

UX Wireframes

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Introduction

The wireframes below have been created based upon observations in several Flemish hospitals. The observations were based on the use of the home medication throughout the hospital practice.



Please note that the wireframes below illustrate only an example of the workflows described in the use cases. They do not represent all features of the hospital software, nor all information.

Only key features that are relevant for the Vitalink workflow are visible in the wireframes. The wireframes do not intend to make any suggestions on the look and feel of the hospital software.

UX GUIDELINES - Requirements

All software packages should also comply with the UX guidelines for Vitalink found [here](#).

Access to medication information

Access to medication information in a hospital is unlike in primary care, not regulated by governmental guidelines. Each care organisation, including hospitals, are allowed to import and export Vitalink medication via the principle of circle of trust. It is thus up to the hospital security policy to allow hospital staff access to medication information or not. This means that the hospital security management can determine if e.g. administrative staff of a hospital department, a pharmacy assistant has access to the Vitalink information.

Automatic questioning of Vitalink

- When opening a patient's EHR, it must be **checked automatically** if the registration of the informed consent is fulfilled, if there is a Vitalink medication scheme for this patient and whether the EHR has the most recent version of the Vitalink medication scheme.
- This automatic questioning is done for all patients **as soon as their file in the EHR is opened**, independent what the reason for hospital visit is (ambulant visit, emergency room visit or admission).
- An automatic questioning of the Vitalink medication scheme is crucial. The care giver should not take any action (eg no click to start a download).
- The CG must be able to **clearly see** whether or not a Vitalink medication scheme has been **created** for the patient.
 - If not, the CG must be able to indicate that he/she wants to make use of the Vitalink medication scheme for the patient in question, if applicable.
- The CG must be able to clearly see that the application is **still working** on importing the information from the Vitalink medication scheme.
- The CG must be able to clearly see when the import of the Vitalink medication scheme has been **completed**.

- Always mention the date & time of the last validation since this is useful to the CG to validate the validity of the Vitalink medication scheme.
 - Other information like date & time of last download, validator, version ... can be visualized via a tooltip (if not enough screen space).
- The CG must be able to clearly see when the application has **failed** to import the Vitalink medication scheme.
- In the case of a hospital, if all mandatory authorizations/mandates are set, it must be possible for a member of administrative staff to prepare the EHR by importing the medication scheme for the patient in question.
- Automatic import and analysis of the information from the Vitalink medication scheme in a combined overview should take a **minimum of time** (preferably 4 to 6 seconds or less on average, with a maximum of 10 seconds).
- This takes place in the background and starts immediately when the patient's medical record is opened. In the meantime, the CG can continue working in the EHR.
- When the Vitalink medication scheme has been received, the CG can easily switch between his/her work screen and the medication scheme (eg through tabs or other interaction mechanisms).
- This may not take more than one click on the screen.
- It is important that the vendor can monitor the performance in an active way if the automatic import and analysis of the information from the Vitalink medication schedule takes more than a pre-determined number of seconds (eg after more than 10 seconds).
- If, after an adjustable period of, for example, 60 - 120 seconds, a connection has not yet been established with Vitalink, the connection will be terminated automatically.
- The CG is hereby informed about the problem in a user-friendly and concrete way and should be able to send the error easily (ask for error report).
- Display visually that the application is working on the Vitalink medication scheme.
 - This can be done, for example, by a progress indicator or an icon indicating that the Vitalink medication scheme is loading.
- Display visually that the Vitalink medication scheme has been collected.
 - This can be done, for example, by an icon indicating that all data from Vitalink has been retrieved (+ mandatory information: date & time of last update of the Vitalink medication scheme).
- If it is not possible to obtain data from the Vitalink medication scheme, also visualise it and indicate why there is a problem / what the problem is (in understandable language).

