Sustainability in the Medical Devices Sector
What Does It Mean?

TEAM DISCUSSION NO.1
‘Sustainability’ is a buzzword in almost every industry sector – but what about medical device design? What does it really mean in such a specialised and highly regulated context?

insight asked a group of Team consultants for their response to the issue of sustainability - where are we now, where are we going, and what does the future hold for our clients?

Taking part in the discussion

Paul Greenhalgh  Director of Design  PG
Chris Ferris  Head of Electronics and Software  CF
Stephen Augustyn  Head of Mechanical Engineering  SA
Ben Cox  Human Factors Consultant  BC
Colin Mathews  Chief Operating Officer  CM
Brennan Miles  Senior Consultant  BM

Easy to say but hard to define. What does sustainability mean for medical device design?

CM: The sustainability agenda is forcing companies in every sector to take a more holistic view of their activities; for medical devices, this not only means looking at the product itself – how it’s designed, the materials used and so on – but also at a much wider picture, from the energy required to manufacture the raw materials, to the impact of different logistical demands, such as cold chain storage, and then onto disposal.

PG: If we look at sustainability purely from the design perspective, a sustainable product needs to satisfy economic, ecological and social demands. It means that we can’t just consider short-term financial drivers when assessing a product’s potential. It will likely require the industry to focus on priorities other than those of safety, efficacy and robustness. It may even mean regulatory requirements being adjusted in order to promote sustainability.

CF: This is important, as a sustainable product must account for its ecological impact in terms of disposal and recycling – the wider picture mentioned by Colin - but these costs are not yet factored into development budgets or market pricing in our sector, making environmental impact always ‘someone else’s problem’.

SA: But all this is meaningless without the force of regulation. Sustainability is simply enlightened self-interest without legislation, or else considered a constraint making the pursuit of sustainability harder to justify in a highly competitive market place.
Is it the case, therefore, that sustainability is an issue that is not well understood in the medical devices sector?

BC: I think this is certainly the case – whereas sustainability is both ubiquitous, and a differentiator, for consumer products, it is not part of the design ‘mission’ for many of our clients. But sustainability is poorly understood by many end users as well – for example, there is a knee-jerk reaction against disposable products, but are recyclable alternatives really more sustainable, given the cleaning, sterilising and often re-engineering demanded? As the middle classes in the emerging economies continue to grow at a staggering rate, will this mix of awareness and misconception only increase and if so, is greater regulation coupled with greater education the answer?

CM: Top of the list for our clients is always safety and usability, followed by affordability which is, in turn, dictated by whoever pays for the product. Currently, these immediate goals outweigh longer term sustainability objectives. But the introduction of full product lifecycle analyses – already introduced in other sectors – could help challenge existing mind sets, and could eventually become a commercial driver as they provide a basis for performance comparison. Sustainability also demands a change to the corporate mind set in our sector, as it is a moral as well as a commercial issue, but it is also true that it is very difficult to assess the sustainability of medical products, as they can be so complex, and their use so specific.

CF: Widening the risk assessment process to include environmental impact could also play a part. This is relatively easy to do while a product is under development, but much harder once the product is out in the market place, and contributes to a poor understanding of the full impacts that medical devices could have. Perhaps, again, regulation could change this balance?

BM: One problem for our industry is that the ‘cost carrot’ that helps to encourage sustainable design in consumer products doesn’t always apply in the same way. For instance, by reducing the volume of raw material used in the manufacture of a kettle there are likely to be commercial benefits for both the manufacturer and the consumer. However, in the case of drug delivery devices it is difficult to apply the same rules because the costs of the drug can often far outweigh the costs of device manufacture, so there isn’t always a substantial commercial benefit to reducing the raw material.

PG: It has to be said that disposable devices can offer greater patient safety, reducing risk of patient infection or transmission of dangerous diseases such as HIV/AIDS. However, disposable products have, by default, created a revenue model for suppliers which is difficult to change, even though users are now more focused on reducing cost and wastage. The lack of a direct feedback loop (end users are less often the buyer) also means that they have less overall influence on demand.

Disposability – an obvious sustainability challenge – is clearly an important issue for the sector. What is the current state of play?

PG: A user has a very different relationship with a medical device than with a consumer brand, in that they exercise very little choice over what they are given. However, the general reaction to disposable products is undoubtedly negative, influenced directly by consumer product experience, and this is something we are increasingly aware of in feedback from interviews with patient groups when assessing new product concepts.

SA: There is also the growing issue of hospitals recycling ‘disposable’ products to save costs, with possibly life threatening results – such as the imperfect cleaning and then reuse of biopsy cutters. Single use devices are also sometimes pulled apart and then incorrectly reassembled, compounding the problem further.

