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Medications Management – Medication Line

User Interface Design Guidance

Prepared for

NHS Connecting for Health

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PREFACE

Documents replaced by this document

Document Title	Version
Medications Management – Medication Line – User Interface Design Guidance	1.0.0.0

Documents to be read in conjunction with this document

Document Title	Version
Design Guide Entry – Medications Management – Medications Views	2.0.0.0
Design Guide Entry – Medications Management – Drug Administration	3.0.0.0
Design Guide Entry – Patient Banner	3.0.0.0

Patient Safety Process

The development cycle for this design guide is compliant with the Clinical Safety Management System (CSMS) – the patient safety risk assessment and management process defined by NHS Connecting for Health (NHS CFH) in conjunction with the National Patient Safety Agency (NPSA).

The design guide developers reviewed patient safety incidents arising from both current practice and existing systems for medications management. The resulting guidance points support mitigation of these known patient safety risks. In addition, the developers identified any potential new risks by applying a patient-safety risk-assessment process. The developers are assessing and managing all risks to support a Clinical Safety Case for this design guide.

The Hazard Log records all hazards and risks raised to date and includes mitigation actions that, in some cases, will be applicable to you if you are an implementer or other user of this design guide. The Hazard Log is a live document and updates regularly whilst this design guide continues its development. Until this design guide has received full Clinical Authority to Release (CATR) from the NHS CFH Clinical Safety Group (CSG) – based on an approved Clinical Safety Case – there may be outstanding patient safety risks yet to be identified and mitigated. Therefore, it is essential that you review the relevant Hazard Log in conjunction with this design guide.

Refer to nww.cui.nhs.uk (N3 connection required) for all current patient safety documentation, including Hazard Logs and the current patient safety process status for this and other design guides.

This document was prepared for NHS Connecting for Health which ceased to exist on 31 March 2013. It may contain references to organisations, projects and other initiatives which also no longer exist. If you have any questions relating to any such references, or to any other aspect of the content, please contact cuistakeholder.mailbox@hscic.gov.uk

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1 INTRODUCTION

This document provides guidance for the representation of a medication in a user interface (UI). It describes the area of focus, lists mandatory and recommended guidance points with usage examples and explains the rationale behind the guidance.

This document replaces the previously published guidance *Medications Management – Medication Line* **{R1}**. It has been extended to provide formatting and layout rules that add structure and consistency to the way that medications are displayed in a user interface.

Table 1 describes the changes made since the previous version of this document:

Previous Baseline Version	Previous Baseline Date	Changes Since Previous Baseline
1.0.0.0	28-Mar-2008	The following table summarises updates that have been made to this document: **Deleted**: ▪ MEDi-006 deleted to remove constraint to UK or NHS standards **Modified**: ▪ MEDi-002 includes additional information that cites exceptions in which capital letters can be used in a generic drug name ▪ MEDi-004 has been split into MEDi-023 and MEDi-026. These two guidance points are listed in separate sections to provide more detailed guidance for truncation and abbreviation respectively ▪ MEDi-005 has been split into MEDi-018 and MEDi-027. These two guidance points are listed in separate sections to provide more detailed guidance for separators and symbols respectively ▪ MEDi-007 has been updated to mandate the use of the word 'DOSE' in a text label for a dose value ▪ MEDI-010, MEDi-011 and MEDi-012 have been reworded to clarify the guidance **Added**: ▪ A further 42 guidance points, MEDi-013 to MEDi-054, have been added. Refer to section 2.1 for more details

Table 1: Changes Since the Last Baseline Version

> **Note**
>
> In this document, the words 'generic' and 'brand', when associated with drug names, are used with very specific meanings that may differ from their accepted meanings in other contexts. Refer to section 4.2 for definitions of the specific terminology used in this document.

1.1 Customer Need

An electronic – system for managing a patient's medications must be able to support the complex needs of a wide range of health care professions and health care settings. A successful display solution must therefore balance those complex information needs with safety concerns, and ensure consistency across views and between systems.

Medications Incidents – The National Patient Safety Agency (NPSA) reports that the majority of medication incidents reported between January 2005 and June 2006 related to the administration of medicines (59.3 percent), followed by incidents related to the preparation and dispensing of medications (17.8 percent) and the prescribing of medications (15.7 percent). Their findings, documented in *Safety in doses: medication safety incidents in the NHS*[1], also state that the most

[1] NPSA – Safety in doses: medication safety incidents in the NHS **{R2}**: http://www.npsa.nhs.uk/EasySiteWeb/GatewayLink.aspx?alId=5535

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common types of medication incidents reported to the NSPA included incorrect dose, incorrect strength or frequency, omitted medicine and wrong medicine.

Existing Systems – In-patient hospital care settings currently use multiple kinds of medications documents, both paper-based and electronic. As care professionals move between hospitals and are faced with new information groupings while working in stressful environments, the differences in the designs of the documents they use may well already impact patient safety. Differences in display formats for medicines impact both the review and management of those medications and will become a safety concern as electronic systems become more widely available in the next few years. The challenge for designers developing electronic systems in this area is particularly great as there are no universally-accepted paper-based standards to reference.

Research in which extensive studies of medication-related errors were reviewed, suggests that the most powerful means of preventing medication-related errors are computerised order entry and administration management along with standards for processes and for the writing of prescriptions (see *Medication Errors* **{R3}**, *To Err Is Human* **{R4}** and *Understanding Patient Safety* **{R5}**).

Anecdotal references to medication errors most frequently describe problems with legibility of handwritten scripts, the use of abbreviations, translation errors in verbal communications and mistakes exacerbated by similar looking bottles or product labels and similar looking or similar sounding drug names. These well-documented errors focus on specific elements of a medication order, as do the means by which we mitigate them. In addition to these specific errors, there is a need to ensure that medications orders are more thorough in terms of the information they contain, and that they are created, structured, displayed and communicated in a consistent way. Mitigations of this kind may also address the specific errors described above, by providing additional information in a medication order in a way that leaves less room for misinterpretation.

1.2 Scope

This guidance has been designed for the display of medications for a single patient in a hospital ward environment. The guidance applies to the display of the details of a medication including drug name, strength, form, dose, route and frequency. The additional information about medication required for safe medication management, review and modification is out of scope.

1.2.1 In Scope

The guidance in this document covers the following features:

- Line item display rules:
  - Generic rules for the display of medication including wrapping, truncation, abbreviation, spacing, fonts formatting and labelling

The following users are covered in this guidance:

- Doctors and other independent prescribers
- Nurses with responsibility for medicines administration
- Pharmacists

The following care settings are covered in this guidance:

- Inpatient

The following medications are covered in this guidance:

- Oral solids and liquids
- Inhalers and sprays
- Eye, ear and nose drops

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- Topical liquids
- Creams, ointments and gels
- Enemas and rectal solutions
- Granules and powders
- Suppositories and pessaries
- Topical patches
- Nebuliser solutions
- Simple infusions (by example only)
- Injections (insulin example only)
- Unlicensed medications

1.2.2 Out of Scope

Although there may be specific risks associated with the out of scope areas that are not addressed in this guidance, it is likely that the principles in this guidance will extend to the display of medication information in many of the areas listed below.

The following features are not covered in this guidance:

- The display of all information about a single medication:
  - Guidance for the layout and structure for the presentation of 'all' information for one medication from the selection of a medication anywhere in a clinical application
- Identity of a medication:
  - Definition of which attributes can be changed without the need for a new medication line to be created (in the UI)

The following users are not covered in this guidance:

- Other health care professionals
- Senior nurse (for ward management and multi-patient tasks)
- Non-clinical staff
- Patient

> **Note**
>
> The patient is out of scope because the guidance is designed to support user interfaces used by clinicians. As such, it will therefore present information in formats that are designed to support health care professionals. The display of medication information in views that are designed for patients is not addressed in this guidance.

The following care settings are not covered in this guidance:

- Outpatients
- Clinics
- Pharmacies
- Emergency services and departments

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- Intensive Care, High Dependency Unit (HDU)
- Primary care, including General Practice
- Community and home visits

The following types of medications are not covered in this guidance:

- Enteral feeds
- Dressings and devices
- Implants and sticks
- Intrauterine devices (IUDs)
- Cements
- Homeopathic products (including complementary and alternative therapies)
- Dialysis solutions
- Injections (except by specific example)
- Insulin (except by specific example)
- Infusions and fluids (except by specific examples)
- Combination infusions
- Total Parental Nutrition (TPN)
- Gases
- Blood and platelet products
- Radio-pharmacy
- Variable dose medications (by example only)
- Foams
- Radioactive agents
- Regimens and order sets
- Advisory Committee on Borderline Substances (ACBS) products
- Over the counter (OTC) medications
- Recreational drugs
- Medications with titrating doses
- Discharge medications – to take out (TTO)
- Patient's own drugs (PODs)
- Epidurals and analgesia (and similar patient controlled medications)
- Extemporaneous prescriptions
- Medication prescribed by Patient Group Direction (PGD)
- Medication prescribed by supplementary prescribers

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The following are also not covered in this guidance:

- Sealed envelopes
- Decision support
- Knowledge support
- Alerts and warnings
- When a patient is 'Nil by Mouth'
- Allergies
- Patient preference (for example, for a particular drug form)

1.3 Dependencies

ID	Dependency
D1	This guidance is informed by ongoing and unpublished work by the NHS National Programme for IT (NPfIT) that is referred to in this document as NHS Connecting for Health (NHS CFH) Medication Types Rules. The NHS CFH Medication Types Rules is still evolving and is based on extensive research and consultation. Changes to this work will trigger changes to this guidance.
D2	The guidance points in section 3.3.1 are particularly dependent on research into the application of Tallman lettering, as documented by the Institute for Safe Medication Practices (ISMP) in *How should Tallman lettering be applied to look-alike/sound-alike drug name pairs?*[2]. In summary, Tallman lettering is a proposed solution for mitigating the risks of 'look-alike, sound-alike' drug names. Tallman lettering is mandated in the US and recommended by the World Health Organization (WHO) in *Look-Alike Sound-Alike Medication Names*[3]. The uptake of Tallman lettering in electronic prescribing in the UK would require a review of the use of capital letters for differentiating brand names, and is currently the subject of an ongoing NHS CFH research project.
D3	This guidance is informed by the NHS CFH *ePrescribing Functional Specification*[4] .
D4	This guidance uses the concepts 'generic drug' and 'brand name' and depends on access to, or creation of, a database or dictionary, that can support these concepts, such as the *Dictionary of Medicines and Devices* (known as 'dm+d')[5].