One combined overview of all active medication

- It is important that the care giver has **one combined overview** of the active medication of the patient. Since information about the active medication can be found both in the local EHR and on Vitalink, the CG wishes to see this information in one combined overview.
 - The CG does not want to manually compare the information from the local EHR and the Vitalink medication scheme to determine what has changed.
 - Comparing two different schemes is too time-consuming, too complex and can lead to mistakes. Methods where they can 'update' per line, 'upload' are not well understood. Rows in a table using different status icons can not be interpreted unambiguously.
 - The aim of this combined overview is that the CG can see at a glance what has changed since the last time he/she uploaded the patient's medication scheme (e.g. if other caregivers made any changes to it).
- The principle of a combined overview should be kept simple:
 - Provide an indication 'what is on Vitalink' and 'What is in the local EHR'.
 - It is important that this combined overview is automatically displayed, clearly indicating what has changed with respect to the local EHR, any alerts concerning medication lines that may be a problem, etc.
 - Draw attention to changes, new additions, inconsistencies in this combined overview.
 - Afterwards, the CG can take further decisions related to these medication lines (e.g., returning to the previous posology of a particular medication, re-activating deleted medication, etc.) in an ambulant setting or starting the hospital medication in case of an admission.
- The combined overview of the active medication (medication coming from Vitalink + medication of the EHR) should be visualized in a **schema view** as well as in a **list view**.
 - It should depend on the user's preference in which view the active medication will open.
 - It is very important that the CG can have a **hour view** of the medication scheme.
- The CG should be able to make changes directly into the medication scheme. Such an **interactive medication** scheme would allow to easily change the posology, intake moments, comments, ...

- It should be possible to **sort** the medication lines via ATC code, CNK code, alphabetical, ...
 - Make it also possible to sort on a column.
 - Visually indicate which column has been sorted.
 - Ensure that this representation is remembered when opening the Vitalink medication scheme for other patients.
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- In some cases it is **not** necessary to show the complete (combined) medication scheme.
 - When the CG would like to have a global overview on the patient, the software can show an **reduced combined overview** of the active medication, e.g. an abbreviated list. This can be used on the homepage of the patient file, on a dashboard page, ...
 - The presentation of an abbreviated list of the active medication on Vitalink combined with the active medication from the local EHR should display at least the product name, dosage & posology.
 - In this way, the care giver has a first overview of any changes to medication since the last visit of the patient.
 - In this reduced combined overview, it is also visible which medication line is coming from Vitalink & which medication line is coming from the local EHR.
 - In addition, additional information must be provided via a tooltip or fold out action (if applicable: start / stop, from, to) and comments (if applicable).
 - The CG can also adjust medication lines in the abbreviated list. The possibility should therefore be offered that the caregiver can perform actions on the reduced list of the combined overview without having to open the complete medication scheme.
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- **Visualize** changes in the following way:
 - Newly added medication with respect to the local EHR:
 - Emphasise this with a different background colour so that attention is drawn to it (note: people with colour blindness do see colour shades, so for them it is also visible that there is a difference of colour with the other lines).
 - Display a textual label indicating 'new'.
 - Display an icon, indicating that the related medication line of coming from Vitalink.
 - Change in posology, intake moment, etc:
 - Strike through the medication line that has been replaced (in this way the CG clearly sees what he/she had prescribed and how this was replaced by medication prescribed by another health care provider).
 - Display the relevant medication line from the local EHR and the medication line from Vitalink in a clustered way (in this way the 2 'associated' medication lines are placed underneath each other, making the comparison easier for the CG).
 - By keeping the unique URI once the mapping has been made, the connection between 2 'associated' medication lines can be better and faster verified next time. A 'reference algorithm' can be worked out for this.
 - Removal of prescribed medication:
 - Strike through the medication line that has been removed.
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- The necessary changes (make the deleted medication line active again, change the modified posology to previous posology, etc) can be done by e.g. using a drop down menu or by having a shortcut (buttons / links) on the related medication line.
 - When the CG does nothing, he/she agrees with the overview of the active medication that he/she sees (deleted medication will disappear, adapted posology will be retained and the previous posology will disappear, etc).
 - At a next opening of the EHR it is shown as a local scheme.
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- Provide the option to display an **alert or notification**:
 - This can be the case when, for example, 2x same type of medication is displayed but with a different product name.
 - Make sure that these medication lines are grouped/clustered.
 - Next, provide an alert on these medication lines.
 - This can be the case when there is an incomplete medication line.
 - Make sure that it is pointed out that the medication line isn't complete.
 - Aka, via an alert / notification if the CG can complete the medication line.
 - An alert or notification can be an icon or textual
 - Via a tooltip, more information can be provided.
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- The CG wants to see the following **extra information** per medication line:
 - Name of the health care provider who prescribed / adjusted the medication.
 - This information is sent with the medication scheme to Vitalink.
 - This gives added value to the interpretation of the scheme and in this way it is clear to other care providers which medication is prescribed by whom.
 - For which pathology is the medication prescribed? (not compulsory to enter during prescribing, but desirable).
 - The pathology should be selected in a quick way when prescribing medication. Preferably, the offered choice list prefers the diagnoses present in the EHR.
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- In addition, the CG also has certain expectations regarding the **visualization** and use of this medication scheme. The CG does not view this as a static page, but wants to use it for:
 - Adjusting intake moments: provide dynamic input fields to adjust the intake moments to the medication scheme itself (bi-directional operation).
 - Removing a medication line: provide check boxes to select one or more medication line(s) and remove them with one click (this gives the GP a complete overview of all active medication before removal).
 - Adjusting a medication line: click on edit icon or link of medication line will lead to the prescription module where, for example, the posology can be adjusted.

