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## The efficacy of self-management of type 1 diabetes in the inpatient setting.

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Aljehani, F. A., Funke, K., & Hermayer, K. L. (2020). Inpatient Diabetes and Hyperglycemia Management Protocol in the COVID-19 Era. *The American journal of the medical sciences*, 360(4), 423–426. <https://doi.org/10.1016/j.amjms.2020.07.005>

Diabetes care in the covid-19 era has changed drastically in order to meet with new demands and new challenges that the pandemic has brought. This article explains how some new treatment guidelines may improve patient quality and safety for patients with diabetes. Updated treatment guidelines include self-management of diabetes in inpatient settings, new glucose target ranges (140-180 mg/dL), and various new contraindications for medicines that frequently increase blood glucose.

During the time of covid, we have gained a lot of knowledge of how to manage diabetes in the inpatient setting, especially as it pertains to people who are covid positive. New guidance suggests that all diabetics should self-manage their own diabetes inpatient that are capable and do not have a contraindication such as DKA/HHS or any other illness/condition that would hinder their ability to operate a CGM/Insulin pump. Guidance has been updated to include weight-based insulin calculations as a safe and effective way of calculating diabetic's insulin dose. New guidance also suggests that all diabetics on insulin should be considered for basal as well as correction insulin with an ideal ratio being 50% basal 50% prandial with corrections as needed. Metformin should be stopped on patients with covid-19 due to risk of dehydration as well as other medications that can cause glucagon release, or medications that can result in dehydration.

This study, while relating specifically to adult diabetics with covid-19, suggests that all diabetics should self-monitor inpatient with a CGM/Insulin pump therapy. The article concludes that using many of their suggested new guidance's not only increases safety and efficacy, but also decreases workload for healthcare workers as well as lowers the risk of hypoglycemic events.

American Diabetes Association. (2021, December 16). *Introduction: Standards of medical care in diabetes-2022*. American Diabetes Association. Retrieved October 13, 2022, from [https://diabetesjournals.org/care/article/45/Supplement\\_1/S1/138921/Introduction-Standards-of-Medical-Care-in-Diabetes](https://diabetesjournals.org/care/article/45/Supplement_1/S1/138921/Introduction-Standards-of-Medical-Care-in-Diabetes)

This Journal contains the entire updated guidelines for diabetes managements from 2022.

This Journal contains all of the treatment and clinical standard practices for healthcare workers as it pertains to the treatment of diabetes. All types of diabetes are included and mentioned in the literature. This journal was written and reviewed by the American Diabetes Association, and it's board members. Countless physicians rely on this information as a standard of practice.

According to the American Diabetes Association, "Recommendation 7.29 has been modified to include outpatient procedures and the consideration that people should be allowed continued use of diabetes devices during inpatient or outpatient procedures when they can safely use them and supervision is available"

Korytkowski, M., Antinori-Lent, K., Drincic, A., Hirsch, I. B., McDonnell, M. E., Rushakoff, R., & Muniyappa, R. (2020). A Pragmatic Approach to Inpatient Diabetes Management during the COVID-19 Pandemic. *The Journal of clinical endocrinology and metabolism*, 105(9), dgaa342.  
<https://doi.org/10.1210/clinem/dgaa342>

This article explains how diabetes care has changed during the covid-19 pandemic. The article explains many different ways in which healthcare workers can limit exposure to infectious diseases in patients who have diabetes by placing infusion set outside of rooms, storing insulin and other medications inside of the patient room, and use CGM's to remotely monitor blood glucose. CGM's have shown good results in the inpatient system during covid-19. Despite the fact they are not approved by the FDA for inpatient use, they have been shown to statistically lower the amount of hypoglycemic events as well as total patient time spent with hypoglycemia. Clinically, certain medications should be avoided for diabetics with infectious disease, particularly those that are known to increase blood sugar through various methods. There are suggestions as well for mitigating the effects of hyperglycemia caused by these medication such as intensifying insulin

This article explains similar points to other similar articles coming out of the covid-19 pandemic. The treatment of diabetes has changed quite a bit for all levels of healthcare due to not only the pandemic, but the furthering of knowledge, skills, and tools that the pandemic has brought us. Certain drugs, like steroids, should be particularly paid attention to when diabetics are involved in the inpatient setting. Withholding these types of drugs is not always viable, especially in the presence of infectious disease. While this may be the case, and more intense management of diabetes is needed for these patients, CGM's/ Insulin pumps, and out of room insulin infusion pumps have helped limit patient contact while also improving or maintaining patient outcomes.

