Innovation in Modernizing IIS HL7 Data and Knowledge

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AGENDA

- Why Build an AI Chatbot?
- How Did We Build the HelperBot?
- How is the HelperBot Currently Being Used?
- What's Next?

Why Build an AI Chatbot?

What was the Problem?

- **Requirements to update the HL7 v2.5.1 Implementation Guide for Immunization Messaging**
  - Difficult to search
  - Documents are long and complex
- **HL7 team requires fast information retrieval**
- **Document updating is a slow process**
  - Requires knowledge of all versions of documents
  - Needs to be consistent with historical documents

Why an AI Chatbot?

- **Capable of both Conceptual Search and Keyword Search**
  - No longer require specific keywords to return correct results
  - Can use Keyword Search for highly technical requests
- **Fast retrieval over many documents**
- **Provides page- and paragraph-specific references**
  - Easy to reference original text
- **Ability to summarize and deep-dive**

Using revolutionary technology to help us interact with knowledge seamlessly

How Did We Build the AI Chatbot?

History of HelperBot, Our AI Chatbot

2022

MIROW Proof-of-Concept

Tested AI handling technical terms

Explored limits and capabilities

2023

Migration to EDAV

Learn & understand internal EDAV policies

Development of MIROW and HL7 bots within EDAV

2024

HL7 Team Collaboration

Close working relationship with HL7 Team

Feedback loop to provide fit-for-purpose Helperbot

2025

CDSi SmartUpdate

CDSi team requirements gathering and process analysis

Planning application development

Lessons Learned

- **HL7 technical language required special handling**
- **User education and user-centric design are necessary**
  - “Human in the loop” is important
  - Working with HL7 team for requirements and iteration
- **Constant changes in AI require flexible infrastructure**
- **Accuracy is essential; mitigate hallucinations**
  - Reduce “temperature” to enhance precision and determinism
  - Using only trusted HL7 documents
- **Document security**
  - Only using external documents
  - Importing into EDAV, the trusted system for CDC
  - Abiding by governance policies within CDC

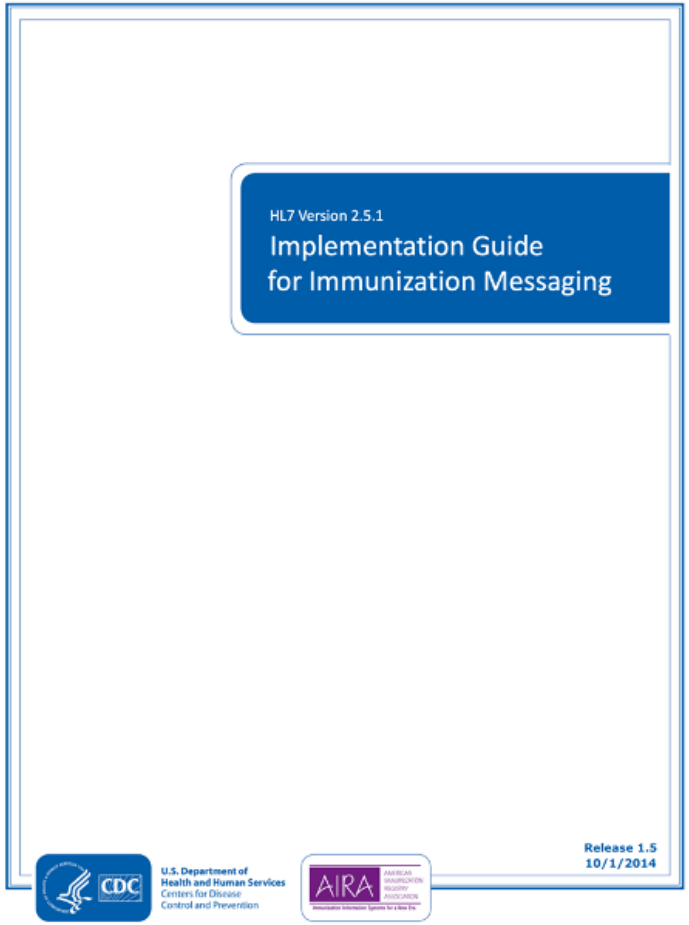
How is HelperBot Currently Being Used?

