SYKEHUSAPOTEKENE I MIDT-NORGE

Purchase Agreement

Agreement governing the purchase of software and equipment

The Norwegian Government's Standard Terms and Conditions for IT Procurement

SSA-K 2018

Tender for delivery of Advanced Unit Dose Packaging and Dispensing Solution

SSA-K Appendix 3 Customer Technical Platform

Case number: 2022/512

Appendix 3 – Customer Technical Platform

Content

1. Introduction

This appendix provides a description of the planned workflow and ICT structure for a future centralized production plant for unit doses, located at the Hospital Pharmacy in Trondheim. This production plant will produce and distribute unit doses to all the hospitals in the Central Norway Regional Health Authority (HMN). Other relevant information which may be important for the Contractor to be aware of is also included.

1.1. Background

Starting in the spring of 2022, HMN will implement a new Electronic medical record (EMR) in all the hospitals in Central Norway: Helseplattformen, an EMR solution delivered by EPIC. To increase patient safety, one of the main objectives of this implementation is to achieve closed loop medication management (CLMM). To close the medication loop, the hospitals will need electronically identifiable unit doses, and HMN has advised Sykehusapotekene i Midt-Norge HF to provide unit doses for all the hospitals throughout the region.

Sykehusapotekene i Midt-Norge HF has hence decided to establish a centralized production plant for unit doses, located at the Hospital Pharmacy in Trondheim. The Hospital pharmacy in Trondheim already has a unit dose production facility and is currently providing unit doses for St. Olavs hospital. The current facility located in Trondheim is however approaching the technical age for replacement and does not have sufficient capacity to supply unit doses for the rest of the hospitals in the region. Consequently, Sykehusapotekene i Midt-Norge HF is planning to build a new production facility. This production facility will be established in a new building located at St. Olavs hospital in Trondheim. Construction of this building is planned to begin in spring of 2022 and will, according to the tentative building plans, be made available to the Contracting Authority in 2023 and completed in 2024. Installation of the unit dose production system (UDPS) will need to be performed parallel with the final construction phase of the building. Find the Contracting Authority's estimated delivery dates and deadlines in K Appendix 4.

The following descriptions will focus on the tentative workflow developed for the supply chain for unit doses throughout HMN and the ICT ecosystem for the planned solution. The non-unit dose medications follow a separate workflow and is therefore not included in this description.

The workflow and corresponding ICT integrations are not yet established, and the Contracting Authority is open to discuss alternative solutions if the Contractor has any suggestions for improvement.

1.2. Terms and definitions

Term	Meaning/explanation
Helse Midt-Norge (HMN)	Central Norway Regional Health Authority
Helseplattformen	The new Electronic medical record (EMR) to be implemented in HMN in 2022/2023, the EMR in HMN is Epic.

Centralized production plant	The unit dose production plant that Sykehusapotekene i Midt-Norge HF is planning to establish, located at the Hospital Pharmacy in Trondheim.
Regional pharmacies	The other Hospital Pharmacies in HMN (Namsos, Levanger, Molde, Ålesund and Kristiansund)
Sykehusapotekene i Midt-Norge HF	The Hospital Pharmacies Health Authority - Central Norway. Also, The Contracting Authority for this tender.
UDPS	Unit dose production system
CLMM	Closed loop medication management
PTS	Pneumatic tube system
AGV	Automated guided vehicle
Pharmacy staff	Staff for operating the offered solution
Technical personnel	Local trained technicians for service/maintenance of the offered solution

Table 1: Terms and definitions

2. Context

2.1. Tentative workflow for the offered solution

Sykehusapotekene i Midt-Norge HF is planning to establish an advanced production plant for unit doses with a high degree of automation and digitalization, which provides a high proportion of drugs delivered as unit doses to all the hospitals in HMN. When implemented with Helseplattformen, the unit doses provided will contribute to achieving CLMM, and thereby increased patient safety and more efficient drug handling.

As shown in Figure 1, the centralized production plant in Trondheim will produce and store unit doses, before dispensing and transporting them to other Hospital Pharmacies in the region, as well as delivering unit doses (and non-unit dose medications) directly to St. Olavs hospital. We would like to use the hospital's PTS and AGV, both from Swisslog, combined with manual transport for the internal deliveries to St. Olavs hospital.

The regional hospital pharmacies will each have a stock of unit doses and will need a storage unit for the unit doses from the advanced UDPS. The unit doses will be dispensed and delivered to local ward stocks at their associated hospitals.

Some form of patient specific deliveries may be part of a future solution in HMN, and the offered solution must have functionality for patient specific deliveries implemented.

