

MSL Companion

A case study on how to use LLMs to empower MSL teams at Bristol Myers Squibb.

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Objectives

Identify a solution that uses LLMs to inform, train and empower MSL teams by using custom data.

Create a prototype that will showcase the benefits of an MSL companion to drive further investment in AI.

MSL Companion

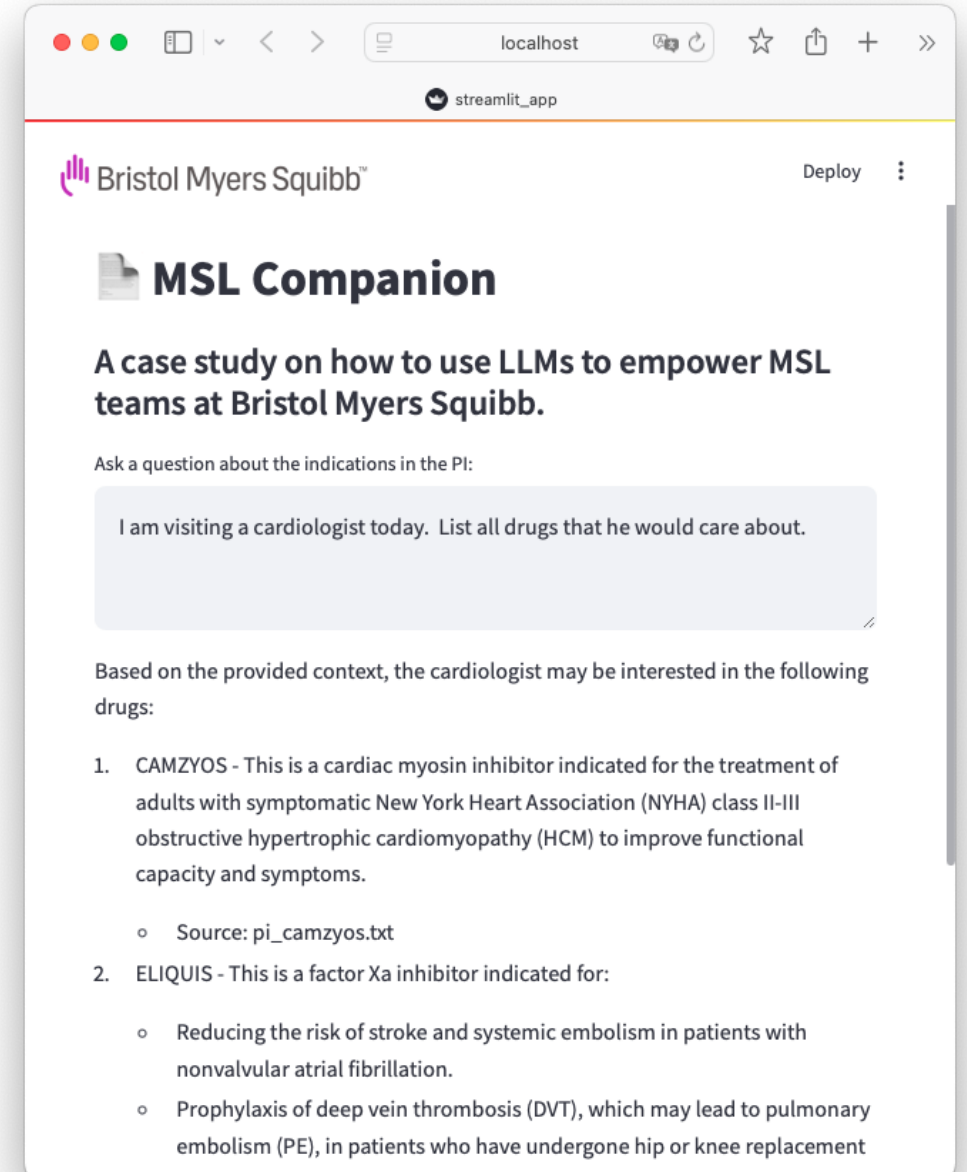
MSL Companion can make indication information available at the fingertips.

A web-based solution using the latest technology:

- Python
- Streamlit.io, a Python library to build data apps.

