Technical Report

ISO/TR 6231

First edition
2024-06

Health informatics — Standardizing graphical content

Informatique de santé — Normalisation du contenu graphique

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 6231:2024

Reference number
ISO/TR 6231:2024(en)

© ISO 2024

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 6231:2024

COPYRIGHT PROTECTED DOCUMENT

© ISO 2024

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 6231:2024

© ISO 2024 – All rights reserved

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 215, *Health informatics*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 6231:2024

© ISO 2024 – All rights reserved

Introduction

Images and graphics predate any formal written human communication. Cave paintings and engravings have given pointers to lifestyles and methods from ancient times. Pictograms describing health problems have been found as engravings and drawings in the Egyptian pyramids (approximately 2 500 BC), the frescoes and road signs in Pompei (approximately 1st century AD) and the murals in the ancient temples of India such as Konark Sun Temple (1 250 AD). They have helped retrace the history of medicine and given an idea of health problems existing in those times. More importantly, their usage transcended language barriers.

Healthcare needs are universal. The health information technology sector depends on accurate and consistent transfer of information relevant to the health care providers and their patients. The focus is on finding convenient and universally understood methods for information transfer. In this context, graphics usage in the form of emojis, emoticons and stickers has become an indispensable tool in enhancing online communications and making it richer and more emotive. Healthcare applications are also adopting graphics, but their usage is still less prevalent than in other fields. One of the major reasons behind this is the lack of standardization in this field. This document attempts to stimulate interest, emphasize the need, and suggest ways for better usage of graphics in healthcare information technology.

With rising life expectancy, along with higher incidence of non-communicable diseases (NCDs), there is a constant need for care support. Advances in telecommunication have allowed this to be offered remotely through telehealth systems. Even before the COVID period, 76 % of US citizens preferred remote care over a physical visit[19].

Telehealth has spurred the need for interoperability standards. Telehealth usage increased exponentially globally following the COVID pandemic. With global warming and related environmental issues, the frequency of other natural disasters has increased. During disasters, the need for remote support increases the interchange of health-related communication, even among communities and people who have never met before. Improved travel facilities have given rise to tourism, and especially medical tourism. Migration is also a rising phenomenon. Both medical tourism and migration increase the possibility of language and cultural differences between the care provider and the patient. Thus, methods to easily transfer health information across platforms and language barriers can help achieve consistent and uniform delivery of care.

Graphics and visually relatable content, for example locating injuries or pain with additional on-the-spot markings, have been long used for medical record keeping. However, these are not yet standardized.

This document extrapolates the need and current status of health-related graphics standardization.

Likely beneficiaries of this document include:

— application developers;

— telehealth solution providers;

— those working in the social media workspace;

— those working with terminologies;

— clinicians and other users of applications;

— informaticians, analysts and researchers working in the field of health information.

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 6231:2024

© ISO 2024 – All rights reserved

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 6231:2024

Health informatics — Standardizing graphical content

1 Scope

This document describes the need for standardization of graphics and images in the health informatics domain. It focuses on the current status of adoption and presents an overview of the opportunities as well as challenges in creating sets of standardized images and graphics. A plan of action is proposed to serve as the future roadmap for implementation.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1 General terms

3.1.1
assessment in ankylosing spondylitis
ASAS
method to calculate *disease activity score* (3.1.3) for ankylosing spondylitis and related disorders

3.1.2
botulinum toxin
botox
product used to release spasm in certain neurological conditions

Note 1 to entry: Botox is also used in cosmetic surgery to erase fine wrinkles in the skin.

3.1.3
disease activity score
DAS
method to assess the disease activity

Note 1 to entry: DAS is commonly used for rheumatological disorders assessing specific problems in a few named joints. In rheumatoid arthritis, 28 joints are assessed (DAS28), for SSA, the number of joints can be 44 (DAS44) or even higher (DAS 66/68).

