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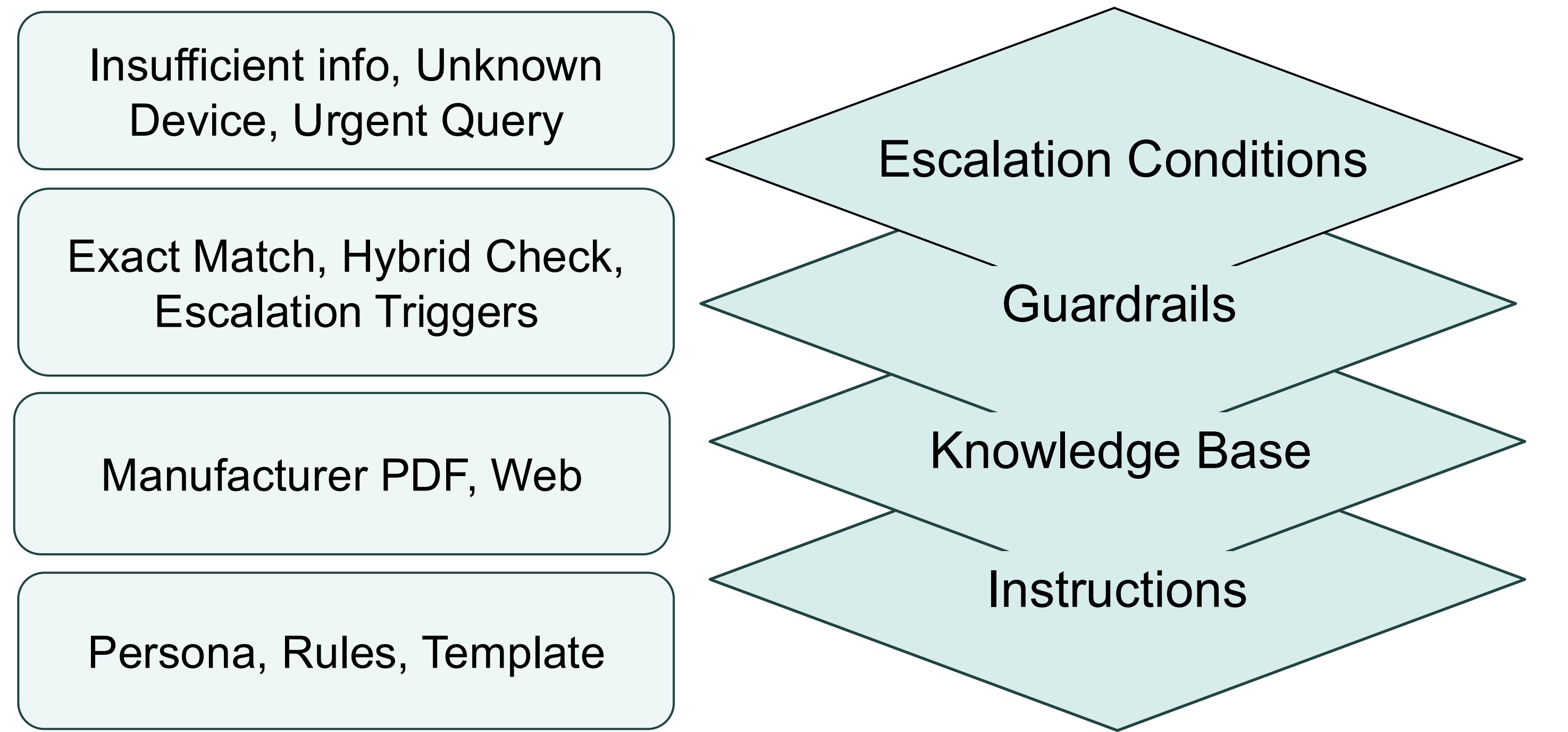
INTRODUCTION

MRI scanning of patients with implants carry risks from minor discomfort to **death**. MR Safety Experts (MRSEs) are trained to advise under which conditions a patient may be scanned, including risk assessments for off-label devices. AI Chatbots are increasingly used as **search engines** but have been shown to provide unsafe and contradictory advice for scanning patients with implants (Rose et al., 2026).

