Improving Clinical Workflows by Addressing Real User Needs

Using usability insight and Voice of the Customer to enable better product development

For MedTech and digital health product leaders navigating complex clinical environments

01

Why Usability Must Be Embedded into Clinical Workflows

In MedTech and digital health, it is tempting to treat usability as a checkpoint, something to validate once a product is largely formed. But this approach consistently underdelivers. Devices that fail to fit the clinical context and workflow in which they are used, and interfaces that confuse the very clinicians they are meant to support, are not design failures that emerge at the end of development. They are the predictable result of usability being treated as an afterthought.

Usability, done well, is a system-level consideration. It asks not just whether a user can operate a device in isolation, but whether that device makes sense in the broader context of clinical work: the competing demands on a nurse's attention, the physical layout of a ward, the variation in how staff are trained, the integration points with existing hospital systems, and the expectations of different care settings across different markets.

Voice of Customer is hard to do well, not hard to value	Most MedTech teams see the value of Voice of the Customer, but practical constraints often get in the way. High quality VoC can be expensive, dependent on access to overstretched healthcare systems, and time intensive to execute with rigour. Under pressure, this can lead to VoC being omitted or pushed later in the process, where it validates decisions rather than shaping direction.

The Cost of Late Discovery

When usability insight is is discovered too late, such as during summative evaluation or post-launch review, the scope to act on it is severely constrained, because key system-level assumptions and design decisions have already been fixed. At this point, even clearly identified usability issues can be extraordinarily expensive to address.

The alternative is to integrate usability thinking from the outset. This means going beyond heuristic review and desktop research, and establishing structured, ongoing dialogue with the people who will use the product (such as clinicians, nurses, patients, administrators) in the environments in which they actually work.

Voice of the Customer as a Bridge

Voice of the Customer (VoC) is often misunderstood as a marketing tool. In the context of MedTech development, it is much more than that. Structured VoC activities, such as contextual observation, workflow mapping, in-depth interviews and simulated use studies, generate the kind of evidence that allows product teams to shape design and development decisions earlier, before options narrow and trade-offs are locked in. They can surface assumptions that might be incorrect, reveal workflow steps that are invisible from a distance, and expose the gap between how a product is intended to work and how it will actually be used.

This eBook explores how to integrate usability, with a strong emphasis on VoC, into real clinical workflows in a way that meaningfully shapes product development. It addresses the common challenges product teams face when designing for complex healthcare environments, and offers practical, credible approaches to address them.

Throughout, one principle remains constant: specialist partners can be brought in at any stage to optimise the process, plug gaps in capability, and ensure that usability work generates structured, actionable insight that supports better product decisions and reduces downstream risk.

> Usability is not a stage gate. It is a continuous capability that should be woven through every phase of product development.

02

Understanding Real Clinical Workflows

One of the most persistent challenges in MedTech product development is designing for clinical workflows that are far more complex, variable, and dynamic than they appear from the outside. Teams working in corporate R&D environments, even experienced ones, often begin development with a mental model of how clinical work is organised. That model is often incomplete and can also be incorrect.

Workflows Are Not Uniform

A workflow that functions effectively in a large urban teaching hospital in Germany will not look the same as the equivalent process in a community hospital in rural Ireland, or a specialist clinic in the United States. The differences are not merely logistical. They can be heavily influenced by varying healthcare cost models and reflect different staffing models, different equipment configurations, different IT infrastructure, different patient populations, and different cultures of practice.

Even within a single hospital, workflows vary by shift, by ward, by the experience level of individual staff members, and by the informal adaptations that clinicians make when official processes do not quite fit reality. The 'ideal' workflow documented in a hospital's standard operating procedures is a starting point for understanding, not a reliable description of what actually happens.

Key Insight

Assumed workflows lead to adoption failures

What this means for product teams

Designing to idealised or assumed workflows creates products that fit the manual but not the reality of practice — a leading cause of poor clinical adoption.

Why Assumed Workflows Fail Products

When development teams design to assumed or idealised workflows, they create products that fit neatly into the process as documented, but struggle in the process as lived. A device that requires a specific sequence of steps may be perfectly usable when that sequence is available, but become a liability when, as often happens, staff are interrupted, equipment is not in the expected location, or a second clinician is required but unavailable.

Workflows also tend to be more static in design documents than in practice. They do not automatically adapt to new technologies. When a new device is introduced into a clinical setting, it does not simply slot into an existing workflow; it changes the workflow, sometimes in predictable ways and sometimes not.

Tasks, Roles and Systems in Practice

Effective workflow analysis requires an understanding of the interaction between tasks, roles, and systems. Which staff members are responsible for which steps? What happens when those staff members are unavailable? How does the device interact with existing equipment, electronic health record systems, or sample management platforms?

