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Working Paper: Implementation Guidance for Identification of Medicinal Products (IDMP) in Medicinal Product Dictionaries

This is a UNICOM working paper developed under Grant Agreement No 875299 of the EU Horizon 2020 programme.It has been made available in the public domain to ensure early dissemination of core UNICOM results of wider interest and to collect supplementary feed-back from the public.

This guidance cannot be considered to be (worldwide) agreed regulatory guidance

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Statement of originality

This working paper contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

Working paper abstract

This document provides implementation and mapping guidelines for use of Identification of Medicinal Product (IDMP) data within Medicinal Product Dictionaries (MPD). It includes different scenarios of implementation depending on the structure of the MPD. It gives an overview on the controlled vocabularies/terminology from Substances, Products, Organisations and Referentials (SPOR) from the European Medicines Agency (EMA).

It will help MPD providers to use IDMP data for prescribing and for dispensing, nationally and for cross-border care.

Involved partners: IDMP1, IHD, ZINDEX, VIDAL, IEDOH, SNOMED, DWIZ

Keywords: Controlled Medical Terminology, Vocabulary, ISO Standards, SPOR, PMS, IDMP, Medicinal Product Dictionary, Mapping Controlled Vocabularies, Extraction Transformation Loading Process.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

List of abbreviations

Abbreviation	Complete form
ATC	anatomical therapeutic chemical classification
BoSS	basis of strength substance
CDS	clinical decision support
CoE	Community of Expertise
DADI	Digital Application Dataset Integration Project
eD	eDispensation
EDQM	European Directorate for the Quality of Medicines & HealthCare
EHR	electronic health record
EMA	European Medicines Agency
eP	ePrescription
ePI	Electronic Product Information
ETL	Extraction Transformation Loading
EU	Europe
EU IG	EU IDMP Implementation Guide
FHIR	fast healthcare interoperability resources
IDMP	identification of medicinal products
IG	implementation guide
ISO	International Organisation for Standardization
MAH	marketing authorisation holder
MPD	medicinal product dictionary system
NCA	national competent authority
OHDSI	observational health data sciences and informatics
PAI	precise active ingredient substance
PhPID	pharmaceutical product identifier
PS	patient summary
SNOMED CT	SNOMED clinical terms
SPC, SmPC	summary of product characteristics
SPOR	substances, products, organisations and referentials

TS	technical specification
WHO-UMC	Uppsala Monitoring Centre
XEVMPD	extended EudraVigilance medicinal product dictionary

1 Executive summary

UNICOM is a European Commission supported Innovation Action that focuses on improving patient safety and healthcare by facilitating the flow of standardised “trusted data” about medicines from the regulatory agencies through to clinicians’ desktops and to patients via apps.

It does this by focusing on the implementation of the International Organization for Standardization (ISO) suite of IDMP (Identification of Medicinal Products) standards in national competent authorities and then use of that data in patient care.

The IDMP suite of standards is about the accurate identification of medicines and UNICOM’s goal is to have them widely implemented.

The European Medicines Agency (EMA) has implemented the ISO Standard of Implementation of Medicinal Products (IDMP) into regulatory processes and thus also National Competent Authorities are required to adapt their product data to the IDMP Standard.

This Implementation Guide for Medicinal Product Dictionary Provider (MPD) gives guidance on how to interact with trusted National Competent Authorities´ (NCA) data as a single source of truth for description of the medicinal products.

The IDMP common data model and the EMA PMS Implementation Guide have been used as a core element in this initiative for harmonising the terminologies used as well as facilitating the cross-border ePrescription in the EU.

The interoperability in ePrescription is a focal area for the UNICOM project as it looks to support cross border care involving medication.

This implementation guide provides insights into how the implementation of IDMP could be managed such that it most effectively supports the flow of medicinal product identification data from the “trusted source” of the NCAs to clinicians and patients through the MPD that operate in the patient care systems throughout the European Community.

2 Content of the working paper

2.1 Contents of the working paper

This working paper is an IDMP implementation and mapping guide for MPD providers. It reflects the status of IDMP as of 31.5.2022 (the submission date for this working paper).

This IG will explain how to implement IDMP data into an drug dictionary, using the IDMP drug model. After describing the controlled vocabularies of SPOR and the IDMP data model for drugs, this IG will explore different implementation approaches including mapping to the IDMP PMS data and creating an IDMP drug extension data directly from national drug regulatory information. Lastly, this IG will consider the benefits and challenges of each approach, and how using the IDMP product model and SPOR attributes values supports this ambitious interoperability goal.

2.2 Objective and scope

MPDs in eHealth systems demand very consistent and very high data quality to describe medicinal products and provide their additional functionalities such as clinical decision support.

To get good data quality, the data providers need to understand IDMP as well as possible and they need help to do this. IDMP standards are complex, and examples are still fragmentary.

The aim of this working paper is to provide insights into if and how the implementation of IDMP could be managed such that it most effectively supports the flow of medicinal product identification data from the “trusted source” of the NCAs to clinicians and patients through the MPD that operate in the patient care systems throughout the European Community.

The objectives of this delivery D9.2 is to provide as much clarity as possible on

- The structured Extraction, Transformation, and Loading process (ETL) to implement IDMP data
- The appropriate mapping process to map MPDs data to IDMP data based on the MPD structure
- Any recommendations that may help to achieve the implementation and the mapping of IDMP data to the MPD data

Other working papers in UNICOM look at other aspects of implementing IDMP into MPD – for example "D9.1 IDMP versus NCAs IDMP data gap analysis"

REFERENCE TO UNICOM WORKING PAPER D9.1: AN ANALYSIS OF THE IDMP MEDICINAL PRODUCT IDENTIFICATION DATA PROVIDED BY NCAS (AND SPOR) COMPARED TO THAT NEEDED IN MPD FOR CLINICAL CARE AND FOR SECONDARY USES

D9.1 is focused on the following core points

- The requirements of MPD for medicinal product identification data, for the use case of identifying medicinal products in a cross-border patient care and ePrescription

- The data flows of medicinal product identification data from NCAs (and SPOR) to MPDs

- An understanding of what is likely to be provided by the NCAs (and SPOR) and what the structured format of that data is likely to be

- The congruence, challenges, and gaps between the existing MPDs´ data and the IDMP data

- Equivalence and interchangeability in patient care and ePrescription

Equivalence and interchangeability are themselves qualitative concepts that depend on their use case; this document focuses on how to best Implement IDMP to MPD for cross-border product identification in patient care.

Other working papers in UNICOM look at other use cases – for example in pharmacovigilance "D8.7 IDMP Coding Principles and Guidance for ICSRs".

Reference to

D8.7 IDMP Coding Principles and Guidance for ICSRs

One of the biggest challenges in developing this implementation guide is to achieving clarity on what it is that IDMP will provide. The following is based on what is known and understood regarding IDMP and its implementation from the various standards documents and implementation guidance as of May 2022. The implementation of ISO 11615 and IDMP PMS data discussed here is that put forward by the EMA in its Implementation Guide V2.0 (version 2021-02) using the Fast Health Interoperability Resources (FHIR).

3 Methods

3.1 Summary of approach

To undertake an analysis of how the implementation of IDMP could be managed effectively in MPD, the following steps were undertaken:

- Listing the data elements that are needed to precisely identify a medicinal product via IDMP data in a medication lists in a cross-border patient care
- Describing how to make a gap analysis of these IDMP product identifiers compared to the MPDs´ congruent data elements
- Describing the patterns of models of MPDs and depending on it – the ways how to best implement and map IDMP data
- Analysing similar mapping projects in standard terminologies such as SNOMED CT
- Defining step by step IDMP data integration as a structured process of Extraction, Transformation and Loading (ETL)
- Giving best practice tips based on what is known at the time of writing (May 2022), whilst also
- Describing some of the unknowns of IDMP provision and implementation
- Working with a pool of substances and products which could be used for testing purposes
- Organising a CoE on "Draft Implementation Guide of IDMP into MPD" to understand the pain points of MPD providers in IDMP to implement those into this IG as far as possible

From this analysis it was then possible to offer a set of recommendations as to how IDMP implementation into MPDs could be managed to meet the needs of MPD to precisely identify medicinal products in a cross-border ePrescription based on IDMP product data.

Reference to the CoE " Unicom – Pilot Product List ", November 2020 link to all CoE

3.2 Community of Expertise for MPD provider

Reference to the CoE 25.2.2022, "Draft Implementation Guide of IDMP in MPD" Link to all CoE

For a better understanding of what MPD provider will need to implement IDMP into their MPDs, we organised a CoE on "Draft Implementation Guide of IDMP into MPD". With question-and-answer sessions via MentiMeter we got feedback on what the pain points of MPD provider in IDMP are.

3.2.1 Feedback on type of support needed

During the CoE on IDMP implementation for MPD, we started a MentiMeter analysis on the question "What type of support would you need to start an ETL Process on implementing IDMP into your MPD?" In the graphic below you can see the result. We put in green the points covered by this IG. In black and red those points which are not part of this document.

What do you wish as help for your IDMP implementation?	Answer type(s)
Lots of examples of products, especially tricky products.	examples
Not directly involved in this work (therefore, no pain points) ;-).	
Political committment of stakeholders	
A good cookbook	step by step guideline
Examles	examples
A public list of pitfalls and solutions	pitfalls and solutions
mapping this and harmonize this with my country referenced vocabulary (WHO ATC)	step by step guideline
Guideline for implementation in personal health record	step by stepguideline
Depends on implementation date	
process to Dose form EDQM. A methodology to perform a first gap analysis	step by step guideline for gap analysis and training
Examples and trainings	examples and training
A business case outlining the profits of moving to idmp for a local mpd from a cost benefits persperctive	use cases (based on that you can make a business case yourself, cannot be done centrally)
Use cases	use cases
A guideline for implementation in pharmacovigilance	step by step guideline
Multiple mapping grids_ open format	
Access to example data (we'd like to see SMS and PMS up and running)	examples
A SNOMED-IDMP cross-map would really facilitate this, as we are already fully mapped to SNOMED (and local version: dm+d)	cross-maps
Gap analysis, use cases, guidelines to implementation	use case/step by step guideline for gap analysis and mapping
Single source of truth	
Pharmacovigilance	
Dispensing Traceability Interoperability	
Regulatory complianceStructure internal databaseMore efficient decision making	
Interoperabilty	
Track and trace in the world wide	
Cross border	
Is there a use case involved in patient's sign-off from hospitals > general practice (and/or home)? I.e., especially if the way drugs are dispensed in hospitals is not the same way in which they are available to the patient post-release.)	use case
Step by step guideline is appreciated	step by step guideline for mapping

Figure 1 - MentiMeter: How to support you in implementing IDMP?

3.2.2 Approach to these wishes for support

This table gives all the comments from the attendees of the Community of Expertise webinar; responses are given where possible and for those that are not the main focus of this working paper (e.g. the response about pharmacovigilance and ICSR) BUT it is not possible, within the scope of this project, to provide positive responses for all.

Table 3-1 Where to find Answers

WISHES FOR TYPE OF SUPPORT	WHERE TO FIND IN THIS IG OR IN UNICOM
A business case outlining the profits of moving to IDMP for a local MPD from a cost benefits perspective	UNICOM is not currently able to provide this specifically for MPD

A good cookbook; Step by step guideline is appreciated	"IDMP Implementation Guidance"
A public list of pitfalls and solutions	Chapter "Challenges in Implementation"
A SNOMED-IDMP cross-map would really facilitate this, as we are already fully mapped to SNOMED (and local version: dm+d)	Chapter "IDMP and SNOMED CT"
Access to example data (requested most often in this CoE) especially tricky products	UNICOM has some example data in its "Pilot Product List" but this is currently for use within the UNICOM project unfortunately
Cross border product identification	D9.1 AN ANALYSIS OF THE IDMP MEDICINAL PRODUCT IDENTIFICATION DATA PROVIDED BY NCAS (AND SPOR) COMPARED TO THAT NEEDED IN MPD FOR CLINICAL CARE AND FOR SECONDARY USES
Gap analysis to implementation	Chapter 4.1.2 First gap analysis from MPD to IDMP data
Guideline for implementation in personal health record	Probably, this is through an MPD. An app will use the data of an MPD. An app builder will not use IDMP. So this point is covered by the guidelines for an MPD.
Improved wording: IDMP tends to confuse organizations (EDQM), systems (PMS, SMS) vs. code systems and value sets.	We improved the wording in this document
Political commitment of stakeholders	"IDMP and MPDs legal Background"
Mapping and harmonizing this with my country referenced vocabulary (WHO ATC)	See chapter concerning ATC code
Structure internal database	Chapter Implementation depending on the MPD model
Training sessions by international experts for the standardization process to Dose form EDQM.	This would be a request to EDQM, this is not part of this IG.
Use cases	Chapter 4.1.4 Use Cases for IDMP in MPDs for product identification
A guideline for implementation in pharmacovigilance	D8.7 IDMP Coding Principles and Guidance for ICSRs

3.2.3 Statistics on structured standardisation process versus EDQM dose forms

The EDQM Pharmaceutical Dose Form terminology is one of the foundation terminologies that is used in the identification of medicinal products. Therefore, during the CoE on IDMP implementation for MPD, we started a MentiMeter analysis on the question "Has your organisation already started an EDQM

standardisation process?" to have a sense of how organisations are progressing with their IDMP implementation. In the graphic below you can see the result.

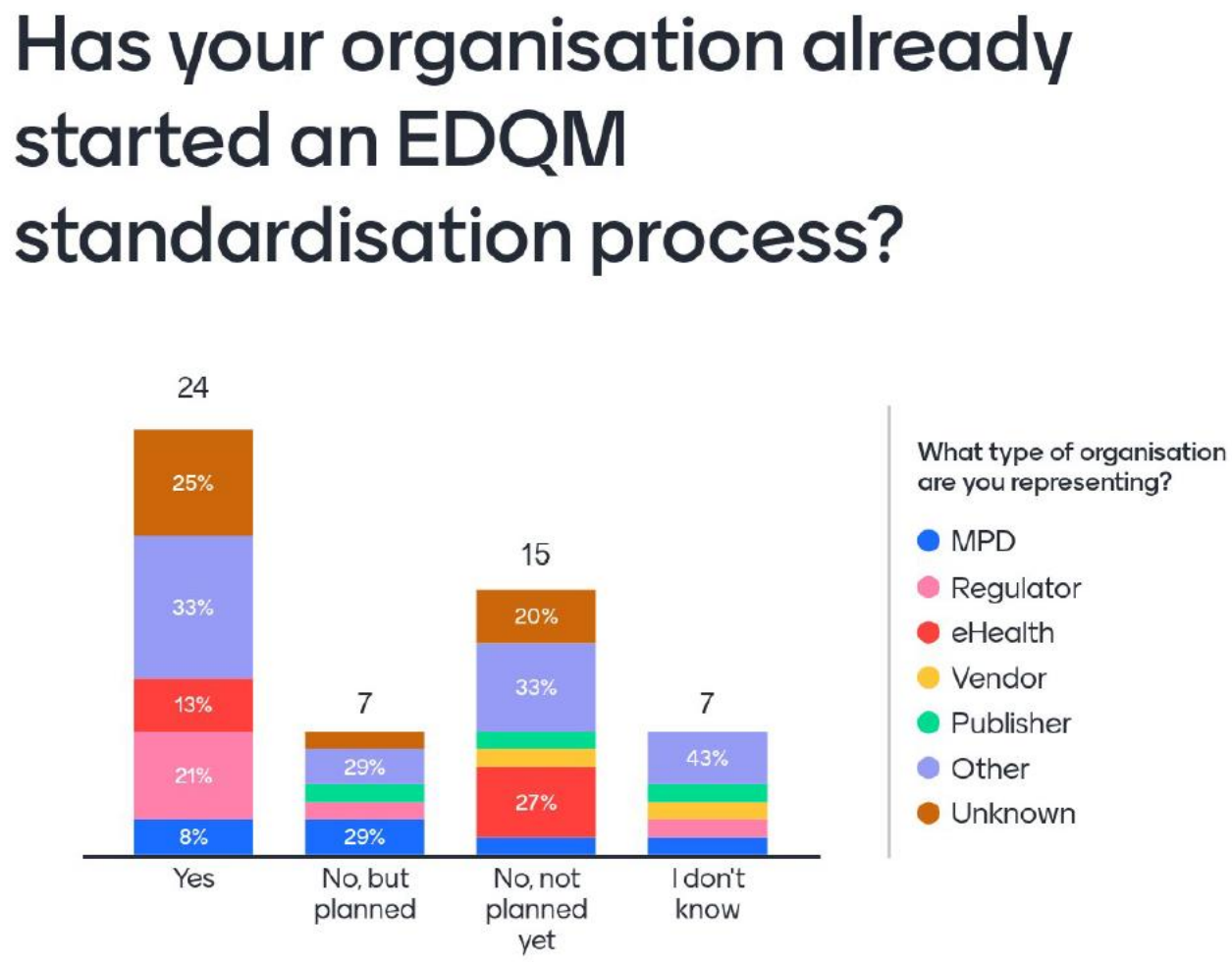


Figure 2 - Organisation with an EDQM standardisation process analytic

The majority of organisations of all types had indeed started their mapping process, with others having the mapping planned, but a significant number have not started, including both eHealth and MPD organisations, indicating that guidance is definitely required.

Reference to the CoE 25.2.2022, "Draft Implementation Guide of IDMP in MPD"

https://unicom-project.eu/all-community-of-expertise-webinars-in-a-nutshell/

Source (retrieved 13.1.2022):

Mapping Guidance for EDQM to SNOMED CT Pharmaceutical Dose Form Mapping

https://confluence.ihtsdotools.org/display/USRG/Mapping+Guidance+for+EDQM+to+SNOMED+CT+Pharmaceutical+Dose+Form+Mapping

4 Context of IDMP and MPDs

REFERENCE TO UNICOM WORKING PAPER D9.1: AN ANALYSIS OF THE IDMP MEDICINAL PRODUCT IDENTIFICATION DATA PROVIDED BY NCAS (AND SPOR) COMPARED TO THAT NEEDED IN MPD FOR CLINICAL CARE AND FOR SECONDARY USES

The document D9.1 provides requirements for the identification and description of medicinal products in patient care by examining existing medicinal product dictionaries that are used in patient care and particularly by examining the standards that govern them, the use cases that they support, and the challenges they face and overcome. It draws on investigative work undertaken in two previous tasks in Work Package 9; T9.1 - a characterisation of the MPD (commercial/national) that operate in EU member states and T9.2, which characterises the community prescribing and dispensing software systems that that operate in EU member states facilitating the main community-based care medication business processes of prescribing and dispensing.

The document D9.1 is about the gap between IDMP data needed for regulatory purposes and IDMP data needed for clinical care and secundary use in MPDs.

4.1.1 The Identification of Medicinal Products (IDMP)

Reference to Technical Specifications (TS) 16791 https://www.iso.org/standard/75312.html

Reference to Technical Requirements (TR) 14872 https://www.iso.org/standard/65714.html

Recognising the technical challenges of identifying medicinal products across disparate regions, ISO designed the IDMP Standard as a mechanism to standardize the structure, content, and semantics of product data and to make it possible to identify them globally.

The IDMP Standards are a set of 5 ISO international standards that has been developed in response to a worldwide demand for internationally harmonised specifications for identification and description of medicinal products. IDMP provides the basis for the unique identification of medicinal products, which facilitates the activities of medicines regulatory agencies worldwide by jurisdiction for a variety of regulatory activities (development, registration and life cycle management of medicinal products, pharmacovigilance, and risk management).

In IDMP Standards messaging specifications are included as an integral part of the standards. They describe and protect the integrity of the interactions for the submission of regulated medicinal product information in the context of the unique product identification; they include acknowledgement of receipt including the validation of transmitted information. Health Level Seven (HL7) FHIR Message Exchange are normative within the IDMP Standards.

IDMP Standards are completed with Implementation Guides, as well as with:

- Technical Specifications (TS) 16791 (provides guidance for the identification of medicinal products by using international supply chain Standards, securing traceability, safe supply chain and other market requirements)
- Technical Requirements (TR) 14872 (Requirements for the implementation of the Standards for the identification of medicinal products for the exchange of regulated medicinal product Information)

The ISO IDMP standards have been designed to cover many aspects of information about medicinal products not purely identification, to support a broad range of regulatory contexts. An overview of the data elements contained in the ISO IDMP standard is shown (for illustration purposes only) in the figure below.

Source (retrieved 8.12.2021):

https://www.ema.europa.eu/en/documents/other/introduction-iso-identification-medicinal-products-spor-programme_en.pdf

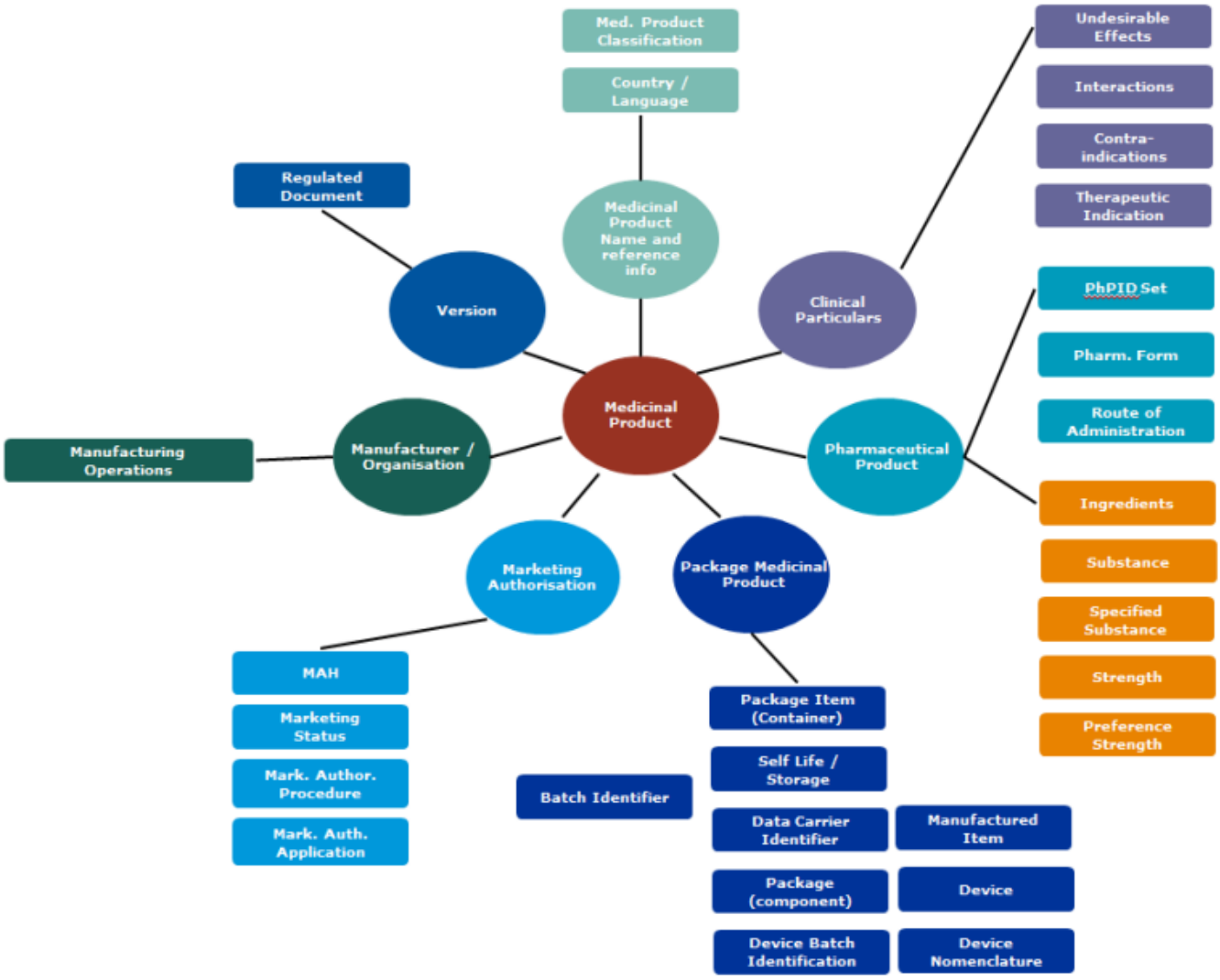


Figure 3 - Overview of ISO IDMP data elements - for illustration purposes only

4.1.2 The Medicinal Product Dictionary

The medicinal product dictionary plays a central role in storing and disseminating information about medicinal products for prescription and dispensation in a country.

