

A Review of the Security of Insulin Pump Infusion Systems

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Abstract

Insulin therapy has enabled patients with diabetes to maintain blood glucose control to lead healthier lives. Today, rather than injecting insulin manually using syringes, a patient can use a device such as an insulin pump to deliver insulin programmatically. This allows for more granular insulin delivery while attaining blood glucose control. Insulin pump system features have increasingly benefited patients, but the complexity of the resulting system has grown in parallel. As a result, security breaches that can negatively affect patient health are now possible.

Rather than focus on the security of a single device, we concentrate on protecting the security of the entire system. In this article, we describe the security issues as they pertain to an insulin pump system that includes an embedded system of components, which include the insulin pump, continuous glucose management system, blood glucose monitor, and other associated devices (e.g., a mobile phone or personal computer). We detail not only the growing wireless communication threat in each system component, but also describe additional threats to the system (e.g., availability and integrity). Our goal is to help create a trustworthy infusion pump system that will ultimately strengthen pump safety, and we describe mitigating solutions to address identified security issues.

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Abbreviations: (BGM) blood glucose monitor, (CGM) continuous glucose monitor, (FDA) Food and Drug Administration, (PC) personal computer

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