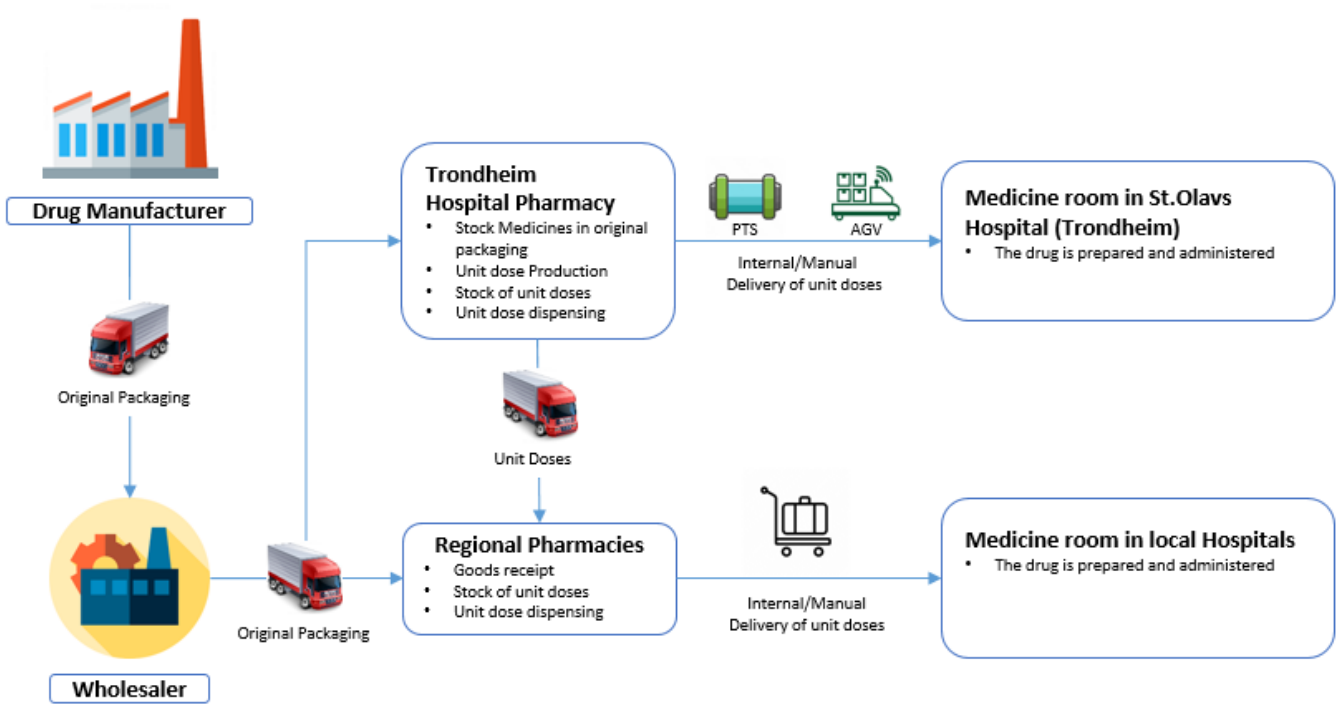

Figure 1: Overview of the centralized solution for unit doses.

The preferred solution is the one that will provide the lowest operating and investment costs in addition to offering the most optimal logistics solution with the least possible environmental footprint.

2.2. Centralized production plant in Trondheim

Sykehusapotekene i Midt-Norge HF's new production plant in Trondheim will consist of both fast-dispensing unit dose production systems to produce unit doses from bulks of tablets or capsules, and more advanced unit dose production systems (UDPS) that also handles other medication forms. Fast-dispensing UDPS are part of a separate tender, this tender is only for the advanced UDPS. There will be no need for integrations between the different unit dose production systems (see chapter 2.4 for details), the rest of this document will focus on the advanced UDPS and what the Contracting Authority requires from the Contractors offered solution for this tender.

The offered solution for the centralized production plant, must provide a complete system for drug preparation, unit dose production, unit dose storage and unit dose dispensing, according to the requirements stated in K Appendix 1. All drug packages intended for unit dose production (raw materials) will be stored and registered in an automated storage solution, e.g., BD Rowa or similar. Table 2 gives an overview of the activities at the centralized production plant.

Activity	Description
Goods receipt and Stock Raw Material	Pharmacy employee receives drugs in original packaging from the wholesaler/vendor. All drug packages intended for unit dose production are to be stored in an automated pack dispensing system which registers the drugs into the Contracting Authority's ERP system (SAP). The offered solution must be integrated with the Contracting Authority's ERP system for information about stock level of drugs intended for unit dose production.
Drug Preparation	Pharmacy employee prepares the drugs for unit dose production in conformance with national and internal guidelines, and according to the offered solutions requirements for drug preparation. Find the Contracting Authority's requirements regarding the drug preparation process in K Appendix 1, Chapter 2 "Drug preparation".
Production	The unit dose production system produces unit doses from the prepared drugs according to the Contracting Authority's design requirements. Find the Contracting Authority's requirements regarding the unit dose production process in K Appendix 1, Chapter 3 "Unit dose production".
Stock Unit Dose	The offered solution must include an automated storage solution for the unit doses. Find the Contracting Authority's requirements regarding the storage solution for unit doses in K Appendix 1, Chapter 4 "Unit Dose Storage".
Dispense and Group Unit Doses	The unit doses are dispensed and grouped according to orders from the Contracting Authority's ERP system. The offered solution must be integrated with the Contracting Authority's ERP system to receive and confirm/send orders of unit doses to the Contracting Authority's customers. Find the Contracting Authority's requirements regarding the Dispensing process in K Appendix 1, Chapter 5 "Unit dose dispensing".
Prepare delivery to St.Olavs hospital	Pharmacy employee prepares the order for St.Olavs hospital. The order is composed of unit doses and drugs in original packaging. The drugs in original packaging are handled via the Contracting Authority's ERP system and this activity is not included in this tender.
Prepare delivery to regional pharmacies	Pharmacy employee prepares the order for the regional pharmacies. The order is exclusively composed of unit doses and will include unit doses from both fast-dispensing UDPS and unit doses from the advanced UDPS. (The offered solution must include a solution to facilitate the handling and storing of unit doses at the regional pharmacies. Find the Contracting Authority's requirements regarding the transportation and handling of unit doses for regional pharmacies in K Appendix 1, Chapter 6 "Regional pharmacies".)

Table 2: Overview of activities in the centralized production plant in Trondheim and the requirements connected to these activities.

2.3. Regional pharmacies

The Contracting Authority will need a solution to prepare and register unit doses for transportation to the regional pharmacies, and a goods receipt, storage and dispensing solution for unit doses at the regional pharmacies. The solutions for the regional pharmacies are included in the customer requirement section of this tender (K Appendix 1, Chapter 6 "Regional pharmacies"), and the Contractors are encouraged to offer solutions for the regional pharmacies with a high degree of digitalization and automation.

The storage solutions for regional pharmacies will be placed in areas of different sizes. The Contracting Authority will prefer a modular storage solution that can be adapted to fit the various locations and might be extended if needed.

3. Production volume, storage capacity and users

3.1. Production volume and prognosis

The total need for unit doses in HMN is estimated to 7,5 million unit doses in 2025. As described in chapter 2.2, the total volume of unit doses to be delivered in HMN will consist of both unit doses from fast-dispensing UDPS, and unit doses from the advanced UDPS. Estimated volume of unit doses needed from the advanced UDPS in this tender is approximately 2,9 million unit doses in 2025.

According to drug consumption trends for the region, the estimated volume needed from the advanced UDPS will reach approximately 3,5 million unit doses in 2035. The offered solution must be able to deliver the necessary amount of unit doses needed to reach the yearly estimate within 100 operating hours per week or less.

Table 3 gives the estimated production volume in millions of unit doses from 2025 to 2035 and an approximation of how this volume will be split between unit doses from the fast-dispensing UDPS and the advanced UDPS.

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Total	**7,49**	**7,65**	**7,80**	**7,95**	**8,11**	**8,27**	**8,44**	**8,61**	**8,78**	**8,96**	**9,14**
Fast UDPS	**4,63**	**4,73**	**4,82**	**4,91**	**5,01**	**5,11**	**5,22**	**5,32**	**5,43**	**5,54**	**5,65**
Advanced UDPS	**2,86**	**2,92**	**2,98**	**3,04**	**3,10**	**3,16**	**3,22**	**3,29**	**3,35**	**3,42**	**3,49**

Table 3: Estimated production volume in million unit doses. These numbers have a significant degree of uncertainty.

