

# Design Guidance

## Patient Identification Number Input and Display

Thursday, 28 January 2010  
Version 2.0.0.0

*Prepared by*  
**Microsoft**

## PREFACE

### Documents replaced by this document

Document Title	Version
Design Guidance – Patient Identification Number Input and Display	1.0.0.0

### Documents to be read in conjunction with this document

Document Title	Version
Design Guidance – Accessibility Principles	1.0.0.0
Design Guidance – Accessibility Checklist	1.0.0.0

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# 1 INTRODUCTION

This document describes the design guidance for input and display of patient identification numbers in clinical applications. It describes the area of focus, provides guidance and recommendations, and explains the rationale behind the guidance and recommendations.

This document is intended for the use of anyone whose role includes screen design, implementation, or assessment of a clinical application. This document can be used as guidance for the:

- Specification of an input control and a display control for a patient identification number in a user interface (UI)
- Implementation of an input control and a display control for a patient identification number within an application
- Assessment of an input control and a display control for a patient identification number in a clinical application user interface

## Notes

- This document contains some examples explicitly derived from research in the UK. Whilst you should adhere to the underlying principles, disregard any country-specific detail if it is not appropriate for your locale. Ensure that your clinical application adheres to the requirements of the location where it will be used
- Elements used within a software application are commonly referred to as a 'control'. These can take many forms but the types referred to in this document will either be 'input controls' that can receive input from a user, such as a button, text box, option button (radio button) or check box, or 'display controls' such as a label, which can only display information

Table 1 describes the changes made since the previous version of this guidance (Baseline version 1.0.0.0 dated 01-Apr-2008):

Change	IDs	Change Description
Deleted		None
Modified		Enhanced out of scope context setting (section 1.2.2)
		Enhanced usage example description (section 2.1.2)
Added	NUM-0002	Display the patient identification number (for example, NHS Number) in groups for readability

Table 1: Changes Since the Last Baseline Version

## 1.1 Customer Need

The accurate identification of patients is vital to ensure that the correct patient receives the right care. This is a very frequent task and must necessarily be repeated every time a patient presents themselves, for example, to a receptionist, sometimes several times in one day. In addition to being accurate, the patient-identification task must therefore also be performed efficiently. The patient identification number is a unique identifier that makes it possible to share patient information across the healthcare industry safely, efficiently and accurately.

The patient identification number will be read from screen displays and be correlated with information in different media, for example, paper records, and forms, to check that these show the same identifier. Unambiguous display enhances patient safety and application usability by enabling rapid correlation with paper records and forms on which the identifier is printed. Therefore, it should be presented in an easy-to-read and consistent format across all media.

The patient identification number will provide the means to efficiently integrate a patient's data from disparate registers. Additional checks with the full set of patient information, such as family name, given name, gender, date of birth and address, are used for greater accuracy when matching for clinical purposes.

## 1.2 Scope

This section defines the scope of this guidance document.

### 1.2.1 In Scope

This guidance is applicable to UIs such as those displayed on desktop or laptop computers. It is assumed that, as a minimum, these computers are capable of operating at a display resolution of 1024 x 768, and have a keyboard and pointing device. The following items are in scope:

- Input of a fully specified patient identification number
- Display of a fully specified patient identification number

### 1.2.2 Out of Scope

This section defines areas that are not covered in this guidance. Although there may be specific risks associated with these areas that are not addressed in this guidance, it is likely that the principles in this guidance will extend to the input and display of a patient identification number in many of the areas listed below.

The following items are out of scope:

- **Validation** – That a given patient identification number is that of the stated person
- **Multi-language applications** – Languages that use right-to-left writing, such as Arabic, the Cyrillic alphabet such as Russian, or ideograms such as Japanese
- **Display styles** – Choice of display font size, background and foreground text colour will affect the readability of patient identification numbers, as with all other displayed text
- **Bar code representation** – The display on a wristband of a patient identification number in the form of a bar code
- **Reduced-size form factors** – This guidance does not cover reduced-size form factors, such as personal digital assistants (PDAs) and such other small mobile devices
- **Data storage and transmission** – This guidance relates only to the display layer of a clinical application, and does not prescribe how patient identification numbers should be stored. It is assumed that all applications will be capable of transforming a patient identification number stored in an arbitrary format, into that prescribed by this guidance, without error
- **Data history and provenance** – The recording of dates for when a patient identification number is valid is left to the designer of the clinical application
- **Form design** – Typically a patient identification number will be entered in a form in which a user is asked to enter additional information such as name and contact address. This guidance does not address form-level aspects such as the positioning of labels, error messages, or how mandatory fields should be displayed

