User Manual
Clinical Decision Support System (CDSS)

Contents

1 General Description

The Clinical Decision Support System (CDSS) provides healthcare professionals with an intuitive interface for managing patient data. The system streamlines clinical workflows through a user-friendly graphical interface that ensures accurate, timely updates and supports informed clinical decision-making.

Through this system, users can:

- **Patient Management:** Register and search for patient records
- **Measurement Tracking:** Record and store standardized medical measurements
- **Historical Data Access:** Search and retrieve past records using precise time filters
- **Record Maintenance:** Update or delete existing measurements as needed
- **LOINC Integration:** Access and track measurements using standardized LOINC codes

2 System Screens Overview

The following sections will guide you through each screen in the CDSS application. As you use the system, you'll notice that every input field provides helpful tooltips when you hover your mouse over them. These tooltips give you clear instructions, format guidelines, and examples offering real-time support exactly when and where you need it.

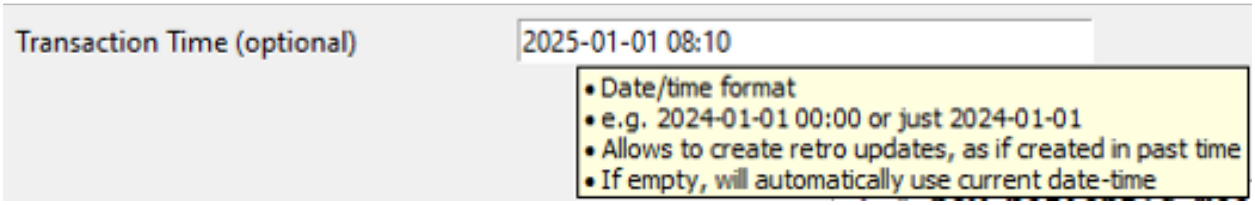


Figure 1: In-context assistance.

2.1 Get Patient by Name

This screen allows you to find a patient's ID by searching with their full name. The purpose of this page is to help you retrieve the intended patient's ID, and to avoid duplication problems in name based search when patients share the same first name + last name.

Required Fields:

- First Name [1]
- Last Name [2]

Process:

- Enter the patient's first and last name
- Click "Get Patient" [3]
- View results in the display area [4]

Notes:

- All fields are required
- Patient must already be registered in the system
- Search returns all IDs that match the provided name combination

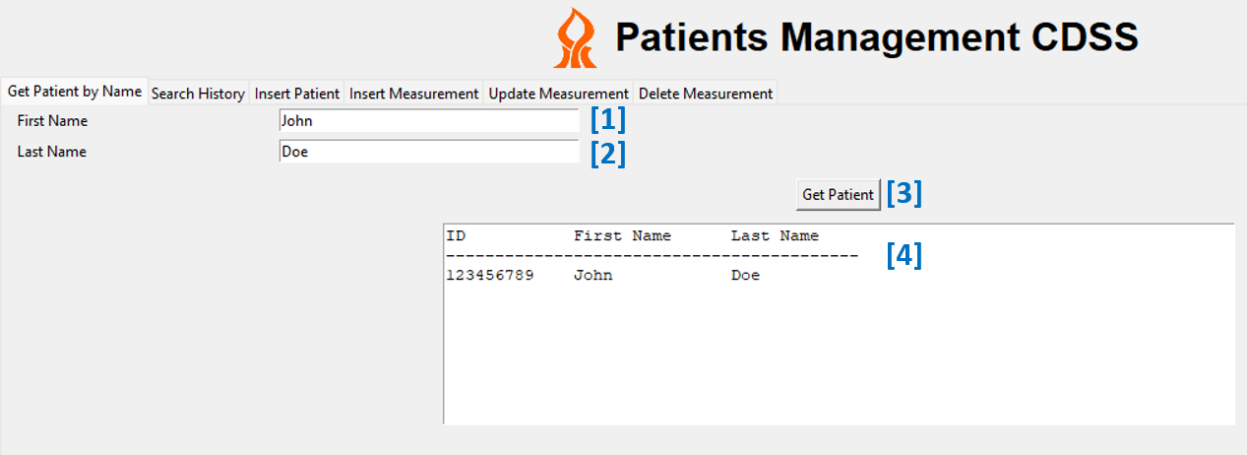


Figure 2: Finding a patient's ID based on their full name.

2.2 Search History

This screen allows you to retrieve a patient's historical measurement records using various filters.