3.2. Storage solution

The offered solutions storage capacity should be at least two weeks stock of unit doses based on average needs defined in Table 3 and Figure 2. The Contracting Authority envision at least one week stock stored at the regional pharmacies as a safety measure due to long transportation distances from the centralized production plant. At the centralized production plant, the storage capacity should include one week volume for the regional pharmacies and a total of two weeks volume for St. Olav hospital.

3.2.1. Medication mix

The total volume of unit doses needed from advanced UDPS will be a mix of the different medication forms. Based on the composition of the current unit dose production for St. Olavs hospital, the Contracting Authority expects an approximate mix of 35% blister, 35% bulk, 28% ampules/vials and 2% suppositories from the advanced UDPS. However, it is important to emphasise that this mix will need to be dynamic and will vary according to the needs of the hospitals.

3.3. Regional distribution

As shown in Figure 2, the regional hospitals have different needs for unit doses. The numbers given in the figure are estimated number of unit doses from advanced UDPS per hospital in 2025. These numbers have a significant degree of uncertainty.

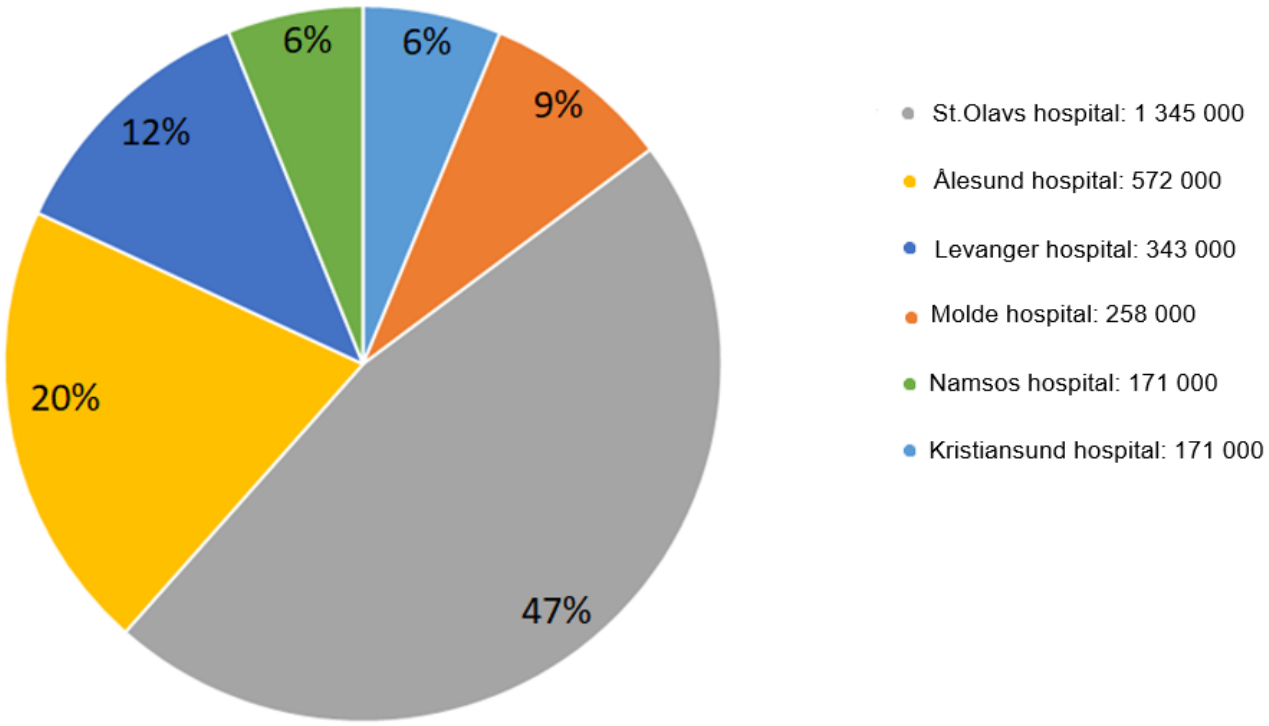

Figure 2: Approximate distribution of the unit dose needs for the different hospitals in HMN.

HMN is currently building a new hospital in Helse Møre og Romsdal, which will replace Molde hospital and partly Kristiansund hospital by 2025, but it is assumed that this only will affect the distribution of the unit doses, not the total volume needed.

There are considerable distances between the centralized production plant and the regional pharmacies, e.g., it is 460 km from Trondheim to Volda (part of Ålesund hospital pharmacy) in the south end of the region and 190 km from Trondheim to Namsos in the north end. The Contracting Authority is planning daily deliveries Monday to Friday transported by truck from the centralized production plant.

3.4. Users

The number of users is a result of the solution offered, and consequently will have to be decided in cooperation with the Contractor. The Contractor must specify in K Appendix 7 the cost of each client or licence needed for each user and specify if there are differences according to access level.

The Contracting Authority is planning to operate the offered solution with pharmacy staff. For daily/monthly maintenance and error handling, we are planning to use local technicians, trained and certified by the Contractor.

4. Facility

The building for the production plant is under construction and an address is not yet available. The delivery address will be provided later.

The Norwegian Labor Inspection Authority requires all personnel working on-site with the offered solution during the construction phase, to obtain a valid HSE card (in Norwegian: HMS-kort). The Contractor is responsible for providing this through the Norwegian Labor Inspection Authority. The property manager requires the Contractor to provide liability insurance on behalf of all personnel working on-site.

