

# Batteries Gone Bad

**Batteries power countless medical devices, making reliable performance essential. The effect of unanticipated battery failure can range in severity from benign inconvenience to a clinical emergency.**

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A battery's moment of death may come as a beep, a red warning light, or a complete surprise. If you are lucky (i.e., prepared), you have a power cord or backup battery handy. If you are unlucky (i.e., unprepared), you may find yourself scrambling to resuscitate the device and possibly even the patient.

Batteries afford portability and convenience to countless medical devices. The type of battery, single-use or rechargeable, affects device performance and the potential for device failure.

Single-use batteries, also known as primary batteries, are the typical AA found in telemetry packs and the button batteries found in hearing aids.<sup>1</sup> Types of single-use batteries include alkaline, which are the most common, and lithium, which cost more but provide higher energy output and a longer life for devices such as implantable pacemakers.<sup>1, 2</sup>

Rechargeable or secondary batteries may recharge when the device is plugged in or require removal and placement in a charger.<sup>1</sup> Types of rechargeable batteries include lead-acid, nickel-cadmium (NiCd), nickel-metal hydride (NiMH), and lithium-ion (Li-ion or LIB).<sup>1</sup> Lead-acid are the oldest, most inexpensive, and most common secondary battery, typically large in size and found in devices such as wheelchairs.<sup>2</sup> NiCd and their less toxic successor, NiMH, provide higher power than lead-acid batteries at a lighter weight, making them practical for such devices as laryngoscopes.<sup>1</sup>

Li-ion batteries have become increasingly more common, offering the highest energy density and number of recharging cycles for devices such as smartphones and laptops.<sup>2</sup>

Analysts queried the PA-PSRS database for events involving battery failure submitted between January 1, 2018, and December 31, 2018, containing the keywords “battery” and “batteries” in the report narrative or equipment name field. The query identified 363 reports, of which 169 were excluded, leaving 194 reports for further analysis.

Four events did reach the patient and resulted in harm or death (i.e., Serious Events). Nearly 98% of the 194 relevant reports did not involve patient harm (i.e., Incidents).

## Limitations

Despite mandatory reporting laws in Pennsylvania, PA-PSRS data is subject to the limitations of self-reporting and the complexity of reporting. The ability to categorize the type of device and battery-related failure is limited by the information provided by the reporter.