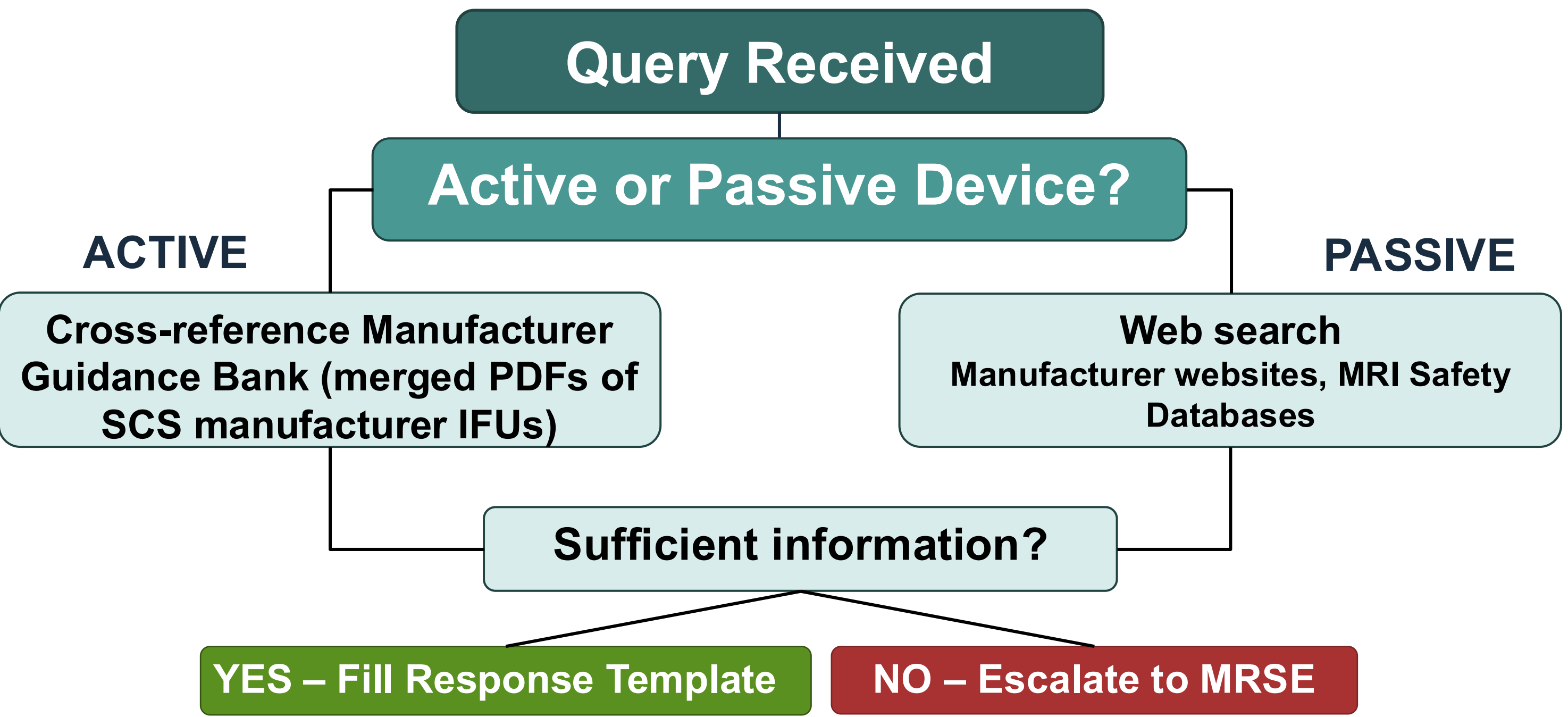
Can a **guardrailed AI agent**, with a defined knowledge bases, structed response template, and escalation logic, **safely assist MRSEs** with implant-related queries?

METHODS

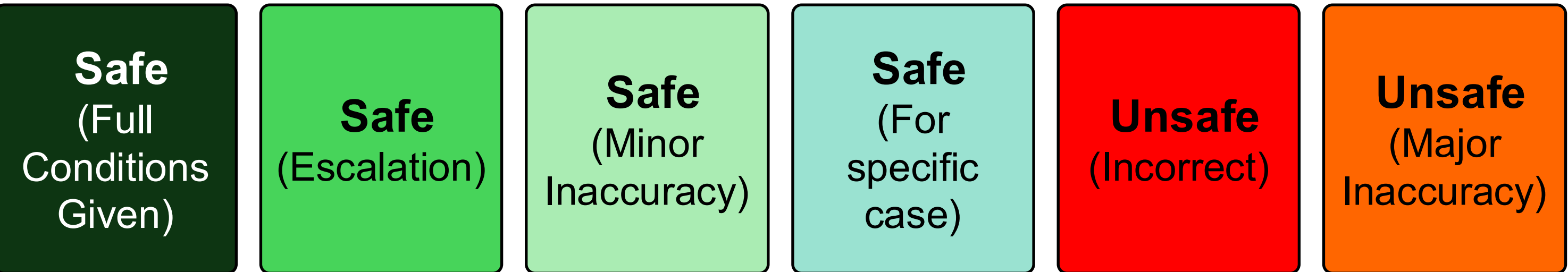
A Google Gemini Gem operating with the v3 Pro model was created with the following agentic structure:



Active and **Passive** implants were triaged separately:

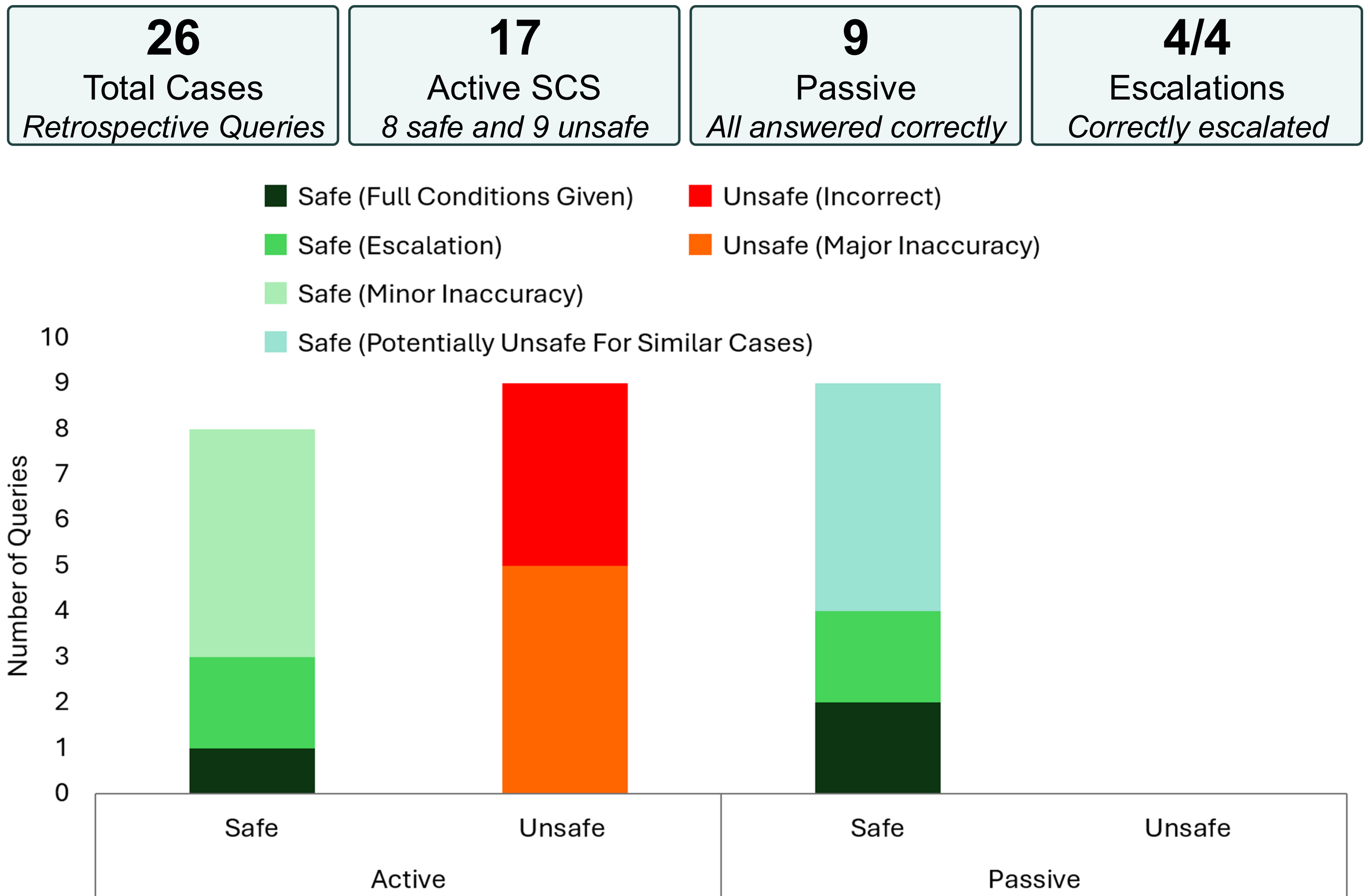


Instructions were iteratively refined with dummy queries. MaRISA was fed **26 anonymised queries** and compared against a **real MRSE** response and scored by MRSEs:



Escalation procedures were needed as some queries lacked enough context for a safe response due to incomplete knowledge from the radiographer and anonymisation for testing. **Non-agentic AI would attempt to answer (unsafe).**

RESULTS



DISCUSSION

100% escalation ratio shows improvement with guardrails. **Passive** implants answered well (9/9) with relevant citations. 6-week rule hallucinated once (potential scan delay). MaRISA struggled to give exhaustively safe conditions for the spinal cord stimulators, with the following failure modes seen:

Error Type	Case(s)	Safety Impact
RF polarisation incorrect MC-2 stated; CP only required at 3T	TC6: Medtronic SCS	UNSAFE RF hot spots possible
B1+rms constraint omitted. Only SAR given	TC7, TC9: Saluda SCS	UNSAFE Incomplete conditions
Normal Operating Mode stated Low SAR mode required by IFU	TC3, TC4: SCS Saluda and BosSci	UNSAFE Exceeds RF limit
Sternal wires classified "MR Safe"	TC22: Passive (cardiac)	MISCLASSIFICATION Sternal wires are MR Conditional
6-week post-implant wait added	TC18, TC24: Passive	HALLUCINATION May delay urgent scans

Local protocol vs IFU limits caused discrepancies: First Level Controlled Mode sometimes allowed by IFU but restricted locally; MaRISA only validated against maximal IFU limits.

CONCLUSION & FUTURE WORK

This **AI Safety experiment** highlighted the importance of **MRSEs** who use their knowledge to facilitate scanning of patients with implants. Future work on an implant agent includes testing with other models, more patients and implant types. Better agentic design may pass individual manufacturer PDFs to each API call rather than the mixed bank to prevent cross contamination. Local procedures can be passed to instructions and multi-turn dialogue with MRSEs may refine responses.