Required Fields:

- Patient ID [1]

Optional Filters:

- LOINC Code [2] – Search for a specific standardized code
- LOINC Name [3] – Search for records **containing** this component name (sub strings are acceptable for this screen)
- Start Date/Time [4] – Beginning of search period
- End Date/Time [5] – End of search period
- Snapshot Date/Time [6] – View database as it existed at this point in time

Process:

- Enter the Patient ID (required)
- Apply any desired filters
- Click "Search" [7]
- View matching records in the results area [8]

Notes:

- Date/time format: YYYY-MM-DD HH:MM:SS (24-hour clock)
- For date ranges: if only date is provided, the system will use the full range from the beginning of the first day (00:00:00) to the end of the last day (23:59:59).
- For snapshots: if no time is provided, the system defaults to 00:00:00
- If no records match your criteria, you'll see: "No measurement records found for this patient under these conditions"

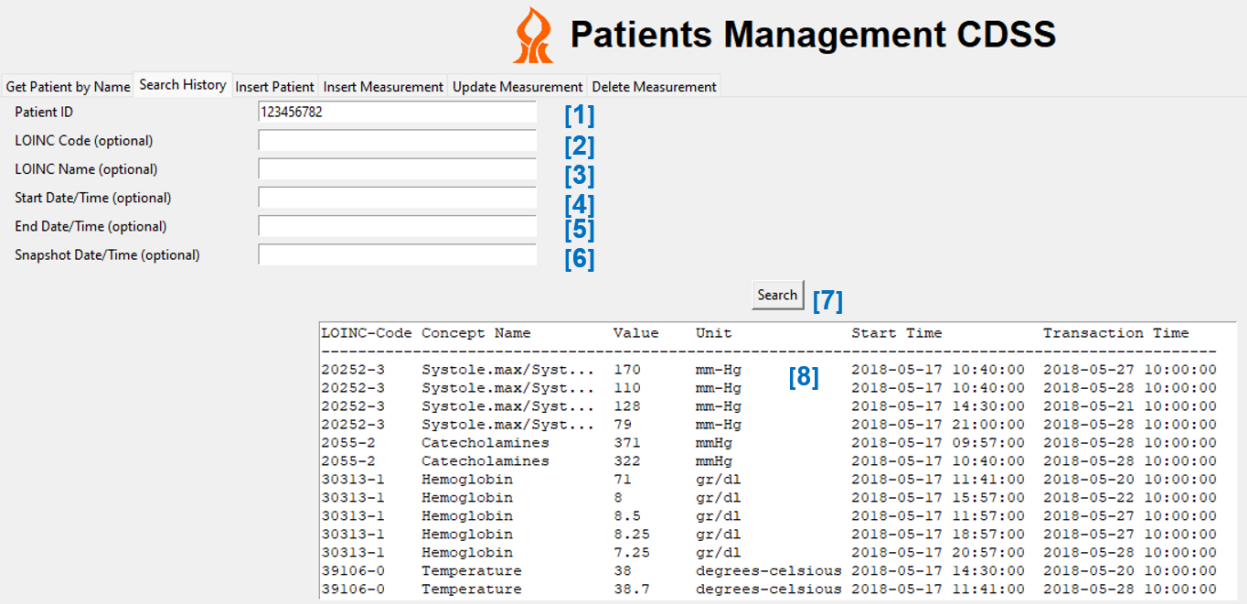


Figure 3: Loading all records matching the patient with the entered ID.

