



# Standard Comparison

***Assessing risk management processes  
for regulated health industries*** | by Carolyn Wright

**I have often heard quality or regulatory colleagues in health industries say they're familiar with drug regulations but not medical device regulations.**

Or they say they know the International Organization for Standardization (ISO) requirements for medical devices, but not the drug risk standard.

Over the years, quality and regulatory professionals have developed into specialists and have lost the ability to work broadly across the regulated health-care industry. There is one subject, however, that we all have in common: risk management.

As we start this discussion, it's important to ground ourselves in the fundamental goals of risk management. In all industries, the intent of risk management is to drive an increased understanding of products or processes so risk can be identified, assessed and reduced before any harm occurs.

To implement a risk management process and make it part of the culture, the drug and medical device industries each created international teams to develop standards to achieve this goal. The good news is that each team produced documents that were accepted globally in their product category:

- + The International Conference on Harmonization's *Guidance for Industry—Q9 Quality Risk Management* (ICH Q9) was developed for drug products in 2006.
- + *ISO 14971—Medical devices—Application of risk management to medical devices* was developed in 1998.

## Just the Facts

***ISO 14971 and ICH Q9 are risk management standards for medical device and pharmaceutical industries, respectively.***

***Quality and regulatory professionals in these health industries should not only have knowledge of their industry's specific standard but also both standards to truly understand how to implement risk management in their quality management systems.***

The even better news is that these documents are similar and use the same basic approach. They essentially validate each other on an international scale, and when examined more closely, it's clear how fundamentally close these two approaches are while remaining specific enough to meet the separate concerns of their respective industries.

## Comparing the standards

If you take a look at ICH Q9 and ISO 14971 risk management standards, they each start their process with risk assessment, flow into risk control and transition into risk review (see Figure 1). These three steps are the fundamental building blocks of the entire process because all decisions, reports and monitoring activities depend on these events.

It is only when you start to look more deeply at the details and at the supporting structure that you will see differences between the two systems. It is this level of prescriptiveness that enables each process to be effectively used in its industry.

The initial and most obvious difference between the standards is the total number of pages each contains. ICH Q9 is a 25-page document that includes guidance

on how to perform risk management, as well as definitions, tools and potential applications. These sections offer ideas, but they are not extremely prescriptive on how to do the activities, allowing drug manufacturers flexibility in their implementation of the overall process.

ISO 14971 is 109 pages and includes an explanation of how risk management should work and

FIGURE 1

## Risk management building blocks

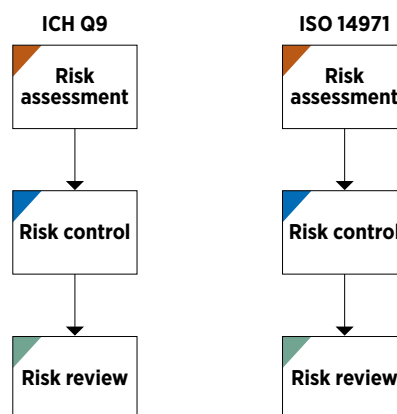


FIGURE 2

## Risk assessment comparison

ICH Q9—Risk assessment	ISO 14971—Risk assessment
<ul style="list-style-type: none"> <li>+ Process formality depends on risk level.</li> <li>+ Management is responsible for ensuring this is done.</li> </ul>	<ul style="list-style-type: none"> <li>+ Process is <b>consistent</b> for all medical devices.</li> <li>+ Management is responsible for ensuring this is done <b>and must set the criteria for acceptable risk</b>.</li> <li>+ <b>Intended use and reasonably foreseeable misuse are documented.</b></li> <li>+ <b>Safety characteristics of the product are identified.</b></li> </ul>
<ul style="list-style-type: none"> <li>+ Hazard identification.</li> <li>+ Probability of harm.</li> <li>+ Severity of harm.</li> </ul>	<ul style="list-style-type: none"> <li>+ Hazard identification.</li> <li>+ Probability of harm.</li> <li>+ Severity of harm.</li> </ul>
<ul style="list-style-type: none"> <li>+ Risk assessments must be reviewed.</li> </ul>	<ul style="list-style-type: none"> <li>+ Risk assessments must be reviewed <b>at planned intervals</b>.</li> </ul>
<ul style="list-style-type: none"> <li>+ Quantitative or qualitative.</li> </ul>	<ul style="list-style-type: none"> <li>+ Quantitative or qualitative.</li> </ul>

