

Unique Identification
of processes in for Hospitals with ISO/IEC conformity

HIBC Wrist Band ID

1. Introduction

The processes in a hospital are related to special quality procedures to enable patient care and safety. Unique identification of items, devices, locations but also of patients and related services are of vital importance. Information Technology enables not only unique identification but also documenting processes automatically and error free. The tools for fulfilment of efficient data collection are Barcode, Matrix code and nowadays RFID as well.

This paper shall supply information how to mark and to identify wrist bands uniquely under use of reliable HIBC and ISO standards in an interoperable manner with other processes.

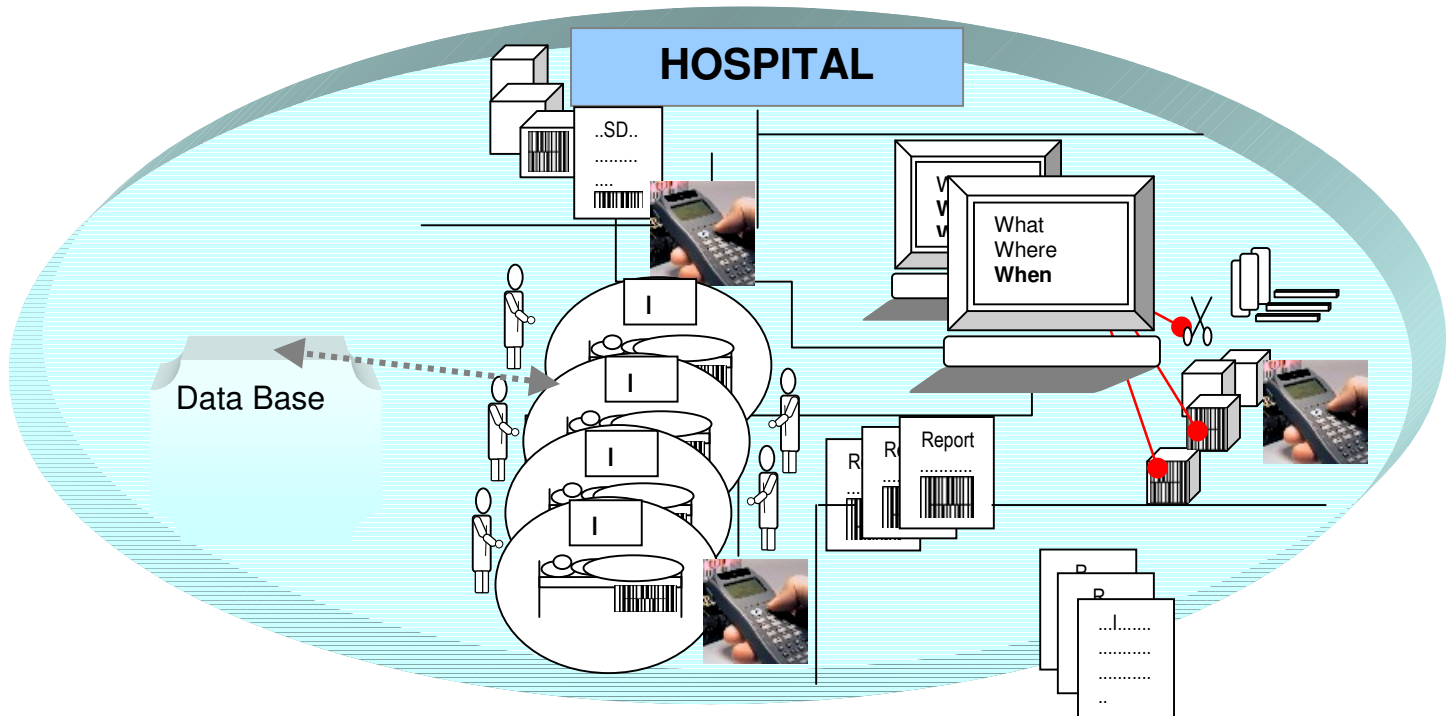


Figure 1: Automatic Data Capture for patient safety and reliable processes.

2. Unique Identification for Hospitals with HIBC & DI's

The HIBC concept for unique identification of items and processes in health care and hospital environmental takes use of the ISO/IEC specifications for full interoperability between in house services and items coming in form external sources. The classical Health Care Barcode "HIBC" is identified by the System Identifier "+", defining products and its variables for tracing them from supplier to the point of use and back safely. All other items get ID's out of the list of Data Identifiers "DI's commonly used for supply chain management and item tracking. DI's are available for open use, they are listed in the ISO/IEC 15418 reference list ¹ANS MH 10.8.2, part ASC Data Identifiers. DI's are already in wide usage in health care for unique marking and identification of surgical instruments, probes, vials, etc. but also for identifying incoming shipments of any kind. Data elements applied with an ASC DI might be flagged with System ID ". ." (Dot) or embedded with syntax ISO/IEC 15434 for providing additional safety.

