



# Designing Medical Devices with Economics in Mind



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## Designing for economy doesn't mean making a cheap device

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When I started in the medical device industry 15 years ago, health care economics was largely ignored by medical device companies. Fast forward to 2019 and health care economics and outcomes are considerations 1a and 1b for hospitals when it comes time to purchase devices. Similarly, in the past, the critical path for new medical devices was the path to regulatory approval. While regulatory approval is still an obvious and necessary hurdle for new devices, the path to reimbursement and coding is often much longer and more complex. In response to this new economic reality, the medical device community has responded by routinely including economic endpoints in foundational clinical trials and developing marketing materials that speak specifically to the cost savings of a device. However, we rarely see medical devices explicitly taking health care economics into consideration in the creation of user needs and the ultimate design of the device. Designing with health care economics in mind does not necessarily mean removing features and making a device at a lesser price. Rather, there are a few rules of thumb that you can keep in mind:

### 1. Design around the user

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“Human Centered Industrial Design” is a phrase that is used a lot but it can have a dramatic effect on the economics of introducing a new device into the market. We all realize how often end users actually read the instructions for use. Making your device as intuitive to use as possible can reduce the amount of effort spent on training new users as well as reducing operator errors during use of the device. Similarly, thinking through the procedural workflow from the outset may allow you to reduce the number of people specifically needed for the device during the implant. If you can simplify a user interface so that a company representative doesn't need to be present during every implant or if you can concentrate all activities related to a device in a single user, do it. It's always worth remembering the plight of over the wire (OTW) catheters which have almost completely been replaced by rapid exchange (RX) catheters simply because it only takes one user instead of two.

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 DEVICES ADAPT  
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 RATHER THAN  
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 DEVICE.**”

## 2. Encourage patient compliance

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Many medical devices, like pharmaceuticals, are only useful (and cost effective) if a patient uses them. In these cases, everything that happens outside the operating room is as important as what happens during the procedure. An understanding of patient psychology can be useful in this circumstance. Generally speaking, patients would rather not have a device that changes their normal routine, that makes it more difficult to do activities that they enjoy, or reminds them that they’re “sick”. Make your devices adapt to your patient’s life rather than patients adapting their life to your device. If possible, it’s worth considering tracking how patients are using your device so that their physician can provide feedback and coaching if their compliance drops off. Just be certain that the compliance data you collect paints a complete picture. A physician once told me about an inhalable drug study run at his center. The inhaler carried ten doses and patients understood their devices would be measured at follow up. They did not know, however, that the devices also measured when the device was actually being discharged. Completely unsurprisingly, the researchers learned that a large number of patients would discharge all 10 doses about an hour before their follow-up appointment!

## 3. Increase utilization of existing infrastructure

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Many devices, particularly capital equipment, have functions that are replicated across many other devices. Pumps, filters, heaters/coolers, tubes, syringes, compressed air are just a few examples of modules that exist across many different types of hospital equipment. Your device likely can borrow this functionality from existing hospital infrastructure rather than reproducing it. In addition to reducing the cost of your device, doing so will also increase the hospital’s utilization rate of their existing infrastructure.

## 4. The device lifecycle

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Wander around any hospital and you’ll inevitably come across a lonely graveyard full of forgotten equipment. At some point, your device will come to the end of the road and will need to be disposed. In some implant cases, that implant may need to be retrieved and then disposed. Thinking through this process and making the cost of disposal as low as reasonably possible contributes to the ultimate economics underlying your device. Often times, disposal is a business model issue more than a product design issue. Take a cue from the consumer electronics industry, for instance, and offer your users a discount when they trade in their old equipment. In the case of implants, however, designing your device so that it can be easily retrieved in cases of emergency or infection can dramatically lower the overall cost of an implant. These cases happen rarely but, when they do occur, they have an outsized effect on hospital costs.

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