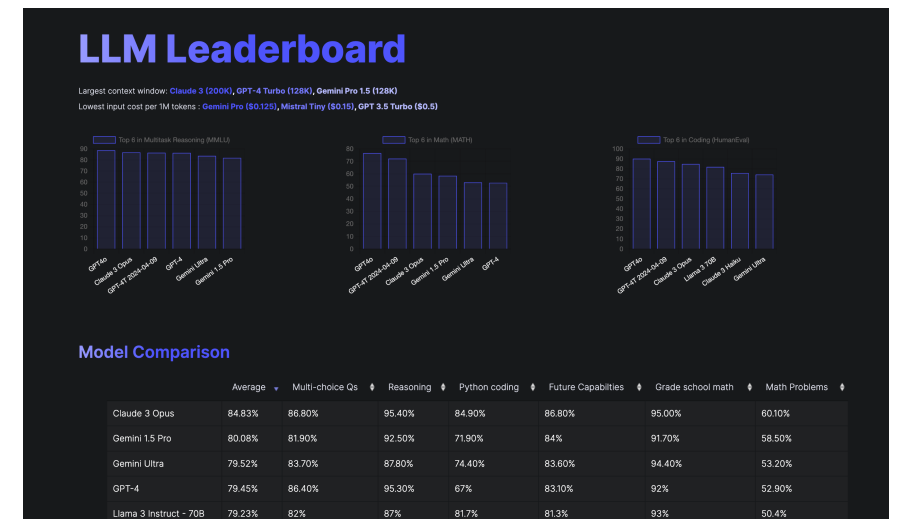
## More information about benchmarks

- <https://chat.lmsys.org/?leaderboard>
- <https://www.vellum.ai/llm-leaderboard>



The screenshot shows the LMSYS Chatbot Arena Leaderboard. It features a table with columns for Rank, Model, Arena Elo, 95% CI, Votes, Organization, License, and Knowledge Cutoff. The top models listed are GPT-4o-2024-05-13, GPT-4-Turbo-2024-04-09, GPT-4-1106-preview, Gemini 1.5 Pro API-0409-Preview, and Claude 3 Opus.

Rank* (UB)	Model	Arena Elo	95% CI	Votes	Organization	License	Knowledge Cutoff
1	GPT-4o-2024-05-13	1287	+5/-3	20156	OpenAI	Proprietary	2023/10
2	GPT-4-Turbo-2024-04-09	1252	+3/-3	62283	OpenAI	Proprietary	2023/12
2	GPT-4-1106-preview	1250	+3/-3	82286	OpenAI	Proprietary	2023/4
2	Gemini 1.5 Pro API-0409-Preview	1248	+3/-3	62929	Google	Proprietary	2023/11
3	Claude 3 Opus	1246	+2/-2	123218	Anthropic	Proprietary	2023/8



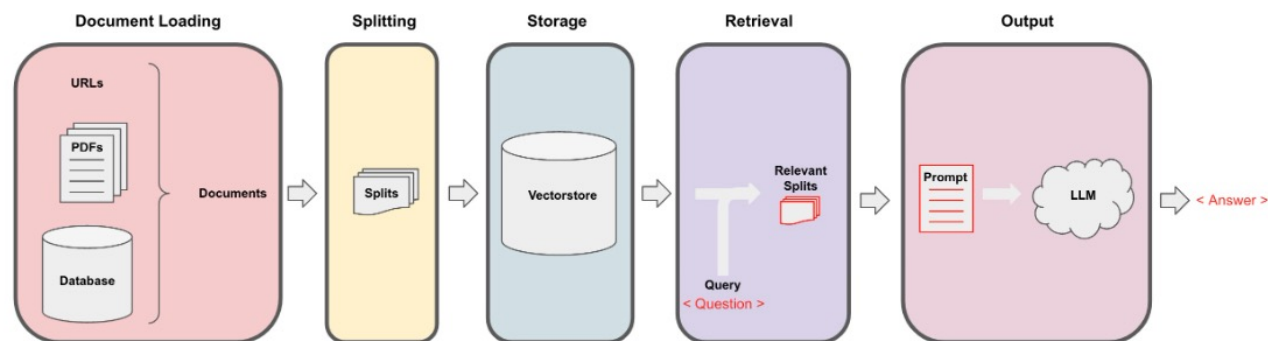
# New AI Design patterns? What is RAG?

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## Overview

The pipeline for converting raw unstructured data into a QA chain looks like this:

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# Materials and Methods used in the study

## Material

- NordDRG specification:**
- Database containing about 20 tables
  - DRG groups, CD codes, Procedure codes, Diagnosis and Procedure categories, etc
- Document: how to read NordDRG definition table:**
- Written description of what the tables and columns contain
- How to write technical changes for NordDRG the DRG system**
- In what kind of notations changes can be suggested
- More Information**
- <https://medcase.org/>
  - <https://medcaseforum.easredmine.com>

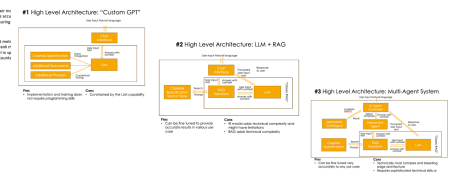
## Used LLM models

- **Intense Vendor Competition:** Analysis of market trends, identifying key players, and assessing competitive advantages and disadvantages in the current market.
- **Benchmarking Through Rigorous Testing:** Systematic evaluation of performance metrics, including accuracy, speed, and ability to handle diverse requests, ensuring consistent quality.
- **Comparative Analysis via Leaderboards:** Establishing a fair and transparent evaluation process, allowing users and developers to easily identify which model performs best in specific use cases.

- More information about benchmarks**
- <https://www.siftun.ai/en/ai-technology>

Model

## High Level Architectures and AI Design Patterns



# Materials: NordDRG Specifications

## Materials: NordDRG Definition Tables

**NordDRG specification:**

- Database containing about 20 tables
- DRG groups, ICD codes, Procedure codes, Diagnose and Procedure categories, etc

**More information**

- <https://nordcase.org/>
- <https://nordcaseforum.easyredmine.com>

## Materials: NordDRG Documentation

NordCase+

### How to read the NordDRG definition tables

The NordDRG definition tables consist of all the grouping forms. Through these tables, one can find the groups for each DRG. The definition tables also contain the ICD codes for diagnosis, surgery, anatomy, ECD, CVY and BPOV. The CVY and BPOV files are used in the computer-based program for the coding, while the ICD forms are used for information. In Excel, all tables are on the same CD with the various tables in the different tabs. These tables are easy to read because even data not needed for the grouping are included, e.g. notes for DRG, diagnosis and procedure codes.

This document describes the basis for how to read the definition tables in Excel format. The description is concentrated on the table data not mentioned in the grouping.

It is recommended that the document is printed on paper so that you can read it while you have the Excel file open in your computer screen and not while you scroll through the document file.

The most common reason for studying the definition tables is to see which diagnoses or procedures that are included in a certain DRG or to see what DRGs a certain diagnosis or procedure can be grouped into. This can be done from the read of the document, but reading it in the given format gives a better knowledge of the content of the tables (see section).

**1. Table "diag\_maj"**  
The table has 7700 rows depending on national version. Each row refers to a grouping rule. Therefore, there are significantly more rows than the number of DRGs, and it depends on the national rules can lead to the use of some DRGs. During the grouping process, the health care center data are compared with those in the grouping rules. After this, starting from the top of the table, until the data is accepted. Thus, the process stops at the group defining the DRG code and the IC code. The data are accepted when the following conditions are met:  
• The grouping rule is for a diagnosis or procedure code.  
• The value on national level is the diagnosis and procedure code, a different grouping program selected from the definition tables "diag\_maj" and "diag\_dsp", which are described more below. From these diagnosis or procedure codes, the same grouping program, a single grouping rule can handle a larger amount of diagnosis and procedures. This table "diag\_maj" has a number of columns with different functions for the grouping process. The columns are described below in the sections that you are at in the table.

- **Column "ver"** The table makes the "major" column in the column header description under the grouping rules. The main principle is that the value for DRGs with higher weight shall read before the value for DRGs with low weight, as long as the code NCC can have more than one NCC. Notes: The International Order shall, except other things, prevent that addition of further procedure code results in a DRG with lower weight.
- **Column "M"** The column makes the "diagnosis" and "procedure" is a unique value for each rule.
- **Column "M1", "M2", "M3"** This is for grouping results, i.e. the DRG code that the grouping rule leads to.
- **Column "diag\_maj"** The additional code in the DRG code that the grouping rule leads to.
- **Column "diag\_dsp"** This is the DRG code in the additional version of NordDRG that the grouping rule leads to.

NordCase+

### How to write technical changes for NordDRG

It is a table to write technical changes for NordDRG. It is necessary to have these changes printed in NordDRG or combined in the definition tables. If you do not have this knowledge, you should first read the document "How to read NordDRG definition tables".

You should also consider the overall DRG development guidelines at the end of this document.

Proposed or decided technical changes shall be described in Excel format according to the template for changes for the Nordic-Careline Group (NCC) provided (CD-ROM 4/03, 2001-03-06, 2002).

The IC template is in the front section of the CD-ROM. Double-clicking on the file opens a copy to work and the template itself is not changed. Your working copy should be named "XX" after the IC file name, for your national ID and the NCC ID - the Former identifier number (if it is known from the IC 2001-03-06).

Note that numbering of any columns should be included in the IC file. This must be repeated separately in the table name "diag\_maj" after the IC file name.

- The IC template is printed on empty copy of the definition tables in Excel format, but with some corrections in the table.
  - Use column for the change instruction (option to change: IN/OUT). The column "ver" must be changed in accordance to the fact that before and besides have separate table processes provided with NCC processes in NCCMS.
  - One column for NCC ID of the proposed changes according to the number of the case on NordDRG (Diagnosis or procedure definition).
  - One column for the national ID (diagnosis and procedure code).
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- The IC template includes an additional "read\_maj" with short instructions and spaces where you should note the reason of the case, all DRG development and possible comments. Read the instruction carefully.

### General instructions

These general instructions are valid for all of the definition tables. Instructions that are specific to the additional tables are presented below.

- **Changing of content data** If you have a change to make in the content data, you should first be thinking about the data, why the data are in the table and what you want to change and make the corresponding table in the Excel template. When writing, the data are in the table in the same way as the data are in the database NCCMS, with the ICD. Thus you give the same row again, but change the code in the table to the code you want to change and the column NCC ID of the row, you give the NCC ID. Always fill in National ID on both ends and also the NCC ID - the Former identifier number if it is known.

## Material: Additional Prompts

**Example Additional Prompts**

If I ask you something about which DRG groups contain some medical conditions you should first check:

- 1) *diag\_name sheet in the Excel*
- 2) *from the drg\_name use the different columns containing descriptions of those DRG groups*
- 3) *Prefer to use English versions of the DRG group descriptions*
- 4) *Understand that drg\_name sheet contains also country column specifying in which version the group is relevant*

**Additional Prompts**

- Additional prompts are instructions for the LLM
- Examples include sequence of steps that the LLM should follow in order to provide a simple answer
- Prompts can be written in natural language by substance expert

**More information**

- <https://nordcase.org/>
- <https://nordcaseforum.easyredmine.com>

# Materials: NordDRG Definition Tables

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
	ord	id	drg_com	rtc	icd	mdc	dgcat	pdgpro	compl	or_procd	procprcd	secprcd	dgprop	dgprop	dgprop	dgprop	ageml	sex	dur	disch	nat_ver		
25	#00D000002	X09R	0	+							40V62		99X50	40X00					<1		swe		
37	#00D000003	X09R	0	+									99X50	40X00					<1		swe		
43	#00D000004	X09R	0							N			99X50						<1	E	swe		
50	#00D000005	Z82R	0										99X50	00X90					<1	N	swe		
100	#00D000010	Z70R	1	-							99V35		99X50						<1	N	swe		
150	#00D000015	Z70R	1	-							99V22		99X50						>1	N	swe		
160	#00D0000157	Z70L	1	-									99X50						>0	N	swe		
165	#00D0000164	Z70L	1	-									99X50							E	swe		
170	#00D000017	Z90R	9	+	15								99X50				<0				swe		
250	#00D000025	Z76R	5	+				00P02					99X50				>6574		<1		swe		
300	#00D000030	Z75R	4	+				00P01					99X50				<5114		<1		swe		
350	#00D000035	Z77R	6	+									99X50				>45654		<1		swe		
375	#00D000038	Z71R	8	+		99M02							99X50	99X35					<1	N	swe		
400	#00D000040	Z71R	8	+	99	99M00							99X50						<1		swe		
410	#00D000041	Z71R	8	+		00M00							99X50						<1		swe		
420	#00D000042	Z71R	8	+				23P07					99X50						<1		swe		
427	#00D000039	Z71L	8	+		99M02							99X50						>0	N	swe		
435	#00D000043	Z71L	8	+	99	99M00							99X50						>0		swe		
442	#00D000044	Z71L	8	+		00M00							99X50						>0		swe		
450	#00D000045	Z40R	0	+	99	99M01							99X50						<1		swe		
500	#00D000050	Z75R	4	+	14								99X50				<4018		<1		swe		
550	#00D000055	Z76R	5	+	14								99X50				>21915		<1		swe		
600	#00D000060	Z75R	4	+									99X50	14X03			<4018		<1		swe		
650	#00D000065	Z76R	5	+									99X50	14X03			>21915		<1		swe		
700	#00D000070	Z75R	4	+					S	14S01			99X50				<4018		<1		swe		
750	#00D000075	Z76R	5	+					S	14S01			99X50				>21915		<1		swe		
800	#00D000080	Z75R	4	+	13								99X50	14X01			<4018		<1		swe		
850	#00D000085	Z76R	5	+	13								99X50	14X01			>21915		<1		swe		
900	#00D000090	Z79R	9	+	14								99X50	14X04	14X01				<1		swe		
950	#00D000095	Z79R	9	+	14								99X50	14X05	14X01				<1		swe		
1000	#00D000100	Z79R	9	+	13								99X50	14X04	14X01				<1		swe		
1050	#00D000105	Z79R	9	+	13								99X50	14X05	14X01				<1		swe		
1200	#00D000120	Z76R	5	+	15								99X50				>365		<1		swe		
1250	#00D000125	Z71R	8	+	15	15M01							99X50						<1		swe		
1262	#00D000128	Z78R	9	+	23	23M04						40V78	99X50						<1		swe		
1268	#00D000131	Z78R	9	+				99P78				40V78	99X50						<1		swe		
1275	#00D000129	Z83R	9	+					S	99V24		99X50							<1		swe		
1300	#00D000130	Z78R	9	+	15	15M02				15S02		99X50							<1		swe		
1350	#00D000135	Z79R	9	+	15	15M02						99X50	15X40						<1		swe		
1400	#00D000140	Z78R	9	+					S	14S01		99X50	14X31						<1	N	swe		
1440	#00D000144	P05S	0	+				14P01				99X50	50X55						<1	N	swe		
1450	#00D000145	P05S	0	+				14P01	1			99X50							<1	N	swe		
1500	#00D000150	P05T	0	+				14P01				99X50							<1	N	swe		
1650	#00D000165	C70R	0	+	03				P	03E01		99X50							<1	N	swe		
1700	#00D000170	C70R	0	+	03					03E01		99X50	00X10						<1	N	swe		

## NordDRG specification:

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# Materials: NordDRG Documentation



## How to read the NordDRG definition tables

The NordDRG definition tables control most of the grouping process. Through these tables, one can study the grouping logic in detail. The definition tables for each version of NordDRG are in different formats, currently Excel, CSV and JSON. The CSV and JSON files are used in the computer-based groupers on the market, while the Excel format is intended for information. In Excel, all tables are in the same file with the various tables in the different tabs. These tables are easy to read because extra data, not needed for the grouping, is included, e.g. texts of the DRG, diagnosis and procedure codes.

