NORAV medical

ECG Excellence

NEMS-Q

INSTRUCTIONS FOR USE

VERSION: 2.7.9.0

DATE: 09.02.2026

CE
2797

www.norav.com info@norav.com

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General Information

NEMS-Q. Instructions for Use.

For software version: 2.7.9.0 Software release date: 09.02.2026

For device models: Norav NR Series, Norav PC-ECG 1200 Series, NBP-24 NG, NBP One, Oscar 2, NSpiro™ Spirometry, MiniSpir

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Item(s)	Basic UDI-DI
Software: NEMS-Q v2.7.9.0	426049856DE55252NMKEYVQ
Devices: Norav NR Series	426049856DE55252NMAMBTG
Devices: Norav PC-ECG 1200 Series	426049856DE55252NMDECT9
Devices: NR-1207-E and NR-1207-3	426049856DE55252NMNRSX2
Devices: NBP One	0840935100000000000250D92
Devices: Oscar 2	08409351000000000002507E
Devices: MiniSpir	805299032052-053D4

Copyright Information

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Compliance Information

This product (software) complies with the applicable requirements of Regulation (EU) 2017/745 of the European Parliament and of the Council on medical devices, as well as the UK Medical Devices Regulations 2002 (Statutory Instruments 2002 No. 618 Consumer Protection), as amended.

CE 2797 UKCA 0086

This product (software) is intended for installation on equipment that meets the applicable edition of IEC 62368-1. Medical devices used in conjunction with this product must comply with the relevant IEC 60601 series standards, as appropriate. In addition, any electromagnetic interference generated by devices in this configuration must conform to Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014.

⚠Caution: Federal Law restricts this device to sale by or on the order of a licensed physician or healthcare provider.

Disclaimer

This product (software) is intended solely as a decision support system for individuals who have received appropriate medical training, and must not be used as the sole basis for making clinical decisions pertaining to patient diagnosis, care, or management. Any application of medical information from the product, other than its original design or intended use, is not advised and is considered misuse of the product.

Important Usage Notice

Like in all medical (including but not limited to ECG) data processing systems, noise or artifacts may produce false-positive events. Therefore, patient data must be reviewed and edited only by a qualified technician or physician who has received appropriate training. Norav Medical and its staff shall not be held liable for patient data reviewed or edited by an unqualified person, or by a qualified person acting outside the scope of appropriate medical judgment.

Norav Medical Limited Warranty

Norav Medical products are warranted to be free from manufacturing and material defects for a period of two (2) years from the date of shipment by Norav Medical or an authorized dealer to the original purchaser.

Expendable supply items, including but not limited to electrodes, lead wires, and patient cables, are excluded from this warranty. This warranty does not apply to any product that Norav Medical determines has been modified or damaged by the customer.

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Any action for breach of warranty must be commenced within one (1) year of the alleged breach or be forever barred. Any repairs made to the product that are not covered by this warranty shall be billed to the customer.

For service or technical support, please contact your local supplier or Norav Medical.

Table of Contents

1. Introduction

Document Conventions

Warnings Cautions and Notes

Pay particular attention to specific points in a procedure when one of the following messages is displayed:

 **Warning**	Warnings call attention to possible hazards involving potential damage or injury to persons.
 **Caution**	Cautions refer to practices necessary to protect against potential damage to equipment or loss of equipment. Pay careful attention to instructions.
 **Note**	Notes provide pertinent information to help obtain optimum software/system performance or signify an important step or procedure requiring special attention.

Abbreviations and Acronyms

Abbreviation	Meaning
ABPM	Ambulatory Blood Pressure Monitoring
BPM	Beats Per Minute
BP	Blood Pressure
DB	Database
ECG	Electrocardiogram
EHR	Electronic Health Record
EMR	Electronic Medical Record
EMS	ECG Management System
GDT	Gerätedatentransfer (device data transfer) A format to transfer data among medical devices and software systems.
HL7	Health Level Seven – platform for connectivity between software and EHR
HR	Heart Rate
HRV	Heart Rate Variability
ID	Patient Identification
IFU	Instructions For Use
LP	Late Potential
LQTS	Long QT Syndrome
MI	Myocardial Infarction
NEMS	Norav ECG Management System
METS	Metabolic Stress Estimation
MRN	Medical Record Number
QT	Time from the start of the Q wave to the end of the T wave
Record	Rest/Stress/Holter ECG/ABPM test
SN	Serial Number
ST Segment	The ST segment encompasses the region between the end of ventricular depolarization and beginning of ventricular repolarization on the ECG (see https://en.ecgpedia.org/wiki/ST_Morphology)
USB	Universal Serial Bus

