

Journal Summary

A Retroactive Study of HbA1c Levels in Analogue and Human Insulin



Summary

The following project is a summary of the Luo et al. journal article that petitioned the use of human insulin as an alternative to reduce healthcare costs. I aimed to create a review that summarized the vital points of the research and tailored the content for a lay audience.

I focused on the reasoning behind their research and the results they garnered through this retroactive study. After a preliminary analysis, the content was tailored for a broader audience that may find the information useful.²

Intended Audience

Client: Mario Castagnaro – Carnegie Mellon University
Healthcare Communication Professor

Recipient: Mario Castagnaro – Carnegie Mellon University
Healthcare Communication Professor

Completed Tasks

- Analyzed the provided text by Luo et al.
- Assessed project information
- Outlined topic points and vital information
- Researched the topic
- Proofread and edited for lay audiences
- Turned in project

Developed Skills

- Medical Writing
- Writing for a Lay Audience
- Healthcare Communication
- Journal Review and Summary
- Proofreading
- Editing
- Technical Research
- Organization
- Information Architecture

A Retroactive Study of HbA1c Levels in Analogue and Human Insulin

CareMore, a managed care organization, recently conducted a retroactive study to determine the association of their newly implemented insulin program- substituting analogue insulin with human insulin - on clinical outcomes to potentially lower economic measures. Furthermore, labs produce analogue medicine by growing insulin proteins found within E-coli bacteria and modified to enter the bloodstream quickly. Human insulin, on the other hand, is made through a purified DNA code grown in bacteria or yeast cells but takes longer before it can fully take effect.

During their study, CareMore researchers, Luo et al. (2019) found a 0.14% increase in Hemoglobin A1c through a test that measures [HbA1c or higher blood sugar] levels among a study group of over 14,000 older adults categorized with type-2 diabetes. Though the study did find a subtle increase, it remained well within the intended range. Through these results, Luo et al. achieved the goal of their study on the intervention plan, determining no significant clinical change between analogue and human insulin. Thus, implementing a program that switches insulin for type- 2 diabetes patients becomes a viable alternative to cut the cost of insulin for healthcare plans substantially.

To accomplish this study, leading the intervention through guided protocols, Luo et al. employed the aid of health center pharmacists with the support of nurse practitioners, physician assistants, and experienced chronic disease management physicians. Subsequently, Luo et al. gathered the necessary information for the study by identifying patients of the health plan with characteristics, such as using two or more injections per day, that would aid clinicians in implementing the conversion protocol.

Additionally, researchers incorporated a secondary aspect by altering aid benefits – their intention to encourage patients to switch insulin from analogue to human for financial reasons. In the study, Luo et al. worked to illustrate the points that human insulin produced the same results, showing no differences when compared to analogue. They also pointed out that human insulin is more cost-efficient for patients that require insulin. With an already substantial increase in price for analogue insulin, the co-pay of \$0 for human insulin incentivized members with higher out-of-pocket payouts to switch.

To determine their analysis, Luo et al. used a time series method in the course of three periods, lasting 12 months each from 2014 to 2016 with prespecified populations. Secondly, they conducted post hoc analyses by implementing a differences-in-differences approach [DD], in which they determined the differential effects of their treatment on the switch group and control. According to Luo et al., they focused on the association of HbA1c, levels, and slope changes per month between the start and completion of the intervention.

Researchers determined that blood sugar levels and the slope showed an average change of 0.14% per month during the intervention period but had a highly unlikely statistical relationship from the end of the intervention period and any time after. Luo et al., also concluded that before the intervention period, those that stayed on analogue insulin showed an HbA1c mean of 7.83% and those that switched to human insulin showed an average of 8.13%, the corresponding difference landing at .29%- an insignificant result as it falls within the confidence interval.

Furthermore, researchers determined that mean trends prior showed a 0.005% per month for non-switch participants and 0.01% in those who did, totaling a difference of 0.02% per month. Post-intervention then showed a 0.01% change in non-switch participants and a 0.11% change in those that did, indicating a 0.12% difference between groups. Lastly, Luo et al. found that all participants showed a 0.001% change per month, resulting in a <0.001% difference.

According to Luo et al., the 0.14% HbA1c level increase did not exceed the suggested measured control of 0.5% for monitored blood sugar levels. With researchers' primary goal to estimate the change in HbA1c levels over these three periods, the corresponding difference of <0.001% only showed a slight increase in the population's HbA1c level. Therefore, the increase of 0.14% is not clinically relevant regarding the measured control.

Thus, the study determined that the overall changes were well within targeted measures, which allows Luo et al. to garner the necessary information to push for healthcare plans to implement the inexpensive human insulin as a viable alternative. As a significant and unsustainable strain in healthcare, type-2 diabetes patients would benefit from lower costs insulin, in turn, driving costs in the healthcare industry down.