The structure of unique marking of items is simple, the Data Identifier "DI" describes the meaning of the data element:

Data Identifier	data element
DI	data

System Identifier ". ." put prior to the first DI according to DIN 66403 increases safety:

System ID	Data Identifier	Variable
SI ". ." (dot)	DI	Data

One typical application for DI's is the Unique Identification Mark "UIM" specifically for small and smallest devices.

Example of an "UIM²" of a small medical item flagged by for a unique serial number "25S":

DI "25S" defining the sequence of a unique serial number: DI followed by an Issuing Agency Code (e.g. LH for HealthCare), followed by the Labeller Identification Code, issued by EHIBCC, followed by the serial number	data element for the serial number
25S LH EHOS	1234567890
Unique Serial number:	25S LH EHOS1234567890
Applied with System ID ". ."	.25S LH EHOS1234567890

The sequence "25SLHEHOS1234567890" is a world wide unique serial number for an item. ready to be carried by a symbology for automatic identification such as Barcode, Matrix code or RFID.

If more than one data elements applies, they will be concatenated:

Data Identifier	data element	separator	Data Identifier	data element	separator	etc.
DI	data	+	DI	data	+	etc

Note: Example see chapter 5

¹ ASC Data Identifiers list is available by all Normalization Institutes committed to ISO, e.g. www.DIN.de, AFNOR, ANSI, BSI, etc.

² The Standard Unique Identification Mark for small items is available from www.DIN.de under DIN V66401

There are Data Identifiers available to mark any kind of different items: Parts, locations, documents, persons, etc.

Wrist bands are subject of unique identification as well, where Data Identifiers are the right tools for open applications preventing overlapping of numbering schemes.

Examples of specific information encoded in a wrist band shall be given below.

3. Unique codes for patient wristbands

A wrist band ID shall be unique within the hospitals system, but could be designed for global uniqueness and cross hospital functionality. The ISO/IEC 15418 Data Identifier list ASC MH10.8.2 defines category “H” Human Resources appropriate for patients but for any other personal as well. The table below shows an excerpt of the list with most appropriate standard DI’s available and ready for use:

<i>DI</i>	<i>data element</i>	<i>Example</i>
1H	Employee Identification Code assigned by employer	1H772812X14
3H	Personal ID, mutually agreed	3H1281011PQ18
11H	First name and middle initial	11HMEYERED
25H <i>(new)</i>	Globally Unique Personal ID with Issuing Agency followed by Hospital ID, followed by serial number	25HQCKLNK01234567XYZ
nY	for defining internal reference codes, e.g. 1Y for hospital internal patient ID, 2Y for something else, etc.	1Y09876X4321B

4. Globally Unique Patient ID via identifier “25H”

As of 2010 the new data identifier “25H” for a globally unique personal ID is ideal to mark wrist bands for patients which need to move between different systems. The sequence guaranty local, national and even international uniqueness.

The sequence of a globally unique personal ID is illustrated below.

	<i>DI</i>	<i>Issuing Agency Code (IAC)</i>	<i>issued labeller code(Hospital ID)</i>	<i>serial number</i>
Globally Unique Personal ID	25H			
Code for Health Care		LH (e.g. EHIBCC)		
Labellers Code (Hospital)			EHOS	
Serial number				<u>1234567XYZ</u>

According the sample a typical unique personal code would look like the following data string: **(25H) LH EHOS 1234567XYZ**, ready to be encoded with a Barcode:

25HLHEHOS1234567XYZ

Leading System Identifier „ . “ put in front offers increased safety against overlapping with any other data string: **.25HLHEHOS1234567XYZ**

If the Hospital may wish to use it for patients, internal and external personals, an attribute could be add to the data base entry or attributes could be add to the serial number as a flag for each required category, e.g. P for Patient, I for internal personal, E for externals (see table below).