The MPD is sourced with different types of information from NCAs´ marketing authorisation process, from regulated text files such as the SmPCs, and from other scientific documentation.

The MPD provides a structured repository of information from these sources and makes them available to multiple types of users such as clinicians (via supporting software and systems), patients (via online queries or apps), e-Health authorities and others. MPD focusses on marketed and available medicinal products.

In this the IDMP product data provide a complete and accurate structured information on medicinal products, provided by a single source of trust, the NCA.

Reference to the Community of Expertise webinars in a nutshell
CoE " IDMP and Medical products dictionaries", April 2021
CoE " IDMP Implementation Guide for Medical products dictionaries", February 2022

Link to All CoE

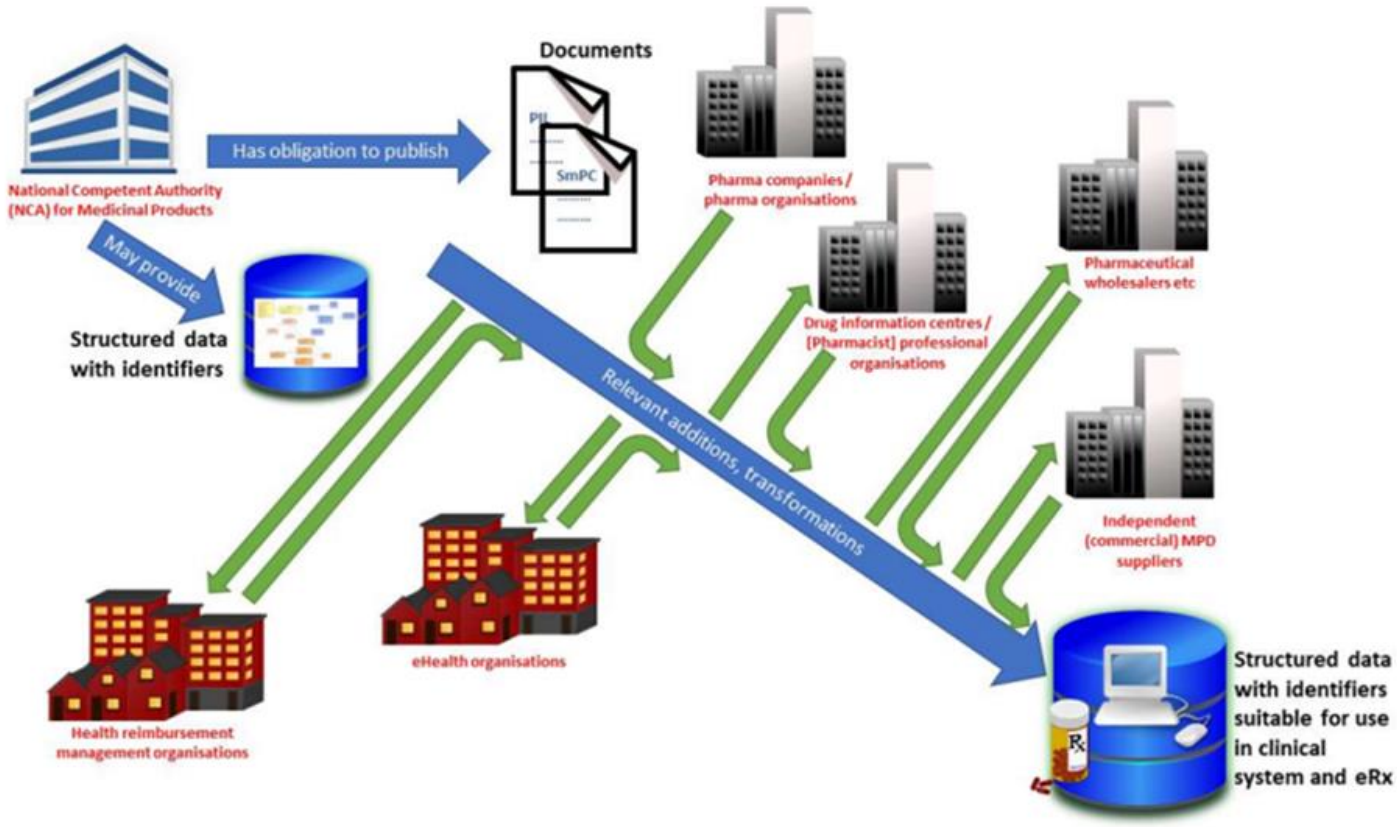
4.1.3 The Journey from authorized Product Data to ePrescription (eRx)

Everywhere in healthcare, across the world, within hospitals and private practices, regulatory agencies, medicinal product dictionary providers and medical product manufacturers, insurance companies and at the heart of every patient interaction, there is a common challenge: how do we identify products?

Why? The journey of product data from the NCAs to eRx to the patient is an arduous one. In fact, there is no single notion of "product data," nor is there a singular notion of "medication". Views and requirements of a product can be very different.

One important aspect to be considered for MPD data is knowing the source(s) of their information, and therefore how various types of information flow into them. The primary source of information about medicines for MPDs is the Summary of Product Characteristics – the SmPC. The SmPC provides the regulated, scientifically validated information that assists healthcare professionals in prescribing and dispensing. This source data needs to be extracted from in some instances, free text, or structured text, and it will be augmented with other information (e.g. clinical and reimbursement information) before the MPD is fit for purpose within a healthcare domain. The diagram below and the description of the discussion following, examines the process to produce an MPD for ePrescription and clinical use.

Figure 4 Data flow of trusted NCA´s product data via MPD suppliers to eRx



REFERENCE TO UNICOM WORKING PAPER D9.1: AN ANALYSIS OF THE IDMP MEDICINAL PRODUCT IDENTIFICATION DATA PROVIDED BY NCAS (AND SPOR) COMPARED TO THAT NEEDED IN MPD FOR CLINICAL CARE AND FOR SECONDARY USES, CHAPTER 6.5.1.2. STRUCTURED PRODUCT INFORMATION FROM NCAS

NCAs from twelve countries provide structured data and identification and description of medicinal product concepts – either at the product or package level or both. These countries are CZE, DNK, POL, PRT, AUT, BEL, HRV, EST, FIN, SWE, NOR and ESP.

The characterisation of MPD according to the provision of medication concepts, descriptions and identifiers needed to support the business processes of patient care yielded two clear patterns– those with a "full set" of real and abstract product and package concepts versus those that have primarily actual package concepts. D9.1 analysis these two major patterns for the structure of an MPD, and a small number of variations in the flow of data from source at the NCA to MPDs.

EMA website for information on centrally authorised products (CAP):

https://www.ema.europa.eu/en/medicines

HMA website for products authorised by the Mutual Recognition or Decentralised procedures:

https://www.hma.eu/mriproductindex.html

4.1.4 Use Cases for IDMP in MPDs for product identification

REFERENCE TO:

INTERNATIONAL ORGANIZATION FOR STANDARDS. ISO/TS 19256:2016 HEALTH INFORMATICS: REQUIREMENTS FOR MEDICINAL PRODUCT DICTIONARY SYSTEMS FOR HEALTH CARE

The ISO TS:19256 defines an "MPD system" as something that "stablishes a consistent representation of medication concepts (set of identifiers) at various levels of detail and with meaningful relationships between the concepts, to support parts of several processes in healthcare in which medication plays a role". The TS also provides a goal or raison d'être for an MPD system in terms of interoperability: "to offer various parties in healthcare a complete overview of available medicinal products in such a way the (elements of the) concepts and the descriptions and identifiers can be used interoperable in a variety of other healthcare information systems.

The specification contains a section ("Relation with ISO IDMP standards") which describes how its content relates to the ISO IDMP standards. One of the aims of this is to facilitate "accuracy and consistency of the use of concepts and terms according to the ISO IDMP standards" but it also acknowledges and highlights two important considerations:

1.) the development, supply and use of medicinal products is highly regulated; this directly affects how medicines are named and therefore identified

2.) cultural differences in the practice and delivery of care and national legislation and remuneration practices require MPD meet specific local, regional and/or national needs; this directly affects the specific collection of 'medication abstractions' which must be identified, defined and related to each other within an MPD

The specification suggests that information structures should be "consistent and appropriate" according to the ISO IDMP Standards"; however the reason for this and a sense of how much consistency and appropriateness is possible or desirable is not detailed.

It acknowledges that the IDMP standards are primarily designed for the medicines regulatory process rather than patient care. Therefore not everything in the IDMP standard is required to be supported in an MPD. But it makes a clear and explicit statement that it expects that, at some point in the future – and indeed there is a section on "Migration" to acknowledge this journey, MPD "will be created and maintained in accordance with the IDMP series". The specification also explicitly states that when MPD use ancillary concepts in identification of medicinal products (substances, dose forms and routes of administration etc.) the same concepts and their identifiers be as used in IDMP and in the regulatory domain, although it acknowledges that "different views" may be needed and suggests that this may require "mapping".

The IDMP standards as used by EMA and the NCAs are primarily designed for the medicines regulatory processes rather than patient care and ePrescription. And even in this regulatory area the differentiation of IDMP data depending on the specific regulatory use case such as PMS, DADI, Falsified Medicines, pharmacovigilance, and clinical studies was still a work in progress at the time of writing this document.

Supply of medicines is highly regulated, and different from country to country.

For example:

- "Variquel 0.2 mg/ml, solution for injection" (UK)
- "Terlipressin Acetate 1 mg solution for injection" (Sweden)

These are equivalent products, although their name and description are different, because they both contain 0.2mg/mL of terlipressin acetate.

So, each country needs to express their medicinal products in the way that fits with their national regulation and their healthcare culture and practice.

There is a medical product abstraction in the IDMP standards (the PhPs); however, at this point in the UNICOM project it remains unclear as to a) how those abstractions are fully defined and b) which use case(s) they are designed to meet.

The bridge between national MPD data and IDMP data allows us to identify generic products even if they are described differently in different countries. IDMP allows us to interchange information even though we cannot use the same concepts and data models.

Use cases related to eRX which are relevant to MPD provider and in the scope of this document are:

- Identifying medicinal products in patient medication lists (including cross-border care)
- Facilitate international interoperability of medication concepts
- Provide compatibility with the IDMP model for identification of medicinal products cross-border
- Electronic data exchange of medicinal products identifier compatible with the IDMP standard

Statistic on use cases for implementing IDMP data

During the CoE on IDMP implementation for MPD, we started a MentiMeter analysis on the question "Use cases for implementing IDMP data?". In the graphic below you can see the result.

Keyword: what are three use cases for implementing IDMP data?

Figure 5 - Word cloud on answers concerning use cases for implementing IDMP data

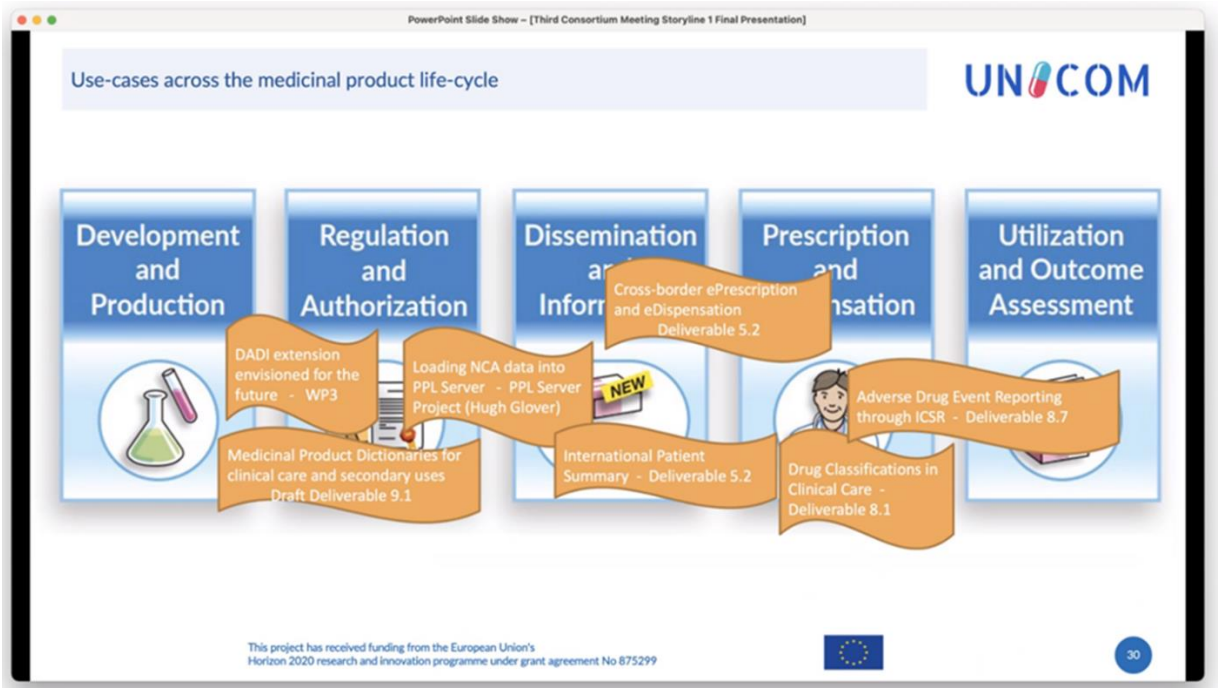


Figure 6 - Use-cases across the medicinal life-cycle

4.1.5 IDMP documentation

Data on medicines (ISO IDMP standards): Overview from EMA website:

https://www.ema.europa.eu/en/human-regulatory/overview/data-medicines-iso-idmp-standards-overview

4.1.6 IDMP and MPDs legal Background

There are no legal requirements for MPDs to use IDMP data yet. There are even no legal requirements for NCAs to publish their structured product data in form of IDMP data yet.

The only legal requirement is (as of today) EMA´s timeline for making the upload of IDMP based regulatory data from industry to NCAs mandatory in the DADI Project (see chapter 4.1.9). The implementation of these new IDMP based forms supports the EU requirement to integrate ISO IDMP standards for human medicines. The PMS data model will link to DADI. It is planned to go life at the end of 2022 for new products in the central procedure evaluated by EMA.

5 SPOR Standardised Vocabularies

Reference to EMA SPOR Portal

The SPOR Portal contains the following contents:

SPOR documents and other content, a Database with organisation data which refers to a dictionary of Organisations and their locations details and Referential data which refers to Lists and Terms of IDMP ontology.

https://spor.ema.europa.eu/sporwi/

5.1 Substance, product, organisation and referential (SPOR) data of EMA

The European Medicines Agency (EMA) is in the process of implementing the standards developed by the International Organization for Standardization (ISO) for the identification of medicinal products (IDMP).

EMA is implementing the standards in a phased programme based on the four domains of master data in pharmaceutical regulatory processes: substance, product, organisation and referential (SPOR) master data.

The ISO IDMP standards specify the use of standardised definitions for the identification and description of medicinal products for human use.

Their purpose is to facilitate the reliable exchange of medicinal product information in a robust and consistent manner.

They help to ensure wide interoperability across global regulatory and healthcare communities, which is critical in ensuring accurate analysis and unambiguous communication across jurisdictions.

Commission Implementing Regulation (EU) No 520/2012 (articles 25 and 26) obliges European Union (EU) Member States, marketing authorisation holders and EMA to make use of the ISO IDMP standards. This will impact on many areas of the pharmaceutical regulatory environment, both in the EU and other regions.

Four domains of master data and management

The four SPOR services cover the four domains of SPOR master data:

- Substance Management Service (SMS) - harmonised data and definitions to uniquely identify the ingredients and materials that constitute a medicinal product.
- Product Management Service (PMS) - harmonised data and definitions to uniquely identify a medicinal product based on regulated information (e.g. marketing authorisation, packaging and medicinal information).
- Organisation Management Service (OMS)- data comprising organisation name and location address, for organisations such as marketing authorisation holders, sponsors, regulatory authorities and manufacturers.
- Referential Management Service (RMS)- lists of terms (controlled vocabularies) to describe attributes of products, e.g., lists of dosage forms, units of measurement and routes of administration.

While the ISO IDMP standards relate to human medicinal products, SPOR applies to both human and veterinary domains. Human and veterinary medicines will use the same SMS, OMS and RMS services in terms of data, format, and processes for submitting and maintaining master data.

The EMA together with the European Commission, European Union (EU) Network Data Board and EU ISO IDMP Task Force have endorsed a phased implementation of the ISO IDMP standards. This will allow lessons learnt during each phase to be applied to subsequent phases, processes, and systems to mature over time and stakeholders to gain an understanding prior to the full roll out.

The first phase of SPOR implementation focuses on delivering the RMS, SMS and OMS, which lay the data foundations for the subsequent delivery of PMS.

OMS and RMS are operational and enable organisation and referential data to be entered once and reused many times in MPDs and other business processes and related regulatory procedures.

The submission and maintenance of data on authorised human medicines is already mandatory since July 2012. This is based on a format called Extended EudraVigilance Product Report Message (xEVPRM), which will be replaced by the ISO IDMP compatible format.

RMS contains 152 lists (and growing) comprising 125K+ terms from different maintenance organisations such as EDQM standard terms (dosage forms, routes of administration); WHO (ATC Human, ATC Vet); and MSSO (MedDRA).

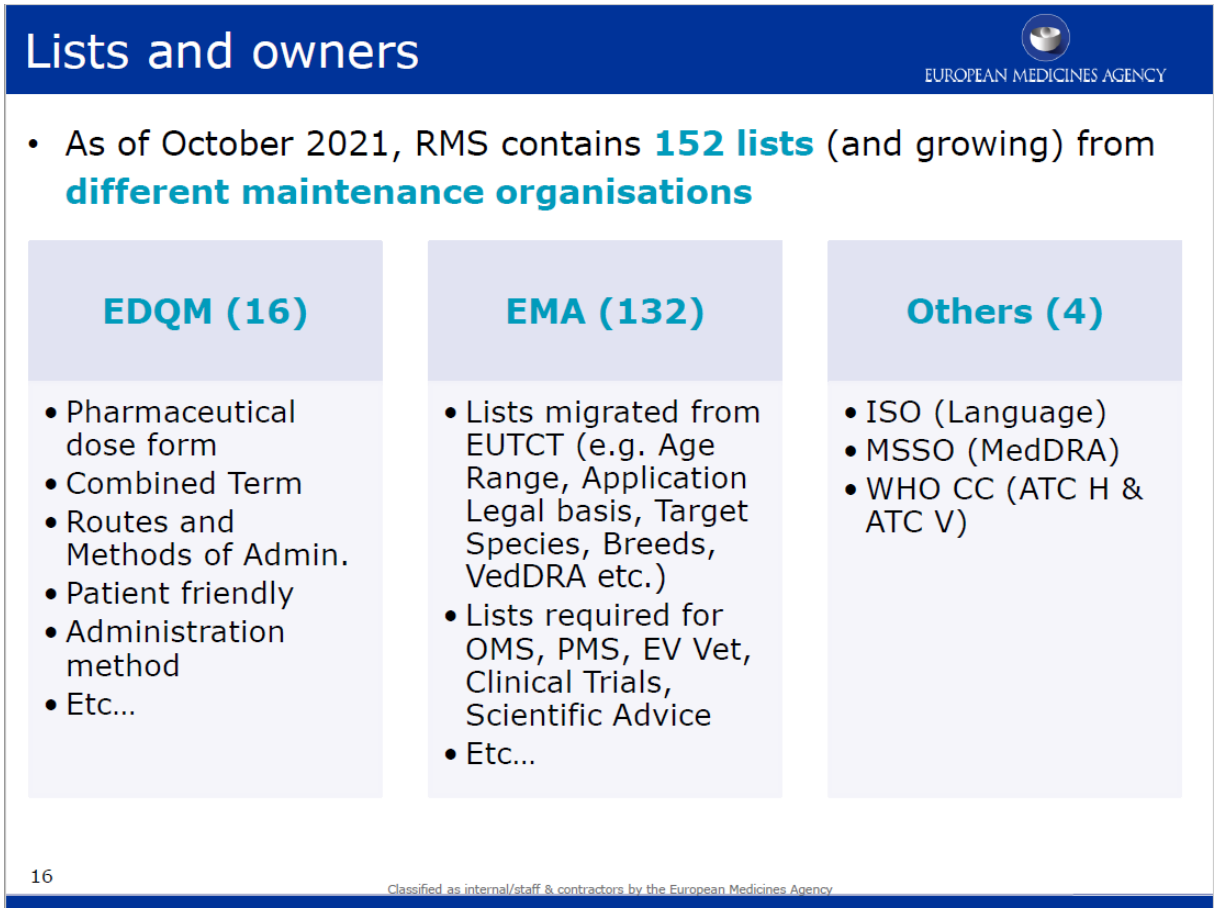


Figure 7 - RMS lists and owners

5.2 Access to the SPOR Referentials

5.2.1 EMA SPOR Portal

EMA´s Industry Webinar - Introduction to RMS services and activities (Nov. 2021) *https://youtu.be/VLrFcwQbsVw*

Manuals, documents, technical guidance to SPOR - How to search, view, export data and web user manual in RMS web portal:

https://spor.ema.europa.eu/rmswi/#/viewDocuments

You will find the EMA SPOR Portal homepage here:

https://spor.ema.europa.eu/rmswi/

The SPOR Portal is a public website. Anyone with access to the internet automatically possesses 'read-only' guest user access. Users registered for any EMA application, and after they log in, will also have some level of download access which is relevant for MPD provider.

Link to create a new EMA account:

https://register.ema.europa.eu/identityiq/home.html

The help file on how to register is here:

https://register.ema.europa.eu/identityiq/help/selfregister.html

RMS All these lists will be held in RMS:

(Source RMS web user manual version 1.0, retrieved 8.12.2021)

		RMS All these lists will be held in RMS				
		RMS/EUTCT	EDQM	Bfarm/ UCUM*	WHO	MSSO
		- Country/Language - Target species, Vet lists - EudraCT lists, TIGes lists, etc - VedDRA	- Dosage Forms - Routes of Administration - Containers/packaging - Units of Presentation	- Units of measurement * Done by EMA in the first phase	- ATC Human - ATC Vet - INN	- MedDRA
		Lists in RMS to which stakeholders have access				
NCAs	Download/access lists via RMS	Yes	Yes	Yes	**Yes**	Yes
NCAs	Requests changes to lists/terms via RMS	Yes Mostly for legacy Unlikely in other cases, Industry should have done it in advance	Yes Mostly for legacy Unlikely in other cases, Industry should have done it in advance	Yes Mostly for legacy Unlikely in other cases, Industry should have done it in advance	**Request to WHO first and then to EMA**	No, request to MSSO Only available in EMA via updates from MSO
NCAs	Add/amend translations via RMS	Yes	No, through EDQM only	Yes	**Yes**	No
INDUSTRY	Download/access lists via RMS	Yes	Yes	Yes	No Browse only Access through WHO	No Browse only Access through MSSO
INDUSTRY	Requests changes to lists/terms via RMS	Yes	Yes	Yes	**Request to WHO first and then to EMA**	No, request to MSSO Only available in EMA via updates from MSO
INDUSTRY	Add/amend translations via RMS	No	No	No	No	No

Figure 8 - RMS lists and stakeholder access

5.3 Using the SPOR Referential

In addition to the ISO IDMP Standards, additional, more detailed specifications and guidance are required to understand the implementation of ISO IDMP by the EMA. These are outlined in here.

Table 5-1 - IDMP Implementation Guides

Specification/Guide	Description	Responsible organisation
ISO IDMP Standards	▶ Define the required data elements and their structure ▶ Provide 'business-level' description of IDMP	ISO TC 215 Working Group 6
ISO IDMP Implementation Guides (Technical Standards)	▶ Define the technical details on how to implement the standards ▶ Include field formats, business rules etc.	ISO TC 215 Working Group 6
HL7 Messaging Specifications	▶ Define the messages that will be used to exchange IDMP information ▶ Based on existing HL7 'Common Product Model' standard (similar to FDA's SPL)	HL7

Regional Implementation Guides	▶ Interpretation of fields specifically for the regional regulatory environment ▶ Guidance on processes of submitting and updating data	Regional regulators
EMA PMS Implementation Guide	▶ Interpretation of fields specifically for the European regulatory environment ▶ Guidance on processes of submitting and updating data	EMA

Regional implementation guides define details of implementation that are specific to a jurisdiction. This includes both how specific fields should be interpreted as well as the processes mandated by the regulator to provide the data.