- HSE cards in building and construction (arbeidstilsynet.no)

4.1. Location and area for the offered solution

4.1.1. Centralized production plant in Trondheim

The planned area dedicated for the unit dose production units is shown in Figure 3:

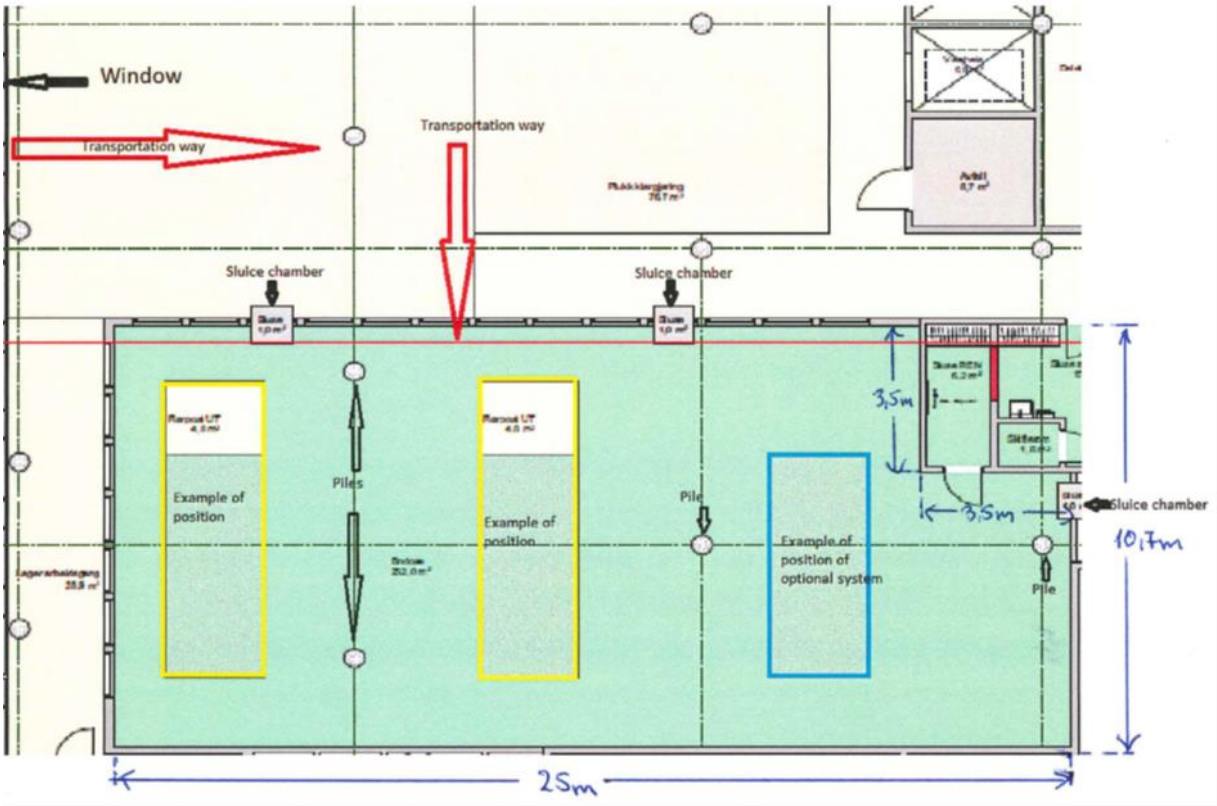

Figure 3: Controlled production area for the advanced UDPS. (This is a temporary draft)

The green area is a controlled room on the second floor reserved for the unit dose production units of the advanced UDPS. Dimensions given are approximate, exact drawings (in mm) will be developed later. Ceiling height is not yet calculated, but distance between second and third floor will be 3600 mm total. The final ceiling height is dependent on beams, technical installations etc., which will reduce the height.

There is also a dedicated clean room (approximately 45 m²) for drug preparation not included in this figure.

4.1.2. Regional pharmacies' storage solutions

The storage solutions for regional pharmacies will be placed in areas of different sizes. These areas are yet to be defined and are expected to be very limited. The regional pharmacies will have different needs for storage capacity, according to the different needs of their associated hospitals.

Estimated storage capacity needed for the regional pharmacies is shown in table 4. The number of unit doses per location is estimated from the approximate number of unit doses from advanced UDPS needed in 2035 (ref table 3 and figure 2), and based on storage capacity for two weeks average unit dose need:

Regional pharmacy	**Storage capacity needed**
Namsos	8 500
Levanger	16 500
SNR (Kristiansund and Molde combined)	21 000
Ålesund	24 000
Volda	6 000

Table 4: estimated storage capacity needed per location.

The Contractor should describe how their storage solution could be adapted to fit different size areas and different storage capacities, and elaborate on the relationship between size and storage capacities.

4.2. Load capacity of the production floor

Load capacity on production floor is limited to 8 kN/m², which is 800 kilograms per square meter.

4.3. Transportation path

We will have to use a crane outside of the building in order to get the system to the second floor and then through a temporary opening in the face of the building. The temporary opening is estimated to be 2700x2700 mm. This opening will only be available for a definite time period in the construction phase of the building (see K Appendix 4). As shown in fig. 3, there will be an open unhindered space for transportation between the face of the building and the controlled room, and a temporary opening in the controlled room wall that can be made on demand. It will also be possible to use the elevator for transportation of smaller/lighter modules/equipment, but only after final construction of the building. The dimensions of the elevator are 1400 x 2400 x 2200 mm, door dimensions will be 1300 x 2100 mm for this elevator, and it will support a weight of 1600 kg.

4.4. Ventilation system, Vacuum and Air supply

According to current plans, the new building will be supplied with the following: (Any necessary adaptations of the designated production area must be explicitly specified and will be subject to the Contracting Authority's consideration)

4.4.1. Ventilation

The offered solution will be installed in a designated production room prepared for class D classification. However, the air exchange is estimated to 20 m3/h pr m2 with an estimated ceiling height of up to 3600 mm, which is not sufficient for fulfilling class D requirements. This production room may be upgraded to class D classification if legal requirements regarding unit dose production requires this in the future.

4.4.2. Vacuum

4 x Busch Mink MM 1102BV
Working pressure: 170-220mbar (Restricted due to other vital functions attached to the central)
Capacity: 135 m³/h
Pipe Dimension: 84mm
The pumps permit continuous, uninterrupted operation, cycling in series with a redundancy to another vacuum central with the same specifications.

4.4.3. Air supply

Technical compressed air: 4 x Kaeser CSG-2 SFC W.
Working pressure: 8.29bar
Capacity: 120m³/h (This is the maximum flowrate for the stabilizer)
Pipe Dimension: 28mm at the production area.
The compressors are all connected to the same central supply and is producing by demand, Medical quality is maintained and regularly measured.

4.5. Power connections and electric supply

The system will be installed in a new building where there will be established a 400V TN-S voltage system that will provide 230V 1-phase and 400V 3-phase.

Suggested needs for UPS and emergency power supply may be described in K Appendix 1 (requirement 13).

4.6. Network

All physical network connections will be established on demand in cooperation with the Contracting Authority's building constructor. Further specifications can be found in the reference document "Customer ICT Technical Platform".

