eMedication Plan ChMed23A

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1. Table of contents

2. Introduction

Medication plans are a central pillar of any eHealth solution. To enable interoperability between eHealth systems in Switzerland, the organisation "IG eMediplan" was founded in 2016. Its aim is to support and provide public, open-source, medication plan formats used by a broad group of stakeholders from the public and private sectors.

This paper describes the specification and reference implementation of the object model for a medication plan, the so-called ChMed23A.

The reference consists of the content and layout specification for the electronic document, a JSON file containing a medication.

The content and layout specification for a paper-based layout used in Print/PDF scenarios is described in the document "eMediplan_Paper-based_Layout".

A ChMed23A can be transmitted using the so called ChTransmissionFormat[1], which specifies the type of the content and includes the compressed and Base64 encoded content.

ChFormat: {inputType}.{compressed-base64-payload}
Example: ChMed23A.
H4sIAAAAAAAACq2OOw4CMQxE7zIt2ZUTAmzcLZsGiU+KUCEKYKlokIACRbk7jkLBAWisZz/NyAmb6/gAHxJWI7hsGgqhnsIOnBDBRmF4+9cebCuBtUL0Xy38g73MnIu+DxX/1nRUkCRiv1zLl9tzOF1uIloqxj9FGTKmId1oHcnxtGM7a+28c9YtJqSZCPkD+iD8fPQAAAA=

This allows IT systems to store and transmit electronic medication plans in the form of a JSON file in UTF-8. It also enables the medication plan to be transmitted in a print-based form by using QR barcodes. Therefore, the medication plan is readable by users and systems alike. This is necessary to guarantee simple handling.

The possibility to transmit and store the compressed and Base64 encoded chunked payload (mainly to not exceed the maximum character size supported by a QR code), will be considered in the future.
Here is an example which describes how to create chunks that fit on one line in this document:
Chunk 1: ChMed23A.1/4.H4sIAAAAAAAACq2OOw4CMQxE7zIt2ZUTAmzcLZsGiU+KUCEKYKlokIACRbk7jk
Chunk 2: ChMed23A.2/4.LBAWisZz/NyAmb6/gAHxJWI7hsGgqhnsIOnBDBRmF4+9cebCuBtUL0Xy38g73MnI
Chunk 3: ChMed23A.3/4.u+DxX/1nRUkCRiv1zLl9tzOF1uIloqxj9FGTKmId1oHcnxtGM7a+28c9YtJqSZCPkD+
Chunk 4: ChMed23A.4/4.iD8fPQAAAA=

3. Conventions

3.1. Objects

In the context of this document, properties named 'Object' can hold different types of data. Every object contains a type as well as properties defined by the type itself.

E.g. for dosage objects, a simple dosage only contains an amount:

```
{
    "t": 1, // Simple dosage
    "a": 1 // Amount of 1
}
```

[1] ChTransmissionFormat: Transmission format (currently used with ChMed and ChVac)

Whereas a dosage range specifies a minimum and a maximum amount:

```
{
    "t": 3, // Dosage range
    "aMin": 1.0, // Minimum amount of 1
    "aMax": 3.0 // Maximum amount of 3
}
```

Use the appropriate object type to represent the desired posology.

Objects must be deserialised according to the specified type.

3.2. Naming

To minimise the size of the JSON files being generated, property names have been abbreviated using the following rules:

- Property names always start with a lowercase character.
- Properties holding an array of elements have the suffix ‘s’, which represents the plural.
- Properties holding variable object types contain an ‘o’. E.g. *PosologyDetail* object → po, *Dosage* object → do
- If the abbreviation of a word consists of a single character, keep it lowercase; use CamelCase otherwise. E.g. MeasurementType → mt, ApplicationInstructions → appInstr

3.3. Value types

The following types are used for the properties in the model.

Property type	Format	Examples	Description
boolean	true / false	true false	The value is either true or false or can be null if not required.
integer	whole number	1 700	A number without a decimal separator. In case it contains a decimal separator, the number will be rounded to the closest whole number.
decimal	decimal number	1.5 7 30.005	A number which is either a whole number or a number containing a decimal, the separator is a dot.
string	text	“any text”	A text contained in quotes.
list of …	a list of items	[1, 7] ["item1”]	An array containing elements of the specified type.
object	complex object	{ }	Can contain any type of complex object. Supported type(s) will be described.

3.4. Usage

The usage specifies if a property must be provided. The following values can be set.

Usage	Description
R	The value is required and must be set.
R if …	The value must be provided if the specified condition is met (usually if another property has a certain value).
O	The value is optional. It will be used by certain use cases if it has been set.
-	The value can be set, but won't be used.
x-N	A list of values can be provided; the minimum amount that must be included is specified by x.

4. The ChMed23A eMedication object

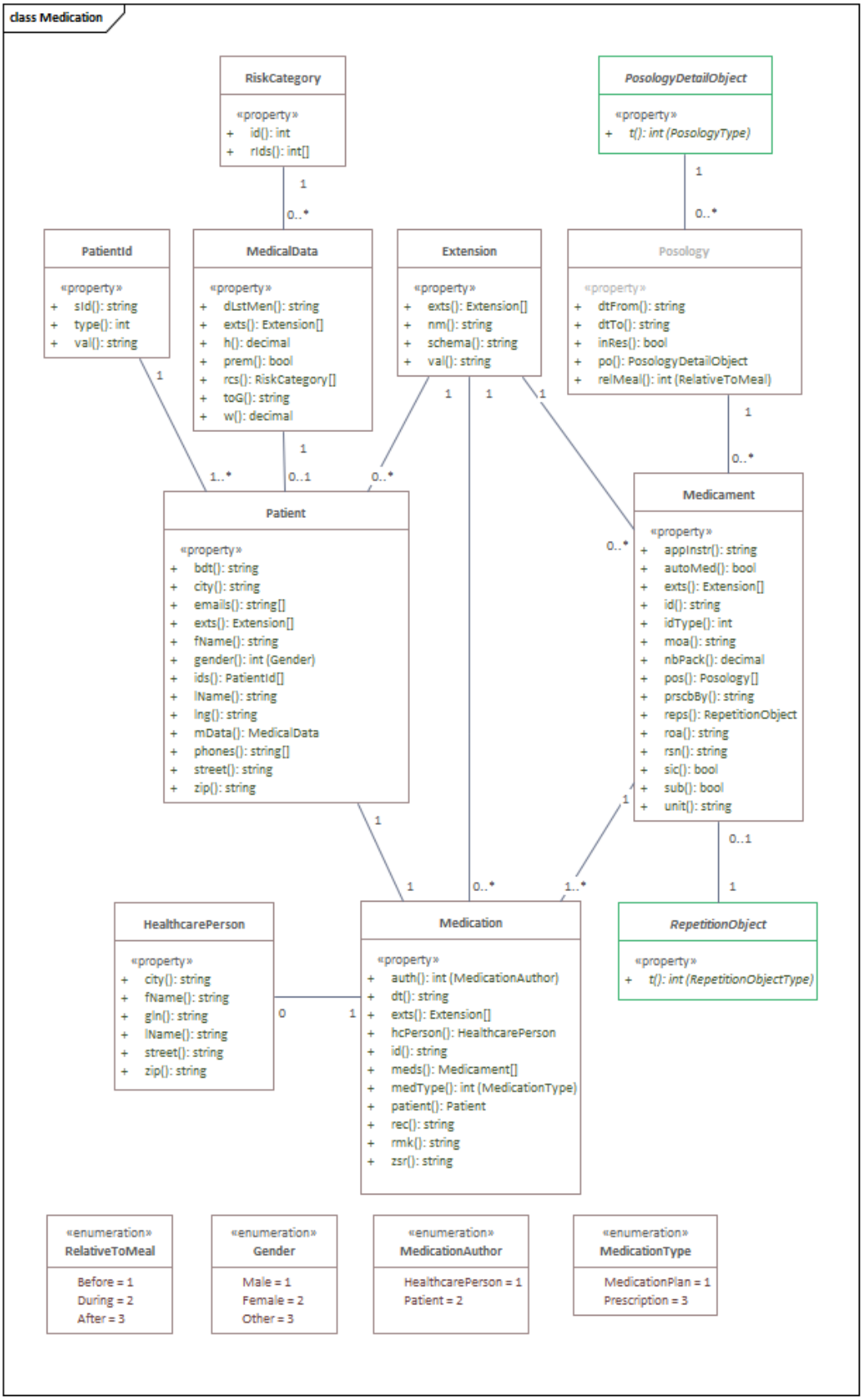
4.1. Overview of the object model

The hierarchy of the object model is quite simple. A ChMed23A eMedication contains one patient with personal data and medical data and multiple medicaments with associated posologies.

The object model is represented using a JSON structure.

To allow serialisation and deserialisation in a QR barcode, the data size of the JSON file should be minimised. We therefore chose quite short property names. We recommend omitting required and optional fields when they are null or empty.

4.2. Object model



Note that the two blocks marked green (*PosologyDetailObject* and *RepetitionObject*) are dynamic objects, which have not been fully represented in this diagram. Please refer to the dedicated chapters in this document for additional details.

4.2.1. Medication

The *Medication* object is the main object; it contains exactly one *Patient* and a list of *Medicaments*.

Name	Type	Usage		Description
		MP	Rx	
patient	*Patient*	R	R	The patient Please refer to 4.2.2 *Patient.*
hcPerson	*HealthcarePerson*	R if auth =1	R if auth =1	The healthcare person (the author of the document) Please refer to 4.2.10 *HealthcarePerson.*
meds	list of *Medicaments*	0-N	1-N	List of medicaments Please refer to 4.2.6 *Medicament.*
exts	list of *Extensions*	0-N	0-N	List of extensions Please refer to 4.2.9 *Extension.*
medType	integer	R	R	The type of the *Medication* object Possible values: 1: MedicationPlan (MP) *2: PolymedicationCheck (PMC)* ***[deprecated]*** 3: Prescription (Rx)
id	string	R	R	The ID of the *Medication* object. The responsibility to set the ID is given to the ChMed23A creator.
auth	integer	R	R	The author of the document Possible values: 1: Healthcare person 2: Patient
zsr	string	-	O	The ZSR number of the author himself/herself or his/her organisation
rec	string	-	O	The recipient (GLN) of the electronic prescription. To be used if the electronic prescription is to be transmitted electronically to a healthcare professional.
dt	string	R	R	The date of creation Format: yyyy-mm-ddThh:mm:ss+02:00 (ISO 8601[2] Combined date and time in UTC) (e.g. 2016-01-16T16:26:15+02:00)
rmk	string	O	O	The remark (any information/advice the author would like to share independently of a specific medicament)

[2] ISO 8601: http://en.wikipedia.org/wiki/ISO_8601

4.2.2. Patient

The *Patient* object contains the patient's personal and health data.