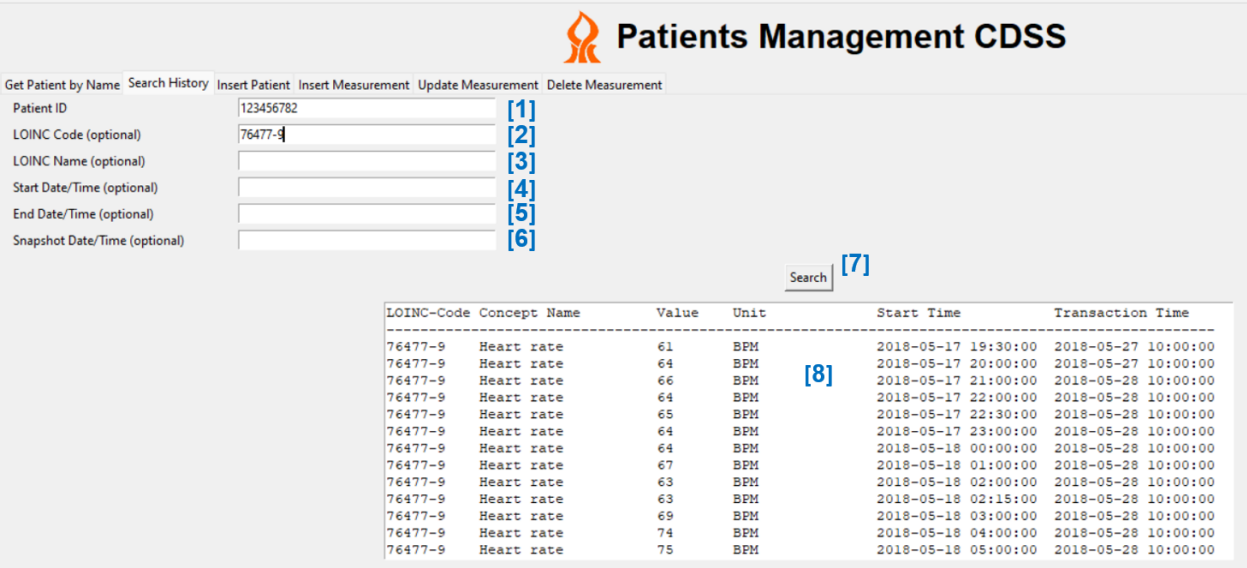
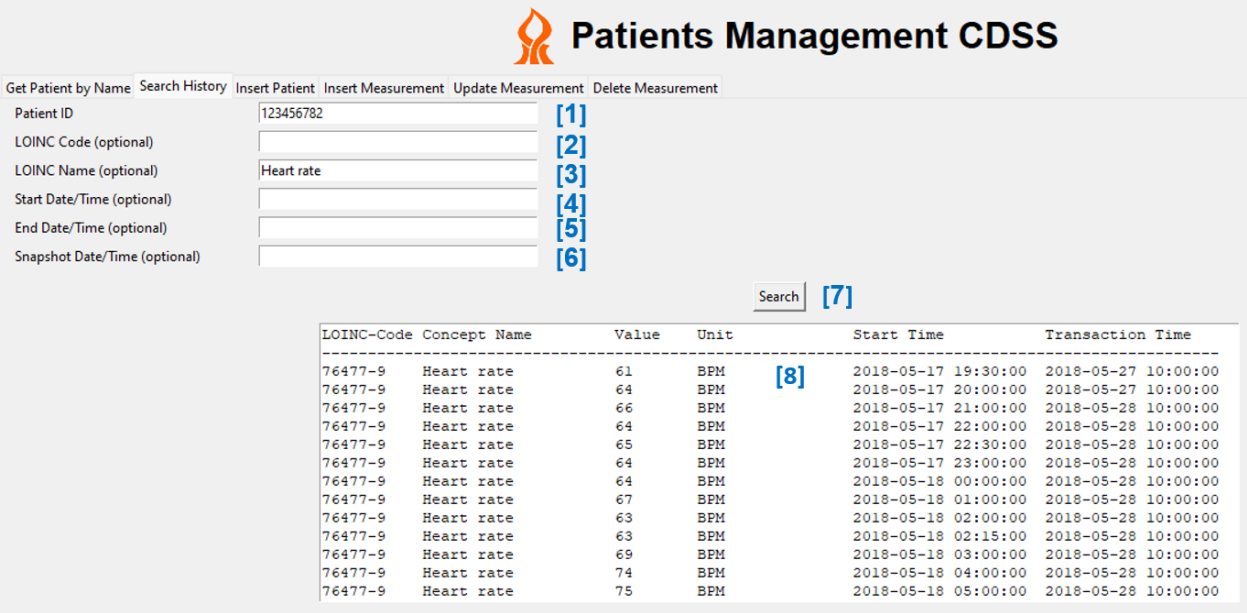
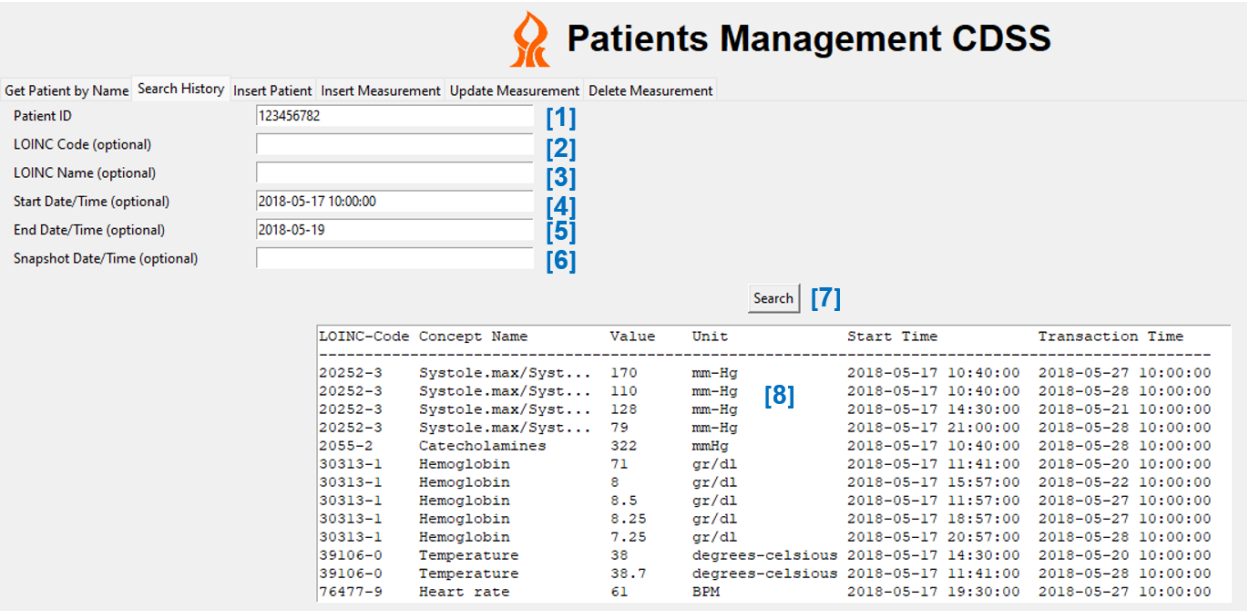