*This document describes the basics of how to read the definition tables in Excel format. The description is concentrated on the tables that are important for the grouping.*

*It is recommended that the document is printed on paper so that you can read it while you have the Excel file open on your computer screen and are able to jump between the different tabs.*

The most common reason for studying the definition tables is to see which diagnoses or procedures that are included in a certain DRG or to see what DRGs a certain diagnosis or procedure can be grouped into. These steps are described in the end of the document, but in order to be able to perform those steps, a basic knowledge of the contents of the tables is necessary.

### 1. Table 'drg\_logic'

The table has 2700 to more than 4000 rows depending on national version. Each row refers to a grouping rule. Therefore, there are significantly more rows than the number of DRGs and it depends on that various rules can lead to the one and same DRG. During the grouping process, the health care contact's data are compared with those in the grouping rules, line by line, starting from the top of the table, until the data is consistent. Then the process stops and the grouper delivers the DRG code and the rtc code (see more about rtc code below) that are on the current row.

The grouping rules contain no diagnosis or procedure codes. The rules are instead based on the diagnosis and procedure code's different grouping properties retrieved from the definition tables 'drg\_feat' and 'proc\_feat', which are described more below. Since many diagnosis or procedure codes have the same grouping properties, a single grouping rule can handle a larger amount of diagnoses and procedures.

The table 'drg\_logic' has a number of columns with different functions for the grouping process. The columns are described below in the sequence that they are arranged in the table.

- **Column 'ord'**  
The title stands for "order" and the values in this column indicate the relative order of the grouping rules. The main principle is that the rules for DRGs with higher weight shall stand before the rules for DRGs with less weight, at least within each MDC (see more about the MDC below). This hierarchical order shall, among other things, prevent that addition of a further procedure code results in a DRG with lower weight.
- **Column 'id'**  
The title stands for "identifier" and there is a unique value for each rule.
- **Column 'drg\_nat'**  
This is the grouping result, i.e. the DRG code that the grouping rule leads to.
- **Column 'drg\_text\_nat'**  
The national text to the DRG code that the grouping rule leads to.
- **Column 'drg\_comb'**  
This is the DRG code in the combined version of NordDRG that the grouping rule leads to.



## How to write technical changes for NordDRG

*To be able to write correct technical changes (TC) it is necessary to know how the grouping process in NordDRG is controlled by its definition tables. If you do not have this knowledge, you should first read the document "How to read NordDRG definition tables".*

*You should also consider the overall DRG development guidelines at the end of this document.*

Proposed or decided technical changes shall be documented in Excel format according to the template for changes that the Nordic Casemix Centre (NCC) provides (TC\_TEMPLATE\_2021-12-08\_xltx)<sup>1</sup>.

The TC template is in the Excel template format (xltx). Double-clicking on the file opens a copy to work in and the template itself is not changed. Your working copy should be named "TC" plus the ID of the case. Use your national ID and the NCC ID (= the Forum ticket/case number) if it is known (e.g. TC\_C750\_#759.xlsx).

Note that reporting of any analyzes should not be included in the TC file. This must be reported separately in a file with the name "Appendix" plus the ID of the case.

The TC template is in principal an empty copy of the definition tables in Excel format, but with some extra columns in each table:

- Two columns for the change instruction (version to change & IN/OUT). The column "version to change" is motivated by the fact that Norway and Sweden have separate update processes in parallel with NCC's process in NDMS.
- One column for the NCC ID of the proposal/decision according to the number of the case on NordDRG Forum (if the case is published there).
- One column for the national ID-designation (nat\_id) according to your own system.
- One column for possible comments.

The TC template includes a tab called "read\_me" with short instructions and space where you should write the name of the case, its ID-designations and possible comments. Read the instructions carefully.

### 1. General instructions

These general instructions are valid for all of the definition tables. Instructions that are specific to the individual tables are presented below.

- **Changing of present data**  
Any change of a row in any definition table must appear twice. First, in the existing definition tables, copy the row you want to change and paste the row into the corresponding table in the TC template. When pasting, be careful that the codes and texts get into the right columns. In the column IN/OUT, write OUT. Then you paste the same row again, but change the code or text in the fields you want to change and in the column IN/OUT of this row, you write IN. Always fill in National ID on both rows and also the NCC ID (= the Forum ticket/case number) if it is known.

<sup>1</sup> [http://documents.norddrg.net/attachments/download/2153/TC\\_TEMPLATE\\_2021-12-08\\_xltx](http://documents.norddrg.net/attachments/download/2153/TC_TEMPLATE_2021-12-08_xltx)

## NordDRG documentation

- Database containing about 20 tables
- DRG groups, ICD codes, Procedure codes, Diagnose and Procedure categories, etc
- Documentation in PDF format about content and interpretation of the Definition Tables

## More information

- <https://nordcase.org/>
- <https://nordcaseforum.easyredmine.com>



# Material: Additional Prompts

## **Example Additional Prompts**

*If I ask you something about which DRG groups contain some medical conditions you should first check:*

*1) drg\_name sheet in the Excel*

*2) from the drg\_name use the different columns containing descriptions of those DRG groups*

*3) Prefer to use English versions of the DRG group descriptions*

*4) Understand that drg\_name sheet contains also country column specifying in which version the group is relevant*

## **Additional Prompts**

- Additional prompts are instructions for the LLM
- Examples include sequence of steps that the LLM should follow in order to provide a simple answer
- Prompts can be written in natural language by substance expert

# Materials: DRG Names FI-EN

drg_nat	drg_text_nat	drg_text_short_nat	drg_comb	drg_text_o	drg_text_si	mdc	country
001A	Keskushermoston kasvaimen kallonisäinen leikkaus	Keskushermoston kasvaimen kallonisäinen leikk	001A	Intracranial	Intracranial	01	fin
001B	Muu kallonisäinen verisuonikirurginen toimenpide	Muu kallonisäinen verisuonikirurginen toimenpide	001B	Other intra	Other intra	01	fin
001C	Kallonisäisen aneurysman, verisuonianomalian tai hemangioman toimenpide	Kallonisäisen aneurysman, verisuonianomalian tai hemangioman toimenpide	001C	Intervention	Intervention	01	fin
001D	Kallonisäinen aivo-selkäydinnestekierron toimenpide	Kallonisäinen aivo-selkäydinnestekierron toimenpide	001D	Intracranial	Intracranial	01	fin
001E	Muu kallonisäinen toimenpide paitsi vamman korjaus	Muu kallonisäinen toimenpide paitsi vamman korjaus	001E	Other crani	Other crani	01	fin
002A	Muu aikuisen kallonisäinen toimenpide traumaa varten	Muu aikuisen kallonisäinen toimenpide traumaa varten	002A	Other crani	Other crani	01	fin
002B	Kroonisen kovakalvonalaisen vuodon leikkaushoito, aikuinen	Kroonisen kovakalvonalaisen vuodon leikkaushoito, aikuinen	002B	Surgery of	Surgery of	01	fin
003O	Kallonisäinen toimenpide, lyhyt hoito	Kallonisäinen toimenpide, lyhyt hoito	003O	Craniotomy	Craniotomy	01	fin
003P	Aivojen stereotaktinen sädehoito, lyhyt hoito	Aivojen stereotaktinen sädehoito, lyhyt hoito	003P	Stereotacti	Stereotacti	01	fin
004	Selkäydinleikkaus	Selkäydinleikkaus	004X	Spinal proc	Spinal proc	01	fin
004O	Selkäydinleikkaus, lyhyt hoito	Selkäydinleikkaus, lyhyt hoito	004O	Spinal proc	Spinal proc	01	fin
005	Kallonulkoisen aivoverenkiertoon vaikuttava verisuonten leikkaus	Kallonulkoisen aivoverenkiertoon vaikuttava verisuonten leikkaus	005X	Extracranial	Extracranial	01	fin
005O	Kallonulkoisen aivoverenkiertoon vaikuttava verisuonten leikkaus, lyhyt hoito	Kallonulkoisen aivoverenkiertoon vaikuttava verisuonten leikkaus, lyhyt hoito	005O	Extracranial	Extracranial	01	fin
006	Rannekanavaoireyhtymän leikkaus	Rannekanavaoireyhtymän leikkaus	006X	Carpal tuni	Carpal tuni	01	fin
006O	Rannekanavaoireyhtymän leikkaus, lyhyt hoito	Rannekanavaoireyhtymän leikkaus, lyhyt hoito	006O	Carpal tuni	Carpal tuni	01	fin
007	Hemostoon liittyvä muu toimenpide, komplisoitunut	Hemostoon liittyvä muu toimenpide, komplisoitunut	007X	Peripheral	Peripheral	01	fin
008	Hemostoon liittyvä muu toimenpide, ei komplisoitunut	Hemostoon liittyvä muu toimenpide, ei komplisoitunut	008X	Peripheral	Peripheral	01	fin
008O	Hemostoon liittyvä muu toimenpide, lyhyt hoito	Hemostoon liittyvä muu toimenpide, lyhyt hoito	008O	Peripheral	Peripheral	01	fin
009	Selkäytimen sairaus tai vamma	Selkäytimen sairaus tai vamma	009X	Spinal diso	Spinal diso	01	fin
010	Keskushermoston kasvain, komplisoitunut	Keskushermoston kasvain, komplisoitunut	010X	Nervous sy	Nervous sy	01	fin
011A	Keskushermoston kasvain, ei komplisoitunut, sädehoito	Keskushermoston kasvain, ei komplisoitunut, sädehoito	011FA	Nervous sy	Nervous sy	01	fin
011B	Keskushermoston kasvain, ei komplisoitunut, stereotaktinen sädehoito	Keskushermoston kasvain, ei komplisoitunut, stereotaktinen sädehoito	011FB	Nervous sy	Nervous sy	01	fin
011C	Keskushermoston kasvain, ei komplisoitunut, vaativa isotoppihoito	Keskushermoston kasvain, ei komplisoitunut, vaativa isotoppihoito	011FC	Nervous sy	Nervous sy	01	fin
011D	Keskushermoston kasvain, ei komplisoitunut, vaativa sytostaattihoito	Keskushermoston kasvain, ei komplisoitunut, vaativa sytostaattihoito	011FD	Nervous sy	Nervous sy	01	fin
011F	Keskushermoston kasvain, ei komplisoitunut	Keskushermoston kasvain, ei komplisoitunut	011FF	Nervous sy	Nervous sy	01	fin
012	Etenevä keskushermoston sairaus	Etenevä keskushermoston sairaus	012X	Degenerati	Degenerati	01	fin
013	MS-tauti tai pikkuaivoataksia	MS-tauti tai pikkuaivoataksia	013X	Multiple scl	Multiple scl	01	fin
014A	Aivoinfarkti tai muu pitkäkestoinen aivoverenkierron häiriö, ei trombolyyttinen	Aivoinfarkti tai muu pitkäkestoinen aivoverenkierron häiriö, ei trombolyyttinen	014A	Specific ce	Specific ce	01	fin
014B	Aivoinfarkti tai muu pitkäkestoinen aivoverenkierron häiriö, ei trombolyyttinen	Aivoinfarkti tai muu pitkäkestoinen aivoverenkierron häiriö, ei trombolyyttinen	014B	Specific ce	Specific ce	01	fin
014C	Aivoinfarkti tai muu pitkäkestoinen aivoverenkierron häiriö, trombolyyttinen	Aivoinfarkti tai muu pitkäkestoinen aivoverenkierron häiriö, trombolyyttinen	014C	Specific ce	Specific ce	01	fin
014D	Aivoinfarkti tai muu pitkäkestoinen aivoverenkierron häiriö, trombolyyttinen	Aivoinfarkti tai muu pitkäkestoinen aivoverenkierron häiriö, trombolyyttinen	014D	Specific ce	Specific ce	01	fin
015	Ohimenevä iskemia (TIA) tai muu aivoverenkierron häiriö ilman infarktia	Ohimenevä iskemia (TIA) tai muu aivoverenkierron häiriö ilman infarktia	015X	Transient is	Transient is	01	fin
016	Aivoverenkierron häiriö, diffuusi, komplisoitunut	Aivoverenkierron häiriö, diffuusi, komplisoitunut	016X	Nonspecific	Nonspecific	01	fin
017	Aivoverenkierron häiriö, diffuusi, ei komplisoitunut	Aivoverenkierron häiriö, diffuusi, ei komplisoitunut	017X	Nonspecific	Nonspecific	01	fin
018	Ääreis- tai aivohemion sairaus, komplisoitunut	Ääreis- tai aivohemion sairaus, komplisoitunut	018X	Cranial & p	Cranial & p	01	fin
019	Ääreis- tai aivohemion sairaus, ei komplisoitunut	Ääreis- tai aivohemion sairaus, ei komplisoitunut	019X	Cranial & p	Cranial & p	01	fin
020A	Hemoston infektiosairaus, ei virusaivokalvontulehdus, komplisoitunut	Hemoston infektiosairaus, ei virusaivokalvontulehdus, komplisoitunut	020C	Nervoussy;	Nervoussy;	01	fin
020B	Hemoston infektiosairaus, ei virusaivokalvontulehdus, ei komplisoitunut	Hemoston infektiosairaus, ei virusaivokalvontulehdus, ei komplisoitunut	020N	Nervous sy	Nervous sy	01	fin
021	Virusaivokalvontulehdus	Virusaivokalvontulehdus	021X	Viral menin	Viral menin	01	fin
023	Tajuttomuus muun kuin vamman takia	Tajuttomuus muun kuin vamman takia	023X	Nontrauma	Nontrauma	01	fin
024	Kohtausoire tai päänsärky, aikuinen, komplisoitunut	Kohtausoire tai päänsärky, aikuinen, komplisoitunut	024X	Seizure & i	Seizure & i	01	fin
025	Kohtausoire tai päänsärky, aikuinen, ei komplisoitunut	Kohtausoire tai päänsärky, aikuinen, ei komplisoitunut	025X	Seizure & i	Seizure & i	01	fin
026	Kohtausoire tai päänsärky, lapsi	Kohtausoire tai päänsärky, lapsi	026X	Seizure & i	Seizure & i	01	fin
027	Vakava aivovamma	Vakava aivovamma	027X	Severe tra	Severe tra	01	fin
028	Aivovamma, aikuinen, komplisoitunut	Aivovamma, aikuinen, komplisoitunut	028X	Traumatic i	Traumatic i	01	fin
029	Aivovamma, aikuinen, ei komplisoitunut	Aivovamma, aikuinen, ei komplisoitunut	029X	Traumatic i	Traumatic i	01	fin
030	Aivovamma, lapsi	Aivovamma, lapsi	030X	Traumatic i	Traumatic i	01	fin
031	Aivotärähdys, aikuinen, komplisoitunut	Aivotärähdys, aikuinen, komplisoitunut	031X	Concussio	Concussio	01	fin