Intended Use

NEMS-Q Intended Use

The NEMS-Q Management System software is intended for marketing to medical professionals and for point-of-care use. The software is designed to work with local/remote Norav management database that commonly stores, retrieves, displays, edits, and prints high-resolution records data received from devices.

NEMS-Q is used as an archive system allowing managing tests and patients as well as displaying real-time status of tests, it can generate reports, download/prepare Holter devices, managing users/sites/modalities/departments, receive worklist from EHR, and more.

Furthermore, NEMS-Q allows creating new patients, viewing existing patients and their test records, opening a test through the Norav Testing Tools, and performing additional operations like comparing tests, analyzing tests, etc.

NEMS-Q can be integrated with EHR systems via HL7.

PC-ECG 1200 Intended Use

ECG Intended Use

ECG is intended to identify normal conditions, arrhythmia patterns, myocardial ischemia, rate abnormalities, or prognostic features in adults and pediatric populations. It is particularly useful for:

- Patients with suspected cardiac abnormalities.
- Populations at an age or period where routine baseline evaluation of ECG characteristics is essential.

QT Analysis within PC-ECG 1200 aids in assessing long QT syndrome (LQTS), which, in certain cases, can be managed with pharmacological therapy. Additionally, QT dispersion measurement, representing the variance between maximal and minimal QT values, indicates ventricular repolarization homogeneity.

PC-ECG 1200 has been tested to measure Heart Rate Variability (HRV) and Late Potential (LP) within a tolerance of 1 millisecond. The clinical significance of Heart Rate Variability and Late Potential, both features of the PC-ECG 1200, should be assessed by a physician.

Stress Testing Intended Use

Stress testing, a primary method for diagnosing myocardial ischemia related to coronary artery disease, evaluates the heart muscle's contractile capacity during exercise, recorded via ECG.

This testing is critical for patients experiencing angina pectoris, symptomatic of myocardial ischemia and indicative of reduced cardiac muscle blood supply.

In stress testing, the contractile capability of the heart muscle is captured by ECG during patient exercise. The ECG monitors patient exercise on a bicycle, treadmill, or other devices, with activity levels set by predefined protocols. ECG signals are recorded for the rest, exercise, and recovery phases of the exercise protocol. The changes in ECG waveforms are compared with the resting ECG records to detect myocardial ischemia or coronary artery disease (CAD), evaluate ST segment depression, and monitor CAD treatment efficacy. The significance of observed ST segment changes, analyzed through a validated algorithm, must be determined by a physician.

Holter NH-301 Intended Use

The Holter NH-301 analysis system is intended for patients requiring ambulatory (Holter) recordings from 1 to 336 hours. This recording is commonly used for:

- Evaluation of symptoms suggesting arrhythmia or myocardial ischemia.
- Documenting therapeutic interventions in individual patients or patient groups.
- ST segment changes evaluation.

- Patient's response assessment after resuming occupational or recreational activities, for example, post-myocardial infarction or cardiac surgery.
- Clinical and epidemiological research studies.

The NH-301 Holter analysis system contains Heart Rate Variability (HRV) measurements. The clinical significance of HRV measurements should be determined by a physician.

NSpiro™ Intended Use

NSpiro is a spirometry system for accurate measurements crucial in asthma management, detecting acute respiratory disorders, and pharmaceutical trials.

The system can be used standalone or integrated with the Norav Medical ECG Management System (NEMS) for expanded functionality. NSpiro includes a powerful SQL database and offers optional interfaces for connectivity with various hospital information systems, supporting a wide range of clinical applications.