HL7 Document Updating

Updating the HL7 v2.5.1 Implementation Guide for Immunization Messaging

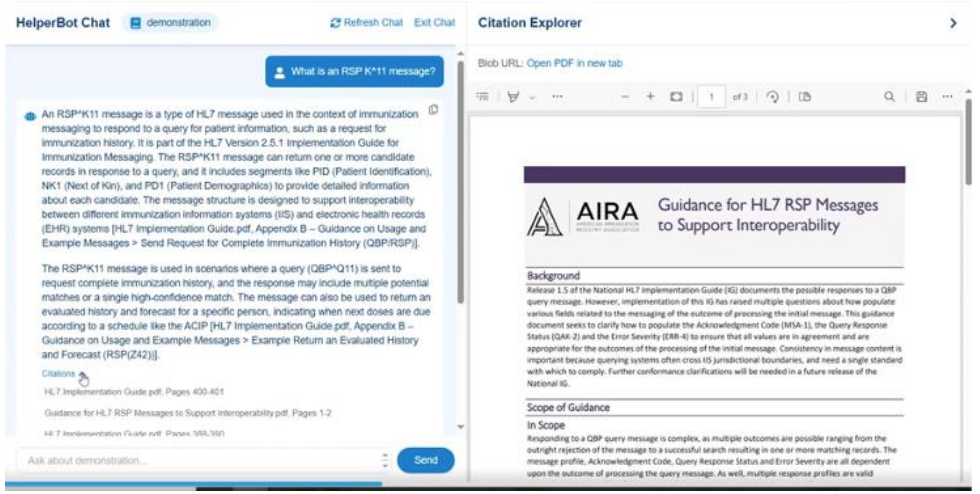
Use Cases:

- **Looking up information from historical documents**
- **Quickly finding and referencing source material from previous documents**
- **Ensuring consistency between documents**



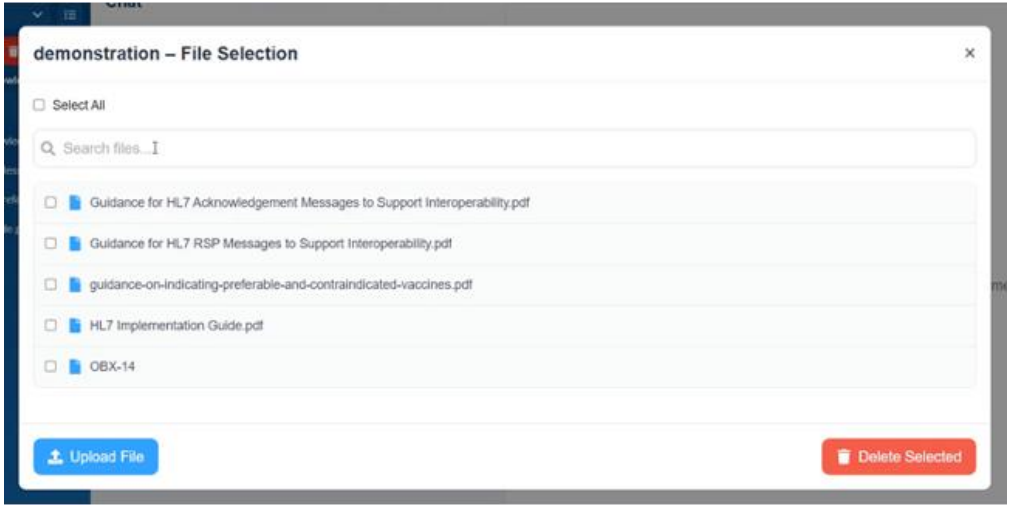
What are the HelperBot's Features?

- **AI chat with Hybrid Search**
  - Conceptual Search
  - Key Word Search
- **PDF Viewer**
  - View full PDF Documents
- **Specific Citations**
  - Document, page, and paragraph
  - Open Citations in PDF Viewer to see original text



What are the HelperBot's Features?

- **Differentiated Knowledge Bases**
  - Separate different knowledge bases
  - Easily build a new knowledge base
  - Easily upload new documents
- **Document-Specific Search**
  - Select specific subset of knowledge base for search parameters



Why are these Features Helpful?

Feature	HL7 Requirement
Hybrid Search	HL7 terms can be very specific (e.g. Z32) – can be hard for traditional AI. Keyword search solves this issue
PDF Viewer + Citations	HL7 needs to see original text to compare to updates
Differentiated Knowledge Bases	HL7 is updating their documents – they only want to see a specific set of historical documents. It is important to only reference a small number of documents
Document-Specific Search	Even within that small set of documents, sometimes HL7 wants to reference a smaller subset. This feature can be used instead of creating a new Knowledge Base

Did We Succeed?

Metrics for Success	Outcome	Measurements
Accuracy of Answers	•Reduced hallucinations through strict parameters •Improved coverage through hybrid search	Precision: 98% Coverage: 82% Declines to answer if uncertain
Speed of Answer Return	•Much faster than manual search	10 sec – 5 mins answer return
Ability to Improve Process	•Efficiently search through documents •Improved process of document updating •Features are easy to use and helpful	~45 mins of work done in ~10 mins 50% fewer clarifications

What’s Next?