## Part of NordDRG Definition Tables:

- List of DRG Group codes and names in Finnish (FI) and in English (EN)

## More information

- <https://nordcase.org/>
- <https://nordcaseforum.easyredmine.com>

# Material: DRG Names FI

drg_nat	drg_text_nat
001A	Keskushermoston kasvaimen kallonisäinen leikkaus
001B	Muu kallonisäinen verisuonikirurginen toimenpide
001C	Kallonisäisen aneurysman, verisuonianomalian tai hemangioman toimenpide
001D	Kallonisäinen aivo-selkäydinnestekierron toimenpide
001E	Muu kallonisäinen toimenpide paitsi vamman korjaus
002A	Muu aikuisen kallonisäinen toimenpide trauman takia
002B	Kroonisen kovakalvonalaisen vuodon leikkaushoito, aikuinen
003O	Kallonisäinen toimenpide, lyhyt hoito
003P	Aivojen stereotaktinen sädehoito, lyhyt hoito
004	Selkäydinleikkaus
004O	Selkäydinleikkaus, lyhyt hoito
005	Kallonulkoisen aivoverenkiertoon vaikuttava verisuonten leikkaus
005O	Kallonulkoisen aivoverenkiertoon vaikuttava verisuonten leikkaus, lyhyt hoito
006	Rannekanavaoireyhtymän leikkaus
006O	Rannekanavaoireyhtymän leikkaus, lyhyt hoito
007	Hemostoon liittyvä muu toimenpide, komplisoitunut
008	Hemostoon liittyvä muu toimenpide, ei komplisoitunut
008O	Hemostoon liittyvä muu toimenpide, lyhyt hoito
009	Selkäytimen sairaus tai vamma
010	Keskushermoston kasvain, komplisoitunut
011A	Keskushermoston kasvain, ei komplisoitunut, sädehoito
011B	Keskushermoston kasvain, ei komplisoitunut, stereotaktinen sädehoito tai isotoppihoito
011C	Keskushermoston kasvain, ei komplisoitunut, vaativa isotoppihoito
011D	Keskushermoston kasvain, ei komplisoitunut, vaativa sytostaattihoido
011F	Keskushermoston kasvain, ei komplisoitunut
012	Etenevä keskushermoston sairaus
013	MS-tauti tai pikkuaivoataksia
014A	Aivoinfarkti tai muu pitkäkestoinen aivoverenkierron häiriö, ei trombolyyssihoitoa, komplisoitunut
014B	Aivoinfarkti tai muu pitkäkestoinen aivoverenkierron häiriö, ei trombolyyssihoitoa, ei komplisoitunut
014C	Aivoinfarkti tai muu pitkäkestoinen aivoverenkierron häiriö, trombolyyssihoito, ei komplisoitunut
014D	Aivoinfarkti tai muu pitkäkestoinen aivoverenkierron häiriö, trombolyyssihoito, komplisoitunut
015	Ohimenevä iskemia (TIA) tai muu aivoverenkierron häiriö ilman infarktia
016	Aivoverenkierron häiriö, diffuusi, komplisoitunut
017	Aivoverenkierron häiriö, diffuusi, ei komplisoitunut
018	Ääreis- tai aivohemion sairaus, komplisoitunut
019	Ääreis- tai aivohemion sairaus, ei komplisoitunut
020A	Hemoston infektiosairaus, ei virusaivokalvontulehdus, komplisoitunut
020B	Hemoston infektiosairaus, ei virusaivokalvontulehdus, ei komplisoitunut
021	Virusaivokalvontulehdus
023	Tajuttomuus muun kuin vamman takia
024	Kohtausoire tai päänsärky, aikuinen, komplisoitunut
025	Kohtausoire tai päänsärky, aikuinen, ei komplisoitunut
026	Kohtausoire tai päänsärky, lapsi

## Part of NordDRG Definition Tables :

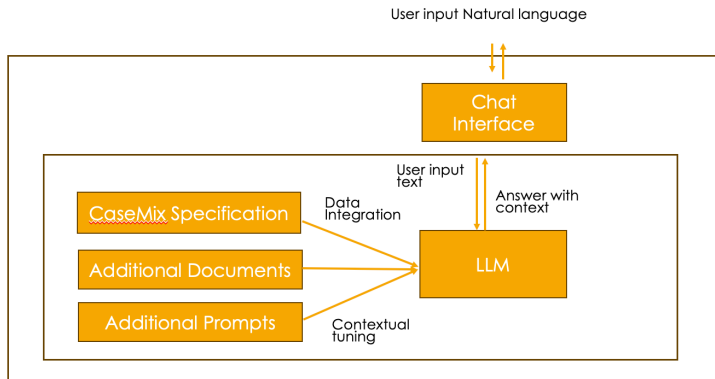
- List of DRG Group codes and names in Finnish (FI)

## More information

- <https://nordcase.org/>
- <https://nordcaseforum.easyredmine.com>

# High Level Architectures and AI Design Patterns

## #1 High Level Architecture: "Custom GPT"



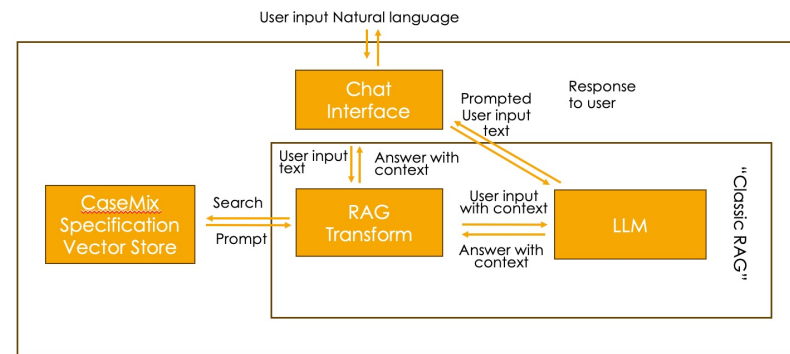
### Pros

- Implementation and training does not require programming skills

### Cons

- Constrained by the LLM capability

## #2 High Level Architecture: LLM + RAG



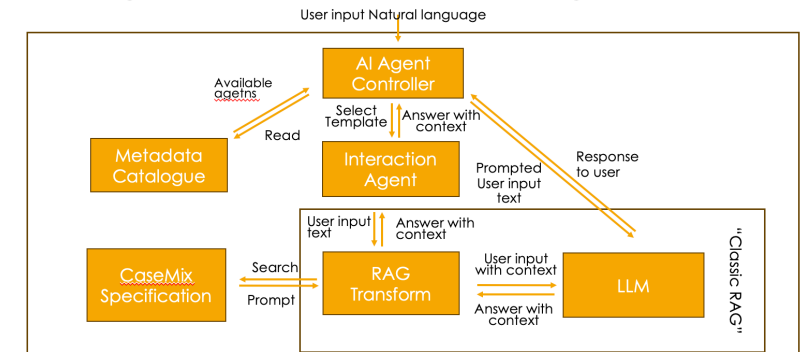
### Pros

- Can be fine tuned to provide accurate results in various use case

### Cons

- IR model adds technical complexity and might have limitations
- RAG adds technical complexity

## #3 High Level Architecture: Multi-Agent System



### Pros

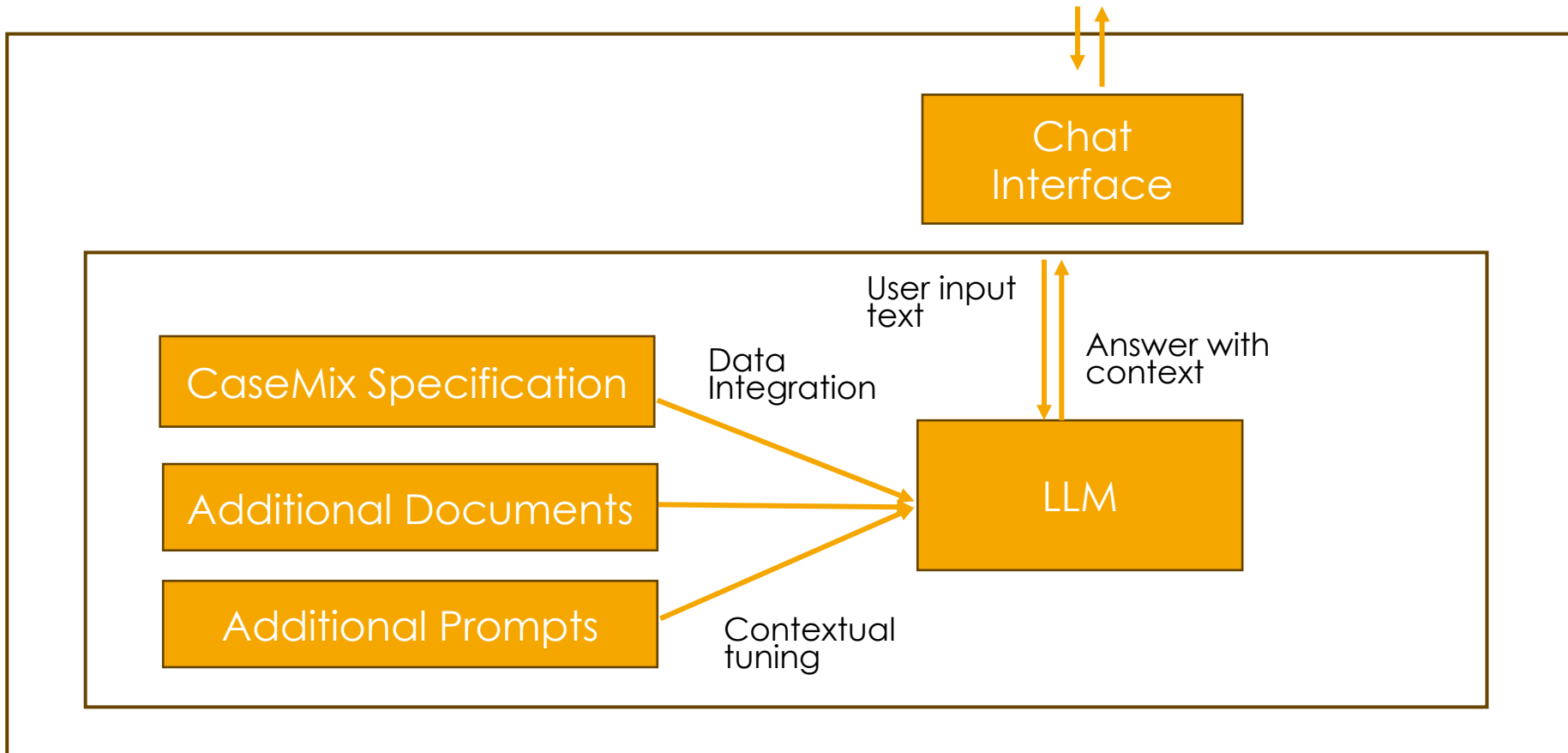
- Can be fine tuned very accurately to any use case

### Cons

- Technically most complex and bleeding edge architecture
- Requires sophisticated technical skills or maintenance organization