MIR Spiro Intended Use

MIR Spiro software is a database for managing spirometry and oximetry tests acquired from compatible spirometers. The connected spirometers carry out all the measurement functions and calculate spirometric and oximetric parameters. The software provides a series of parameters related to human respiratory function.

This software is for medical or paramedical staff and must be used under the supervision of a physician. Moreover, it must be used and serviced by qualified personnel. This software is to be used at a doctor's practice or hospital ward.

ABPM Devices Intended Use

The NBP One, Oscar 2, and NBP-24 NG are advanced noninvasive oscillometric ambulatory blood pressure monitoring (ABPM) devices intended for use with the NEMS-Q system. These devices can record and display up to 250 measurements or provide 24 hours of systolic and diastolic blood pressure and heart rate monitoring.

They are intended for use as aids or adjuncts to diagnosis and treatment when measuring systolic and diastolic blood pressures over an extended period is necessary for adult and pediatric patients (over 4 years). These systems are intended solely for measurement, recording, and display purposes to assist licensed physicians in making diagnoses.

Norav Recorder (NR) Intended Use

The Norav NR series (hereafter referred to as "NR") devices enable the capture of ECG waveforms with subsequent recording and/or data transmission to an external computer.

The NR series devices are intended for executing:

- Ambulatory Holter ECG
- Ambulatory Event ECG
- Resting ECG
- Stress ECG
- Telemetry ECG

The following NR-series devices are compatible with the NEMS-Q system and related applications:

Model	ECG channels	Patient cable Leads	Pacemaker detection	Acceleration sensor	Respiration signal	Voice recording	Bluetooth communication	USB communication	Ambulatory (Holter recording)	Rest ing ECG	Stress ECG
NR-302	3	3, 5, 7	**yes**	no	no	no	no	**yes**	**yes**	no	no
NR-314	3	3, 5, 7	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**	no	no
NR-314-T	6	4, 5	**yes**	no	no	no	**yes**	no	no	no	no
NR-1207	3, 12	3, 5, 7, 10	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**	no	no
NR-1207-3	3, 6, 12	3, 4, 5, 7, 10	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**
NR-1207-E	6,12	4, 5, 10	**yes**	no	no	no	**yes**	no	no	**yes**	**yes**
NR-314-P	3	3, 4, 5	**yes**	**yes**	no	no	**yes**	**yes**	**yes**	no	no

The NR series devices are indicated for use on patients who may be asymptomatic or who may experience transient symptoms suggesting conditions like arrhythmia or myocardial ischemia. They are used for evaluating therapeutic interventions, monitoring patients for ST segment changes, assessing patient responses to post-cardiac events, in clinical research, and for patients with pacemakers or requiring QT interval reporting.

For more detailed information, please refer to the relevant NR device manual.

The NR series devices are designed for use by medical clinical professionals who must instruct patients on their correct use, ensuring that patients clearly understand these instructions.

MiniSpir Intended Use

MiniSpir is a USB spirometer for real-time tests directly on a PC. The device is powered via an integrated USB cable, has no display or internal memory, and records data directly in the spirometry software. This device can be used exclusively with the Norav Medical ECG Management System (NEMS) for expanded functionality.

2. Overview

Package Contents

The NEMS-Q package contains the following elements:

- Software installation media
  - ♦ NEMS-Q software installation package
  - ♦ NEMS-Q Instructions for Use
  - ♦ Readme.txt
- Software key

Compatible Applications

- PC-ECG 1200 (Rest, Stress, HRV, LP, and ECG Monitoring)
- NECG Cardiograph
- NM-700 Telemetry
- Holter NH-301
- NSpiro™
- MIR Spiro

Compatible Devices

- NR Series devices, including NR-314-P
- PC-ECG 1200 Series
- NBP-24 NG
- NBP One
- Oscar 2
- NSpiro™ spirometry
- MiniSpir spirometry

Recommended PC Specifications

Component	NEMS-Q Client
CPU	i5 @ 2.0 GHz 10th generation
RAM	4 GB
Free Disk Space	8 GB
Operating System	Windows 10 Pro 32/64 bit or Windows 11 Pro
Free USB/LAN Ports	1
Prerequisites	.NET Framework v4.72
Installed Drivers	HMS ABPM device NBP One device Norav driver Sentinel driver Norav printer driver
Database	SQL 2019 and later
Additional Software (3rd parties)	SQL Management Studio HMS IEM ABPM PDF Viewer

3. NEMS-Q Installation

The software package runs on Windows 10/11 operating systems.