Figure 4: Loading all records for the patient with the entered ID, filtered by the specified LOINC number.



LOINC-Code	Concept Name	Value	Unit	Start Time	Transaction Time
76477-9	Heart rate	61	BPM	2018-05-17 19:30:00	2018-05-27 10:00:00
76477-9	Heart rate	64	BPM	2018-05-17 20:00:00	2018-05-27 10:00:00
76477-9	Heart rate	66	BPM	2018-05-17 21:00:00	2018-05-28 10:00:00
76477-9	Heart rate	64	BPM	2018-05-17 22:00:00	2018-05-28 10:00:00
76477-9	Heart rate	65	BPM	2018-05-17 22:30:00	2018-05-28 10:00:00
76477-9	Heart rate	64	BPM	2018-05-17 23:00:00	2018-05-28 10:00:00
76477-9	Heart rate	64	BPM	2018-05-18 00:00:00	2018-05-28 10:00:00
76477-9	Heart rate	67	BPM	2018-05-18 01:00:00	2018-05-28 10:00:00
76477-9	Heart rate	63	BPM	2018-05-18 02:00:00	2018-05-28 10:00:00
76477-9	Heart rate	63	BPM	2018-05-18 02:15:00	2018-05-28 10:00:00
76477-9	Heart rate	69	BPM	2018-05-18 03:00:00	2018-05-28 10:00:00
76477-9	Heart rate	74	BPM	2018-05-18 04:00:00	2018-05-28 10:00:00
76477-9	Heart rate	75	BPM	2018-05-18 05:00:00	2018-05-28 10:00:00

Figure 5: Loading all records for the patient with the entered ID, filtered by the specified LOINC name.



LOINC-Code	Concept Name	Value	Unit	Start Time	Transaction Time
20252-3	Systole.max/Syst...	170	mm-Hg	2018-05-17 10:40:00	2018-05-27 10:00:00
20252-3	Systole.max/Syst...	110	mm-Hg	2018-05-17 10:40:00	2018-05-28 10:00:00
20252-3	Systole.max/Syst...	128	mm-Hg	2018-05-17 14:30:00	2018-05-21 10:00:00
20252-3	Systole.max/Syst...	79	mm-Hg	2018-05-17 21:00:00	2018-05-28 10:00:00
2055-2	Catecholamines	322	mmHg	2018-05-17 10:40:00	2018-05-28 10:00:00
30313-1	Hemoglobin	71	gr/dl	2018-05-17 11:41:00	2018-05-20 10:00:00
30313-1	Hemoglobin	8	gr/dl	2018-05-17 15:57:00	2018-05-22 10:00:00
30313-1	Hemoglobin	8.5	gr/dl	2018-05-17 11:57:00	2018-05-27 10:00:00
30313-1	Hemoglobin	8.25	gr/dl	2018-05-17 18:57:00	2018-05-27 10:00:00
30313-1	Hemoglobin	7.25	gr/dl	2018-05-17 20:57:00	2018-05-28 10:00:00
39106-0	Temperature	38	degrees-celsious	2018-05-17 14:30:00	2018-05-20 10:00:00
39106-0	Temperature	38.7	degrees-celsious	2018-05-17 11:41:00	2018-05-28 10:00:00
76477-9	Heart rate	61	BPM	2018-05-17 19:30:00	2018-05-27 10:00:00

Figure 6: Loading all records for the patient with the entered ID, showing results within the specified date range.