3.1.4
light amplification by simulated emission of radiation
laser
treatment used in cosmetic surgery for scars, pigmented lesions, and hair removal

3.1.5
lexicon
complete set of meaningful units in a language

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 6231:2024

© ISO 2024 – All rights reserved

3.1.6
medical device
instrument, apparatus, implement, machine, appliance, implant, reagent for in vitro use, software, material or other similar or related article, intended by the manufacturer to be used, alone or in combination, for human beings, for one or more of the specific medical purpose(s) of:

— diagnosis, prevention, monitoring, treatment or alleviation of disease;

— diagnosis, monitoring, treatment, alleviation of, or compensation for an injury;

— investigation, replacement, modification or support of the anatomy, or of a physiological process;

— supporting or sustaining life;

— control of conception;

— cleaning, disinfection, or sterilization of medical devices;

— providing information by means of *in vitro* examination of specimens derived from the human body;

and that does not achieve its primary intended action by pharmacological, immunological or metabolic means, in or on the human body, but which can be assisted in its intended function by such means

[SOURCE: Essential Principles of Safety and Performance of Medical Devices and IVD Medical Devices[23]]

3.1.7
post-coordination
technique used in *SNOMED CT* (3.1.9) to combine clinical *concepts* (3.2.1) to ontologically define more complex concepts

3.1.8
pre-coordinated expressions
expressions that represent the meaning of individual *concepts* (3.2.1) which are predefined in *SNOMED CT* (3.1.9)

3.1.9
SNOMED CT
Systemic NOmenclature in MEDicine Clinical Terms
systematically organized computer processable collection of medical terms providing codes, terms, synonyms, and more, managed by SNOMED International

3.1.10
terminology
set of designations and *concepts* (3.2.1) belonging to one domain or subject

[SOURCE: ISO 1087:2019, 3.1.11]

3.1.11
training data set
data set of examples used during the learning process and used to fit the parameters

3.1.12
typeahead
method wherein a keyboard entry of the first few letters suggests the most likely word or phrase which will complete the text

3.2 Terms related to information management

3.2.1
concept
unit of knowledge created by a unique combination of characteristics

Note 1 to entry: *SNOMED CT* (3.1.9) concept codes are numerical codes that identify clinical terms, primitive or defined, organized in hierarchies.

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 6231:2024

© ISO 2024 – All rights reserved

[SOURCE: ISO 1087:2019, 3.2.7, modified — Notes to entry were removed; a new Note 1 to entry was added.]

3.2.2
coding scheme
collection of rules that maps the elements of one set on to the elements of a second set

[SOURCE: ISO/TS 21089:2018, 3.33]

3.2.3
data
information elements which are input, stored, processed or output by the automated information system which supports the clinical and business functions of a *healthcare* (3.3.1) organization

Note 1 to entry: These data can relate to person identifiable records or be part of an administrative system where persons are not identified.

[SOURCE: ISO/TS 21089:2018, 3.43]

3.2.4
electronic health record
EHR
health record (3.2.7) where all information is stored on electronic media

[SOURCE: ISO 13606-1:2019, 3.3.13]

3.2.5
electronic medical record
EMR
electronic record derived from a computerized system used primarily for delivering patient care in a clinical setting

[SOURCE: ISO/TR 24291:2021, 3.3]

3.2.6
health information
information about a person relevant to his or her health

[SOURCE: ISO 18308:2011, 3.28]

3.2.7
health record
data (3.2.3) repository regarding the health and *healthcare* (3.3.1) of a subject of care

Note 1 to entry: The term *electronic health record* (3.2.4) may be used for a health record where all *information* is stored on electronic media.

Note 2 to entry: A *health record* may include, for example, medical records, dental records, social care records.

[SOURCE: ISO 13606-1:2019, 3.3.11]

3.3 Terms related to healthcare

3.3.1
healthcare
care, services or supplies related to the health of an individual

Note 1 to entry: Includes any: a) preventative, diagnostic, therapeutic, rehabilitative, maintenance, or palliative care, counselling, service, or procedure with respect to the physical or mental condition, or functional status, of a patient or affecting the structure or function of the body; b) sale or dispensing of a drug, device, equipment, or other item pursuant to a prescription; or c) procurement or banking of blood, sperm, organs, or any other tissue for administration to patients.

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 6231:2024

© ISO 2024 – All rights reserved

[SOURCE: ISO 13940:2015, 3.1.1, modified — Original note to entry was removed; a new Note 1 to entry was added.]

