

Navertica Clinical Information System

Navertica Clinical Information System (NaClin) is an information system designed for the processing of medical and nursing documentation and the management of the operation of a healthcare facility providing inpatient and/or outpatient care. NaClin has been developed/built using the Microsoft Dynamics Power Apps Platform.

NaClin mainly covers the following areas:

- Patient Identification (Central Patient Register)
- Calendar for planning/ordering
- Beds availability
- Outpatient card and records
- Medical records / Childbirth process description
- Operating records
- Daily records
- Medication
- Nursing outpatient card
- Prescriptions, e-Prescriptions
- Examination requests
- Laboratory results
- Results of imaging methods
- Medical dismissal report
- Records of provided healthcare
- Operation management
- Reporting health care to national registers

NaClin is part of an integrated healthcare solution. Although NaClin maintains all records of medical procedures, the actual billing and invoicing of provided care to self-payers and health insurance companies is carried out in the hospital ERP system (NaHERP). Similarly, billing of consumed material and medicines takes place in ERP.



The basic features of NaClin are:

- Compliant with HL7
- Compliance with ISO 9001 requirements
- Compliance with ISO 27001 requirements
- System operation in the cloud or on-premise
- Access from mobile devices
- Responsive web design
- Connection to the Navertica HERP economic system based on the Microsoft Business Central platform or another ERP system
- Connection to Microsoft PowerBI
- Group and individual access rights settings
- Work with multiple patient records simultaneously
- Copy texts between records
- Possibility to prepare and share text templates
- Possibility to connect image information resp. PDF, JPG, etc. files to individual records
- Possibility to use barcodes
- Integration with Microsoft Office
- Interface for laboratory and other hospital complement systems

Solution Concept

Microsoft Dynamics 365, respectively the Microsoft PowerApps platform is an integrated system for complex coverage of customer care processes across different kinds of organizations. Using the right methodology ensures that this system implementation is quick and efficient. However, the standard Dynamics 365 without NaClin solution does not include any tools for processing medical and nursing documentation, or managing the operation management of a healthcare facility, providing both inpatient and outpatient care.

NaClin extends the standard Dynamics 365 with advanced tools for managing medical procedures as well as managing of medical records, including requests and results. NaClin also provides the hospital ERP system with information on medical/nursing procedures, bed fund management, drug, and medical material consumption and other operating costs.

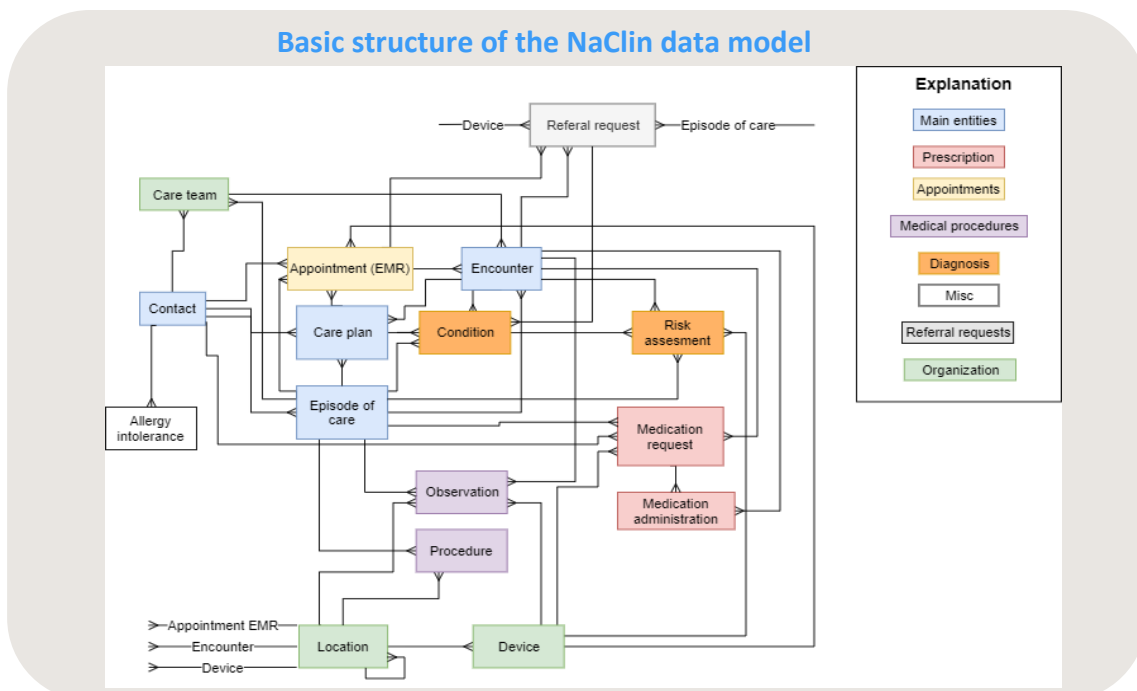
Of course, standard Dynamics 365 functionality, such as navigation, drill-down tracking, filtering, and many other useful gimmicks, is part of new functionalities.