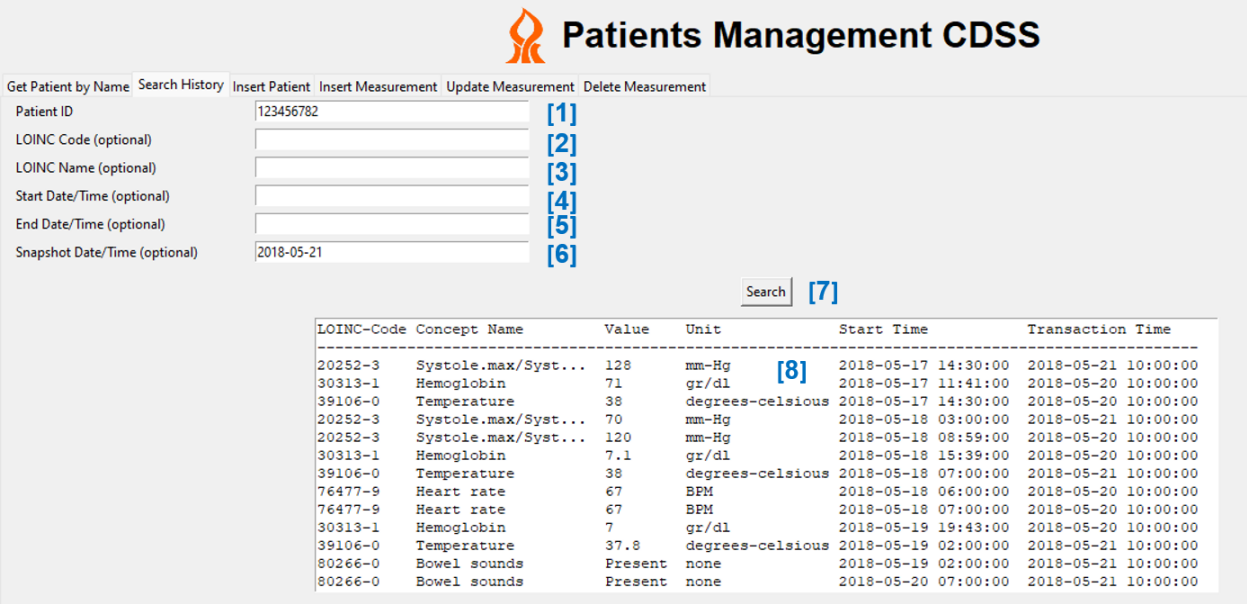


Figure 7: Loading all records for the patient with the entered ID, showing results according to the specified snapshot.

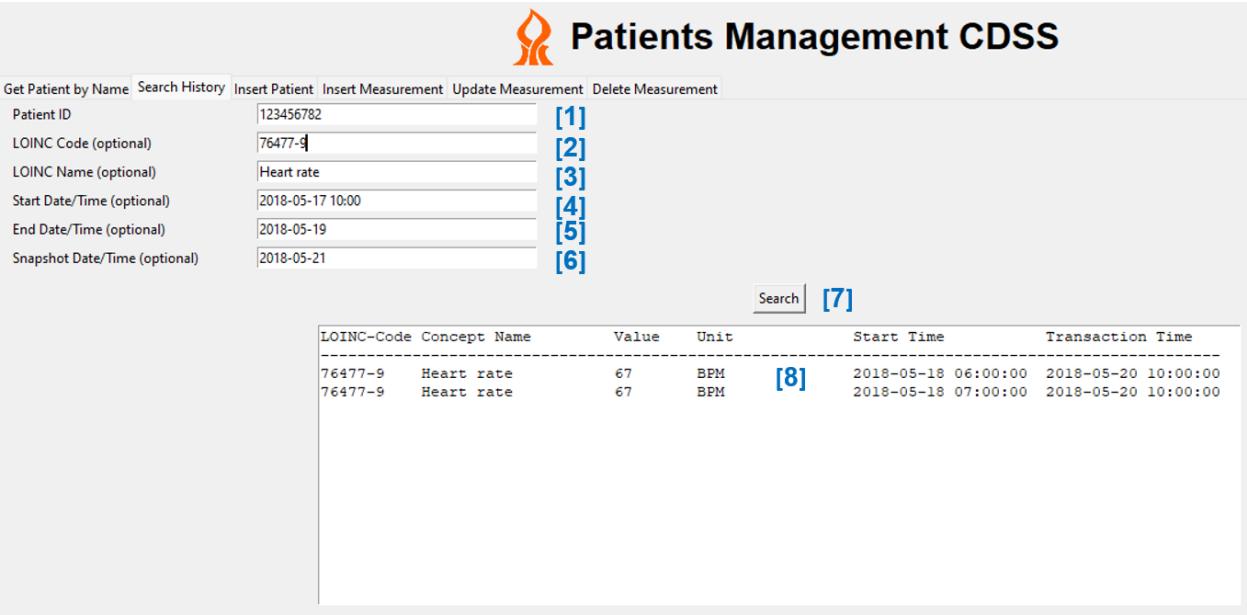


Figure 8: Loading all records for the patient with the entered ID, with all filters applied.

2.3 Insert Patient

This screen allows you to add a new patient to the system database.