5. ICT ecosystem and integration

This section gives an overview of the pharmacy applications and integrations between them, that will remain, referred to as "AS-IS". In addition to the AS-IS situation, the Contracting Authority has written a "TO-BE" situation. The "TO-BE" section is foremost a proposal that can be challenged by the contractor during the procurement process. It is important for the Contracting Authority to conclude the procurement process with an integration specification agreed between both parties and with a list of prerequisites to implement when necessary.

5.1. ICT Context (AS-IS)

5.1.1. Application Ecosystem

The application ecosystem illustrates the applications and their interactions in a "TO-BE" context composed of a Centralized Production Plant and Regional Pharmacies. Figure 4 shows the existing integrations, represented by arrows and highlights the potential integrations by yellow, orange, blue areas. Each area represents integrations to different equipment. Whitened applications and their

related areas/integrations are not part of the present procurement scope and therefore not described in this document.

The contractor's solution may interact with one or several of the following applications:

- Delta: it is an IT system for stock management of ward stocks for medicines in all the hospitals in the region. Today pharmacists, across the central region, handles all orders for medicines to ward stocks through this system. Orders from Delta create sales orders in SAP.
- SAP: it is the enterprise solution for all hospitals and pharmacies in the central region regarding economy and logistics. The system handles all sales orders for the hospital pharmacies and will also handle all purchase of medicines from external vendors (Wholesaler).
- EIK: Entrance point to the medicines verification system (FMD registry) and national material registry.
- Epic / Helseplattformen (HP): Central Norway is currently implementing the health information system (HIS), Epic. Integrations with the HIS is not in the scope.
- Centralized Production Plant (Application System): it represents applications used by the different equipment composing the future Centralized Production Plant. Section 2 details the integration between SAP and the different applications. The hospital pharmacy in Trondheim is the owner of the centralized production plant.
- Unit Dose Dispensing System: It represents a proprietary application used by the dispensing system. Each of the regional pharmacies will have a unit dose dispensing system.
- Package Dispensing System: It represents a proprietary application used by the package dispensing system. Regional pharmacies and Centralized production plant may have an automatic package dispensing system.

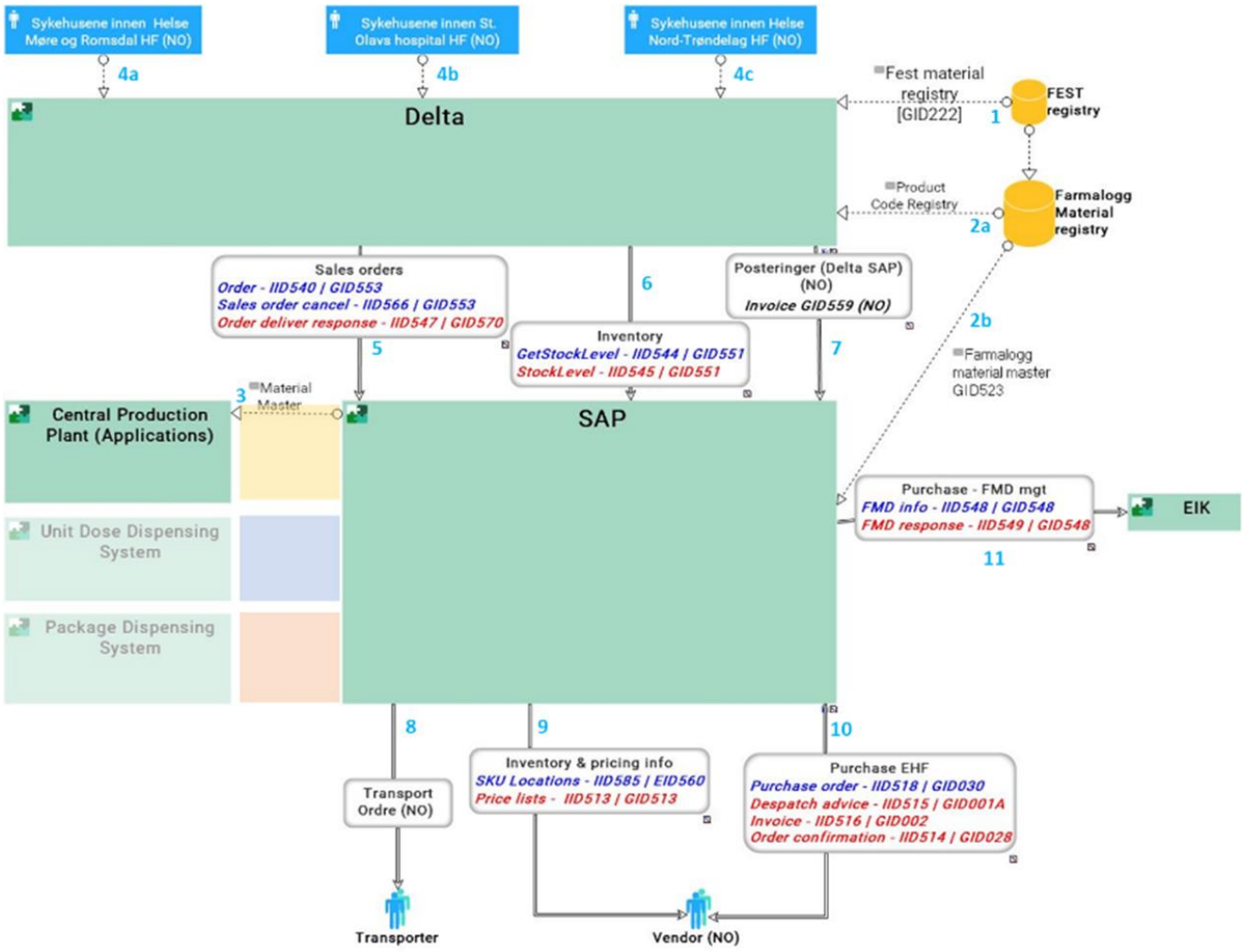

Figure 4: Illustration of the application ecosystem (Whitened area are out of procurement scope)

Table 5 gives a description of the information.