3.3.2
home healthcare
healthcare (3.3.1) provided in a dwelling place in which a care recipient lives or other places where care recipients are present, excluding professional healthcare facility environments where operators with medical training are continually available when care recipients are present

Note 1 to entry: Professional healthcare facilities include hospitals, physician offices, freestanding surgical centres, dental office, freestanding birthing centres, limited care facilities, first aid rooms or rescue rooms, multiple treatment facilities and emergency medical services.

Note 2 to entry: For the purpose of this document, nursing homes are considered dwelling places for home healthcare.

Note 3 to entry: Other places where a care recipient is present include the outdoor environments while working and in vehicles.

[SOURCE: ISO/TR 25555:2024, 3.4]

3.3.3
telehealth
healthcare (3.3.1) activity supported at a distance by information and communication technology service(s)

Note 1 to entry: It is possible that the subject of care is not directly involved in a telehealth service, e.g. in the case of tele-dermatology where one physician consults another physician who is at a distant location.

Note 2 to entry: Healthcare activities may include healthcare provider activities such as diagnosis, treatment, review or advice, and self-care activities as prescribed or recommended by a health professional, preventive (educational) advice and management of healthcare processes.

Note 3 to entry: Healthcare activities may include both synchronous (real-time) and asynchronous (delayed) interactions between actors. For example, a radiology examination can be transmitted and subsequently reported by a radiologist over a communications network. A discussion on the diagnostic findings can occur in real time over a telephone or video conferencing connection between a patient and health professionals.

[SOURCE: ISO 13131:2021, 3.5.2, modified — The preferred term “telehealth service” was changed to “telehealth”.]

3.4 Terms related to graphical information

3.4.1
description
normative text which defines the purpose, the application and the use of the graphical symbol, and optional product area

3.4.2
dragging
dragging and dropping
moving one (or more) object(s) on a display by translating it (them) along a path determined by a pointer

[SOURCE: ISO 9241-400:2007, 3.9.1]

3.4.3
frame
enclosing border or the matter or area enclosed in such a border, such as a picture

3.4.4
icon
digitized [*pixelated* (3.4.7)] representation of a graphical symbol, usually used on a reconfigurable electronic display screen or graphical user interface (GUI)

Note 1 to entry: A single symbol can be represented by multiple icons, each of a different size, pixel count or colour.

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 6231:2024

© ISO 2024 – All rights reserved

[SOURCE: ISO 3767-2:2016, 3.2]

3.4.5
label
printed, written or graphic information placed on a *medical device* (3.1.6) or its container

[SOURCE: ISO 18113-1:2009, 3.33, modified — Notes were removed.]

3.4.6
pictogram
graphical composition that can include a symbol plus other graphic elements, such as a border, background pattern or colour, and that is intended to convey specific information

3.4.7
pixel
smallest addressable element of a digital source image

[SOURCE: ISO/IEC 29112:2018, 3.1.21]

3.4.8
video graphics array
VGA
analogue display standard originally developed by International Business Machines (IBM)

Note 1 to entry: VGA uses 640 × 480 resolution.

4 Overview

Usage of informatics in healthcare along with telehealth is now a major component of health delivery. Given the complexity of health-related information, the adoption of information technology in healthcare faces obstacles from those with reading challenges. Illiteracy, poor understanding of health-related terminologies as well as language differences have marred widespread adoption, creating a significant risk of adverse outcomes. Better communication tools can help to circumvent such barriers. Graphical images can help ease adoption and implementation of health information systems.

Although standardized images exist and enable rapid, non-verbal communication in domains such as transportation and occupational safety, no analogous standards exist at present in health informatics. Images and graphics facilitate communication across language and cultural barriers. To be used in health informatics, it is important that they be readable and understood as easily as road signs which are used universally. When used in electronic personal health records, they can improve health literacy and recall of diagnostic information[16].