- Not showing a medication line on Vitalink (by default, everything is on 'show on Vitalink').
 - Adding a note: provide a dynamic input field to enter a comment on a medication line (in this way the comments field will be used more and better).
 - Adding new medication: provide an action button to start the flow to add new medication (this gives the CG a complete overview of all active medication before prescribing new medication).
 - To upload the complete medication scheme to Vitalink (validate).
- In addition to the name of the health care provider, show the **specialty** of the health care provider who has added or adjusted a medication line if this is given via Vitalink.
 - Make it possible to drag medication from the 'chronic' to 'temporary' or 'if necessary' category, taking into account the corresponding specifications for each of these categories (eg with regard to the end date).
 - Visualize medication that was prescribed during the current consultation in a different way (icon and / or color).
 - Showing the version number is less important for the CG, but can be interesting for a print version of the medication scheme or for other reasons.
 - Show **interactions** between medication lines through (e.g. via an alert).

Start Vitalink with one click

- If there is no Vitalink medication scheme present or not yet used, it must be possible to start the creation / use it with one click.
- If starting with the creation of a Vitalink medication scheme, it is important that all active medication is **automatically uploaded** from the local EHR to Vitalink.
 - It is not the intention that the caregiver will transfer all medication lines manually, line by line.
 - Afterwards, details of intake, comments, ... can be entered on the medication scheme itself.

Prescribe

During an ambulant visit

- Prescribed medication is **automatically** added to the medication scheme (combined overview), unless explicitly chosen not to.
- This means that the medication is entered via structured entry fields.
- Visualize newly added medication in a different way in the medication scheme. In this way the CG has a clear overview of what will be added.
- During the prescription of a medication, the CG must be able to indicate whether the medication may or may not be shown on Vitalink.
 - By default, all medication is shown on Vitalink if the CG has indicated to work with Vitalink.
- On this prescription page it is important that the complete medication scheme can be opened with one click (if it is not already fully shown).
- While prescribing, the CG should be able to indicate that he/she would like to starting working with Vitalink (if there isn't yet a Vitalink medication scheme).
- With regard to **prescribing** itself, the focus should be on its speed. This can be done by focusing on the simple prescription flow, which can simplify the user interface.
 - Split the functionalities for easy prescribing vs. complex prescribing.
 - Provide structured entry fields so that a one-off data input is possible (automatic transfer of data to the Vitalink medication scheme).
 - Provide standard posologies for frequently used medication.
 - Show the most frequently used dosage, administration unit, drug route, ... via eg radio buttons so that a quick selection is possible. Less used options can be included behind a choice menu (drop-down list).
 - Simplify working with templates to save frequently used prescriptions (eg provide two action buttons: Prescribe vs. Prescribe and save as template).
- Simplify the addition of indications / pathologies.
 - Provide quick selections / suggestions for indications / pathologies per medication. In this way, the CG can send the most current indication to the Vitalink medication scheme in one click.
 - If the suggestion of indication / pathology does not match, the CG should simply be able to enter another indication / pathology as free text.
- The CG can indicate whether or not medication can be shown on Vitalink, both in the prescription module and on the interactive medication scheme (combined overview).
- Ensure that prescription by substance name is possible (this is then adjusted by a pharmacy in the Vitalink medication scheme to the generic variant).