Name	Type	Usage		Description
		MP	Rx	
fName	string	R	R	First name
lName	string	R	R	Last name
bdt	string	R	R	Date of birth, format: yyyy-mm-dd (ISO 8601[3] Date)
gender	integer	R	R	Gender of the patient Possible values: 1: Male 2: Female 3: Other
street	string	O	O	Street
zip	string	O	O	Postcode
city	string	O	O	City
lng	string	R	-	The patient's language (ISO 639-1[4] language code) (e.g. de)
ids	list of *PatientId*	1-N	1-N	List of patient identifiers Please refer to 4.2.3 *PatientId.*
exts	list of *Extensions*	0-N	0-N	List of extensions Please refer to 4.2.9 *Extension.*
mData	*MedicalData*	O	-	Medical data information Please refer to 4.2.4 *MedicalData.*
phones	list of string	0-N	0-N	List of phone numbers
emails	list of string	0-N	0-N	List of email addresses

[3] ISO 8601: http://en.wikipedia.org/wiki/ISO_8601

[4] Language code ISO 639-1, full list: http://en.wikipedia.org/wiki/list_of_ISO_639-1_codes

4.2.3. PatientId

The *PatientId* object enables a patient to be uniquely identified.

Name	Type	Usage		Description
		MP	Rx	
type	integer	R	R	The type of ID Possible values: 1: Insurance card number 2: Local PID
sId	string	R for *Type* 2 - for *Type* 1	R for *Type* 2 Not R for *Type* 1	The system (e.g. OID, URL etc.) enabling the *Patient* to be identified (system identifier). To be used only with *Type* 2 (Local PID)
val	string	R	R	The value of the ID

4.2.4. MedicalData

Applies only to *medType* MedicationPlan (MP).

The *MedicalData* object contains the patient's health data.

Name	Type	Usage	Description
		MP	
dLstMen	string	O	Only required in case of *Risk Id* 78 in *RiskCategory* 3 First day of last menstruation, format: yyyy-mm-dd (ISO 8601[5] Date)
prem	boolean	O	True if it is a premature baby, false otherwise (only if age <= 18 months)
toG	string	O	The time of gestation (only if premature baby (Prem) == 1) Format: {week}-{day}
rcs	list of *RiskCategory*	0-N	Risk categories Please refer to 4.2.5 *RiskCategory.*
w	decimal	O	Weight (kilogram)
h	decimal	O	Height (centimetre)
exts	list of *Extensions*	0-N	List of extensions Please refer to 4.2.9 *Extension.*

[5] ISO 8601: http://en.wikipedia.org/wiki/ISO_8601

4.2.5. RiskCategory

The *RiskCategory* object contains risks grouped by category.

Name	Type	Usage	Description
		MP	
id	integer	R	The ID of the risk category (*RC Id*) Possible values: 1: Renal insufficiency 2: Liver insufficiency 3: Reproduction 4: Competitive athlete 5: Operating vehicles/machines 6: Allergies 7: Diabetes
rIds	list of integer	0-N	List of risks (*Risk Id*) within the risk category (*RC Id*)

If the risk category is specified without any risk being specified in the list of risks, the entire risk category is considered as explicitly excluded for the current patient. If the category does not exist, the risks are considered as unknown for the patient.

The possible risks are listed below. The allergies have not been listed here. You can find them in the CDSCODE schema of the INDEX database by HCI Solutions AG (CCHTYP: 'CHA') or on the website of the eMediplan FHIR Implementation Guide.

RC Id	Risk Id	German	French
1	597	Niereninsuffizienz, terminale (Clcr <15 ml/min)	Insuffisance rénale, terminale (Clcr <15 ml/min)
1	575	Niereninsuffizienz, schwere (Clcr ≥15–29 ml/min)	Insuffisance rénale, sévère (Clcr ≥15–29 ml/min)
1	576	Niereninsuffizienz, mittelschwere (Clcr ≥30–59 ml/min)	Insuffisance rénale, modérée (Clcr ≥30–59 ml/min)
1	577	Niereninsuffizienz, leichte (Clcr ≥60–89 ml/min)	Insuffisance rénale, légère (Clcr ≥60–89 ml/min)
2	572	Leberinsuffizienz, schwere (Child-Pugh C)	Insuffisance hépatique, sévère (Child-Pugh C)
2	573	Leberinsuffizienz, mittelschwere (Child-Pugh B)	Insuffisance hépatique, modérée (Child-Pugh B)
2	574	Leberinsuffizienz, leichte (Child-Pugh A)	Insuffisance hépatique, légère (Child-Pugh A)
3	78	Schwangerschaft	Grossesse
3	77	Stillzeit	Allaitement
3	612	Frauen im gebärfähigen Alter	Femmes en âge de procréer
4	580	Leistungssportler	Sportifs de compétition
5	615	Potenziell gefährlichen Situationen ausgesetzt, wie beispielsweise dem Führen von Fahrzeugen, dem Bedienen von Maschinen oder dem Arbeiten in grossen Höhen	Exposés à des situations potentiellement dangereuses, comme la conduite de véhicules, machines ou travaillant en haute altitude
6	The allergies have not been listed here. You can find them in the CDSCODE schema of the INDEX database by HCI Solutions AG (CCHTYP: 'CHA') or on the website of the eMediplan FHIR Implementation Guide.		
7	779	Diabetes mellitus Typ 1	Diabète de type 1
7	780	Diabetes mellitus Typ 2	Diabète de type 2

4.2.6. Medicament

The *Medicament* object contains information about a medicament as well as its posologies.

Name	Type	Usage		Description
		MP	Rx	
id	string	R	R	The ID defined in the *IdType* below. If the *IdType* is 'None', add a free text description here.
idType	integer	R	R	The type of *ID* Possible values: 1: None 2: GTIN[6] 3: Pharmacode[7] 4: Product Number[8] (not for Rx) 5: ATC[9] code (not for Rx)
pos	list of *Posology*	0-N	0-N	List of posologies Please refer to 4.2.7 *Posology*.
unit	string	R	O	The quantity unit. Mandatory if *Pos* is defined. (The unit must be based on the standardised substance in the INDEX database.) Possible values: CDTYP 9 in INDEX database / CODE schema. The value set is also available on the website of the eMediplan FHIR Implementation Guide.
rsn	string	O	O	Reason for applying the medication (the reason for the medication treatment)
appInstr	string	O	O	Application instructions (further information on how to apply the medication, e.g. take before meals). Please note: For unstructured posology we recommend using the *Posology* object *FreeText* instead of *AppInstr*. Please refer to the document "eMediplan_ChMed23A_Posology".
autoMed	boolean	R	-	Automedication (self-medication), true if it is automedication, false otherwise. Self-medication = The patient self-administers treatment without a prescription from a physician.
prscbBy	string	O	-	Prescribed by: the GLN or designation of the person who prescribed the medicament (e.g. physician, pharmacist etc.)

The table continues on the next page.

[6] Global Trade Item Number (GTIN): https://www.refdata.ch/de/artikel/anmeldung/artikel-refdatabase-gtin

[7] The Pharmacode is the main article identifier in the INDEX database. It is managed by the editorial team at HCI Solutions AG.

[8] The product number is a unique identifier for products in the INDEX database. It is managed by the editorial team at HCI Solutions AG.

[9] The Anatomical Therapeutic Chemical code (ATC) is a unique code that is used to classify medicaments according to anatomical, therapeutic and chemical aspects.

The table starts on the previous page.

Name	Type	Usage		Description
		MP	Rx	
roa	string	O	O	The route of administration (according to EDQM[10]) Possible values: CDTYP 61 in INDEX database / CODE schema
moa	string	O	O	The method of administration (according to EDQM) Possible values: CDTYP 62 in INDEX database / CODE schema
reps	*Repetition* object	-	O	The repetition object indicates how often a prescription can be repeated or how long the prescription is valid. If no repetition object is set, it will be interpreted as if the *Repetition* object of the type *Number* had been set with V=1. If the prescription of a medicament is not repeatable, use the *Repetition* object with the type *Number* and set V=0. Please refer to 4.2.8 *Repetition object.*
sub	boolean	O	O	True if the medicament should not be substituted, false otherwise. Default: false
sic	boolean	-	O	Sic erat scriptum (latin). Is intended to avoid misunderstandings between the physician and pharmacist and indicates to the pharmacist that the physician has deliberately chosen the prescription and wishes to prescribe the drug in exactly this way and not otherwise. Default: false
nbPack	decimal	-	O	Number of packages to be delivered. Default: 1
exts	list of *Extensions*	0-N	0-N	List of extensions Please refer to 4.2.9 *Extension.*

[10] EDQM: European Directorate for the Quality of Medicines & HealthCare

4.2.7. Posology (Pos)

A posology describes when and what amount of a medicament must be taken.

The table below describes the properties of a posology. Please refer to the document "eMediplan_ChMed23A_Posology" for additional information about creating posologies.