Required Fields:

- Patient ID [1]
- First Name [2]
- Last Name [3]

Process:

- Enter all required information
- Click "Insert Patient" [4]
- A confirmation message [5] will be displayed, and a summary of the new patient's registration will be shown on the screen [6]

Notes:

- All fields are mandatory
- The system will prevent duplicate patient IDs with an error message

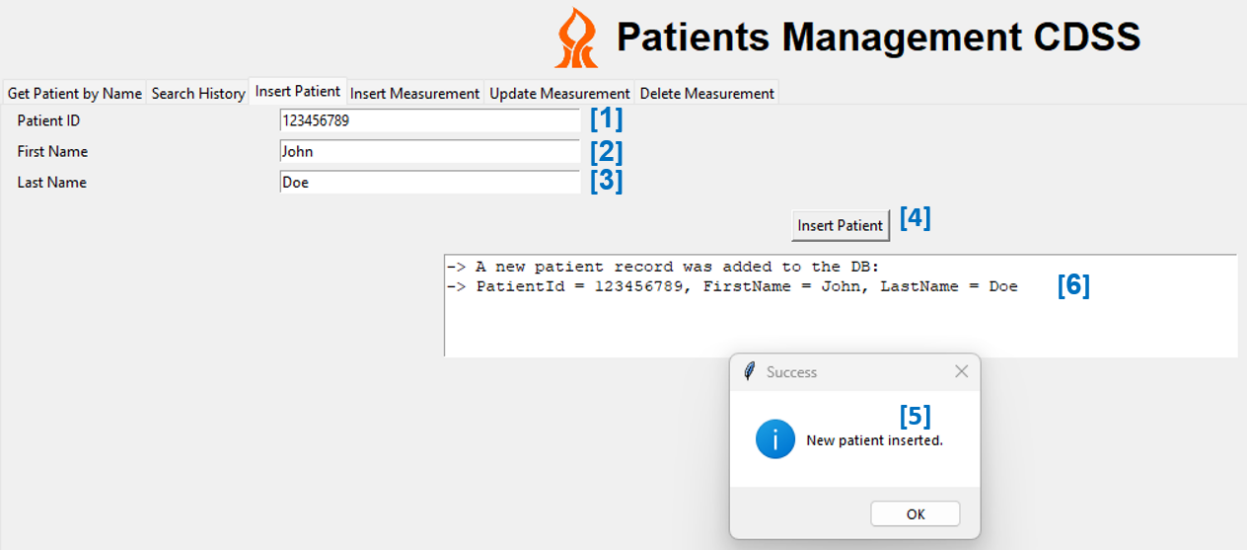


Figure 9: Registering a New Patient.

2.4 Insert Measurement

This screen allows you to record a new measurement for an existing patient.

Required Fields:

- Patient ID [1] – Must match an existing patient
- Valid Start Time [4] – Exact time the measurement was taken
- Value [5] – The measurement result
- Unit [6] – Unit of measurement
- Either LOINC Code [2] OR Component [3] – At least one must be provided. A lookup will be performed in the patient's data to find the relevant LOINC code.

Optional Fields:

- Transaction Time [7] – When the record was created (defaults to current time)

Process:

- Enter all required information
- Click "Insert Measurement" [8]
- View confirmation message [9] and record summary [10]

Notes:

- Date/time format: YYYY-MM-DD HH:MM:SS (24-hour clock). You are encouraged to use the "Search History" page to locate the exact record you wish to modify.
- If no transaction time is entered, the current time will be used automatically
- When using component name only, the system will attempt to match it to the appropriate LOINC code. If several codes are found to match the input, the user will be notified and the process will be stopped.
- This page will only allow you to modify records that are active. A deleted record cannot be modified further.

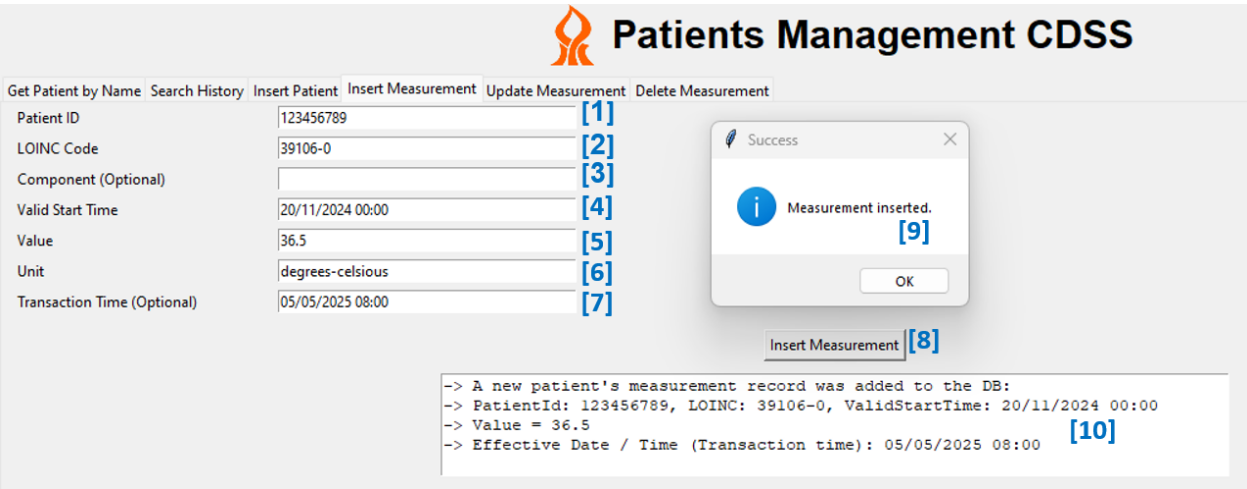


Figure 10: Inserting a New Measurement for a Patient.