This article speaks strongly to the idea that patients who are capable of self-management of their own diabetes should be allowed to do so. Guidelines for allowing a patient to self-manage include having only one glucose monitor per patient, reporting of glycemic events to staff, and insulin dosage reporting to staff. Another suggestion is to either turn off closed loop systems or having a protocol for avoiding pump malfunction by avoiding patient/pump exposure to radiation, electromagnetic fields, and certain medications. Patients should have their devices removed when it is believed that they have deteriorated enough to no longer be able to self-manage. To that end, all diabetic patients should be reassessed several times a day to ensure that self-management is safe and effective

Polonsky WH, Fortmann AL. Impact of Real-Time CGM Data Sharing on Quality of Life in the Caregivers of Adults and Children With Type 1 Diabetes. *Journal of Diabetes Science and Technology*. 2022;16(1):97-105. doi:10.1177/1932296820978423

This research study examines the qualitative differences between continuous glucose monitoring for type one diabetics against manual glucose monitoring. Participants were asked to answer the blood glucose monitoring system rating questionnaire to measure qualitative differences between the use of continuous glucose monitors (CGM) and self-monitoring blood glucose (SMBG).

Patients' responses to questionnaires told researchers that CGMs along with continuous subcutaneous insulin infusion (CSII) was more beneficial to the patient's outlook on their own diabetes care than SMBG. Metrics found that that CGM/SMBG group gave statistically better scores to how they perceive their own glucose control efficacy, overall health satisfaction, desire to switch to CGM/CSII, as well as willingness to recommend. At the same, members in the CGM/CSII reported lower interference to daily living.

This study shows that, at least in the opinions of those who wear the devices, that CGM/CSII is better than manual control. While this is not the end all be all the argument, we do know that perceived outlook on one's own health is an important factor in obtaining good health outcomes for patients of all types. Better health outcomes are also generally associated with higher quality scores and metrics for hospitals.

Umpierrez, G. E., & Klonoff, D. C. (2018). Diabetes Technology Update: Use of Insulin Pumps and Continuous Glucose Monitoring in the Hospital. *Diabetes care*, 41(8), 1579–1589.

<https://doi.org/10.2337/dci18-0002>

This literature review examines the use of CGM/CSII in the hospital setting. Using an insulin pump or CGM in the hospital setting can be difficult and face many barriers. One of the main barriers is provider/nurse education. Without knowledge of how to work these devices, providers and nurses are more likely to want to use older established protocols. The reasons for falling back to established protocols are many, but one of the main ones is confidence in safety. Lack of knowledge is known to lead to confusion for staff, possible medication errors, and lesser health outcomes for patients.

The biggest problem with this literature review is expressed very early on in the paper: There is not enough research on the subject matter of CGM/CSII therapy use in hospital setting. CMG/CSII therapy for inpatient use should be considered only when the patient is alert, orientated, and capable of managing the system themselves. Other contraindications include DKA as well as mental illness. CMG use specifically can be for providers, the patient, or both. Little CGM data is available in the United States, with only the GlucoScout and the OptiScanner 5000 being cleared for use by the FDA. Ultimately, while some studies do show potential for these types of devices to assist in catching hypo and hyperglycemic events, studies are small and contradictory for the time being.

This study reinforces the idea clearly that more studies are needed about inpatient use of CGM and CSII. The idea that diabetics who can do so, should manage their own CGM/CSII systems is an important note here. The compiled data shows small, but statistically significant improvements on quality and health outcome scores of diabetics who are allowed to continue their outpatient diabetes regiment in the hospital, with the caveat that the data is not strong due to small study groups.

Yu, J., Lee, S. H., & Kim, M. K. (2022). Recent Updates to Clinical Practice Guidelines for Diabetes Mellitus. *Endocrinology and metabolism (Seoul, Korea)*, 37(1), 26–37.

<https://doi.org/10.3803/EnM.2022.105>

This is a literature review of the current standards of care for diabetes across several medical associations. These guidelines include all the standards of care for diabetics, type 1 and 2. These standards of care include various target blood glucose levels, monitoring methods, insulin therapies, as well as many other aspects of diabetes care.

This article ultimately explains how the various standards of care for diabetics fails to meet quality expectations. One of the major points of the article is that all diabetes care should be highly individualized given the different presentations that patients have. Guidelines for when and how to treat high levels of low-density lipoproteins are debated across many agencies. Metformin remains the gold standard in 2022 for the treatment of type 2 diabetes, however in Japan it is still not considered a first line agent. Also, guidelines for when to treat type 2 diabetics with insulin therapy have changed and debated amongst different agencies from between A1C greater than 9 to A1C greater than 10.

This review does go over many of the benefits of CGM/CSII therapy, as well as mentions that insulin pump/CGM therapy is the gold standard for type 1 diabetes care. CGM's are considered so important to the proper maintenance of type 1 diabetes that new guidance says all type 1 diabetics should have one. Insulin pumps are also recommended for use in all adult type 1 diabetics that experience severe hypoglycemia, even in the absence of a CGM.