

## Quieting Medical Devices

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There are many types of medical devices used in hospitals and other healthcare facilities, physicians' offices, and the home. These devices are the result of extensive design processes that accomplish highly sophisticated and often complicated functions. However, a common deficiency is inadequate consideration of the sound produced by these devices, which if sufficiently loud or otherwise annoying, can lead to non-compliance by the patient.

When it becomes clear to product manufacturers that a medical device is noisy, they will hire an acoustician to fix the problem. The acoustician cannot help but mutter to herself, "Why couldn't the product engineers have contacted me when they designed this device? It would have been much easier and more cost effective to solve this problem during the product's design."

One manufacturer recently bucked this trend by hiring acoustical specialists to focus on product noise reduction early in the design process. Realizing that his device was going to be noisy, the manufacturer included space within the bedside device for a muffler, which designed by the acousticians, thus making the device quiet for patients on day one.

The at-home Continuous Positive Airway Pressure device (CPAP) is a good example to illustrate the importance of noise reduction in medical devices. The CPAP provides a positive air pressure to treat sleep apnea—a potentially life threatening condition—while the patient sleeps. As there is a growing trend to provide devices of this type for home use, a quiet product is essential.

Typically, a sleep apnea patient will snore, causing a great deal of annoyance. Early versions of CPAPs may have put an end to snoring, but it exchanged one type of noise for another—that of the CPAP itself. Because of the device's noise, many patients did not use their CPAPs. Failure to follow a doctor's order because of noisy at-home devices is a serious problem.

Fortunately, acousticians have been able to quiet CPAP machines, leading to better patient compliance and satisfaction.

A second illustration of product noise in the operating room (OR) does not yet have a happy acoustic ending. Surgery has been vastly improved with more and better devices, but many of these can be quite noisy. Fans, respirator pumps, power tools, and alarms, all contribute to the OR din. This noise can be a psychological stress to surgeons. OR noise has other more obvious effects for many types of surgeries, including interference with communications among the surgical team and the risk of noise-induced hearing loss on the chronically exposed emergency room personnel.

Hopefully, continuing success in the development of quieter CPAPs can be extended to other devices to make the OR of the future a quieter and more efficient place.

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