White Paper

Medical Device Labeling

Regulations in the US, EU and China

Contents

METTLER TOLEDO

1 Introduction

Medical technology has advanced to a point where people are able to live longer lives than ever before. Not only that, but medical devices are finding an increasingly large place in the home, as formerly complex and unwieldy systems become more compact and easier to use.

This results in more users without medical training taking on the responsibility of operating medical equipment and diagnostic tools. The result of this trend is that more consumers without technical knowledge are forced to attempt to understand manuals and instructional information which was written for a medically trained audience. This has led to frustration and the subsequent pressuring of government regulators to get manufacturers to provide better, more easily understood and accessible instruction manuals along with clearer labeling on the products themselves.

In a public setting (i.e. in a doctor's office or hospital) medical devices are utilized by trained professionals, but there is still a need for easily-accessible information regarding them. This not only includes user manuals, but important safety information which operators need to know in order to safely administer treatments. A centralized registry of information on medical devices currently on the market also makes conducting recalls or contacting users in the event of a product recall much easier.

Of course, not all medical devices are complex pieces of machinery. The term covers not just mechanical devices, but any "instrument, apparatus, implement, machine, contrivance, implant, in vitro reagent or any other similar or related article, including a component part, or accessory" which accomplishes its function without "chemical action within or on the body of man or other animals and which is not…metabolized for the achievement of any of its primary intended purposes" [1], meaning there may be separate requirements for some devices which do not apply to other devices.

This white paper explores the labelling requirements for medical devices in the United States, the European Union, and China. Each territory has its own particular set of regulations governing the labeling of medical devices, and while there are a certain amount of commonalities in each of the regulations, there are differences which necessitate care from global manufacturers when distributing products.

1.1 Medical Device Classifications

Medical devices are classified into three distinct categories which are based on the risk associated with use of the device. Risk is determined by the consequences of a device malfunction or misuse. (The European Union has additional sub-classifications within these tiers, but these general rules apply).

Class I devices are those which are considered lowest risk, and are as a result subject to much more relaxed regulatory controls. A toothbrush or floss would be considered a Class I device, as improper use would not lead to any serious health risk.

Class II devices have greater consequences associated with misuse, and as such are more heavily regulated than Class I devices. Contraceptives, such as condoms, are classified as Class II and as such require greater assurance of the quality and effectiveness of the device.

Class III devices are those which pose the most serious risk to a user's health in the event of malfunction or misuse and are, as a result, the most heavily regulated. devices go through a far more rigorous approval process before manufacturers are permitted to market them and include implantable devices such as pacemakers.

1.2 Definition of Labeling

It should be noted that the term "labeling" as laid out in the following sections refers only (unless otherwise specified) to the contents of the labeling present on the package surface and not, as in some regulations, referring to both the package label content and any other documentation that comes with the device, i.e. instruction manuals, quick start guides, etc. See figure 1 for example label design.