#### Note

Listing an item as out of scope does not classify it as unimportant. Project time and resource constraints inevitably restrict what can be in scope for a particular release. It is possible that items out of scope for this release may be considered for a future release.

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## 1.3 Key Principles

The following key principles have shaped the guidance in this document:

- Conforming to convention and existing best practice with which clinicians are already familiar, so as to reduce the training requirements of clinical applications
- Promoting data quality to reduce the occurrence of errors
- Balancing the need for consistency and commonality across clinical applications with the need to support Independent Software Vendor (ISV) requirements for flexibility

## 2 RECOMMENDATIONS AND GUIDANCE

The guidance provided in this document is based upon a programme of user research, including:

- A desk-based research project looking at a range of information entry Web pages and clinical applications
- A Web-based survey of 41 respondents drawn from ISVs, healthcare administrative staff and healthcare professionals, including clinicians and community pharmacists
- A patient safety assessment

### Important

The visual representations used within this document to display the guidance are illustrative only. Stylistic choices, unless otherwise specified, are not part of the guidance and are therefore not mandatory requirements for compliance with the guidance in this document.

### 2.1 Number Display

Patient identification numbers will be read frequently by healthcare professionals and by patients, on computer monitors, as displayed by clinical applications, as well as on paper communications such as referral letters, appointment cards and test results. They must, therefore, be easy to read. As they are used to identify patients and match patient records, they must be displayed in full, to ensure these tasks are conducted accurately. The guidance for displaying the patient identification number takes these requirements into account.

#### 2.1.1 Guidance

ID	Guideline	Status
NUM-0001	Display the patient identification number in full, on a single line, without truncation or splitting it over multiple lines	Mandatory
NUM-0002	Display the NHS Number as three groups, with a single space included as a separator between groups, as follows: <ul style="list-style-type: none"> <li>■ The first group must consist of the first, second and third digits in order</li> <li>■ The second group must consist of the fourth, fifth and sixth digits in order</li> <li>■ The third group must consist of the seventh, eighth, ninth and tenth digits in order</li> </ul>	Mandatory
NUM-0003	Support the copying of patient identification numbers by the user as part of the 'Copy and Paste' task	Recommended

Table 2: Guidance for Patient Identification Number Display

#### 2.1.2 Examples of Correct Usage

Usage	Format	Example	Comments
✓	999 999 9999	123 456 7890	The patient identification number is displayed in the required format with numbers grouped to improve screen reader performance

Table 3: Correct Patient Identification Number Display Examples

## 2.1.3 Examples of Incorrect Usage

Usage	Format	Example	Comments
✘	9999999999	1234567890	Patient Safety Critical This example displays a very poor reading pattern because a single ten-digit number is beyond the normal capacity of short-term memory. This representation is likely to cause errors
✘	999999- 9999	123456- 7890	Patient Safety Critical The patient identification number is split over two lines making it likely that users will not read all ten digits or assume that the hyphen is part of the number
✘	99999 99999 99 99 99 99 99	12345 67890 12 34 56 78 90	Lack of Intuitive Structure The display of more than four digits in a group or of more than three groups does not make best use of short-term memory
✘	999/999/9999 999.999.9999	123/456/7890 123.456.7890	Poor Readability A space provides better separation; it also assists in differentiating the patient identification number from other numeric data items, such as dates and telephone numbers

Table 4: Incorrect Patient Identification Number Display Examples

## 2.1.4 Rationale

This section discusses the reasons underlying the guidance for displaying patient identification numbers.

### 2.1.4.1 Wrapping and Truncation

Readability is enhanced when the digits comprising the patient identification number can be read together. If the patient identification number is split over two lines, a hyphen will be inserted at the point at which the line breaks. This could potentially cause the reader to think that the patient identification number contains the hyphen. Alternatively, the continuation of the number on another line may not be noticed by the user, or may be read incorrectly.