BM: Disposable products are an interesting topic; even 30 years ago, most devices in a hospital were sterilised and reused whereas now, many of the same instruments are disposable. It is also interesting to note that previously, much more emphasis was placed on hospital ward cleanliness whereas now we often read of high rates of superbugs on wards, such as MSRA. I’m convinced that an over-reliance on disposable items has partially led to a relaxation in basic cleaning skills – so going back to sustainable, re-usable products could have some huge benefits all round.

Looking further ahead, if sustainability drivers are currently weak, what will deliver the critical impetus for change?

PG: We all know that the commercial dynamic is different in the medical space, where regulation is so tight and where end users are, in general, not as brand aware or brand loyal – key factors in driving change through consumer sectors. But Governments are major purchasers of medical devices – they already demand more sustainable products, and this will hopefully encourage greater support from regulators, driving change through the sector.

BC: We’re already seeing the pressure Governments can bring to bear on suppliers in this context in other sectors – such as the recent refusal by San Francisco city officials to purchase Apple products as they failed to meet green guidelines for disassembly and recycling, a major embarrassment for Apple and one which prompted a corporate U-turn. Government purchasing power,
linked to sustainability standards, is very important and will start to shift some of the burden of product recycling onto the manufacturer.

SA: The influence of emerging economies – and their different approach to, and understanding of, medical devices – must also be closely watched as these economies already have drivers in common with a sustainable approach (such as an emphasis on recycling), and a more radical approach to cost cutting. Recent developments in single dose inhalers, destined for emerging economies where the cost of drugs is relatively high, feature stripped back yet elegant and effective designs comprising significantly fewer parts than the more complex inhalers being developed for Western markets. Perhaps we have something to learn from this approach?

BM: I agree with Steve; you can see the clear waste reduction benefit for a simple blister based inhaler of say six to seven components, over a more complex multi-dose inhaler (where the drug is contained internally) that consists of around 15 components. In a lot of cases, the simple inhalers can also be more efficient because of the shorter, simpler air-paths. As designers we need to ask; why are these types of devices not more popular?

CF: Overall, an increasing emphasis on sustainability will result in the realisation for manufacturers that they should assess both the cost of manufacture and the cost of disposal when calculating product development budgets, which could have a real impact on future product design direction.

BC: There are some changes we could consider, even when not demanded by the client. For example, we could try to reduce the size of products where possible, as this has a direct impact on raw material use (and costs) and also on the supply chain, by reducing packaging for example, or transportation costs. Bigger innovations can also generate new IP opportunities for clients, which could be explored more actively.

PG: We could also provide a sustainability weighting when presenting product design options, as already happens in the development of big name consumer products. This could help improve general awareness of sustainability while also providing the information required to make an educated choice between product options. A limited form of environmental impact assessment could be part of this. The challenge will be to find enough ‘good’ information to base this assessment on.

CM: I agree. This is a major hurdle – being able to find and assemble enough reliable data to provide educated advice.

CF: We could explore easier sterilisation for certain medical devices wherever relevant and realistic – this would help address the disposability issue, provide a more sustainable approach, and challenge the market forces driving disposable options.

PG: The selection of new materials is an area we could also investigate more thoroughly. It’s not as simple as just using glass instead of plastic; we need suppliers to provide better information about the overall ‘environmental’ cost. But we can also select grades of material which, due to their mechanical properties, can be used in smaller quantities. The big materials suppliers are starting to offer ‘sustainable’ grades of plastic, with assessment and information based on several key criteria, not just whether it’s recycled. But given that we’re already considering innovations such as the cardboard inhaler, we should look again at new materials when feasible.

SA: We already adopt design principles such as ‘zero defects’ and streamlined manufacture, strategies which meet sustainability goals of minimal waste, energy efficiency and so on. Perhaps a greater focus on these strategies as contributors to sustainability could help clients see the value of this approach?

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Final thoughts?

CM: It’s clear that our industry needs to understand how to better assess and address sustainability. This would allow us to see where and how we can contribute to the wider debate, and help our clients prepare for a future which is undoubtedly changing. For Team, taking a pre-compliance approach could be very valuable, and we can use our skills to identify new routes to sustainability which do not compromise product performance or market potential.

BM: Not that long ago we thought it would be impractical to separate our rubbish, we didn’t think our clothes could be cleaned at 30°C and we thought the world would be dull without 60w incandescent light bulbs. But things have changed and the medical world also needs to keep up. We can look at the big changes such as fully recyclable cardboard inhalers and entire supply chain improvements, but this is a conservative industry and we shouldn’t miss the simple opportunities, the continual step changes. These could include a resistance to ‘over-engineering’, specifying non-medical grade ‘common’ materials where the risks allow, and developing simple, recyclable packaging. After all, if you follow the Japanese Kaizen philosophy - small improvements lead to large results.