During a hospital stay

- Make sure that it is easy & quick to **substitute** home medication with hospital medication.
- The home medication should be remembered since it is important for the **re-substitution** to home medication afterwards.
- New prescriptions made during a hospital stay are not uploaded to Vitalink.
- Only if they stay applicable for the home medication, they will be validated and uploaded to Vitalink when discharging the patient (of when having a weekend at home during a hospitalization).

Validate & upload to Vitalink

- After prescribing and completing the consultation it is important that the combined medication scheme is shown before validating and uploading.
- This means that the CG must actively press the '**Validate & update Vitalink**' button before the complete medication scheme is uploaded to Vitalink.
 - This can be done at the end of the consultation, but also after prescribing medication.
- When the active medication isn't validated & updated to Vitalink when the CG is **closing the patient file**, the EHR should show a **notification** (screen overlay), indicating that the active medication isn't yet validated & uploaded to Vitalink.
 - The CG can check the medication scheme and validate & update Vitalink (1 click).
- When **printing** the patient friendly medication scheme for the patient, it must also be possible to Validate & Update Vitalink as from there.
- If Vitalink is still syncing, and when the CG wants to continue, he/she should be able to '**Validate**' the active medication.
 - This is an internal validation (within the EHR).
 - This means also that the CG has seen only the local EHR active medication.
 - No upload to Vitalink will be done.
- It must be possible at all times to be able to open the EHR, and consequently the Vitalink medication scheme of **several patients** at the **same time** (eg telephone contact with another patient during a consultation).

Visualisation of the print version of the Vitalink medication scheme

- It should be taken into account that an official print version of the medication scheme for the patient is offered by Vitalink, it is thus not mandatory to develop an own patient print for your EHR.
- This print should be visualised on the screen. In this way, the CG & patient can go through it together.
- When printing the patient friendly medication scheme, it must also be possible to '**Validate & update Vitalink**'.
- Print version of the Vitalink medication scheme: [in-depth information regarding the Vitalink medication print](#).

How to handle mistakes

- If there is a problem with a medication line on Vitalink, the software of the EHR should notify the CG about this.
 - When having a Vitalink medication scheme with an incorrect medication line, it is important not to block the entire Vitalink medication scheme, but to alert to CG about it & ask to reinterpret the corrupted medication line.
 - It is important to get as much as information as possible on this 'incorrect' medication line.
 - Even full text is better than nothing.
 - In this way, at least something can be displayed.
 - Next, the CG can update the medication line(s).
- Example: when importing the Vitalink medication scheme, and when having a medication line with issues, there should be as much as information as possible retrieved from the medication line until the information can no longer be read (due to the corrupted construction).
 - Eg if the posology is still correct this can be downloaded but it is not possible anymore to download correct information for the intake moments).
 - The rest of the information (from the corrupted construction) should be downloaded as 'free text' (shown in the comments field).
 - In this way, the CG can add the missing information to the active medication and upload it towards Vitalink.

- CGs are open to complete this information to the medication line; in any case it is better to have minimal information regarding the active medication of the patient than no information (eg now the complete Vitalink medication scheme is sometimes blocked by one corrupted medication line).
- A medication line that lacks information must be displayed as an '**alert**' so that this clearly stands out in the combined overview. More information about the error is given at mouse-over or click on the medication line.
- When at the end of a consultation the medication scheme can **not be uploaded to Vitalink**, CGs often receive error messages that they do not understand.
 - It is important that the CG is well informed why the medication scheme can not be uploaded to Vitalink.
 - Inform the CG in a targeted and concrete manner.
 - Avoid technical error messages (translate the return code and show the technical error message only after the error message which is formulated in an understandable way).
 - For example:
 - "The Vitalink medication scheme can not be uploaded. There is an error in the medication line medication x."
 - "The Vitalink medication scheme can not be uploaded. There is currently no connection possible with Vitalink."
- Provide sufficient functional & technical tests to prevent bugs.
- Ensure that the CG can complete the information in an easy way.

WIREFRAMES

1. Reduced combined overview

2. Ambulant Visit

3. Admission