Drugs to Defeat Diabetes: Comparing Diabetes Drug Treatment Efficacy after Metformin using Big Data

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Diabetes affects 30 million Americans, and costs $300 billion a year. The first regimen prescribed to new patients is usually metformin: it is very effective at reducing the level of sugar in the blood and is relatively inexpensive. However, diabetes gets worse over time. After metformin, there are many other drugs to choose from (including expensive ones). The purpose of this project is to find which regimen is best at treating diabetes after metformin (measured by reduction in HbA1c), and which demographics affect regimen efficacy. Raw data with about 1 million patients with metformin comes from Symphony Health Solutions . This research is unique as it considers all classes of treatments, uses Real-World Evidence and big data sets with demographics not available to the average physician . An algorithm was written to identify regimen changes, find relevant patients, and calculate change in HbA1c level. Results are significant: first, dual therapies (Metformin + other drug[s]) almost always are superior to monotherapies. Second, most of the expensive drugs are not statistically different to a generic regimen (MET+TZD). If 100,000 patients switched from these regimens to MET+TZD, roughly 500 million dollars would be saved a year. Finally, some regimens work better for males (DPP4+MET+SFU), and others work better for females (TZD). SGLT2 works better for African Americans and MET+SFU works better for Caucasians. In conclusion, patient demographics, such as gender and race, should be taken into consideration in order to offer patients personalized prescriptions.

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