Table 2: Dependencies

[2] The Institute for Safe Medication Practices – Frequently Asked Questions (FAQ) – How should Tallman lettering be applied to look-alike/sound-alike drug name pairs? **{R6}**: http://www.ismp.org/faq.asp#Question_5

[3] World Health Organization – WHO Collaborating Centre for Patient Safety Releases – Patient Safety Solutions – Volume 1, Solution 1 – Look-Alike, Sound-Alike Medication Names **{R7}**: http://www.ccforpatientsafety.org/fpdf/Presskit/PS-Solution1.pdf

[4] NHS CFH – ePrescribing Functional Specification **{R8}**: http://www.connectingforhealth.nhs.uk/newsroom/news-stories/eprescfunctspec

[5] Dictionary of Medicines and Devices **{R9}**: http://www.dmd.nhs.uk/

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2 GUIDANCE OVERVIEW

When a medication is prescribed, a series of choices are made about the type of medication and the way in which it is to be administered. Assuming that the prescribing and administration of a medication is recorded electronically, those choices are then represented in various degrees of detail and in different areas of a user interface. For example, a summary of the prescription might be displayed in a patient summary, a more detailed set of information might be displayed in a list of that patient's current medications and a different set of detailed information might be displayed in an electronic drug administration schedule.

The details that are displayed on the screen, as well as the formatting and layout applied to them, will vary depending on the purpose of the part of the clinical application in which they are being displayed. Some views will show medications information in text while others will show some of that information encoded visually. A text description of a medication in any of these views is referred to in guidance as a 'medication line'.

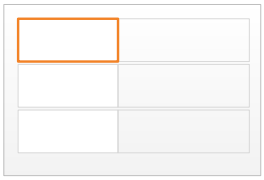
Guidance for two medication views, *Medications Management – Medication View* **{R10}** and *Medications Management – Drug Administration* **{R11}**, define specific layout and details for the display of medication information in those views. The guidance in this document includes layout and formatting details that apply to all views that are designed to support medications management for a single patient in a hospital ward.

It is likely that many of the principles in this guidance will extend to the display of medication information in all areas of a clinical application.

Figure 1 illustrates how the guidance can be applied to four different styles of medication line in four notional views:

diltiazem – CALCICARD CR – modified-release tablet – DOSE **120 mg** – oral – three times a day

view 1



diltiazem – CALCICARD CR – modified-release tablet
DOSE **120 mg**
ROUTE oral – three times a day

view 2

diltiazem – CALCICARD CR – modified-release tablet
DOSE **120 mg** – oral – three times a day

view 3

diltiazem – CALCICARD CR
FORM modified-release tablet
DOSE **120 mg**
ROUTE oral
FREQUENCY three times a day

view 4

Figure 1: Examples of Medication Line Guidance Applied to a Medication Line in Four Notional Views

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2.1 Summary of Guidance

Detailed guidance and rationale for all guidance points is in sections 3.3.1 to 3.3.13. Refer to APPENDIX A for a reference list of all the guidance descriptions. Table 3 provides a summary of the guidance.

> **Note**
>
> In the **Visual Summary** column, items highlighted in blue indicate correct usage and those in red indicate incorrect usage.

Reference	Section	Visual Summary
MEDi-001 MEDi-002 MEDi-003 MEDi-013	3.3.1 Formatting Drug Names How to use bold, uppercase and lowercase to support recognition of generic versus brand names.	generic brand **diltiazem** – CALCICARD CR – modified-release tablet – DOSE **120 mg** – oral – twice a day
MEDi-014 to MEDi-017	3.3.2 Displaying Numbers How to display numbers including large numbers with many zeros and numbers that use decimal points.	**500 mg** **2,000** **0.9 g**
MEDi-018 to MEDi-020	3.3.3 Separators How to use separators to support recognition of chunks of information combined into a text string like a sentence.	**paracetamol** – tablet – DOSE **1 g** – oral – every 6 hours
MEDi-010 MEDi-011 MEDi-021 MEDi-008	3.3.4 Wrapping How to determine where to wrap the text in a medication line when horizontal space is limited.	**paracetamol** 500 mg + **metoclopramide** 5 mg – sachet – DOSE **2 sachets** – oral – every 4 hours as required – maximum 6 doses in 24 hours
MEDi-022 to MEDi-024	3.3.5 Abbreviation How to handle specific examples of abbreviation and abbreviations that should be avoided.	paracetamol **para** – tablet – DOSE **500 mg** – oral – every 6 hours Do not abbreviate drug names
MEDi-025 MEDi-012 MEDi-054	3.3.6 Truncation Specific examples of when it is important to avoid truncation.	injection **heparin** – 5,000 units per mL – solution for in Do not truncate or omit information from a medication line
MEDi-026 to MEDi-028	3.3.7 Symbols When to use specific symbols and symbols that should be avoided.	@ & | / \ < > ( ) [ ] { }

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Reference	Section	Visual Summary
MEDi-009 MEDi-029 to MED-034	3.3.8 Text Labels How and when to use text labels.	**heparin** – solution for injection STRENGTH 5,000 units per mL DOSE **5,000 units** ROUTE subcutaneous – once only
MEDi-035	3.3.9 Line Breaks Where to place separators when hard line breaks are used.	line break **paracetamol** – tablet DOSE **500 mg** – oral – every 6 hours text wrap
MEDi-036 MEDi-037	3.3.10 Line Spacing How much space to leave between lines of text.	**paracetamol** – tablet – DOSE **500 mg** – oral – every 6 hours Preserve white space between lines
MEDi-007 MEDi-038 to MEDi-044	3.3.11 Displaying Dose How to use labels and text formatting to support recognition of a dose within a medication line. How to display numbers in a dose value.	label space DOSE **500 mg** bold DOSE **500 mg**
MEDi-045 to MEDi-050	3.3.12 Displaying Strength How to use layout and appropriate words to display a strength. How to display numbers in a strength value.	**co-amoxiclav** – 400 and 57 mg in 5 mL – suspension – DOSE **1.2 mL** – oral – every 12 hours
MEDi-051 to MEDi-053	3.3.13 Attribute Order The order in which to display the chunks of information that make up a medication line.	**generic** – BRAND – strength – form – DOSE **dose** – route – frequency

Table 3: Summary of Guidance

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3 GUIDANCE DETAILS

3.1 Introduction

This section contains detailed guidance for the display of a medication that has been prescribed for a single patient.

3.2 Principles

The following key principles inform the guidance in this section:

- Minimise visual clutter so that formatting and icons are effective for providing emphasis and implying priorities: draw attention to important information without introducing too much distraction
- Support legibility through the use of font, line spacing, and letter spacing and other proven mechanisms
- Define rules to support standard display of medications information wherever possible whilst allowing flexibility for information to be displayed appropriately for different tasks

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3.3 Guidelines

3.3.1 Formatting Drug Names

ID	Description	Conformance	Evidence Rating
MEDi-001	Display generic drug names in bold	Mandatory	Medium
MEDi-002	Display generic drug names in lowercase (capital letters may still be used for acronyms and abbreviations in some drug names such as amphotericin B, factor VIII, carbomer 974P)	Mandatory	Medium
MEDi-003	Display drug brand names in uppercase	Mandatory	Medium
MEDi-013	Where both the generic name and the brand name appear in a medication line, list the generic name first	Mandatory	Medium

Usage Examples

diltiazem – CALCICARD CR – modified-release tablet – DOSE **120 mg** – oral – three times a day ✓

In this correct example, the generic drug name is bold and lowercase and the brand name is uppercase.

Diltiazem – calicard CR – modified-release tablet – DOSE **120 mg** – oral – three times a day ✗

This example is incorrect because the drug name is in title case but should be in lowercase, the drug name is in a regular font but should be bold and the brand name is in lowercase but should be in uppercase.

Diltiazem – Calcicard CR – modified-release tablet – DOSE **120 mg** – oral – three times a day ✗

This example is incorrect because the drug name is in title case but should be in lowercase and the brand name is in title case but should be in uppercase.

isosorbide mononitrate – IMDUR – modified-release tablet
DOSE **60 mg** – oral – once a day ✓

diltiazem – CALCICARD CR – modified-release tablet
DOSE **120 mg** – oral – three times a day ✓

INFANRIX-IPV Vaccine – suspension for injection
DOSE **0.5 mL** – intramuscular injection – once only ✓

DIORALYTE blackcurrant – powder for oral solution
DOSE **1 sachet** – oral – once only ✓

GAVISCON aniseed – suspension
DOSE **10** to **20 mL** – oral – four times a day – after food ✓

In these five correct examples, the generic drug names are in bold and lowercase and the brand names are uppercase.

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isosorbide mononitrate – IMDUR – modified-release tablet
DOSE 60 mg – oral – once a day

diltiazem – CALCICARD CR – modified-release tablet
DOSE 120 mg – oral – three times a day

INFANRIX-IPV Vaccine – suspension for injection
DOSE 0.5 mL – intramuscular injection – once only

DIORALYTE blackcurrant – powder for oral solution
DOSE 1 sachet – oral – once only

GAVISCON aniseed – suspension
DOSE 10 to 20 mL – oral – four times a day – after food

These three examples are incorrect because the brand names Infanrix-IPV, Dioralyte and Gaviscon are in bold.