5.3.1 RMS functionalities

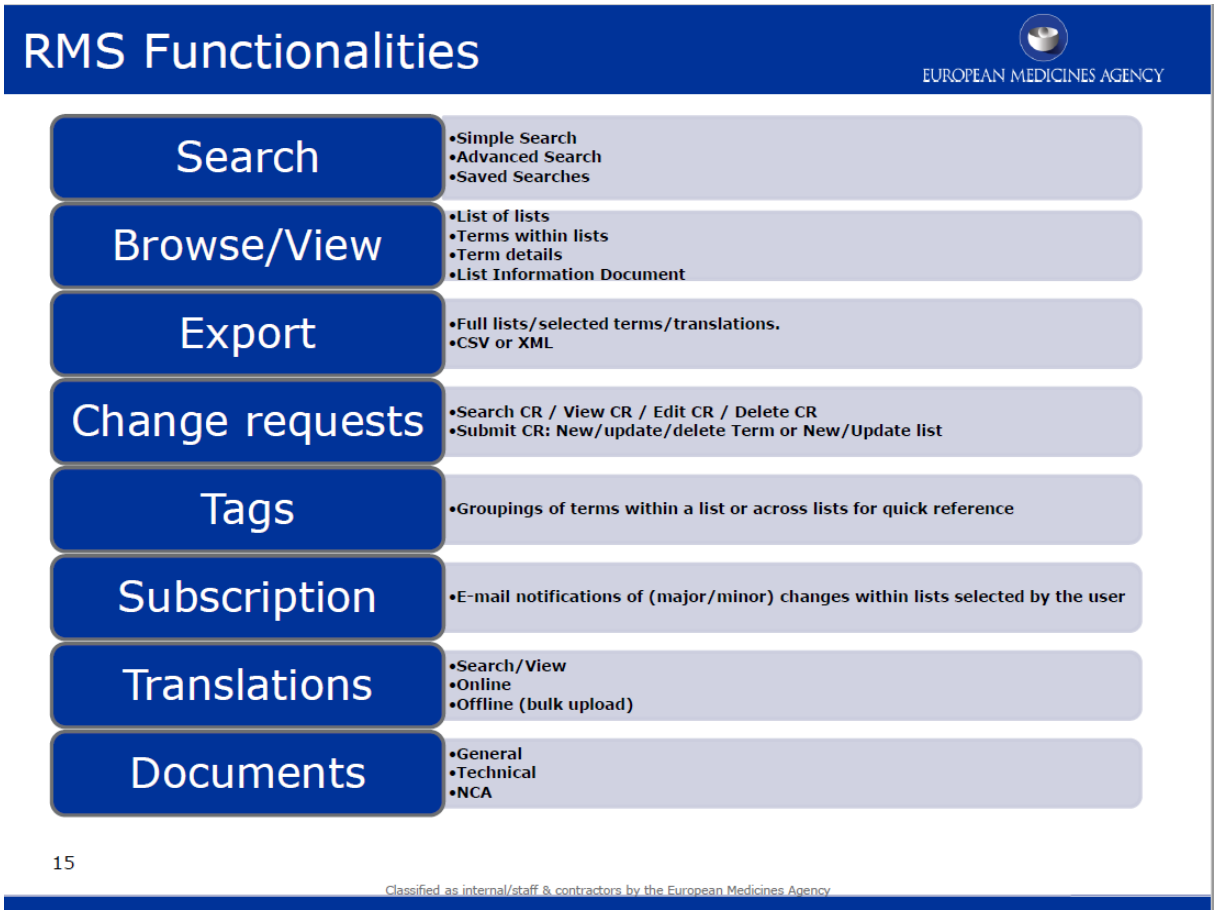


Figure 9 - RMS functionalities

5.4 Structure of SPOR Lists and Terms

Source https://spor.ema.europa.eu/rmswi/ help file "Technical Documents", retrieved 8.12.2021

5.4.1 RMS Data Model - Documentation

You will find the RMS Conceptual Model, the Logical Data Model and documentation (created by the SAP PowerDesigner) in the help files of the SPOR Portal of EMA.

(Source https://spor.ema.europa.eu/rmswi/ help file "Technical Documents", retrieved 8.12.2021)

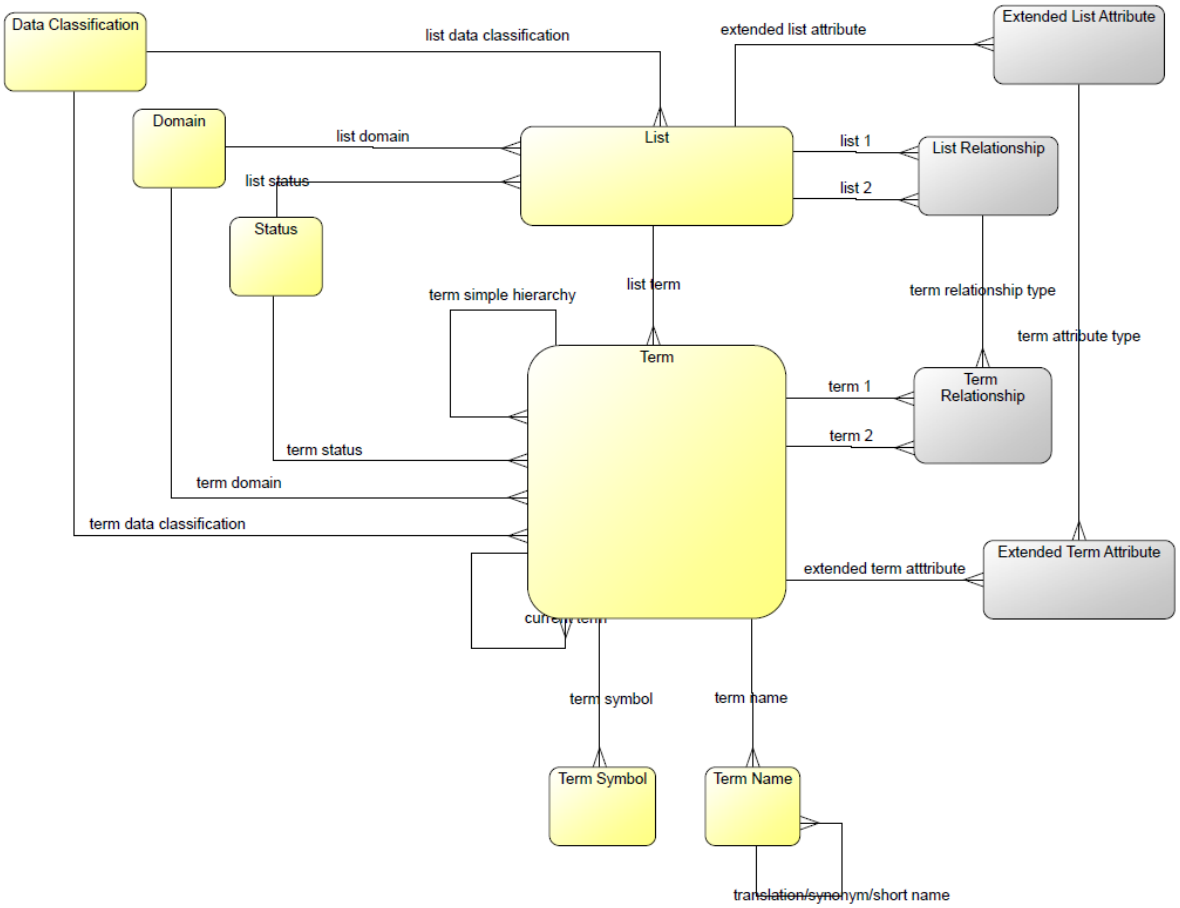


Figure 10 - RMS Conceptual Data Model

5.4.2 Identifier

Each term and each list has its unique identifier.

Source: document A1 - RMS Introduction - Webinar 21 October 2021 (EMA SPOR Portal9, retrieved 8.12.2021)