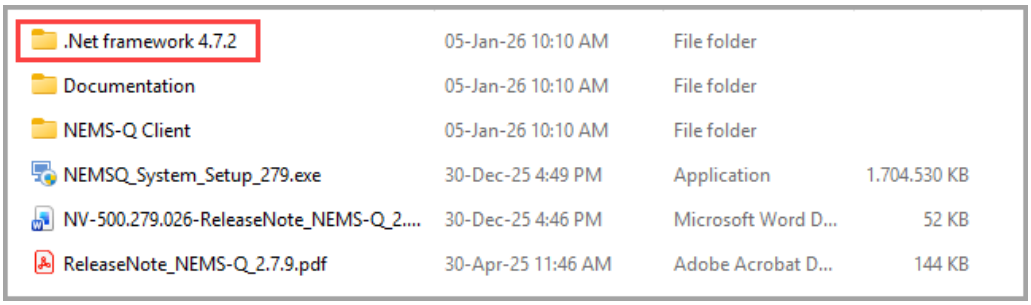
The installation process for the NEMS-Q software is designed to run automatically and prompts the user only to select certain installation and setup options. Please note that during the installation, specific third-party software, as listed below, will be installed on your PC to ensure the proper functioning of the application.

Required Software Setup

Before starting the installation process, ensure that the **.NET Framework v4.7.2** software or later is installed on your computer.

To install the .NET software:

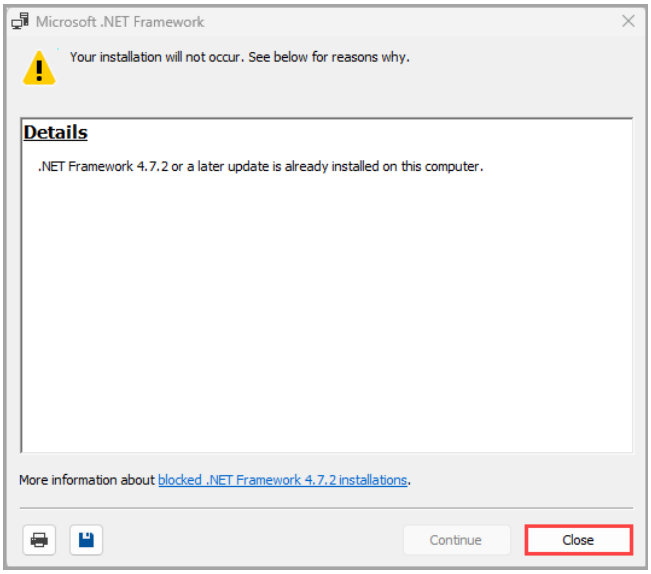
1. Click the provided link to download the NEMS-Q installation package, or insert a data storage device with the package into an available USB slot on your computer.
2. Navigate to the installation package location.
3. Navigate to the **.Net framework 4.7.2** folder within the installation package.



4. To start the .NET Framework software setup, double-click the installation file. The file should have a name similar to `NDP472-KB4054530-x86-x64-AllOS-ENU.exe`.
5. Follow the on-screen instructions until the installation is successfully completed.

Note

If **.NET Framework v4.7.2** is already installed on your PC, you will see the message shown below. In this case, click **Close** to terminate the installation.



When the appropriate .NET Framework version is installed, proceed to the NEMS-Q Server installation.