# #1 High Level Architecture: “Custom GPT”

User input Natural language



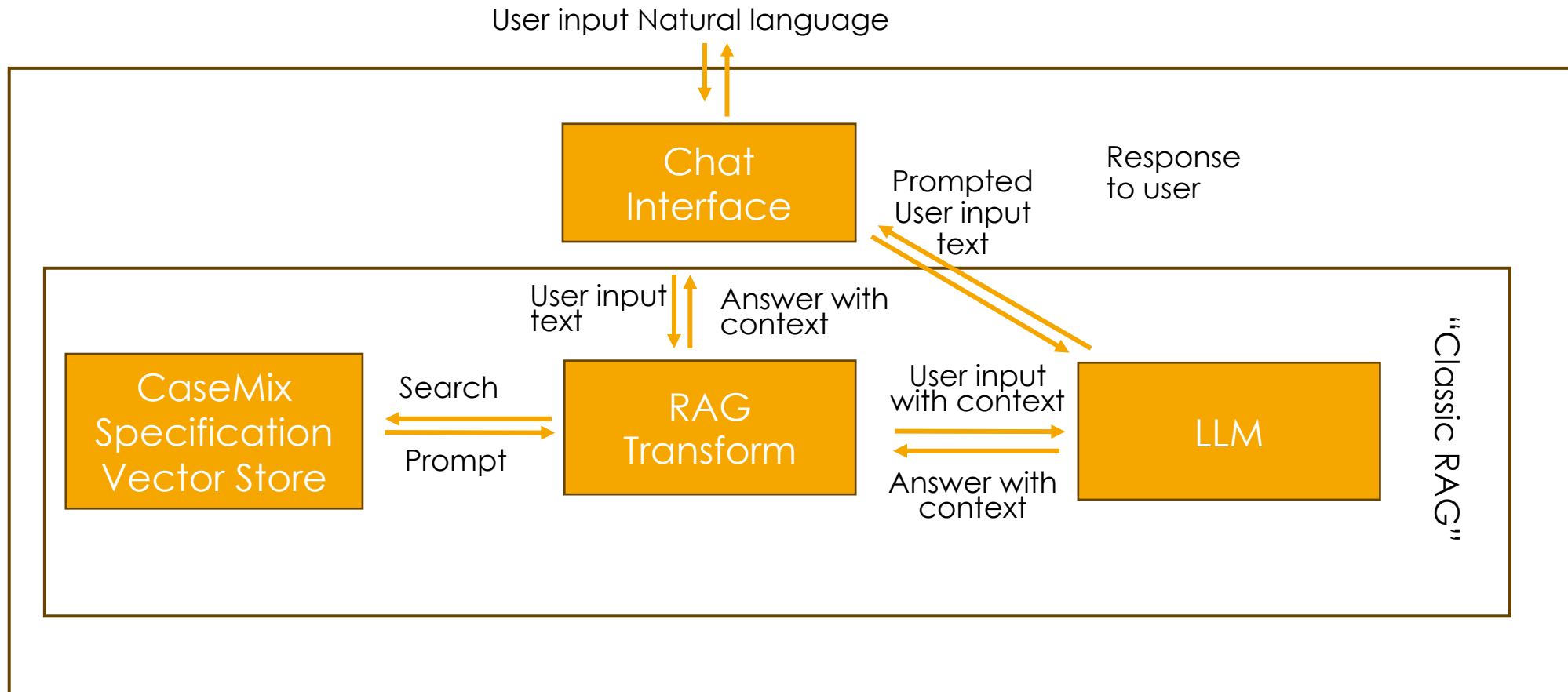
## Pros

- Implementation and training does not require programming skills

## Cons

- Constrained by the LLM capability

# #2 High Level Architecture: LLM + RAG



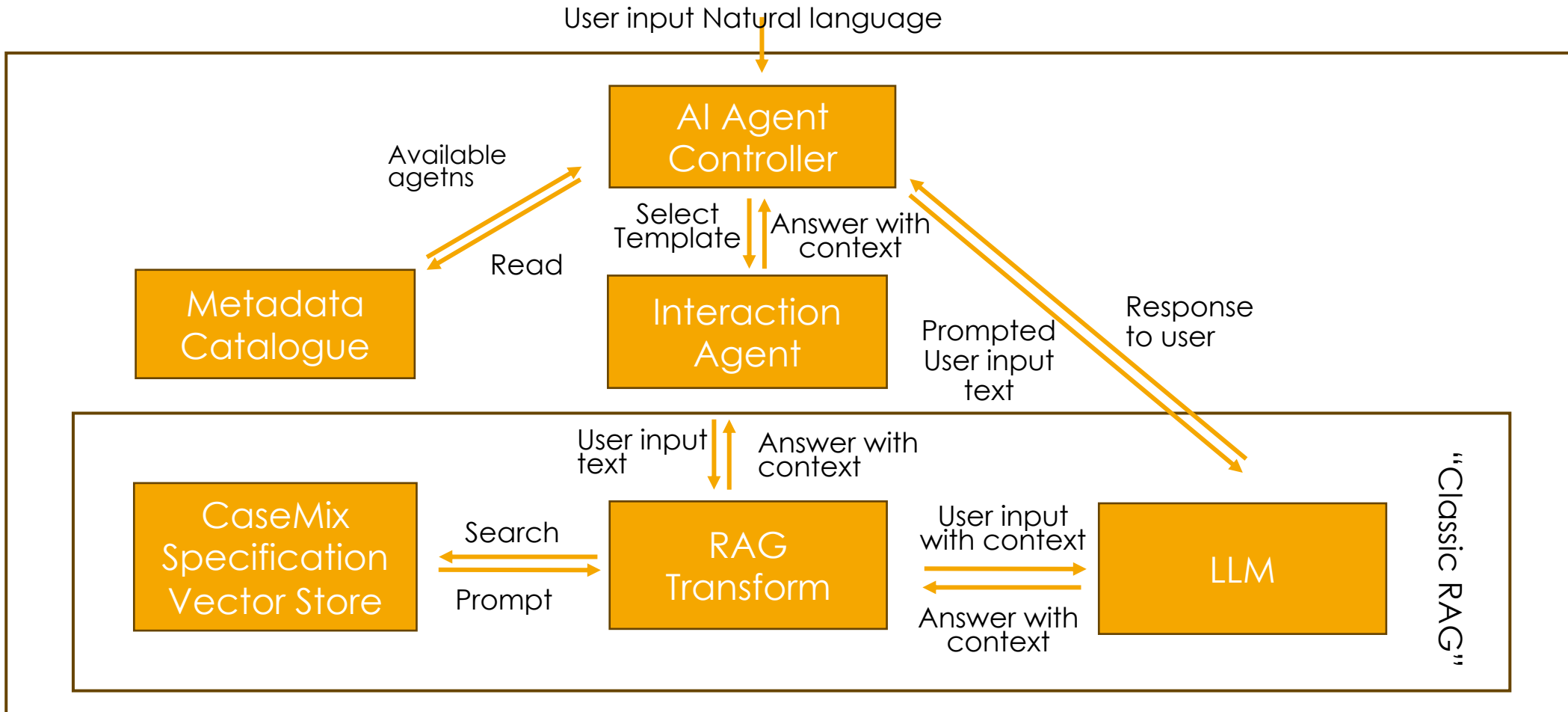
## Pros

- Can be fine tuned to provide accurate results in various use cases
- Grounded to truth (less hallucination)

## Cons

- IR model adds technical complexity and might have limitations
- RAG can also be source of errors

# #3 High Level Architecture: Multi-Agent System



## Pros

- Can be fine tuned very accurately to any use case

## Cons

- Technically most complex and bleeding edge architecture
- Requires sophisticated technical skills or maintenance organization

# LLMs in Experimental Implementation

- LLM models used

- GPT-3.5
- GPT-4
- GPT-4o

- LLM additions

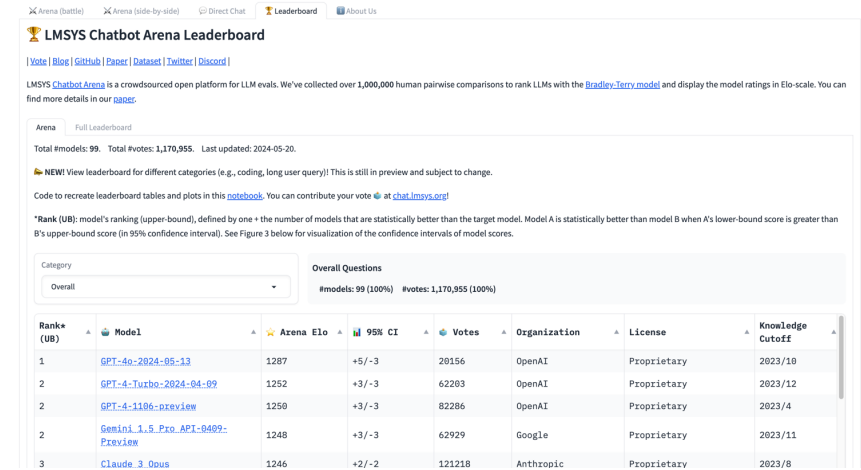
- RAG, MAS

- Python

- RAG
- Pandas
- FAISS
- TF-IDF
- Langchain

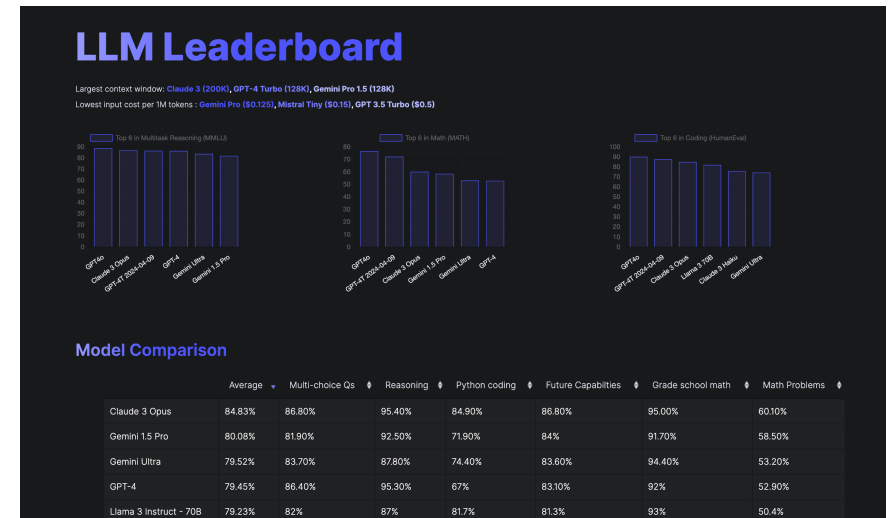
Model

- 
**GPT-4o**  
 Newest and most advanced model
- 
**GPT-4**  
 Advanced model for complex tasks
- 
**GPT-3.5**  
 Great for everyday tasks



## More information about benchmarks

- <https://chat.lmsys.org/?leaderboard>
- <https://www.vellum.ai/llm-leaderboard>





# Experimental Evaluation of the AI Architectures with NordDRG Use Cases

## Materials: NordDRG Specifications

Materials: NordDRG Definition Tables

Materials: NordDRG

### Use Case: DRG Names

- How well does the LLM understand CaseMix group names?

## Summary of the Experimental Results

Abbreviation	Abbreviation	Full name	Main DRG System	Standard Hospital Operations	Hospital/DRG Operations	Standard Hospital Operations
CaseMix	DRG1	DRG1	Standard	Standard	Standard	Standard
CaseMix	DRG2	DRG2	Standard	Standard	Standard	Standard
CaseMix	DRG3	DRG3	Standard	Standard	Standard	Standard
CaseMix	DRG4	DRG4	Standard	Standard	Standard	Standard
CaseMix	DRG5	DRG5	Standard	Standard	Standard	Standard
CaseMix	DRG6	DRG6	Standard	Standard	Standard	Standard
CaseMix	DRG7	DRG7	Standard	Standard	Standard	Standard
CaseMix	DRG8	DRG8	Standard	Standard	Standard	Standard
CaseMix	DRG9	DRG9	Standard	Standard	Standard	Standard
CaseMix	DRG10	DRG10	Standard	Standard	Standard	Standard
CaseMix	DRG11	DRG11	Standard	Standard	Standard	Standard
CaseMix	DRG12	DRG12	Standard	Standard	Standard	Standard
CaseMix	DRG13	DRG13	Standard	Standard	Standard	Standard
CaseMix	DRG14	DRG14	Standard	Standard	Standard	Standard
CaseMix	DRG15	DRG15	Standard	Standard	Standard	Standard
CaseMix	DRG16	DRG16	Standard	Standard	Standard	Standard
CaseMix	DRG17	DRG17	Standard	Standard	Standard	Standard
CaseMix	DRG18	DRG18	Standard	Standard	Standard	Standard
CaseMix	DRG19	DRG19	Standard	Standard	Standard	Standard
CaseMix	DRG20	DRG20	Standard	Standard	Standard	Standard
CaseMix	DRG21	DRG21	Standard	Standard	Standard	Standard
CaseMix	DRG22	DRG22	Standard	Standard	Standard	Standard
CaseMix	DRG23	DRG23	Standard	Standard	Standard	Standard
CaseMix	DRG24	DRG24	Standard	Standard	Standard	Standard
CaseMix	DRG25	DRG25	Standard	Standard	Standard	Standard
CaseMix	DRG26	DRG26	Standard	Standard	Standard	Standard
CaseMix	DRG27	DRG27	Standard	Standard	Standard	Standard
CaseMix	DRG28	DRG28	Standard	Standard	Standard	Standard
CaseMix	DRG29	DRG29	Standard	Standard	Standard	Standard
CaseMix	DRG30	DRG30	Standard	Standard	Standard	Standard
CaseMix	DRG31	DRG31	Standard	Standard	Standard	Standard
CaseMix	DRG32	DRG32	Standard	Standard	Standard	Standard
CaseMix	DRG33	DRG33	Standard	Standard	Standard	Standard
CaseMix	DRG34	DRG34	Standard	Standard	Standard	Standard
CaseMix	DRG35	DRG35	Standard	Standard	Standard	Standard
CaseMix	DRG36	DRG36	Standard	Standard	Standard	Standard
CaseMix	DRG37	DRG37	Standard	Standard	Standard	Standard
CaseMix	DRG38	DRG38	Standard	Standard	Standard	Standard
CaseMix	DRG39	DRG39	Standard	Standard	Standard	Standard
CaseMix	DRG40	DRG40	Standard	Standard	Standard	Standard
CaseMix	DRG41	DRG41	Standard	Standard	Standard	Standard
CaseMix	DRG42	DRG42	Standard	Standard	Standard	Standard
CaseMix	DRG43	DRG43	Standard	Standard	Standard	Standard
CaseMix	DRG44	DRG44	Standard	Standard	Standard	Standard
CaseMix	DRG45	DRG45	Standard	Standard	Standard	Standard
CaseMix	DRG46	DRG46	Standard	Standard	Standard	Standard
CaseMix	DRG47	DRG47	Standard	Standard	Standard	Standard
CaseMix	DRG48	DRG48	Standard	Standard	Standard	Standard
CaseMix	DRG49	DRG49	Standard	Standard	Standard	Standard
CaseMix	DRG50	DRG50	Standard	Standard	Standard	Standard
CaseMix	DRG51	DRG51	Standard	Standard	Standard	Standard
CaseMix	DRG52	DRG52	Standard	Standard	Standard	Standard
CaseMix	DRG53	DRG53	Standard	Standard	Standard	Standard
CaseMix	DRG54	DRG54	Standard	Standard	Standard	Standard
CaseMix	DRG55	DRG55	Standard	Standard	Standard	Standard
CaseMix	DRG56	DRG56	Standard	Standard	Standard	Standard
CaseMix	DRG57	DRG57	Standard	Standard	Standard	Standard
CaseMix	DRG58	DRG58	Standard	Standard	Standard	Standard
CaseMix	DRG59	DRG59	Standard	Standard	Standard	Standard
CaseMix	DRG60	DRG60	Standard	Standard	Standard	Standard
CaseMix	DRG61	DRG61	Standard	Standard	Standard	Standard
CaseMix	DRG62	DRG62	Standard	Standard	Standard	Standard
CaseMix	DRG63	DRG63	Standard	Standard	Standard	Standard
CaseMix	DRG64	DRG64	Standard	Standard	Standard	Standard
CaseMix	DRG65	DRG65	Standard	Standard	Standard	Standard
CaseMix	DRG66	DRG66	Standard	Standard	Standard	Standard
CaseMix	DRG67	DRG67	Standard	Standard	Standard	Standard
CaseMix	DRG68	DRG68	Standard	Standard	Standard	Standard
CaseMix	DRG69	DRG69	Standard	Standard	Standard	Standard
CaseMix	DRG70	DRG70	Standard	Standard	Standard	Standard
CaseMix	DRG71	DRG71	Standard	Standard	Standard	Standard
CaseMix	DRG72	DRG72	Standard	Standard	Standard	Standard
CaseMix	DRG73	DRG73	Standard	Standard	Standard	Standard
CaseMix	DRG74	DRG74	Standard	Standard	Standard	Standard
CaseMix	DRG75	DRG75	Standard	Standard	Standard	Standard
CaseMix	DRG76	DRG76	Standard	Standard	Standard	Standard
CaseMix	DRG77	DRG77	Standard	Standard	Standard	Standard
CaseMix	DRG78	DRG78	Standard	Standard	Standard	Standard
CaseMix	DRG79	DRG79	Standard	Standard	Standard	Standard
CaseMix	DRG80	DRG80	Standard	Standard	Standard	Standard
CaseMix	DRG81	DRG81	Standard	Standard	Standard	Standard
CaseMix	DRG82	DRG82	Standard	Standard	Standard	Standard
CaseMix	DRG83	DRG83	Standard	Standard	Standard	Standard
CaseMix	DRG84	DRG84	Standard	Standard	Standard	Standard
CaseMix	DRG85	DRG85	Standard	Standard	Standard	Standard
CaseMix	DRG86	DRG86	Standard	Standard	Standard	Standard
CaseMix	DRG87	DRG87	Standard	Standard	Standard	Standard
CaseMix	DRG88	DRG88	Standard	Standard	Standard	Standard
CaseMix	DRG89	DRG89	Standard	Standard	Standard	Standard
CaseMix	DRG90	DRG90	Standard	Standard	Standard	Standard
CaseMix	DRG91	DRG91	Standard	Standard	Standard	Standard
CaseMix	DRG92	DRG92	Standard	Standard	Standard	Standard
CaseMix	DRG93	DRG93	Standard	Standard	Standard	Standard
CaseMix	DRG94	DRG94	Standard	Standard	Standard	Standard
CaseMix	DRG95	DRG95	Standard	Standard	Standard	Standard
CaseMix	DRG96	DRG96	Standard	Standard	Standard	Standard
CaseMix	DRG97	DRG97	Standard	Standard	Standard	Standard
CaseMix	DRG98	DRG98	Standard	Standard	Standard	Standard
CaseMix	DRG99	DRG99	Standard	Standard	Standard	Standard
CaseMix	DRG100	DRG100	Standard	Standard	Standard	Standard

### Use Case: DRG Names

- On high level LLM understands what CaseMix system is about and its general structure

The provided list, referred to as "headers", contains codes and corresponding French names for various medical procedures or diagnoses. Here is a brief overview of the structure:

- **DRG\_001**: This header contains the code.
- **DRG\_002**: This header contains the name/description in French.