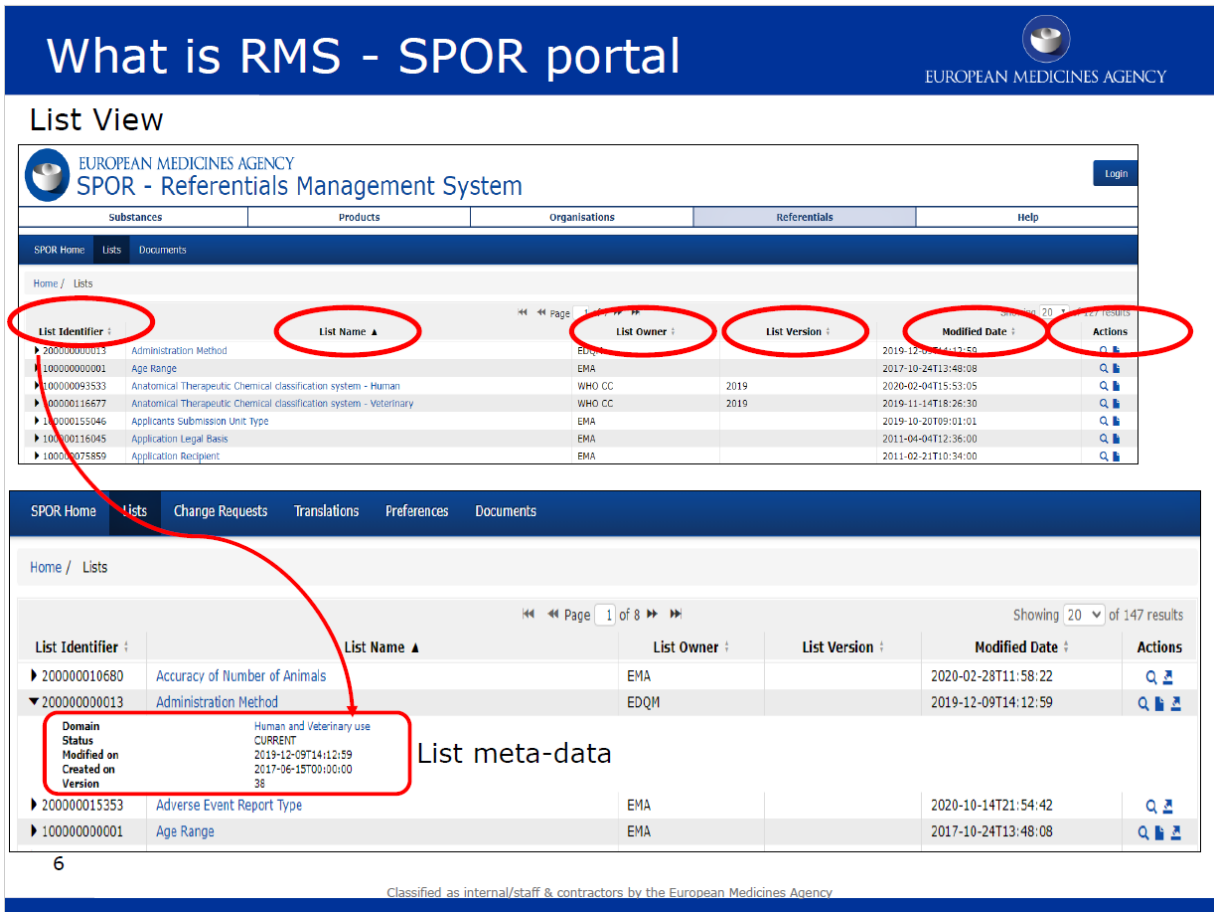


Figure 11 - SPOR list identifiers

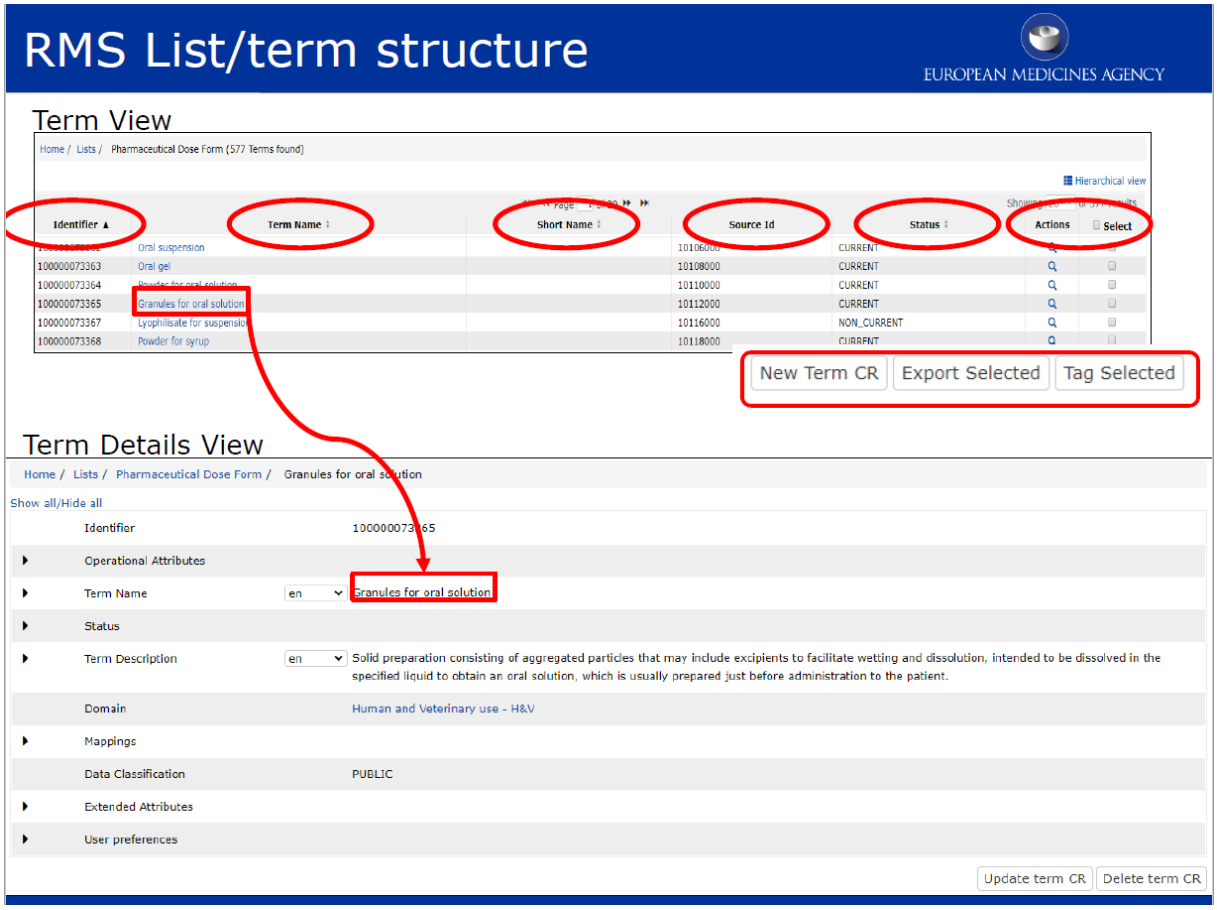


Figure 12 - SPOR term identifier

5.4.3 Term details

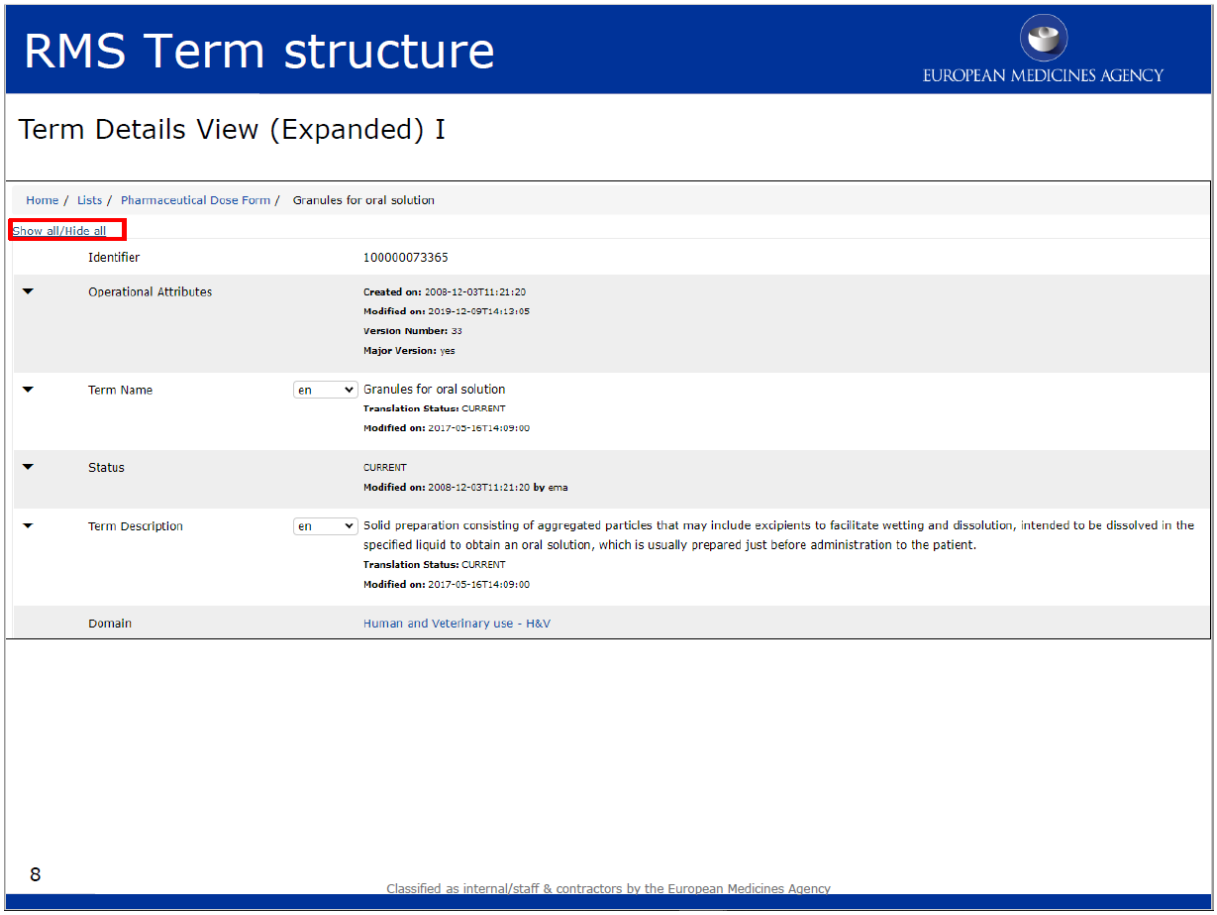


Figure 13 - Term details

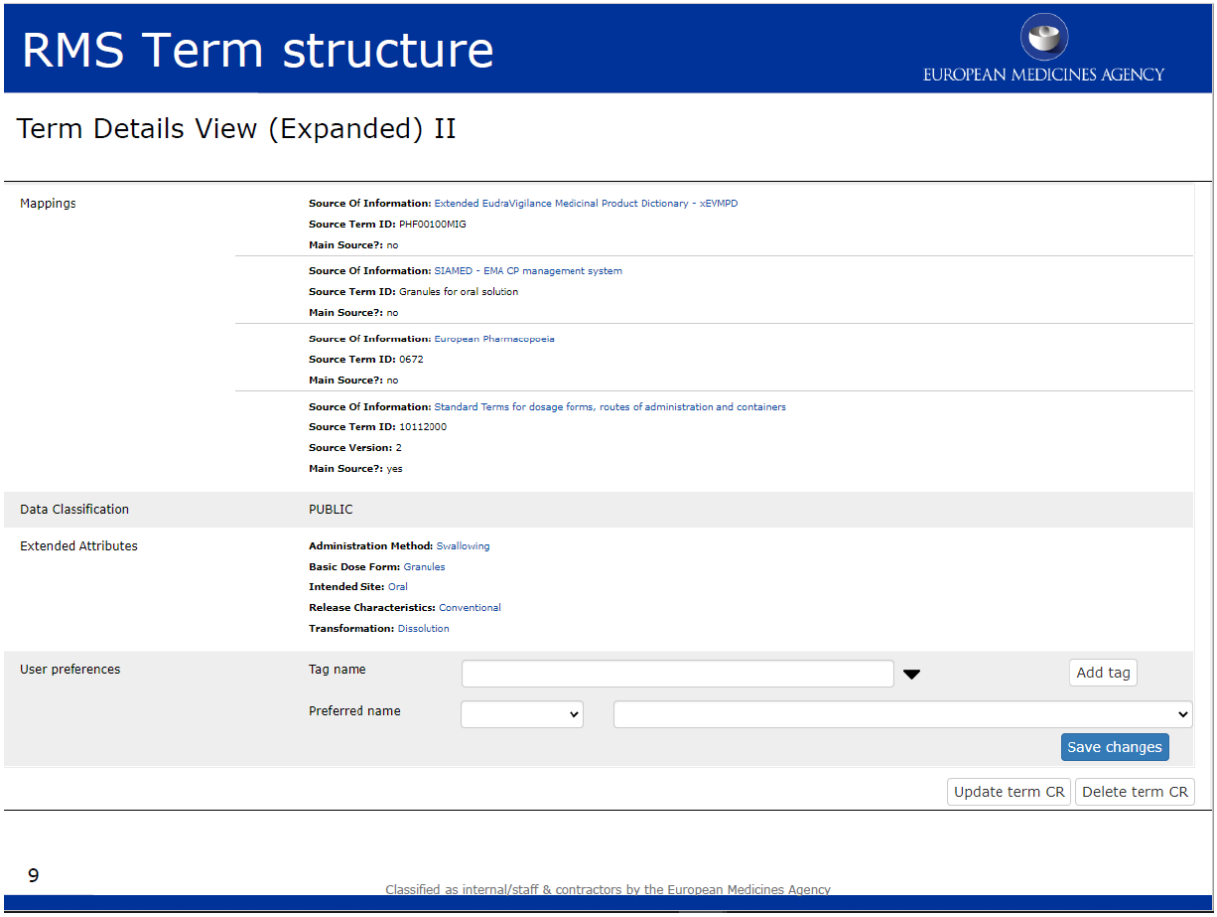


Figure 14 - Term details extended

5.4.4 Term attributes

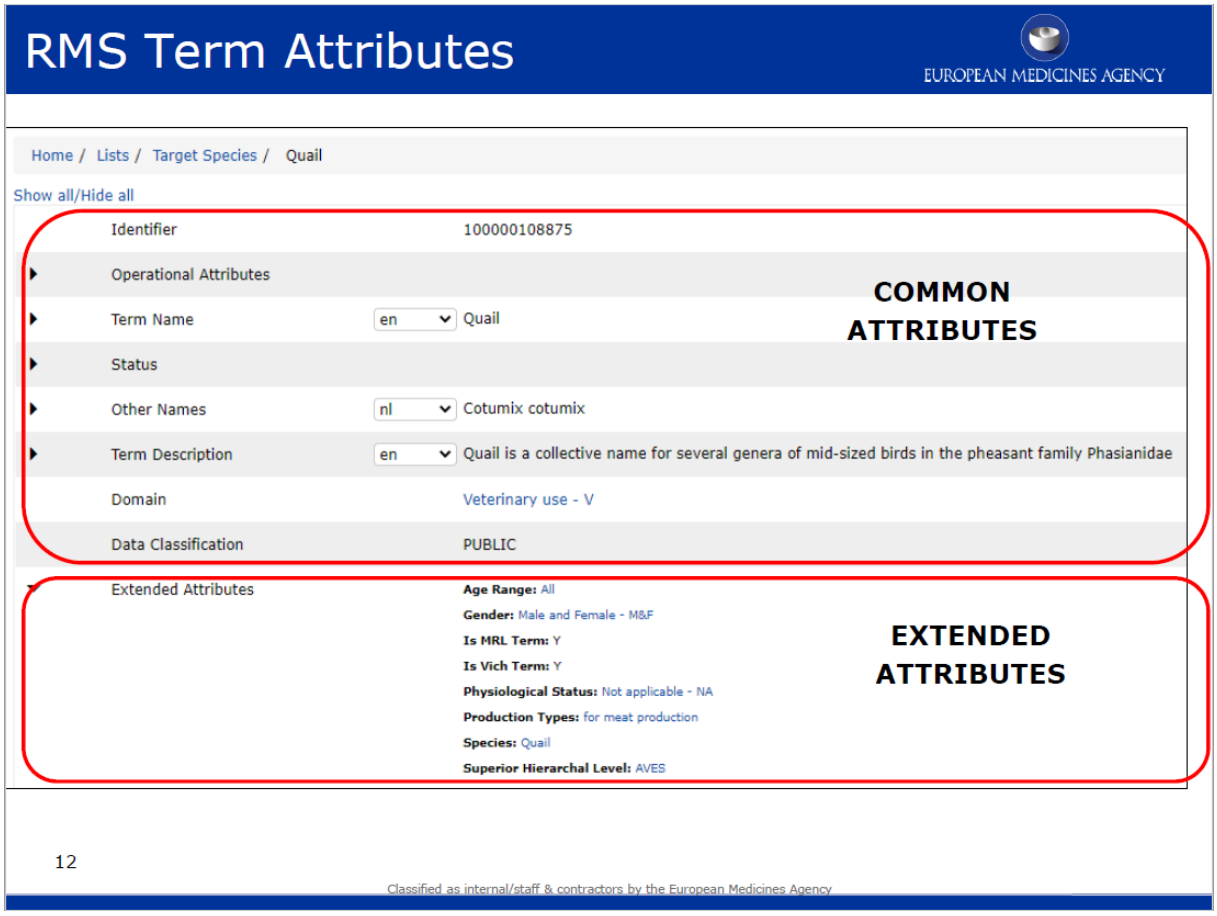


Figure 15 - Term attributes

5.4.5 List information document

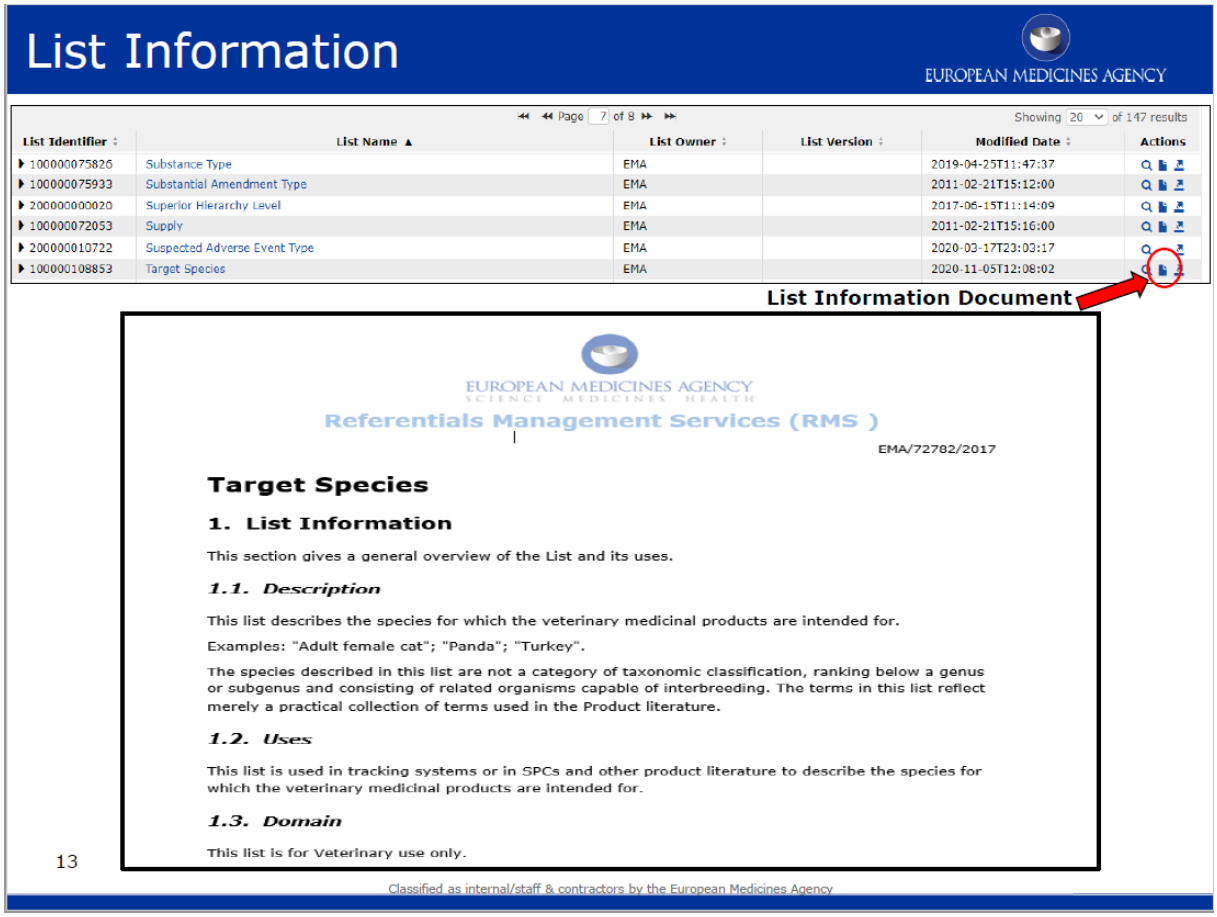


Figure 16 - RMS list information document

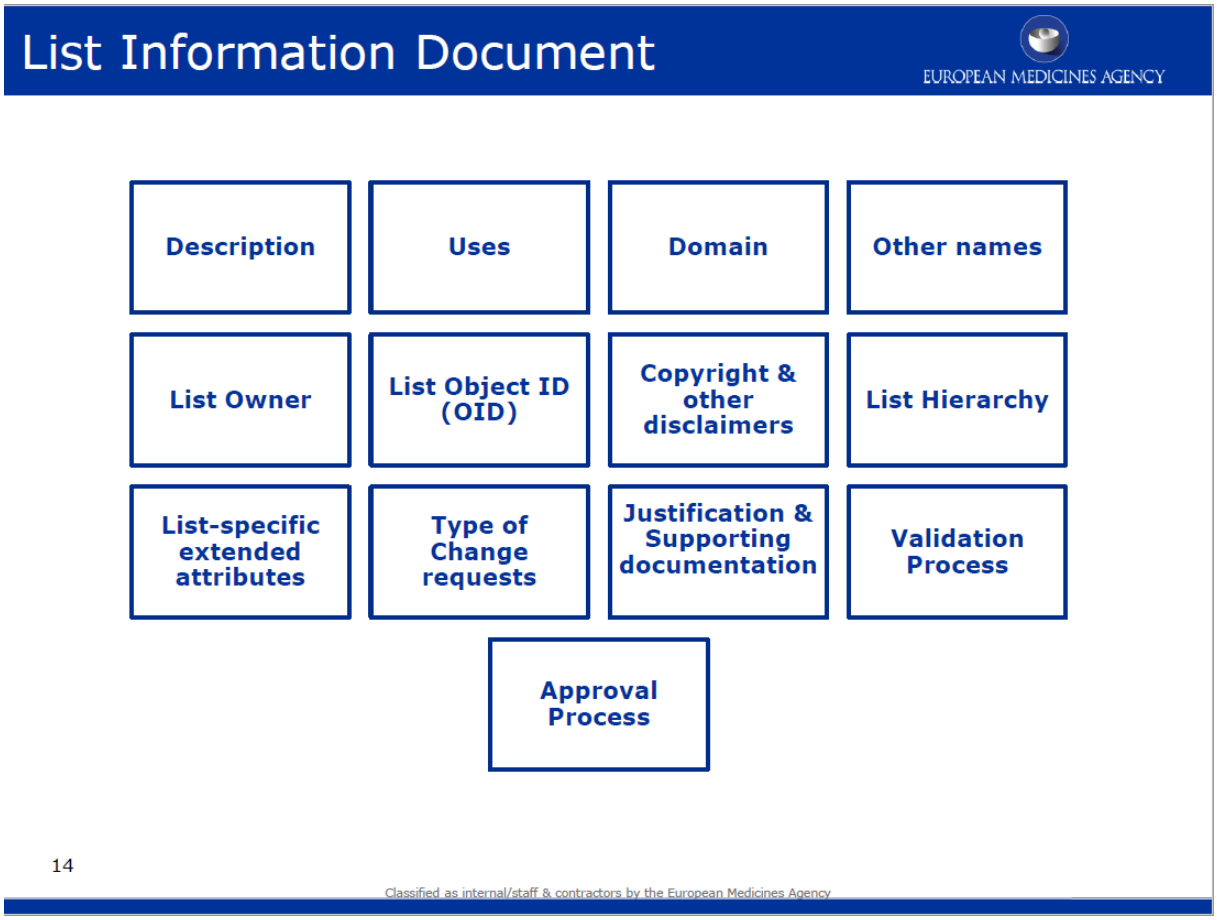


Figure 17 - Content of the list information document

5.4.6 Hierarchy

There is a hierarchical view and a flat view on the terms.

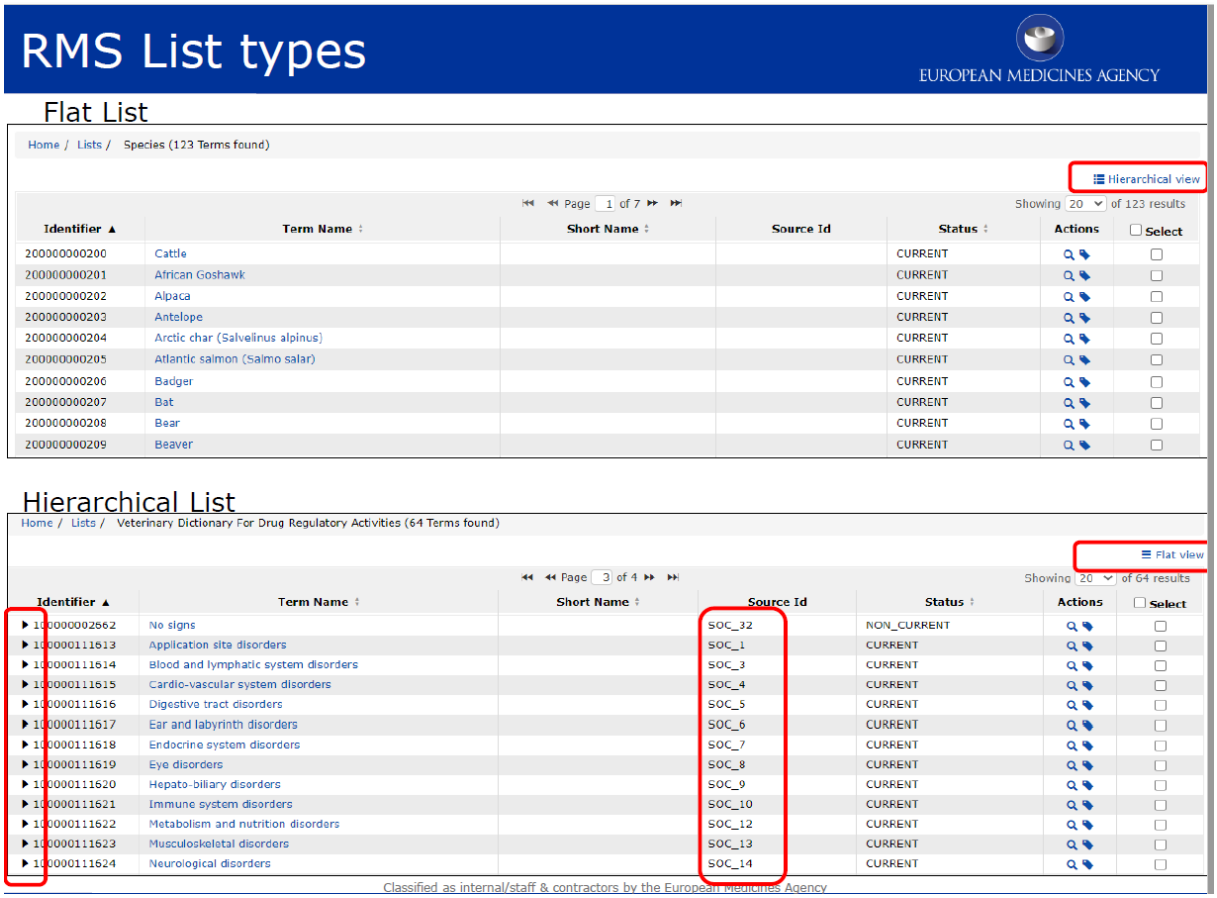


Figure 18 - Hierarchical view of terms

5.5 IDMP Product Data

5.5.1 EMA PMS

Source (retrieved 14.1.2022)

https://www.ema.europa.eu/en/documents/other/introduction-iso-identification-medicinal-products-spor-programme_en.pdf (page 8, 21.10.2021)

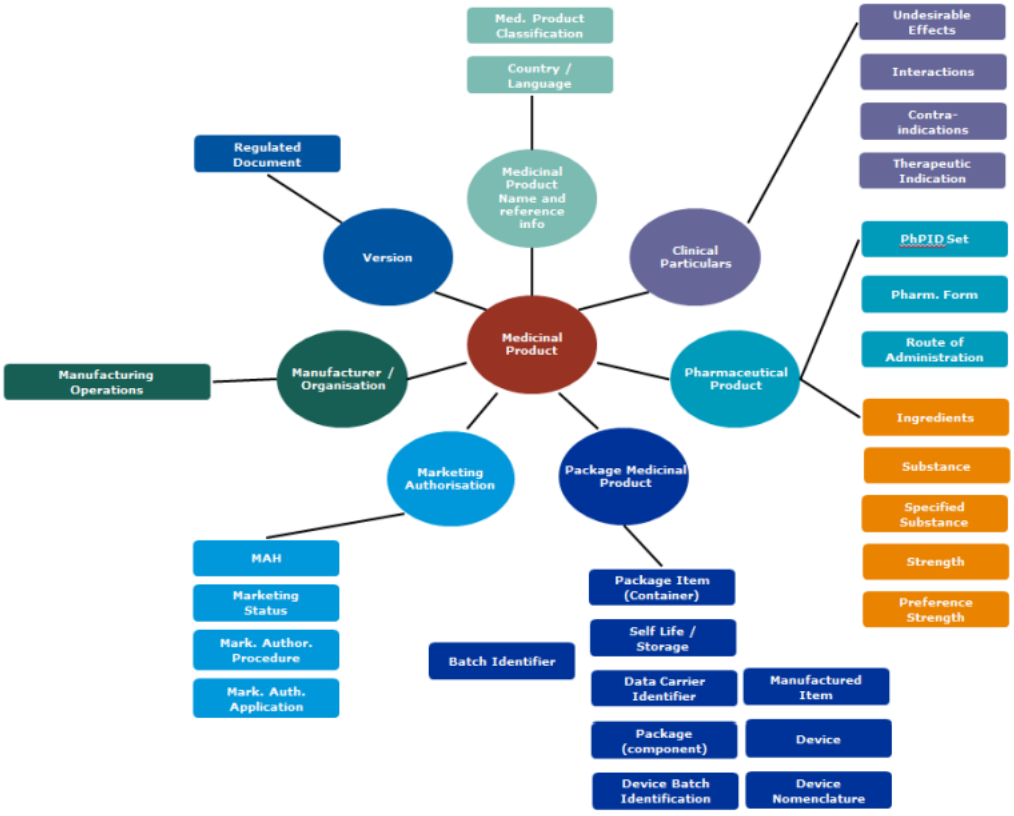


Figure 19 - Identifying medicinal products via the ISO IDMP format

Central to the IDMP model is the Medicinal Product. This object gathers all the product characteristics that are necessary to describe and uniquely identify regulated products, and is composed of the following elements:

- Medicinal Product Name.
- Pharmaceutical Product, which describes the scientific properties of the medicine itself. This includes the ingredients, which are one or more Substances (see below for further information on Substances), the pharmaceutical form, the route of administration and the strength;
- Clinical Particulars (e.g., indication, contraindications);
- Packaged Medicinal Product, which includes information on the products package, any included devices and the manufacturing batch;
- Marketing Authorisation details;
- Manufacturer;

5.5.2 EMA´s PMS Implementation Guide

Source (retrieved 14.1.2022)

Products Management Services (PMS) - Implementation of International Organization for Standardization (ISO) standards for the identification of medicinal products (IDMP) in Europe - Chapter 7 : XEVMPD - PMS Migration guide
https://www.ema.europa.eu/en/documents/regulatory-procedural-guideline/products-management-services-pms-implementation-international-organization-standardization-iso_en-0.pdf

The Article 57 data are the predecessor of the IDMP data. The EMA gives guidance on how to migrate the data held in the eXtended Eudravigilance Medicinal Product Dictionary (XEVMPD) and submitted by marketing authorisation holders (MAHs) under the Art.57 (2) legal obligations since 2012, into the ISO IDMP-compliant data format and terminologies.

This is quite an interesting document for MPD provider as mostly the source for MPD product data is actually the SmPC content evolving via the regulatory process of the product´s authorisation. It is a part of the EMA PMS IG as Chapter 7 : XEVMPD - PMS Migration guide.

6 First gap analysis from MPD to IDMP data

To get an overview on the work ahead, a first gap analysis of the target MPD data and the IDMP data is crucial. It might even be useful to involve external IDMP expertise for this first gap analysis. The outcome of this gap analysis will help you plan how to proceed with the implementation of IDMP in your MPD.

The best starting point to get an overview on the IDMP data elements is the EMA PMS Implementation Guide.

Referral to EMA IG online (retrieved the 26.1.2022, under development): https://www.ema.europa.eu/en/documents/regulatory-procedural-guideline/product-management-services-pms-implementation-international-organization-standardization-iso_en-0.pdf

Product Management Service (PMS) - Implementation of International Organization for Standardization (ISO) standards for the identification of medicinal products (IDMP) in Europe

Chapter 2: Data elements for the electronic submission of information on medicinal products for human use

Referral to the CoE March 2021 on "EMA Implementation guide (EU IG v2.0)" link to the page all CoE

Referral to the ISO TS 19256 MPD, which is the base for the EMA IG.

Based on EMA PMS Implementation Guide V2.0 (version 2021-02) we have identified a list of nearly 70 IDMP data elements relevant to MPD. You will find this list as Excel file attachment to this document. The list is based on the IDMP logical model and colour coded in the same way.

Figure 20 - Legend for Authorised Medicinal Product Colours

Marked in yellow are the IDMP tables which have been checked in the following gap analysis.

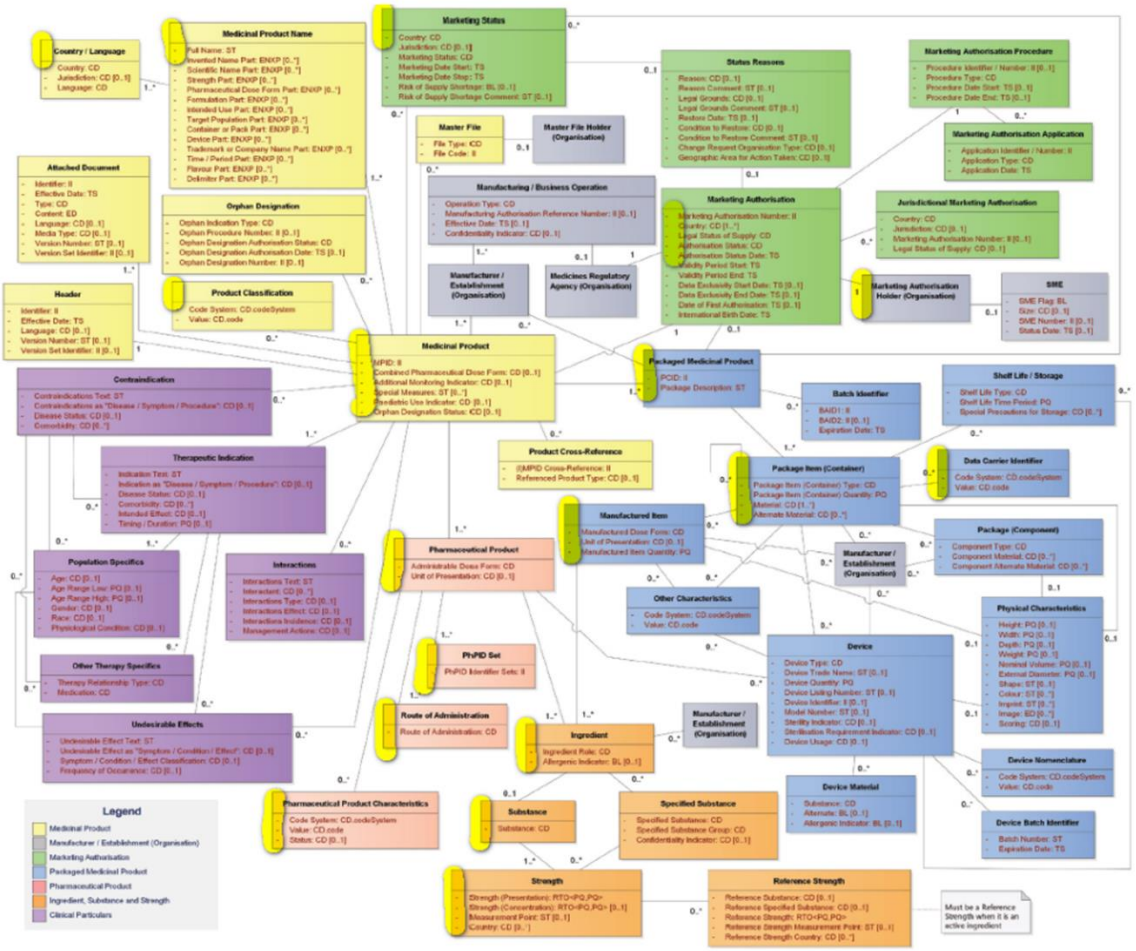


Figure 21 - Legend for Authorised Medicinal Product Tables probably relevant to MPDs

For 5 different national product dictionaries, we made a rough analysis of which fields would be valuable for this special MPD and how the IDMP data could be used.

Table 6-1 - Legend IDMP Data Elements Classification

Classification	MPD data	Example	Rationale
1	add to MPD as new data element	PMS ID	New data element because it has never existed before
2	update MPD data with IDMP data	Additional monitoring indicator	Use the IDMP data because it will be more accurate
3	to be defined individually per MPD	Marketing status and date	IDMP may not have this information or not in the granularity as expected by the MPD
4	others	not classifiable, to be checked when more	

		information is available, e.g., paediatric age range birth-14 or birth-18 or other granularity.	
5	not defined as IDMP data field	No occurrence	
6	ignore	Not usable for MPD	
7	filter	Vet / human domain	For filtering out special groups of products

6.1 Medicinal Product

The medicinal product elements are the core elements of IDMP and represent the top level of the data elements. Most MPD providers indicate that they will add the PMS ID as new data element to their MPD - see 1 in their columns in the table below.

G	I	J	K	L	Y	Z	AA	AB	AC	AD
EMA Implementation Guide Section V2.0 (version 2021-0	Category	Sub-Category	Sub-Sub-Category	Sub-Sub-sub-Category	Classification Dm+D (UK)	Classification Zindex (NL)	Classification NHPC (IR)	Classification SAM(BE)	Classification ABDA (DE)	Classification Vidal (FR)
1.1	Product Management Service Identifier (PMS ID)				1	1	1		1	1
1.2	Medicinal product identifier (MPID)				1	1	1		1	1
1.4	Type				7	4	1		1	1
1.5	(Authorised) pharmaceutical form				1	2	2		1	1
1.6	Combined pharmaceutical dose form				2	2?	2		1	1

Figure 22 - Data analysis Medicinal Product

6.2 Pharmaceutical Product - Administrable Dose Form

The administrable dose form concept is a new concept for all the MPDs in this group. Up to now most MPDs have been working on the basis of the manufactured dose form. In case of granularity mismatches in mapping the pharmaceutical dose forms, it may be good to also consider using attributes of the administrable dose form. FDA has presented this draft concept for mapping FDA´s data in their presentation in the 02-2020 ISO Meeting.

EMA Implementation Guide Section V2.0 (versic 2021-0	Category	Sub-Category	Sub-Sub-Category	Sub-Sub-sub-Category	Classification Dm+D (UK)	Classification Zindex (NL)	Classification NHPC (IR)	Classification ABDA (DE)	Classification Vidal (FR)	Classification PHARMAWIZARD
6.2	Pharmaceutical product	Administrable Dose Form			7	1?	2	1	1	4
FDA Presentation 02-2020	Pharmaceutical product	Administrable Dose Form	Administration Method (AME)		6	4	1	1	1	4
FDA Presentation 02-2020	Pharmaceutical product	Administrable Dose Form	Intended Site (ISI)		6	2	2	1	1	4
FDA Presentation 02-2020	Pharmaceutical product	Administrable Dose Form	Transformation (TRA)		6	4	1	1	1	4
FDA Presentation 02-2020	Pharmaceutical product	Administrable Dose Form	Release Characteristics (RCA)		6	4	1	1	1	4
FDA Presentation 02-2020	Pharmaceutical product	Administrable Dose Form	Basic Drug Form (BDF)		6	4	1	1	1	4
FDA Presentation 02-2020	Pharmaceutical product	Administrable Dose Form	State of Matter (SOM)		6	4	1	1	1	4

Figure 23 - Data analysis Pharmaceutical Product - Administrable Dose Form

6.3 Ingredient and strength

Since IDMP ingredients and strength data are based on the administrable dose form, data is probably only partially available in MPD data. How to integrate substance and strength data into the MPD will probably best be handled together with how to implement the administrable dose form concept.