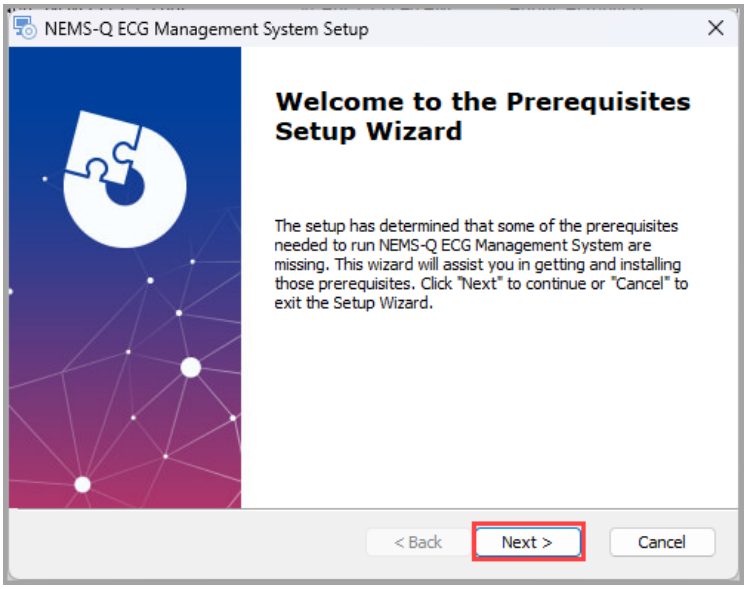
NEMS-Q Server Installation

To install the NEMS-Q Server, it is advised to close all active programs. This will prevent potential errors during the installation and setup.

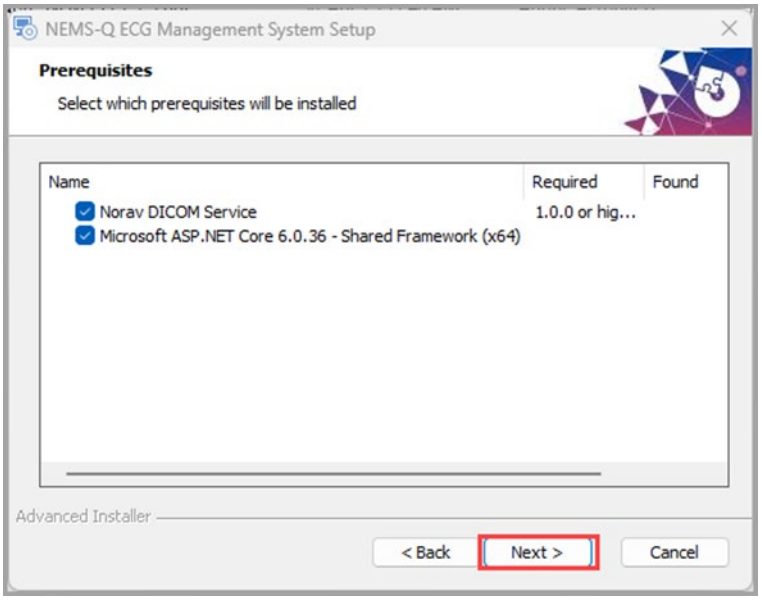
> **Note**
>
> To prevent potential installation issues, run the installation process as an administrator.

Follow these steps for a smooth installation:

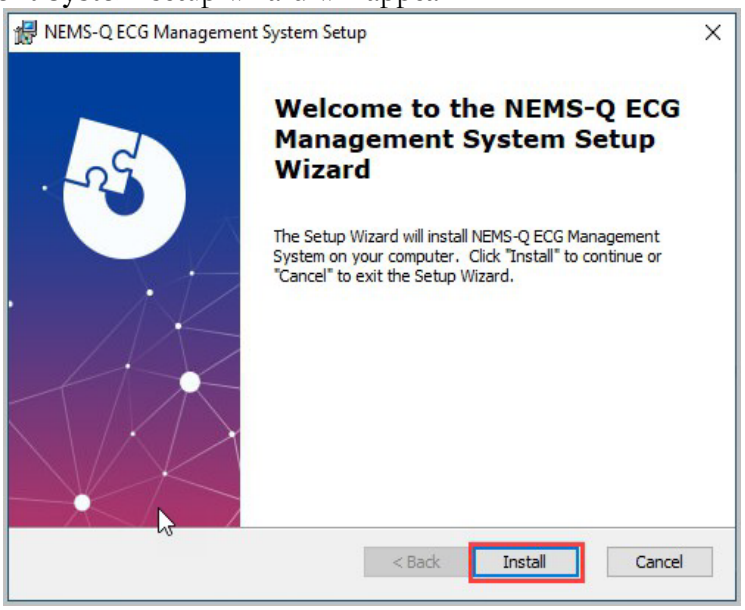
1. Click the provided link to download the installation package, or insert a data storage device with the package into an available USB slot on your computer.
2. If you are using a USB device, the installation process should start automatically (if the autorun feature is enabled in your environment). If the installation does not start automatically, or if you downloaded the installation package via the web link, follow these steps:
    2.1. Open a Windows Explorer window.
    2.2. Navigate to the respective drive and directory (e.g. C:\, F:\) or access the location where the installation package was downloaded.
    2.3. Run the **NEMSQ_System_Setup_[VERSION NUMBER].exe** file within the Windows Explorer window **as an administrator** to start the installation process. For example, run NEMSQ_System_Setup_277.exe, where VERSION NUMBER=277 corresponds to version 2.7.7 of the NEMS-Q application.
    2.4. A **Prerequisites Setup Wizard** dialog box will appear. Click **Next** to proceed.