These questions cannot be answered from a distance. They require direct observation, structured interviews, and genuine engagement with clinical teams. Product teams that invest in understanding real workflows early, including their variability, their informal adaptations, and their interaction with existing systems, make better decisions about where to focus engineering effort, which features matter most, and where the genuine use-related risks lie.

> The workflow documented in the SOP is a starting point. The workflow that exists in practice is the one your product must actually fit.

03

The Role of Training in Real-World Usability

Usability researchers and product teams frequently focus on how a device is used. A question that receives considerably less attention, but that has an equally significant impact on real-world performance, is how users are trained to use it.

Training is not a peripheral concern. For devices used in high-pressure clinical environments, the quality, consistency, and completeness of training can heavily influence whether a product is used safely and effectively in practice.

Training Variability Across Healthcare Settings

Training practices vary enormously across healthcare settings. Formal training programmes may be delivered by dedicated clinical educators, with structured assessment and documented competency sign-off; but often, particularly in resource-stretched facilities, training consists of demonstrations from a more experienced colleague, or reliance on product instructions for use (IFUs).

For products designed for global markets, this variation is not a secondary consideration; it is a central design challenge that directly affects usability, safety, and adoption. A device that performs well when users receive comprehensive, structured training may perform very differently when that training is compressed, informal, or entirely absent. However, it is worth noting that training is often based on the risks associated with the device. Some devices therefore do not include training and rely exclusively on IFUs or intuitive user interfaces, whereas some device training is delivered directly by representatives of the manufacturer.

The Gap Between Intended and Actual Training

Product development teams often make assumptions about training that do not hold up under scrutiny. The assumption that users will have completed a specific training module, that they will remember its content under pressure, or that training will be delivered consistently across an organisation, are all assumptions that VoC research and contextual observation consistently challenge.

Common gaps include training delivered once at implementation and not refreshed as staff turn over; training that covers intended use but not error recovery; and training materials that assume a level of baseline knowledge that many users do not have. Each of these gaps creates a usability risk that is not visible if the only evidence considered is the training plan rather than the training reality.

Critical Factor
Staff turnover is consistently underestimated

Design implication
Products used by frequently changing staff must be designed to support safe use through a combination of intuitive interaction, clear instructions for use and appropriate training. This must be a design requirement, not an assumption.

Designing for the Training Reality

Effective usability design must account for the training reality, not the training ideal. This means understanding how training is typically delivered in the specific setting, how many staff members are likely to need training in a given setting and what baseline skills and knowledge users can reasonably be expected to have.

For products that will be used across multiple markets, this analysis must be conducted for each target environment. Training infrastructures vary substantially across geographies, thus designing to the most capable training environment and assuming it applies everywhere is a reliable route to real-world use-related failure.

Design for how people are actually trained, not how you assume they will be trained. In global markets, this distinction is critical.

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Embedding Voice of the Customer into Development

Voice of the Customer, in terms of user engagement, is most valuable when it is embedded into the product development process as a continuous input, rather than collected at isolated moments and treated as validation. The distinction matters because it changes what VoC is used for: not to confirm that a decision already made was the right one, but to inform design and development decisions while there is still scope to act on the insight.

Practical Approaches to Gathering Insight

The most useful VoC activities in MedTech development are those that place researchers in close proximity to clinical work. Contextual inquiry — observing clinicians in their actual working environments, with appropriate permissions and governance in place — generates a quality of insight that surveys and interviews alone cannot replicate. It makes visible the informal adaptations, the workarounds, and the constraints that clinicians themselves may not articulate when asked directly, and is also helpful in identifying un-articulated pain points and areas for opportunity.

Structured interviews with a range of user types, including end users, procurement decision-makers, trainers, system administrators and even service, maintenance and clinical engineering staff, the broader context in which a product will be evaluated and adopted. Simulated use studies, conducted in environments that replicate the conditions of clinical practice, allow teams to observe how users interact with a product before it is finalised.

Ethical and Compliant Access to Patient Groups

Involving patients in usability research is both ethically necessary and practically complex. Access to patient groups must be managed through appropriate ethical channels, with informed consent processes that are genuinely understood by participants and governance structures that protect their interests.

This complexity is sometimes used as a reason to defer or limit patient involvement in usability research, and that is a significant mistake. Patient insight is not interchangeable with clinician insight. Patients experience a device differently: they bring different knowledge, different anxieties, different physical capabilities, and different priorities. Excluding their perspective creates real gaps in the understanding of how a product will perform in use.

VoC Principle
Input, not validation

Common mistake to avoid
VoC has the greatest impact when it helps inform decisions, not just validate them. Moving it earlier in the process ensures it remains a driver of better outcomes.