Rationale

The differentiation between generic name and brand name supports recognition over recall. By providing a consistent treatment of generic and brand names respectively, the user will learn to recognise the difference rather than relying on consciously interpreting the drug names to determine which are which. This design solution is just as effective for a view or list that contains only generic or only brand name medications. Initially, before the formatting has been learned, it is possible to recognise that the list contains items that are similar. Once the formatting has been learned, the pattern is familiar and is quickly interpreted as a list of generic or a list of brand name medications. Therefore a set of search results, for example, can immediately be recognised as containing only brand name or generic name drugs.

Formatting is applied to the text to retain clarity and simplicity of display. The use of an icon to mark generic names would introduce visual clutter so formatting of the text is recommended in preference. This also minimises the need to introduce additional elements to a display.

This guidance is especially important for recognition of generic and brand names when both are listed for a single medication, as illustrated in the usage examples above.

Formatting conventions for generic and brand names in computer and paper-based systems vary widely. Generic drug names are generally displayed in lowercase (see *Lothian Joint Formulary*[6]) or in sentence case (see the *Complete Guide to Prescription and Nonprescription Drugs* **{R15}**). On the other hand, brand names tend to appear in title case (see *The AARP Guide to Pills* **{R14}**), often with parentheses, and with a trademark symbol (see the *Northumberland and North Tyneside Drugs and Therapeutics Committee Formulary*[7]).

The drug name formatting convention used can vary depending on the context and intended readership. For example, the British National Formulary (BNF) uses a number of different formatting conventions in its documents including:

- Main *British National Formulary*[8]: generic names are in sentence case and brand names in title case
- *Product Label List*[9]: generic names are in title case and brand names in title case italics
- *Name changes*[10]: generic names are in lowercase

The WHO's list of *International Nonproprietary Names for Pharmaceutical Substances (INN)*[11] displays generic drug names in lowercase. A small sample of US formulary lists available online, suggests that they may also follow a convention of generic drug names in lowercase (see *Medica*[12], *Vista Healthplans*[13] and *BlueCross BlueShield of Illinois*[14]).

[6] Lothian Joint Formulary **{R12}** Lothian Joint Formulary

[7] Northumberland and North Tyneside Drugs and Therapeutics Committee Formulary – Version 1.1 September 2004 **{R13}**: http://www.gp-training.net/protocol/therapeutics/formulary_northumberland.pdf

[8] British National Formulary – BNF No. 56 **{R16}**: http://bnf.org/bnf/bnf/current/104945.htm

[9] British National Formulary – BNF No. 56 – Product Label List **{R17}**: http://bnf.org/bnf/bnf/current/100159.htm

[10] British National Formulary – BNF No. 56 – BNF Extra – Resources – Name changes **{R18}**: http://bnf.org/bnf/extra/56/450049.htm

[11] WHO Drug Information, Vol. 22, No. 1, 2008 – International Nonproprietary Names for Pharmaceutical Substances (INN) **{R19}**: http://whqlibdoc.who.int/druginfo/INN_2008_list59.pdf

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The ISMP's *Draft Guidelines for Safe Electronic Communication of Medication Orders*[15] and NHS CFH's *ePrescribing Functional Specification* **{R8}** and *Guidelines for the Design and Presentation of Medication Elements Required in Electronic Prescribing or Medication Ordering Systems* **{R24}**, have recommendations and guidelines that advise the use of lowercase letters for generic names and uppercase letters for brand names.

The WHO's publication *Look-Alike, Sound-Alike Medication Names* **{R7}** provides advice on mitigating the risks of look-alike, sound-alike medication names. Their description of the problem and associated issues includes reference to the potential for confusion between generic and brand names. Their related suggested action is to:

> "…include both the non-proprietary name and the brand name of the medication on medication orders and labels, with the non-proprietary name in proximity to, and in larger font size than the brand name."

In this document, generic names are shown in bold lowercase and brand names in title case italics.

Guidance is supported by the prevalence of an emerging convention in which generic drug names are displayed in lowercase. Guidance also follows one of a few commonly used conventions for displaying brand names. It thus aims to introduce consistency and achieve the benefits described above whilst minimising the impact of potential conflict with existing conventions.

[12] Medica – Over-the-Counter Drug List **{R20}**:
http://member.medica.com/router/default.pdf?doc=/C15/DrugFormulary/Document%20Library/OTC_Druglist_2007.pdf

[13] Vista Healthplans – Formulary Drug List 2006 **{R21}**:
http://www.vistahealthplan.com/Static/shared/PDF/Formulary/vista_member_formulary.pdf

[14] BlueCross BlueShield of Illinois – 2008 Blue Cross and Blue Shield of Illinois Drug Formulary **{R22}**:
http://www.bcbsil.com/rx/pdf/2008_prescription_drug_formulary.pdf

[15] ISMP – ISMP MedicationSafetyAlert! – It's Time for Standards to Improve Safety with Electronic Communication of Medication Orders – Draft Guidelines for Safe Electronic Communication of Medication Orders **{R23}**:
http://www.ismp.org/Newsletters/acutecare/articles/20030220.asp

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3.3.2 Displaying Numbers

ID	Description	Conformance	Evidence Rating
MEDi-014	Where possible, avoid the need for decimal points by changing the units without breaking convention	Recommended	High
MEDi-015	Do not put a trailing zero after a sub-decimal value (that is, '0.5' is correct but '0.50' is incorrect)	Mandatory	High
MEDi-016	Put a leading zero before a decimal point for values of less than one	Mandatory	High
MEDi-017	Use a comma to break up numeric values of one thousand and above	Mandatory	High

Usage Examples

paracetamol – tablet – DOSE **1 g** – oral – every 6 hours 	In this correct example, the dose has been expressed using familiar units without the need for a decimal point.
fludrocortisone – tablet – DOSE **0.1 mg** – oral – once a day 	This example is incorrect because the dose can be reasonably and more correctly expressed as '100 micrograms', thus avoiding the need for a decimal point.
paracetamol – tablet – DOSE **500 mg** – oral – every 6 hours 	In this correct example, the dose is expressed as an integer.
paracetamol – tablet – DOSE **0.5 g** – oral – every 6 hours 	This example is incorrect because the dose is expressed as a value that has a trailing zero after the decimal point.
INFANRIX-IPV Vaccine – suspension for injection – DOSE **0.5 mL** – intramuscular injection – once only 	In this correct example, a leading zero is used before the decimal point.
INFANRIX-IPV Vaccine – suspension for injection – DOSE **.5 mL** – intramuscular injection – once only 	This example is incorrect because the dose is expressed without a leading zero before the decimal point.
heparin – 5,000 units per mL – solution for injection – DOSE **5,000 units** – subcutaneous injection – once only 	In this correct example, a comma is used to separate the thousands in the dose value.
heparin – 5000 units per mL – solution for injection – DOSE **5000 units** – subcutaneous injection – once only 	This example is incorrect because the dose value is expressed in thousands without a comma.

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Rationale
Numbers containing decimals are a major source of errors and the misinterpretation of a decimal point can lead to errors that may contribute to the administration of an overdose. When a dose must be described using a decimal point, the presence of trailing zeros and the absence of leading zeros are associated with errors in the interpretation of the dose (see *Medication Errors – Causes, Prevention, and Risk Management* **{R3}**). The guidance points above are supported by the ISMP's *Draft Guidelines for Safe Electronic Communication of Medication Orders* **{R23}** and NHS CFH's *ePrescribing Functional Specification* **{R8}** and *Guidelines for the Design and Presentation of Medication Elements Required in Electronic Prescribing or Medication Ordering Systems* **{R24}**. They are also supported by the findings in *Medication Errors – Causes, Prevention, and Risk Management* **{R3}**.

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3.3.3 Separators

ID	Description	Conformance	Evidence Rating
MEDi-018	When combining attributes in a text string, use a long dash (em dash) surrounded by spaces between the attributes	Mandatory	Medium
MEDi-019	Use a double space instead of a long dash or separator between a drug name and strength when there are multiple drug names in one medication line	Recommended	Low
MEDi-020	Use a double space instead of a long dash or separator between a drug name and strength when the strength is expressed as a percentage	Recommended	Low

Usage Examples	
paracetamol – 120 mg in 5 mL – suspension – DOSE **80 mg** – oral – every 6 hours 	In this correct example, there are clear separators between the attributes and spaces either side of each separator.
paracetamol / 120 mg in 5 mL / suspension / DOSE **80 mg** / oral / every 6 hours 	This example is incorrect because a '/' has been used to separate attributes.
paracetamol–120 mg in 5 mL–suspension– DOSE **80 mg**–oral–every 6 hours 	This example is incorrect because the long dashes are not surrounded by spaces.
paracetamol 500 mg + **metoclopramide** 5 mg – sachet – DOSE **2 sachets** – oral – every 4 hours as required – maximum 6 doses in 24 hours 	In this correct example, with multiple drug names a double space is used between the drug names and the strengths.
paracetamol – 500 mg – **metoclopramide** – 5 mg – sachet – DOSE **2 sachets** – oral – every 4 hours as required – maximum 6 doses in 24 hours 	This example is incorrect because there are two drug names and a long dash has been used between the drug names and strengths.
sodium chloride 0.9% – infusion – VOLUME **1,000 mL** – 40 mL per hour – over 12 hours – intravenous – once only 	In this correct example with a strength expressed as a percentage, the strength is separated from the drug name by a double space.
sodium chloride – 0.9% – infusion – VOLUME **1,000 mL** – 40 mL per hour – over 12 hours – intravenous – once only 	This example is incorrect because the strength is expressed as a percentage. It is also incorrect because a long dash has been used to separate it from the drug name instead of a double space.

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Rationale

A medication line is a combination of different sets of information that merge into a description that is a hybrid between a list and a sentence. To maintain the relative visual importance of the information, and minimise the distraction that might be caused by the introduction of additional words, they are combined by means of a separator. The aim of the separator is to break the description into meaningful chunks that are easily recognisable as distinct units of information. This use of 'visual structure' for presenting information in a clinical record makes information easier to find (see *How to limit clinical errors in interpretation of data* {**R25}** and *Helping Clinicians to find data and avoid delays* **{R26}**).