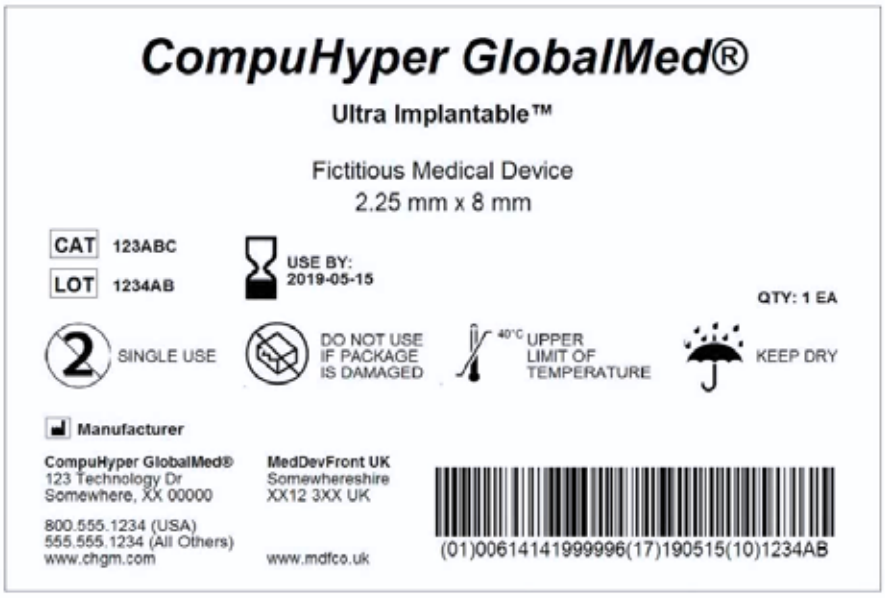

Figure 1 - Sample medical device label. Note the information contained on the label includes unique identifier, lot numbers, packaging information, manufacturing and expiration dates, and instructions for storage. Regulations in each region slightly differ, but the general information is similar.

2 US Regulations

Medical device labeling in the United States was the subject of a study conducted by the Food and Drug Administration (FDA) in early 2015. The study was meant to address a growing concern in the FDA at the lack of standardization of medical device labels, particularly when compared to the clear formatting standards set out for pharmaceuticals. In addition, the FDA held a workshop on Medical Device Labeling later that year to further discuss ways to improve the clarity of information for users.

All medical device labeling is covered under two separate parts of the Federal Code: Title 21, Chapter I, Subchapter H Part 801 handles product labeling requirements, while Title 21 Chapter I Subchapter H Part 830 deals with the defining of a proposed requirement for a Unique Device Identifier (UDI).

2.1 Label Content

All labels shall conspicuously display the name and place of business of the manufacturer or distributor. This must include the full name of the manufacturer and address, although in the case of a packer or distributor the address can instead be the primary headquarters for the company rather than the exact location where the product was assembled or packed. The label must also include a statement of identity including the common name of the device followed by the intended use of the device. In addition the package label must include "adequate directions for use," which are defined as "directions under which the layman can use a device safely and for the purposes for which it is intended" [2]. This includes frequency of use, quantity of dose, preparation for use and time of administration (i.e. "use after meals"). This information must be presented in English, unless it is being distributed solely in a US territory where English is not the predominant spoken language such as Puerto Rico or Guam. In the interest of space considerations, the standards also allow for either the use of symbols with descriptive text in English, or symbols which are "likely to be understood" by the consumer without explanatory text.

Further required information includes a declaration of net quantity of contents, which must be expressed in terms of "weight, measure, numerical count, or a combination of numerical count and weight, measure, or size." In addition the net quantity may not include any terms which may qualify the unit such as "giant" or "full" as this terminology can be misleading. The net quantity must be displayed on the bottom 30% of the area of the label panel, with the exception of principle display panels of 5 square inches or less. The net quantity also does not need to apply on interior packaging which is not intended to be sold separately from the outer packaging. The declaration must appear in "conspicuous and easily legible boldface print or type in a distinct contrast (by typography, layout, color, embossing, or molding) to other matter on the package" with letters that are no more than three times as high as they are wide (using the letter 'o' as measurement).

In addition, there are specific warnings which must appear on certain types of medical devices:

- Emergency denture repair kits must clearly state they are for emergency repairs only and recommend seeing a professional as soon as possible.
- Impact-resistant lenses in eyeglasses and sunglasses must be labeled as such.
- Hearing aids must include a warning to seek the help of a professional in the event of poor performance and instructions for use and cleaning.
- Tampons must include a warning explaining the warning signs of Toxic Shock Syndrome and what to do if these signs appear.
- Latex condoms must include an expiration date for either the latex itself or spermicidal lubricant, whichever comes first.