From One-Off Feedback to Structured Insight

A single round of user feedback is useful. A structured, repeatable user engagement capability is transformative. Product teams that build the capacity to gather, analyse, and act on user insight throughout development, not just at specific milestones, consistently make better decisions and identify problems earlier, when they are cheaper to address.

Achieving this requires investment in process as well as method. It means establishing clear mechanisms for translating user insight into design requirements, creating feedback loops between user research, user testing and product decisions facilitating iterative development practices, and building a shared understanding across the development team of what the evidence is saying and what it implies.

For many organisations, working with a specialist innovation partner can be an effective way to strengthen how Voice of the Customer is embedded into design decisions. Even established teams that might have robust processes in place can benefit significantly from an external, unbiased perspective. For smaller teams in particular, outsourcing VoC activity to a neutral partner can be highly valuable. A partner with deep experience in clinical user research, human factors methodology, and MedTech development cycles can bring methodological rigour, accelerate progress, and help teams avoid the common pitfalls that limit the true value of VoC activity.

VoC is not a single study. It is an ongoing capability that, when embedded into development, consistently generates better products and reduces the cost of late-stage discovery.

05

Designing for Different Healthcare Systems and Care Pathways

MedTech products rarely succeed by serving a single, homogeneous market. The commercial opportunity, and the regulatory requirement, is almost always to develop products that work across multiple healthcare systems each with its own care pathways, organisational structures, clinical cultures and compliance frameworks.

Variability in Care Pathways

Care pathways for the same clinical condition can differ substantially between healthcare systems. In the UK, a patient journey through the NHS may involve GP referral, outpatient assessment, and a different set of touchpoints than the equivalent journey in a US fee-for-service environment or a German hospital system with its own referral structures and DRG-based incentives.

These differences affect how a device will be used, by whom, and at which point in the patient journey. A monitoring device used by a community nurse in the UK may need to function very differently from the same device used by a specialist in an outpatient setting in the US. Designing to one care pathway and assuming transferability can lead not only to safety issues within a clinical setting, but is also a reliable route to adoption failure in other markets, particularly when these differences are discovered late in development.

System-Level Differences and Usability Requirements

Beyond care pathways, healthcare systems differ in their technology infrastructure, their procurement processes, their staffing models, and their tolerance for complexity in clinical workflows. Some systems are highly digitised; others rely heavily on paper-based processes. Some have robust IT support for new device integration; others require products that function independently of existing infrastructure.

Multi-Market Reality
One product, multiple systems

Design consequence
System-level differences between the US, UK, and EU affect usability requirements, integration complexity, and compliance obligations in ways that must be understood early.

Compliance and the Evolving Regulatory Landscape

The regulatory landscape for medical devices and digital health products continues to evolve across all major markets. The EU's MDR and IVDR, the FDA's evolving approach to software as a medical device, and the MHRA's post-Brexit framework each impose different requirements, with different timelines and different evidence standards for usability and human factors.

Understanding these requirements early, and building a development programme that generates the right evidence for each target market, is considerably more efficient than retrofitting compliance activities to a product that was designed without them in mind. Specialist partners with experience across multiple regulatory jurisdictions can provide significant value at this stage.

The question is not whether healthcare systems differ. They do. The question is whether your development programme accounts for those differences early enough to act on them.

06

Testing Usability in Realistic Environments

Usability testing conducted in a neutral facility, with participants removed from the pressures, distractions, and physical constraints of their actual working environment, generates insight of limited generalisability. This is a known limitation of decontextualised testing, and it matters significantly for medical devices.

The conditions under which a device will be used in practice are an integral part of the usability challenge. A device that is simple to operate in a quiet room becomes considerably more demanding when the user is managing multiple simultaneous tasks, working in poor lighting, wearing gloves, or interrupted by a colleague.

The Limitations of Decontextualised Testing

Standard lab-based usability studies have their place in development. They allow controlled comparison of design alternatives, rapid iteration, and the identification of fundamental interface issues. However, they are not sufficient on their own for products that will be used in complex clinical environments. The absence of contextual realism in the testing environment systematically underestimates the demands that real-world use will place on the product.

This limitation is particularly acute for formative studies intended to generate insight for design improvement. If the test environment does not reflect the real use environment, the insight generated will reflect performance in conditions that do not exist, rather than performance in conditions that do.

The Role of Living Labs and Realistic Test Environments

Living labs — purpose-built environments that replicate the physical, technological, and social conditions of clinical settings — address this limitation directly. They allow development teams to observe how products perform under conditions that closely match real use, without the ethical and logistical constraints of testing in live clinical settings.

A well-designed living lab replicates not just the physical environment, but the workflow context in which a device will be used. It allows test participants to engage with the product in a way that reflects their actual roles, constraints and level of training, generating insight that is meaningfully predictive of real-world performance.