## References

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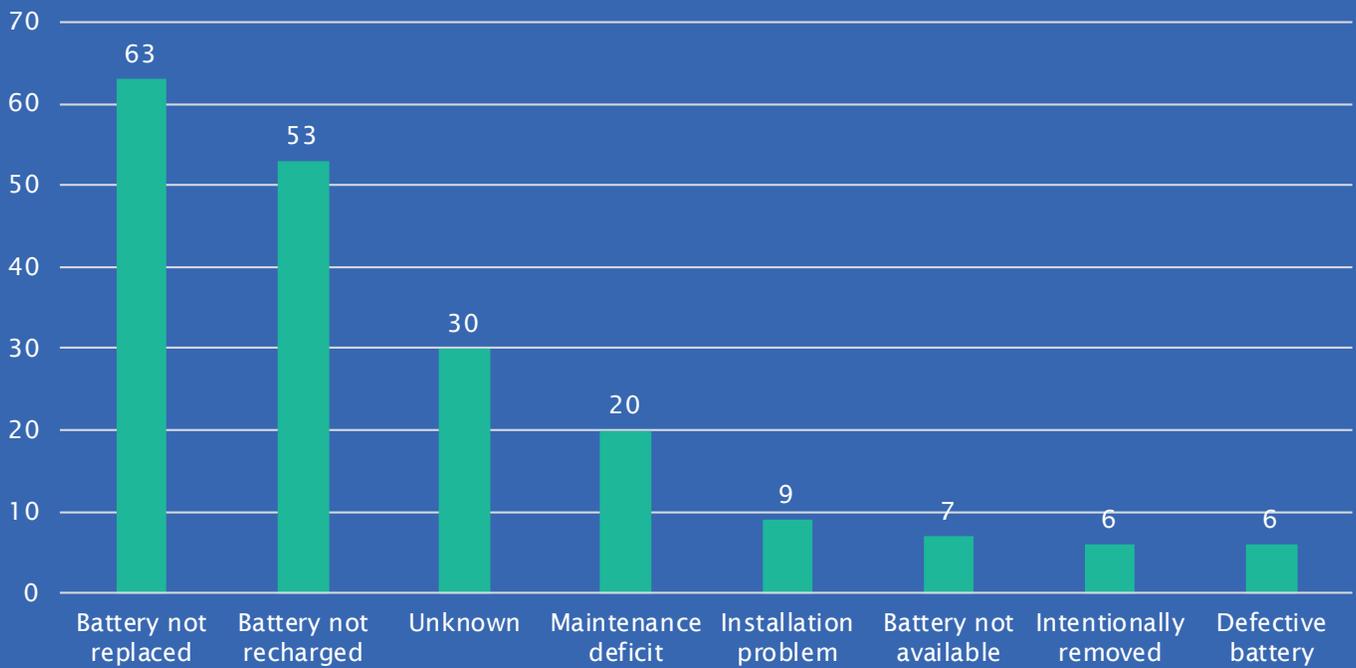
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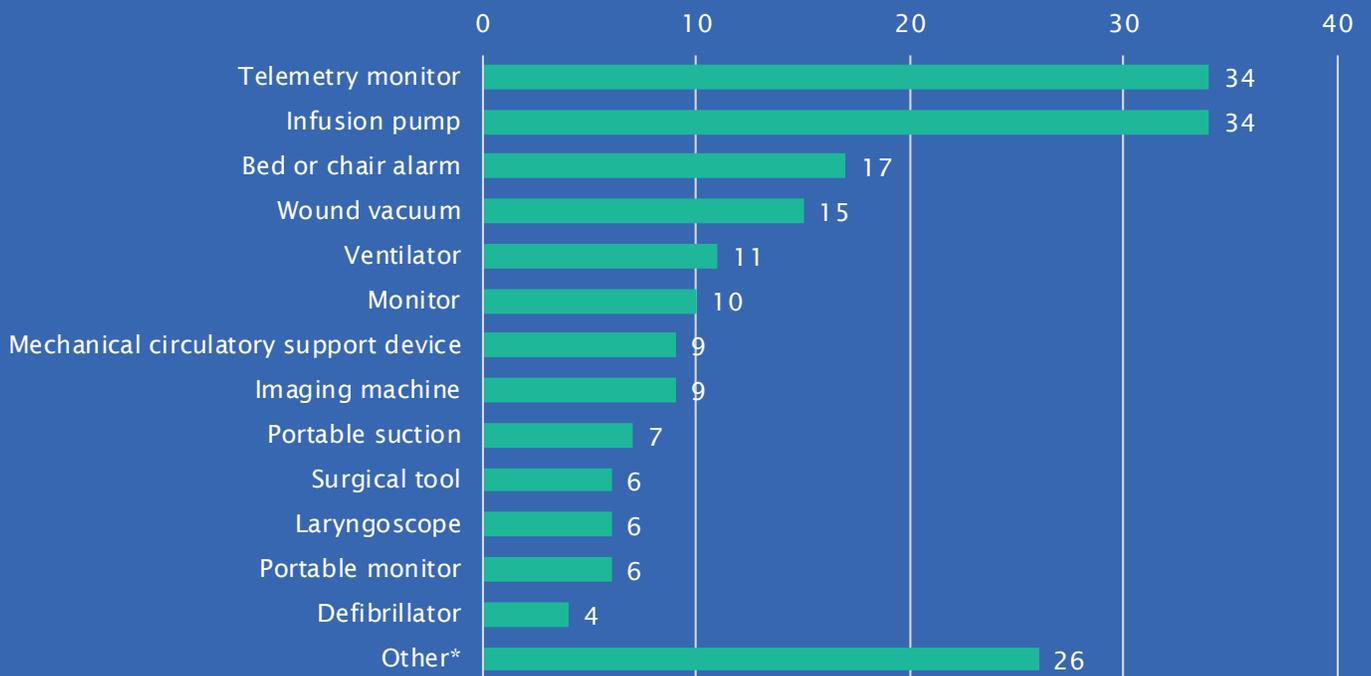


### Number of Reports by Battery-Related Failure Mode (N=194)



Note: Reported through PA-PSRS, January 1, 2018 through December 31, 2018

### Number of Battery-Related Reports by Type of Device (N=194)



Note: Reported through PA-PSRS, January 1, 2018 through December 31, 2018

\*Other includes types of devices with fewer than 4 reports