The long dash is used as a separator because it is does not have a specific grammatical implication that would contradict the way that it is used here. The long dash is also unlikely to be mistaken for a letter or digit and could be mistaken only as a (slightly shorter) hyphen.

A space is used either side of the long dash to separate the information into visual chunks and to further mitigate the risk that it is interpreted as part of the information.

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3.3.4 Wrapping

ID	Description	Conformance	Evidence Rating
MEDi-010	When wrapping the text of a medication line, do so without breaking up the contents of a single attribute unless that single attribute will not fit on one line	Mandatory	Low
MEDi-011	When wrapping the text of a medication line, keep trailing delimiters with the preceding attribute	Mandatory	Low
MEDi-021	If a long drug name exceeds the available screen space and has to be wrapped, ensure that the drug name is wrapped between words	Mandatory	Medium
MEDi-008	Do not allow wrapping to separate a label from a value	Mandatory	Low

Usage Examples

insulin soluble human – ACTRAPID – 100 units per mL – solution for injection – DOSE **12 units** – subcutaneous – twice a day 	In this correct example, the details are wrapped correctly. None of the attributes are broken up and the delimiters are at the end of each of the lines and not at the beginning of each of the wrapped lines.
insulin soluble human – ACTRAPID – 100 units per mL – solution for injection – DOSE **12 units** – subcutaneous – twice a day 	This example is incorrect because the attribute 'solution for injection' is split between two lines.
insulin soluble human – ACTRAPID – 100 units per mL – solution for injection – DOSE **12 units** sub-cutaneous – twice a day 	This example is incorrect because the word 'subcutaneous' has been hyphenated and split across lines. This example is additionally incorrect because the attribute 'solution for injection' is split between two lines.
haemophilus influenzae type B vaccine – solution for injection – DOSE **0.5 mL** – intramuscular – once only 	In this correct example, the drug name has been wrapped in a way that preserves phrases within the drug name.
haemophilus influenzae type B vaccine – solution for injection – DOSE **0.5 mL** – intramuscular – once only 	This example is incorrect because one letter of the drug name has been wrapped, thus breaking up the phrase 'type B'.

Rationale

If an attribute is too long to fit into the horizontal space allocated, it may be necessary to wrap it. Wrapping information within an attribute could lead to misinterpretation if the continuation line is ignored or if the information that has been wrapped onto a new line is interpreted as a separate piece of information.

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3.3.5 Abbreviation

ID	Description	Conformance	Evidence Rating
MEDi-022	Do not abbreviate drug names	Mandatory	Medium
MEDi-023	Use long form names rather than abbreviations or symbols where possible	Recommended	Medium
MEDi-024	Do not put a full stop after abbreviations for units (for example mg and mL)	Mandatory	Medium

Usage Examples

paracetamol 500 mg + **metoclopramide** 5 mg – sachet – oral – DOSE **2 sachets** – every 4 hours as required – maximum 6 doses in 24 hours 	In this correct example, there is no abbreviation of the drug name.
para 500 mg. + **meto** 5 mg. – sachet – oral – DOSE **2 sachets** – every 4 hours as required – maximum 6 doses in 24 hours 	This example is incorrect because the two drug names have been abbreviated and because a full stop has been used after the abbreviation 'mg'.
CPL 1% – eye drops – DOSE **1 drop** – right eye – three times a day 	This example is incorrect because the drug name has been abbreviated.
chloramphenicol 1% – eye drops – DOSE **1 drop** – right eye – three times a day 	This is a corrected version of the infusion example above.

Rationale

The following organisations have published recommendations and examples of drug name abbreviations that should be avoided because they are open to misinterpretation and are potentially a risk to patient safety:

- ISMP – *ISMP List of Error-Prone Abbreviations, Symbols and Dose Designations*[16]
- The Joint Commission – *National Patient Safety Goals – Goal 2B*[17]
- NHS CFH – *ePrescribing Functional Specification* **{R8}** and *Guidelines for the Design and Presentation of Medication Elements Required in Electronic Prescribing or Medication Ordering Systems* **{R24}**

[16] ISMP List of Error-Prone Abbreviations, Symbols, and Dose Designations – November 2003, Volume 8, Issue 24 **{R27}**: http://www.usp.org/pdf/EN/patientSafety/ismpAbbreviations.pdf

[17] The Joint Commission – National Patient Safety Goals – Goal 2B **{R28}**: http://www.jointcommission.org/PatientSafety/NationalPatientSafetyGoals/08_npsg_facts.htm

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3.3.6 Truncation

ID	Description	Conformance	Evidence Rating
MEDi-025	Do not truncate drug names	Mandatory	High
MEDi-012	If necessary, wrap but do not truncate medication line information	Mandatory	Low
MEDi-054	Do not display a part of the medication line alone if its meaning relies on other parts that are not displayed	Mandatory	High

Usage Examples

cefotaxime – powder for solution for injection – intravenous – DOSE **400 mg** – every 8 hours		In this correct example, the drug details are displayed without truncation.
cefotaxime – powder for solution for in		This example is incorrect because the information in the medication line has been truncated instead of wrapped.

Rationale

This guidance mitigates risks similar to those for abbreviation. In an electronic system there is often a conflict between the quantity of information to be displayed and the space available in which to display it. When space is limited, information is often truncated both actively (for example, by restricting the width of space in which information is displayed), and passively (for example, by obscuring information through the presentation of a dialog box). The resultant truncation can lead to misinterpretation because the missing information is assumed, and also because there is additional information hidden from view (such as a second drug name in a multiple-ingredient drug), that might not be anticipated.

In addition to the drug name, other information taken from a medication line should also never be truncated. Although the exact set of information available in a particular context within an electronic system will vary, the chosen information and order in which it is presented should be consistent within that context. Truncating that information would re-introduce the risks of misinterpretation and mis-selection.

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3.3.7 Symbols

ID	Description	Conformance	Evidence Rating
MEDi-026	Do not use symbols that may be confused with numbers or otherwise misinterpreted, including: @ | < > / \ & ° (at sign, vertical bar, greater than bracket, less than bracket, forward slash, backslash, ampersand, degree)	Mandatory	High
MEDi-027	Use the '+' (plus symbol) only for multiple drug name medications and surround it with spaces. When a '+' is displayed adjacent to a '4', separate the two with a double space	Mandatory	High
MEDi-028	Use alternatives such as a dash or a black dot (●) instead of brackets and separators such as ( ) [ ] { } that look like the number one	Mandatory	High

Usage Examples

paracetamol 500 mg + **metoclopramide** 5 mg – sachet – oral – DOSE **2 sachets** – every 4 hours as required – maximum 6 doses in 24 hours 	In this correct example, the symbol '+' has been used to combine the two active ingredients (and strengths) of a drug.
sodium chloride 0.9% – solution for injection – VOLUME **1,000 mL** @ 40 mL per hour – over 12 hours – intravenous infusion – once only 	This example is incorrect because the symbol '@' has been used instead of the word 'at'.
co-amoxiclav – 400 mg and 57 mg in 5 mL – suspension – oral – DOSE **1.2 mL** – every 12 hours 	In this correct example, the long dash is the only symbol that is used.
co-amoxiclav – 400 mg + 57 mg in 5 mL – suspension – oral – DOSE **1.2 mL** – every 12 hours 	This example is incorrect because the '+' symbol has been used to describe the strength.
co-amoxiclav – 400 mg / 57 mg in 5 mL – suspension – oral – DOSE **1.2 mL** – every 12 hours 	This example is incorrect because a forward slash has been used.
co-amoxiclav – 400 mg & 57 mg in 5 mL – suspension – oral – DOSE **1.2 mL** – every 12 hours 	This example is incorrect because an ampersand has been used.
co-amoxiclav – (400 mg, 57 mg) in 5 mL – suspension – oral – DOSE **1.2 mL** – every 12 hours 	This example is incorrect because brackets have been used.

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Rationale
The guidance points above include recommendations made by the ISMP's *Draft Guidelines for Safe Electronic Communication of Medication Orders* **{R23}**,*List of Error-Prone Abbreviations, Symbols and Dose Designations* **{R27}** and NHS NPfIT's *Guidelines for the Design and Presentation of Medication Elements Required in Electronic Prescribing or Medication Ordering Systems* **{R24}**. In addition to the recommendations in these references, symbols such as brackets and the backslash should be avoided because they can be confused with the digit '1' (number one).

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3.3.8 Text Labels

ID	Description	Conformance	Evidence Rating
MEDi-009	Use a different font and colour to differentiate labels from values	Mandatory	Low
MEDi-029	When a medication is represented as a single-text sentence, use a label for dose only	Mandatory	Low
MEDi-030	When a medication is represented as a series of lines with hard line breaks, labels should appear at the beginning of a new line after a hard line break	Mandatory	Low
MEDi-031	Use a space to separate a label from a value	Mandatory	Medium
MEDi-032	Do not use a colon after a label	Mandatory	Medium
MEDi-033	Display labels in uppercase	Recommended	Low
MEDi-034	Keep the number of text labels in a medication represented as a single-text sentence to a minimum	Recommended	Medium

Usage Examples

co-amoxiclav – 400 mg and 57 mg in 5 mL – suspension – oral – DOSE **1.2 mL** – every 12 hours ✓	In this correct example, a text label appears before the dose and is formatted differently to distinguish it from the dose (and other) values. Correct wrapping is also shown in this example.
co-amoxiclav – 400 mg and 57 mg in 5 mL – suspension – oral – dose **1.2 mL** – every 12 hours ✗	This example is incorrect because the dose label is not formatted differently to distinguish it from the dose (and other) values.
co-amoxiclav – 400 mg and 57 mg in 5 mL – suspension – oral – DOSE 1.2 mL – every 12 hours ✗	This example is incorrect because the dose label is not formatted differently to distinguish it from the dose (and other) values.
co-amoxiclav – 400 mg and 57 mg in 5 mL – suspension – oral – DOSE : **1.2 mL** – every 12 hours ✗	This example is incorrect because a colon is used after the label and there is no space between the label and the dose value.
olmesartan – tablet – DOSE **10 mg** – oral – once a day ✓	In this correct example, the medication is represented as a single-text sentence without hard line breaks, and the dose is labelled.
olmesartan – tablet – DOSE **10 mg** – ROUTE oral – once a day ✗	This example is incorrect because more than one label has been used for a medication that is represented as a single-text sentence.
olmesartan – tablet DOSE **10 mg** ROUTE oral FREQUENCY once a day ✓	In this correct example, the medication is represented as a series of lines with hard line breaks, and labels have been used at the beginnings of the lines.