### 2.1.4.2 Accessibility

The provision of a separator between number groups assists with interpretation of the number by screen readers. Without the separator, the numbers would often be read out as large numbers, which are difficult to deconstruct into their constituent numbers.

For example, the JAWS<sup>®</sup> for Windows screen reader reads 4010232137 as “Four billion and ten million two hundred and thirty two thousand one hundred and thirty seven”. However, the same screen reader software reads out the proposed patient identification number as a string of numbers. An inherent problem with screen readers is that the form the read-out numbers take is dependent on the numbers themselves. Some examples are:

- 401 023 2137 – read out as “four hundred and one zero two three twenty one thirty seven”
- 401 230 2137 – read out as “four hundred and one two hundred and thirty twenty one thirty seven”
- 041 023 0104 – read out as “zero four one zero two three zero one zero four”
- 401 230 2009 – read out as “four hundred and one two hundred and thirty two thousand and nine”

It is unfortunate that the audible reading patterns differ according to the specific number. However, this is considered acceptable because users of screen readers are accustomed to dealing with such numbers.



## 2.2 Number Input

The purpose of the patient identification number input control is to enable the user to enter a patient identification number. The control is a 'Text Input Box' as shown in Figure 1. Typically, it would be preceded by a label as shown in Figure 2. Upon input, the control would display the number entered as illustrated in Figure 3.

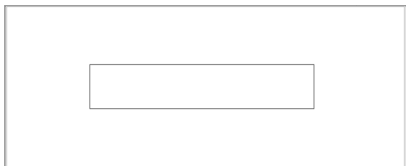


Figure 1: Example of a Patient Identification Number Control Without a Label



Figure 2: Example of a Patient Identification Number Control with a Label

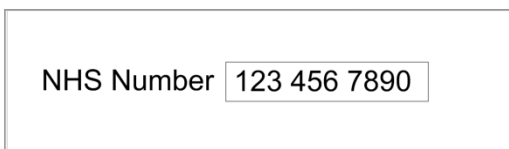


Figure 3: Example of a Patient Identification Number Control with a Label (After Input)

### Important

In the illustrations in this document, the text 'NHS Number' is provided as an example for a label. It is not part of the control and no guidance on the wording or positioning of this label is implied.

### 2.2.1 Hints, Prompts and Tooltips

The input control may provide a hint, prompt, or tooltip. Hints are instructional text placed outside but adjacent, to the text input box. Prompts are commonly known as watermarks and comprise instructional text placed within the text input box. Tooltips are instructional text that appear when the mouse pointer is placed over the text input box. The wording of hints and prompts is left to the designers of clinical applications. A suggestion for when the patient identification number is the NHS Number is to use, for example, '123 456 7890'. A suggestion for a tooltip in this case is: 'Enter the patient identification number e.g. 123 456 7890. This is a ten-digit number used to identify a person uniquely within the NHS in England and Wales'. Examples of hints, prompts, and tooltips are shown in Figure 4, Figure 5 and Figure 6 respectively.



Figure 4: Example of a Patient Identification Number Control with a Hint



Figure 5: Example of a Patient Identification Number Control with a Prompt

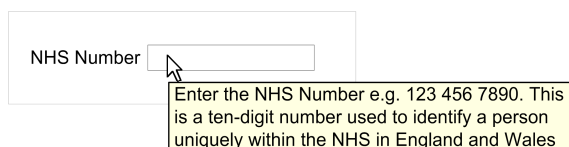


Figure 6: Example of a Patient Identification Number Control with a Tooltip

## 2.2.2 Guidance

ID	Guideline	Status
NUM-0010	Provide a single text input box for patient identification number entry	Recommended
NUM-0011	Permit only one patient identification number to be entered in a patient identification number input box	Mandatory
NUM-0012	Set the length of the patient identification number input box such that the patient identification number is visible in full	Recommended
NUM-0013	Set the height of the patient identification number input box to the largest character height in the currently active display font, taking the user's settings into account	Recommended
NUM-0014	Permit patient identification number input via all the mechanisms supported on a platform such as, but not limited to, typing on a keyboard, copy and paste, and handwriting with a stylus	Recommended
NUM-0018	Do not permit input of old format and temporary patient identification numbers	Mandatory