Name	Type	Usage		Description
		MP	Rx	
dtFrom	string	O	O	From date (start date of medication treatment), format: yyyy-mm-ddThh:mm:ss+02:00 (ISO 8601[11] Combined date and time in UTC) (e.g. 2016-01-16T16:26:15+02:00)
dtTo	string	O	O	To date (end date of medication treatment), format: yyyy-mm-ddThh:mm:ss+02:00 (ISO 8601 Combined date and time in UTC) (e.g. 2016-01-16T16:26:15+02:00) The *DtTo* must be considered as inclusive. For example, DtTo: 2015-05-01, the patient must apply the medicament also on 2015-05-01.
inRes	boolean	O	O	Reserve medication True if in reserve; false otherwise. Default: false
po	*Posology Detail* object	R	R	The *PosologyDetail* object contains the details of the posology. Please refer to the document "eMediplan_ChMed23A_Posology" for additional information.
relMeal	integer	O	O	Indicates whether a medicament must be taken relative to a meal. Possible values: 1: Before 2: During 3: After

[11] ISO 8601: http://en.wikipedia.org/wiki/ISO_8601

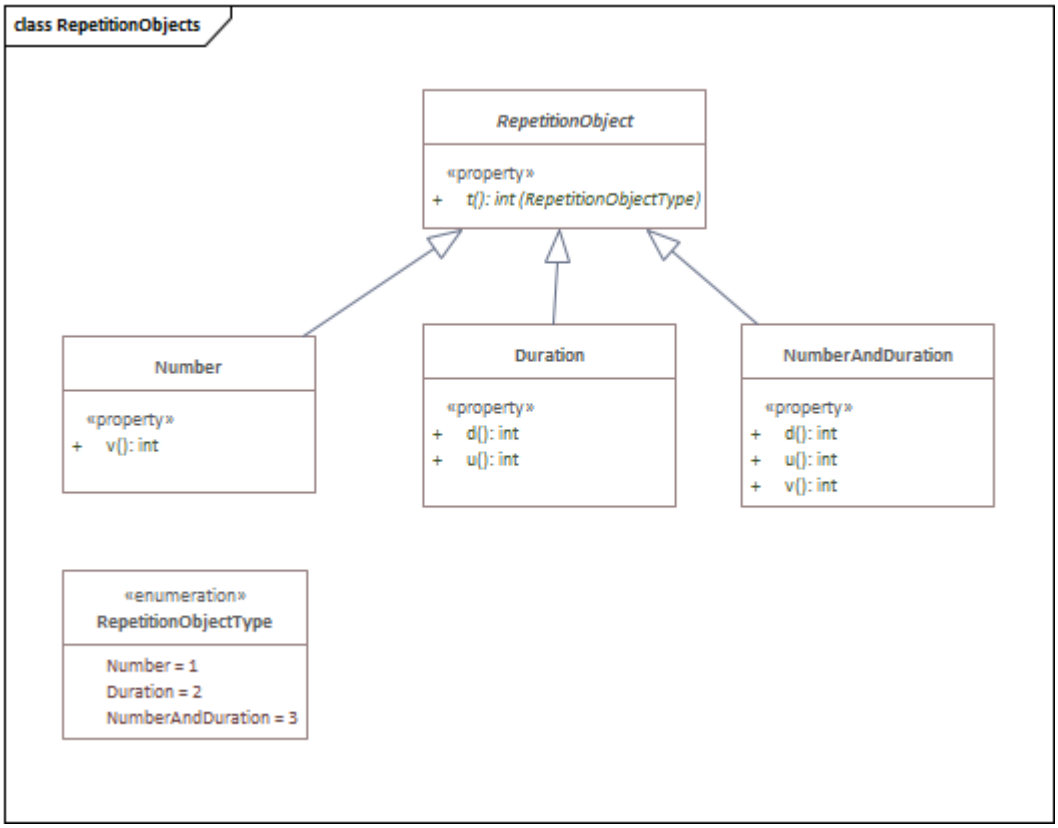
4.2.8. Repetition object

Applies only to *medType* Prescription (Rx).

The repetition object indicates how often a prescription can be repeated or how long the prescription is valid.

The following table shows all *Repetition* objects with their *Repetition* object type:

Repetition object	Repetition object type
Number	1
Duration	2
NumberAndDuration	3



4.2.8.1. Number

Name	Type	Usage		Description
		MP	Rx	
v	integer	-	R	The value defining the number of repetitions; how often a prescribed medicament can be redeemed after it has been redeemed once. If the prescription of a medicament is not repeatable set 0. Validation: Must be greater than or equal 0.

4.2.8.2. Duration

Name	Type	Usage		Description
		MP	Rx	
d	integer	-	R	The duration of the prescription defining in which time frame the prescription can be redeemed (permanent prescription). E.g. the prescription is repeatable within 6 months. Validation: Must be greater than 0.
u	integer	-	R	The unit of the Duration (*d*) Possible values: 1: Second 2: Minute 3: Hour 4: Day 5: Week 6: Month 7: Year

4.2.8.3. NumberAndDuration

Name	Type	Usage		Description
		MP	Rx	
v	integer	-	R	The value defining the number of repetitions; how often a prescribed medicament can be redeemed within the defined duration (*d*) after it has been redeemed once. Validation: Must be greater than or equal 0.
d	Integer	-	R	The duration of the prescription defining in which time frame the prescription can be redeemed (permanent prescription). E.g. the prescription is repeatable within 6 months. Validation: Must be greater than 0.
u	integer	-	R	The unit of the duration (*d*) Possible values: 1: Second 2: Minute 3: Hour 4: Day 5: Week 6: Month 7: Year

4.2.9. Extension

Extensions can be used to include additional information.

Name	Type	Usage		Description
		MP	Rx	
nm	string	R	R	The name of the field
val	string	O	O	The value of the field
schema	string	R	R	The schema can be any string and can be used to determine how to interpret the extension.
exts	list of *Extensions*	0-N	0-N	The list of nested extensions

4.2.10. HealthcarePerson

The *HealthcarePerson* object contains the healthcare person's data.

Name	Type	Usage		Description
		MP	Rx	
gln	string	R	R	The GLN MP: GLN of a person or organisation Rx: GLN of a person
fName	string	R	R	First name
lName	string	R	R	Last name
street	string	R	R	Street
zip	string	R	R	Postcode
city	string	R	R	City

4.3. Example of a JSON medication object

A typical, valid ChMed23A object would look like this. This example describes that Dora Graber must take 1 pill of Med1 every day at 08:00.

```
{
    "patient": {
        "fName": "Dora",
        "lName": "Graber",
        "bdt": "1951-11-06",
        "gender": 2 // Female
    },
    "meds": [
        {
            "id": "Med1",
            "idType": 1, // None
            "pos": [
                {
                    "po": {
                        "t": 4, // Cyclic
                        "cyDuU": 4, // Daily
                        "cyDu": 1, // Repeate every 1 (day)
                        "tdo": {
                            "t": 2, // Timed dosage
                            "ts": [
                                {
                                    "dt": "08:00:00", // Take every day at 08:00
                                    "do": {
                                        "t": 1, // Simple dosage
                                        “a”: 1 // Amount of 1 (tablet)
                                    }
                                }
                            ]
                        },
                        "tdpc": 1
                    }
                }
            ],
            "unit": "TABL",
            "nbPack": 1.0
        }
    ],
    "medType": 1,
    "id": "9196a4e4-3439-4714-b89a-89402db30c02",
    "auth": 2, // Patient is author
    "dt": "2023-07-14T12:40:57.1203496+02:00"
}
```

5. Changelog

Version	Date	Changes
1.0	07.08.2023	PUBLISHED Throughout the document, various texts were optimised. Chapter **4.2.1 Medication** • Property *rec* → name changed from *rcv* to *rec* Chapter **4.2.6 Medicament** • Property *rsn* → name changed from *tkgRsn* to *rsn* Chapters **4.2.8.1 Number**, **4.2.8.2 Duration** and **4.2.8.3 NumberAndDuration** • Validation added Chapter **4.2.9 Extension** • Property *schema* added

0.6	25.07.2023	DRAFT
		Throughout the document, various texts were optimised and references, links and images were updated.
		The **format name** CHMED23A has been changed to **ChMed23A**.
		Chapter **2. Introduction**
		• Various texts were changed, removed and added.
		Chapter **3. Conventions** was added.
		Chapter **4.2 Object model (previously 3.2)**
		• Object model adjusted
		Chapter **4.2.1 Medication (previously 3.2.1)**
		• The following properties were adjusted according to the conventions:
		  ○ *Patient* → *patient*
		  ○ *Meds* → *meds*
		  ○ *PFs* → *exts*
		  ○ *MedType* → *medType*
		  ○ *Id* → *id*
		  ○ *Auth* → *auth*
		  ○ *Zsr* → *zsr*
		  ○ *Rcv* → *rcv*
		  ○ *Dt* → *dt*
		  ○ *Rmk* → *rmk*
		• New property *hcPerson* added
		• The type of *exts* (previously *PFs*) was changed from list of *Private Field* to list of *Extensions*
		• The property *PFSchema* was removed
		Chapter **4.2.2 Patient (previously 3.2.2)**
		• The following properties were adjusted according to the conventions:
		  ○ *FName* → *fName*
		  ○ *LName* → *lName*
		  ○ *BDt* → *bdt*
		  ○ *Gender* → *gender*
		  ○ *Street* → *street*
		  ○ *Zip* → *zip*
		  ○ *City* → *city*
		  ○ *Lng* → *lng*
		  ○ *Ids* → *ids*
		  ○ *PFs* → *exts*
		  ○ *MData* → *mData*
		• The type of *exts* (previously *PFs*) was changed from list of *Private Field* to list of *Extensions*
		• *Property Cs* removed
		• Property *phones* added