Testing Insight
Context changes everything

What living labs enable

Testing in realistic environments is key for identifying use-related risks, as well as revealing usability issues that lab studies miss, generating insight that is genuinely predictive of real-world performance and supporting better go/no-go decisions.

Supporting Better Feasibility Decisions

Context-rich testing also plays a critical role in feasibility assessment. Go/no-go decisions made on the basis of decontextualised performance data carry a higher risk of being reversed when the product encounters real clinical environments. Testing that reflects the real use environment generates more reliable feasibility evidence, and supports decisions that are more likely to hold up.

eg technology's access to clinical simulation facilities and living lab environments enables exactly this kind of realistic, context-rich testing; supporting development teams to make better decisions, earlier, with greater confidence.

Usability testing that does not replicate the conditions of real clinical use cannot reliably predict performance in those conditions. Invest in realistic environments early.

07

Usability as an Enabler of Better Product Decisions

Usability and Voice of the Customer are often discussed in terms of outcomes, such as improved adoption, reduced risk, or better user satisfaction. While these outcomes are desirable, they are rarely the direct or automatic result of usability activity alone. In practice, the value of usability lies in how effectively it informs decisions throughout development, particularly in complex clinical environments where uncertainty is high and assumptions are easy to make.

When usability is embedded into real clinical workflows, it provides teams with evidence that helps them navigate trade offs more deliberately. Rather than removing risk entirely, usability insight helps clarify where risk exists, what form it takes, and which risks are most important to address. This allows product teams to make more informed choices about priorities, scope, and acceptable compromise, based on a clearer understanding of real world use rather than idealised models.

Voice of the Customer as an Ongoing Capability

Voice of the Customer should not be treated as a single study commissioned at a defined milestone and closed once a report is delivered. It is most effective when approached as an ongoing capability that supports decision-making across the development lifecycle.

Product teams that maintain structured, purposeful engagement with users over time are better placed to test assumptions, identify emerging constraints, and sense-check decisions as a product evolves. This ongoing dialogue helps teams interpret usability findings in context, rather than treating them as isolated data points. Establishing such a capability does not require large internal teams or extensive infrastructure, but it does require a deliberate approach to how insight is gathered, interpreted, and fed back into development discussions.

For many organisations, specialist partners can support this capability by providing methodological rigour, access to realistic environments and experience of integrating usability and human factors insight within regulated MedTech development programmes.

A Forward-Looking Perspective

The healthcare environments in which MedTech and digital health products are developed and deployed continue to change. Clinical workflows are becoming more complex, demands on clinical staff are increasing, and regulatory expectations around usability evidence are becoming more explicit.

In this context, the value of embedded usability and Voice of the Customer is not that they eliminate uncertainty or ensure successful outcomes. Rather, they help teams navigate complexity more effectively by grounding decisions in a more accurate understanding of real world use. Applied early and revisited throughout development, usability and VoC support more realistic planning, clearer prioritisation, and better anticipation of the challenges a product may encounter in practice.

The themes explored in this eBook reflect a consistent principle. When usability is integrated into clinical workflows and treated as a continuous input rather than a one off activity, it becomes a practical tool for improving the quality of product decisions. It supports better informed trade offs, more focused engineering effort, and a clearer understanding of where use-related risk genuinely lies, based on evidence from real use environments rather than assumptions or idealised processes.

The organisations that lead in MedTech are those that treat usability not as a compliance burden, but as a source of competitive advantage.

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About eg technology

eg technology is a product design, engineering and development consultancy based in Cambridge, UK, with a second office in Galway, Ireland. Operating across the UK, USA and Europe, we deliver end-to-end engineering support for a wide range of solutions, including diagnostics, surgical tools, Lab/BioTech, drug delivery systems, consumer healthcare and hospital equipment.

Whether you are augmenting internal R&D, outsourcing complex subsystems or launching new product lines, we deliver agile, tailored development programmes that reduce risk and accelerate timelines from concept to commercialisation.

eg technology works flexibly alongside your organisation, whether you need additional resource to support an internal team, a trusted partner to deliver an entire programme, or targeted input at a critical stage of a project. We complement existing capabilities by bringing the right expertise at the right time, helping to drive innovation forward without disrupting established processes.

Whether you have a dedicated usability team or limited in-house resource, we tailor our approach to fit your needs.

Cambridge, UK	Galway, Ireland	UK · USA · Europe
Headquarters	European Office	Markets Served

Talk to us about integrating usability into your development programme

If you would like to explore how usability and Voice of the Customer can be integrated into real clinical workflows within your own development programme, our team would be happy to talk. We work with MedTech and digital health organisations to support evidence-led decision-making at critical stages of development.

Get in touch to discuss your challenges, priorities, or where usability insight could add most value.