Through defined interfaces, NaClin can work with any ERP and/or health insurance billing system. However, the integration with Navertica HERP based on Microsoft Dynamics Business Central represents an advantage. Therefore, both systems partly share Microsoft Dynamics based on Microsoft Common Data Services (CDS) platform.

Generally, concerning the need for integration with other systems, NaClin provides efficient means for two-way communication between sub-systems thanks to the shared database concept of the so-called Common Data Model (CDM). Two-way data exchange takes place between sub-systems regardless of their nature. Examples of such sub-systems include, for example, ERP systems, DMS systems for document storage, or systems for providing data for BI (Business Intelligence).

Data model

The NaClin data model is derived from the Microsoft Common Data Model (CDM) for healthcare based on the HL7 international standard and is completed by other entities by NAVERTICA. CDM is a part of the Open Data Initiative, a collaboratively developed vision of Microsoft, Adobe, and SAP. Microsoft used entities of Fast Healthcare Interoperability Resources (FHIR), such as patient, plan, and state of care as the basis for the CDM for healthcare. These entities were integrated into the Dynamics 365 Healthcare Accelerator. The data model created in this way is generic with all necessary links and can be filled with data from any medical field.



Such a data model relates to the data model NaClin, which contains all the necessary entities, including the relationships between them. It also includes particular data fields predefined for various medical fields. Structures and processes can be configured and customized to the given healthcare facility. E.g., for small outpatient-type medical facilities, NaClin can be simplified, both in terms of data and process. Such simplification reduces the burden on the small medical staff, which means that their activities will not be as complicated as those associated with carrying out the complex clinical processes of a large hospital.

The model is entirely similar for both the outpatient department (outpatient card and record) and the inpatient department (medical record, daily record).

The user interface

NaClin enables working at various levels of detail, from workplace overview screens to detailed records, whether these relate to patients, medications, visits, medical procedures or any of the many other record-keeping included in the solution. The user has a working environment adapted to his/her role in the diagnostic-therapeutic process, and the corresponding screens he/she is working. Within the scope of its activity, the user can be assigned to multiple roles, with a set of access rights according to role and workplace. It is also possible to define the meaning and content of roles and workplaces - without programming. It is possible to create or change data fields in individual entities used medical data storing, allowing full individualization of individual medical facilities according to their needs.

The work area for healthcare professionals is always divided into several optional areas so that the doctor (or nurse) does not lose track of what the patient is working with and what they do. For example, the workspace may take the form of an outpatient dashboard displaying a calendar of ordered patients and adjustable waiting queues or assigning patients to specialized procedures or devices.

Outpatients work area

The screenshot displays the 'Outpatients work area' interface. The main calendar view shows appointments for Sunday, February 09, 2020, to Saturday, February 15, 2020. The calendar is organized by time slots, with appointments represented by colored blocks. The interface includes a top navigation bar with 'Working Space' and 'Episodes of Care Current Department'. Below the calendar, there are three panels: 'Workspace Today's Booked Appointments Current Department', 'Waiting Room Current Department', and 'Encounters Created Today Current Department'. The 'Waiting Room' panel shows a list of patients with their names, appointment types, and times.

