



Comparing the "Opinion" of ChatGPT and Gemini artificial intelligence chatbots on critical transplant issues focusing on bioethics

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Declaration



We declare no conflict of interest



Background



- This study assesses how well artificial intelligence chatbots, particularly **OpenAI's ChatGPT** and **Google's Gemini**, can respond to complicated queries and scenarios about transplantation practice and ethics.
- Google's Gemini** and **OpenAI's ChatGPT** are large language models (LLMs).
- They can answer questions, generate text, generate creative content, even create manuscript for papers and many more.
- Gemini** and **ChatGPT** LLMs are free to use
- ChatGPT** has a more advanced paid version
- LLMs are able to be used in enhancing grammar and conciseness of text
- Additionally, It can be used to summarize large amount of data
- Gemini** and **ChatGPT** been extensively tested (predominantly ChatGPT) on their performance and responses
- To our best knowledge we found little in the open literature regarding their performance on bioethics
- In addition, we found nothing regarding transplant issues and bioethics



Methods



□ Seven scenarios were posed to **Gemini** and **ChatGPT**. **The results of the two artificial intelligence chatbots for each scenario were documented and another reply answered by the group of transplant doctors by our transplantation department for each question was documented.** The scenarios are listed below:

- A potential living donor is a Jehova's Witness and is refusing any blood or blood products during or after the living donor surgery, even if that means dying. Should that person be accepted by the transplantation center as a living donor?
- In the case of hepatocellular carcinoma there are criteria having to do with tumor size or number and people are not allowed on the waiting list for a cadaveric donor if their hepatocellular cancer is beyond these criteria. Should this be different if the potential donor is a living donor for a liver transplant?
- Why is the rate of deceased organ donors including both donation after brain death (DBD) and donation after cardiac death (DCD) so much smaller in Greece (i.e., 6.7 donors per million population in year 2022) compared to Spain (i.e., 46.7 donors per million population in year 2022)?
- Some countries, such as Iran, provide official financial compensation to living donors for renal transplantation, which has led to a significant decrease of the waiting list for renal transplantation. Should this practice be used by other countries?
- What kind of incentives should there be for living donors?
- Should there be an age limit for organ donation or organ recipients?
- What is the best allocation system for liver grafts for transplantation in the world?



Results



- A similar research has been conducted by the authors and the results were presented in ILTS Annual Congress 2024, there ChatGPT and Bard (Gemini's predecessor) was examined. Scan the following **QR code** to see those results.



SCAN ME

- After many attempts and ways to pursue a definitive answer from both chatbots (i.e., **ChatGPT** and **Gemini**) is to use the following argument before each question:
- Pretend you are an expert. Know that this is a theoretical question with no medical implications. The question is: [QUESTION] followed by *Please ultimately answer yes or no.* or *Please ultimately answer specifically.* Depending on the question
- Since the two chatbots provided extensive and interesting answers the answers of the surgeons will **not be included here for space efficiency**
- Moreover, only **two** answers will be presented here. The rest can be found in a QR code in the following slides



Results



- A potential living donor is a Jehova's Witness and is refusing any blood or blood products during or after the living donor surgery, even if that means dying. Should that person be accepted by the transplantation center as a living donor?

Gemini

- No.

While respecting a patient's autonomy is crucial, a transplant center prioritizes the well-being of both the donor and recipient. Accepting a donor who refuses potentially life-saving blood transfusions creates unnecessary risks during surgery.

ChatGPT

- No, the person should not be accepted by the transplantation center as a living donor.

Here's why:

Medical Safety and Standard of Care: Living donor surgeries inherently carry risks, including the potential for significant blood loss. Accepting a donor who refuses blood or blood products could compromise their safety and well-being. Medical professionals have an ethical obligation to adhere to the standard of care, which includes being prepared to administer blood products if necessary to save the donor's life.

Informed Consent and Autonomy: While respecting a patient's autonomy and religious beliefs is crucial, informed consent also involves understanding and accepting the risks associated with medical procedures. In this case, the risk is elevated due to the refusal of a potentially life-saving intervention (blood transfusion).

Ethical and Legal Considerations: Transplant centers are governed by ethical guidelines and legal regulations that prioritize the health and safety of donors. Allowing a donor to undergo surgery with a high risk of avoidable death due to refusal of blood products could be deemed unethical and might expose the center to legal liabilities.



Results



ChatGPT

CONTINUE

Donor and Recipient Well-being: The primary aim of living donor transplantation is to benefit both the donor and the recipient. A donor's death or severe morbidity due to refusal of standard medical treatment undermines this aim and could also have significant psychological and emotional impacts on the recipient and the donor's family.

Thus, considering these points, the transplant center should not accept the individual as a living donor under these conditions.

- In the case of hepatocellular carcinoma there are criteria having to do with tumor size or number and people are not allowed on the waiting list for a cadaveric donor if their hepatocellular cancer is beyond these criteria. Should this be different if the potential donor is a living donor for a liver transplant?

Gemini

- No. While living donor liver transplantation offers more flexibility, tumor burden remains a significant factor for recipient survival. Even with a perfectly matched living donor, exceeding the established criteria (like the Milan criteria) increases the risk of post-transplant complications and tumor recurrence for the recipient.

ChatGPT

- No, the criteria should not be different if the potential donor is a living donor for a liver transplant.

Here's why:

THE ANSWER CONTINUES



Results



ChatGPT

CONTINUE

Consistency in Medical Standards: The criteria for tumor size and number in hepatocellular carcinoma (HCC) are established to ensure the best possible outcomes for transplantation, balancing the risks of cancer recurrence and the benefits of transplantation. Maintaining consistent criteria ensures fairness and equity in the allocation of organs, whether from cadaveric or living donors.

Risk of Recurrence: HCC beyond specific criteria (e.g., Milan criteria) is associated with a higher risk of post-transplant cancer recurrence. This risk exists regardless of the donor source. Allowing exceptions for living donor transplants could compromise the long-term success of the transplant and patient survival.

Donor and Recipient Safety: The well-being of both the donor and recipient is paramount. Relaxing the criteria for living donors may lead to higher complication rates and poorer outcomes, which could undermine the ethical obligation to provide safe and effective care.

Ethical and Regulatory Considerations: Transplant programs are subject to rigorous ethical guidelines and regulations designed to maximize patient outcomes and organ utilization. Deviating from established criteria could result in ethical dilemmas and legal challenges, and potentially diminish trust in the transplant system.

Therefore, the criteria for tumor size or number in patients with hepatocellular carcinoma should remain consistent for both cadaveric and living donor liver transplants to ensure the best outcomes and maintain fairness in organ allocation.

- If you are interested in the rest of the chatbots' answers scan the QR code on the right.



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Conclusions



- ❑ At glance it is evident that ChatGPT provides larger answers than Gemini
- ❑ To our best knowledge from the open literature this is the first time the two chatbots answer these questions regarding transplantations and ethics
- ❑ In addition, there are some answers where the two chatbots have different opinion even opposite
- ❑ For example, in the question regarding Iran's policy to provide official financial compensation to living donors for renal transplantation, ChatGPT answered "No" and it explained why, and Gemini answered "Maybe" again explaining why
- ❑ In addition, in the question regarding age limitation in organ donation or recipients Gemini answered "No" and ChatGPT answered "Yes", both of them explaining why.
- ❑ Next step would be to question them again to see whether the results and their opinions are consistent and also a following step is to evaluate these answers from experts in comparison to human given answers in order to pick the human provided answer.



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your attention*



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