The complexity of healthcare terms, multiple meanings for the same term, and language and pronunciation differences led to the creation of terminology standards like SNOMED CT. These clinical terminologies and coding schemes, being vast and complex, require specialized skills to navigate and use. Graphics usage can ease the navigation. The prerequisite is that standardized graphics and images have a firm linkage to the related terminology or code. It is possible for an image to represent a unique identifier and map to one-to-many terms which can be synonyms of each other. Over and above, despite there being over three million terminologies within SNOMED CT, there still are many terms that need post-coordination. Graphical content can ease finding the correct post-coordinated term.

Another issue in the implementation of terminologies is related to the challenge posed by language differences. Language editions do address this issue, but not all languages can be covered. Even otherwise, finding the correct term slows down data entry. Inbuilt spellcheck along with autocorrect, a part of many applications, can create wrong or misunderstood terms. Images appearing alongside can allow for better recall and correlation, besides correcting problems related to voice recognition, spelling, autocorrect and typeahead solutions. While some images related to healthcare information are well defined, for example for human anatomy, there are many intuitive symbols for abstract concepts which are yet to be standardized.

A surfeit of commercial imaging solutions is available, and also many free and open-source solutions. Some examples are described in Clause 5.[20,22] However, the exact meaning or explanatory text is mostly lacking.

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 6231:2024

© ISO 2024 – All rights reserved

Sometimes different images can be used to represent a common terminology (for example see the two different representative signs for male and female gender in Table 1).

It is important to think proactively about graphic messaging standards. With standardization, images used for medical communication will gain relevance in relation to the use case.

Additional values brought about for end-users and software developers include a better user interface (UI), wherein the graphical content guides the user towards the next steps and ensures correct data entry.

For users, standardized graphical images in the form of icons or pictograms can ensure better understanding and usage of terminologies. The specific hierarchies where the role is the easiest to define include anatomy, physical devices, and inclusion of drugs within treatment lists which cater to a specific problem such as hypertension or diabetes.

Table 1 — Examples of health images

Image	Meaning
	Left, right
	Up, down
	Change
	Implies, change into
	Equivocal
	Not, none, null
	Heart
	Male, female (family[a])
	End of anaesthesia
	After, status post
	Psychiatric

[a] These icons differ from the common gender icons shown here: 

Graphics can be a key component of health applications used by those with disabilities. Different sets can be required to compensate for impaired auditory, visual or mental capabilities.

Health-related artificial intelligence (AI) processes which are dependent on a visual interface depend on a base training set of normal images.

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 6231:2024

© ISO 2024 – All rights reserved

There is also scope for creating a set of toolbar icons and photo-realistic illustrations. Elements to consider include specifications of colour, line, symbols, text and numbers, frames, view, perspective, change of scale, style, as well as the presence and design of human character.

A health specific keyboard which incorporates pictograms can provide cross language support and help create a medical lexicon.

5 Current efforts of graphics standardization

ISO/IEC 80416[16] provides a fair number of images and graphical symbols, including those for use on equipment, safety signs and public information. These symbols have helped create a uniform method for controlling road traffic and other modes of transportation, as well as for operating machinery. They are well understood and widely used, overcoming the constraints of geography and language. They have been beneficial in generating immediate correlation and related responses in potential hazardous situations[3].

Within healthcare settings, signs exist physically for critical areas of operation, for example movement of personnel, radiation and biohazards.

Figure 1 — Graphical symbol ISO 7001/PI PF 043

Available icons are supposed to be self-explanatory, hence there is no associated text. On-screen usage can provide this additional functionality. While working on images which can be linked to terminologies, the standardization process ensures that the related, term, concept or code is also provided.

Many commercial as well as open-source icons and graphic sets are being used within the health informatics domain, including the following.

1) The Noun Project[20] provides over three million icons and photos. It also provides APIs for ease of adoption within applications. A search under “health” revealed 413 100 icons, 1 660 icon collections and 3 316 photos. These are available as either lone images or sets, but without description, the correlation or meaning being left to the individual user or developer.

2) A site (and specification) maintained by the UN's Office for Coordination of Humanitarian Affairs (OCHA)[21] has an icon library. It has a small set of health icons and encourages the public with guidelines for developing new icons.

3) Healthicons[22] is a “global public goods” effort offering a large health-related icon library free for use under a creative commons license.