Table 5: Guidance for the Input of the Patient Identification Number

## 2.2.3 Examples of Correct Usage

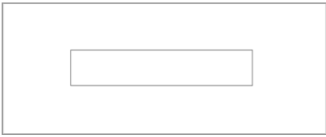
Usage	Format	Example	Comments
✓	Sufficiently-sized input box		The input box is the right size to accommodate a single patient identification number; it must be no bigger and no smaller

Table 6: Correct Patient Identification Number Display Examples

## 2.2.4 Examples of Incorrect Usage



Usage	Format	Example	Comments
✗	Multi-line input box		A tall input box incorrectly implies that more data than a single patient identification number can be entered, while also unnecessarily consuming real-estate on a monitor
✗	Long input box		A long input box incorrectly implies that more data than a single patient identification number must be entered

Table 7: Incorrect Patient Identification Number Display Examples

## 2.2.5 Rationale

The patient identification number is unique to an individual. This elevates its importance in patient identification over patient name and date of birth, which may not be unique to an individual. The chosen layout provides the best display format because it divides the patient identification number into a consistent set of easy-to-read sections. This should increase patient safety through a reduction in patient identification errors, caused by misreading the number.

### 2.2.5.1 *Height and Length of the Patient Identification Number Text Box*

The dimensions of the text input box should be sufficient to correctly indicate the intended purpose of the box, namely to enter a single patient identification number. The height of the box should therefore be adequate to accommodate a single line, not a paragraph. The length of the box should be sufficient to permit the user to read the patient identification number in its entirety.

The checking of a patient identification number after it has been entered is a common task and one which users will perform after each patient identification number input. When a user enters a patient identification number in a box that is not long enough, the initial numbers will scroll to the left side of the box, and therefore, not be visible. The user will then be forced to scroll back to the start of the box to reveal the initial numbers of the patient identification number. To do this, keyboard users will have to locate and press either the left arrow or the HOME key, thereby, reducing task efficiency.

### 2.2.5.2 *Automatic Reformatting*

Entering, and then checking, the long sequence of numbers that make up a patient identification number, such as an NHS Number, is an error-prone task. The required display format, namely the constituent numbers arranged in three groups delimited by a single space, makes the number easier to read, and decreases the cognitive load on the user. By having the control do this automatically, the user is assisted proactively, and data quality is enhanced.

### 2.2.5.3 *Screen Reader*

Screen reader software would read out a patient identification number, such as an NHS Number, that did not contain any spaces in such a way that it did not make sense. For example, the number 1234567890 would be read out by JAWS as “one billion two hundred and thirty four million five hundred and sixty seven thousand eight hundred and ninety”. Read out in this way, the number is almost unintelligible and cannot be validated by the person who has just entered it. Conversely, a number displayed in the required form, for example, 123 456 7890, would be read out by JAWS as “one hundred and twenty three four hundred and fifty six seventy eight ninety”. Read out in this way, the number is easier for the listener to validate.

## 3 DOCUMENT INFORMATION

### 3.1 Terms and Abbreviations

Abbreviation	Definition
CUI	Common User Interface
ISV	Independent Software Vendor
NHS	National Health Service
PDA	Personal Digital Assistant
UI	User Interface

Table 7: Terms and Abbreviations

### 3.2 Nomenclature

This section shows how to interpret the different styles used in this document to denote various types of information.

#### 3.2.1 Body Text

Text	Style
Code	Monospace
Script	
Other markup languages	
Interface dialog names	<b>Bold</b>
Field names	
Controls	
Folder names	Title Case
File names	

Table 9: Body Text Styles

#### 3.2.2 Cross References

Reference	Style
Current document – sections	Section number only
Current document – figures/tables	Caption number only
Other project documents	<i>Italics</i> and possibly a footnote
Publicly available documents	<i>Italics</i> with a footnote
External Web-based content	<i>Italics</i> and a <a href="#">hyperlinked footnote</a>

Table 10: Cross Reference Styles