Appointment ID	Patient Name	Appointment Type	Time
A-20169-GMC-Mills Alice	Mills Alice	Regular visit	8:00 AM
A-20175-GMC-Huuba Nikoia	Huuba Nikoia	Regular visit	8:00 AM
A-20174-GMC-Faber Daniel	Faber Daniel	Regular visit	8:00 AM
A-20173-GMC-Beran Adam	Beran Adam	Regular visit	11:00 AM
A-20172-GMC-Bale Anna	Bale Anna	Vision check	12:00 PM
A-20171-GMC-Aldridge Daniel	Aldridge Daniel	Vision check	1:00 PM
A-20170-GMC-Albot Emma	Albot Emma	Surgery	2:00 PM

The work area can also take the view form of a history of medical records or outpatient card. In addition to the control panels and icons, you can access areas such as visits, medical histories, diagnosis, prescription, procedures, requisitions, and more.

Outpatient's card

The screenshot shows the NaClin interface for an outpatient card. The main header displays the patient's name, ID, and principal diagnosis: E11.9 Type 2 diabetes mellitus without complications. The interface is divided into several sections:

- Basic Information:** Shows the patient's type as 'Ambulatory Card', primary doctor as 'Jaromir skorkovsky', and global anamnesis as 'Albot Emma Anamnesis'.
- Quick Create:** Buttons for Appointment, Encounter, Medication, Prescription, and Request.
- Encounters:** A table listing encounters with columns for Name and Created On.

Name	Created On
000278 - Ambulatory visit	11.02.2020 13:29
000277 - Ambulatory visit	11.02.2020 12:26
- Timeline:** A vertical list of activities with icons and timestamps.
 - Diagnosis Activity from fajkos jiri (13:32): Type 2 diabetes mellitus without complications.
 - Encounter Activity from Encounter created o... (13:24): 000278 - Ambulatory visit.
 - Diagnosis Activity from fajkos jiri (13:24): Flu due to oth ident flu virus w unsp type of pneumonia.
 - Encounter Activity from Encounter created o... (10:59): 000277 - Ambulatory visit.
 - Appointment (EMR) from fajkos jiri (10:59): Albot Emma - Surgery.
 - Appointment (EMR) from GMC-JB (10:31): Albot Emma - Vision check.
- Diagnosis:** A list of diagnoses with icons and timestamps.
 - E11.9 Type 2 diabetes mellitus without complications (11.02.2020 13:32): Principal diagnosis.
 - J10.00 Flu due to oth ident flu virus w unsp type of pneumonia (11.02.2020 13:24): Principal diagnosis.
- Anamnesis - A-00170-GMC-Albot Emma:** A section for anamnesis with a 'Local' toggle and a table for related anamnesis.

Name	Anamnesis - A-00170-G...
Personal Anamnesis	Diabetes mellitus II.
Family Anamnesis	Mother-Hypertension, Father - healthy

In addition to statistical record-keeping, NaClin also assists the worker in an active way; for example, assigning procedures to the attending doctor and recording their performance, such as administering medications, measuring physiological parameters, nursing diagnosis:

Record kept of the implementation of nursing tasks on daily record on the course of diseases

The screenshot shows the NaClin interface for a daily record on the course of diseases. The main header displays the patient's name, ID, and episode of care: Decurus 12. 2. 2020. The interface is divided into several sections:

- Summary:** Shows the patient's name and the date of the record: Decurus 12. 2. 2020.
- Subjective:** A text field containing the patient's report: 'she noted the onset of "aching pain under her breast bone"'. The objective section contains the plan: 'Plan 1.Continue aspirin, heparin, nitrates, beta blockers, nasal oxygen. Follow serial'.
- Today's Medication Tasks:** A table listing medication tasks for the day.

Order	Medication	Time	Notes
1	ZARZIO 30 MU/0.5 ML	7:00	
3	ZARZIO 30 MU/0.5 ML	13:00	
1	ZARZIO 30 MU/0.5 ML	19:00	Note [input field] ✓
- Today's Measuring Tasks:** A table listing measuring tasks for the day.

Task	Time	Unit
Alice Mills body temperature	6:00	°C
Pressure x	6:00	150/47 °C
Alice Mills body temperature	11:00	37.5 °C
- Medication Requests:** A table listing medication requests for the day.