CDSi Chatbot

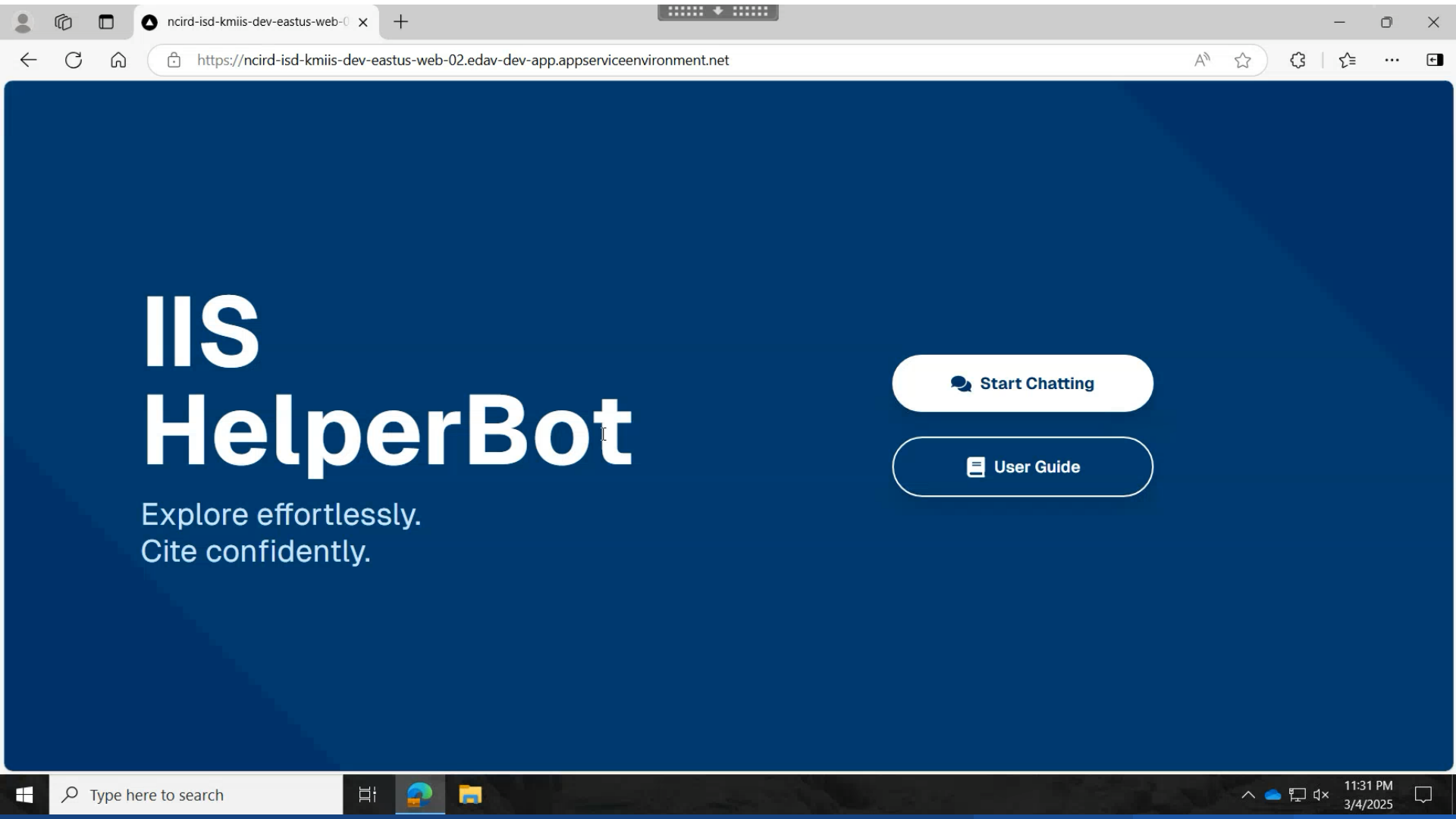
Use cases:

- **Updates from new ACIP recommendations**
  - Identify places in the CDSi Logic Specification that require updates
  - Provide recommendations for updates
- **Test case generation**
  - Provide test case options for more comprehensive or edge-case scenarios
  - Provide test case updates based on ACIP recommendations
- **Answering questions from CDSi Logic Specification**
  - Efficient lookup and contextual search

Proposed CDSi Chatbot Process

Identify Recommendations	Identify Change Target Areas	Generate Draft Changes	Generate and Update Test Cases
Input: ● ACIP Meeting Materials **Output:** ● Changes recommended during ACIP Meeting	**Input:** ● Changes recommended during ACIP Meeting ● Supporting Data Documents ● Test Case Documents **Output:** ● Pairs of ACIP recs and document excerpts that require updating	**Input:** ● Matched pairs of ACIP Recommendations and supporting data excerpts that require updating **Output:** ● Recommended new language for supporting data	**Input:** ● Matched pairs of ACIP Recommendations and test cases that require updating **Output:** ● Recommended new test cases ● Recommended updates to test cases

HelperBot Demo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IIS HelperBot
Explore effortlessly.
Cite confidently.
Start Chatting
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Conclusion

Take-Aways

- **AI is a great tool to improve processes and information discoverability**
  - HL7 team has been using the Helperbot to increase efficiency when updating guidance documentation
  - The Helperbot can easily accept new documents for easy knowledge base management
  - Citations and PDF viewer help users easily find source information
- **Partnering with users when developing AI solutions is essential**
  - The HL7 Helperbot is fit-for-purpose and has features customized to their needs
- **The HelperBot can be used for other knowledge bases, potentially including Knowledge Management for local programs in the future**

THANK YOU

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