	<i>DI</i>	<i>IAC</i>	<i>Hospital ID</i>	<i>Internal ID</i>	<i>Serial number</i>	<i>Unique data string</i>
Patient	25H	LH	EHOS	P	<u>1234567XYZ</u>	<u>25HLHEHOSP1234567XYZ</u>
Internal personal	25H	LH	EHOS	I	<u>1234567XYZ</u>	<u>25HLHEHOSI1234567XYZ</u>
External personal	25H	LH	EHOS	E	<u>1234567XYZ</u>	<u>25HLHEHOSE1234567XYZ</u>

5. Optional “Blood Group ID” encoded with a wrist band

³ILBS EUROCODE defines Blood Group’s for open use already. Therefore to use the ILBS EUROCODE Blood Groups is very appropriate in case of demand for such an information related to a patient. One of the advantages of the ILBS EUROCODE is it, that a continued maintenance for blood groups is set up.

As the solution the Blood Group ID shall follow the patient ID as a secondary data element. Following the concatenation rules for DI’s a “+” separates the first data element from the next. It is very appropriate to append the original ILBS EUROCODE data element without change. The EUROCODE standard specifies the data format under chapter 1.2 BLOODGROUP (RED CELL ANTIGENS).

The EUROCODE format consists of the modules below:

- ! = Primary data identifier for a EUROCODE 128
- R = Secondary data identifier
- abcd are numeric {0-9} defining the blood groups in detail (see list below)

Excerpt of the list of BLOOD GROUPS according ILBS EUROCODE

a	AB0;TABLE: 0= no result; 1 = A; 2=B; 3=AB; 4= 0; 8 =0h (Bombay); 9 = special
b	Rh; TABLE: 0=no result; 1=D pos.; 2=D neg.; 3=D weak; 4=D partial; 8=--dd--; 9=special
c	Rhesus subgroups; TABLE: 0 = no result; 1 = CcEe; 2= CCee; 3 = Ccee; 4 = ccee; 5=ccEe; 6= ccEE; 7 = CcEE; 8=CCEE; 9 = CCEe.
d	Kell and/or Cw; TABLE: 0= no result; 1 = K pos.; 2= K neg.; 3 =C w pos ; 4=C wneg; 5=Kell pos,Cwpos; 6=Kell pos, Cw neg; 7 = Kell neg, Cw pos; 8 = Kell neg, Cwneg; 9= special

EXAMPLE of a Blood Group code as a single data element:

<i>CODE</i>	<i>encodes the Blood Group information</i>
!“R1131	the red cell antig. of the unit A Rh pos (D pos) CcD.ee Kell pos

Patient ID associated with Blood Group in one code

For encoding in a wrist band code, the Blood Group ID shall follow the patient ID as a secondary data element. Following the concatenation rules for DI’s a “+” separates the first data element from the next. It is very appropriate to concatenating the original ILBS EUROCODE data element.

Example to concatenate a Patient ID with a Blood Group information.

For illustration the hospital internal definition for a Patient ID is used:

DI	Patient ID	separator	Eurocode Blood Group
25H	LHEHOS1234567XYZ	+	!R1131
complete data string:		25HEHOS1234567+!R1131	
Data string with SI “. ”		.25HEHOS1234567+!R1131	

³ Source: www.eurocode.org

6. Other unique markings, e.g. with DI “25S”

In a clinical environment there are many individual items to be identified uniquely such as equipment, inventory, spare parts, etc. If such items are not uniquely marked yet, the hospital can do it internally. For generic Serial numbers which need to be unique inside the hospital but also unique in external environments, the DI “25S” applies.

Option with Data Identifier “25S” for unique serial numbers

	<i>DI</i>	<i>Issuing Agency</i>	<i>issued labeller code</i>	<i>serial number</i>
describing the sequence	25S			
Code for Health Care		LH		
Labellers Code (Hospital)			CODE	
Serial number				12345678YZ
Example				
Complete data string				25SLHCODE12345678YZ
Applied with SI “. ”				.25SLHCODE12345678YZ

DI “25S” is part of DIN 66401 Unique Identification Mark – UIM. It specifies smallest UIM’s down to 2.8x2.8mm for smallest spaces.

7. Selection of a data carrier for a wrist band with Patient ID

The selection of a data carrier is a matter of available space and specific requirements. Linear Barcode was used in the passed, today Dot Matrix codes as Data Matrix and QR Code are in trend but RFID is a suitable option as well.

Figure 2) shows the unique data element for a wrist band “**25HLHEHOS1234567XYZ**” encoded with 3 different symbols: Code 128, DATAMATRIX and QR Code.

DATAMATRIX ISO/IEC 16022	QR ISO/IEC 18004
 .25HLHEHOS1234567XYZ	 .25HLHEHOS1234567XYZ
CODE 128 ISO/IEC 15417	
 .25HLHEHOS1234567XYZ	

Figure 2) Same data, 3 different codes for same purpose

8. Interpretation of Patient ID and information in a RFID TAG

A unique wrist band ID is structured for independence of the data carrier.