**Risk identification** (points to Hazard identification in both)

**Risk analysis** (points to Probability and Severity of harm in both)

**Risk evaluation** (points to Risk assessments must be reviewed in both)

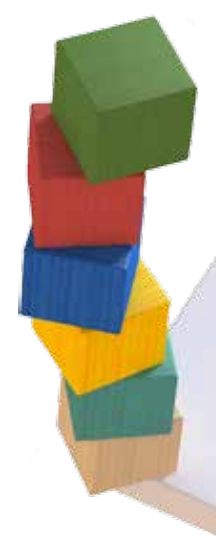


FIGURE 3

## Risk control comparison



ICH Q9—Risk control	ISO 14971—Risk control
<ul style="list-style-type: none"> <li>+ Mitigate severity or harm.</li> <li>+ Improve detection of risk issues.</li> </ul>	<ul style="list-style-type: none"> <li>A. Design changes.</li> <li>B. Protective measures.</li> <li>C. Information of safety (labeling).</li> </ul>
<ul style="list-style-type: none"> <li>+ Evaluate residual risk.</li> <li>+ Check compliance by inspecting risk management file.</li> </ul>	<ul style="list-style-type: none"> <li>+ <b>Verify implementation of risk controls.</b></li> <li>+ Evaluate residual risk.</li> <li>+ Check compliance by inspecting risk management file.</li> </ul>

many pages of supporting details with specific examples on how to perform risk management activities. The International Organization for Standardization (ISO) format of risk management embraces more formality and detail, as demonstrated by the inclusion of:

- + Several pages of recommended questions to help facilitate risk assessment teams through hazard identification.
- + The application examples for risk analysis and evaluation.

The committees that developed these two standards not only had different approaches to the level of detail they wanted to provide their industries, but they also had different areas of focus for risk management activities. The two risk management processes show their unique focus in their fundamental building block details.

### Risk assessment

The risk assessment stage in the pharmaceutical industry is open to the judgment of an organization's leadership about when and how formally to perform a risk assessment. If an organization does decide to assess risk, it performs the same basic activities as the ISO standard outlines: risk identification, risk analysis and risk evaluation.

As expected, the formality of the review of these activities depends on corporate procedures and can be as frequent or infrequent as needed.

Figure 2 shows the risk assessment stage that clarifies the variation or additional detail based on the expectations of the standards (in orange). Words or phrases such as "consistent,"

"set the criteria" and "planned intervals," as well as the very specific recommendations on how to identify use, misuse and safety characteristics, are differences between the ISO standard and the ICH Q9 guidance.

The risk evaluation stage is common to both processes, and both allow either a quantitative or qualitative method of evaluation. The result of this evaluation, of course, will be documented, and a risk control will be recommended, if needed.

### Risk control

After it has been determined that risk control is required, the method for identifying the control activity is prescribed with different levels of detail in the two risk management processes.

ICH Q9 offers two ideas for control but does not indicate a preferred order and does not specifically label the controls.

ISO 14971 provides a list of different types of risk controls and a preferred order of implementation, as indicated with the A, B and C (Figure 3). The standard also provides detailed instructions on how to handle risks that have low probabilities of occurrence and how a manufacturer should handle a situation when it believes the risk control is not practical. Finally, the ISO process includes a requirement for verification of risk controls.

**ISO 14971 also provides detailed instructions on how to handle risks that have low probabilities of occurrence and how a manufacturer should handle a situation when it believes the risk control is not practical.**



The last parts of the risk control processes are common in that both standards require the re-review of the residual risk after controls have been implemented. Both assume there will be an inspection of the risk management file, presumably during an internal audit. Figure 3 shows how risk control in ICH Q9 and ISO 14971 compare.

### Risk review

The last step of the risk management process is the risk review. Both methods provide quite a bit of detail on how to do this review, but they take different approaches regarding the information they suggest be collected as part of the review.

ICH Q9 recommends a much larger amount of the information come from the manufacturing processes, while ISO 14971 has a stronger focus

on the user and installation process. This is a case in which each process is appropriate for its industry and reflects the regulatory environment at the time of the process creation.

The pharmaceutical industry, in general, exhibits more manufacturing process variability than does the medical device industry. Consequently, it also experiences a greater concern over drug shortages due to manufacturing quality issues. So, it makes sense that the ICH Q9 guidance would have a greater focus on manufacturing processes

to ensure high quality and a consistent supply to the consumer.

In contrast, the medical device industry is generally more focused on software and electro-mechanical production and is, therefore, more stable from a manufacturing standpoint. The industry, however, has experienced an explosion of new technologies that have been quickly adopted in the medical area.