	Source	Target	Description
1	FEST Registry	Delta	FEST is a national registry owned by the Norwegian Medicines Agency. The database provides to doctors, pharmacies and truss maker ("bandagist"), updated information about everything you can get on prescription in Norway. FEST is integrated to Farmalogg Material Registry.
2a,2b	Farmalogg Material Registry (EIK)	Delta SAP	Farmalogg is a national registry owned by the Pharmacy Association. The database contains information about the goods sold in pharmacy (ex: Package codes, Product Code, handling information…).
3	SAP	Central Production Plant (Applications)	SAP is the regional material master for all the hospital pharmacies and hospitals. An integration will populate and update the contractor's solution with material information. The material master is a compilation of data contained in the registry FEST and Farmalogg. The material registry also contains information locally managed in the region outside the national registries.
4a,4b,4c	Pharmacist	Delta	Pharmacist manages the ward stock orders in the application Delta. Pharmacist selects the LMR code and has the option to order per unit or per package. Delta has an overview of available medicines in the pharmacies, if they are available as unit dose or packages.

5	Delta	SAP	Delta sends Hospital sales order to SAP
6	Delta	SAP	Delta request stock levels for all materials in the pharmacies from SAP at a given frequency.
7	Delta	SAP	Delta sends element for Invoicing to SAP when ward stocks do internal transfers between stocks.
8	SAP	Transporter	Central Production Plant manages the transport of finished product (Unit Dose) to local pharmacies and local hospital (St Olavs hospital) through the application SAP.
9	SAP	Vendor	Central pharmacies manage the purchase orders to vendor (grossists) with the application SAP.
10	SAP	Vendor	
11	SAP	EIK	Today, an integration is existing between SAP and the FMD Registry (through EIK). SAP sends package information to FMD Registry when a package is dispensed. For packages used in unit dose production the dispense is sent during goods receive.

Table 5: Information flow between applications

5.1.2. Data Structure

The section describes the existing information model and the terms used today by the Contracting Authority. The information model of SAP may change during the procurement process to comply with the project ambitions.

Table 6 lists the terms used in the document.

Terms	Description		Example	Source	ID
ERX	Medicine Active Substance	Active substance, drug form, strength	paracetamol 500 mg	Not available with current registries	
LMR	Medicine Branded Product	Active substance, drug form, strength, brand	Paracet pill 500 mg Panodil pill 500 mg	FEST/ Farmalogg Registry	LMR ID
Package Code (Material)	Medicine Package Branded Product	Active substance, drug form, strength, brand, package size	Panodil pill 500 mg, 96 pills Panodil pill 500 mg, 300 pills	FEST / Farmalogg Registry	VNR ID
Product Code		Unique identifier, assigned to each finished/ manufactured product which is ready, to be marketed or for sale.		FEST/ Farmalogg Registry	Produktkode ID
Batch information		Batch (or "lot") information is a unique identifier assigned to a group of materials allowing the access to history of its production and control.			
Expiration Date		Final day that the manufacturer guarantees the full potency and safety of a medication.			

Serial number (Serie-nummer)		Unique identifier of the manufactured package or unit dose.			SNR_P SNR_UN

Table 6: Terms

Table 7 illustrates the structure defined in the application SAP. For each material there is one or several product codes associated (Ex: GTIN (GS1)) sourced from the national registry. At date, the relation between Material and LMR is defined by a set of properties in SAP, represented by a dashed line. The project is aware of the constraint of such information model and are evaluating alternative solutions. The Contractor is encouraged to propose other solutions for this matter.

SAP	Material 1 ⇢ LMR 1 Material 2 ⇢ LMR 1 Material 3 ⇢ LMR 2 Material 4 ⇢ LMR 2	Paracet pill 500 mg, 20 pills ⇢ Paracet pill 500 mg Paracet pill 500 mg, 100 pills ⇢ Paracet pill 500 mg Panodil pill 500 mg, 96 pills ⇢ Panodil pill 500 mg Panodil pill 500 mg, 300 pills ⇢ Panodil pill 500 mg

Table 7: information model in SAP

5.2. Integration Proposal

This section describes a preferred integration scenario. It is a proposal, and the contractor is encouraged to challenge it. The Contractor and the Contracting Authority shall conclude on and commit to an integration plan prior to conclusion of contract.

The section is composed of three headings:

1. Material Master and other data master
2. Centralized Production Plant (Figure 4: Yellow and Orange Area)
3. Regional Pharmacy (Figure 4: Blue and Orange Area)

5.2.1. Master Data

The Contracting Authority differentiates between master data from Material Registry/FEST (drug master data), referring to the data sourced from national registries, and other production master data. Production master data is referring to information on how the drug is handled within the offered solution, e.g., drug shape and size, production method and parameters etc.

The Contracting Authority will assess the capability to deliver the general drug data (ex: names, product code) from SAP. Master data not provided by SAP, needed to ensure a smooth operation, in conformance with the expected functionalities, must be maintained by the offered solution.

The contractor shall describe its information model and the expected data formatting to ensure a smooth operation in conformance with the expected functionalities (K Appendix 1a - ICT Requirements).

5.2.2. Application and integration - Centralized Production Plant

Figure 5 details the proposed integration between SAP and the different applications composing the centralized production plant. The centralized production plant is composed of advanced and fast dispensing UDPS', completed by package dispensing systems. In the figure, arrow represents an interaction between applications. Each of the interactions contains messages. Blue messages correspond to messages sent by the application source. At the difference, red messages correspond to messages sent by the targeted application as a response. The advanced UDPS will internally handle all the steps/processes from the package (raw material) to the unit dose is produced, stored and dispensed. The Contracting Authority does not expect an integration from SAP to trigger internal processes of the Contractor's solution, however, results may be communicated back to SAP through an integration. Whitened systems and messages are out of scope for the current procurement.

According to section 2.1, the advanced UDPS has an automated storage system for unit doses. In such context, SAP sends a dispensing order (Demand), and the system manages the production and dispense of unit dose based on the demand.