These initiatives have been disparate efforts, lacking standardization, sometimes creating duplicate or contrasting content. When there are different representations, it is important to have a detailed explanation to clarify the meaning of a graphic.

For example, the male and female icons when shown in a family tree chart are different from what are generally recognized as male and female gender icons (see Table 1). This example identifies an area where standardization can help to ensure constancy. In turn this can lead to uniform correlation to understand the usage within applications as well as within social media. The many areas within health informatics where standardized graphics can help are extrapolated in Clause 6.

When searching the ISO OBP platform for clinical images (using the search term “clinical” under “graphical symbols”) only one graphical symbol was found – that of a dentist (Figure 1).

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 6231:2024

© ISO 2024 – All rights reserved

6 Example sets of healthcare graphics usage

6.1 General

Table 2 summarizes existing areas of graphics usage in health informatics.

Table 2 — Example sets summary

Component	Example sets	Remarks
Healthcare terminology implementation and adoption	— SNOMED CT Pre-coordinated expressions — Post-coordination — Anatomical correlation — Severity of pain	A liaison is a pre-requisite to working with SNOMED.
EHR and applications toolbar	— Toolbar icons — Helpfiles /suggestions — A Medical Keyboard can be a useful addition to day-to-day communication platforms	There are design differences from the graphics developed by ISO/TC 145 as these are meant for display on a screen which has colour. Also, size of image can vary depending on device.
Use within PC-based and mobile applications	— Explanation of correct anatomy as well as pathology — Adding markers to pinpoint lesions, for example for injury marking in medical legal cases or localization of pain in abdomen.	— Ease of use and better adoption — Many clinical forms already use images for specific marking. — Assisting the population with visual, mental, language and other challenges.
Natural language processing (NLP)	— As part of selection lists — Inline additions to assist processing	The images can be linked to terminologies
Helpfiles and suggestions	— Typeahead choices — Help selection on a particular topic	Context based icon appearing when entering a phrase
Artificial intelligence (AI) in healthcare	— Part of training data set — Assist conversation of chatbots	— Availability of a standard normal image helps compare the differences as well as pathology of the particular reading. — Images appear in conversational text
Medical devices	On screen controls and help	Medical devices are for home use. Usage needs simplification.

6.2 Working with terminologies

SNOMED CT is one of the most comprehensive and multi-lingual clinical care terminologies in the world and fundamental to making electronic health records interoperable. It has a large base of over 360 000 unique concepts and over a million terms including synonyms and preferred names to refer to these unique concepts. These concepts belong to one of the 18 hierarchies available in the terminology and can be related to other concepts in other hierarchies through appropriate relationship types. Each concept is uniquely identified by an immutable code. SNOMED concept codes are meant for computation purposes and normally are not immediately visible to the user.

Given the size and multi-lingual coverage of this terminology, it is considered relevant to introduce a standardised use of images that can be mapped to the SNOMED CT concepts. This would be especially useful in the case of terms that are being used across multiple hierarchies rendering them with completely different meanings. For example, the term ‘pain’ appears in several concepts spanning across multiple hierarchies

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 6231:2024

© ISO 2024 – All rights reserved

such as pain (finding), pain level (observable entity), pain diary (assessment scale), and pain behaviour present (situation). Images of the terms along with the hierarchy to which they belong can help the user make the correct selection. On the other hand, a graphical set for the severity of pain immediately provides correlation to severity. Any one symbol from the type of pain can be a replacement of a post-coordinated term as shown in Table 3.

Similarly, where a pre-coordinated or individual concept is not available, a composite, also called post-coordinated, expression can be created utilizing a combination of concepts that provide a clinically valid term. Using post-coordinated expressions requires specialist knowledge. Images can be used to identify these post-coordinated expressions though pictures which can be interpreted into a computable post-coordinated expression at the backend. For example (see Figure 2), there is no concept for the term 'laceration of left thigh', indicating that a post-coordinated expression can be useful.

An image to present this concept would enable the user to select the image rather than write a complex expression or choose multiple terms, thereby reducing errors and effort.

283385000 | Laceration of thigh (disorder) |: laterality = 7771000 | Left (qualifier value) |

OR

35933005 | Laceration (morphologic abnormality): finding site = 61396006 | Structure of left thigh (body structure).