For example, the first few entries include:

- 0001: Intervention chirurgicale abdominale
- 0002: Intervention chirurgicale abdominale
- 0003: Intervention chirurgicale abdominale
- 0004: Intervention chirurgicale abdominale
- 0005: Intervention chirurgicale abdominale

Let's discuss CaseMix system basics. Attached you will find a list of codes and names. We call this list "headers". This list is in French.

If you have specific questions or need further analysis or translation, please let me know!

# Use Case: Search NordDRG Definition Tables

Best AI model (**GPT4o**) **fails** when Definition Tables is the only source

ChatGPT 4o ▾



2023-06-14\_Combined2024PL\_xls...  
Spreadsheet

Let's discuss CaseMix system basics. Attached you will find a NordDRG definition tables.

Could you list all DRG groups that are related to appendectomy?

It appears that there were no direct matches for appendectomy-related DRG groups using the keyword "apendektomia." There might be other terms or variations used in the dataset.




Could you please provide any specific keywords or alternative terms you think might be used for appendectomy in this context? This will help refine the search. [->]



# Use Case: Search NordDRG Definition Tables

Best AI model (GPT4o) **succeeds** when instructions by NordDRG specialist is included into the context

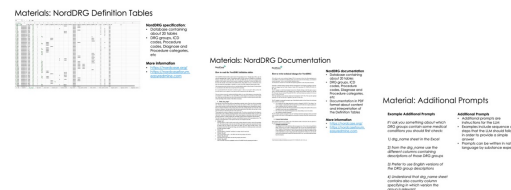
ChatGPT 4o ▾

-  2023-06-14\_Combined2024PL\_xls...  
Spreadsheet
-  How to write technical changes for ...  
PDF
-  How to read NordDRG definition tab...  
PDF

Let's discuss CaseMix system basics. Attached you will find a NordDRG definition tables.



## Materials: NordDRG Specifications



Could you list all DRG groups that are related to appendectomy?



Here are the DRG groups related to appendectomy:




- DRG 166N:** Appendectomy with complicated principal diagnosis
  - National Code:** 166N
  - Text:** Appendectomy w complicated principal diagnosis
- DRG 167:** Appendectomy without complicated principal diagnosis, with CC
  - National Code:** 167X
  - Text:** Appendectomy w/o complicated principal diag w/ CC
- DRG 167O:** Appendectomy, short therapy
  - National Code:** 167O
  - Text:** Appendectomy, short therapy
- DRG F30C:** Appendectomy, complicated
  - National Code:** 166C
  - Text:** Appendectomy, w CC
- DRG F30E:** Appendectomy, not complicated
  - National Code:** 167N
  - Text:** Appendectomy, w/o CC
- DRG F30O:** Appendectomy, outpatient care
  - National Code:** 167O
  - Text:** Appendectomy, short therapy

These DRG groups are categorized based on whether the appendectomy is complicated, not complicated, or conducted as short therapy or outpatient care. If you need further details on any specific DRG, please let me know! [-]

# Use Case: Search NordDRG Definition Tables

The second best AI model (GPT4) **fails** when instructions by NordDRG specialist is included into the context

ChatGPT 4 ▾

-  2023-06-14\_Combined2024PL\_xls...  
Spreadsheet
-  How to write technical changes for ...  
PDF
-  How to read NordDRG definition tab...  
PDF

Let's discuss CaseMix system basics. Attached you will find a NordDRG definition tables.

Could you list all DRG groups that are related to appendectomy?



The documents you provided don't specifically list the DRG groups related to appendectomy. However, based on how the NordDRG system functions, appendectomy-related DRG groups can be identified using the following process:

1. **DRG Logic Table** (``drg_logic``): Search for appendectomy procedure codes (using procedure codes from the ``proc_feat`` table) in this table to see which DRG codes they are associated with.
2. **Procedure Features Table** (``proc_feat``): Identify all codes related to appendectomy procedures and their properties, which help in defining which DRG they fall into based on complexity, complications, or concomitant diagnoses.

For a precise answer, I would need to directly search these tables in the NordDRG definition file that specifically includes these tables and procedure codes for appendectomy. If you can enable access to view the tables or provide specifics on appendectomy procedure codes, I could directly identify the relevant DRG groups for you.

# Use Case: Local Medical Terms from DRG Names FI

ChatGPT 4

- Could you list DRG groups that might be related to Finnish word **umpilisäke**?
- **GPT4 Fails** to find the relevant groups from the DRG Names table

drg_nat	drg_text_nat
166N	Umpilisäkkeen poisto, komplisoitunut
167	Umpilisäkkeen poisto, ei komplisoitunut
167O	Umpilisäkkeen poisto, lyhyt hoito

Reason for failure:

- GPT4 is generating code but is doing exact string matching instead of understanding the word variants

```
Analysis
python Always show details Copy code
where the drg_text_nat contains the word 'umpilisäke'
umpilisake = df[df['drg_text_nat'].str.contains('umpilisäke', co
ls as tools: tools.display_dataframe_to_user(name="DRG Groups
umpilisake
Result
Empty DataFrame
Columns: [drg_nat, drg_text_nat]
Index: []
```

DRG\_Names-FIN-Grouper-FI.xlsx Spreadsheet

Let's discuss CaseMix system basics. Attached you will find a list of codes and names. We call this list drgnames. This list is in Finnish.

I see you've attached a file named "DRG\_Names-FIN-Grouper-FI.xlsx" which contains a list of codes and names in Finnish related to the CaseMix system. Before we discuss the basics of the CaseMix system, would you like me to extract and translate the content of the file for our discussion, or do you have specific questions about it?

Could you list DRG groups that might be related to Finnish word umpilisäke?

First, I'll open and read the contents of the Excel file you've provided to identify DRG groups that may be related to the Finnish word "umpilisäke," which translates to "appendix" in English. Let's see what we find.

The Excel file contains a list of DRG codes ("drg\_nat") and their descriptions in Finnish ("drg\_text\_nat"). Now, I'll search for entries related to "umpilisäke," which refers to the appendix, to find relevant DRG groups.

It appears there are no DRG entries in the file specifically mentioning "umpilisäke." It's possible that the term might be described using different wording or synonyms.

Would you like me to search for broader terms related to appendicitis or appendix surgeries, or is there another specific term or area you're interested in exploring within the dataset?

# Use Case: Local Medical Terms from DRG Names FI

- Could you list DRG groups that might be related to Finnish word **umpilisäke**?
- **GPT4o Fails** to find the relevant groups from the DRG Names table

drg_nat	drg_text_nat
166N	Umpilisäkkeen poisto, komplisoitunut
167	Umpilisäkkeen poisto, ei komplisoitunut
167O	Umpilisäkkeen poisto, lyhyt hoito

Reason for failure:

- GPT4o is generating code but is doing exact string matching instead of understanding the word variants

```
python
Always show details
Copy code

where the drg_text_nat contains the word 'umpilisäke'
umpilisake = df[df['drg_text_nat'].str.contains('umpilisäke', case=

ls as tools: tools.display_dataframe_to_user(name="DRG Groups

umpilisake

Result
Empty DataFrame
Columns: [drg_nat, drg_text_nat]
Index: []
```

ChatGPT 4o

DRG Names FIN Grouper FI taulu	
drg_nat	drg_text_nat
1 001A	Keskushermoston kasvaimen kallonisäinen leikkaus
2 001B	Muu kallonisäinen verisuonikirurginen toimenpide
3 001C	Kallonisäisen aneurysman, verisuonianomalian tai hemangioman toimenpide

Let's discuss CaseMix system basics. Attached you will find a list of codes and names. We call this list drgnames. This list is in Finnish

The `drgnames` list is structured with two columns:

1. `drg\_nat`: The DRG code.
2. `drg\_text\_nat`: The name/description of the DRG in Finnish.

Here are the first few entries:

drg_nat	drg_text_nat
001A	Keskushermoston kasvaimen kallonisäinen leikkaus
001B	Muu kallonisäinen verisuonikirurginen toimenpide
001C	Kallonisäisen aneurysman, verisuonianomalian leikkaushoito
001D	Kallonisäinen aivo-selkäydinnestekierron toiminnan leikkaus
001E	Muu kallonisäinen toimenpide paitsi vamman korjaus

This list contains DRG (Diagnosis-Related Group) codes along with their corresponding descriptions in Finnish. If you have specific questions or need further processing of this data, feel free to ask! [↗](#)

Could you list DRG groups that might be related to Finnish word umpilisäke?

**DRG Groups Related To 'Umpilisäke'** Unable to display visualization

The list of DRG groups does not contain any entries directly related to the Finnish word "umpilisäke". If you need further assistance or have other related terms or criteria to search for, please let me know! [↗](#)

# Use Case: Local Medical Terms from DRG Names FI

## Retrieval Augmented Generation

- Could you list DRG groups that might be related to Finnish word umpilisäke?
- **GPT4 Succeed** to generate the relevant groups from the DRG Names FI table
- Downside: this requires Retrieval program to be written and LLM role is merely text generator

Text Similarity Search App

Upload Excel File  
Select Sheet  
dig\_name  
Select Text Column  
dig\_text\_nat  
Search Query  
Umpilisäkkeen  
Search Method  
TH-QP  
Number of Results (k)  
20  
Search

drp_nat	drp_text_nat	drp_text_short_nat	drp_com	drp_text_com	drp_text_short_com	msc	country
1664	1670	Umpilisäkkeen poisto, komplisoitunut	1664	Appendectomy w/ complicated principal diagnosis	Appendectomy with complicated principal diag	8	fin
1666	1670	Umpilisäkkeen poisto, lyhyt hoito	1666	Appendectomy, short therapy	Appendectomy, short therapy	8	fin
1668	167	Umpilisäkkeen poisto, ei komplisoitunut	1668	Appendectomy w/o complicated principal diagnosis	Appendectomy without complicated principal diagnosis	8	fin
2107	230	Etäsuuren osan raajoista ja päälämpöä sisältävien laitteiden tai niiden osien poistaminen	2107	Local excision & removal of int fix devices of hip & femur	Local excision & removal of int fix devices of hip & femur	8	fin
2088	225	Algerin ääntä	2088	Foot procedures	Foot procedures	8	fin
2089	2250	Algerin ääntä, stult menetelmä	2089	Foot procedures, short therapy	Foot procedures, short therapy	8	fin
2101	226	Algerin ääntä ja muunlaista muunlaista	2101	Soft tissue procedures w/ CC	Soft tissue procedures, w/ CC	8	fin
2101	227	Algerin ääntä ja muunlaista muunlaista	2101	Soft tissue procedures w/o CC	Soft tissue procedures, w/o CC	8	fin
2102	2270	Algerin ääntä ja muunlaista, stult menetelmä	2102	Soft tissue procedures, short therapy	Soft tissue procedures, short therapy	8	fin
2103	228	Mieli hatar algerin ääntä ja muunlaista stult menetelmä	2103	Major thumb or joint proc, or oth hand or wrist proc w/ cc	Major thumb or joint proc, or oth hand or wrist proc w/ cc	8	fin
2104	2280	Mieli hatar algerin ääntä ja muunlaista stult menetelmä	2104	Major thumb or joint proc, or other hand or wrist procedure, short therapy	Major thumb or joint procedures, or other hand or wrist procedure, short therapy	8	fin



Based on the data provided, the following DRG (Diagnosis-Related Group) codes are related to "Umpisuolileikkaus," which is Finnish for "appendectomy":

1. **DRG 166N:** This group is for "Umpilisäkkeen poisto, komplisoitunut," which translates to "Appendectomy with complicated principal diagnosis." This DRG group would be used for appendectomy procedures that are complicated by additional factors affecting the primary diagnosis.
2. **DRG 1670:** This group is for "Umpilisäkkeen poisto, lyhyt hoito," meaning "Appendectomy, short therapy." This DRG group likely refers to appendectomy procedures that require a shorter duration of hospital care, possibly indicating less complexity or fewer complications.
3. **DRG 167:** This group is for "Umpilisäkkeen poisto, ei komplisoitunut," which translates to "Appendectomy without complicated principal diagnosis." This DRG group would apply to standard appendectomy procedures that are not complicated by additional diagnoses.

All of these groups fall under MDC (Major Diagnostic Category) 6, which typically relates to diseases and disorders of the digestive system. The country code 'fin' indicates that these DRG codes are specific to the Finnish adaptation of the NordDRG system.

# Use Case: Local Medical Terms from DRG Names FI-EN

- Could you list DRG groups that might be related to Finnish word **umpilisäke**?
- GPT4o **Succeeds** to find the relevant groups from the DRG Names FI-EN

Reason for success:

- GPT4o is generating code and is doing exact string matching in English word variants

Could you list DRG groups that might be related to Finnish word umpilisäke?

It appears there are no direct matches for the word "umpilisäke" (appendix) in the dataset. It's possible that the relevant DRG codes might use a different term or a broader medical description.

Let's broaden the search to look for terms related to appendicitis or appendectomy in both Finnish and English descriptions. I will perform another search for potential related terms.