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salbutamol –
STRENGTH 100 micrograms per dose –
metered dose inhaler – DOSE **2 puffs** –
ROUTE inhaled
every 4 hours as required
maximum 8 puffs in 24 hours

This example is incorrect because more than one label has been used, and the lines following a hard line break (the last two lines) do not start with text labels.

Rationale

Formatting of medication line text must strike a balance between providing emphasis for important information and maintaining legibility by keeping 'visual noise' to a minimum. 'Visual noise' can include icons, fonts, colours and embellishments such as italics, uppercase and underlining. In their paper, *How to limit clinical errors in interpretation of data*, **{R25}**, Wright et al cite the Simmonds and Reynolds textbook *Data presentation and visual literacy in medicine and science* **{R29}** when noting that the advantage in legibility of type over handwriting can be lost if the writer uses too many different sources of visual noise.

Whilst the use of capital letters is not recommended for blocks of text **{R30}**, it can be used to further differentiate labels from values. It is mandated here in order to promote consistency between clinical applications thus discouraging the display of labels using capital letters in some and lowercase in others.

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3.3.9 Line Breaks

ID	Description	Conformance	Evidence Rating
MEDi-035	When using hard line breaks at set points (such as before a dose), do not use a long dash at the end of the previous line	Recommended	Low

Usage Examples

paracetamol – tablet
DOSE 1 g – oral – every 6 hours

oxycodone – OXYCONTIN – modified-release tablet
DOSE 10 mg – oral – once only

DIORALYTE – powder for oral solution
DOSE 1 sachet – oral – once only

In these three correct examples, dose begins on a new line so the long dash is omitted from the end of the previous line.

paracetamol – tablet –
DOSE 1 g – oral – every 6 hours

oxycodone – OXYCONTIN – modified-release tablet –
DOSE 10 mg – oral – once only

DIORALYTE – powder for oral solution –
DOSE 1 sachet – oral – once only

These three examples are incorrect because the dose begins on a new line and the previous line still shows a long dash.

olmesartan – tablet
DOSE 10 mg
ROUTE oral
FREQUENCY once a day

In this correct example, the dose, route and frequency start on a new line so there are no long dashes at the ends of the previous lines.

olmesartan – tablet –
DOSE 10 mg –
ROUTE oral –
once a day

This example is incorrect because the dose, route and frequency start on a new line and the dashes are still displayed at the ends of the previous lines.

salbutamol – metered dose inhaler
STRENGTH 100 micrograms per dose
DOSE 2 puffs
ROUTE inhaled
every 4 hours as required –
maximum 8 puffs in 24 hours

In this correct example, the strength, dose, route and frequency start on a new line and the frequency has wrapped. The long dash is only used:

- Between the drug name and its form
- Between the two parts of the frequency description when the text has to wrap

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salbutamol – metered dose inhaler –
STRENGTH 100 micrograms per dose –
DOSE **2 puffs** –
ROUTE inhaled –
every 4 hours as required –
maximum 8 puffs in 24 hours

This example is incorrect because long dashes appear at the ends of lines before each of strength, dose and route, which are configured to start on a new line.

Rationale

When a medication line is presented as a series of chunks of information joined together into a sentence by separators, it is important to indicate at the point of wrapping, that there is more information on the next line. This is especially true given that some medications can be expressed in a single line providing there is enough horizontal space. In some contexts or 'views', a medication line may be presented as a series of chunks that are listed on new lines. This is especially true when that information is presented in a very narrow horizontal space. When this is the case, the information is not wrapped; it is consistently displayed across a number of lines and there is no need for the separator (dash) at the end of the line to indicate that information has been wrapped.

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3.3.10 Line Spacing

ID	Description	Conformance	Evidence Rating
MEDi-036	When displaying a medication as one or many lines of text, preserve white space between the lines by ensuring that the line height is no less than 120% (120% leading) and no greater than 140% (140% leading)	Recommended	Medium
MEDi-037	When displaying a list of medications, ensure that there is a space equivalent to at least one line height of 100% between the last line of one medication line and the first line of the medication line below	Recommended	Medium

Usage Examples

co-amoxiclav – 400 mg and 57 mg in 5 mL – suspension – oral – **DOSE** 1.2 mL – every 12 hours 	In this correct example, the medication line text has a line height of 120%.
co-amoxiclav – 400 mg and 57 mg in 5 mL – suspension – oral – **DOSE** 1.2 mL – every 12 hours 	In this correct example, the medication line text has a line height of 140%.
co-amoxiclav – 400 mg and 57 mg in 5 mL – suspension – oral – **DOSE** 1.2 mL – every 12 hours 	This example is incorrect because the medication line text has a line height of 100%.
paracetamol – tablet **DOSE** **1 g** – oral – every 6 hours  **oxycodone** – OXYCONTIN – modified-release tablet **DOSE** **10 mg** – oral – once only	In this correct example, the medication line text has a line height of 130% and the space between the text of one medication line and the text of the medication line below, is one line height.
paracetamol – tablet **DOSE** **1 g** – oral – every 6 hours  **oxycodone** – OXYCONTIN – modified-release tablet **DOSE** **10 mg** – oral – once only	This example is incorrect because the medication line text has a line height of 100% (that is, there is too little space between the lines)
paracetamol – tablet **DOSE** **1 g** – oral – every 6 hours  **oxycodone** – OXYCONTIN – modified-release tablet **DOSE** **10 mg** – oral – once only	This example is incorrect because the space between the text of one medication line and the text of the medication line below is less than one line height.

Rationale

Space between lines has been found to support legibility **{R25}**. As well as contributing to legibility, guidance mandates a minimum

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space between the lines to mitigate the risk of mis-associating information in one line with the medication in the lines above or below.

3.3.11 Displaying Dose

ID	Description	Conformance	Evidence Rating
MEDi-007	Provide a text label that reads 'DOSE' before a dose	Mandatory	Low
MEDi-038	Display the dose amount and units in bold	Mandatory	Medium
MEDi-039	When a dose is expressed as a volume, display the volume amount in bold	Mandatory	Medium
MEDi-040	When there is no dose or volume, display a dose equivalent in place of the dose and subject to the same guidance points as a dose. Precede with an appropriate text label	Mandatory	Medium
MEDi-041	Separate the dose amount from the dose units with a space	Mandatory	High
MEDi-042	Do not put a trailing zero after a sub-decimal value when displaying a dose amount (that is, '0.5' is correct but '0.50' is incorrect)	Mandatory	High
MEDi-043	Put a leading zero before a decimal point for values of less than one when displaying a dose value	Mandatory	High
MEDi-044	Use a comma to break up numeric values of one thousand and above when displaying a dose value	Mandatory	High

Usage Examples

morphine – 2 mg in 10 mL – solution for injection – DOSE **2 mg** – intravenous – once only	✓	In this correct example, the dose is preceded with a label and the dose amount (2) and units (mg) are in bold.
paracetamol 500 mg + **metoclopramide** 5 mg – sachet – DOSE **2 sachets** – oral – every 4 hours as required – maximum 6 doses in 24 hours	✓	In this correct example, the dose is preceded with a label and the dose amount (2) and units (sachets) are in bold.
morphine – 2 mg in 10 mL – solution for injection – DOSE 2mg – intravenous – once only	✗	This example is incorrect because the dose amount (2) and dose units (mg) are not in bold and because the dose amount (2) has not been separated from the dose units (mg) with a space.
paracetamol 500 mg + **metoclopramide** 5 mg – sachet – DOSE **2** sachets – oral – every 4 hours as required – maximum 6 doses in 24 hours	✗	This example is incorrect because the dose amount (2) is in bold but the dose units (sachets), is not in bold.
sodium chloride 0.9% – infusion – VOLUME **1,000 mL** – 40 mL per hour – over 12 hours – intravenous – once only	✓	In this correct example, the volume amount (1,000) and units (mL) are in bold.

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Rationale

For simple oral solid medications, a medication line is only likely to include numbers where the dose is expressed. The introduction of a strength into the description of a medication also introduces the risk that the numbers for the dose are mistaken as the numbers for the strength, and vice versa. The similarity between the way that a strength and dose are expressed (digits and unit measurements) is also a contributing factor, especially true when the strength value appears before the dose value in a sentence.

Consistently labelling the dose helps to mitigate this risk whilst also providing a strong visual cue for quickly locating the dose within a medication line. The efficacy of that visual cue is reinforced by using formatting to differentiate the label from the data.

Dose is labelled rather than strength for two reasons. Firstly, it provides a consistent, always-present cue to support quick location of the dose, and secondly, because the strength is not always displayed. Thus there cannot be consistent placement and visual cue for a strength label.

The risk that labelling of dose values is considered patronising by users of a clinical system is considered to be mitigated by the patient safety benefits that can be attributed to clearly marked dose values.

The separation of the dose amount from the dose units with a space is supported by findings in *Medication Errors – Causes, Prevention and Risk Management* **{R3}**.

> **Important Note**
>
> The guidance for the display of dose neither includes nor precludes the addition of qualifiers such as '0.1 mg per kg' that may be necessary for absolute clarity and as an extra mitigation against incorrectly administered doses in paediatrics.