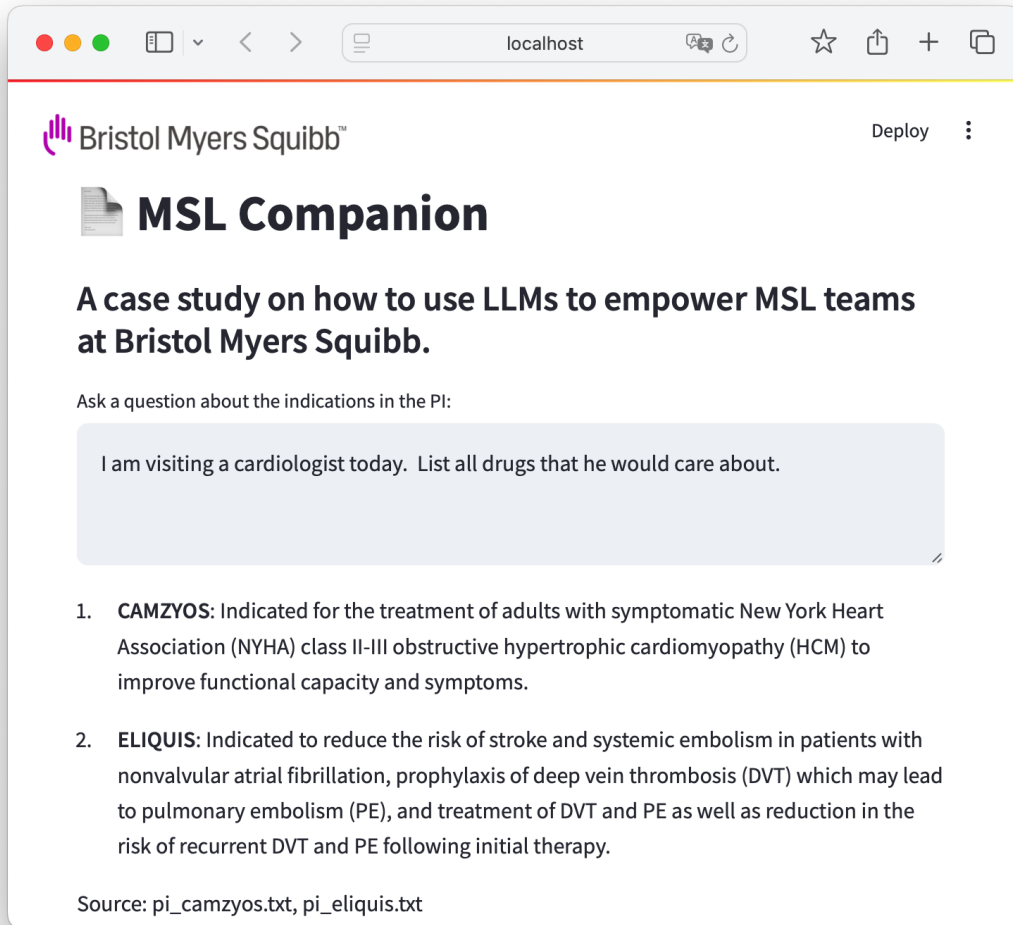
... and the latest LLM modeling:

- OpenAI GPT-4o.
- Prompt tuning.
- RAG (Retrieval-Augmented Generation) document search, top 17 drugs manufactured by BMS.