Figure 2 — Example of post-coordination

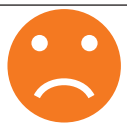
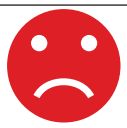
Consultation with SNOMED International would enable mapping some or all the images created as pointers to pre- or post-coordinated concepts. This could then be piloted for usage within electronic health record (EHR) systems and adoption for wider coverage.

Getting a one-to-one match for the over 300 000 and rising number of concepts within SNOMED CT, let alone other terminologies, is not the aim. More important is to identify concepts and terminologies that are easier to link to a particular graphic. Human anatomy can be a good start.

6.3 EHR and applications toolbar

Traditionally, images have been used within EHR systems to provide visual cues and to save space, when used in place of a term that has already been explained elsewhere in the application. The most common use of images is in areas related to patient demographics, to represent gender, vital signs measured through devices (such as blood pressure and temperature), and other data such as pain scale (Tables 3 and 4). Other toolbar images used in EHR applications are shown in Figure 6.

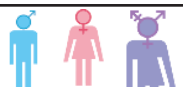
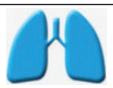
Table 3 — Emojis describing pain severity

No pain	Mild	Moderate	Severe	Very severe	Worst possible
					

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 6231:2024

© ISO 2024 – All rights reserved

Table 4 — Some existing graphical representation of terminologies

Textual representation	Graphical representation
Male/female/unspecified	
Fasting/non-fasting	
Respiration	
Blood pressure	
Pulse	
Temperature	

Although the use of images within applications is increasing, there is no standardized manner of using them. This results in the propagation of several pictorial representations for the same concept. This lack of standardization and the lack of universal semantic equivalence of the images lead to interoperability issues. For instance, all airports across the world use the same set of standardized images to represent departure, arrival, gates, toilets, restaurants/cafes, etc. A similar set of standardized images in the healthcare domain would enable universal understanding of an image. It would also reduce the effort made by individual EHR vendors to create their own images and improve the overall quality of EHR systems globally.

6.4 Use within PC based and mobile applications

Many clinicians prefer to use diagrams and figures with markings to document a lesion, for example the location of the lump in the breast or abdomen. Within an EMR, a background image with specific pointers and markers can be used to preserve such a finding or procedures using a background line diagram of the normal anatomy. Sophisticated systems can enable the markings to be stored as a new image or as an add-on with specific storage and recall within the database. A few examples are provided below with the accompanying Figures 3 to 6.

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 6231:2024

© ISO 2024 – All rights reserved

EXAMPLE 1 Standard images of different body positions used for pinpointing the lesions in a medico-legal assessment can be done onscreen too (Figure 3). The lower part of Figure 3 shows sample markings. Standardization of how and what to mark will be important. Unlike a physical form, an onscreen version can change the base images from male to female as needed. It can allow additional closeups for important points or remove the unnecessary ones. Special drawings can be used to distinguish the type of injury such as abrasion or laceration.