		• Property *emails* added
		Chapter **4.2.3 PatientId (previously 3.2.3)**
		• The following properties were adjusted according to the conventions:
		  ○ *Type → type*
		  ○ *Sid → sId*
		  ○ *Val → val*
		Chapter **4.2.4 MedicalData (previously 3.2.4)**
		• The following properties were adjusted according to the conventions:
		  ○ *DLstMen → dLstMen*
		  ○ *Prem → prem*
		  ○ *ToG → toG*
		  ○ *RCs → rcs*
		  ○ *W → w*
		  ○ *H → h*
		  ○ *PFs → exts*
		• The type of *exts* (previously *PFs*) was changed from list of *Private Field* to list of *Extensions*
		• Property w → type changed from number to decimal
		• Property h → type changed from number to decimal
		Chapter **4.2.5 RiskCategory (previously 3.2.5)**
		• The following properties were adjusted according to the conventions:
		• *Id → id*
		• *RCs → rcs*
		• Property *rcs* → type changed from list of number to list of integer
		• Additional explanation that the value set of the allergies can be found on the Website of the eMediplan FHIR Implementation Guide
		Chapter **4.2.6 Medicament (previously 3.2.6)**
		• The following properties were adjusted according to the conventions:
		  ○ *Id → id*
		  ○ *IDType → idType*
		  ○ *Pos → pos*
		  ○ *Unit → unit*
		  ○ *TkgRsn → tkgRsn*
		  ○ *AppInstr → appInstr*
		  ○ *AutoMed → autoMed*
		  ○ *PrescbBy → prescbBy*
		  ○ *Roa → roa*
		  ○ *Moa → moa*
		  ○ *Reps → reps*
		  ○ *Sub → sub*
		  ○ *Sic → sic*
		  ○ *NbPack → nbPack*
		  ○ *PFs → exts*
		• The type of *exts* (previously *PFs*) was changed from list of *Private Field* to list of *Extensions*
		• Additional explanation of the ID types in the footnote
		• Additional explanation that the value set of the units can be found on the Website of the eMediplan FHIR Implementation Guide
		• Additional explanation that ROA and MOA are based on EDQM
		• Property nbPack → type changed from integer to decimal
		Chapter **4.2.7 Posology (previously 3.2.7)**
		• The following properties were adjusted according to the conventions:
		  ○ *DtFrom → dtFrom*
		  ○ *DtTo → dtTo*
		  ○ *InRes → inRes*
		  ○ *PO → po*
		  ○ *RelM → relMeal*
		Chapter **3.2.8 *Contact*** removed

		Chapter **4.2.8 Repetition object (previously 3.2.9)**
		• Object model adjusted
		Chapter **4.2.8.1 Number (previously 3.2.9.1)**
		• Property *t* added
		• The following properties were adjusted according to the conventions:
		  ○ *V* → *v*
		Chapter **4.2.8.2 Duration (previously 3.2.9.2)**
		• Property *t* added
		• The following properties were adjusted according to the conventions:
		  ○ *D* → *d*
		  ○ *U* → *u*
		Chapter **4.2.8.3 NumberAndDuration (previously 3.2.9.3)**
		• Property *t* added
		• The following properties were adjusted according to the conventions:
		  ○ *V* → *v*
		  ○ *D* → *d*
		  ○ *U* → *u*
		Chapter **4.2.9 Extension (previously 3.2.10 Private Fields)**
		• Name changed from *Private Field* to *Extension*
		• The following properties were adjusted according to the conventions:
		  ○ *Nm* → *n*
		  ○ *Val* → *val*
		  ○ *PFs* → *exts*
		• The type of *exts* (previously *PFs*) was changed from list of *Private Field* to list of *Extensions*
		Chapter **4.2.10 HealthcarePerson (previously 3.2.11)**
		• The following properties were adjusted according to the conventions:
		  ○ *GLN* → *gln*
		  ○ *FName* → *fName*
		  ○ *LName* → *lName*
		  ○ *Street* → *street*
		  ○ *Zip* → *zip*
		  ○ *City* → *city*
		Chapter **3.3 Compression** removed
		Chapter **4.3 Example of a JSON medication object (previously 3.4)**
		• Example adjusted

0.5	24.07.2023	Internal version for the developers.
0.4	28.06.2023	DRAFT Throughout the document, various texts were optimised and references, links and images were updated. The **format name** CHMED21A has been changed to **CHMED23A**. Chapter **3.2.1 Medication** • Property *Meds* → usage of Rx changed from 0-N to 1-N • Property *MedType* → type changed from number to integer • Property *MedType* → value 2 changed to Polymedication (PMC) [deprecated] • Property *MedType* → Prescription (Rx) changed from value 2 to value 3 • Property *Auth* → type changed from string to integer and possible values defined: 1: Healthcare person, 2: Patient • Property *AuthR* → removed • Property *Rcv* → usage of MP changed from O to – Chapter **3.2.2 Patient** • Usage of the properties *FName*, *LName*, *BDt* and *Gender* changed from O to R • Property *Cs* → type changed from list of *Contact* to *Contact* object

		• Property *Cs* → usage of MP and Rx changed from 0-N to O • Property *Ids* → usage of MP and Rx changed from 0-N to 1-N Chapter **3.2.3 PatientId** • Property *Type* added • Property *SId* → *SId* depends on the type: not required if type 1 (insurance card number), required if type 2 (local PID) Chapter **3.2.5 RiskCategory** • Property *Id* → type changed from number to integer • Risk category Id 5 text adaption → changed from "Driver" to "Operating vehicles/machines" • *RC Id* 6 including description added to the table Chapter **3.2.6 Medicament** • Property *IdType* → new possible value: 5: ATC code (not for Rx) • Property *Pos* → usage of Rx changed from 0-1 to 0-N • Property *Unit* → usage of MP changed from O to R • Property *TkgRsn* → usage of Rx changed from - to O • Property *Sub* → text adaption → "True if the medicament should not be substituted, false otherwise. Default: false". • Property *Sic* added • Property *NbPack* → type changed from number to integer Chapter **3.2.7 Posology (Pos)** • Property *PO* → name changed from *Posology* object to *PosologyDetail* object • Property *RelM* → name changed from *RM* to *RelM* Chapter **3.2.8 Contact** • Property *Mobile* removed Chapter **3.2.9 Repetition object** • New *Repetition* object added: *NumberAndDuration* New object (*HealthcarePerson*) added → see Chapter **3.2.9 HealthcarePerson**
0.3	14.01.2022	Initial version (DRAFT)

eMedication Plan ChMed23A Posology

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1. Table of contents

2. Introduction

This document is an addition to the specification “eMediplan_ChMed23A”. It focuses on the topic of posology and describes how to use the *PosologyDetail* objects and its dependencies (*TimedDosage* objects, *Dosage* objects, *Sequence* objects and *Application* objects).

3. Conventions

3.1. Objects

In the context of this document, properties named ‘Object’ can hold different types of data. Every object contains a type as well as properties defined by the type itself.

E.g. for dosage objects, a simple dosage only contains an amount:

```
{
    "t": 1, // Simple dosage
    "a": 1 // Amount of 1
}
```

Whereas a dosage range specifies a minimum and a maximum amount:

```
{
    "t": 3, // Dosage range
    "aMin": 1.0, // Minimum amount of 1
    "aMax": 3.0 // Maximum amount of 3
}
```

Use the appropriate object type to represent the desired posology.

Objects must be deserialised according to the specified type.

3.2. Naming

To minimise the size of the JSON files being generated, property names have been abbreviated using the following rules:

- Property names always start with a lowercase character.
- Properties holding an array of elements have the suffix ‘s’, which represents the plural.
- Properties holding variable object types contain an ‘o’. E.g. *PosologyDetail* object → po, *Dosage* object → do
- If the abbreviation of a word consists of a single character, keep it lowercase; use CamelCase otherwise. E.g. MeasurementType → mt, ApplicationInstructions → appInstr

3.3. Value types

The following types are used for the properties in the model.

Property type	Format	Examples	Description
boolean	true / false	true false	The value is either true or false or can be null if not required.
integer	whole number	1 700	A number without a decimal separator. In case it contains a decimal separator, the number will be rounded to the closest whole number.
decimal	decimal number	1.5 7 30.005	A number which is either a whole number or a number containing a decimal, the separator is a dot.
string	text	“any text”	A text contained in quotes.
list of …	a list of items	[1, 7] ["item1”]	An array containing elements of the specified type.
object	complex object	{ }	Can contain any type of complex object. Supported type(s) will be described.

3.4. Usage

The usage specifies if a property must be provided. The following values can be set.

Usage	Description
R	The value is required and must be set.
R if …	The value must be provided if the specified condition is met (usually, if another property has a certain value).
O	The value is optional. It will be used by certain use cases if it has been set.
-	The value can be set, but won’t be used.
x-N	A list of values can be provided; the minimum amount that must be included is specified by x.

4. Overview

This overview shows the dependencies between the *PosologyDetail* objects, *TimedDosage* objects, *Sequence* objects, *Dosage* objects and *Application* objects.

The following table illustrates which *TimedDosage* object or *Sequence* object can/can't be used for a specific *PosologyDetail* object:

***PosologyDetail* object**	***TimedDosage* object**					
	DosageOnly	Times	DaySegments	WeekDays	DaysOfMonth	Interval
Daily	No	No	No	No	No	No
FreeText	No	No	No	No	No	No
Single	**Yes**	**Yes**	**Yes**	No	No	No
Cyclic	**Yes**	**Yes**	**Yes**	**Yes, if CyDuU = week**	**Yes, if CyDuU = month**	**Yes**
Sequence	**Yes, within the Posology *Sequence* (part of *Sequence* object)**					

The following table illustrates which *TimedDosage* object, *Dosage* object or *Application* object can/can't be used for a specific *TimedDosage* object:

***TimedDosage* objects**	***TimedDosage* object**						***Dosage* object**			***Application* objects**	
	DosageOnly	Times	DaySegments	WeekDays	DaysOfMonth	Interval	DosageSimple	DosageFromTo	DosageRange	ApplicationAtTime	ApplicationSegment
DosageOnly	No	No	No	No	No	No	**Yes**	**Yes**	**Yes**	No	No
Times	No	No	No	No	No	No	No	No	No	**Yes**	No
DaySegments	No	No	No	No	No	No	No	No	No	No	**Yes**
WeekDays	**Yes**	**Yes**	**Yes**	No	No	**Yes**	No	No	No	No	No
DaysOfMonth	**Yes**	**Yes**	**Yes**	No	No	**Yes**	No	No	No	No	No
Interval	No	No	No	No	No	No	**Yes**	**Yes**	**Yes**	No	No

5. Posology

The posology of a medicament describes **when**, which **quantity** of the medicament must be applied. Different kind of posologies can be specified with the available *PosologyDetail* objects, this chapter describes how.

A posology CAN contain a start and an end date for the treatment and MUST specify the type of the *PosologyDetail* object it contains.