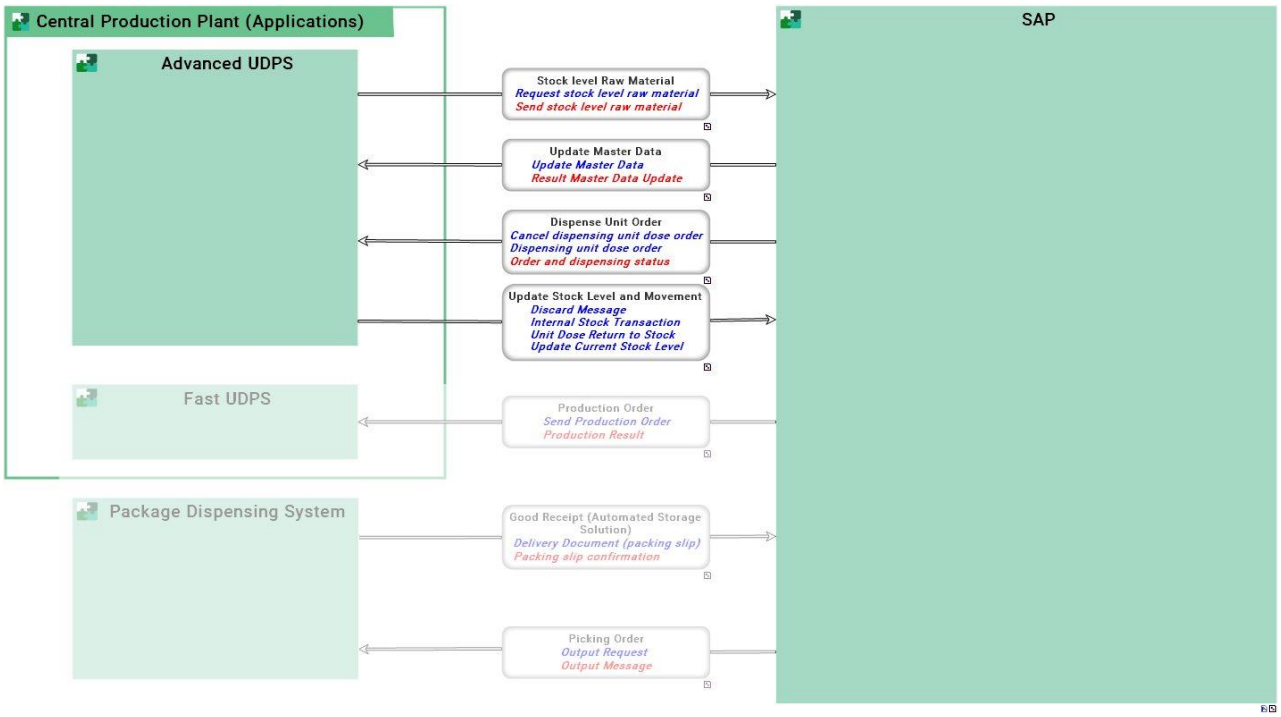

Figure 5: Illustration of the application ecosystem at the centralized production plan (Whitened area are out of scope)

5.2.2.1. SAP to advanced UDPS

The section presents the interactions between SAP and the Advanced UDPS. Figure 5 highlights the "most probable" interactions overseen by the Contracting Authority. Interactions described in this section, not illustrated in Figure 5, corresponds to additional options the Contracting Authority may consider.

5.2.2.1.1. Interaction: Stock level Raw Material

The Contractor in collaboration with the Contracting Authority must specify the interaction and its messages. The thought behind this interaction is to trigger internal processes of the Advanced UDPS, such as request of replenishment, internal production planning etc.

The interaction given in Figure 5 is a proposal composed of two messages. First message is a call from the Advanced UDPS to SAP requesting the stock level of raw material (Packages). Second message is the response from SAP.

5.2.2.1.2. Interaction: Update Master data

The Contactor in collaboration with the Contracting Authority must specify the interaction and its message. “Master Data” is defined in the description given in section 5.2.1.

5.2.2.1.3. Interaction: Dispense Unit Dose Order

The interaction groups the messages related to the dispense unit dose order. A dispense unit dose order is a delivery document in SAP.

Table 8 gives the delivery document status in SAP.

Status	Description
Created	Delivery document is planned in SAP
Released	Delivery document is sent to advanced UDPS
Partially Delivered	Items listed in the delivery document are partially delivered.
Delivered	All items listed in the delivery document are delivered.
Cancelled	Delivery document is cancelled

Table 8: Delivery Document Status

Table 9 lists the messages of the “Dispense Unit Dose Order” interaction and their content.

Message	Application Source	Content	Comment
Dispensing Unit Dose Order	SAP	Dispensing Order ID Customer ID Priority LMR ID (Medicine Branded Product) BOMLine position Quantity PTS carrier Number Delivery Preference*	A dispensing order may consist of one or several Medicine Branded Product reference and their respective quantity. (See example Table 9)
Modify Dispensing Unit Dose Order	SAP	Dispensing Order ID BOMLine position Quantity Actions	The workflow is not internally agreed. (Discussion ongoing)
Cancel Dispensing Unit Dose Order	SAP	Dispensing Order ID Reason	
Order and Dispensing Status	Advanced Unit Dose Production System	Dispensing Order ID Status Dispensing Date: XX.XX.XXXX LMR ID VNR ID SNR_UN ID Batch Number Expiration date Delivery method:	The application source shall return the dispensing results. (See example Table 10)

Table 9: Dispense Order Interaction Message List.

In Table 9 and Table 10, the advanced UDPS dispenses the medicine package branded product based on the availability in the system.

Dispensing Order ID		**Priority**
Client ID		
Delivery Preference		
BOM Line Position	**LMR ID**	**Quantity**
1	LMR 1	10
2	LMR 2	20
3	LMR 3	5
…	…	…

Table 10: Example of a Dispense Order Sent

Table 11 gives an example of information sent to SAP by the advanced UDPS. SAP shall receive the relation between LMR, VNR (Item number) and SNR_UN (Serial Number of the Unit Dose).

Dispensing Order ID				**Dispensing Date**
Status				
Ref	**LMR ID VNR ID SNR_UN ID**	**Quantity**	**Batch Number (BN)**	**Expiration date**
1	LMR 1	4		
1.1	VNR 1	2		
1.1.1	SNR_UN 1	1	BN 1	XX.XX.XXXX
1.1.2	SNR_UN 2	1	BN 1	XX.XX.XXXX
1.2	VNR 2	2		
1.2.1	SNR_UN 3	1	BN 2	XX.XX.XXXX
1.2.2	SNR_UN 4	1	BN 3	XX.XX.XXXX

Table 11: Example of a Delivered Dispense Order.

5.2.2.1.4. Interaction: Update Stock level & Movement

The “Update Stock level & Movement” interaction groups the message related to stock and product status within the Contractor’s system. The interaction is composed of four messages that are updating SAP. SAP updates are triggered by user or system actions occurring in the advanced UDPS.

Message	**Application Source**	**Content**	**Comment**
Discard Message	Advanced Unit Dose Production System	LMR ID VNR ID SNR ID Quantity Batch Expiration Date Stock ID Reason of Discard	When medicines are discarded due to processes in the advanced UDPS this should be communicated to SAP. SAP will handle the financial transactions related to discarded medicines. Each stock can have their owned ID in SAP.
Update Current Stock Level	Advanced Unit Dose Production System	Stock ID LMR ID VNR ID Quantity	The UDPS manages different stock (ex: package (raw material) - canister/cassettes/boxes - unit dose). Each stock can have their owned ID in SAP.