EMA Implementation Guide Section V2.0 (version 2021-0	Category	Sub-Category	Sub-Sub-Category	Sub-Sub-sub-Category	Classification Dm+D (UK)	Classification Zindex (NL)	Classification NHPC (IR)	Classification ABDA (DE)	Classification Vidal (FR)	Classification PHARMAWIZARD
5.1	Pharmaceutical product	Ingredient	Ingredient role		7	2	1	1	1	2
5.2	Pharmaceutical product	Ingredient	Manufacturer		6	4	1	1	1	4
5.3.1	Pharmaceutical product	Ingredient	Substance	Substance	7	2	1	1	1	2
5.3.2.2.1	Pharmaceutical product	Ingredient	Substance	Strength	7	?	3	1	1	2
5.3.2.2.2	Pharmaceutical product	Ingredient	Substance	Strength	7	4	2	1	1	2

Figure 24 - Data analysis Pharmaceutical Product - Ingredient and strength

6.4 Packaged Medicinal Product

For Packaged Medicinal Product, IDMP introduces a quite complex data model. The packages are a key element for MPDs and in eHealth activities. The packages are using mostly nationally defined package identifiers. The field "Data Carrier Identifier" is therefore most relevant to MPD provider. As of today, it is not quite clear, if the Data Carrier Identifier will be available to NCAs, the moment product data will be published.

EMA Implementation Guide Section V2.0 (version 2021-02)	Category	Sub-Category	Sub-Sub-Category	Sub-Sub-sub-Category	Classification Dm+D (UK)	Classification Zindex (NL)	Classification NHPC (IR)	Classification ABDA (DE)	Classification Vidal (FR)
4.1	Packaged medicinal product	Packaged Medicinal Product Identifier PCID			1	1	1	1	1
4.2	Packaged medicinal product	Package description			6	2?	1	1	1
4.2.1	Packaged medicinal product	Package description	Language		6	4	1	1	1
4.3	Packaged medicinal product	Pack size			2	4	3	1	1
4.7.1	Packaged medicinal product	Package item (container)	Package item (container) type		1	1.2	3	1	1
4.7.2	Packaged medicinal product	Package item (container)	Package item reference(s)		1	4	1	1	1
4.7.3	Packaged medicinal product	Package item (container)	Manufactured item reference(s)		1	4	1	1	1
4.7.5	Packaged medicinal product	Package item (container)	Package item (container) quantity		2	2?	1	1	1
4.7.6	Packaged medicinal product	Package item (container)	Data carrier identifier		1	4	1	1	1
4.7.7	Packaged medicinal product	Package item (container)	Material		6	4	1	1	1

Figure 25 - Data analysis Packaged Medicinal Product

6.5 Conclusion

After this first analysis of IDMP data and granularity it became clear, that the process of implementing IDMP data into a MPD is different for many reasons not the least of which is the fact that all MPDs are structured differently within different national extensions as regards granularities and specialities. There is no “one-size-fits-all” solution. To conduct a reliable gap analysis expertise in both data content and structure, and technical expertise in data storage will be needed for both data models, one expert on the MPD data and one expert on the IDMP data. Mobilise inhouse expertise, if needed supported by external consultants.

7 Mapping Guidelines

7.1 Formal Mapping Guidelines

Mapping is the process of defining a set of maps.

A map is an association between a particular code/concept/term in one code system, and code/concept/term in another code system that have the same (or similar) meaning.

Maps are developed in accordance with a documented rationale, for a given purpose, and as a result there may be different maps between the same pair of code systems to meet different use cases.

- Simple map is a 1:1 relationship between a source terminology to a selected target concept of another terminology ie. between concepts with similar meaning, E.g., SNOMED CT to ICD-O.
- Complex map is regarded as a rule-based map in that it includes multiple map groups and map advice, E.g., SNOMED CT to ICD-10.

7.1.1 Prerequisites

Prior to embarking on the process of creating a map, the following are key considerations not to be overlooked. Some of these points listed below also include the distribution of the mapping to other stakeholders.

- Agreed scope based on agreed use cases
- Methodology to be used e.g., dual independent review vs. mapper-reviewer workflow
- Creation of a map requires a documented mapping process outlining a clear workflow tied to a methodology
- Requirement for local or national modifications
- Establishing a robust Quality Assurance process
- Resource planning: agreement of required competencies and skill sets for mappers
- Education and training:
- - Source and target terminologies
- - Understand and explain the purpose of the map
- - Understand the chosen methodology
- - Understand the way in which the map will be utilised (end user experience)
- - Understand and be able to apply the structure, content and relationships for the source and target terminology
- - Tooling: understand the process to develop, maintain and publish the map
- End-user feedback methodology
- Clinical validation
- Technical validation
- Governance and ongoing maintenance agreement
- Agreed format for publication and distribution
- Agreed timelines for publication and distribution including future
- Funding - ongoing
- Tooling: map tooling environment (for example the Mapping Tool developed by SNOMED CT International) or will it be a spreadsheet exercise?

7.1.2 General mapping principles/Conventions

Given the many and various rules to consider to produce accurate, consistent and reproducible maps, there needs to be clearly worded, documented mapping conventions (rules) focused on ensuring a consistent approach resulting in a stable quality product that is fit for purpose.

Key principles:

- Source and target of the map must be identified.
- Bi-directional maps must be managed as two separate artefacts and created separately.
- Create pilot map as proof of concept.
- Checking the hierarchical placement to determine if the concepts/terms are equivalent. Flagging any concepts/terms that are not an Exact Match as unmappable; identifies relevant concepts in either terminology that might be missing and are required to provide a more complete mapping.

- Established agreement on the addition of any new content

7.2 Mapping Scenarios for IDMP

There are different solutions and best practices for different scenarios with advantages and disadvantages:

- Mapping all IDMP data elements (which proved to be the most challenging as mostly granularity between existing product data and IDMP data where different)
- Mapping only IDMP data elements relevant to product identification, such as mapping the PhPID, MPID, PCID to the corresponding ID's in the MPD. This proved to be the most efficient solution the moment an MPD is already existing and is using its individual controlled vocabularies and product structure. This form will also help in keeping the mapping updated according to the terminologies evolving.
- When starting the creation of a MPD from scratch, genuine IDMP data formats, referential, and models should be used.

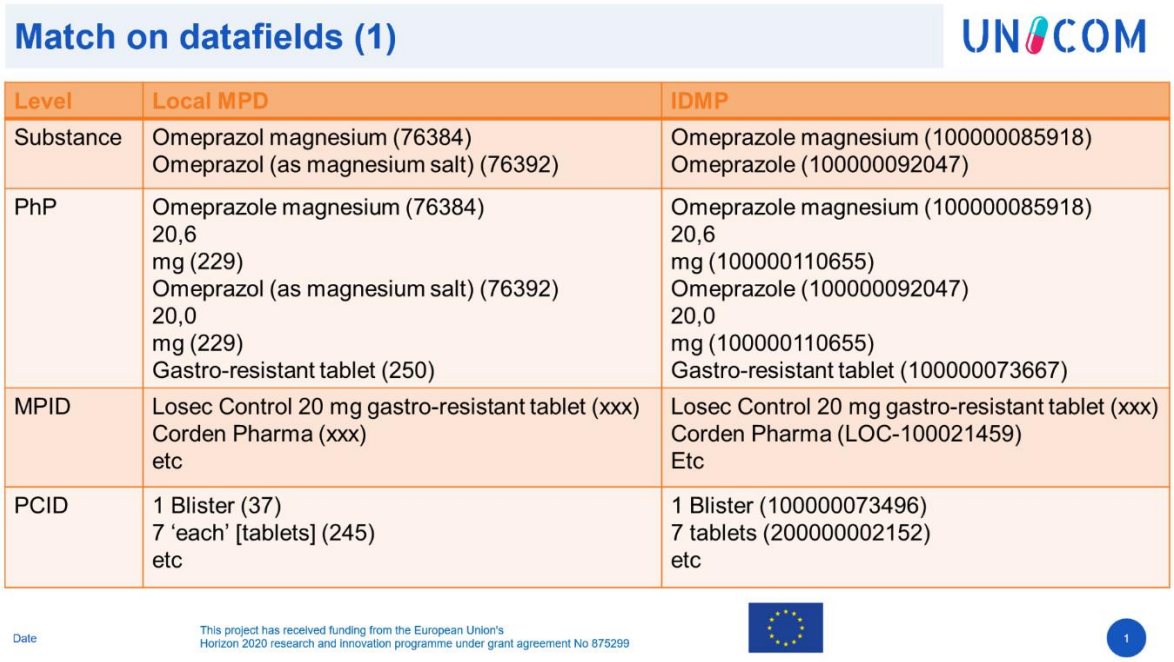


Figure 26 - Example mapping all IDMP data elements (CoE, 25.2.2022, Leonora Grandia Z-Index)

7.2.1 MPD Structure

The mapping strategy also depends on the MPD structure if it is a mirror MPD or a flat MPD.

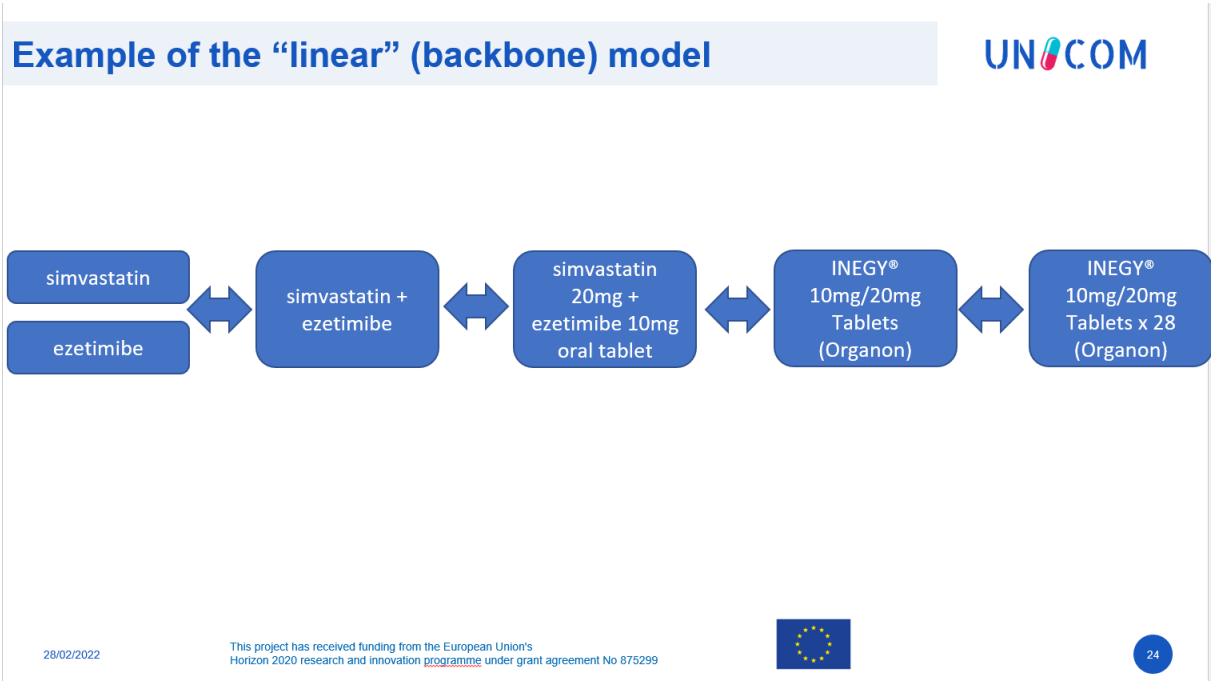


Figure 27 - Example of the "linear" MPD model

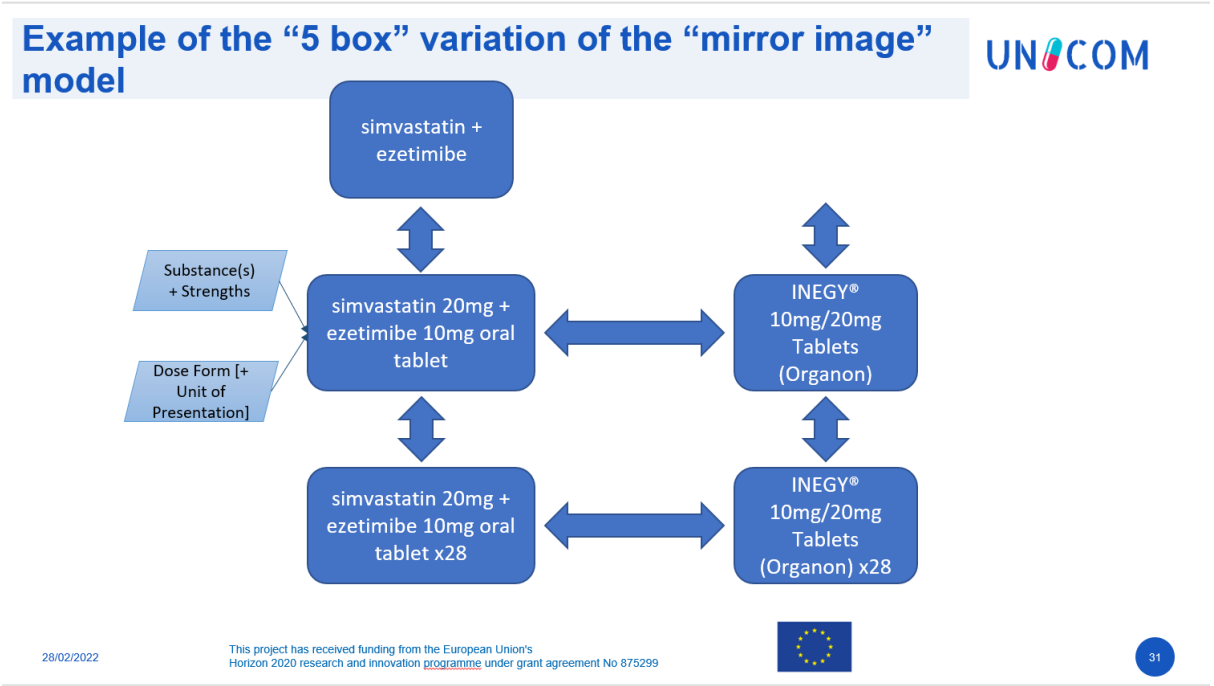


Figure 28 - Example of the “5 box” variation of the “mirror image” MPD model

7.2.2 How does the IDMP model fit?

The IDMP model is more “linear” than “mirror image. But the philosophy is different as the central/starting concept is the Medicinal Product.

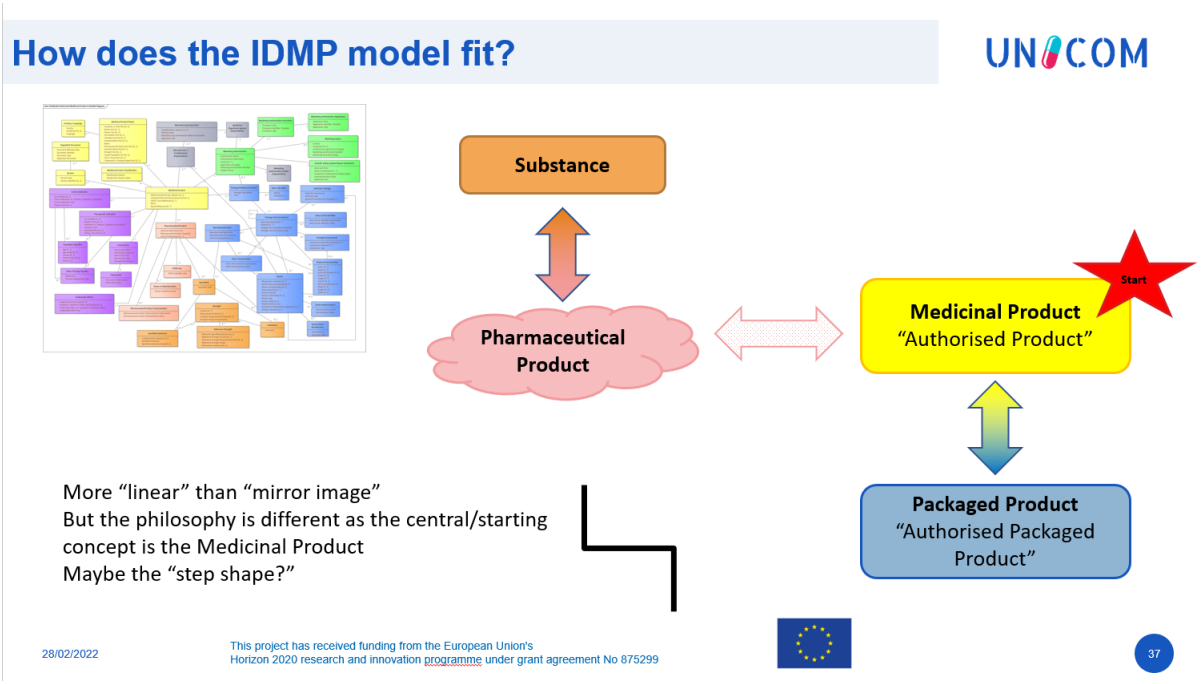


Figure 29 - IDMP model is more "linear" than "mirror"

Reference to the Community of Expertise 25.2.2022, "Draft Implementation Guide of IDMP in Medicinal Product Dictionaries" for all the content of this chapter.

https://unicom-project.eu/all-community-of-expertise-webinars-in-a-nutshell/

The mapping strategy also depends on the MPD structure if it is a mirror MPD or a flat MPD. For more information, please refer to the following document:

Implementing an Interoperable National Drug Dictionary using SNOMED CT

http://confluence.ihtsdotools.org/download/attachments/115870807/1b.%20SNOMED%20CT%20Drug%20Model%20for%20supporting%20National%20Extension%20V1.0.pdf?api=v2

7.3 SPOR and mappings

The current EMA IDMP implementation requires use of the SPOR terminologies, even to the extent of „recoding" externally sourced content such as ATC and EDQM´s pharmaceutical dose forms controlled vocabulary. This means that organisations external to the regulatory domain, including eHealth organisations and MPD, will have to manage a mapping to the terminologies as they use them. Even if that mapping is 1:1, all mapping introduces risk and additional resource demand.

There is a tendency to look globally not at a direct mapping, but to try to use attributes rather than SPOR identifiers. The danger is also, that in different stages in the life cycle of a product, different terminologies are used (e.g., MedDRA in regulatory and SNOMED in eHealth and ePrescription).

Additionally mapping work will be challenging in terms of maintaining an updating in line with the version of the terminologies as they evolve. So perhaps it may be best practice to map your local and internal MPD identifiers directly to the IDMP PHPID.

One-to-one mapping may not be possible, it is context/use case dependent as in:

- MedDRA´s clinical terms to SNOMED CT and SNOMED CT to MedDRA
- EDQM´s dose forms choices for manufactured and / or administrable dose form
- EDQM to SNOMED CT for dose forms

The result is data at the end of the life cycle of product data, different from the data you have started with.

For example: the product may originally have been described as a "capsule" but after the implementation of IDMP and the use of standard EDQM dose forms, the product must be described as having a "hard capsule" pharmaceutical dose form.

Having a standardised map facilitates the movement of information in a standardised way and facilitates consistent retrieval. It is essential that processes are in place for maintenance and updating. Consideration must be given to maintaining data history.

Once a globally unique identifier exists in IDMP, it will be possible to navigate to the undisputed source of the actual attributes that you need for your use-case.

Source (retrieved 14.1.2022)

IDMP1 Tool for matching your data with IDMP controlled terms, The Identification for Medicinal Products (IDMP) translating and converting tool for healthcare professionals.

https://www.idmp1.com/wiki/spor-data-mapping-activities/

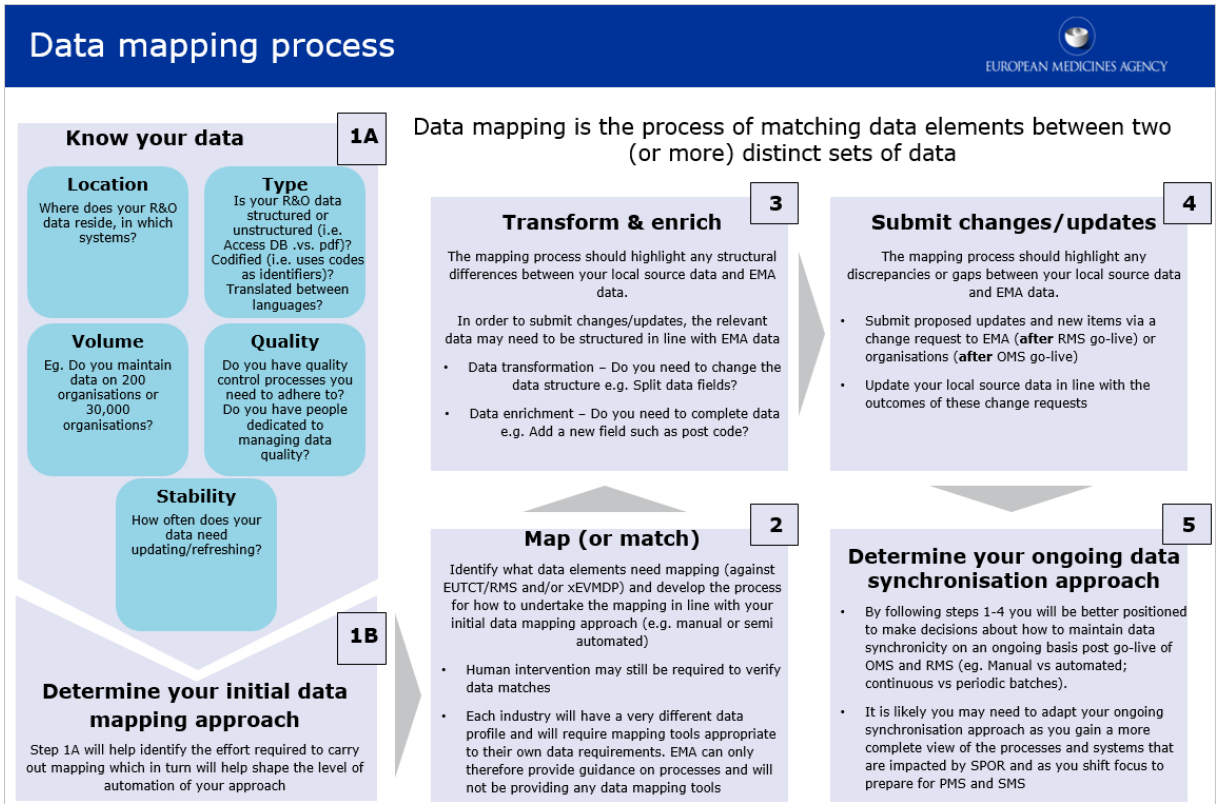


Figure 30 - Data mapping process

Some tricky aspects to pay attention to:

- Case sensitive / insensitive
- Plural / singular
- Avoid mapping to NULLIFIED - fix data instead
- Exclude "use" in ROA (or make sure that certain standard additions or deletions from the terms does disturb the mapping process)
- Map directly to SPOR ID for the EDQM pharmaceutical dose forms
- How to track the versioning of the mappings

7.4 Summary for the Mapping Process

Here summarised the mentioned steps of mapping in form of a Recipe as 'cook book', as it was asked during our CoE.

1a. Know your data

1b Determine your initial data mapping approach

2. Map or match

3. Transform and enrich

4. Check on changes / updates needed in your MPD data

5. Determine your ongoing data synchronisation approach

5. plan much more time than estimated for the process

6. start the work…

7.5 Maintaining the Map

Decide on the update process and update rhythm of the map between the MPD data and the IDMP data.