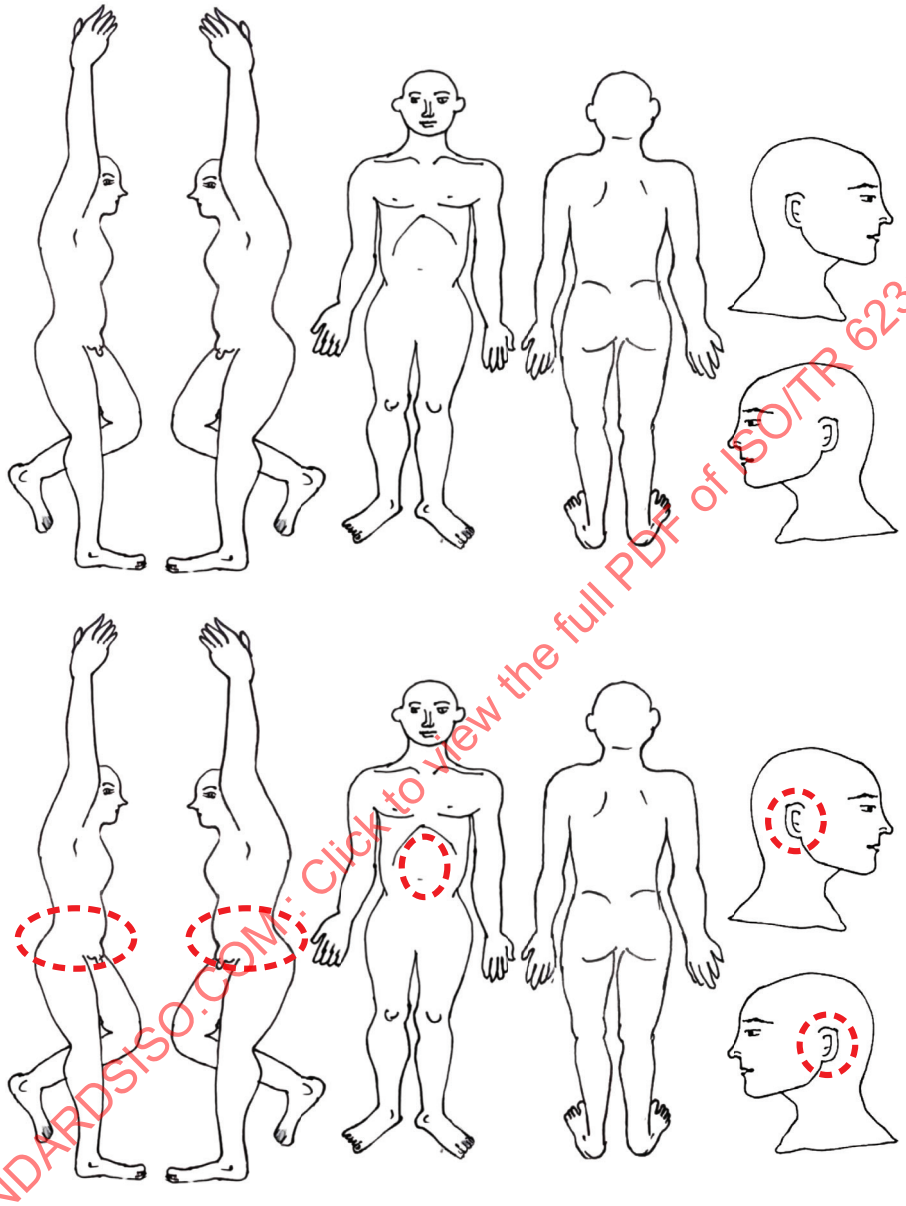


Figure 3 — Base image set for marking injuries

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 6231:2024

© ISO 2024 – All rights reserved

EXAMPLE 2 A homunculus image, as shown in Figure 4, is a diagram of a human skeleton for easy highlighting of all the joints. The smaller joints, for example those of the hand, are given relatively more prominence so that highlighting can be done with equal emphasis as for the bigger joints.

NOTE 1 One of the most common diseases in rheumatology affects the smaller joints of the hand so it is important to display its involvement prominently. The homunculus is hence best suited for this. The green-marked joints on the right side of Figure 4 are the ones used for calculation of DAS 28, used for assessing rheumatoid arthritis, while those marked in brown and black are used for other DAS variations.

Figure 4 — Homunculus image without (left) and with markings (right)

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 6231:2024

© ISO 2024 – All rights reserved

EXAMPLE 3 Profile pictures allow for marking out of cosmetic surgery procedures. In Figure 5, the background is a standard image where the markings for botox and cosmetic laser shots are placed. The markings can mention the type of area covered and the dose used, the same is entered in a worksheet. Since botox is not administered in the neck, the background images would be without the neck component. The syringe is used as a pointer. It is dragged then dropped to the spot where the botox injection or single laser shot is provided. For laser, a circle can also be dragged and then expanded to show a wider area coverage.

NOTE 2 Recording of lesions in dermatology is possible through photographs. Saved images can provide an overview of the lesions and a record of changes over time.

These markings are important, as there are limitations in terms of the maximum dose of a treatment which can be given at one time. Availability of the positions treated in previous sessions and of their outcomes helps planning the dose and locations of treatment during subsequent visits.