2.2 Unique Device Identifier (UDI)

Each medical device must include a unique device identifier on the label which is issued "under a system operated by FDA or an FDA-accredited issuing agency" [3]. The device identifier is meant to identify a single version or model of a medical device – in the event that a device is discontinued the UDI is not reassigned to another device. UDIs are made up of two primary parts: a device identifier, which is a fixed portion of the number identifying the model and labeler of the device in question, and a production identifier that includes some or all of the following: the lot or batch number, serial number, expiration date and any other identification code required. The UDI must be submitted electronically to the FDA along with the following information:

- The name of the labeler
- The email address and phone number for a designated point of contact at the company for the FDA
- A statement confirming the UDI reported is the UDI appearing on the device label
- The name of the device as it appears on the device label
- Any version or model number or similar reference appearing on the device label
- A statement confirming device sterility, if the device is meant to be sterilized
- If the device contains latex
- Whether or not the device is safe for use in magnetic resonance imaging equipment (primarily a concern for implantable medical devices)
- The size of the particular device
- Any production identifiers appearing on the label of the device
- The FDA submission number of the device, if the device needed to be cleared for use
- The FDA listing number assigned to the device
- The global medical device nomenclature name for the device
- The number of individual units contained in the device package

These records are all submitted to the Global Unique Device Identification Database, which the FDA is developing with the goal of providing easily accessible information to medical providers. Class III medical devices are already required to have UDIs – the deadline for compliance was 24 September 2016. The deadline for medical device manufacturers to comply with the requirements for the addition of a UDI for Class II medical devices to product labeling is 24 September 2018. The extension to 2021 was implemented in order to allow all stakeholders in the supply chain to have sufficient time to make the necessary preparations to switch over to the new identification systems. Class I devices – not all of which require UDIs – have until 24 September 2020 to comply. While these deadlines are meant to be firm, the FDA has stated that it does not intend to aggressively enforce the UDI requirements until 2021, after feedback from stakeholders in the supply chain indicated they would not be able to prepare for the transition to the new database system.

3 EU Regulations

There are three separate EU regulations which govern the labeling of medical devices: one which deals specifically with devices meant to be implanted in the body (Council Directive 90/385/EEC), one which governs the use of in vitro medical devices (Council Directive 98/79/EC) and one which deals with all other medical devices (Council Directive 93/42/EEC). In April 2017, the EU voted to replace these three directives with two revisions which consolodated the medical device regulations into a single regulation and made updates to the directive on in vitro devices.

These regulations are all identical in terms of their labeling requirements, as well as the requirement that all regulatory data be stored in a centralized database. The particulars of label format such as font size and type are left up to the member countries to decide for themselves. With the official publishing of the new EU regulations, a three-year transitional period has started, giving manufacturers time to make the necessary updates to their production process.

3.1 Label Content

Regardless of device type, all medical devices must have the name of the product as well as the name and address of the manufacturer on the product label. Imported devices must include the name and address of the in-country representative or distributing firm and the name of the manufacturer. The label must also include all details necessary for users to identify the device and other package contents, as well as a batch and lot code or serial number. In the event that the intended purpose of the device is not immediately obvious to the user, the manufacturer must clearly state the intended use on the label.

Expiration dates (for devices with a limited shelf life) must be clearly displayed on the label, along with any special storage or handling conditions, usage warnings, and special operating instructions if applicable. Equipment which has been sterilized must include the word "sterile" as well as an explanation of the method of sterilization. The date of manufacturing is also required, although this information can be integrated into the lot code display.

Devices which are custom-made or intended for clinical investigations must be labeled as such, with the words 'custom-made device' and 'exclusively for clinical investigations,' respectively. All required content should be in the predominantly spoken language for a given country, and whenever possible should use symbols instead of words. These symbols must conform to EU standards or, should they be for symbols which are not governed by standards or in common use, explained in the documentation included with the device.