Name	Instructions for Use...	Instructions for Usage Detail
ZARZIO 30 MU/0.5 ML	12.02.20 1-1-1	---
- Measuring Requests:** A table listing measuring requests for the day.

Name	Instructions
Body Temperature 12. 2. 2020 - 15. 2. 2020	---
Pressure 12. 2. 2020 - 16. 2. 2020	---
- Nursing Activity Requests:** A table listing nursing activity requests for the day.

Name	Nursing Activity	Instructions

NaClin covers the areas of standard medical outpatient and inpatient care processes. The environment is set up so that the user is always able to see relevant records, arranged a summary of the patient's medical records in the medical record or outpatient record, including the possibility of searching and filtering. Patients can be assigned to different dispensary groups. The system enables adding other functionalities according to the needs of individual work areas, including own types of patient records – e.g., pregnancy book, structured and unstructured documents, and forms. To save time, the doctor can use predefined templates and texts from previous findings when writing records. The doctor always sees the whole picture, thanks to a concise and informative timeline that chronologically depicts patient-related events, has the option of looking operatively into previous records and can update patient data as needed at any time. Acceleration of NaClin operations can be achieved by the bulk entry of activities such as medication, nursing procedures, etc.

An integral part of NaClin is also the interface for the connection of diagnostic complement (especially laboratories). Requests for examination are issued in NaClin and transmitted to the laboratory system. If the portal is a part of the laboratory system, the requests are issued directly there. The transfer of examination results to patient records is automatic. It indicates whether the doctor has seen them, or the results are new. Requests and conciliary examinations take place inside NaClin, but it is also possible to use interfaces to connect external systems.

A more extensive part of NaClin is also the so-called Web portal of the patient through which the patient communicates with the medical facility – system allows the patient to book a reservation.

Visit the outpatient department

- Patient registration, patient outpatients card creation
- The registered patient can (according to the settings) electronically order himself through the Patient Web Portal
- Arrival in the waiting room and queuing – staff always have an overview of waiting patients, measuring waiting time
- Taking a medical histories, performing an objective examination, making a diagnosis, creating a structured outpatient record, requesting an additional examination, entering medical procedures for insurance companies, prescriptions with the possibility of using positive sheets and subsequent printing of a medical report
- Booking the next visit

Hospital inpatient ward

In the inpatient department, NaClin enables, among others:

- central patient records keeping medical records management
- administrative and medical patient admission
- structured medical record/childbirth process description keeping
- structured daily record on the course of the disease
- therapeutic plan for the patient creation
- outpatients, medication, diets, compliance monitoring
- nursing diagnoses – nursing documentation
- requests for diagnostic complement and acceptance of results
- measurement of physiological indicators
- overview and control of the fulfillment of the nursing plan
- administration of conciliatory examinations
- relocation of patients within or between departments - setting according to established logic in a hospital facility
- administrative and medical discharge of the patient

Benefits

Functions	Consequence
Unified and comprehensive system	Efficiency - work in one user environment
Computer processing, integration, and simplification of processes and medical equipment	Reducing administrative burdens, more time for treatment
Microsoft platform	Long-term perspective and platform and product support
Homogeneous system and application software environment	Reduce maintenance and upgrade costs, reduce IT staff
Possibility of integration to related systems (ERP, DMS, Business Intelligence...)	Significant time savings, user comfort, reduced data redundancy
A single database, single data repository	Reducing error rate, reducing processing time => reducing the number of employees
Sharing and consolidating information in a healthcare facility	Reduction of duplicate examinations, effectiveness of treatment
Security elements	Multi-level protection against unauthorized access to data, sophisticated security model
Up-to-date information online	Management at any time has a completely up-to-date overview of the system status and the work of users
System logging, timestamps, versions and history	Increased security, prevention of unauthorized data editing

Solution details

Type of solution: Complex information system (licenses and services)

Product: MS Dynamics Power Apps

Significance of Microsoft technologies: Increasing productivity of user solutions on the Microsoft platform
Besides, the integrated vertical solution is represented by extensive functionality over the standard Microsoft application platform

Industry classification: health care

Specification of customer size in the market segments considered: Medium segment: 50-3000 employees

Supported language versions: English, Czech

Price of the solution: It is necessary to contact the seller

NAVERTICA a.s.

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