	Manual mapping	Automated mapping	Substitution
Description	• Manual download/upload of the RMS – deltas only? • Maintain a manual mapping of "internal" & RMS lists	• Consuming Static URLs/ Services – deltas only or full set of terms • Automate the mapping of "internal" & RMS lists	• Consuming Static URLs/ Services – deltas only or full set of terms • Replace "internal" list with RMSlist
PROS	• Easier to implement	• Only one mapping required • Easier to maintain – can be automated	• Only one mapping required • Easiest to maintain
CONS	• Harder to maintain – needs manual intervention • No assurance that all parties perform a consistent mapping	• Harder to implement • May still need some manual intervention • May require reclassification of records	• Hardest to implement • May require huge system changes
Requirements	• Human resources availability • Adherence to process – mapping, change requests or pre-registration of terms	• Investment in coding of mapping logic • Ideally automation of change requests or enforcement of pre-registration in RMS	• Requires coding of mapping logic
Frequency	• Daily?? Weekly? • Before any exchange of data?	• Daily? • Before any exchange of data?	• Continuously?? • Before any exchange of data?

Figure 31 - Maintaining the Map

Major challenges in this synchronisation process:

- Term in local language has changed
- Term in a different language has changed
- A completely irrelevant change has triggered a new version
- The term status was changed (e.g., non-current)
- In special cases national terms might have priority

7.6 Mapping PMS ID

Example of Losec Control 20 mg

Referral to CoE on "IDMP Implementation Guide for MPDs", 25.2.2022, link to all CoE

Level	Local MPD	IDMP
Substance	Omeprazol magnesium (76384) Omeprazol (as magnesium salt) (76392)	Omeprazole magnesium (100000085918) Omeprazole (100000092047)
PhP	Omeprazole magnesium (76384) 20,6 mg (229) Omeprazol (as magnesium salt) (76392) 20 mg (229) Gastro-resistant tablet (250)	Omeprazole magnesium (100000085918) 20,6 mg (100000110655) Omeprazole (100000092047) 20,6 mg (100000110655) Gastro-resistant tablet (100000073776)
MPID	Losec Control 20 mg gastro-resistant tablet (xxx) Corden Pharma (xxx) etc	Losec Control 20 mg gastro-resistant tablet (xxx) Corden Pharma (LOC-100021459) etc
PCID	1 Blister (37) 7 'each' [tablets] (245) etc	1 Blister (100000073496) 7 tablets (200000002152) etc

Figure 32 - Mapping Substance, MPID, PCID

8 Challenges in Implementation

8.1 Substance Hierarchy in products´ strength

Codes for collections of products and codes for collections of substances, entail two different domains, with different governance and use cases. The use case of CAS for example describing chemical molecules is different from the more pharmacological approach of EUTCT SMS and IDMP SPOR.

EUTCT SMS has supported the need for a substance hierarchy and a grouper, but always linked to the use case of describing medicinal products active ingredients and strength. The idea of a grouper is currently not worked out in EUTCT SMS, but it was recognised that this could become a working item, and discussions were still under way (as of May 2022).

https://unicom-project.eu/all-community-of-expertise-webinars-in-a-nutshell/

Unicom page on the CoE "Perspectives on substance and strength in IDMP" (November 2021) Link to all CoE

8.2 PHPIDs data elements

Reference to:

D9.1 Pivot section. " MPD will have their own "PhP" - how they interact with the IDMP PhPID will depend on their structure, their use cases and how PhPIDs evolve"

The brochure "IDMP in a capsule" describes how PHPIDs elements relate to MPDs. You find this on https://bit.ly/IDMP_in_a_capsule. The purpose of that document is to provide an overview about the medicinal product life cycle and how this is supported by the IDMP set of ISO standards. That includes description on how PHPIDs are created.

https://bit.ly/IDMP_in_a_capsule

The PhPID globally represents the substances, strength, and pharmaceutical dose form of a medicinal product, regardless of where it is prescribed, dispensed or used.

Unicom page on the CoE "PhPID – calculating a globally unique identification as defined by IDMP" (September 2020) Link to all CoE

Unicom page on the CoE "PhPID in – Vaccine challenges – cleansing, confidentiality and vaccine naming" (January 2022) Link to all CoE

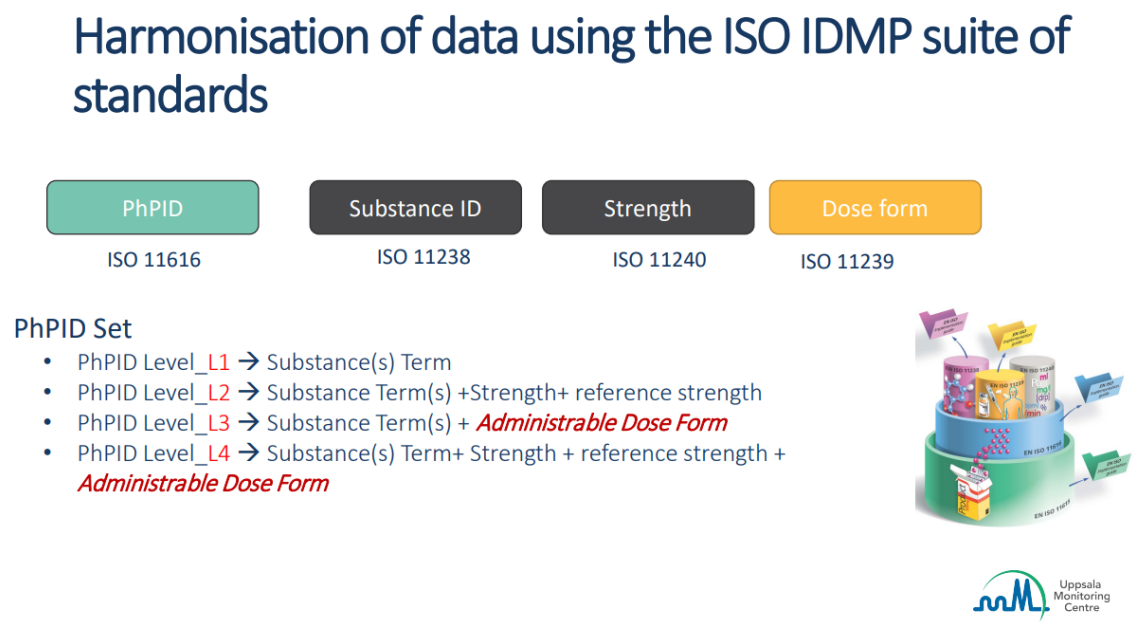


Figure 33 - Harmonisation of data using the ISO IDMP suite of standards (Uppsala Monitoring Centre)

8.3 Pharmaceutical Dose Form and Unit of Presentation

EDQM and SPOR Ids and Rhythm of update

MPD products have often been mapped to the EDQM Dose Forms. The EDQM Dose Forms are also used in IDMP. But IDMP SPOR comes with its own pharmaceutical dose form identifier. So, a mapping from the EDQM identifier to the corresponding SPOR identifier will be needed.

Note: For those MPDs which already use the EDQM Pharmaceutical Dose Form Code, it might be important to check on the maintenance of this code. The Update rhythm between EDQM publication and SPOR PHF Code publication may be different. Also, most MPDs are using the concept of the manufactured pharmaceutical dose form to express substance and strength. IDMP product data, including substance and strength data is based on the administrable dose form concept.

Reference to D9.1 Chapter 8.2 Definitional attributes

Both manufactured dose forms and administrable dose forms are a type of pharmaceutical dose forms. For a significant proportion of pharmaceutical dose forms, no transformation is required prior to their administration to the patient. However, for those that do require a transformation, representing that, and representing the transformed product, can be challenging for MPD.

Generally, MPD use the manufactured dose form representation, rather than the administrable dose form. For example, a parenteral product supplied as a powder for solution for injection will be described using that dose form and the product strength will be given as a mass amount „per unit of presentation" (vial or ampoule). This makes it difficult, even if a specific solvent is supplied, to be sure of the volume used to transform the powder into a solution for administration. And on top the strength as liquid concentration strength (or indeed presentation strength) must be safely provided.

The exception are oral liquids, usually antibiotic preparations. Although the product is supplied as (for example) a „powder for oral suspension", an exact volume of solvent must be added and this transformation is undertaken prior to dispensing the product to a patient. Therefore, the clinically relevant dose form is the administrable dose form (for example oral solution or oral suspension) and the strength will be described as if it is already the liquid that will be administered rather than the powder, for example, as 125mg/5mL. This reflects the standard dosing measure of a 5mL medicine spoon or occasionally as a concentration strength with a unitary denominator of „per 1ml" (25mg/1ml).

The representation of the medicinal product will probably use the administrable dose form and the strength description that matches this rather than the manufactured dose form.

For those oral liquids that are supplied as powders and undergo transformation for administration, the unit of presentation for the supply (the powder in the bottle) may be different from the unit of presentation of the administration (the 5mL spoonful).

So, for many types of MPDs, the denominator part of the strength ratio is „the unit of presentation ". But this may differ from MPD to MPD.

8.4 Concentration versus presentation strength

CoE " Perspectives on substance and strength in IDMP", November 2021 link to all CoE

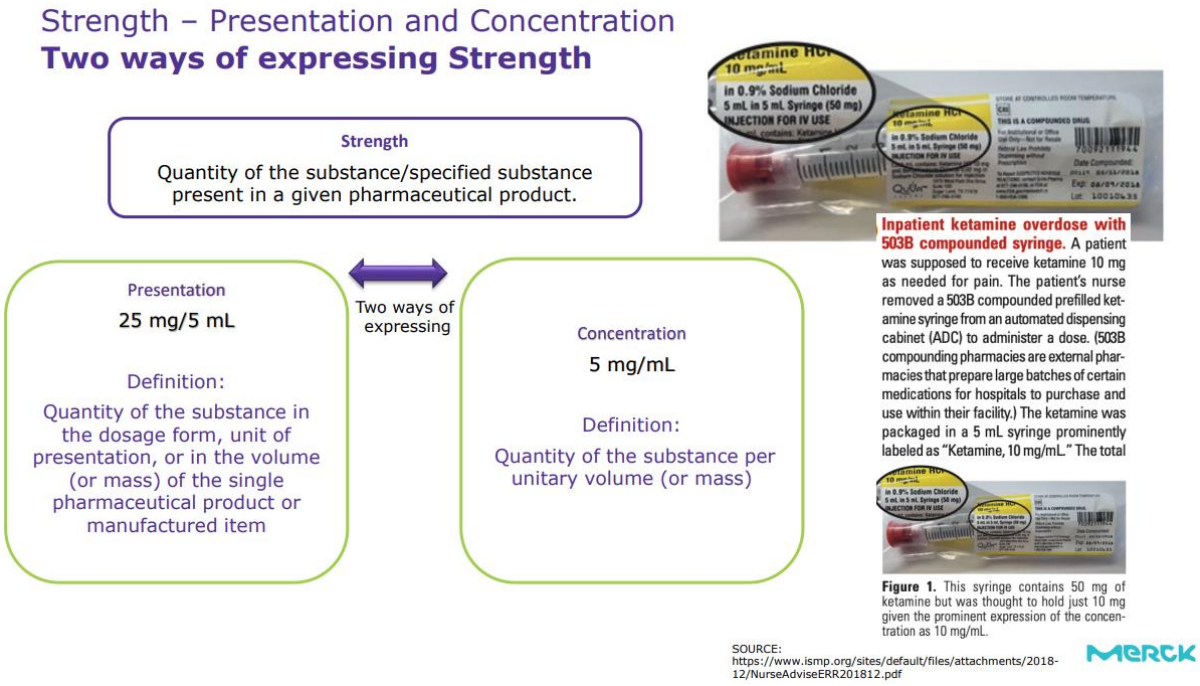


Figure 34 - Strength - Presentation and Concentration

There are different practise and way of expressing the strength when it comes to labelling. When expressing the strength following should be considered:

- SmPC is to be used as a main reference (examples given in Ch.8 of IDMP IG)
- Either presentation or concentration strength to be used (*if both present in SmPC MAH can add these on optional basis)
- In case of difference between Ch. 8 and SmPC – information in SmPC is the leading one
- Reference table should give a high-level guidance when it comes to expressing the strength – nevertheless decisions on how to express the strength might deviate and should be decided case-by case

You will find a set of patterns which are included to the EMA IG. They have been developed to give structure to the examples used. The patterns show how the Manufactured Item (MI) and the Pharmaceutical Product (PhP) should be expressed for a particular type of product. Products can then be matched to the appropriate pattern which then shows how the MI and PhP should look, for which the strength is mandatory.

Pattern	Type of product	Examples	Manufac. Item Unit of Present.	Pharm. Prod. unit of Present	Strength by Presentation	Strength by Concentration
1a	Solid, countable	Tablets, capsules, suppositories	Basic dose form related to the pharmaceutical form of the MI (tablet, capsule, etc.)	Basic dose form related to the pharmaceutical form of the Pharm Prod (tablet, capsule etc.)	Mandatory	Empty
1b	Solid dose forms in "container"	Powder or granules in sachet, ampoules, vials, Spincap, Rotocap – the whole content of the capsule is delivered to the patient via one or more actuations	Container (vial, sachet, etc.)	Container (vial, sachet, etc…) – not always informative depending on the dosing instructions	Mandatory	Empty
1c	Metered dose delivered by a metered actuation - dose cannot be adjusted	Dry-powder inhalers (DPI) pressurised metered-dose inhalers (pMDI), nasal sprays	Actuation (inhaler)	Actuation (inhaler, etc.)	Mandatory	Empty
2a	Products enclosed in a "presentation", where the total amount per presentation is clinically relevant	Unit dose solutions, parenteral liquid, unit dose nebuliser solutions NOT partial use preparations	Container (vial, etc.)	Container (vial, etc.)	Mandatory Expressed per total volume of the presentation (not per unit of presentation). This makes calculations easier	Mandatory (QRD)

Figure 35 - Patterns for expression of strength (part 1)

Pattern	Type of product	Examples	Manufac. Item Unit of Present.	Pharm. Prod. unit of Present	Strength by Presentation	Strength by Concentration
2b	Products enclosed in a "presentation", where the concentration is clinically relevant rather than the total amount in the presentation	Multi-dose syringe, Partial dose syringe, infusion bags	Container (bottle, etc.)	N/A since it is the concentration that is relevant	Optional	Mandatory
3a	Continuous presentation (dosing is individual/not accurate and the total volume in the container is of less importance for dosing purposes)	Bulk powders/granules, semi-solids "bulk" liquids (e.g. eye drops)	Not useful clinically	N/A since it is the concentration that is relevant	Optional – usually not interesting	Mandatory
3b	Products enclosed in a "presentation", where the dose has a delivery rate	Transdermal patches	Patch	N/A since it is the concentration that is relevant	Optional	Mandatory – as a delivery rate over time

Figure 36 - Patterns for expression of strength (part 2)

https://www.ema.europa.eu/en/documents/regulatory-procedural-guideline/product-management-service-pms-implementation-international-organization-standardization-iso_en.pdf

See page 32 + 33 + 34 + 35 of PMS IG

8.5 IDMP logical model

Reference to Unicom Working paper 1.2 Requirements for a new ISO logical model [platform independent] PDF

CoE " How will a common logical model for IDMP help you?", February 2021 link All CoE

Actually (as of May 2022) there is no official IDMP logical model in existing standards. In ISO WG6 it is planned to have an IDMP logical model drafted by March 2023. So, this is still work in progress.

Of course, this is challenging work, as each logical model is always based on the business process it is created for.

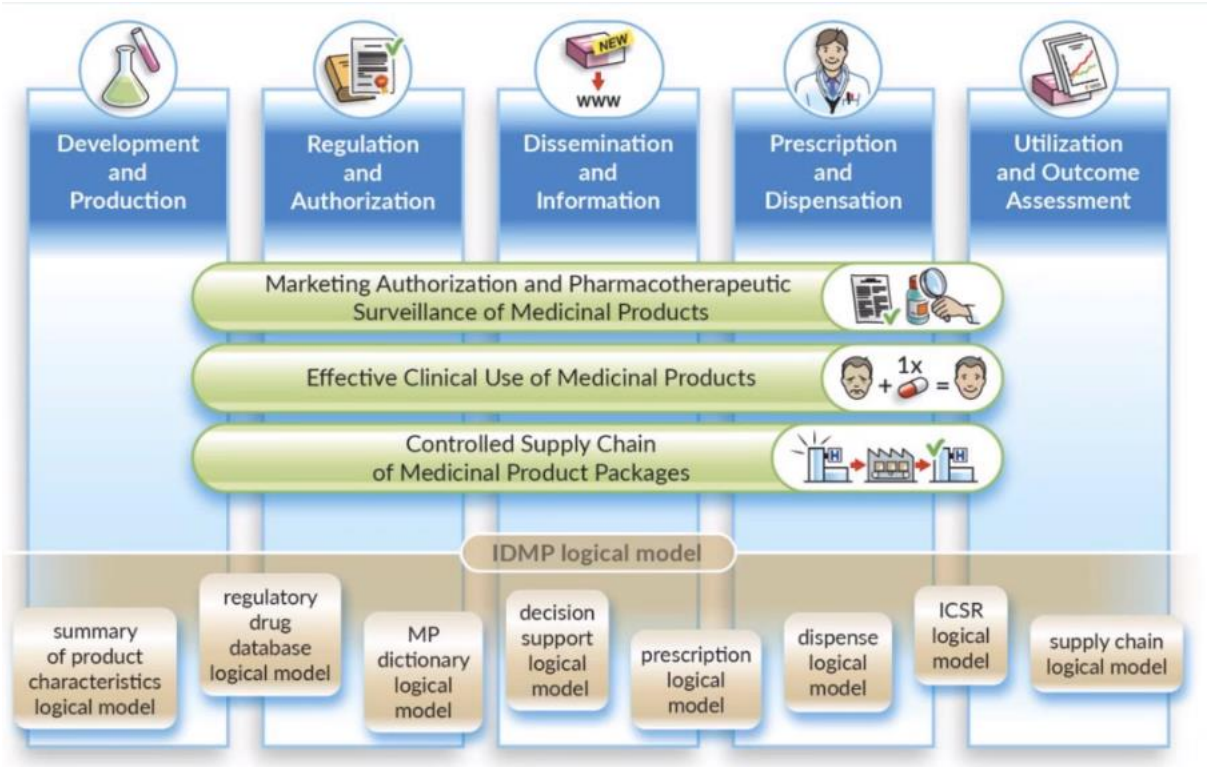


Figure 37 - Unicom IDMP logical models and business requirements

The biggest barrier to the unambiguous and fair identification of medicinal products is to overcome:

- Diverging implementation of IDMP
- Inconsistencies of interpretation
- The need for semantic alignment between regulatory implementations
- Essential governance of the IDMP standards and implementations is not assigned to a specific overarching governing body

8.6 IDMP in clinical applications

Reference to the Community of Expertise on clinical applications 4.2.2022 YouTube video

Presenters: Robert Vander Stichele (I~HD, UNICOM WP1 and WP8) Mohammad Nouri Sharikabad (WHO Collaborating Centre for Drug Statistics Methodology, Oslo and UNICOM WP1) Malin Fladvad (WHO-UMC, UNICOM WP1)

Reference to Working paper D8.1: Report on the link between IDMP and Pharmacotherapeutic Groups and the Need for Medical Data in Pharmacotherapeutic Audit PDF

9 ETL Process

To get from your MPD data into the IDMP Common Data Model (CDM) you need to design and develop an Extraction Transformation Loading (ETL) process.

This process should restructure either the MPD data to the IDMP CDM or the other way round and add mappings from or to the IDMP Standardised Vocabularies. Typically, it is implemented as a set of automated scripts, for example SQL scripts. It is important that this ETL process is repeatable, so that it can be rerun whenever the source data is refreshed.

Creating an ETL is usually a large undertaking. Best practice requires four major steps:

- Data experts and IDMP experts together design the ETL.
- People with medical knowledge create the code mappings.
- A technical person implements the ETL.
- All are involved in quality control.

In this chapter we will discuss each of these steps in detail. Several tools are being developed at the time of the creation of this document to support some of these steps, and these will be discussed as well. We close this chapter with a discussion of IDMP and ETL maintenance.

Source of the figure from OMOP ETL process (retrieved 26.1.2022) under

https://ohdsi.github.io/TheBookOfOhdsi/ExtractTransformLoad.html

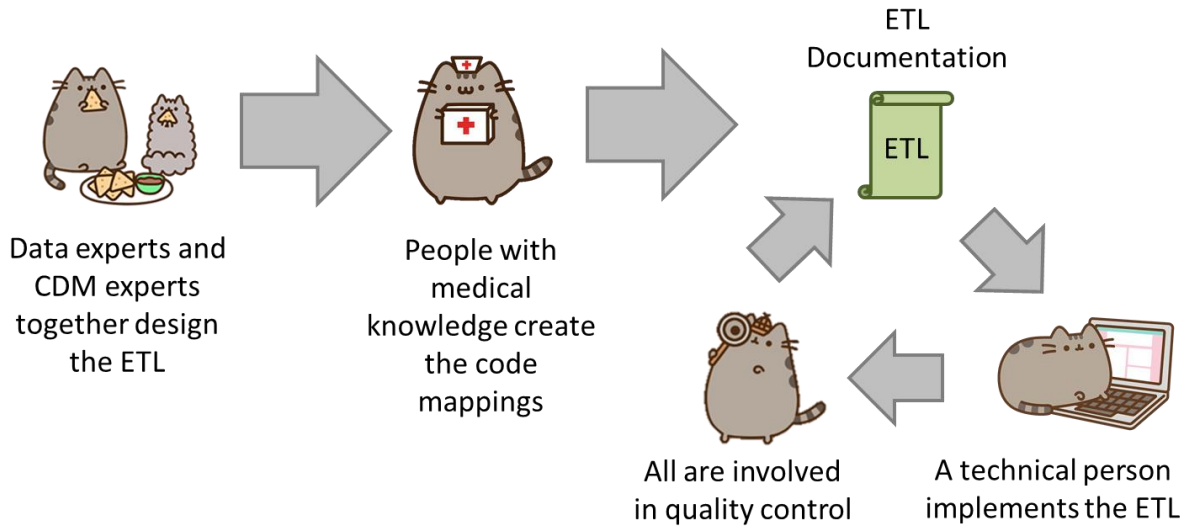


Figure 38 - ETL process from MPD to IDMP

9.1 ETL Step 1: Design the ETL

The goal of this step 1 is to learn about IDMP to help with designing an extract, transform, & load process to take or to map your database from your internal data model to the IDMP Common Data Model.

Make a gap analysis of the data elements you will get from IDMP product data to your internal product data elements.

It is important to clearly separate the design of the ETL from the implementation of the ETL. Designing the ETL requires extensive knowledge of both the source data as well as the IDMP CDM. Implementing the ETL on the other hand typically relies mostly on technical expertise on how to make the ETL computationally efficient. If you try to do both at once, you are likely to get stuck in detail, while you should be focusing on the overall picture.

To initiate an ETL process on a database you need to understand your data, including the tables, fields, and content. On the other hand you need to understand the IDMP data structure, content and data elements. Matching those data elements to your tables, fields and content will be part of the ETL design.

9.2 ETL Step 2: Create the Code Mappings

IDMP comes with controlled vocabularies on all attributes needed for identifying medicinal products. This means that the coding systems in your MPD data need to be aligned with or mapped to IDMP coding systems. If using the approach to make a mapping to all elements, check the IDMP data elements list relevant to the MPD, to determine which controlled vocabularies need to be implemented in your ETL process. If you make a mapping just on PhPID, MPID and PCID, you may not need a mapping to the coding elements.

Unfortunately, sometimes the MPD data uses coding systems that are not in the IDMP vocabularies or in another granularity. In this case, an enrichment of data may be needed from the MPD coding system to the IDMP coding system. Code mapping can be a daunting task, especially when there are many codes in the MPD coding system. There are several things that can be done to make the task easier:

- Focus on the most frequently used codes. A code that is never used or infrequently used is not worth the effort of mapping.
- Make use of existing information whenever possible. For example, MPD products have often been mapped to ATC. Although ATC is not detailed enough for many purposes, the relationships between ATC and IDMP can be used to make good guesses of what the right IDMP codes are. The ATC codes (with ROA) can be used to group similar products for subtasks in the work (cutting the elephant to pieces).
- Each mapping requires exact definition of its use case.

