Emerging Programs AI Workgroup Meeting #1

Date: 08/02/2024

Topic: Selection and Recruitment of Trial Participants

Overview and Current Issues

For the past 15 years, CTTI has been committed to developing and driving the adoption of practices that improve the quality and efficiency of clinical trials. Our vision has always been to transform clinical research by making trials more effective, inclusive, and accessible. As we look to the future, we recognize that Artificial Intelligence (AI) offers tremendous potential to help us achieve these goals, opening up new opportunities to address longstanding challenges in clinical trials.

The August AI Workgroup meeting, the first in a series of discussions, brought together a diverse group of stakeholders to explore how AI can be leveraged to enhance participant recruitment and selection—critical areas where inefficiencies continue to impact trial timelines and outcomes. Traditional recruitment methods can be slow and limited, often struggling to identify the right participants quickly and ensuring diversity in trial populations. AI offers the potential to streamline these processes by automating participant identification, improving matching accuracy, and fostering more inclusive trial designs.

Throughout the meeting, participants discussed both the opportunities and challenges associated with AI's role in clinical trials. While AI has the ability to optimize recruitment and increase diversity, there are significant hurdles to overcome, including integrating AI tools with current clinical practices, ensuring data quality and privacy, and addressing equity concerns in AI-driven recruitment strategies.

The goal of this series of meetings is to continue fostering collaboration across the clinical research community, identifying strategies to overcome these challenges and accelerate the adoption of AI in clinical trials. By driving these conversations, CTTI aims to help make clinical trials more efficient, inclusive, and ultimately better aligned with the needs of both patients and researchers.

Meeting Key Points

- Clinical trials face numerous obstacles, such as delays in recruiting participants, challenges in identifying and matching them appropriately, and a lack of diversity in the trial populations. Traditional recruitment methods are often inefficient and time-consuming.

- Artificial intelligence (AI), particularly natural language processing (NLP), has the capability to enhance clinical trial operations by making processes more efficient and accurate, while also lowering costs.
- Many trials are overly restrictive, filtering out patients who could benefit from the treatments due to stringent eligibility criteria. AI can provide more data-driven evidence to guide the design of these criteria.
- AI can offer near real-time insights into patient populations, enabling more precise matching of patients to clinical trials based on their medical records and other relevant data.
- AI presents a unique opportunity to automate participant identification, optimize recruitment strategies, and increase the diversity of trial populations. It can help design more inclusive eligibility criteria and simplify clinical trial documentation to make it more accessible to patients.
- AI can also be used to simplify clinical trial consent forms, making them easier for patients to understand. For example, language models like ChatGPT can be trained to simplify complex medical and legal jargon in these documents.

AI Application Examples for Participant Selection and Recruitment

Case Examples Presented

Trial Pathfinder

James Zou from Stanford presented the Trial Pathfinder platform, an AI-based tool designed to optimize eligibility criteria for clinical trials. The platform is already in use by major pharmaceutical companies like Genentech, Roche, and AstraZeneca to design new immunotherapy trials.

The primary goal of Trial Pathfinder is to address the issue of highly selective clinical trials, which often exclude many patients due to restrictive eligibility criteria based on lab values, comorbidities, or previous treatments. This exclusion leads to a lack of diversity among trial participants.

Trial Pathfinder leverages AI to analyze large-scale electronic health record (EHR) data and simulate different clinical trials. It identifies patients who meet initial eligibility criteria and compares their outcomes with those who do not meet all criteria but are receiving the same treatments. This approach provides data-driven evidence to support the relaxation of certain eligibility criteria, making trials more inclusive and efficient.

James highlighted that with Trial Pathfinder, they were able to more than double the number of eligible patients for certain immunotherapy trials without increasing adverse events. This method also increased the participation of women, minorities, and older patients.

Deep 6 AI

Wout Brusselaers, representing Deep 6 AI, discussed how their company aims to mitigate risks and accelerate clinical trials by leveraging AI for greater visibility and real-time access to patient populations. He highlighted several key points, including the complexity and inefficiency of traditional clinical trials, which often face delays and recruitment challenges due to isolated

decision-making and outdated tools. AI can provide real-time insights into patient populations, enabling more precise matching of patients to clinical trials based on their medical records and other relevant data. This helps optimize recruitment strategies and increases the diversity of trial participants.