Name	Type	Usage		Description
		MP[1]	Rx[2]	
dtFrom	string	O	O	From date (start date of medication treatment), format: yyyy-mm-ddThh:mm:ss+02:00 (ISO 8601[3] Combined date and time in UTC) (e.g. 2016-01-16T16:26:15+02:00)
dtTo	string	O	O	To date (end date of medication treatment), format: yyyy-mm-ddThh:mm:ss+02:00 (ISO 8601 Combined date and time in UTC) (e.g. 2016-01-16T16:26:15+02:00) The *DtTo* must be considered as inclusive. For example DtTo: 2015-05-01, the patient must apply the medicament also on 2015-05-01.
inRes	boolean	O	O	Reserve medication True if in reserve, false otherwise. Default: false
po	*PosologyDetail* object	R	R	The *PosologyDetail* object contains the details of the posology. Please refer to 6 *PosologyDetail objects.*
relMeal	integer	O	O	Indicates whether a medicament must be taken relative to a meal. Value set: 11.3 *Relative to meal*

5.1. Limitations and validations

- If both *dtFrom* and *dtTo* are set, the to date (*dtTo*) must be greater than the from date (*dtFrom*) or equal to the from date (*dtFrom*)

5.2. Examples

```
{
    "dtFrom": "2023-07-13",
    "dtTo": "2023-08-13",
    "relMeal": 1,
    "inRes": false,
    "po": { … },
}
```

[1] MP: *MedicationPlan* corresponds to *medType*: 1 of the *Medication* object (see specification document “eMediplan_ChMed23A”)

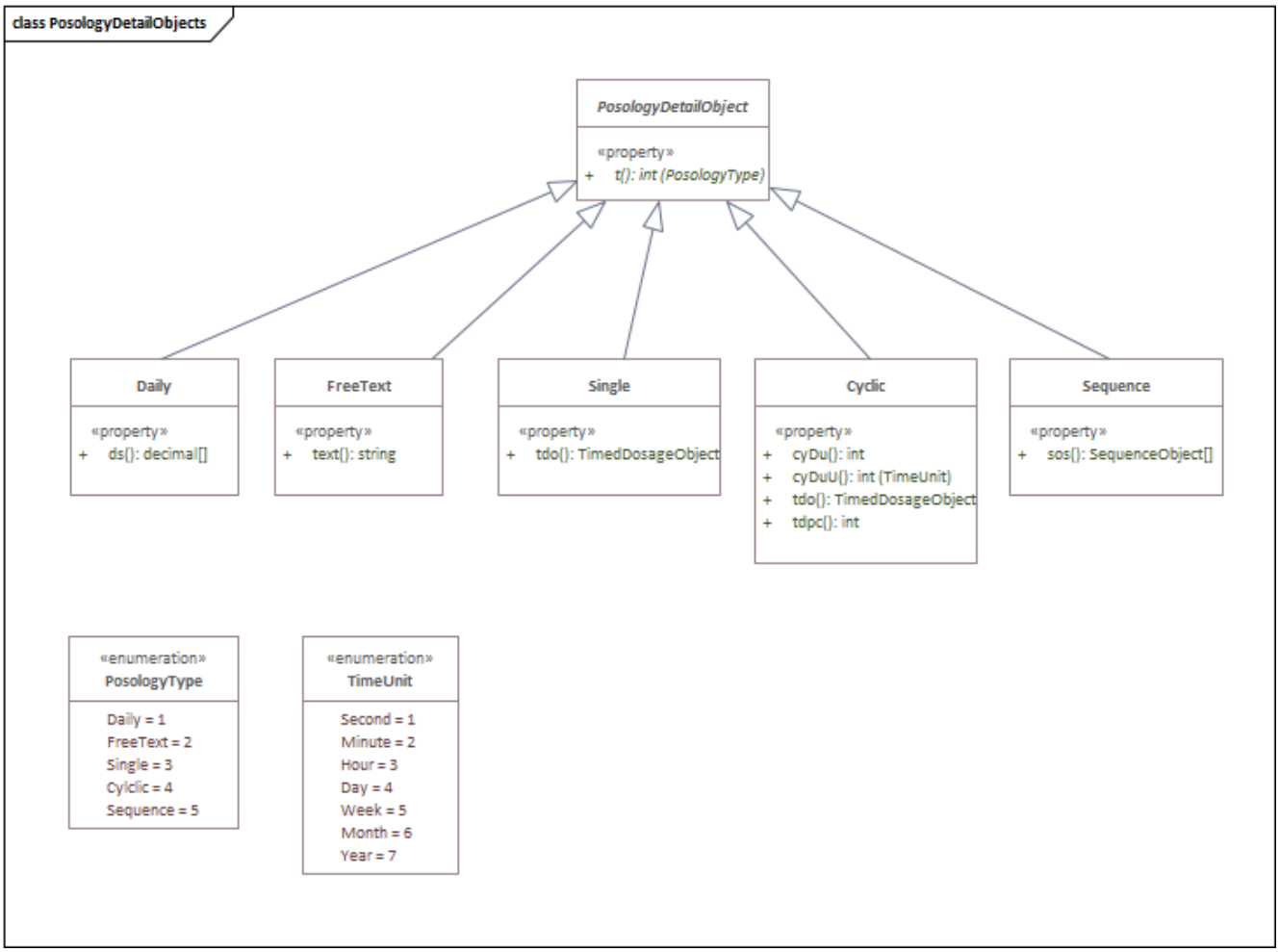
[2] Rx: *Prescription* corresponds to *medType*: 2 of the *Medication* object (see specification document “eMediplan_ChMed23A”)

[3] ISO 8601: http://en.wikipedia.org/wiki/ISO_8601

6. PosologyDetail objects

Different types of *PosologyDetail* objects are available. E.g. the daily posology object can be used to easily define daily dosages for morning, noon, evening and night or a sequence can be used to specify a complex posology like ‘take daily for 2 weeks, then take a break of 2 days”.

The chapters below will describe the structure of every available *PosologyDetail* object with examples.



The following table shows all *PosologyDetail* objects with their *PosologyDetail* object type:

***PosologyDetail* object**	***PosologyDetail* object type**
Daily	1
FreeText	2
Single	3
Cyclic	4
Sequence	5

6.1. Daily

Describes when (morning, noon, evening, night) and how much of a medicament must be applied daily, using a simple structure.

Note that the unit of the dosage specified is set on the medicament with the property *unit*.

Name	Type	Usage		Description
		MP	Rx	
t	integer	R	R	MUST be 1
ds	array of decimal	R	R	The dosages specify the amount of the medicament to be applied in a day segment. Indexes: 1: Morning 2: Noon 3: Evening 4: Night

6.1.1. Limitations and validation

- Dosages must contain exactly four decimal values
- All dosages must be equal to or greater than 0

6.1.2. Example

Take daily 1 in the morning and 2 in the evening.

```
{
    "t": 1, // Daily
    "ds": [
        1.5, // 1.5 (pills) in the morning
        0,
        2, // 2 pills in the evening
        0
    ]
}
```

6.2. FreeText

Describes an unstructured posology consisting of free text.

Name	Type	Usage		Description
		MP	Rx	
t	integer	R	R	MUST be 2
text	string	R	R	Free text describing the posology

6.2.1. Limitations and validation

- Length of text must be greater than 0

6.2.2. Examples

Free text.

```
{
    "t": 2, // Free text
    "text": "Take one pill. Wait one hour. If symptoms persist, take a second pill and wait 30 minutes. If symptoms persist, contact doctor."
}
```

6.3. Single

Describes a single application of a medicament. With the *TimedDosage* object, there are several possibilities to specify when the single application takes place.

Name	Type	Usage		Description
		MP	Rx	
t	integer	R	R	MUST be 3
tdo	*TimedDosage* object	R	R	The *TimedDosage* object specifies the timing and dosage of a medicament to be applied. Please refer to 7 *TimedDosage objects.*

6.3.1. Limitations and validation

- The following *TimedDosage* objects are supported: *DosageOnly*, *Times*, *DaySegments*.
- Make sure the timed dosage specifies a unique dosage. This is not being enforced by the validation.

6.3.2. Examples

Take 1:

```
{
    "t": 3, // Single application
    "tdo": {
        "t": 1, // Dosage only
        "d": {
            "t": 1, // Simple dosage
            "a": 1 // Amount of 1
        }
    }
}
```

6.4. Cyclic

Describes the application of a medicament at constant intervals.

Name	Type	Usage		Description
		MP	Rx	
t	integer	R	R	MUST be 4
cyDuU	integer	R	R	The cycle duration unit specifies the time unit (hours, days etc.) *cyDu* will be interpreted with it. Value set: 11.4 *Time units*
cyDu	integer	R	R	The duration of a cycle
tdo	*TimedDosage* object	R	R	The *TimedDosage* object specifies the timing and dosage of a medicament to be applied. Please refer to 7 *TimedDosage objects.*
tdpc	integer	O	O	The timed dosages per cycle specifies how often the timed dosage must be repeated within the cycle. Default: 1 Example: tdpc=2 if a medication must be applied twice a week without specifying when.

6.4.1. Limitations and validation

- The following *TimedDosage* objects are supported:
  - *DosageOnly*, *Times*, *DaySegments*, *Interval*
  - *WeekDays*: Supported if cycle duration unit is week
  - *DaysOfMonth*: Supported if cycle duration unit is month
- Cycle duration (*cyDu*) must be greater than 0
- Timed dosages per cycle (*tdpc*) must be greater than 0

6.4.2. Examples

1 pill twice a week:

```
{
    "t": 4, // Cyclic
    "cyDuU": 5, // weekly duration unit
    "cyDu": 5, // Cycle duration of 5 (weeks)
    "tdo": {
        "t": 1, // Dosage only
        "d": {
            "t": 1, // Simple dosage
            "a": 1 // Amount of 1
        }
    },
    "tdpc": 2 // take twice within cycle
}
```

6.5. Sequence

Allows multiple posologies to be combined with a pause as a sequence.

Name	Type	Usage		Description
		MP	Rx	
t	integer	R	R	MUST be 5
sos	List of *Sequence* objects	R	R	The ordered list of *Sequence* objects. Please refer to 0 Sequence objects.