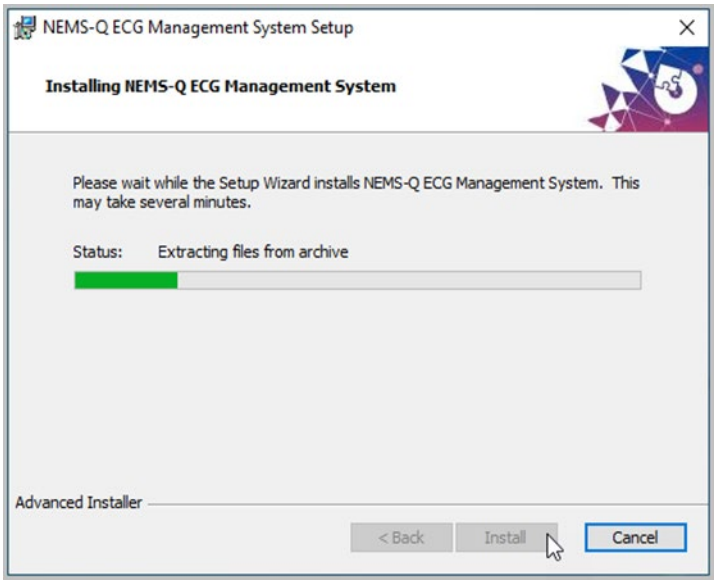
    2.5. On the next screen, review the checkboxes. Select the **Norav DICOM Service** checkbox to install the service required for working with external ECG devices via the DICOM protocol. If you do not select this option at this step and later require this functionality, you will need to **reinstall the application** to install the service. Click **Next** to proceed.



2.6. When the prerequisites are installed, a dialog box of the **NEMS-Q ECG Management System** setup wizard will appear.

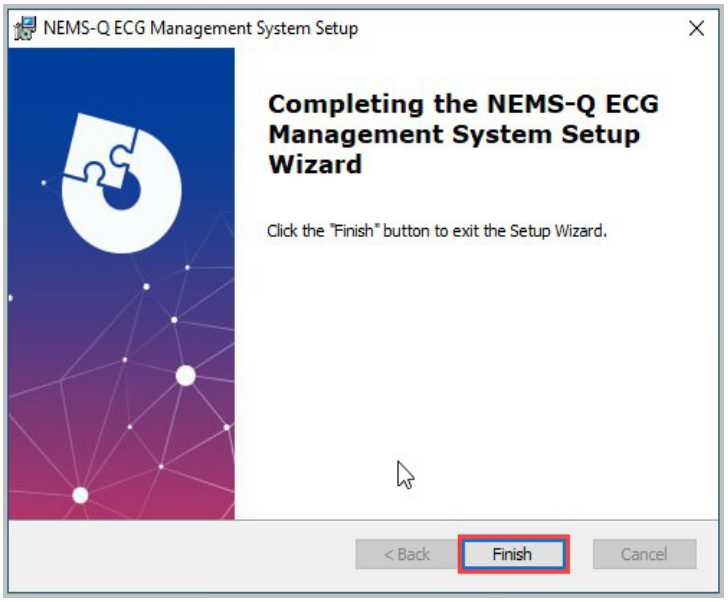


3. Click **Install** in the system setup wizard dialog box. The installation process will begin, and a progress bar will be displayed.