Demo & Code Review

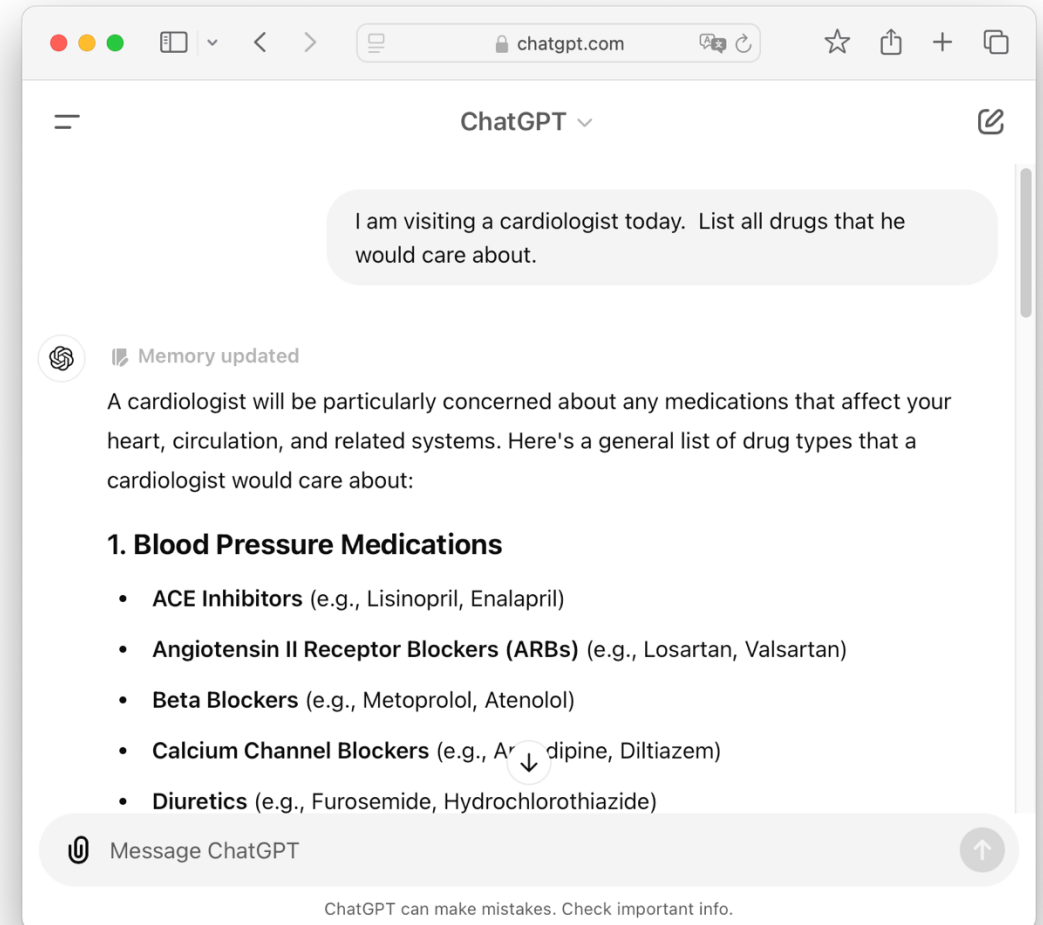
MSL Companion vs ChatGPT: Results Are More Relevant to BMS MSL team



The screenshot shows the MSL Companion web application. The header includes the Bristol Myers Squibb logo and a 'Deploy' button. The main heading is 'MSL Companion' with a subtitle 'A case study on how to use LLMs to empower MSL teams at Bristol Myers Squibb.' Below this, there is a prompt area where the user has entered: 'I am visiting a cardiologist today. List all drugs that he would care about.' The application has responded with two numbered items:

1. **CAMZYOS:** Indicated for the treatment of adults with symptomatic New York Heart Association (NYHA) class II-III obstructive hypertrophic cardiomyopathy (HCM) to improve functional capacity and symptoms.
2. **ELIQUIS:** Indicated to reduce the risk of stroke and systemic embolism in patients with nonvalvular atrial fibrillation, prophylaxis of deep vein thrombosis (DVT) which may lead to pulmonary embolism (PE), and treatment of DVT and PE as well as reduction in the risk of recurrent DVT and PE following initial therapy.

At the bottom, the source is cited as: 'Source: pi_camzyos.txt, pi_eliquis.txt'.



The screenshot shows the ChatGPT web application interface. The user's input is: 'I am visiting a cardiologist today. List all drugs that he would care about.' The response from ChatGPT is as follows:

Memory updated

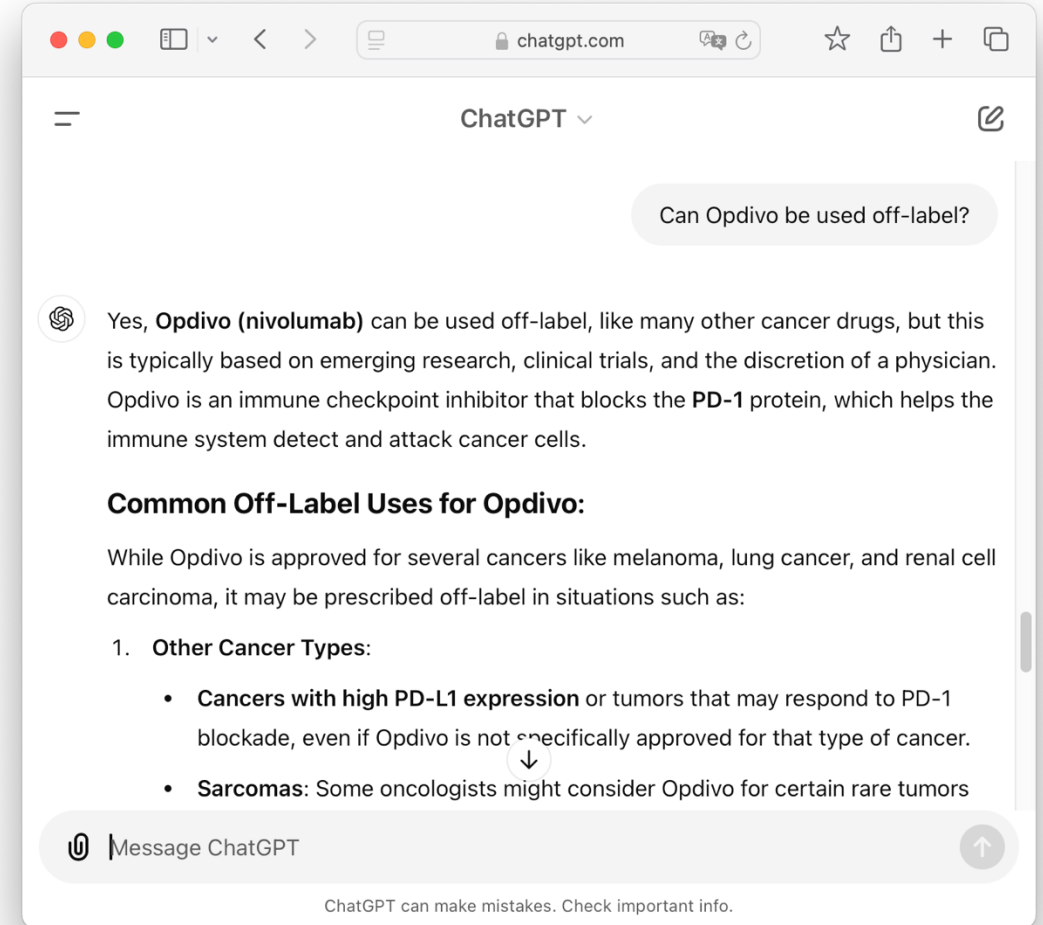
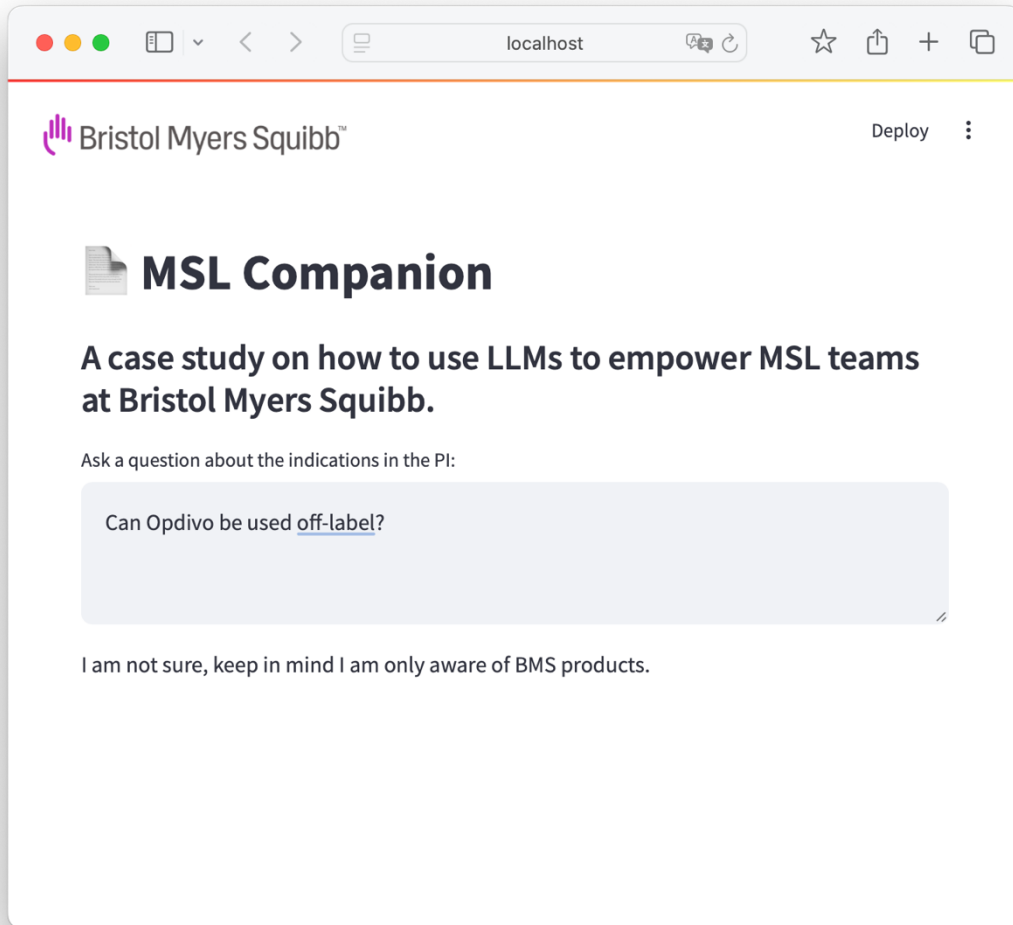
A cardiologist will be particularly concerned about any medications that affect your heart, circulation, and related systems. Here's a general list of drug types that a cardiologist would care about:

1. Blood Pressure Medications

- **ACE Inhibitors** (e.g., Lisinopril, Enalapril)
- **Angiotensin II Receptor Blockers (ARBs)** (e.g., Losartan, Valsartan)
- **Beta Blockers** (e.g., Metoprolol, Atenolol)
- **Calcium Channel Blockers** (e.g., A_r ↓ dipine, Diltiazem)
- **Diuretics** (e.g., Furosemide, Hydrochlorothiazide)

At the bottom, there is a 'Message ChatGPT' button and a disclaimer: 'ChatGPT can make mistakes. Check important info.'

MSL Companion vs ChatGPT: Limited Breath of Answers Improves Reliability



MSL Companion vs ChatGPT

Mitigate Incorrect Answers (Hallucination)



Deploy

MSL Companion

Melanoma

- adult and pediatric (12 years and older) patients with unresectable or metastatic melanoma, as a single agent or in combination with ipilimumab. (1.1)
- for the adjuvant treatment of adult and pediatric patients 12 years and older with completely resected Stage IIB, Stage IIC, Stage III, or Stage IV melanoma. (1.2)

Yes, OPDIVO is approved for pediatric patients 12 years and older for the treatment of:

- Unresectable or metastatic melanoma, as a single agent or in combination with ipilimumab. (1.1)
- Microsatellite instability-high (MSI-H) or mismatch repair deficient (dMMR) metastatic colorectal cancer that has progressed following treatment with a fluoropyrimidine, oxaliplatin, and irinotecan, as a single agent or in combination with ipilimumab. (1.11)

Colorectal Cancer

- adult and pediatric (12 years and older) patients with microsatellite instability-high (MSI-H) or mismatch repair deficient (dMMR) metastatic colorectal cancer that has progressed following treatment with a fluoropyrimidine, oxaliplatin, and irinotecan, as a single agent or in combination with ipilimumab.^a (1.11)



chatgpt.com

OpenAI ChatGPT

ChatGPT

Is OPDIVO approved for pediatric patients?

Yes, **Opdivo (nivolumab)** has been approved for certain pediatric patients, but its use in children is limited to specific cancer types and age groups.

FDA Approval for Pediatric Patients:

Opdivo is approved for **pediatric patients aged 12 years and older** in the following situation:

- **Classical Hodgkin Lymphoma (cHL):**
 - Opdivo is approved for the treatment of pediatric patients aged **12 years and older** with **relapsed or refractory classical Hodgkin lymphoma (cHL)** after failure of other treatments, such as autologous stem cell transplantation (ASCT) or multi-agent chemotherapy.

Off-Label or Experimental Use:

For younger pediatric patients (under 12) or for cancers other than Hodgkin lymphoma

Classical Hodgkin Lymphoma (cHL)

- adult patients with classical Hodgkin lymphoma that has relapsed or progressed after^a: (1.8)
- autologous hematopoietic stem cell transplantation (HSCT) and brentuximab vedotin, or
- 3 or more lines of systemic therapy that includes autologous HSCT.

ChatGPT can make mistakes. Check important info.

Future Potential Enhancements

- Enable web links to each source PI.
- Enable other information in the PI.
- Enable other information relevant to MSLs, including proprietary information.
- Enable open-source models like Llama that can be hosted in-house to limit the risk of proprietary data being sent externally.

Thank you

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