6.5.1. Limitations and validation

- The list of *Sequence* objects must contain at least 1 element

6.5.2. Examples

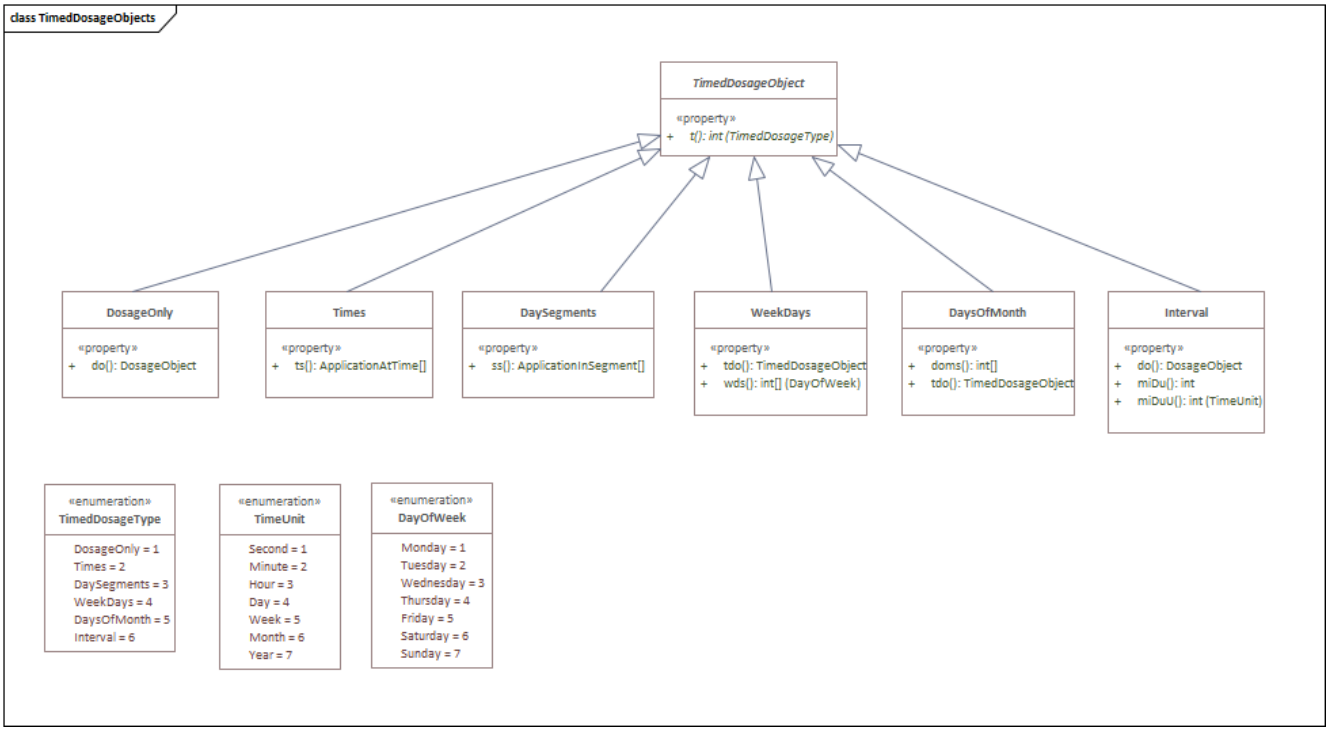
Take daily 1 for 21 days, then take a break of 7 days

```
{
    "t": 5, // Sequence
    "sos": [
        {
            "t": 1, // Posology sequence
            "po": {
                "t": 4, // Cyclic
                "cyDuU": 4, // Daily cycle duration unit
                "cyDu": 1, // Take every 1 (day)
                "td": {
                    "t": 1, // Dosage only
                    "d": {
                        "t": 1, // Simple dosage
                        "a": 1 // Amount of 1
                    }
                },
                "tdpc": 1 // take once within cycle
            },
            "duU": 4, // Daily duration unit
            "du": 21 // Duration of 21 (days)
        },
        {
            "t": 2, // Pause
            "duU": 4, // Daily duration unit
```

```
            "du": 7 // Duration of 7 (days)
        }
    ]
}
```

7. TimedDosage objects

Different types of *TimedDosage* objects are available to specify the moment and amount of an application of a medicament. All *TimedDosage* objects must specify an amount to be applied. It is not mandatory to specify the moment of the application, but it is possible to set them precisely (time of day) or vaguely (day of week or month, day segment etc.).



The following table shows all *TimedDosage* objects with their *TimedDosage* object type:

***TimedDosage* object**	***TimedDosage* object type**
DosageOnly	1
Times	2
DaySegments	3
WeekDays	4
DaysOfMonth	5
Interval	6

7.1. DosageOnly

Specifies a dosage without specifying a precise moment for taking.

Name	Type	Usage		Description
		MP	Rx	
t	integer	R	R	MUST be 1
do	*Dosage* object	R	R	The object specifies the dosage to be applied. Please refer to 8 *Dosage objects*.

7.1.1. Limitations and validation

- None

7.1.2. Examples

Take 1

```
{
    "t": 1, // Dosage only
    "do": {
        "t": 1, // Simple dosage
        "a": 1 // Amount of 1
    }
}
```

7.2. Times

Specifies precise times when a medicament must be applied.

Name	Type	Usage		Description
		MP	Rx	
t	integer	R	R	MUST be 2
ts	list of *ApplicationAtTime*	R	R	Specifies the dosage to be applied at a certain time. Please refer to 10.1 *ApplicationAtTime.*

7.2.1. Limitations and validation

- None

7.2.2. Examples

Take 1 at 08:00.

```
{
    "t": 2, // Times
    "ts": [
        {
            "dt": "08:00:00", // Time of day
            "do": {
                "t": 1, // Simple dosage
                "a": 1 // Amount of 1
            }
        }
    ]
}
```

7.3. DaySegments

Specifies the day segment (morning, noon, evening, night) when a medicament must be applied.

Name	Type	Usage		Description
		MP	Rx	
t	integer	R	R	MUST be 3
ss	list of *ApplicationInSegment*	R	R	Specifies the dosage to be applied in a day segment. Please refer to 10.2 *ApplicationInSegment.*

7.3.1. Limitations and validation

- None

7.3.2. Examples

Take 1 in the evening

```
{
    "t": 3, // day segments
    "ss": [
        {
            "s": 3, // Evening
            "do": {
                "t": 1, // Simple dosage
                "a": 1 // Amount of 1
            }
        }
    ]
}
```

7.4. WeekDays

Specifies on which days of the week a medicament must be applied.

Name	Type	Usage		Description
		MP	Rx	
t	integer	R	R	MUST be 4
wds	list of integers	R	R	The weekdays for which the timed dosage must be applied. Value set: 11.1 *Days of week*
tdo	*TimedDosage* object	R	R	The *TimedDosage* object specifies the timing and dosage of a medicament to be applied. Please refer to 7 *TimedDosage objects.*

7.4.1. Limitations and validation

- At least one day of the week must be specified
- A day of the week may only be contained once in the list
- The following *TimedDosage* objects are supported for *tdo*: *DosageOnly*, *Times*, *DaySegments*.

7.4.2. Examples

Take 1 on Monday, Wednesday and Friday

```
{
    "t": 4, // Weekdays
    "wds": [1, 3, 5], // Monday, Wednesday, Friday
    "tdo": {
        "t": 1, // Dosage only
        "do": {
            "t": 1, // Simple dosage
            "a": 1 // Amount of 1
        }
    }
}
```

7.5. DaysOfMonth

Specifies on which days of the month a medicament must be applied.

Name	Type	Usage		Description
		MP	Rx	
t	integer	R	R	MUST be 5
doms	list of integers	R	R	The days of the month specify when the application(s) must occur.
tdo	*TimedDosage* object	R	R	The timed dosage object specifying the timing and dosage of a medicament to be applied. Please refer to 7 *TimedDosage objects.*

7.5.1. Limitations and validation

- At least one day must be specified in days (*DoMs*).
- All days included must be greater than 0 and smaller than 28.
- The following *TimedDosage* objects are supported for TD: *DosageOnly*, *Times*, *DaySegments*.

7.5.2. Examples

Take 1 on the 1st and 15th of the month

```
{
    "t": 5, // Days of month
    "doms": [ 1, 15  ], // Specified days in month
    "tdo": {
        "t": 1, // Dosage only
        "do": {
            "t": 1, // Simple dosage
            "a": 1 // Amount of 1
        }
    }
}
```

7.6. Interval

Specifies the application of a medicament with a minimal interval between two applications.

Name	Type	Usage		Description
		MP	Rx	
t	integer	R	R	MUST be 6
do	*Dosage* object	R	R	The object specifies the dosage to be applied. Please refer to 8 *Dosage objects.*
miDu	integer	R	R	Minimal interval duration between two applications of a medicament
miDuU	integer	R	R	The unit of the minimal interval duration Value set: 11.4 *Time units*

7.6.1. Limitations and validation

- Minimal interval duration (*miDu*) must be greater than 0.