Here are the DRG groups related to the Finnish word "umpilisäke" (appendix) and the terms associated with appendicitis or appendectomy:

### 1. DRG Code: 166N

- **Finnish Description:** Umpilisäkkeen poisto, komplisoitunut
- **Short Finnish Description:** Umpiliis poisto, komplisoitunut
- **Combined DRG Code:** 166N
- **English Description:** Appendectomy w complicated principal diagnosis
- **Short English Description:** Appendectomy w complicated principal diag

### 2. DRG Code: 167

- **Finnish Description:** Umpilisäkkeen poisto, ei komplisoitunut
- **Short Finnish Description:** Umpilisäkk poisto,ei komplis
- **Combined DRG Code:** 167X
- **English Description:** Appendectomy w/o complicated principal diag w/o complications
- **Short English Description:** Appendectomy w/o complicated principal diag w/o complications

### 3. DRG Code: 167O

- **Finnish Description:** Umpilisäkkeen poisto, lyhyt hoito
- **Short Finnish Description:** Umpilisäkkeen poisto, lyh h
- **Combined DRG Code:** 167O
- **English Description:** Appendectomy, short therapy
- **Short English Description:** Appendectomy, short therapy

These DRG codes correspond to different types of appendectomy procedures, indicating whether they were complicated or uncomplicated, and the length of therapy involved.

```
python
for DRG descriptions containing English terms related to "app
M_drgs_english = drg_names_data
data["drg_text_comb"].str.contains("appendectomy|appendicitis")
sorted DRG groups
M_drgs_english[["drg_nat", "drg_text_nat", "drg_text_comb"]]

Result
drg_nat      drg_text_nat \
230 166N  Umpilisäkkeen poisto, komplisoitunut
239 167  Umpilisäkkeen poisto, ei komplisoitunut
240 167O  Umpilisäkkeen poisto, lyhyt hoito

drg_text_comb
230  Appendectomy w complicated principal diagnosis
239  Appendectomy w/o complicated principal diag w/...
240  Appendectomy, short therapy
```

drg_nat	drg_text_nat	drg_text_comb
166N	Umpilisäkkeen poisto, komplisoitunut	Appendectomy w complicated principal diagnosis
167	Umpilisäkkeen poisto, ei komplisoitunut	Appendectomy w/o complicated principal diag w/o cc
167O	Umpilisäkkeen poisto, lyhyt hoito	Appendectomy, short therapy

ChatGPT 4o

drg_nat	drg_text_nat	drg_text_short_nat	drg_comb
1 001A	Keskushermoston kasvaimen kaltonsisäinen leikkauk	Keskushermoston kasvaimen kaltonsisäinen leik	001A
2 001B	Muu kaltonsisäinen verisuonikirurginen toimenpide	Muu kaltonsisäinen verisuonikirurginen toimenpide	001B
3 001C	Kaltonsisäinen aneurysman, verisuonionn/ohjauksen tai hemangioman leikkauk	Kaltonsisäinen aneurysman, verisuonionn/ohjauksen tai hemangioman leikkauk	001C

Let's discuss CaseMix system basics. Attached you will find a list of codes and names. We call this list dgrnames. This list is in Finnish and names are also in English.

The provided file contains a list of DRG (Diagnosis-Related Group) codes and names in both Finnish and English. The data is organized with the following columns:

1. drg\_nat: DRG code in the national system.
2. drg\_text\_nat: Full description of the DRG in Finnish.
3. drg\_text\_short\_nat: Short description of the DRG in Finnish.
4. drg\_comb: Combined DRG code.
5. drg\_text\_comb: Full description of the DRG in English.
6. drg\_text\_short\_comb: Short description of the DRG in English.
7. mdc: Major Diagnostic Category associated with the DRG.
8. country: Country code.

Here are the first few rows of the dataset for better understanding:

drg_nat	drg_text_nat	drg_text_short_nat	drg_comb	drg_text_comb	drg_text_short_comb
001A	Keskushermoston kasvaimen kaltonsisäinen leikkauk	Keskushermoston kasvaimen kaltonsisäinen leik	001A	intracranial surgery for central nervous system neoplasm	intracran central n system n
001B	Muu kaltonsisäinen verisuonikirurginen toimenpide	Muu kaltonsisäinen verisuonikirurginen toimenpide	001B	Other intracranial vascular surgery	Other int vascular
001C	Kaltonsisäinen aneurysman, verisuonionn/ohjauksen tai hemangioman leikkauk	Kaltonsisäinen aneurysman, verisuonionn/ohjauksen tai hemangioman leikkauk	001C	Intervention of intracranial vascular abnormality	Intervent intracran abnormality
001D	Kaltonsisäinen avo-selkäspondylolistektomian toimenpide	Kaltonsisäinen avo-selkäspondylolistektomian toimenpide	001D	Intracranial cerebrospinal fluid shunt surgery	Intracran cerebrosp fluid shunt su
001E	Muu kaltonsisäinen toimenpide paitsi vamman korjaus	Muu kaltonsisäinen toimenpide paitsi vamman korjaus	001E	Other craniotomy except for trauma	Other craniotomy except for trauma



# Use Case: Local Medical Terms from DRG Names FI-EN

- Could you list DRG groups that might be related to Finnish word **umpilisäke**?
- GPT4 **Succeeds** to find the relevant groups from the DRG Names FI-EN

Reason for success:

- GPT4 is generating code and is doing exact string matching in English word variants

```
python
for DRG descriptions containing English terms related to "appendectomy"
M_drgs_english = drg_names_data
data[drg_text_comb].str.contains("appendectomy|appendicitis")

Sorted DRG groups
M_drgs_english[['drg_nat', 'drg_text_nat', 'drg_text_comb']]

Result
drg_nat      drg_text_nat \
230  166N  Umpilisäkkeen poisto, komplisoitunut
239  167  Umpilisäkkeen poisto, ei komplisoitunut
240  1670  Umpilisäkkeen poisto, lyhyt hoito

drg_text_comb
230  Appendectomy w complicated principal diagnosis
359  Appendectomy w/o complicated principal diag w/...
240  Appendectomy, short therapy
```

drg_nat	drg_text_nat	drg_text_comb
166N	Umpilisäkkeen poisto, komplisoitunut	Appendectomy w complicated principal diagnosis
167	Umpilisäkkeen poisto, ei komplisoitunut	Appendectomy w/o complicated principal diag w/o cc
1670	Umpilisäkkeen poisto, lyhyt hoito	Appendectomy, short therapy

Could you list DRG groups that might be related to Finnish word umpilisäke?



To find DRG groups related to the Finnish word "umpilisäke," which translates to "appendix" in English, I'll search the dataset for descriptions containing references to appendix-related conditions or procedures. Let's identify any DRG codes and their descriptions that might be associated with appendicitis or appendectomy. I'll perform this search and provide you with the relevant groups.

It appears that there are no DRG descriptions explicitly containing the term "umpilisäke" (appendix) in the dataset. This could be due to variations in the terminology used or specific procedural language that might not directly reference the common name.

To broaden the search, I will look for English terms related to appendix procedures, such as "appendectomy" or "appendicitis," in the English descriptions provided in the dataset. This might help us locate the relevant DRG groups. Let's proceed with that search. [-]

Here are the DRG groups related to appendix procedures, including appendectomy, with their descriptions in both Finnish and English:

## 1. DRG Code: 166N

- **Finnish Description:** Umpilisäkkeen poisto, komplisoitunut
- **English Description:** Appendectomy with complicated principal diagnosis

## 2. DRG Code: 167

- **Finnish Description:** Umpilisäkkeen poisto, ei komplisoitunut
- **English Description:** Appendectomy without complicated principal diagnosis with CC/MCC

## 3. DRG Code: 1670

- **Finnish Description:** Umpilisäkkeen poisto, lyhyt hoito
- **English Description:** Appendectomy, short therapy

These codes are specifically for appendectomy procedures, differentiated by complexity and length of treatment. If you need further details about these groups or another specific query, feel free to ask! [-]

ChatGPT 4

DRG\_Names-FIN-Grpwr-FI-EN.xlsx

Let's discuss CaseMix system basics. Attached you will find a list of codes and names. We call this list drgnames. This list is in Finnish and names are also in English.

Great! Let's dive into the basics of the CaseMix system. Before we get into that, I'll take a look at the file you've uploaded to better understand the list of codes and names you're referring to. Let's start by examining the contents of the DRG (Diagnosis-Related Group) Names file you've provided. I'll check the structure of the data and then we can continue our discussion on how these codes fit into the CaseMix system. Please hold on for a moment while I review the file.

The file contains the following columns, which provide detailed information about Diagnosis-Related Groups (DRGs) in both Finnish and English:

- **drg\_nat**: National DRG code.
- **drg\_text\_nat**: Full description of the DRG in Finnish.
- **drg\_text\_short\_nat**: Shortened description of the DRG in Finnish.
- **drg\_comb**: Combined or standardized DRG code.
- **drg\_text\_comb**: Full description of the DRG in English.
- **drg\_text\_short\_comb**: Shortened description of the DRG in English.
- **ndc**: Major Diagnostic Category, indicating the general area of diagnosis.
- **country**: The country code, which is 'fin' for Finland in this case.

### Understanding CaseMix System Basics

The CaseMix system, which often utilizes DRG codes, is a method to classify hospital cases into one of approximately 500 groups, intended to have similar hospital resource use. They are assigned by a "grpwr" software which calculates the DRG based on the coded data including diagnoses, procedures, age, sex, discharge status, and the presence of complications or comorbidities.

### Key Points:

1. **Resource Allocation:** This system helps in understanding and managing healthcare resource allocation and utilization. By categorizing similar treatment scenarios, healthcare providers can predict costs and resource needs more accurately.
2. **Compatibility:** Allows hospitals and other healthcare facilities to compare their data against each other and national benchmarks in a standardized way, which is crucial for quality improvement and planning.
3. **Billing and Payment:** In many systems, DRG-based payments can provide a more consistent and equitable method of reimbursement, encouraging efficiency in healthcare provision without compromising quality.

Would you like to delve deeper into any specific aspect of the CaseMix system using this data, or is there something specific you're interested in exploring or analyzing within these DRG codes and descriptions? [-]

# Use Case: DRG Names FI

- Result is pretty good (GPT4o)!

We uploaded drgnames for you.  
The list is in Finnish. Could you list all DRG groups where it seems that a child has born?

370C	Keisarileikkaus, komplisoitunut
370M	Keisarileikkaus, erittäin komplisoitunut
371	Keisarileikkaus, ei komplisoitunut
371O	Keisarileikkaus, lyhyt hoito
372C	Alatiesynnytys, komplisoitunut
372M	Alatiesynnytys, erittäin komplisoitunut
373	Alatiesynnytys, ongelmaton
373O	Alatiesynnytys, lyhyt hoito
374	Alatiesynnytys ja synnytyksen jälkeinen kohdun kaavinta tai sterilisaatio
375	Alatiesynnytys ja muu synnytykseen liittyvä toimenpide
376	Synnytyksen tai abortin jälkeinen tilanne ilman toimenpiteitä
377N	Obstetrinen toimenpide
377O	Synnytyksen tai abortin jälkeinen toimenpide, lyhyt hoito
378N	Kohdunulkoinen raskaus, leikkaushoito
379	Uhkaava keskenmeno
380	Abortti ilman kaavintaa
381	Abortti ja kaavinta, kohdun avaus
381O	Abortti ja kaavinta, kohdun avaus, lyhyt hoito
382	Keskeytynyt synnytys tai valeraskaus
383	Raskauden aikainen muu komplikaatio
384	Raskauden aikainen muu ei komplisoitunut tila
385A	Vastasyntyneen lyhyt sairaalahoito
385B	Vastasyntyneen jatkohoito tai myöhään ilmenevä neonataalinen ongelma, syntymäpaino 1000 g tai enemmän
385C	Alle 1000 g painavan vastasyntyneen jatkohoito
386N	Vastasyntynyt, syntymäpaino alle 1000 g
387N	Vastasyntynyt, syntymäpaino 1000-1499 g
388A	Vastasyntynyt, syntymäpaino 1500 - 2499 g, useiden elinjärjestelmien ongelmia
388B	Vastasyntynyt, syntymäpaino 1500 - 2499 g, ei useiden elinjärjestelmien ongelmia
388C	Keskosen vakava hengitysongelma
389A	Vastasyntynyt, syntymäpaino 1500g tai enemmän, laaja leikkaus
389B	Vastasyntynyt, syntymäpaino 2500 g tai enemmän, useiden elinjärjestelmien ongelmia
389C	Täysiaikaisen vastasyntyneen vakava hengitysongelma

Childbirth Related DRG Groups

		drg_nat	drg_text_nat
1	559	372C	Alatiesynnytys, komplisoitunut
2	560	372M	Alatiesynnytys, erittäin komplisoitunut
3	561	373	Alatiesynnytys, ongelmaton
4	562	373O	Alatiesynnytys, lyhyt hoito
5	563	374	Alatiesynnytys ja synnytyksen jälkeinen kohdun kaavinta tai sterilisaatio
6	564	375	Alatiesynnytys ja muu synnytykseen liittyvä toimenpide
7	573	382	Keskeytynyt synnytys tai valeraskaus
8	579	386N	Vastasyntynyt, syntymäpaino alle 1000 g
9	580	387N	Vastasyntynyt, syntymäpaino 1000-1499 g
10	581	388A	Vastasyntynyt, syntymäpaino 1500 - 2499 g, useiden elinjärjestelmien ongelmia
11	582	388B	Vastasyntynyt, syntymäpaino 1500 - 2499 g, ei useiden elinjärjestelmien ongelmia
12	584	389A	Vastasyntynyt, syntymäpaino 1500g tai enemmän, laaja leikkaus
13	585	389B	Vastasyntynyt, syntymäpaino 2500 g tai enemmän, useiden elinjärjestelmien ongelmia
14	587	390	Vastasyntynyt, syntymäpaino 2500 g tai enemmän, muu merkittävä ongelma
15	588	391	Normaali vastasyntynyt

# Use Case: Diagnosis Categories from DRG Logic

- Result is pretty good (GPT4o)!

Which diagnosis categories and properties are listed in drg\_logic for DRG group 372C?

Which diagnosis categories and properties are listed in drg\_logic for DRG group 372C?



DRG Logic Details For DRG 372C

		ord	id	drg_comb
1	6223	70007126265	400D712006	372C
2	6231	70007130006	400D7130001	372C
3	6233	70007130011	400D7130011	372C
4	6235	70007130101	400D7130101	372C
5	6237	70007131001	400D7131001	372C
6	6239	70007131011	400D7131011	372C

The diagnosis categories and properties listed in the `drg\_logic` table for DRG group 372C are as follows:

- **Diagnosis Category (dgc):** None specified (NaN).
- **Principal Diagnosis Property (pdgprop):** None specified (NaN).
- **Complication and/or Co-morbidity (compl):** Values include 1.0 (indicating the presence of complications).
- **Operation Room Procedure Property (or\_proc):** Includes 'S' (requires OR with value 1), 'N' (OR with value 1 must not occur, but OR with value 2 is allowed).
- **Procedure Property (procpro):** None specified (NaN).
- **Secondary Procedure Property (secpro):** Includes values such as '-14S90' (indicating a secondary procedure with property 14S90 is not allowed).
- **Diagnosis Properties (dgprop1 to dgprop4):** Values include 14X03, 14X11, 14X13, 00X10.

