Know Your Enemy: Characteristics of Cyber Attacks on Medical Imaging Devices

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Publications

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Description

Medical devices play increasingly important roles in health services eco-systems, including: (1) Patient Diagnostics and Monitoring, including digital devices that measure heart rate, blood glucose, blood pressure, radiology images, etc. Such devices monitor or deliver important pieces of information that are used by doctors to make medical decisions regarding the patient's medical care; alternatively, this information is used by the patient's supportive medical devices to overcome or compensate for failures in his/her body. (2) Medical Treatment and Surgery, such as radiotherapy for cancer patients, robots that conduct complicated surgeries, and laparoscopic instruments (e.g., the Da Vinci robot). (3) Patient Life Support Devices and Stabilizers including devices which can be implanted (such as pacemakers) or external devices (such as defibrillators, insulin pumps, etc.). Devices in the medical device eco-system are connected to the network, sending vital information (patients' measurements, diagnoses, imaging results, and surgical and treatment summaries) to the internal medical information systems of medical centers, such as Picture Archiving and Communication Systems (PACS) that manage this data. In addition, medical devices today also connected to the cloud, interacting with patient information in real time. Wireless components are often embedded within medical devices, enabling doctors and technicians to control and configure them remotely.

All these functionalities, roles, and uses of medical devices make them attractive targets of cyber-attacks launched for many malicious goals. This trend is likely to significantly increase over the next several years, with increased awareness regarding their vulnerabilities, the enhancement of potential attackers' skills, and expanded use of such devices.