Wout also discussed how AI can efficiently mine patient populations and match them to studies and sites by integrating into clinical workflows to identify eligible participants from unstructured data sources. He shared examples of AI improving recruitment outcomes, such as identifying eligible patients who were previously overlooked due to their location or other factors. Additionally, Wout emphasized the need for comprehensive change and alignment of incentives among stakeholders to fully realize AI's benefits in clinical trials, while also stressing the importance of safeguarding patient data and ensuring data quality.

Challenges to Adoption

Challenges

- **Complexity of Eligibility Criteria**: Clinical trial eligibility criteria can be complex and overly restrictive, excluding many potential participants who might benefit from the trial.
- **Clinical Trial Documentation**: Consent forms and other trial documents are often lengthy and filled with medical and legal jargon, making them difficult for patients to understand. This can deter patients from enrolling in trials.

- **Data Quality and Real-Time Access:**
    - Ensuring high-quality data is crucial for the success of clinical trials. Data quality issues often arise from inconsistent data entry, missing data, and errors in data collection. These issues can be exacerbated when data is collected from multiple sources, such as different hospitals or clinics, each with its own data standards and practices.
    - Real-time access to data is essential for making timely decisions. However, achieving this can be challenging due to the need for robust data integration and management systems. Many clinical trial sites still rely on outdated systems that do not support real-time data sharing. This can lead to delays in identifying and addressing issues, such as adverse events or deviations from the study protocol.
- **Misaligned Incentives:**
    - Sponsors often prioritize speed and cost-efficiency to bring a product to market quickly, while sites may prioritize patient care and contracted support, e.g. CROs, rely on billable hours, which can slow down the process.
    - Additionally, there is often a trade-off between the speed of data collection and the quality of the data, with sponsors pushing for faster data collection to meet deadlines, while sites may need more time to ensure data accuracy.

Perspectives

Academia:

- Consent forms were often too complex for some individuals to understand, requiring translation for participants.
- Different administrators have varying levels of education, leading to inconsistent translations of the consent form.
- Large Language Models (LLMs) can be used to simplify consent forms, ensuring important messages are not lost during translation.

Regulators:

- Regulators are open to data-driven changes in trial protocols if there is supporting evidence. However, changing eligibility criteria could affect comparisons with other trials.
- Bringing diverse populations into trials is important but challenging, as current models are trained on data favoring certain populations, age groups, and socioeconomic demographics.
- High data quality and real-time access are crucial, but there are ongoing challenges despite new standards.

Sponsors:

- Sponsors are encouraged to use data-driven approaches to design clinical trials, particularly in setting eligibility criteria. This can help make trials more inclusive and efficient by providing real-world evidence to support the design decisions.
- Sponsors are urged to collaborate closely with various stakeholders, including regulatory bodies like the FDA, to ensure that the trial designs are robust and meet regulatory requirements. Feedback from these stakeholders is crucial for refining the trial processes.
- Sponsors should focus on improving patient recruitment strategies to enhance diversity in clinical trials. AI can help identify and recruit a more diverse patient population, which is essential for the generalizability of trial results.
- Sponsors need to ensure that AI tools are used ethically, particularly with patient recruitment. This includes safeguarding patient data, ensuring privacy, and avoiding any form of coercion or undue influence on patients to participate in trials.
- Sponsors should align their AI-driven approaches with regulatory guidelines and be prepared to provide evidence supporting any changes to traditional trial designs. This alignment helps in gaining regulatory approval and ensures that the trials are conducted within the legal framework.

Future Directions

- High-quality, real-time data is essential for accurate AI-driven insights and decision-making. Efforts should be directed towards standardizing data formats, integrating various data sources, and ensuring that data is up-to-date and accessible.
- A focus on data quality and access will help in overcoming one of the significant challenges in the adoption of AI in clinical trials and enhance the overall effectiveness of AI applications.