2.5 Delete Measurement

This screen allows you to remove a measurement from active records.

Required Fields:

- Patient ID [1] – ID of the patient
- Valid Start Time [2] – Timestamp of the measurement to delete
- EITHER LOINC Code [3] OR LOINC Component Name [4] – At least one must be provided. A lookup will be performed in the patient's data to find the relevant LOINC code.

Optional Fields:

- Deletion Time [5] – When the deletion is recorded (defaults to current time)

Process:

- Enter all required information to identify the record
- Click "Delete Measurement" [6]
- View deleted record details [7]

Notes:

- Date/time format: YYYY-MM-DD HH:MM (24-hour clock)
- For Valid Start Time, you can enter just the date to delete the latest record from that day
- Deletions are "logical" rather than physical – the record remains in the database but is marked as deleted
- If no matching record is found, you'll receive an error message

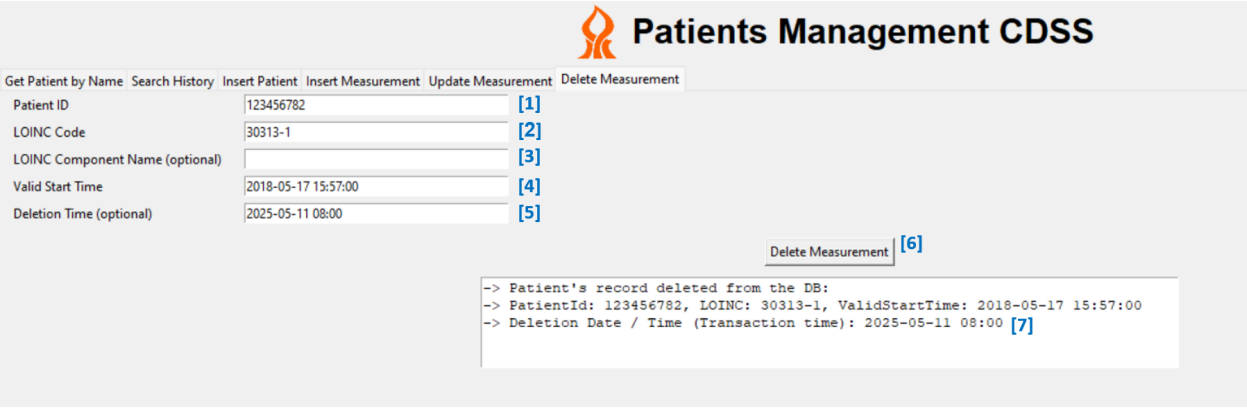


Figure 11: Deleting a Measurement for a Patient.