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3.3.12 Displaying Strength

ID	Description	Conformance	Evidence Rating
MEDi-045	When describing strengths with an active ingredient in a fluid, use 'in' rather than a forward slash ('/') before the fluid quantity	Mandatory	Medium
MEDi-046	When describing strengths of an ingredient in a single unit of fluid, use the word 'per' to describe the unit of fluid	Mandatory	Medium
MEDi-047	When describing a strength for a combination drug whose two strength values use the same unit (such as mg), use the word 'and' in a smaller font to join the two strength values and display the units after the second strength value	Mandatory	Low
MEDi-048	Do not put a trailing zero after a decimal point when displaying numbers in a strength value	Recommended	High
MEDi-049	Put a leading zero before a decimal point for values of less than one when displaying numbers in a strength value	Recommended	High
MEDi-050	Use a comma to break up numeric values of one thousand and above when displaying numbers in a strength value	Recommended	High

Usage Examples	
paracetamol – 120 mg in 5 mL – suspension – DOSE **80 mg** – oral – every 4 hours 	In this correct example, the strength and quantity of fluid are separated by the word 'in'.
paracetamol – 120 mg / 5 mL – suspension – DOSE **80 mg** – oral – every 4 hours 	This example is incorrect because the strength and quantity are separated by a forward slash ('/').
insulin soluble human – ACTRAPID – 100 units per mL – solution for injection DOSE **12 units** – subcutaneous injection – twice a day 	In this correct example, the word 'per' is used to separate the strength and unit of fluid.
insulin soluble human – ACTRAPID – 100 units / mL – solution for injection – DOSE **12 units** – subcutaneous injection – twice a day 	This example is incorrect because the strength is separated from the unit of fluid by a forward slash ('/'.)
insulin soluble human – ACTRAPID – 100 units in 1 mL – solution for injection – DOSE **12 units** – subcutaneous injection – twice a day 	This example is incorrect because the strength is described as a quantity in a single unit of fluid and the word 'per' has not been used to describe the unit of fluid.
co-amoxiclav – 400 and 57 mg in 5 mL – suspension – oral – DOSE **1.2 mL** – every 12 hours 	In this correct example, the strength and quantity of fluid are separated by the word 'in' and the two strength values are separated by the word 'and'.

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co-amoxiclav – 400 mg / 57 mg / 5 mL – suspension – DOSE **1.2 mL** – oral – every 12 hours 	This example is incorrect because the strengths are separated from the quantity of fluid by a forward slash ('/'.)
co-amoxiclav – 400 mg and 57 mg in 5 mL – suspension – oral – DOSE **1.2 mL** – every 12 hours 	This example is incorrect because the word 'and' is the same font size as the rest of the medication line.
co-codamol – 8 and 500 mg – tablet – oral – DOSE **1 tablet** – every 4 to 6 hours as required 	In this correct example, the two strength values are separated by the word 'and' which is displayed in a smaller font.
co-codamol – 30 mg codeine – 500 mg paracetamol – tablet – oral – DOSE **1 tablet** – every 4 hours 	This example is incorrect because the two ingredients of the combination drug are listed with the strength values.

Rationale

In *Drug selection errors in relation to medication labels: a simulation study* **{R31}**, Garnerin et al's findings imply that the very act of introducing a standard format for strength (in this case for volumes, concentrations and quantities for fluids) improved performance in relation to selection tasks. The guidance introduces a consistent way of describing strengths that in the short term, can mitigate the risk of misinterpretation through consistency and in the longer term, supports faster recognition of a strength based on familiarity with the use of the words 'per' and 'in', in relation to the place within the order of the medication line attributes.

There are particular risks associated with combination drugs partly because their concatenated name forms (for example co-amoxiclav) do not clearly indicate the generic names of the active ingredients. The risks are also partly because their strength must be expressed as a quantity of each of the active ingredients, sometimes within a fluid (for example 400 milligrams of amoxicillin and 57 milligrams of claviculanic acid in 5 millilitres for co-amoxiclav). The guidance introduces a standard way of expressing these strengths that uses a smaller font. Since the smaller font is not used elsewhere in the medication line, the use of the smaller font 'and' signifies a combination drug.

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3.3.13 Attribute Order

ID	Description	Conformance	Evidence Rating
MEDi-051	When describing a medication as a line of text, adhere to the following order for the display of the medication attributes: drug name, brand name, strength, form, dose or volume, rate, dose duration, route, frequency (as applicable)	Recommended	Low
MEDi-052	When designing for specific contexts, especially those that need additional text labels and line breaks, display drug name first and display other attributes (in a different order if necessary) from the one defined above	Recommended	Low
MEDi-053	When a medication is not displayed as a single line of text and the attributes of a medication are listed in a different order, use text labels for as many of these attributes as possible: strength, form, route and frequency	Recommended	Low

Usage Examples

generic – BRAND – strength – form – DOSE **dose** – route – frequency ✓	In this correct abstracted example, the names of the attributes are listed in the correct order.
morphine – 10 mg in 2 mL – solution for injection – DOSE **2 mg** – intravenous – once only ✓	In this correct example, there is no brand name, and the remaining attributes appear in the right order.
morphine – DOSE **2 mg** – intravenous – solution for injection – 10 mg in 2 mL – once only ✗	This example is incorrect because the attributes are displayed in the wrong order.
paracetamol – 120 mg in 5 mL – DOSE **1.2 mL** – intravenous – solution for injection – once only ✗	This example is incorrect because the attributes are displayed in the wrong order. This example illustrates the risks associated with displaying strength next to dose.
oxycodone – OXYCONTIN – modified-release tablet – DOSE **10 mg** – oral – once only ✓	In this correct example, there is no strength, and the remaining attributes appear in the right order.
salbutamol – metered dose inhaler STRENGTH 100 micrograms per dose DOSE **2 puffs** ROUTE inhaled every 4 hours as required – maximum 8 puffs in 24 hours ✓	In this correct example for a specific context, the medication line is displayed as multiple rows with line breaks, and the attributes are displayed in a different order. This example also shows additional attributes (maximum 8 puffs in 24 hours).
generic – form STRENGTH strength DOSE **dose** ROUTE route frequency ✓	In this correct abstracted example, the names of the attributes for the previous usage example (salbutamol) are listed. Although the list of attributes is different from that in the first usage example, this example is still correct because the list adheres to the correct ordering

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Rationale

The primary safety benefit from this guidance is the use of a standard order for attributes when a medication is displayed as a line of text. The order of attributes adheres to a number of principles that are designed to support current practice, as well as to mitigate patient safety risks:

- Display generic drug name first
- Display strength next to drug name
- Separate numbers for a strength from numbers for a dose
- Display form next to strength

The ISMP's *Draft Guidelines for Safe Electronic Communication of Medication Orders* **{R23}** recommends that when drug name, strength, dosage form and dose units appear together, they are listed in the following order: generic name, brand name, strength, dose, dosage form.

These guidelines recommend a different placement for the dosage form in order to keep the form next to the strength. Form is listed before dose to reflect the order in which this information is specified during prescribing. Since the form affects dose and frequency, it is defined earlier in the prescribing process and that priority is retained in the display of the medication when shown as a line of text.

The guidance does not preclude a change in this order for specific views, such as a Drug Administration view, since a change in the order may be important for supporting the specific tasks associated with that view. It does, however, recommend that these attributes are labelled whenever they are shown in a different order.

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3.4 Rationale Summary

This section summarises the principles behind the rationale for all guidance points in this document.

General Principles:

- Provide support for legibility
- Mitigate risks of incorrect selection and mis-interpretation

Usability Principles:

- Minimise the use of embellishments (for example, bold, colour, fonts, font sizes, italics, separators and symbols)
- Minimise instances of each type of embellishment within a reading unit
- Consistent use of specific embellishments within and preferably between user-interface contexts or 'views'
- Use words instead of symbols where it is important for removing ambiguity

Existing Standards:

- NHS CFH – *ePrescribing Functional Specification* **{R8}**
- NHS NPfIT – *Guidelines for the Design and Presentation of Medication Elements Required in Electronic Prescribing or Medication Ordering Systems* **{R24}**
- ISMP (US) – *Draft Guidelines for Safe Electronic Communication of Medication Orders* **{R23}**

Evolving Standards:

- NHS NPfIT – *Types of medication item for display and prescribing within Secondary Care electronic systems* **{R32}**

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4 Document Information

4.1 Terms and Abbreviations

Abbreviation	Definition
ACBS	Advisory Committee on Borderline Substances
AMP	Actual Medicinal Product
BNF	British National Formulary
CATR	Clinical Authority to Release
CSG	Clinical Safety Group
CSMS	Clinical Safety Management System
CUI	Common User Interface
dm+d	Dictionary of Medicines and Devices
HDU	High Dependency Unit
ISMP	The Institute for Safe Medication Practices
IUD	Intrauterine Device
NHS	National Health Service
NHS CFH	NHS Connecting for Health
NPfIT	National Programme for IT
NPSA	National Patient Safety Agency
OTC	Over the Counter
PGD	Patient Group Direction
PODs	Patient's Own Drugs
TFN	Trade Family Name
TPN	Total Parental Nutrition
TTO	To Take Out
UI	User Interface
VTM	Virtual Therapeutic Moiety
WHO	World Health Organization

Table 4: Terms and Abbreviations

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4.2 Definitions

Term	Definition
NHS Entity	Within this document, defined as a single NHS organisation or group that is operated within a single technical infrastructure environment by a defined group of IT administrators.
The Authority	The organisation implementing the NHS National Programme for IT (currently NHS Connecting for Health).
Current best practice	Current best practice is used rather than best practice, as over time best practice guidance may change or be revised due to changes to products, changes in technology, or simply the additional field deployment experience that comes over time.
Generic drug name	This can be a single drug name that refers to a single active ingredient or it can be multiple active ingredients that are prescribed as one drug. In the structure of the dm+d **{R9}**, this generally equates to a Virtual Therapeutic Moiety (VTM). **Important Note** This definition is for this document only and may not reflect the definitions that are used in clinical practice or healthcare organisations.
Brand name	A brand name for a product containing medication. A brand name may be associated with many products. In some cases, the same brand name may be associated with different generic drugs. Future versions of the dm+d **{R9}** are expected to include a separate entity for brand name, known as Trade Family Name (TFN). In the meantime, the brand name is part of the Actual Medicinal Product (AMP). **Important Note** This definition is for this document only and may not reflect the definitions that are used in clinical practice or healthcare organisations.