In addition, all devices must carry the CE conformity marking in order to show compliance with the relevant European health, safety and environmental regulation, as well as any other requirements related to that industry. The CE mark can be no smaller than 5mm in size and must appear on all devices sold in the EU – if the marking is not displayed, it cannot be sold in any member state of the European Union. Finally, the Unique Device Identifier (UDI) must be displayed on the label.

3.2 European Database and Unique Device Identifiers

From 2012, all medical device manufacturers were required to upload all information regarding the approval process and certification for sale to a centralized European database. This requirement did not include any sort of requirement regarding a unique identifier code for each device produced, unlike the FDA's proposed Global Unique Identification Database. The new regulations approved in April 2017, however, change these requirements to bring them in line with the UDI regulations present in the US. It should be noted, however, that the purpose of this database is not to function as a means to verify the authenticity of a given product. Its primary function is to serve as a repository for information regarding a particular product, but not as a protection against counterfeiting or assurance of serialization.

This includes requirements for a unique identification number which is to be displayed on either the device itself or on the device package, with the same structure as described by the FDA's requirements. Higher levels of packaging shall have their own individual numbers, although this requirement does not apply to shipping containers. The UDI is linked to the manufacturer's contact information, name and address of the authorized representative if necessary, risk class of the device, trade/brand name of the device, device model number, product description, storage and handling conditions, number of uses and an optional URL linking to instructions for use or other additional information.

In addition, the UDI must indicate whether or not the device is pre-sterilized or requires a sterilization procedure. All data for UDIs is to be uploaded to a central database known as the European Database of Medical Devices (EUDAMED), which is maintained by the European Union. It will feature connectivity with the US Global Unique Device Identity Database (GUDID), allowing information on products to be shared. UDIs will be distributed by designated entities (for example, GS1 has been designated a provisional provider).

The UDI requirement comes along with a greater focus on accountability in the medical device industry, with requirements for all members of the supply chain to verify the compliance of the organization directly upstream. So, for example, the distributor of a medical device must perform and record compliance checks of their importer, who in turn must do the same to the manufacturer. The manufacturer must perform similar checks on their parts suppliers.

Currently the precise standards for the UDI are still being refined - the GS1 is moving to adapt the existing UDI standard used in the United States to ensure smooth implementation, but the finalized standard is not yet set. The GS1 expects to have this development done before the deadline for compliance hits. The current schedule is set to require complete compliance for all manufacturers by mid-2021, matching up with the deadline for compliance in the United States.

4 Chinese Regulations

China's Food and Drug Administration (CFDA) governs the packaging of medical devices and is intended to standardize the instructions for use, labels and packaging logos of medical devices. The particular powers of the CFDA with regards for labeling were published in Decree of the State Council of the People's Republic of China No. 650, which came into force on 1 June, 2014.

This push for standardization is beginning to be discussed in the United States as well, but currently China is the only country discussed in this white paper with language relating to standardized labeling design.

4.1 Label Content

Medical device labels must include the name of the product, model number and size as well as the contact information for the applicant (i.e. the business seeking to sell the device in China), manufacturing address and, if necessary, the name of any after-sales service organization.

China also requires the display of the registration number or record number of the device; much like the United States devices must have gone through an approval process and this number must be displayed on the product label. Additional information indicating whether or not a device is meant to be single-use should also be included in the description, as well as power requirements should the device require the use of power.

Labeling must also include the date of manufacturing and, if it is a sterilized product, the date of sterilization. The date must be presented in a year/month/day format, or just year/month if appropriate. Any necessary warnings for safe use, special storage conditions or operation instructions and a simple indication of the intended use must also be included on the package. The regulations also warn against the use of language implying a guaranteed cure, absolute declarations such as 'most advanced' or 'best,' any indication of cure rate or efficiency, recommendations from any name or organization for promotional purposes, or any other overly promotional language.

In the event that device packaging is too small to fit all required information there must be an express indication on the label to see instructions for more details. All contents must be in Chinese and comply with the national specifications for the Chinese language.