3 DSS dimensions

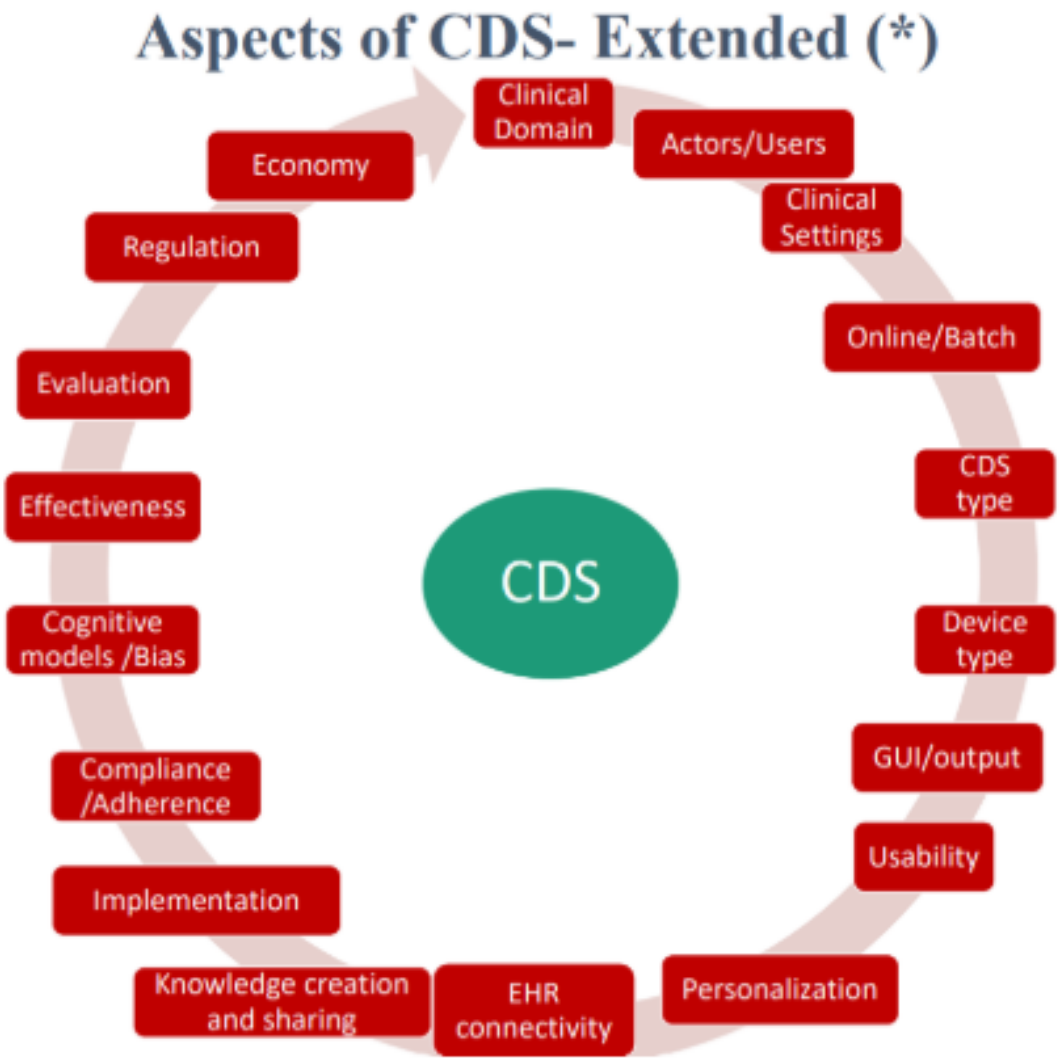


Figure 12: The DSS dimensions.

- **Clinical Domain:** At this stage, the system is not tailored to a specific clinical domain, as it supports any measurement associated with a valid LOINC code, making it applicable across diverse areas of clinical practice. It serves as a general-purpose data management system (currently).

- **Actors / Users:** The system is intended for use by clinical staff, including physicians and nurses.

- **Clinical Settings:** The system can be deployed across wards in the hospital and ICUs.

- **Online / Batch:** The system operates in an online mode, performing on-the-fly data validation and retrieval with high connectivity to the database, allowing users to interact with patient records in real time through a responsive form-based interface.

- **CDS Type:** At this stage, the system falls under the management category, as it focuses on organizing, validating, and displaying clinical measurement data rather than generating diagnostic or treatment recommendations.

- **Device Type:** The system is designed to be operated on a desktop computer, though certain aspects of it (Insert Measurement) can benefit from deployment to the hospital staff's tablets.

- **GUI / Output:** The system presents the information in a clean text-box style, where search results or updates on the performed modifications appear.

- **Usability:** The CDSS system achieves usability through a straightforward tabbed interface where each tab represents a specific clinical workflow, minimizing navigation complexity. Context-sensitive tooltips with clinical examples guide users through data entry, reducing cognitive load during busy clinical work. Data validation prevents common errors while providing meaningful feedback in clinical terminology familiar to healthcare professionals. The system's use of standardized LOINC codes supports potential integration with existing clinical systems, functioning as a complementary form rather than isolated software.

- **Personalization:** This system does not support client personalization and is strictly an information management system, not capable of recommending on personalized treatment.

- **EHR Connectivity:** Currently this system does not support external EHR connectivity and is designed to manage EMR records internally.

- **Knowledge Creation and Sharing:** There is no usage of external knowledge or guidelines in this system, making this dimension irrelevant.

- **Implementation:** This system is a stand-alone system, designed to replace other EMR records management systems, if exists.

- **Compliance / Adherence:** There is no recommendation component to this system, so compliance to such component is irrelevant.
- **Cognitive Models / Bias:** As this system is strictly managerial, it reinforces no biases.
- **Effectiveness:** The system offers an organized way of logging and accessing the hospitalization's records, allowing additional analytical systems to use this information for research or for managerial purposes.
- **Evaluation:** There are no regular user evaluations in the system, and the users are responsible for the proper use of it.
- **Regulation:** This system is not yet regulated in aspects of privacy or cyber security, thus does not meet the regulations by the health organization.
- **Economy:** This system is very cheap to deploy, uses local computational resources thus is very cost effective. The potential ROI from this system lies at better monitoring of the EMR records, which has the potential to improve the medical care as well as to standardize the billing process.