One of the choices is RFID.

The HIBC Guidelines “ISO powered RFID” gives detailed guidance how to use of RFID for health care purposes as for general purposes of supply chain management. The principle is it to make no difference between the data itself but preparing them for synchronous exchange by BARCODE or 2D symbols or by RFID.

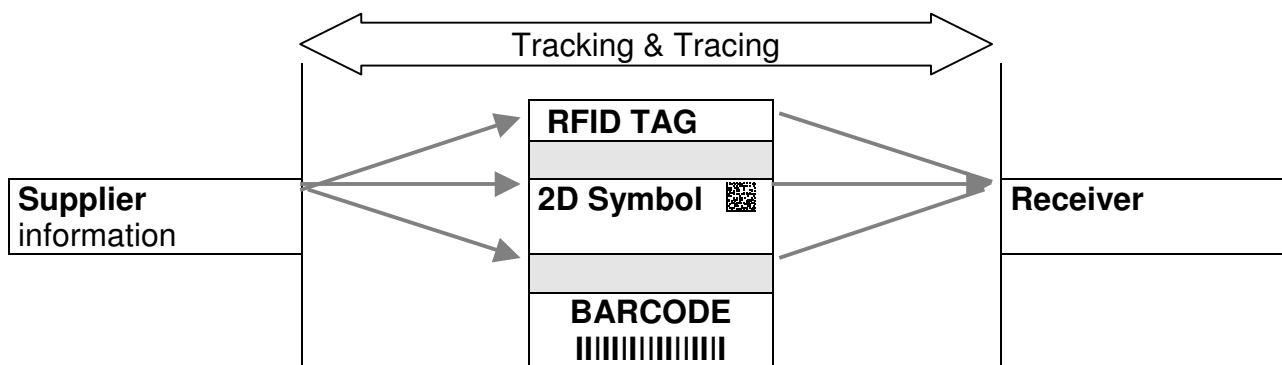


Figure 3) Same supplier information for tracking and tracing items - different but compatible data carriers.

The recommended RFID Air Interface for wrist band use is specified under ISO/IEC 18000-3, 13,56 MHz.

For encoding the HIBC data in an RFID Tag the RFID data protocol ISO/IEC 15961-3 applies.

Data element e.g. Patient ID and Blood Group	RFID Standards for carrying the data safely in open requirements
.25HLHOS1234567+IR1131	ISO/IEC 18000-3, 13,56 MHz ISO/IEC 15961,2, 3 data and protocol



9. Annex RFID Experts information

Technically ISO/IEC 15961 specifies the Application Family Identifier “AFI” for identifying the DI structure used in Barcode and 2D as well for full compatibility. Below you will find an excerpt of the guidelines showing technical realisation for encoding DI structured data elements.

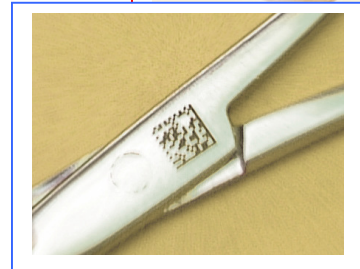
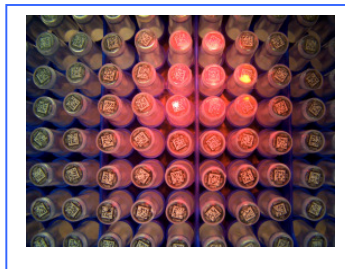
Table: Data elements encoded in a RFID Tag

RFID Tag type	ISO/IEC 15963	& ISO/IEC 7816-6	ISO/IEC 15961, 15962				ISO/IEC 15418 ASC MH10		Application	
			AFI	AF S	Access method	Data format	DI	Optional data	Data (examples)	option
eHIBC I	Fixed UID with IC manufacturer ID	RFID Tag (IC) Manufacturers responsibility	10	1	0	10	25S		LHA23412345678Z	
eHIBC P										
eHIBC T			10	1	0 or 1	10	25H		25H09876X4321B	R1131

10. References and Sources for documents

- Barcode and 2D-Codes, e.g. ISO/IEC 15417 Code 128, ISO/IEC 16022 Datamatrix: www.DIN.de
- DIN 66401 UIM and DIN 66403 System Identifiers; www.DIN.de
- HIBC Standard and Guidelines, www.HIBC.de
- HIBC Unique Identification Mark – UIM: www.HIBC.de
- Application form for membership and Labour ID assignment: www.HIBC.de

HIBC Health Care Solutions



Please ask for your specific solution
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