7.6.2. Examples

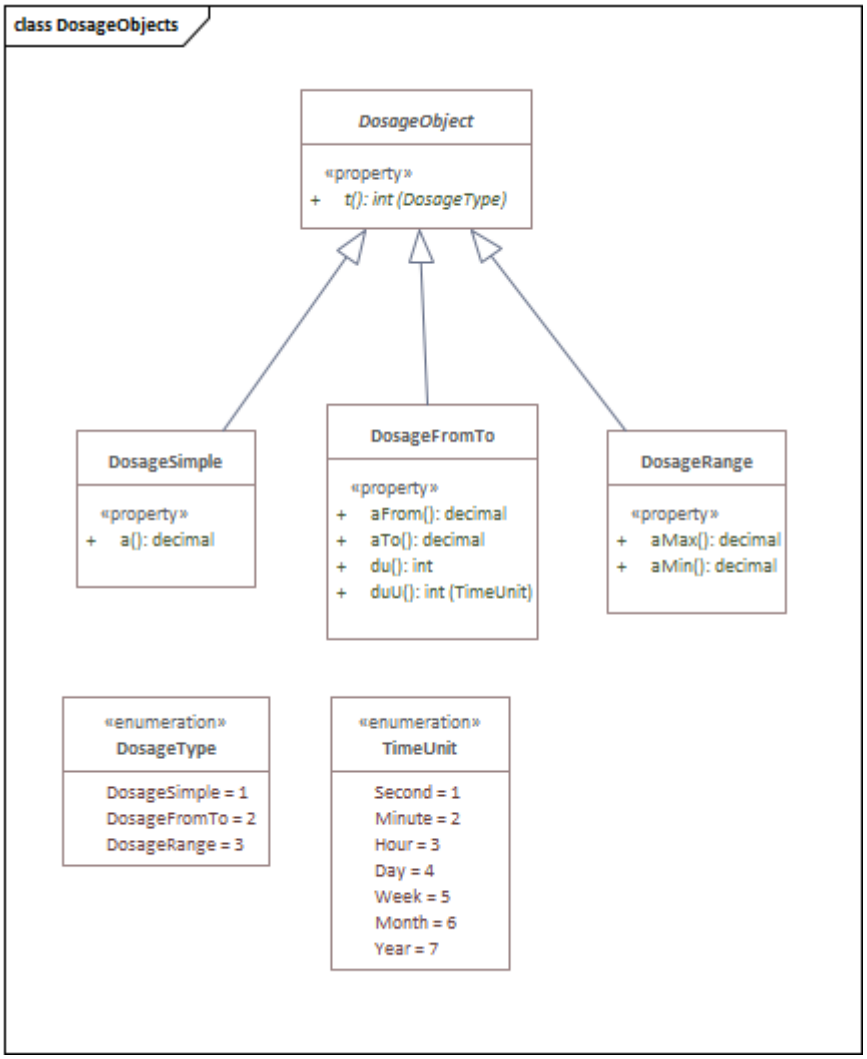
Apply medication with a minimal interval of 6 hours between two applications.

```
{
    "t": 6, // Interval
    "do": {
        "t": 1, // Simple dosage
        "a": 1 // Amount of 1
    },
    "miDuU": 3, // Hours interval unit
    "miDu": 6 // Every 6 (hours)
}
```

8. Dosage objects

Dosage objects describe the amount of a medication that must be applied.

Note that the unit of the amount is specified by the *unit* set for the *Medicament*.



The following table shows all *Dosage* objects with their *Dosage* object type:

***Dosage* object**	***Dosage* object type**
DosageSimple	1
DosageFromTo	2
DosageRange	3

8.1. DosageSimple

Specifies a simple amount. E.g. 1 (pill) or 10 (ml).

Name	Type	Usage		Description
		MP	Rx	
t	integer	R	R	MUST be 1
a	decimal	R	R	The amount to be applied

8.1.1. Limitations and validation

- Amount (*a*) must be greater than 0

8.1.2. Examples

Take 1.

```
{
    "t": 1, // Simple dosage
    "a": 1 // Amount of 1
}
```

8.2. DosageFromTo

Specifies how a dosage changes during time. This can be e.g. used for infusions.

Name	Type	Usage		Description
		MP	Rx	
t	integer	R	R	MUST be 2
aFrom	decimal	R	R	The amount from specifies the start amount
aTo	decimal	R	R	The amount to specifies the end amount
duU	integer	R	R	The unit of the duration Value set: 11.4 *Time units*
du	integer	R	R	The duration

8.2.1. Limitations and validation

- Amount from (*aFrom*) must be greater than or equal to 0
- Amount to (*aTo*) must be greater than the amount from (*aFrom*)
- Duration (*du*) must be greater than 0

8.2.2. Examples

Start with a dosage of 5, end with a dosage of 10 during a time interval of 45 minutes.

```
{
    "t": 2, // From/to dosage
    "aFrom": 5, // Start amount is 5
    "aTo": 10, // End amount is 10
    "duU": 2, // Duration unit is minutes
    "du": 45 // Duration is 45 (minutes)
}
```

8.3. DosageRange

With a dosage range a minimum and a maximum amount must be specified.

Name	Type	Usage		Description
		MP	Rx	
t	integer	R	R	MUST be 3
aMin	decimal	R	R	The minimum amount of a medication that must be applied
aMax	decimal	R	R	The maximum amount of a medication that must be applied

8.3.1. Limitations and validation

- Minimum amount (*aMin*) must be greater than 0
- Maximum amount (*aMax*) must be greater than *aMin*

8.3.2. Examples

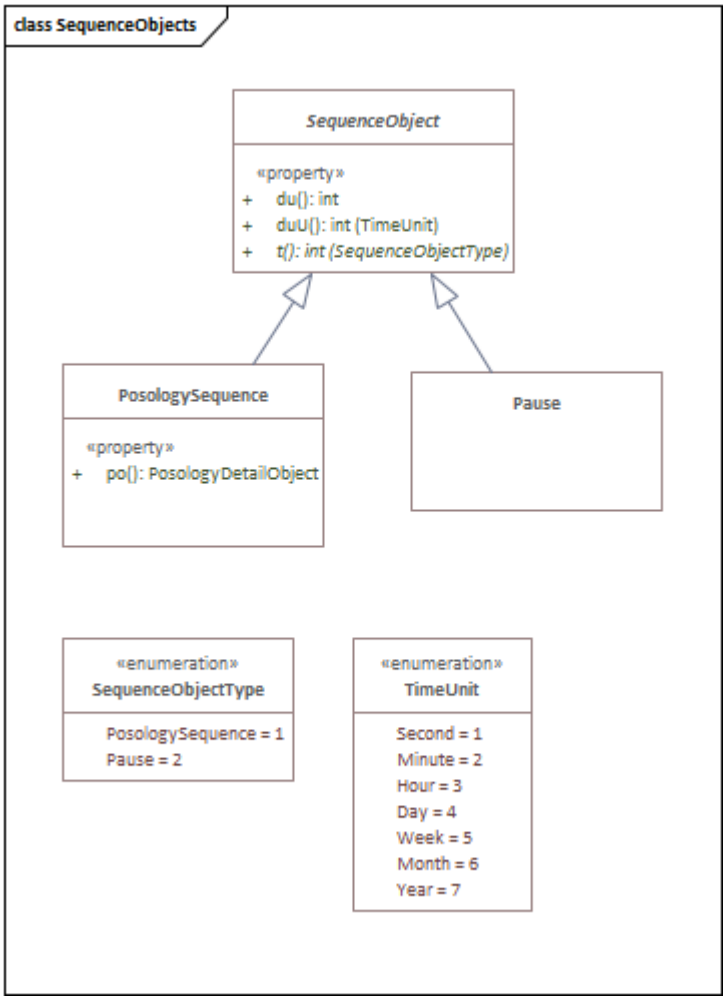
Take min 1 and max 3.

```
{
    "t": 3, // Dosage range
    "aMin": 1.0, // Minimum amount of 1
    "aMax": 3.0 // Maximum amount of 3
}
```

9. Sequence objects

Sequence objects can be used to specify a sequence of posologies that have to be respected in the correct order and can possibly be repeated.

Every sequence specifies its duration (including the unit).



The following table shows all *Sequence* objects with their *Sequence* object type:

***Sequence* object**	***Sequence* object type**
PosologySequence	1
Pause	2

9.1. PosologySequence

Wraps any type of *PosologyDetail* object in order to create a sequence.

Name	Type	Usage		Description
		MP	Rx	
t	integer	R	R	MUST be 1
du	integer	R	R	The duration of the sequence
duU	integer	R	R	The duration unit used to interpret the duration (*du*) of the sequence Value set: 11.4 *Time units*
po	*PosologyDetail* Object	R	R	The *PosologyDetail* object Please refer to 6.1 *PosologyDetail objects.*

9.1.1. Limitations and validation

- Duration (*du*) must be greater than 0

9.1.2. Examples

Take 1 daily for 21 days

```
{
    "t": 1, // Sequence
    "po": {
        "t": 4, // Cyclic
        "cyDuU": 4, // Unit is day
        "cyDu": 1, // Cacle lasts 1 (day)
        "tdo": {
            "t": 1, // Dosage only
            "do": {
                "t": 1, // Simple dosage
                "a": 1 // Amount of 1
            }
        },
        "tdpc": 1
    },
    "duU": 4, // Unit is day
    "du": 21 // Sequence lasts 21 (days)
}
```

9.2. Pause

Specifies a duration of a break where the medication doesn't have to be applied.

Name	Type	Usage		Description
		MP	Rx	
t	integer	R	R	MUST be 2
du	integer	R	R	The duration of the sequence
duU	integer	R	R	The duration unit used to interpret the duration (*du*) of the sequence Value set: 11.4 *Time units*

9.2.1. Limitations and validation

- Duration (*du*) must be greater than 0

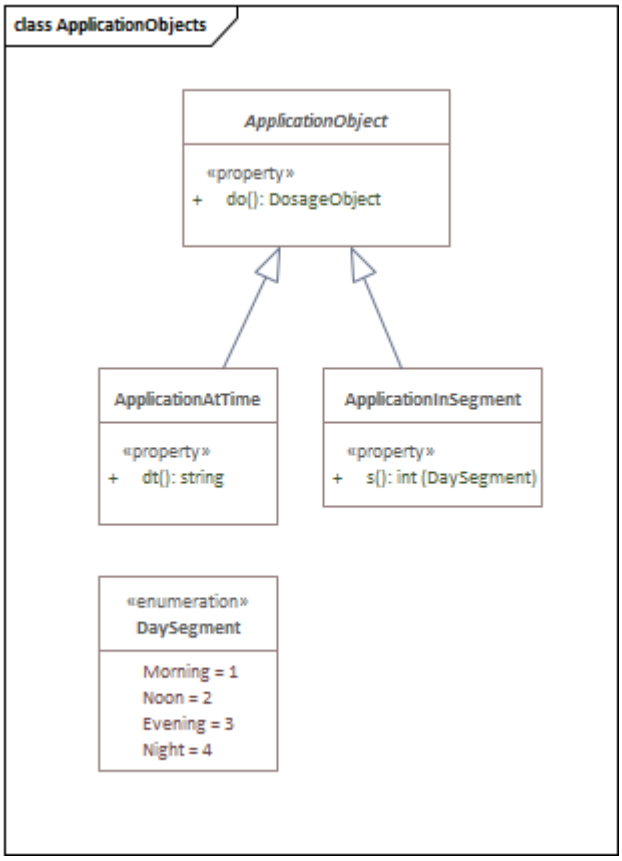
9.2.2. Examples

Break of 7 days.

```
{
    "t": 2, // Pause
    "duU": 4, // Unit is day
    "du": 7 // Pause lasts 7 (days)
}
```

10. Application objects

Application objects specify a dosage that must be applied at certain times; either at a precise time or in a day's segment (morning, noon, evening or night).