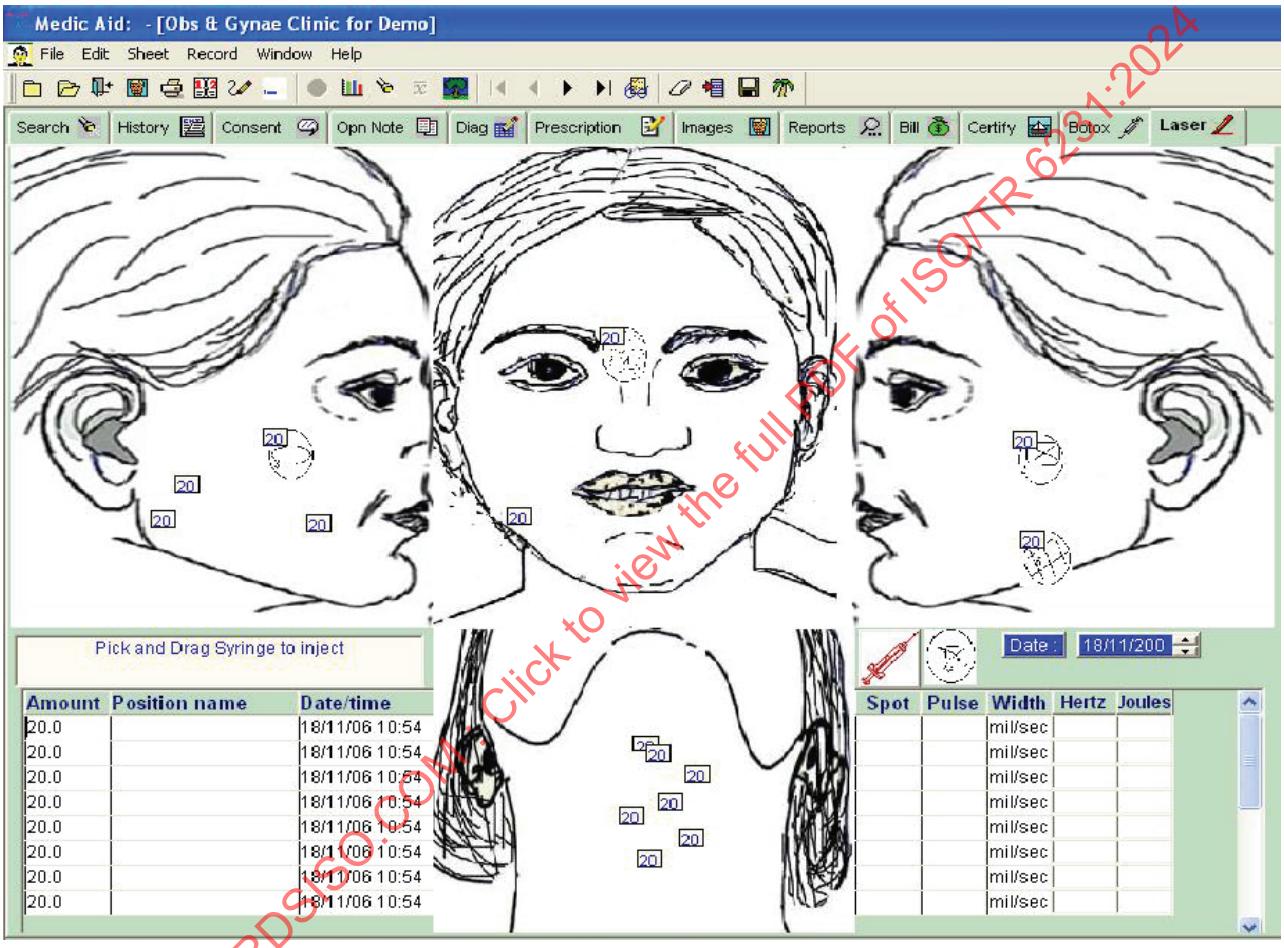


Figure 5 — Screenshot of laser markings on a background image

STANDARDSISO.COM : Click to view the full PDF of ISO/TR 6231:2024

© ISO 2024 – All rights reserved