9.3 ETL Step 3: Implement the ETL

Once the design and code mappings are completed, the ETL process can be implemented in a piece of software. When the ETL was being designed we recommended that people who are knowledgeable about the source and IDMP work together on the task. Similarly, when the ETL is being implemented it is preferred to use people who have experience with working with data (particularly large data) and experience with implementing ETLs. This may mean working with individuals outside of your immediate group or hiring technical consultants to execute the implementation. It is also important to note that this is not a one-time expense. Moving forward it would be good to have someone or a team who spends at least some dedicated time to maintaining and running the ETL. Doing ETL for legacy conversion will be a once-in-a-lifetime operation and dissipate when the legacy conversion is finished and PMS takes over.

Implementation usually varies site to site, and it largely depends on many factors including infrastructure, size of the database, the complexity of the ETL, and the technical expertise available. Because it depends on many factors, we cannot make a formal recommendation on how best to implement an ETL.

9.4 ETL Step 4: Quality Control

For the extract, transform, load process, quality control is iterative. The typical pattern is to write logic -> implement logic -> test logic -> fix/write logic. There are many ways to go about testing an ETL but here are some high-level ways to approach quality control from an ETL standpoint.

- Review of the ETL design document, computer code, and code mappings. Any one person can make mistakes, so always at least one other person should review what was done.
- Manually compare all information on a sample of medicinal products in the source and target data. Use for this e.g., one group of products with one common active ingredient and pharmaceutical dose form.
- Compare overall counts in the source and target data.
- Create unit tests meant to replicate a pattern in the source data that should be addressed in the ETL. For example, if your ETL specifies that products for vet use only should be dropped, create a unit test of a product for vet use only and assess how the builder handles it.

9.4.1 ETL Maintenance

It is no small effort to design the ETL, create the mappings, implement the ETL, and build out quality control measures. Unfortunately, the effort does not stop there. There is a cycle of ETL maintenance that is a continuous process after the first Common Data Model (CDM) is built. Some common triggers that require maintenance are changes in the source data, a bug in the ETL, a new IDMP Vocabulary is released, or the CDM itself has changed or updated. If one of these triggers occur the following might need updating: the ETL documentation, the software programming running the ETL, and test cases and quality controls.

Often a healthcare data source is forever changing. New data might be available (e.g. a new column in the data might exist). Also technical changes in the IDMP data such as the update to a new FHIR resource version may change. Not all changes in the source data may trigger a change in the ETL processing of it, however at a bare minimum the changes that break the ETL processing will need to be addressed.

The IDMP data are also ever changing just as your source data may be. In fact, the IDMP data can have multiple releases as MPD vocabularies update. Each CDM is run on a specific version of a Vocabulary and running on a newer improved Vocabulary could result in changes in how sources codes get mapped to in the standardised vocabularies. Often differences between Vocabularies are minor, so building a new CDM every time a new Vocabulary is released is not necessary. However, it is good practice to adopt a new Vocabulary once or twice a year which would require reprocessing the CDM again. It is rare that changes in a new version of a Vocabulary would require the ETL code itself to be updated.

The final trigger that could require CDM or ETL maintenance is when the IDMP common data model itself updates. As the use of IDMP grows and new business processes and with-it new data requirements are found this may lead to additional data being stored in the IDMP CDM. This might mean data that you previously were not storing in the CDM might have a location in a new CDM version. Less frequently are changes to existing CDM structure, however it is a possibility. For example, the EMA has announced to migrate to the newest FHIR resource version which could cause an error in ETL processing.

Data Download

The EMA SPOR Portal is delivering data management services for substances, products, organisations and referential (SPOR) for download. SMS and PMS are not currently activated. SMS EUTCT will probably become the IDMP Substance Coding System for SMS (discussion is still ongoing as of 7.2.2022).

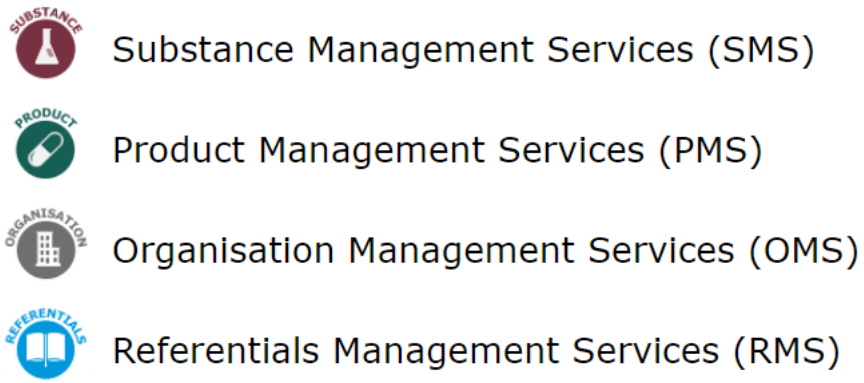


Figure 39 - The four SPOR data management services

SPOR Download data *EUTCT (will probably become the IDMP Substance Coding System)* *https://spor.ema.europa.eu/eutct/lists* *EMA SPOR*

https://spor.ema.europa.eu/sporwi/

Data Integrity and Migration

At the time of the migration and transformation of the IDMP product data into the MPD´s product master data all data based on the controlled vocabularies (CVs) will be mapped and recoded against the terminology available in RMS, OMS and SMS respectively and as applicable.

To maintain data integrity, the following load order must be maintained when loading to the Master Data Management (MDM):

a. Reference data;

b. Organisation data;

c. Substance data;

d. Product data;

e. Deprecation (Substance, Product, Organisation or Reference data transaction).

The table below highlights the relationship between each domain (columns) and its dependencies (rows):

	S	P	O	R
S		X		
P				
O		X		
R	X	X	X	

Figure 40 Dependencies between PMS and its referential

EMA IG (chapter7)

EMA IG V2 CHAPTER 7 / AS reference!

https://www.ema.europa.eu/en/documents/regulatory-procedural-guideline/products-management-services-pms-implementation-international-organization-standardization-iso_en-0.pdf

9.5 Mapping Tools

There are several mapping tools in the process of being developed for mapping to or from IDMP. Please find 2 as examples as placeholder in the following chapters.

9.5.1 IDMP1-Matching Tools

Source (retrieved 7.2.2022)

Homepage: https://www.idpm1.com

The IDMP1 Matching Tools helps healthcare professionals matching their data with IDMP controlled terms. These Identification for Medicinal Products (IDMP) translating and converting tools include at the same time global international drug standards such as IDMP, SNOMED, ICD10, RxNORM, WHO ATC etc..

The user interface of the IDMP Matching Tool is usable for free (www.idmp1.com), the API version is based on a Software a Service (SAS) subscription.

Based on the IDMP1 Matching API there are several helpful solutions:

- IDMP Term Browser
- IDMP Drug Dictionary
- Active Ingredients Dictionary
- MAH Drug Dictionaries

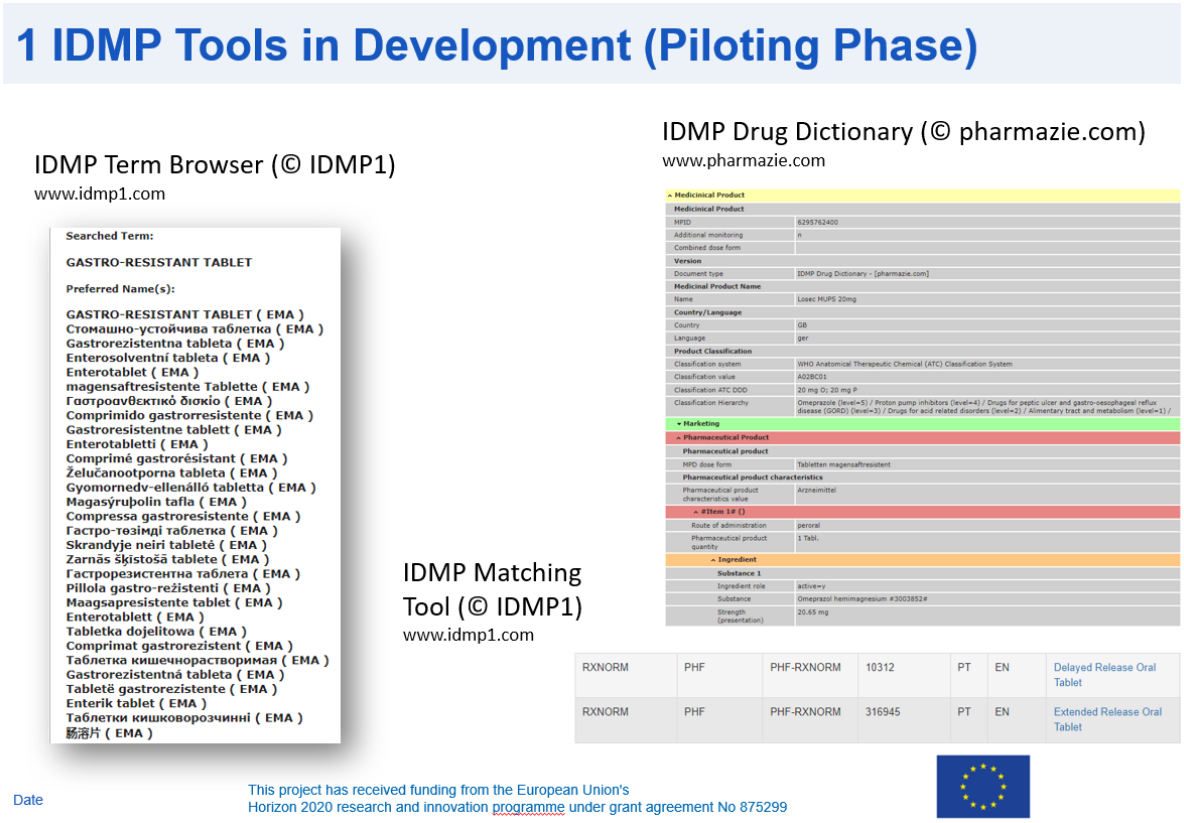


Figure 41 - IDMP Tools in Development (Piloting Phase)

9.5.2 Sporify

Source (retrieved 14.1.2022)

Homepage: https://www.sporify.eu/

Sporify is a tool to match, maintain, synchronise & integrate SPOR Data.

It is a single solution to match, maintain, synchronise and integrate SPOR Data. It is a product of the CorrIT Ltd located in Ireland and based on a SAS subscription.

9.6 Final thoughts on the ETL

The ETL process is different for many reasons, not the least of which is the fact that you are all processing unique source data, making it hard to create a “one-size-fits-all” solution. However, here some best practice advice.

- The 80/20 rule. If you can avoid it do not spend too much time manually mapping source codes to concepts sets. Ideally, map the source codes that cover most of your data. This should be enough to get you started and you can address any remaining codes in the future based on use cases.
- It’s ok if you lose data that is not of the required quality. Often these are the records that would be discarded before starting an analysis, anyway, just remove them during the ETL process instead.
- A CDM requires maintenance. Just because you complete an ETL does not mean you do not need to touch it ever again. Your raw data might change, there might be a bug in the code, there may be

new vocabulary or an update to the CDM. Plan to allocate resources for these changes so your ETL is always up to date.

- Plan the versioning of the ETL data.
- Be aware, that your ETL process should always be based on your concrete use case(s).

10 Mapping for SNOMED Users

Reference to "Implementing an Interoperable National Drug Dictionary using SNOMED CT" (© SNOMED International)

It is available here on YouTube: https://www.youtube.com/watch?v=b354WzHv2Qw

Interlinking IDMP with SNOMED CT is kind of related to implementing an interoperable national drug dictionary using SNOMED CT. The mapping strategy also depends on the MPD structure if it is a mirror MPD or a flat MPD. The above mentioned video gives a very good introduction to interested parties on how to implement a national MPD.

10.1 IDMP and SNOMED CT

Reference to SNOMED CT Drug Model for supporting National Extension V1.0 including IDMP compatibility

https://confluence.ihtsdotools.org/download/attachments/115870807/1b.%20SNOMED%20CT%20Drug%20Model%20for%20supporting%20National%20Extension%20V1.0.pdf?api=v2

SNOMED CT is the most comprehensive, multi-lingual clinical terminology in use around the world in electronic health records. By facilitating consistent, accurate, representation of relevant clinical information in the shared electronic health record, communication between the various healthcare professionals involved in managing patient care, is improved.

Mapped as it is to other international standards, SNOMED CT is helping to remove language barriers in patient care; member nations are responsible for translation; entire or partial translations are available in at least 7 different languages.

SNOMED CT has an International Edition, containing content covering various domains, (e.g., body structures, procedures, clinical findings/disorders, medicinal products) used and understood in more than one national healthcare system. This shared understanding is necessary for international conformance and interoperability.

In addition, member nations and organisations may develop their own extension editions containing content to support a wide range of national, local, institution, vendor, discipline, or specialty specific requirements. This core/extension mechanism is especially important for the identification and description of medicinal products and packages in the SNOMED CT ecosystem.

The SNOMED CT International Medicinal Product hierarchy is composed of abstract concepts with international applicability that represent varying levels of specificity (e.g., active ingredient, active ingredient + intended site of administration, basis of strength substance + precise active ingredient + strength + pharmaceutical dose form). It also includes groupers based on chemical structure of active ingredient substance, mechanism of action of active ingredient substance, or therapeutic role of product. The real or actual products, as authorised by medicines regulatory agencies within specific jurisdictions, are not within scope for the International Release; that level of specificity would exist in a national extension.

The primary use cases for the SNOMED CT International Release Medicinal Product hierarchy include:

- To provide consistently modelled and usable concepts that can serve as a foundation for the creation of national extensions to allow member countries to create additional concepts suitable for their own healthcare culture and practice, or to which existing terminology can be mapped if required.
- To facilitate international interoperability of medicinal product concepts (e.g., for patient summaries or cross-border care).
- To provide compatibility with the IDMP model or other external standards, where appropriate, for identification of medicinal products.
- To provide components and structure that can support development of medication-related decision support.
- To support analysis of medicinal product-related information in healthcare data for pharmacovigilance or research purposes.

- To provide medicinal product concepts required to sufficiently define concepts in other SNOMED CT hierarchies.

Note that the content in the SNOMED CT International Release Medicinal Product hierarchy is not intended to support prescribing use cases but may be sufficient to do so for some implementations; support for prescribing use cases would generally be expected at the national extension level.

10.1.1 SNOMED CT Medicinal Product Content

Medicinal products are described in the International Edition of SNOMED CT in five different levels of abstraction:

Medicinal Product "containing"

An abstract representation of a medicinal product based on description of active ingredient substance(s) that it contains. It means that the medicinal product must contain the active ingredient(s) specified in the FSN but may also contain additional active ingredient(s).

Medicinal Product "containing only"

An abstract representation of a medicinal product based on description of active ingredient substance(s) that it contains. It means that the medicinal product must contain only the active ingredient(s) specified in the FSN.

Medicinal Product Form "containing"

An abstract representation of a medicinal product based on description of active ingredient substance(s) that it contains and on the generalised intended site of administration. It means that the medicinal product must contain the active ingredient(s) specified in the FSN but may also contain additional active ingredient(s).

Medicinal Product Form "containing only"

An abstract representation of a medicinal product based on description of active ingredient substance(s) that it contains and on the generalised intended site administration. It means that the medicinal product must contain only the active ingredient(s) specified in the FSN.

Clinical Drug "containing precisely"

An abstract representation of a medicinal product based on description of the Specified substance with the role of Precise active ingredient, basis of strength substance (BoSS), strength, manufactured dose form, and unit of presentation of a drug product. It implies that the drug product must contain only the precise active ingredient(s) specified in the FSN.

The model in the International Edition of SNOMED CT provides support for National Extensions to describe the actual products authorised and marketed in their own jurisdiction and to author intermediate concepts as required by the local culture.

10.1.2 SNOMED CT Medicinal Product content and IDMP Content

IDMP standards and the SNOMED CT Medicinal Product hierarchy are designed to support different domains with differing use cases, the former the regulatory domain, the latter the patient care domain. However, there is significant harmony and synergy between them. The diagram below shows how the classes of concepts in the Medicinal Product terminology present in SNOMED CT and classes to identify medicinal product concepts in the IDMP suite can be related to each other based on the current understanding of the PhPID concepts in IDMP; the numbered relationship lines are given further detail in the table below.

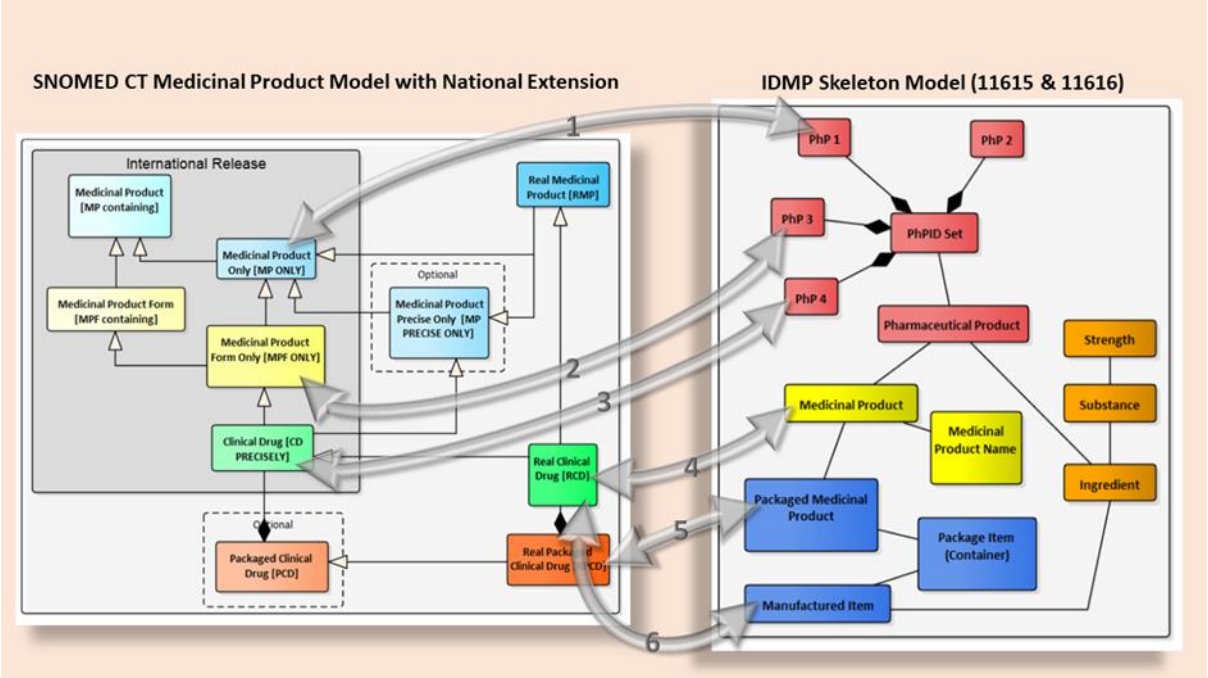


Figure 42 - SNOMED Product Model relation to IDMP Skeleton Model

The table below provides further detail to that diagram by comparing the classes of each medicinal product identification system together.

Table 10-1 - SNOMED concept in relation to IDMP concept

Line in diagram	SNOMED CT CT CT		IDMP	
	Concept	Definition	Concept	Definition
NA	Medicinal Product “containing”	An abstract representation of a medicinal product based on description of active ingredient substance(s) that it contains. It means that the medicinal product must contain the active ingredient(s) specified in the FSN but may also contain additional active ingredient(s). Examples: 108600003 |Product containing atorvastatin (medicinal product)| 409411009 |Product containing amlodipine and atorvastatin (medicinal product)|	No similar equivalent	Not applicable
1	Medicinal Product “containing only”	An abstract representation of a medicinal product based on description of active ingredient substance(s) that it contains. It means that the medicinal product	PhP Level 1 (from ISO 11616)	Active Substance(s)*

		must contain only the active ingredient(s) specified in the FSN. Examples: 773455007 |Product containing only atorvastatin (medicinal product)| 773457004 |Product containing only amlodipine and atorvastatin (medicinal product)|		
NA	Medicinal Product Form "containing"	An abstract representation of a medicinal product based on description of active ingredient substance(s) that it contains and on the generalised intended site of administration. It means that the medicinal product must contain the active ingredient(s) specified in the FSN but may also contain additional active ingredient(s). Examples: 437876006 |Product containing paracetamol in oral dose form (medicinal product form)| 767783007 |Product containing codeine and paracetamol in oral dose form (medicinal product form)|	No similar equivalent	
2	Medicinal Product Form "containing only"	An abstract representation of a medicinal product based on description of active ingredient substance(s) that it contains and on the generalised intended site of administration. It means that the medicinal product must contain only the active ingredient(s) specified in the FSN. Examples: 780128004 |Product containing only paracetamol in oral dose form (medicinal product form)| 778848002 |Product containing only codeine and paracetamol in oral dose form (medicinal product form)|	PhP Level 3 (from ISO 11616)	Active Substance(s)* + Administrable Dose Form

NA	No similar equivalent	No clinical use case has been identified to support inclusion of this concept class.	PhP Level 2 (from ISO 11616)	Active Substance(s)* + Strength + Reference Strength
3	Clinical Drug "containing precisely"	An abstract representation of a medicinal product based on description of the precise active ingredient substance(s), basis of strength substance (BoSS), strength, manufactured dose form, and unit of presentation of a drug product. It implies that the drug product must contain only the precise active ingredient(s) specified in the FSN. Examples: 322236009 |Product containing precisely paracetamol 500 milligram/1 each conventional release oral tablet (clinical drug)| 765548006 |Product containing precisely doxazosin (as doxazosin mesilate) 4 milligram/1 each prolonged-release oral tablet (clinical drug)| 443620003 |Product containing precisely aliskiren 300 milligram and valsartan 320 milligram/1 each conventional release oral tablet (clinical drug)| 322238005 |Product containing precisely paracetamol 24 milligram/1 millilitre conventional release oral solution (clinical drug)|	PhP Level 4 (from ISO 11616))	PhP4: Active Substance(s)* + Strength + Reference Strength + Administrable Dose Form
	Real Medicinal Product [National Extension]	The representation of a medicinal product marketed by a single organisation (supplier) in a single jurisdiction under a single name (which may be a trade or brand name) and which contains the same set of active ingredient substances, regardless of any modification of those active ingredient substances. It is a subtype of and real-world equivalent to the Medicinal Product Only (MP only) class in the International Edition of SNOMED CT	No similar equivalent	

		Examples: Inlyta product Pfizer Limited (real medicinal product)		
4 and 6	Real Clinical Drug [National Extension]	The representation of a medicinal product marketed by a single organisation (supplier) in a single jurisdiction under a single name (which may be a trade or brand name) and which contains the same set of precise active ingredient substances and strengths in a single manufactured dose form. It is a subtype of and real-world equivalent to the Clinical Drug (CD precisely) class in the International Edition of SNOMED CT Examples: Inlyta 3 mg tablet Pfizer Limited (real clinical drug)	Medicinal Product (MPID) (from ISO 11615) and /or Manufactured Item (not an identified class) (from ISO 11615)	any pharmaceutical product or combination of pharmaceutical products that may be administered to human beings (or animals) for treating or preventing disease, with the aim/purpose of making a medical diagnosis or to restore, correct or modify physiological functions Manufactured Item: Qualitative and quantitative composition of a product as contained in the packaging of the Medicinal Product as put on the market or Investigational Medicinal Product as used in a clinical trial
5	Real Packaged Clinical Drug [National Extension]	A representation of a medicinal product as it is supplied in a package by a by a single organisation (manufacturer or supplier) in a single jurisdiction under a single name (which may be a trade or brand name) for placement into the supply chain Examples: Package containing 28 tablets Inlyta 3 mg tablet Pfizer Limited (real packaged clinical drug)	Packaged Product (PCID) (from ISO 11615)	Medicinal Product in a container being part of a package, representing the entirety that has been packaged for sale or supply

10.1.3 Routes of administration

The SNOMED CT value set is more granular than that in EDQM / IDMP. For example, where EDQM uses “oromucosal” SNOMED CT uses the more granular sites that are reflected in the concept names; therefore “buccal tablet” will have an ISI of “buccal” in SCT not “oromucosal”, although with the ontology relationships in SNOMED CT, the buccal intended site is a child of the oromucosal intended site, so grouping is machine processable.

10.1.4 Specified Substances

SNOMED CT does not have specified substances. Specified substances are important to the regulatory use cases and are often proprietary, so would not be appropriate for SNOMED CT or indeed MPD use. The domain definition for SNOMED CT substances excludes specified substances.

10.1.5 Manufactured Dose Forms

The administrable dose form definition does not exist in SNOMED, hence there is no completely equal SNOMED level to the PHPID level IV. SNOMED, specifically addresses the patient care use cases, which require manufactured dose form in preference to the administrable dose form. However, for oral antibiotic liquids, the administrable dose form is used because this is the most clinically relevant for the SNOMED CT use cases. The Editorial Policy of SNOMED describes this in detail.