The full details of the relevant rows are displayed in the provided table. [-]

## drg\_logic

ord	id	drg_comb	rtc	icd	mdc	dgc	pdgprop	compl	or_proc	procpro	secpro	dgprop1	dgprop2	dgprop3	dgprop4
70007126265	400D712006	372C	0	+				1	S	14S06		14X03			
70007130006	400D7130001	372C	0	+				1	S	14S04	-14S90	14X03			
70007130011	400D7130011	372C	0	+				1		14S04	-14S90	14X03	00X10		
70007130101	400D7130101	372C	0	+				1	N			14X03			
70007131001	400D7131001	372C	0	+					S	14S04	-14S90	14X03	14X11		
70007131011	400D7131011	372C	0	+						14S04	-14S90	14X03	14X11	00X10	
70007131101	400D7131101	372C	0	+					N			14X03	14X11		
70007131202	400D7131202	372C	0	+					S	14S04	-14S90	14X03	14X13		
70007131212	400D7131212	372C	0	+						14S04	-14S90	14X03	14X13	00X10	
70007131302	400D7131302	372C	0	+					N			14X03	14X13		

# Use Case: Diagnosis Categories?

- Result is pretty good (GPT4o)!

Which diagnosis (ICD) codes are connected to diagnose category 14X03?

Which diagnosis (ICD) codes are connected to diagnose category 14X03?

Diagnosis Codes For Category 14X03			
	code_plus	d_code_plus	text_plus
1	74799	O6010	Preterm spontaneous labour with preterm de
2	74806	O6020	Preterm lat with term c
3	74813	O6030	Preterm de without spontaneoi labour

The diagnosis codes connected to diagnose category 14X03 are displayed in the table. If you need any further details or additional information, feel free to ask! [-]

🗨️ 🔄 📄 🗑️

A	B	C	D	E	F	G	H	I
code_plus	d_code_plus	text_plus	d_text_plus	vartype	varval	prop_0	varval_text_comb	nat_ver
O6010		Preterm spontaneous labour with preterm delivery		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/nor	
O6020		Preterm labour with term delivery		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/nor	
O6030		Preterm delivery without spontaneous labour		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/nor	
O6230		Precipitate labour		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
O6300		Prolonged first stage (of labour)		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
O6310		Prolonged second stage (of labour)		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
O6320		Delayed delivery of second twin, triplet, etc.		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
O6390		Long labour, unspecified		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
O6800		Labour and delivery complicated by fetal heart rate anomaly		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
O6810		Labour and delivery complicated by meconium in amniotic fluid		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
O6820		Labour and delivery complicated by fetal heart rate anomaly with meconium		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
O6830		Labour and delivery complicated by biochemical evidence of fetal stress		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
O6880		Labour and delivery complicated by other evidence of fetal stress		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
O6890		Labour and delivery complicated by fetal stress, unspecified		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
O7100		Rupture of uterus before onset of labour		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
O7110		Rupture of uterus during labour		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
O7550		Delayed delivery after artificial rupture of membranes		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
O7570		Vaginal delivery following previous caesarean section		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
O8000		Spontaneous vertex delivery		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8010		Spontaneous breech delivery		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8080		Other single spontaneous delivery		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8090		Single spontaneous delivery, unspecified		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8100		Low forceps delivery		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8110		Mid-cavity forceps delivery		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8120		Mid-cavity forceps with rotation		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8130		Other and unspecified forceps delivery		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8140		Vacuum extractor delivery		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8150		Delivery by combination of forceps and vacuum extractor		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8300		Breech extraction		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8310		Other assisted breech delivery		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8320		Other manipulation-assisted delivery		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8330		Delivery of viable fetus in abdominal pregnancy		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8340		Destructive operation for delivery		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8380		Other specified assisted single delivery		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8390		Assisted single delivery, unspecified		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8400		Multiple delivery, all spontaneous		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8410		Multiple delivery, all by forceps and vacuum extractor		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8420		Multiple delivery, all by caesarean section		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8480		Other multiple delivery		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
O8490		Multiple delivery, unspecified		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin	
Z3700		Single live birth		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
Z3710		Single stillbirth		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
Z3720		Twins, both liveborn		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
Z3730		Twins, one liveborn and one stillborn		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
Z3740		Twins, both stillborn		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
Z3750		Other multiple births, all liveborn		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
Z3760		Other multiple births, some liveborn		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
Z3770		Other multiple births, all stillborn		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	
Z3790		Outcome of delivery, unspecified		DGPROP	14X03	FALSE	Delivery this admission est/swe/lat/ice/den/fin/nor	

dgcat	varval_text_comb	nat_ver
14M03	Ectopic pregnancy	est/swe/lat/ice/den/fin/nor

# Use Case: Diagnosis Categories from DRG Logic

- Result is...?

Please read the names for these ICD codes that have been connected 14X03. Then read all names of all diagnosis codes from dg sheet. What do you think would be top 5 most probable diagnosis codes that might be missing from 14X03 category based on their text descriptions?



Here are the names of the ICD codes connected to diagnose category 14X03:

1. Preterm spontaneous labour with preterm delivery
2. Preterm labour with term delivery
3. Preterm delivery without spontaneous labour
4. Prolonged first stage (of labour)
5. Prolonged second stage (of labour)
6. Obstructed labour due to shoulder dystocia
7. Obstructed labour due to maternal pelvic abnormality
8. Obstructed labour due to malposition and malpresentation of fetus
9. Obstructed labour, unspecified
10. Other obstructed labour
11. Delivery by forceps and vacuum extractor
12. Spontaneous vertex delivery
13. Breech delivery
14. Other specified delivery
15. Unspecified delivery
16. Single live birth
17. Single stillbirth
18. Twins, both live born
19. Twins, one live born and one stillborn
20. Other multiple births

Next, I'll analyze the names of all diagnosis codes from the 'dg' sheet to identify the top 5 most probable diagnosis codes that might be missing from the 14X03 category based on their text descriptions. [-]

Based on the text descriptions of the diagnosis codes, the top 5 most probable diagnosis codes that might be missing from the 14X03 category are:

1. **00300** - Spontaneous abortion - Incomplete, complicated by genital tract and pelvic infection
2. **00410** - Missed abortion
3. **00520** - Failed attempted abortion, complicated by genital tract and pelvic infection
4. **00600** - Unspecified abortion, complicated by genital tract and pelvic infection
5. **00800** - Complications following abortion and ectopic and molar pregnancy, unspecified

These codes are related to pregnancy, labor, and delivery complications, which align with the context of category 14X03. If you need further details or have additional questions, feel free to ask! [-]

# Use Case: Suggest Automatic Technical Changes

Case:

- <https://nordcaseforum.easyredmine.com/issues/917>

We propose some changes to Estonian NCSP code list:

- a) few typo error corrections in EST\_NCSP code names
- b) two procedure codes should be removed from the list, as they are not relevant: not procedure nor investigation and these codes have not been used
- c) one procedure code we want to change (from UJX00 to UJF92), so it will be in more logical place as Finnish list shows.
- Our proposal in attached file.

	est	text	text_plus	est_since	valid	plus1	text_plus
OUT	KCX56	Kusepõie kompressioon	Compression of urinary bladder	1.1.2018	31.12.2024	KCXX56	Compression of urinary bladder
OUT	KCX59	Muu kusepõie füsioteraapia	Other physical therapy of urinary bladder	1.1.2018	31.12.2024	KCXX59	Other physical therapy of urinary bladder
OUT	LBW80	Munajuha perfusioon gaasilise hapnikuga (PSF)	Persufflation of Fallopian tube	1.1.2023	31.12.2024	LBXX14	Persufflation of Fallopian tube
IN	LBW80	Munajuha perfusioon gaasilise hapnikuga (PSF)	Persufflation of Fallopian tube		1.1.2025		
OUT	UJX00	Peensoole kapselendoskoopia	Capsule endoscopy of small intestine	1.1.2010	31.12.2024	JFE092	Capsule endoscopy of small intestine
IN	UJF92	Peensoole kapselendoskoopia	Capsule endoscopy of small intestine		1.1.2025	JFE092	Capsule endoscopy of small intestine
OUT	XPR16	Lumbaalne kavograafia röntgenkontrolli all	Lumbar cavography with X-ray	1.1.2023	31.12.2024	PHDC7A	Lumbar cavography with X-ray
IN	XPR16	Lumbaalne kavograafia röntgenkontrolli all	Lumbar cavography with X-ray		1.1.2025		
		addition on April 1st 2024					
OUT	QWC00	Naha pindmise infektsiooni kordusoperatsioon	Reoperation for superficial infection in sur	1.1.2022	31.12.2024	QWSC00	Reoperation for superficial infection in surgery of skin
OUT	QWC00	Naha pindmise infektsiooni kordusoperatsioon	Reoperation for superficial infection in surgery of skin				
OUT	PEG00	Kompressioon reiearteri pseudoaneurüsmi sulgemiseks sonograafilise kontrolli all			1.1.2025		
IN	PEG00	Kompressioon reiearteri pseudoaneurüsmi sulgemiseks sonograafilise kontrolli all					

# Use Case: Suggest Automatic Technical Changes

How do you understand attached screenshot? What kind of changes do the users want to make to the NordDRG definition tables?



The screenshot outlines a proposal for changes to the Estonian NCSP code list within the NordDRG system. Here is a detailed explanation of the proposed changes:

## 1. Typo Corrections:

- **KCX56** and **KCX59** have typographical errors in their Estonian names. The proposal is to correct these typos.

## 2. Removal of Non-Relevant Procedure Codes:

- **KCX56** (Compression of urinary bladder) and **KCX59** (Other physical therapy of urinary bladder) are proposed to be removed from the list as they are not relevant, meaning they are neither procedural nor investigative and have not been used.

## 3. Reassignment of a Procedure Code:

- **UJX00** (Capsule endoscopy of small intestine) is proposed to be replaced with **UJF92** to place it in a more logical position within the list, aligning it with the Finnish list for better coherence.

## 4. Additional Changes:

- **LBW80** (Persufflation of Fallopian tube with gas) has changes in its validity period, extending from 1.1.2023 to 31.12.2024.
- Another entry for **LBW80** with a new validity period from 1.1.2025 is added.
- **XPR16** (Lumbar cavography with X-ray) is updated similarly, with changes in validity and potentially other properties.
- A new procedure code is added for reoperation for superficial infection in surgery of skin, coded as **QWC00**.
- **PEG00** sees updates to its description and potentially its grouping properties.

These changes aim to improve the accuracy and logical arrangement of the procedure codes within the Estonian NCSP list, ensuring better alignment with clinical practices and other national versions of the NCSP list.

Case:

- <https://nordcaseforum.easyredmine.com/issues/917>

Are you sure Typo Corrections were related to KCX56 and KCX59?



I apologize for the confusion earlier. Based on the document "How to write technical changes for NordDRG," here is a revised understanding of the proposed changes in the screenshot:

## 1. Typo Corrections:

- The proposal mentions making a few typo corrections in the Estonian NCSP code names. However, the specific codes with typographical errors are not detailed in the screenshot. The typo corrections are likely applied to multiple codes as needed.

## 2. Removal of Non-Relevant Procedure Codes:

- **KCX56** (Compression of urinary bladder) and **KCX59** (Other physical therapy of urinary bladder) are proposed to be removed from the list because they are not relevant procedures and have not been used.

## 3. Reassignment of a Procedure Code:

- The procedure code **UJX00** (Capsule endoscopy of small intestine) is proposed to be replaced with **UJF92**. This change aims to place the code in a more logical position within the list, aligning it with the Finnish list.

## 4. Validity Updates:

- **LBW80** (Persufflation of Fallopian tube) has changes in its validity period, extending from 1.1.2023 to 31.12.2024, and a new entry starts from 1.1.2025.
- **XPR16** (Lumbar cavography with X-ray) has a similar pattern with updated validity periods.

## 5. Addition of New Procedure Code:

- A new procedure code **QWC00** is added for reoperation for superficial infection in surgery of the skin, effective from 1.1.2025.

## 6. Descriptions and Adjustments:

- **PEG00** has updates to its description and potentially its grouping properties, reflecting the latest clinical practices.

These changes ensure the Estonian NCSP code list remains accurate and relevant, reflecting current clinical practices and aligning with other national versions where appropriate.

For detailed instructions on how to make these changes, including adding, deleting, or updating codes in the NordDRG system, the document provides step-by-step guidance on filling out the TC template and ensuring proper documentation and logical placement of the codes.



# Use Case: Suggest Automatic Technical Changes

Case:

- <https://nordcaseforum.easyredmine.com/issues/898>

## Nordic Casemix Centre

Dashboard **Tasks** Spent time Roadmap Wiki Documents Files News Calendar

### #898 - Obstetric ultrasound - adding PROCPR

Status: Further active Priority: Error correction  
Assignee: - Start date: 2023-09-26 

We kindly ask that the PROCPR 14D51 will be added to the NCSP codes MADE2D, MADE2H, MADE2X, MADE32 and MADE3A so it will group into DRG 914P in the ICE version.

#### Attachments (2)

 TC_#898_Obstetric_imaging_ultrasound.xlsx(20 kB) - v1	Lotta Sokka, 2023-12-08 12:54	
 Obstetric_ultrasonography_national_proc_codes.xlsx (10 kB) - v1	Kristiina Kahur, 2023-09-27 08:18	



# Use Case: Suggest Automatic Technical Changes

Could you read the PDF document "how to write technical changes to NordDRG" that you have? Could you suggest how to describe, based on the PDF instructions, the technical changes that would be needed for this change request:

We kindly ask that the PROCPR 14D51 will be added to the NCSP codes MADE2D, MADE2H, MADE2X, MADE32 and MADE3A so it will group into DRG 914P in the ICE version.



To describe the technical changes needed for the change request "PROCPR 14D51 to be added to NCSP codes MADE2D, MADE2H, MADE2X, MADE32, and MADE3A so it will group into DRG 914P in the ICE version," based on the instructions in the "How to write technical changes for NordDRG" document, follow these steps:

## 1. Prepare the TC Template:

1. **Open the TC Template:** Download and open the TC template provided by the Nordic Casemix Centre (NCC). Ensure your working copy is named appropriately (e.g., `TC\_YOURCASEID.xlsx`).

## 2. Document the Changes in the `proc\_feat` Table:

1. **Identify Existing Rows:** Find the rows for the NCSP codes MADE2D, MADE2H, MADE2X, MADE32, and MADE3A in the `proc\_feat` table.
2. **Copy Rows:** Copy these rows into the TC template.
3. **Modify and Mark Rows:**
  - For each row, make a duplicate. In the original row, mark the `IN/OUT` column as `OUT`. In the new modified row, mark the `IN/OUT` column as `IN`.
  - In the new rows, add `PROCPR 14D51` to the `procpro` column or create a new variable value if needed, following the format described in the document.
4. **Update Comments:** Add comments to clarify the change (e.g., "Adding PROCPR 14D51").