Note that *Application* objects do not include a type, as all other objects do. This is because *Application* objects can't be generically added to their parent, but are always explicitly typed. A *TimedDosage* object of the type *Times* must contain a list of *ApplicationAtTime* and one of the type *DaySegments* must contain a list of *ApplicationInSegment*.

10.1. ApplicationAtTime

Specifies a precise moment in time when a medicament must be applied.

Name	Type	Usage		Description
		MP	Rx	
do	*Dosage* Object	R	R	The object specifies the dosage to be applied.
dt	string	R	R	Time of day when the medicament must be applied (hh:mm:ss). The time applies to the time zone of Switzerland: GMT+2 (summer time) or GMT+1 (winter time). The time format hh:mm is also supported (e.g. 08:00). Validation: It must be greater than 0 and smaller or equal to 24:00.

10.1.1. Limitations and validation

- None

10.1.2. Examples

Take 1 at 08:00

```
{
    "dt": "08:00:00", // Take at 8 in the morning
    "do": {
        "t": 1, // Simple dosage
        "a": 1 // Amount of 1
    }
}
```

10.2. ApplicationInSegment

Specifies a day segment (morning, noon, evening or night) when a medicament must be applied.

Name	Type	Usage		Description
		MP	Rx	
do	*Dosage* Object	R	R	The object specifies the dosage to be applied.
s	integer	R	R	The day segment Value set: 11.2 *Day segments*

10.2.1. Limitations and validation

- None

10.2.2. Examples

Take 1 in the evening

```
{
    "s": 3, // evening
    "do": {
        "t": 1, // Simple dosage
        "a": 1 // Amount of 1
    }
}
```

11. Value sets

The ChMed23A uses proprietary value sets described in this chapter.

11.1. Days of week

Specifies a day of the week.

Name	Value (integer)
Monday	1
Tuesday	2
Wednesday	3
Thursday	4
Friday	5
Saturday	6
Sunday	7

11.2. Day segments

Specifies a day segment.

Name	Value (integer)
Morning	1
Noon	2
Evening	3
Night	4

11.3. Relative to meal

Specifies whether a medicament must be taken relative to a meal.

Name	Value (integer)
Before	1
During	2
After	3

11.4. Time units

Specifies the available time units.

Name	Value (integer)
Second	1
Minute	2
Hour	3
Day	4
Week	5
Month	6
Year	7

12. Changelog

Version	Date	Changes
1.0	07.08.2023	PUBLISHED Throughout the document, various texts were optimised. Chapter **10.1 ApplicationAtTime** • Property *do* added Chapter **10.2 ApplicationInSegment** • Property *do* added
0.5	25.07.2023	DRAFT Throughout the document, various texts were optimised and references, links and images were updated. The **format name** CHMED23A has been changed to **ChMed23A**. New chapter added: **3. Conventions** Chapter **5. Posology (previously 4.)** • The following properties were adjusted according to the conventions: ○ *DtFrom → dtFrom* ○ *DtTo → dtTo* ○ *InRes → inRes* ○ *PO → po* ○ *RelM → relMeal* • Property *dtFrom* and *dtTo* → type changed from date to string • Example in chapter 5.2 adjusted Chapter **6. PosologyDetail objects (previously 5.)** • Object model adjusted Chapter **6.1 Daily (previously 5.1)** • Property *t* added • The following properties were adjusted according to the conventions: ○ *Ds → ds* • Property ds → type changed from array of numbers to array of decimal • Example in chapter 6.1.2 adjusted Chapter **6.2 FreeText (previously 5.2)** • Property *t* added • The following properties were adjusted according to the conventions: ○ *Text → text* • Example in chapter 6.2.2 adjusted Chapter **6.3 Single (previously 5.3)** • Property *t* added • The following properties were adjusted according to the conventions: ○ *TD → tdo* • Example in chapter 6.3.2 adjusted Chapter **6.4 Cyclic (previously 5.4)** • Property *t* added • The following properties were adjusted according to the conventions: ○ *CyDuU → cyDuU* ○ *CyDu → cyDu* ○ *TD → tdo* ○ *TDpC → tdpc* • Example in chapter 6.4.2 adjusted Chapter *6.5 Sequence (previously 5.5)* • Property *t* added • The following properties were adjusted according to the conventions: ○ *SO → sos* • Example in chapter 6.5.2 adjusted

		Chapter **7. TimedDosage objects (previously 6.)**
		• Object model adjusted
		Chapter **7.1 Dosage only (previously 6.1)**
		• Property *t* added
		• The following properties were adjusted according to the conventions:
		  ○ *DO → do*
		• Example in chapter 7.1.2 adjusted
		Chapter **7.2 Times (previously 6.2)**
		• Property *t* added
		• The following properties were adjusted according to the conventions:
		  ○ *Ts → ts*
		• Example in chapter 7.2.2 adjusted
		Chapter **7.3 DaySegments (previously 6.3)**
		• Property *t* added
		• The following properties were adjusted according to the conventions:
		  ○ *Ts → ss*
		• Example in chapter 7.3.2 adjusted
		Chapter **7.4 WeekDays (previously 6.4)**
		• Property *t* added
		• The following properties were adjusted according to the conventions:
		  ○ *WDs → wds*
		  ○ *TD → tdo*
		• Example in chapter 7.4.2 adjusted
		Chapter **7.5 DaysOfMonth (previously 6.5)**
		• Property *t* added
		• The following properties were adjusted according to the conventions:
		  ○ *DoMs → doms*
		  ○ *TD → tdo*
		• Example in chapter 7.5.2 adjusted
		Chapter **7.6 Interval (previously 6.6)**
		• Property *t* added
		• The following properties were adjusted according to the conventions:
		  ○ *DO → do*
		  ○ *MIDu → miDu*
		  ○ *MIDuU → miDuU*
		• Example in chapter 7.6.2 adjusted
		Chapter **8. Dosage objects (previously 7.)**
		• Object model adjusted
		Chapter **8.1 DosageSimple (previously 7.1)**
		• Property *t* added
		• The following properties were adjusted according to the conventions:
		  ○ *A → a*
		• Property *a* → type changed from numerical to decimal
		• Example in chapter 8.1.2 adjusted
		Chapter **8.2 DosageFromTo (previously 7.2)**
		• Property *t* added
		• The following properties were adjusted according to the conventions:
		  ○ *AFrom → aFrom*
		  ○ *ATo → aTo*
		  ○ *DuU → duU*
		  ○ *Du → du*
		• Properties *aFrom* and *aTo* → type changed from numerical to decimal
		• Example in chapter 8.2.2 adjusted
		Chapter **8.3 DosageRange (previously 7.3)**
		• Property *t* added

		• The following properties were adjusted according to the conventions:
		  ○ *AMin* → *aMin*
		  ○ *AMax* → *aMax*
		• Properties *aMin* and *aMax* → type changed from numerical to decimal
		• Example in chapter 8.3.2 adjusted
		Chapter **9. Sequence objects (previously 8.)**
		• Object model adjusted
		Chapter **9.1 PosologySequence (previously 8.1)**
		• Property *t* added
		• The following properties were adjusted according to the conventions:
		  ○ *Du* → *du*
		  ○ *DuU* → *duU*
		  ○ *PO* → *po*
		• Property duU → type changed from numerical to integer
		• Example in chapter 9.1.2 adjusted
		Chapter **9.2 Pause (previously 8.2)**
		• Property *t* added
		• The following properties were adjusted according to the conventions:
		  ○ *Du* → *du*
		  ○ *DuU* → *duU*
		• Property *duU* → type changed from numerical to integer
		• Example in chapter 9.2.2 adjusted
		Chapter **10. Application objects (previously 9.)**
		• Object model adjusted
		Chapter **10.1 ApplicationAtTime (previously 9.1)**
		• Property *t* added
		• The following properties were adjusted according to the conventions:
		  ○ *DT* → *dt*
		• Example in chapter 10.1.2 adjusted
		Chapter **10.2 ApplicationInSegment (previously 9.2)**
		• Property *t* added
		• The following properties were adjusted according to the conventions:
		  ○ *S* → *s*
		• Example in chapter 10.2.2 adjusted

0.4	24.07.2023	Internal version for the developers.
0.3	28.06.2023	DRAFT Throughout the document, various texts were optimised and references, links and images were updated. The **format name** CHMED21A has been changed to **CHMED23A**. Chapter **4 Posology** • Property *PO* → name changed from *Posology* object to *PosologyDetail* object • Property *RelM* → name changed from *RM* to *RelM* Chapter **5 PosologyDetail objects** • Name changed from *Posology* object to *PosologyDetail* object • *PosologyDetail* object *Even/odd days* removed Chapter **5.6 Evend/odd** removed Chapter **6.2 Times** • Property *Ts* → name changed from *TakingAtTime* to *ApplicationAtTime* Chapter **6.2 DaySegments** • Property *Ts* → name changed from *TakingInSegment* to *ApplicationInSegment* Chapter **6.5 DaysOfMonth** • Property *Ds* changed to *DoMs*

		Chapter **6.5.1 Limitations and validation** • Days changed from 32 to 28: “all days included must be greater than 0 and smaller than 28” Chapter **6.6 Interval** • Property *D* changed to *DO* • Property *MID* changed to *MIDu* • Property *MIDU* changed to *MIDuU* Chapter **8.1 PosologySequence** • Property *D* changed to *Du* • Property *DU* changed to *DuU* Chapter **8.2 Pause** • Property *D* changed to *Du* • Property *DU* changed to *DuU* Chapter **9** changed from *Taking* objects to **Application objects** Chapter **9.1** changed from *TakingAtTime* to **ApplicationAtTime** • New property *DT* • properties *Off* and *OffU* removed Chapter **9.2** *TakingInSegment* changed to **ApplicationInSegment**
0.2	14.01.2022	Initial version (DRAFT)