Table 5: Definitions

4.3 Nomenclature

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

4.3.1 Body Text

Text	Style
Code	Monospace
Script	
Other markup languages	
Interface dialog names	**Bold**
Field names	
Controls	
Folder names	Title Case
File names	

Table 6: Body Text Styles

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4.3.2 Cross References

Reference	Style
Current document – sections	Section number only
Current document – figures/tables	Caption number only
Other project documents	*Italics* and possibly a footnote
Publicly available documents	*Italics* with a footnote
External Web-based content	*Italics* and a hyperlinked footnote

Table 7: Cross Reference Styles

4.4 References

Reference	Document	Version
R1.	NHS CUI Programme – Design Guide Entry – Medications Management – Medication Line	1.0.0.0
R2.	NPSA – Safety in doses: medication safety incidents in the NHS http://www.npsa.nhs.uk/EasySiteWeb/GatewayLink.aspx?alId=5535	2007
R3.	Medication Errors – Causes, Prevention, and Risk Management – Cohen M R (Ed) – Jones and Bartlett Publishers	2004
R4.	To Err is Human – Building a Safer Health System – Kohn L, Corrigan J, Donaldson M – Washington, DC: National Academy Press, 2000	2000
R5.	Understanding Patient Safety – Wachter R M – The McGraw-Hill Companies, Inc, 2008	2008
R6.	ISMP – Frequently Asked Questions (FAQ) – How should Tallman lettering be applied to look-alike/sound-alike drug name pairs? http://www.ismp.org/faq.asp#Question_5	2008
R7.	WHO Collaborating Centre for Patient Safety Releases – Patient Safety Solutions – volume 1, solution 1 – Look-Alike, Sound-Alike Medication Names http://www.ccforpatientsafety.org/fpdf/Presskit/PS-Solution1.pdf	May 2007
R8.	NHS CFH – ePrescribing Functional Specification http://www.connectingforhealth.nhs.uk/newsroom/news-stories/eprescfunctspec	1.0
R9.	NHS – dictionary of medicines + devices Welcome to the dm+d website — The NHS Dictionary of Medicines and Devices	Release 2.3
R10.	NHS CUI Programme – Design Guide Entry – Medications Management – Medication Views	2.0.0.0
R11.	NHS CUI Programme – Design Guide Entry – Medications Management – Drug Administration	3.0.0.0
R12.	Lothian Joint Formulary Lothian Joint Formulary	July 2008
R13.	Northumberland and North Tyneside Drugs and Therapeutics Committee – Formulary – Version 1.1 September 2004 http://www.gp-training.net/protocol/therapeutics/formulary_northumberland.pdf	September 2004
R14.	The AARP Guide to Pills – Essential Information on More than 1,200 Prescription & Nonprescription Medications, Including Generics – AARP, Avord, J, Greider, K	January 2006
R15.	Complete Guide to Prescription and Nonprescription Drugs – Griffith H W, Moore S, Boesen, K	August 2007
R16.	British National Formulary – BNF No. 56 http://bnf.org/bnf/bnf/current/104945.htm	September 2008
R17.	British National Formulary – BNF No. 56 – Product Label List http://bnf.org/bnf/bnf/current/100159.htm	September 2008

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Reference	Document	Version
R18.	British National Formulary – BNF No. 56 – BNF Extra – Resources – Name changes http://bnf.org/bnf/extra/56/450049.htm	September 2008
R19.	WHO Drug Information, Vol. 22, No. 1, 2008 – International Nonproprietary Names for Pharmaceutical Substances (INN) http://whqlibdoc.who.int/druginfo/INN_2008_list59.pdf	2008
R20.	Medica – Over-the-Counter Drug List http://member.medica.com/router/default.pdf?doc=/C15/DrugFormulary/Document%20Library/OTC_Druglist_2007.pdf	01-Aug-2007
R21.	Vista Healthplans – Formulary Drug List 2006 http://www.vistahealthplan.com/Static/shared/PDF/Formulary/vista_member_formulary.pdf	2006
R22.	BlueCross BlueShield of Illinois – 2008 Blue Cross and Blue Shield of Illinois Drug Formulary http://www.bcbsil.com/rx/pdf/2008_prescription_drug_formulary.pdf	01-Jul-2008
R23.	ISMP – ISMP MedicationSafetyAlert! – It's Time for Standards to Improve Safety with Electronic Communication of Medication Orders – Draft Guidelines for Safe Electronic Communication of Medication Orders http://www.ismp.org/Newsletters/acutecare/articles/20030220.asp	20-Feb-2003
R24.	NHS NPfIT – Guidelines for the Design and Presentation of Medication Elements Required in Electronic Prescribing or Medication Ordering Systems – NPfIT-EP-DB-0003.01	2005
R25.	How to limit clinical errors in interpretation of data – Wright P, Jansen C, Wyatt J – Lancet 1998; 352: 1539-43	1998
R26.	Helping Clinicians to find data and avoid delays – Nygren E, Wyatt J C, Wright, P – Lancet 1998; 352: 1462-66	1998
R27.	ISMP List of Error-Prone Abbreviations, Symbols, and Dose Designations – November 2003, Volume 8, Issue 24 http://www.usp.org/pdf/EN/patientSafety/ismpAbbreviations.pdf	27-Nov-2003
R28.	The Joint Commission – National Patient Safety Goals – Goal 2B http://www.jointcommission.org/PatientSafety/NationalPatientSafetyGoals/08_npsg_facts.htm	June 2007
R29.	Data Presentation & Visual Literacy in Medicine and Science – Simmonds D, Reynolds L – Newton, MA, USA – Butterworth-Heinemann – 1994	1994
R30.	Designing Instructional Text – Hartley J – London, Kogan Page	Third Edition, 1994
R31.	Drug selection errors in relation to medication labels: a simulation study – Garnerin et al – Anaesthesia 2007, 62, pages 1090-1094	2007
R32.	NHS NPfIT – Types of medication item for display and prescribing within Secondary Care electronic systems – NPfIT-EP-DB-0022.01	2008

Table 8: References

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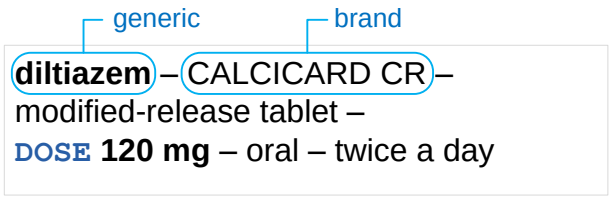
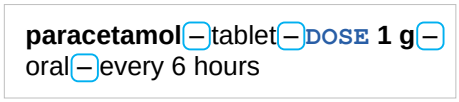
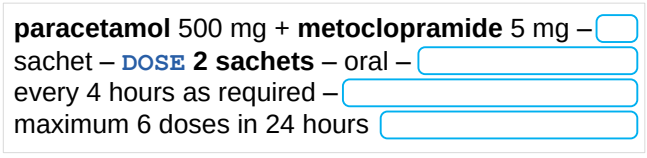
APPENDIX A REFERENCE SUMMARY OF GUIDANCE

Reference	Section	Description
MEDi-001 to MEDi-003, MEDi-013 Visual Summary:		
MEDi-001	3.3.1	Display generic drug names in bold
MEDi-002	3.3.1	Display generic drug names in lowercase (capital letters may still be used for acronyms and abbreviations in some drug names such as amphotericin B, factor VIII, carbomer 974P)
MEDi-003	3.3.1	Display drug brand names in uppercase
MEDi-013	3.3.1	Where both the generic name and the brand name appear in a medication line, list the generic name first
MEDi-014 to MEDi-017 Visual Summary:		
MEDi-014	3.3.2	Where possible, avoid the need for decimal points by changing the units without breaking convention
MEDi-015	3.3.2	Do not put a trailing zero after a sub-decimal value (that is, '0.5' is correct but '0.50' is incorrect)
MEDi-016	3.3.2	Put a leading zero before a decimal point for values of less than one
MEDi-017	3.3.2	Use a comma to break up numeric values of one thousand and above
MEDi-018 to MEDi-020 Visual Summary:		
MEDi-018	3.3.3	When combining attributes in a text string, use a long dash (em dash) surrounded by spaces between the attributes
MEDi-019	3.3.3	Use a double space instead of a long dash or separator between a drug name and strength when there are multiple drug names in one medication line
MEDi-020	3.3.3	Use a double space instead of a long dash or separator between a drug name and strength when the strength is expressed as a percentage
MEDi-010, MEDi-011, MEDi-021, MEDi-008 Visual Summary:		
MEDi-010	3.3.4	When wrapping the text of a medication line, do so without breaking up the contents of a single attribute unless that single attribute will not fit on one line
MEDi-011	3.3.4	When wrapping the text of a medication line, keep trailing delimiters with the preceding attribute
MEDi-021	3.3.4	If a long drug name exceeds the available screen space and has to be wrapped, ensure that the drug name is wrapped between words
MEDi-008	3.3.4	Do not allow wrapping to separate a label from a value