		Reason of Update	At given times or when medicines are counted, stock levels in advanced UDPS and SAP should be aligned. This interaction shall deliver an accurate overview of stocks level to SAP either for single material or for multi material.
Internal stock Transaction		Stock ID Source Stock ID Target LMR ID VNR ID Quantity	For planning purpose in SAP, it will be necessary to update SAP with the internal stock transaction. The Contracting Authority would like to have updated "State of Product" information. (Ex: Movement from Raw Material to Unit Dose) Each stock can have their owned ID in SAP.
Unit Dose Return to Stock		Last sold to (Customer ID) LMR ID VNR ID Quantity Reason of returned Stock ID Target	A customer (regional pharmacies or St.Olav hospital) is returning Unit Dose to the production facility. The Unit dose production and dispensing system sends the information to SAP when the unit dose is received in the unit dose dispense system.

Table 12: Update stock level & movement interaction message list.

5.2.2.1.5. Interaction: Request Dispensing Raw Material (Option a)

The Contracting Authority would like to explore the possibility to have an integration between the Advanced UDPS and the Package Dispensing system through the ERP System, SAP. The advanced UDPS sends a request to dispense a raw material (original package) to SAP, SAP forwards the request to the Package Dispensing System.

The Contractor must describe the possibility to have such an interaction. A different option is given in section 5.2.2.2.

5.2.2.2. Advanced UDPS to Package Dispensing System (Option)

5.2.2.2.1. Interaction: Pack Dispense Raw Material (Option b)

The Contracting Authority would like to explore the possibility to have an integration between the advanced UDPS and the Package Dispensing System.

The advanced UDPS sends a request to the Package Dispensing System for dispensing a package in order to produce unit dose.

The Contractor must describe the possibility to have such interaction. The interaction is a variant of the section 5.2.2.1.5.

5.2.3. Application and integration – Regional Pharmacies

As described in section 2.1 of this document, regional pharmacies will have only storage systems for unit doses (no unit dose production system). In Figure 6, whitened application and interactions are out of the procurement scope.

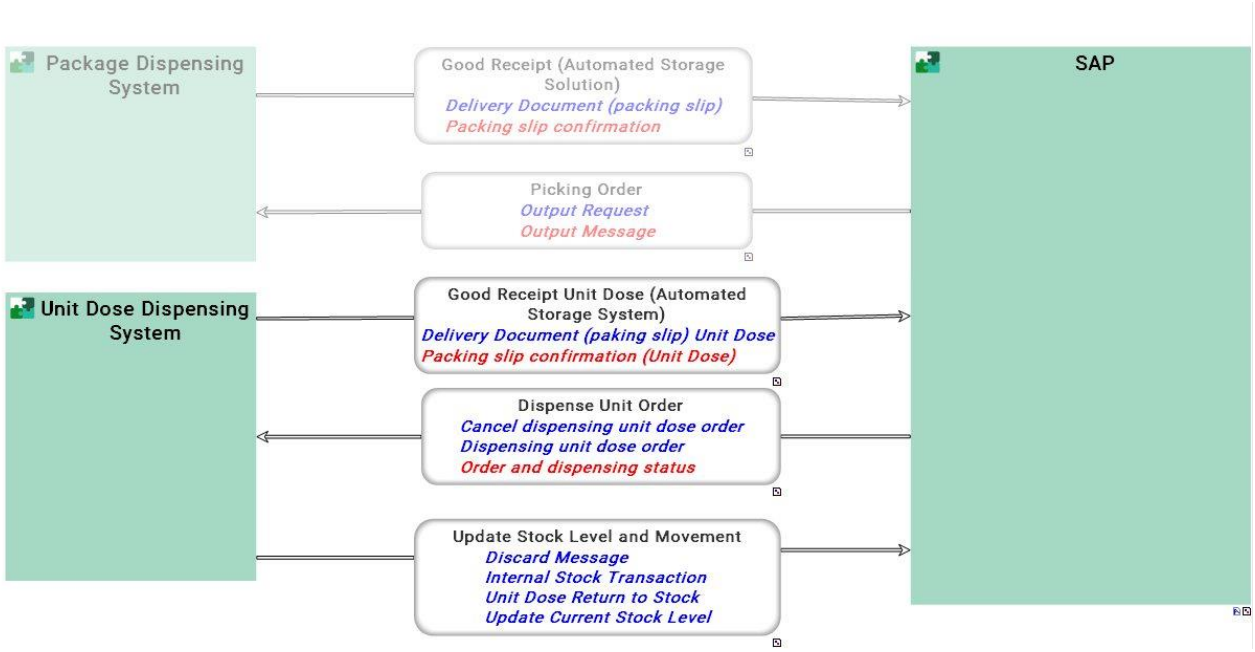

Figure 6: Illustration of the application ecosystem at the regional pharmacies

5.2.3.1. SAP to Unit Dose Dispensing System

5.2.3.1.1. Interactions: Good Receipt Unit Dose (Automated Storage System)

The section is relevant if the Contractor's system is capable to register goods received from centralized production plant and then interact with SAP to track the receiving of goods. The physical flow of goods should be defined during the procurement process. In the table below, the assumption is made that the dispensing system can handle the reception of transport boxes or unit doses. When leaving the centralized production plant, the unit dose is supposed to be delivered in a transport box. Each container of unit doses is identified by a unique ID. When the packing slip is scanned the dispensing system will interact with SAP to confirm the reception of goods.

Message	Application Source	Content	Comment
Delivery Document (packing slip)	Unit Dose Dispensing System	Packing slip Id TransportBox ID SNR_UN ID Quantity	Unit Dose Dispensing System requests to SAP the confirmation of the packing slip id associated to the Unit Dose ID.
Packing slip confirmation	SAP	Packing slip Id TransportBox IDSNR_ID Quantity	Response of SAP to the message "Delivery Document (Packing slip)"

5.2.3.1.2. Interaction Dispense Unit Dose Order

See the description of the interactions in the section 5.2.2.1.3 "Interaction: Dispense Unit Dose Order".

5.2.3.1.3. Interaction: Update Stock level & Movement

See the description of the interactions in the section 5.2.2.1.4 "Interaction: Update Stock level & Movement".

A message must handle process to “Return Unit dose” to centralized production plant. By example, the offered solution shall communicate to SAP when the unit dose is returned at the centralized production plant.