4.2 Unique Code Requirement

Any implantable medical device must include a label with a unique traceable code for identification purposes. This is only for implanted devices – no equivalent requirement exists for other medical devices. The motivation behind this is, presumably, that implantable devices are the most potentially dangerous if, for example, a counterfeit device were to be used. Adding a measure of traceability to these devices seems like a fairly self-evident step, but it should be noted that China is the only government body discussed in this paper with something like this. The purpose of the UDI program outlined by the US and EU is primarily focused on being able to access information. The UDI may include traceable information such as a serial number, but there is no verification step required.

5 Conclusion

All the regulations discussed in this white paper have received updates in the last five years, and the United States and EU are both in the midst of significant overhauls to their regulations. Medical device labeling is a more complicated topic than most other product labeling, as the definition of what constitutes a medical device is tremendously broad. This means that regulations in every country have a lengthy list of caveats depending on the precise purpose and construction of the device, but the core requirements are the same and focus on instructions for use and identification.

As the use of medical equipment in the home becomes more common, the need for simple and quickly accessible instructions increases. Including an instruction manual may not be sufficient, as manuals can be lost or misplaced. This is a large part of the push for Unique Device Identifiers and a searchable database in the US and EU – the idea is to create a tool for both health care providers and home users to access important information about a medical device with which they may not be familiar.

The importance of clear and easily accessible instructions cannot be understated – in many cases they can quite literally be the difference between life and death. No manufacturer wants to find themselves responsible for the death of a customer due to poor documentation or unclear labeling, making label design critical. Currently, medical device labeling is relatively unregulated, but governments are moving to exert a greater influence. With the pharmaceutical industry becoming more tightly regulated as serialization requirements come into effect, odds are high that similar requirements will eventually be considered and enacted in the medical device industry.

When designing a label, it is important to keep these regulations in mind – ensuring a clear and simple design is the best way to ensure compliance with regulations. In addition, the print quality of the labels should be a top priority to keep difficult-to-read or improperly-labeled products from reaching end users.

While there is no requirement to verify the accuracy of a medical device's label, the penalties for putting a product without the required label information into the marketplace range from costly – the offending devices must be recalled, which is an expense and wasted time – to disastrous – manufacturers may be forbidden to distribute their products. This is all without even getting into the consequences that would arise from user death or injury due to improper use arising from a missing warning or instruction on the device label. It is important, therefore, to ensure that each label is properly printed and applied to every medical device on the production line.

A look back through these regulations makes one thing clear: the amount of information expected to appear on the label is extensive, particularly for Class III devices. With so much information to verify, it is far too time-consuming to have personnel manually inspect each label for accuracy – there is simply too much room for user error. Using an automated vision inspection system to verify the presence and accuracy of all required information goes a long way toward ensuring compliance with labeling regulations. Combination printer/inspection systems can be utilized to quickly enter required information to pre-determined label design, and capabilities for centralized control can further ensure accurate label information. Regardless of system type, however, vision inspection is a crucial tool for medical device manufacturers.

6 Endnotes

1. "What is a medical device?" U.S. Food & Drug Administration. 2016. Web. 5 September 2016. <http://www.fda.gov/AboutFDA/Transparency/Basics/ucm211822.htm>

2. All quotes in this section are taken from: Title 21, Chapter I, Subchapter H, Part 801. eCFR.gov. Web. 5 September 2016 <http://www.ecfr.gov/cgi-bin/text-idx?SID=ea6dc6558b6ffe3264b7d6d5f3694367&mc=true&node=pt21.8.801&rgn=div5>

3. All quotes in this section are taken from Title 21, Chapter I, Subchapter H, Part 830. eCFR.gov. Web. 5 September 2016 <http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=2e3099419e3e107abc5e678c805eb462&mc=true&n=pt21.8.830&r=PART&ty=HTML>

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Vision Inspection

X-ray Inspection

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