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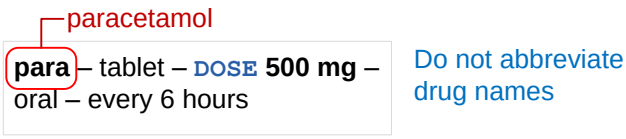
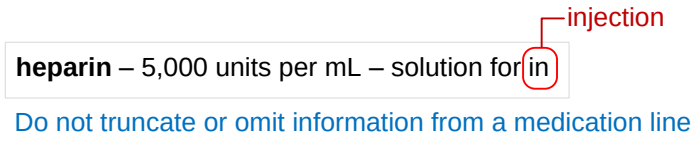
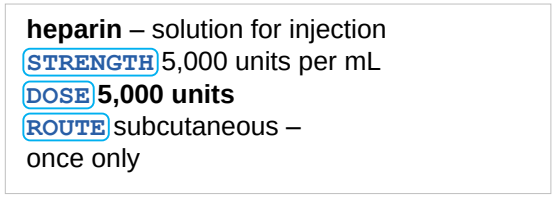
Reference	Section	Description
MEDi-022 to MEDi-024 Visual Summary:		
MEDi-022	3.3.5	Do not abbreviate drug names
MEDi-023	3.3.5	Use long form names rather than abbreviations or symbols where possible
MEDi-024	3.3.5	Do not put a full stop after abbreviations for units (for example, mg and mL)
MEDi-025, MEDi-012 Visual Summary:		
MEDi-025	3.3.6	Do not truncate drug names
MEDi-012	3.3.6	If necessary, wrap but do not truncate medication line information
MEDi-054	3.3.6	Do not display a part of the medication line alone if its meaning relies on other parts that are not displayed
MEDi-026 to MEDi-028 Visual Summary:		
MEDi-026	3.3.7	Do not use symbols that may be confused with numbers or otherwise misinterpreted, including: @ | < > / \ & ° (at sign, vertical bar, greater than bracket, less than bracket, forward slash, backslash, ampersand, degree)
MEDi-027	3.3.7	Use the '+' (plus symbol) only for multiple drug name medications and surround it with spaces. When a '+' is displayed adjacent to a '4', separate the two with a double space
MEDi-028	3.3.7	Use alternatives such as a dash or a black dot (●) instead of brackets and separators such as ( ) [ ] { } that look like the number one
MEDi-009, MEDi-029 to MED-034 Visual Summary:		
MEDi-009	3.3.8	Use a different font and colour to differentiate labels from values
MEDi-029	3.3.8	When a medication is represented as a single-text sentence, use a label for dose only
MEDi-030	3.3.8	When a medication is represented as a series of lines with hard line breaks, labels should appear at the beginning of a new line after a hard line break
MEDi-031	3.3.8	Use a space to separate a label from a value
MEDi-032	3.3.8	Do not use a colon after a label
MEDi-033	3.3.8	Display labels in uppercase
MEDi-034	3.3.8	Keep the number of text labels in a medication represented as a single-text sentence to a minimum

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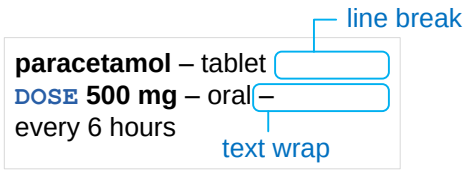
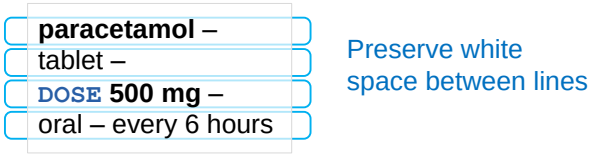
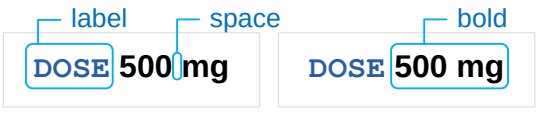
Reference	Section	Description
MEDi-035 Visual Summary:		
MEDi-035	3.3.9	When using hard line breaks at set points (such as before a dose), do not use a long dash at the end of the previous line
MEDi-036, MEDi-037 Visual Summary:		
MEDi-036	3.3.10	When displaying a medication as one or many lines of text, preserve white space between the lines by ensuring that the line height is no less than 120% (120% leading) and no greater than 140% (140% leading)
MEDi-037	3.3.10	When displaying a list of medications, ensure that there is a space equivalent to at least one line height of 100% between the last line of one medication line and the first line of the medication line below
MEDi-007, MEDi-038 to MEDi-044 Visual Summary:		
MEDi-007	3.3.11	Provide a text label that reads 'DOSE' before a dose
MEDi-038	3.3.11	Display the dose amount and units in bold
MEDi-039	3.3.11	When a dose is expressed as a volume, display the volume amount in bold
MEDi-040	3.3.11	When there is no dose or volume, display a dose equivalent in place of the dose and subject to the same guidance points as a dose. Precede with an appropriate text label
MEDi-041	3.3.11	Separate the dose amount from the dose units with a space
MEDi-042	3.3.11	Do not put a trailing zero after a sub-decimal value when displaying a dose amount (that is, '0.5' is correct but '0.50' is incorrect)
MEDi-043	3.3.11	Put a leading zero before a decimal point for values of less than one when displaying a dose value
MEDi-044	3.3.11	Use a comma to break up numeric values of one thousand and above when displaying a dose value
MEDi-045 to MEDi-050 Visual Summary:		
MEDi-045	3.3.12	When describing strengths with an active ingredient in a fluid, use 'in' rather than a forward slash ('/') before the fluid quantity
MEDi-046	3.3.12	When describing strengths of an ingredient in a single unit of fluid, use the word 'per' to describe the unit of fluid
MEDi-047	3.3.12	When describing a strength for a combination drug whose two strength values use the same unit (such as mg), use the word 'and' in a smaller font to join the two strength values and display the units after the second strength value
MEDi-048	3.3.12	Do not put a trailing zero after a decimal point when displaying numbers in a strength value

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Reference	Section	Description
MEDi-049	3.3.12	Put a leading zero before a decimal point for values of less than one when displaying numbers in a strength value
MEDi-050	3.3.12	Use a comma to break up numeric values of one thousand and above when displaying numbers in a strength value
MEDi-051 to MEDi-053 Visual Summary:		**generic** – BRAND – strength – form – DOSE **dose** – route – frequency
MEDi-051	3.3.13	When describing a medication as a line of text, adhere to the following order for the display of the medication attributes: drug name, brand name, strength, form, dose or volume, rate, dose duration, route, frequency (as applicable)
MEDi-052	3.3.13	When designing for specific contexts, especially those that need additional text labels and line breaks, display drug name first and display other attributes (in a different order if necessary) from the one defined above
MEDi-053	3.3.13	When a medication is not displayed as a single line of text and the attributes of a medication are listed in a different order, use text labels for as many of these attributes as possible: strength, form, route and frequency

Table 9: Reference Summary of Guidance

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Revision and Signoff Sheet

Change Record

Date	Author	Version	Change Reference
28-Jul-2008	Sarah Parker	0.0.0.1	Initial draft for review/discussion
10-Sep-2008	Sarah Parker	0.0.0.2	Revised draft for second review
16-Sep-2008	Niki Nicolaides	0.0.0.3	Initial copyedit
30-Sep-2008	Sarah Parker	0.0.0.4	Responses to copyedit
01-Oct-2008	Sarah Parker	0.0.0.5	Guidance updated in response to technical feedback and user research findings
03-Oct-2008	Mick Harney	0.0.0.6	Remaining questions for Sarah after copyedit
03-Oct-2008	Sarah Parker	0.0.0.7	Updates in response to Mick's questions. A few questions remain.
06-Oct-2008	Mick Harney	1.0.0.8	Restored correct versioning. Last few points to agree with Sarah.
07-Oct-2008	Sarah Parker	1.0.0.9	Updates in response to Mick's questions. One last point to resolve.
07-Oct-2008	Mick Harney	1.0.1.0	Raised to Working Baseline
23-Oct-2008	Sarah Parker	1.0.1.1	Updates in response to CRS
23-Oct-2008	Mick Harney	1.0.1.2	Copyedit of updates: final points to check.
23-Oct-2008	Sarah Parker	1.0.1.3	Final points updated
29-Oct-2008	Mick Harney	1.1.0.0	Raised to Baseline Candidate
06-Nov-2008	Mick Harney	2.0.0.0	Raised to Baseline

Document Status has the following meaning:

- **Drafts 0.0.0.X** – Draft document reviewed by the Microsoft CUI Project team and the Authority designate for the appropriate Project. The document is liable to change.
- **Working Baseline 0.0.X.0** – The document has reached the end of the review phase and may only have minor changes. The document will be submitted to the Authority CUI Project team for wider review by stakeholders, ensuring buy-in and to assist in communication.
- **Baseline Candidate 0.X.0.0** – The document has reached the end of the review phase and it is ready to be frozen on formal agreement between the Authority and the Company
- **Baseline X.0.0.0** – The document has been formally agreed between the Authority and the Company

Note that minor updates or corrections to a document may lead to multiple versions at a particular status.

Open Issues Summary

Issue	Raised By	Action to Resolve
None		

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Audience

The audience for this document includes:

- **Authority CUI Manager / Project Sponsor**. Overall project manager and sponsor for the NHS CUI project within the Authority.
- **Authority Clinical Applications and Patient Safety Project Project Manager.** Responsible for ongoing management and administration of the Project.
- **The Authority Project Team**. This document defines the approach to be taken during this assessment and therefore must be agreed by the Authority.
- **Microsoft NHS CUI Team**. This document defines the approach to be taken during this assessment, including a redefinition of the Clinical Applications and Patient Safety Project strategy.

Reviewers

Name	Position	Version Approved	Date
Mike Carey	Workstream Lead		
Tim Chearman	UX Architect		
Peter Johnson	Clinical Architect		
Ann Slee	Clinical Lead for e-Prescribing		
Beverley Scott	Clinical Safety Advisor		
Dee Hackett	Clinical Advisor		
Mark Wills	Clinical Advisor		

Distribution

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Mike Carey	Workstream Lead
Tim Chearman	UX Architect
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Beverley Scott	Clinical Safety Advisor
Dee Hackett	Clinical Advisor
Mark Wills	Clinical Advisor

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Document Properties

Item	Details
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Author	Clinical Applications and Patient Safety Project
Restrictions	**RESTRICTED – COMMERCIAL; MICROSOFT COMMERCIAL;** Access restricted to: NHS CUI Project Team, Microsoft NHS Account Team
Creation Date	22 July 2008
Last Updated	23 June 2015

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