Case:

- <https://nordcaseforum.easyredmine.com/issues/898>

## 3. Document the Changes in the `drg\_logic` Table:

### 1. Identify or Create New Rule:

- If a rule already exists that groups procedures into DRG 914P, copy and modify it. Otherwise, create a new rule following the format and guidelines provided.
- Ensure the `ORD` value places the new rule appropriately in the hierarchy.

### 2. Modify Rule:

- Ensure the `procpro` column includes the new `PROCPR 14D51`.
- Set the `DRG\_NAT` column to 914P for the Icelandic version, and update the `drg\_comb` column if needed.

### 3. Mark Changes:

- For existing rules being modified, mark the original rule with `OUT` and the modified rule with `IN`.
- For new rules, simply mark the row with `IN`.

## 4. Additional Table Updates:

### 1. procprop\_name Table:

- If `PROCPR 14D51` is a new variable, add it to the `procprop\_name` table with an appropriate description.

### 2. drg\_name Table:

- If DRG 914P is a new DRG, add it to the `drg\_name` table with the necessary descriptive text.

## 5. Validate and Finalize:

1. **Ensure Consistency:** Double-check all entries for consistency, especially the `ORD`, `ID`, and `procpro` values.
2. **Fill in Meta Columns:** Complete the `National ID`, `NCC ID`, and comments columns to ensure all changes are well-documented and traceable.

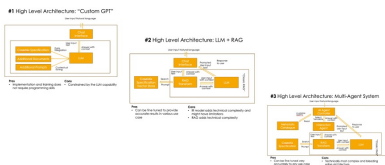
By following these steps and carefully updating the relevant tables in the TC template, you will properly document and describe the technical changes required for adding PROCPR 14D51 to the specified NCSP codes to group into DRG 914P in the Icelandic version. This ensures that the changes align with the NordDRG system's requirements and guidelines.

# Summary of the Experimental Results



AI Architecture	LLM Configuration	Input data	Basic DRG Questions	Medium NordDRG Questions	Hard NordDRG Questions	Simple technical changes
Custom GPT	GPT3.5	Definition Tables	Fail	Fail	Fail	Fail
Custom GPT	GPT3.5	Definition Tables + PDF Instructions	Fail	Fail	Fail	Fail
Custom GPT	GPT3.5	Definition Tables + PDF Instructions + Additional prompts	Fail	Fail	Fail	Fail
Custom GPT	GPT4	Definition Tables	Fail	Fail	Fail	Fail
Custom GPT	GPT4	Definition Tables + PDF Instructions	Fail	Fail	Fail	Fail
Custom GPT	GPT4	Definition Tables + PDF Instructions + Additional prompts	Fail	Fail	Fail	Fail
RAG	GPT4 + RAG	Definition Tables + PDF Instructions	Succeed	Succeed	Fail	Fail
Custom GPT	GPT4o	Definition Tables + PDF Instructions	Succeed	Succeed	Fail	Succeed
RAG	GPT4o + RAG	Definition Tables + PDF Instructions	Succeed	Succeed	Fail	Succeed
Custom GPT	AI Assistant (Custom GPT4o)	Definition Tables + PDF Instructions	Succeed	Succeed	Fail	Succeed
MAS	AI Assistant (MAS GPT4o)	Definition Tables + PDF Instructions + Additional prompts	(Theoretically) Succeed	(Theoretically) Succeed	(Theoretically) Succeed	(Theoretically) Succeed

High Level Architectures and AI Design Patterns



Model

- GPT-4o  
Newest and most advanced model
- GPT-4  
Advanced model for complex tasks
- GPT-3.5  
Great for everyday tasks

Materials: NordDRG Specifications



# NordDRG AI Assistant



**NordDRG AI Assistant**

Which tables are included in the NordDRG definiti...

Understanding 'Patient Group' in NordDRG.

Could you list all DRG groups where it seems that a...

Could you list all DRG groups that are related to...

# Use Case: Search Relevant DRG Groups from Definition Tables

- Could you list all DRG groups that are related to appendectomy?
- GPT4o **Succeeds** to find the relevant groups from the NordDRG definition tables



NordDRG AI Assistant

Could you list all DRG groups that are related to appendectomy?



The following DRG groups are related to appendectomy:

1. **DRG 166N**

- National Text: "Appendektomi med kompliserende hovedtilstand" / "Appendectomy with complicated principal diagnosis"
- Combined Text: "Appendectomy w complicated principal diagnosis"

2. **DRG 167**

- National Text: "Appendektomi uten kompliserende hovedtilstand" / "Appendectomy without complicated principal diagnosis"
- Combined Text: "Appendectomy w/o complicated principal diag w/o CC"

3. **DRG 167O**

- National Text: "Appendektomi, dagkirurgisk behandling" / "Appendectomy, short therapy"
- Combined Text: "Appendectomy, short therapy"

4. **DRG 166C**

- National Text: "Appendektomi, komplicerat" / "Appendectomy, complicated"
- Combined Text: "Appendectomy, w CC"

5. **DRG 167N**

- National Text: "Appendektomi, ej komplicerat" / "Appendectomy, not complicated"
- Combined Text: "Appendectomy, w/o CC"

6. **DRG 167O**

- National Text: "Appendektomi, öppenvård" / "Appendectomy, outpatient"
- Combined Text: "Appendectomy, short therapy" [-]

# Use Case: Medical Terms from Definition Tables

NordDRG Navigator ▾



- Could you list DRG groups that might be related to Finnish word umpilisäke?

Could you list DRG groups that might be related to Finnish word umpilisäke?

- GPT4o **Succeeds** to find the relevant groups from the NordDRG specification



The Finnish word "umpilisäke" refers to the appendix, commonly associated with appendicitis and appendectomy procedures. Relevant DRG groups related to this would include those dealing with appendicitis and surgical procedures for appendectomy. Based on the documents, the following DRG codes may be relevant:

1. **DRG 167** - Appendectomy without complicated diagnosis
2. **DRG 168** - Appendectomy with complicated diagnosis
3. **DRG 1670** - Appendectomy, outpatient procedure

These DRGs cover appendectomy procedures differentiated by the presence of complications and whether the procedure was done on an inpatient or outpatient basis .

# Use Case: Search Relevant DRG Groups from Definition Tables

- Could you list all DRG groups where it seems that a child has born?
- GPT4o **Fails** to find the relevant groups from the NordDRG definition tables



NordDRG AI Assistant

Could you list all DRG groups where it seems that a child has born?



It appears that the ``drg_logic`` table does not contain a column named ``drg_text_nat``. Based on the initial structure and purpose, we need to locate another table that includes descriptions or texts for DRGs to identify those related to childbirth.

Let's explore the ``drg_name`` table which likely contains the DRG names and descriptions. I'll load and inspect this table next. [\[-\]](#)

The following DRG groups are related to childbirth or neonatal care:

1. **DRG 385B**

- National Text: "Aprupes turpinajums, saistīts ar neonatalam problemam vai attīstības aizturi" / "Oppfølging av neonatalproblemer eller forsinket utvikling" / "Eftervård för neonatala problem vid födelsevikt < 1500 g"
- Combined Text: "Follow-up care of neonatal problems or delayed development"

2. **DRG 385C**

- National Text: "Eftervård för neonatala problem vid födelsevikt < 1500 g"
- Combined Text: "Neonate, arrived during first two days of life with birth weight < 1500g"

These DRG codes are used for follow-up care and neonatal problems related to childbirth. [\[-\]](#)

# Use Case: Search Relevant DRG Groups from Definition Tables with additional instructions

- Could you list all DRG groups where it seems that a child has born?
- GPT4o **Succeeds** to find the relevant groups from the NordDRG definition tables
- This is achieved by providing additional instruction (prompt) for the LLM how to interpret the NordDRG definition tables

NordDRG AI Assistant ▾

If I ask you something about which DRG groups contain some medical conditions you should first check:  
 1) drg\_name sheet in the Excel  
 2) from the drg\_name use the different columns containing descriptions of those DRG groups  
 3) Prefer to use English versions of the DRG group descriptions

Is this clear?



Yes, this is clear. When you ask about which DRG groups contain certain medical conditions, I will first check the "drg\_name" sheet in the Excel file, then use the columns containing descriptions of those DRG groups, and prioritize using the English versions of the DRG group descriptions.

Could you list all DRG groups where it seems that a child has born?



NordDRG AI Assistant

Children DRG Groups									
drg_nr	drg_text	drg_text_1	drg_text_2	drg_text_3	drg_text_4	drg_text_5	drg_text_6	drg_text_7	country
1	312	Vaginata sartata, uti ga	Vaginata sartata, uti ga	312x	Vaginal delivery in complicated diagnosis	Vaginal delivery in complicated diagnosis	14	est	
2	313	Vaginata sartata, uti ga	Vaginata sartata, uti ga	313x	Vaginal delivery, not CC	Vaginal delivery, not CC	14	est	
3	314	Vaginata sartata, uti ga	Vaginata sartata, uti ga	314	Vaginal delivery, short therapy	Vaginal delivery, short therapy	14	est	
4	315	Vaginata sartata, uti ga	Vaginata sartata, uti ga	315x	Vaginal delivery with analgesia A30-32C	Vaginal delivery with analgesia A30-32C	14	est	
5	316	Vaginata sartata, uti ga	Vaginata sartata, uti ga	316x	Vaginal delivery in a room equipped with A30-32C	Vaginal delivery in a room equipped with A30-32C	14	est	
6	317	Vaginata sartata, uti ga	Vaginata sartata, uti ga	317x	Vaginal delivery in a room equipped with A30-32C	Vaginal delivery in a room equipped with A30-32C	14	est	
6	317	Sivertu probleem, vaaka operatsioon	Sivertu probleem, vaaka operatsioon	317x	Obstetrical problems with other DR procedure	Obstetrical problems with other DR procedure	14	est	
7	318	Sivertu probleem, vaaka operatsioon	Sivertu probleem, vaaka operatsioon	318	Obstetrical problems with other DR procedure	Obstetrical problems with other DR procedure	14	est	
8	319	Sivertu probleem, vaaka operatsioon	Sivertu probleem, vaaka operatsioon	319	Surgery after abortion or still born, short therapy	Surgery after abortion or still born, short therapy	14	est	
9	320	Vastu sartata, uti ga	Vastu sartata, uti ga	320x	Normal, anal with 2 days of transfer to other unit within 5 days	Normal, anal with 2 days of transfer to other unit within 5 days	15	est	
10	321	Vastu sartata, uti ga	Vastu sartata, uti ga	321	Normal, anal with 2 days of transfer to other unit within 5 days	Normal, anal with 2 days of transfer to other unit within 5 days	15	est	
11	322	Vastu sartata, uti ga	Vastu sartata, uti ga	322	Normal, anal with 2 days of transfer to other unit within 5 days	Normal, anal with 2 days of transfer to other unit within 5 days	15	est	
12	323	Vastu sartata, uti ga	Vastu sartata, uti ga	323	Normal, anal with 2 days of transfer to other unit within 5 days	Normal, anal with 2 days of transfer to other unit within 5 days	15	est	
13	324	Vastu sartata, uti ga	Vastu sartata, uti ga	324	Normal, anal with 2 days of transfer to other unit within 5 days	Normal, anal with 2 days of transfer to other unit within 5 days	15	est	
14	325	Vastu sartata, uti ga	Vastu sartata, uti ga	325	Normal, anal with 2 days of transfer to other unit within 5 days	Normal, anal with 2 days of transfer to other unit within 5 days	15	est	
15	326	Vastu sartata, uti ga	Vastu sartata, uti ga	326	Normal, anal with 2 days of transfer to other unit within 5 days	Normal, anal with 2 days of transfer to other unit within 5 days	15	est	
16	327	Vastu sartata, uti ga	Vastu sartata, uti ga	327	Normal, anal with 2 days of transfer to other unit within 5 days	Normal, anal with 2 days of transfer to other unit within 5 days	15	est	
17	328	Vastu sartata, uti ga	Vastu sartata, uti ga	328	Normal, anal with 2 days of transfer to other unit within 5 days	Normal, anal with 2 days of transfer to other unit within 5 days	15	est	
18	329	Vastu sartata, uti ga	Vastu sartata, uti ga	329	Normal, anal with 2 days of transfer to other unit within 5 days	Normal, anal with 2 days of transfer to other unit within 5 days	15	est	
...	...	Normal	Normal	...	...	...	...	...	...

# Conclusions

## Conclusions

1. LLMs are getting better all the time
  - During lifecycle of this paper the efficient way to get same results changed. First we needed to use LLM + RAG however new enhanced LLM achieved same results without RAG
2. Differences between LLMs
  - General reasoning capability in best models starts to be useful for CaseMix Systems
3. Getting good results requires:
  - Going through relevant use cases and having "right answers"
  - Conducting prompt engineering to teach the AI
4. LLMs have issues with small languages such as Finnish
  - Important to have English clinical terms mapped in specification level
5. Advanced methods such as RAG are no silver bullet
  - Embedding search as vector model might do the damage already



# Conclusions

1. LLMs are developing fast and getting better all the time
  - During lifecycle of this paper the efficient way to get same results changed. First we needed to use LLM + RAG however new enhanced LLM achieved same level results with more simple AI architecture
2. Differences between LLMs
  - General reasoning capability in best models starts to be useful for CaseMix Systems
3. Getting good results requires discipline (“Experimental Science”)
  - Going through relevant use cases and having “right answers”
  - Conducting prompt engineering to teach the AI
4. LLMs have issues with small languages such as Finnish
  - Important to have English clinical terms mapped in specification level together with smaller languages
5. Advanced methods such as RAG are no silver bullet
  - Embedding search as vector model might do the damage already

# Future Work



## NordDRG AI Assistant

By TalentAdore &

AI Assistant for NordDRG Definition Tables

Which tables are included in the NordDRG definiti...

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# Future Work

## 1. NordDRG AI Assistant

- Happy to get your questions what you would like to ask from AI Assistant
- Discuss with many stakeholders
  - Collect more questions and answers

## 2. Multi-Agent System

- Several specific agents instead of one general AI agent
- One to answer DRG questions, another to propose technical changes, third to search for gaps in the specification (“QA”), etc
- Automatic maintenance agent?

## 3. Other CaseMix related specifications

- Try out other casemix specifications
- ICD-11?



Thank you!

- Questions?
- 

What would you like to ask “**CaseMix / DRG AI Assistant**”?

Take your  
mobile phone  
and show  
camera



Help to improve  
AI study!



**NordDRG AI Assistant**

- <https://forms.gle/hTRkKGo3gFemB4yY7>