Because of the ontological nature of SNOMED CT, you get the basic dose form automatically for each and every Clinical Drug because of the concept definition.

10.2 Mapping EDQM / IDMP dose forms to SNOMED

There is a pilot project in progress at SNOMED International in cooperation with EDQM as part of the work ongoing at the Drug Extension User Support Group. This is a draft map from EDQM pharmaceutical dose forms to SNOMED CT pharmaceutical dose forms and whilst IDMP compliant, it is not a map from IDMP directly.

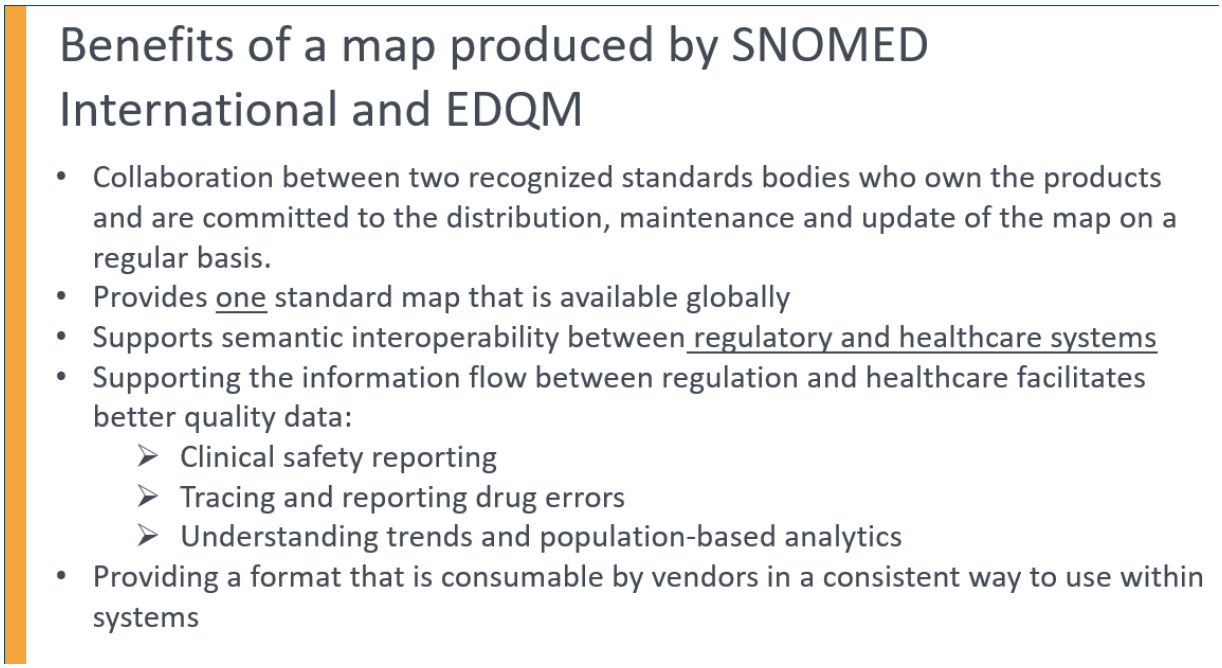


Figure 43 - Benefits of a map SNOMED EDQM

10.3 Snap-2-SNOMED Project

Source (retrieved 14.1.2022)

Snap-2 SNOMED is a hosted tool for SNOMED International Members to collaboratively create and maintain simple maps to SNOMED CT (work in progress). This application is hosted by SNOMED International for use by the community. To log in you need a SNOMED International account.

This tool is aimed at SNOMED members and their stakeholders to collaboratively create and maintain simple maps to SNOMED CT.

Source (retrieved 14.1.2022)

https://confluence.ihtsdotools.org/download/attachments/123901441/MTUG%20meeting%20%2823%20March%202021%29.pptx?api=v2

https://snap.snomedtools.org/ and user guide http://snomed.org/s2sug

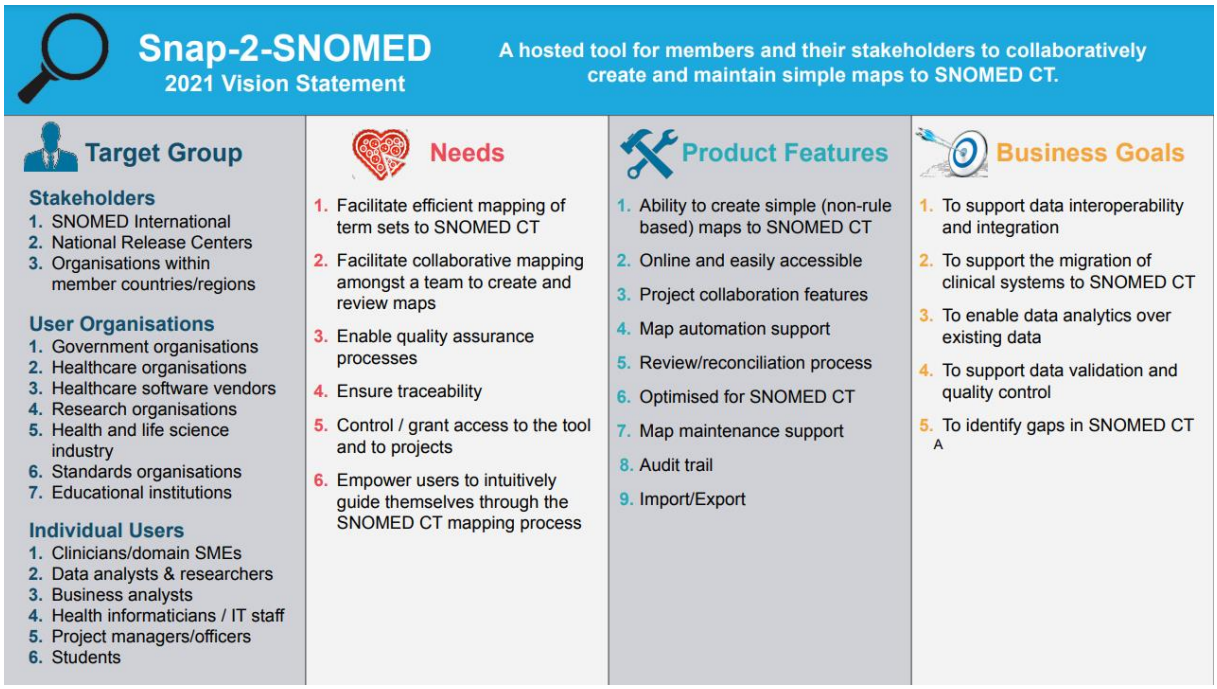


Figure 44 - Snap-2-SNOMED 2021 Vision Statement

11 Activities related to IDMP

11.1 ePI for Medicinal Products in the EU

Electronic product information for human medicines in the EU is a joint EMA–HMA–EC collaboration which has started in March 2017. The development of this ePI project will be relevant for MPD providers as MPDs are the link between regulatory data and e-Prescription. ePI data will also use IDMP SPOR data.

It states that the regulator will provide PMS structured data, SmPC, Leaflet and the package label. To which extend PMS data will be part of the ePI is still work in progress.

Source (retrieved 13.1.2022)

Electronic product information for human medicines in the EU: key principles

https://www.ema.europa.eu/en/documents/regulatory-procedural-guideline/electronic-product-information-human-medicines-european-union-key-principles_en.pdf

(retrieved 8.3.2022)

Report on public consultation on EU ePI Common Standard Summary of comments received and next steps (as of 22.2.2022)

https://www.ema.europa.eu/en/documents/report/report-public-consultation-eu-common-standard-electronic-product-information-epi-summary-comments_en.pdf

The key principals in this ePI projects are:

The regulator should hold ePI data, as a trustworthy source for reliable medicines information. The NCA in each country will store and handle ePI in their jurisdiction. In addition, it is envisaged that a pan-European medicines web portal could provide a central point for access of ePI for all centrally and nationally authorised medicines.

Implication: In the future, it is envisaged that the EMA and all NCAs will be able to use ePI from the point of submission, and ePI will be made available through EMA and NCA websites.

ePI will interface and interact with many ongoing and foreseen eHealth initiatives. eHealth and related services should work together, within and across organisations or domains. ePI interoperability with cross-border prescription, electronic health records, the future European medicines web portal, pharmacovigilance systems, SPOR data management services, future ePI for veterinary medicines, a future European common data model, current electronic application procedures and national ePI systems must be considered in the design of EU ePI.

Use of ePI in both an EU and global context should also be considered.

Electronic product information for human medicines in the EU: key principles

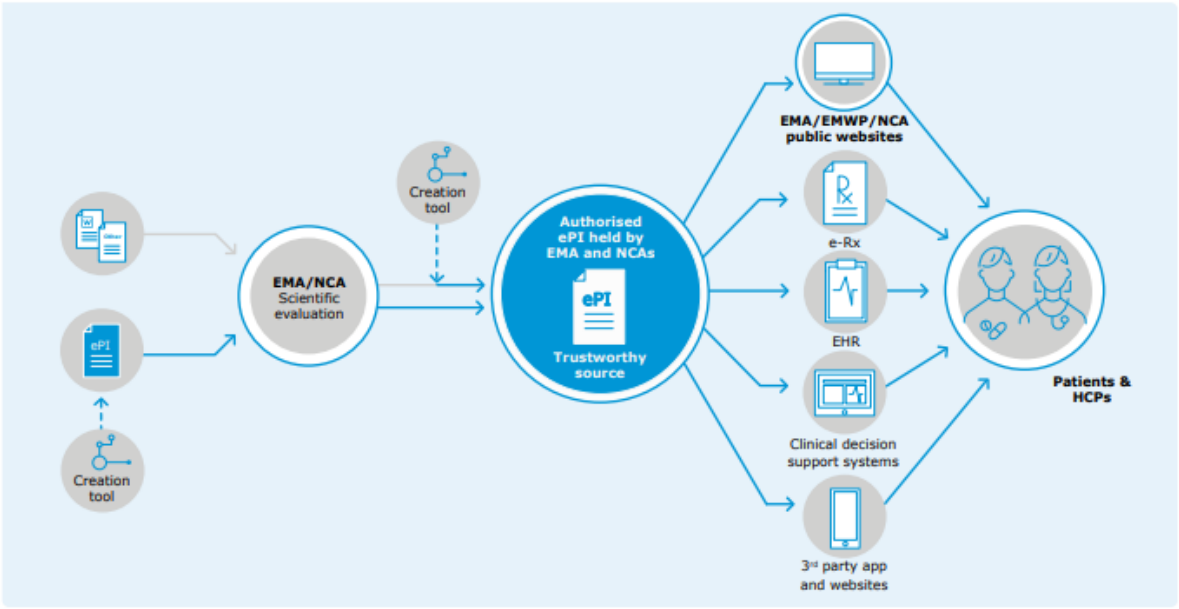


Figure 1. Proposed model for ePI process (subject to change following feasibility analysis once ePI project is started). A free, validated ePI creation tool is provided by the regulator. The tool could be used by the MAH to create ePI for submission in an application or to create ePI once an evaluation is complete. ePI for both nationally and centrally authorised products can be accessed from the European medicines web portal (EMWP) and NCA public websites. ePI can be used with systems for e-prescribing (e-Rx) and electronic health records (EHR). Data can be accessed by third-parties for example, for use in websites and patient / consumer apps.

Figure 45 - Model for ePI process

11.1.1 Gravitate-Health

The Gravitate Health is a public – private partnership with 39 members from Europe and the US, co-led by University of Oslo (coordinator) and Pfizer (industry lead), funded by the Innovative Medicines Initiative (IMI) – a joint undertaking of the European Commission, the European Federation of Pharmaceutical Industries and Associations (EFPIA), IMI2 Associated Partners.

The current objective of this project is to create a new digital platform that gives patients a more accessible way of acquiring trusted medicinal product Information. This will be done by combining information from the International Patient Summary (IPS) document, a selected list of medication list with ePIs for each medication and the associated medication product definition resources.

Source (retrieved 14.1.2022)

https://www.gravitatehealth.eu/

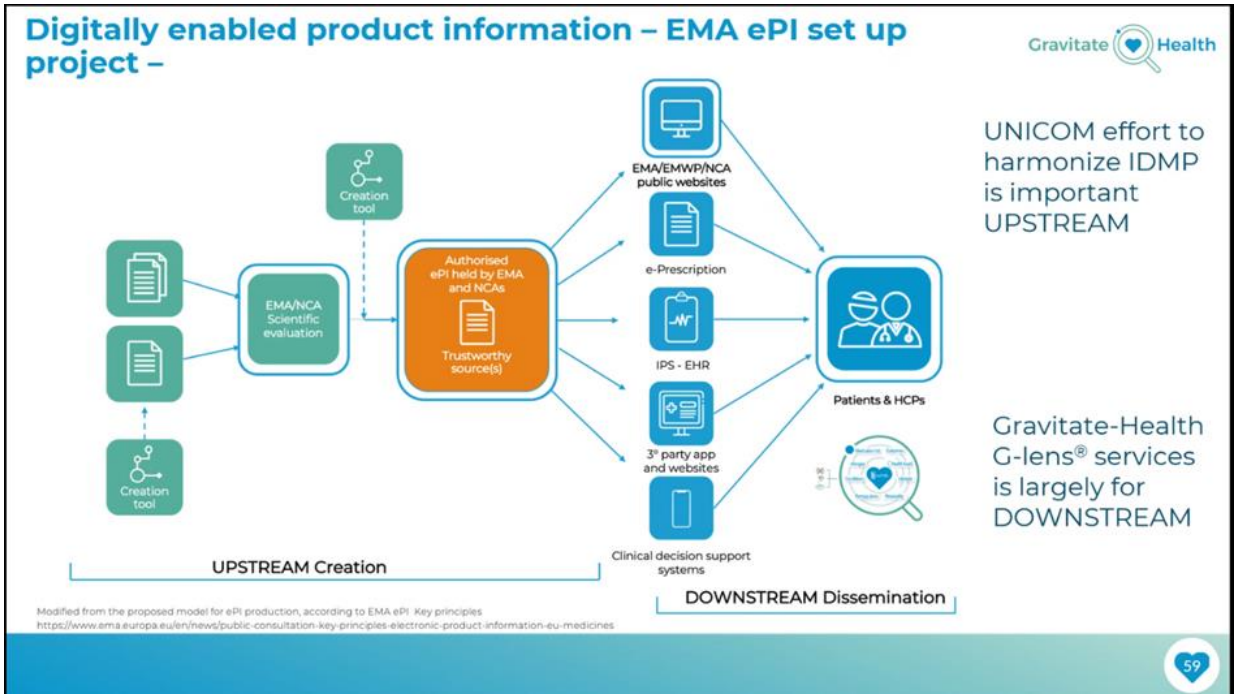


Figure 46 - Gravitate-Health G-lens(R) services

11.2 Digital Application Dataset Integration (DADI)

The Digital Application Dataset Integration (DADI) project of EMA will replace PDF electronic application forms (eAF) used for regulatory submissions with online forms, making the future form-filling and submission-handling process more efficient.

The implementation of these new forms supports the EU requirement to integrate ISO IDMP (Identification of Medicinal Products) standards for human medicines. The PMS data model will link to DADI and vice versa.

It is planned to go life at the end of 2022. The output of this DADI project will feed into the PMS product data.

Source EMA retrieved 7.2.2022, 25.1.2022 presentation on DADI - FHIR and DATA

Introducing DADI – The Digital Application Dataset Integration Network Project to replace electronic application forms, 18 January 2022, Webinar

https://www.ema.europa.eu/en/documents/presentation/presentation-introducing-dadi-digital-application-dataset-integration-network-project-replace_en.pdf

DADI is lead by the EMA and will replace all the eForms in regulatory.

Introducing DADI | Objectives

EUROPEAN MEDICINES AGENCY

Project Objectives

1. Replace the **current PDF-format application forms** for marketing authorisation applications, variations and renewals for human and veterinary medicinal products **with web-based application forms** compatible with ISO IDMP and FHIR standards and the EU Implementation Guide for human medicine
2. Provide a **structured data format (FHIR standard based)** which can be **imported** into PMS services and reused in other submission related tasks to support the PMS target operating model
3. Provide a **human readable PDF output** in line with the Notice to Applicants requirements
4. Use an **out of the box solution for the interface**

How is PMS linked to eAF

EUROPEAN MEDICINES AGENCY

PMS

eAF

Key concepts

- The **variation** form uses data from PMS by;
  - Product selection from
  - Display of structured data elements that can be changed in scope of the variation
- PMS and eAF data structures adhere to the **ISO IDMP** (for human CAPs and NAPs); Veterinary products will follow in a similar fashion (UPD)
- Not all PMS data elements are in scope of **MAA/variation/Renewal** forms
  - Data/Process **Out of scope**: MA transfer, Update of QPPV, PSMF location, PhV contacts, marketing status and authorisation status
- The DADI project does **not** define the new business processes, but is focusing on providing the basis for data to be exchanged: A **common FHIR message** format for medicinal products
- Examples of processes that can be built based on the same FHIR message:
  - Feeding approved data **back to PMS**
  - The submission of **Art 57(2)** data elements
  - as well as **data cleansing/enrichment**

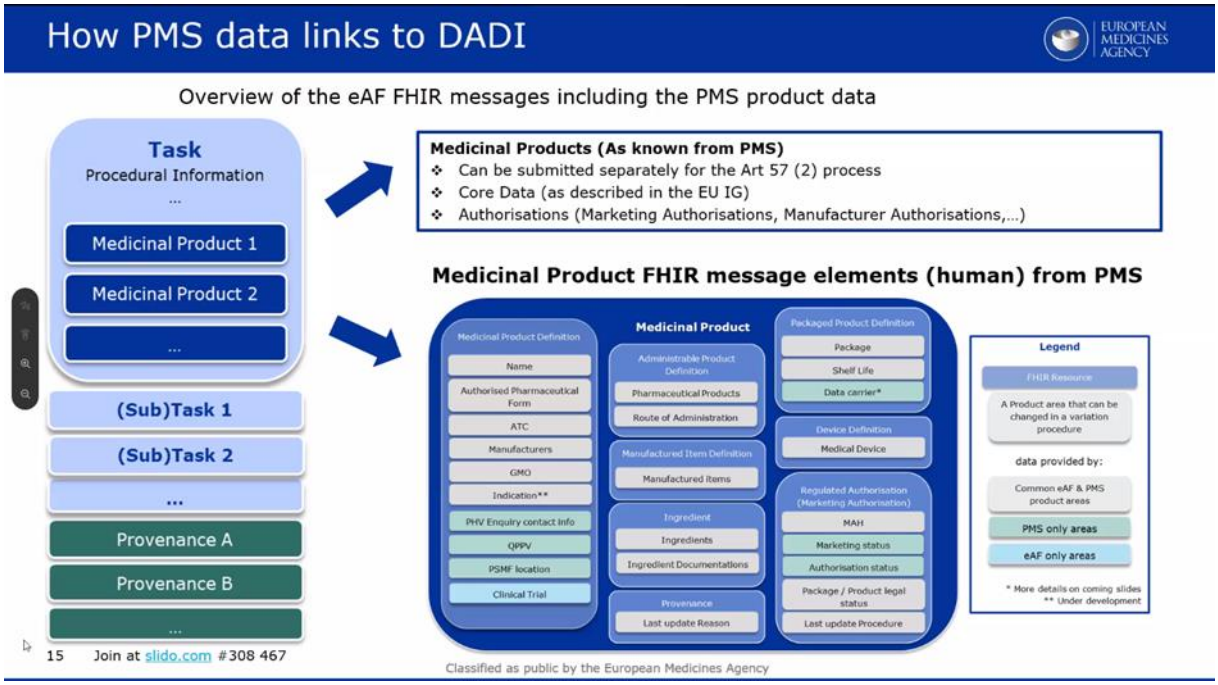


Figure 47 - How PMS data links to DADI (Source EMA as of 25.1.2022)

Project Question and Answers Version 2 (as of December 2021) PDF

This document is for information only and is based on insights available at the time of its release. It will be updated regularly by EMA.

12 Call to action

The implementation of ISO IDMP/SPOR turns out to be a moving target requiring significant investment. Work on a global scale is essential and crucial in this fast-developing eHealth world, but even more important is to monitor the jurisdictional requirements in parallel. The implementation of ISO IDMP/SPOR must be based on more than one business case to be able to explore the full power of harmonised high-quality data.

For an MPD provider it is also crucial to monitor the future developments of ePI and DADI (see chapter 4.1.8 and 4.1.9 this document).

ePI will interface and interact with many ongoing and foreseen eHealth initiatives such as cross-border prescription and electronic health records. The SPOR data management services, and a future European common data model, must be considered in the design of EU and global MPD application systems.

To realise the benefits for all stakeholders, pharmaceutical companies, regulators and MPD providers shall act to fully implement IDMP standards for medicinal products.

IDMP standards-enabled information shall then be collected and stored in medicinal product dictionaries for easy access by doctors and pharmacists.

With the link between IDMP standards and the MPD, IT solution providers shall integrate this medicinal product information in their solutions. Only then, will healthcare providers be able to safely prescribe and dispense the right medicinal products to the right patients, regardless of where they are.

Public health organisations can more easily and quickly aggregate worldwide information to address ADEs, recalls and important public health initiatives to ensure the world is a safer place for everyone.

13 Appendices

13.1 Gap Analysis Belgium MPD SAM - IDMP

*Reference to the **Gap Analysis SAM - ISO IDMP** (see Annex)*

"The Belgian Agency (FAGG/AFMPS) commissioned DIGILE for the IDMP/SAM Gap Analysis in the scope of UNICOM. The result of the Belgian MPD SAM-2-IDMP gap analysis, is part of D9.2 delivery with official permission of the FAGG - AMPS (the Belgian NCA).

The 3 big challenges in the Belgian gap analysis between SAM as Belgian MPD and IDMP where:

- Finding and mapping the SAM substances to the IDMP Substances
- Checking the already existing relation of the SAM to the EDQM dose form
- Normalisation of the product strength

Please find the outcome of this analysis as an additional PDF file attachment to this document.

Two examples to find in this document as result of the gap analysis:

	only used	terms		alterms
current EDQM terms	277	94%	585	80%
deprecated EDQM terms	3	1%	24	3%
rejected EDQM terms	2	1%	4	1%
not found as EDQM term	13	4%	118	16%
total number of terms	**295**	100%	**731**	100%

Figure 48 - Gap analysis between SAM and EDQM pharmaceutical dose forms

In SAM, 12 out of 303 units of measure do not validate as UCUM units:

unit	validation	remark
kcaL	kcaL is not a valid UCUM unit.	kcaL is not a valid UCUM code. No alternatives were found.
kcaL/(8.h)	kcaL/(8.h) is not a valid UCUM unit.	kcaL is not a valid UCUM code. No alternatives were found.
kcaL/d	kcaL/d is not a valid UCUM unit.	kcaL is not a valid UCUM code. No alternatives were found.
kcaL/h	kcaL/h is not a valid UCUM unit.	kcaL is not a valid UCUM code. No alternatives were found.
k{unit}/mL	k{unit}/mL is not a valid UCUM unit.	k is not a valid unit expression, but [k] is. Did you mean [k] (Boltzmann constant)?
Lm/m2	Lm/m2 is not a valid UCUM unit.	Lm is not a valid UCUM code. No alternatives were found.
mg I/mL	mg I/mL is not a valid UCUM unit.	mg I/mL is not a valid unit. Blank spaces are not allowed in unit expressions.
		I is not a valid UCUM code. We found possible units that might be what was meant: [mi_i], mile, standard unit used in the US and internationally [cr_i], cord, unit of measure of dry volume used to measure firewood equal 128 ft3 [cml_i], circular mil,
[ppm] mol	[ppm] mol is not a valid UCUM unit.	[ppm] mol is not a valid unit. Blank spaces are not allowed in unit expressions.
		[ppm]mol is not a valid UCUM code. No alternatives were found.
[ppm] mol/mol	[ppm] mol/mol is not a valid UCUM unit.	[ppm] mol/mol is not a valid unit. Blank spaces are not allowed in unit expressions.
		[ppm]mol is not a valid UCUM code. No alternatives were found.
% v/v	% v/v is not a valid UCUM unit.	% v/v is not a valid unit. Blank spaces are not allowed in unit expressions.

Figure 49 - Gap analysis between SAM and UCUM units of measure