As you might expect, the majority of post-market problems for this industry have been related to not understanding the design of these new technologies. This is the area of greatest concern to medical device regulators and the industry. Accordingly, the focus of the medical device ISO standard has been directed toward the area of product realization and design control.

Additionally, ISO has demonstrated its concern for the control of development understanding with ISO 14971. This standard provides a strong focus on intended use, potential misuse and feedback from the user and others in contact with the device. Increased feedback will aid in the development of more robust and efficacious product development processes.

ISO's risk management standard further supports this focus by concentrating the risk review in the area of device use and installation. The feedback from these sources will help ensure increased quality of developed products. See Figure 4 for the differences in details in the risk review.

**The medical device industry is generally more focused on software and electro-mechanical production and is, therefore, more stable from a manufacturing standpoint.**



FIGURE 4

## Risk review comparison

ICH Q9—Risk review	ISO 14971—Risk review
<ul style="list-style-type: none"> <li>+ System to collect and review or monitor events about the drug product is required: <ul style="list-style-type: none"> <li>- Product reviews.</li> <li>- Inspections.</li> <li>- Audits.</li> <li>- Change control.</li> <li>- Failure investigations.</li> <li>- Recalls.</li> </ul> </li> <li>+ Risk assessment and risk control steps should be re-reviewed based on new information.</li> <li>+ Frequency should be based on risk level of the product.</li> </ul>	<ul style="list-style-type: none"> <li>+ System to collect and review information about the medical device (or similar) is required: <ul style="list-style-type: none"> <li>- Operations staff.</li> <li>- User.</li> <li>- Installation.</li> <li>- Maintenance.</li> <li>- New standards.</li> </ul> </li> <li>+ Risk assessment and risk control steps should be re-reviewed based on new information.</li> </ul>

## Tools and communication

Two additional areas warrant discussion when comparing the ICH Q9 and ISO 14971 risk management processes: risk management tools and risk communication (see Figure 5).

Risk management tools are clearly identified by a box on the right side of the flowchart shown in the ICH Q9 guidance. The ICH guidance dedicates 14 pages at the end of the document to examples that can be used to perform risk management activities.

In contrast, ISO 14971 does not provide risk management tools on a diagram. It does, however, include 65 pages of examples to help the industry perform risk management. So, clearly both standards reflect the importance of using these tools to facilitate the process—even if they are not provided in process diagrams.

Risk communication is a box on the left side of the ICH Q9 guidance process flow diagram. In this case, the guidance explains how there should be continuous communication with many different groups about product risk throughout its life cycle.

Specifically, the guidance contains this statement, “Communications might include those among interested parties (for example, regulators and industry; industry and the patient; within a company, industry, or regulatory

authority).”<sup>1</sup> This communication is exactly what the U.S. Food and Drug Administration is requesting when the possibility of a drug shortage exists due to a manufacturing quality concern.

Within ISO 14971, however, communication is managed through reviews with management so there is less focus on external parties receiving risk communication. This might be an opportunity for the standard to evolve in future revisions.

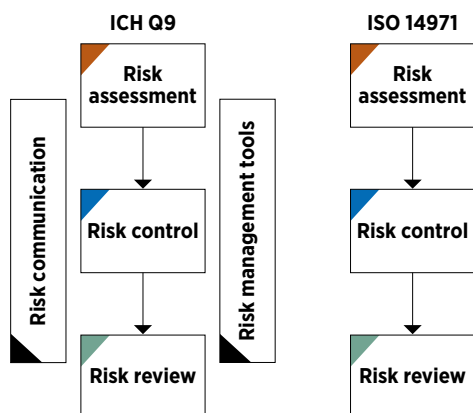
Still, if a crisis management program exists in the quality management system of the medical device company, the communication would likely be handled professionally and efficiently through this process.

By containing the same fundamental steps, ISO 14971 and ICH Q9 strive to strengthen the understanding that product quality and safety should be maintained and monitored throughout a product's life cycle. The differences between these two risk management processes are primarily found in the details of the steps because they were tailored to the area of concern for each industry.

Organizations are encouraged to follow the standard that directly applies to their industry, but it would be wise to incorporate the benefits of the other when putting together organizational procedures. [QD](#)

FIGURE 5

## Risk management and risk communication



**Carolyn Wright** is a quality assurance launch engineer for Amway in Ada, MI. She has a master's degree in regulatory affairs, drugs, biologics and medical devices from Northeastern University in Boston. Wright is a member of ASQ.