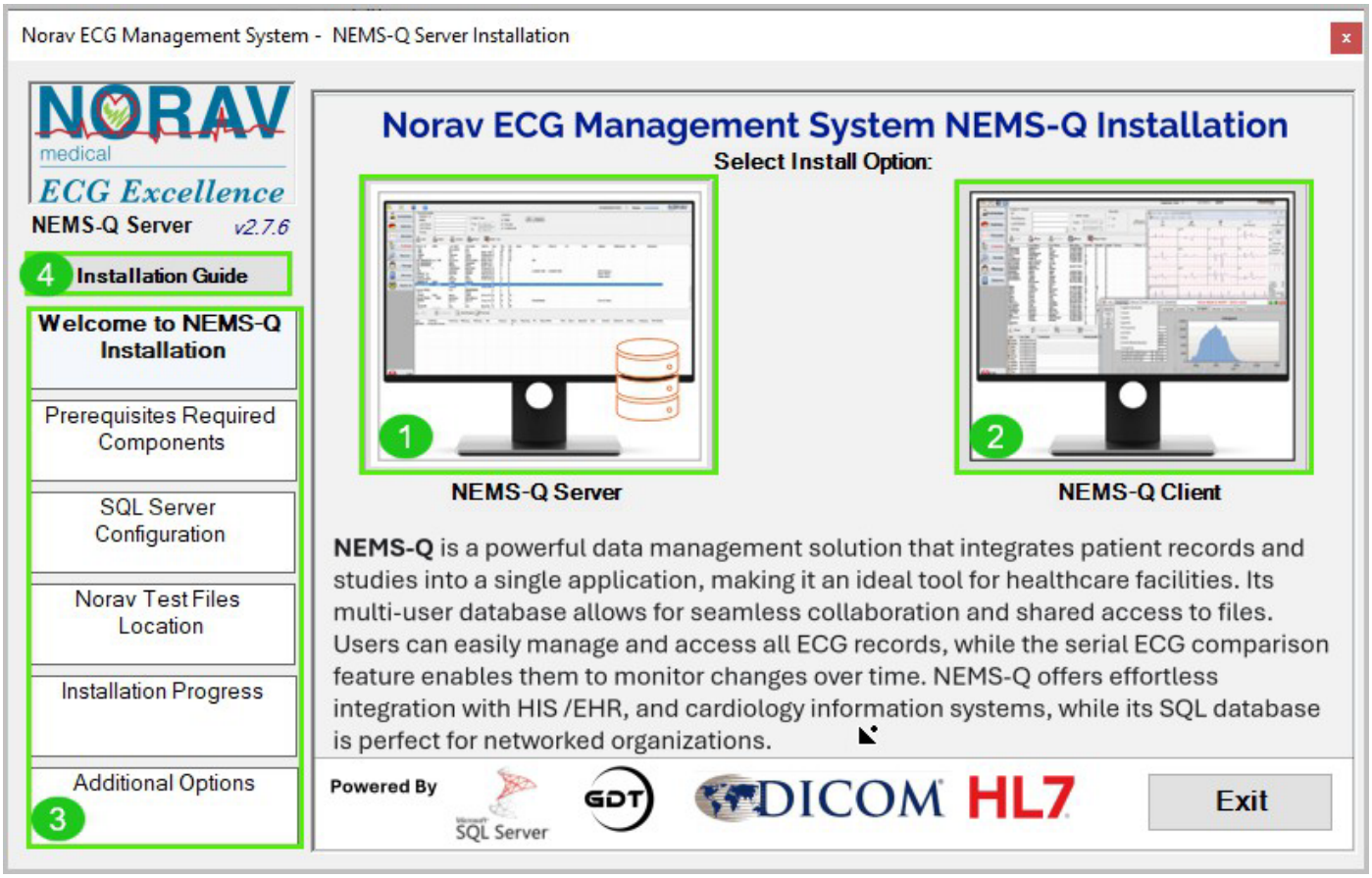


4. Click **Finish** when prompted. The dialog box will close.

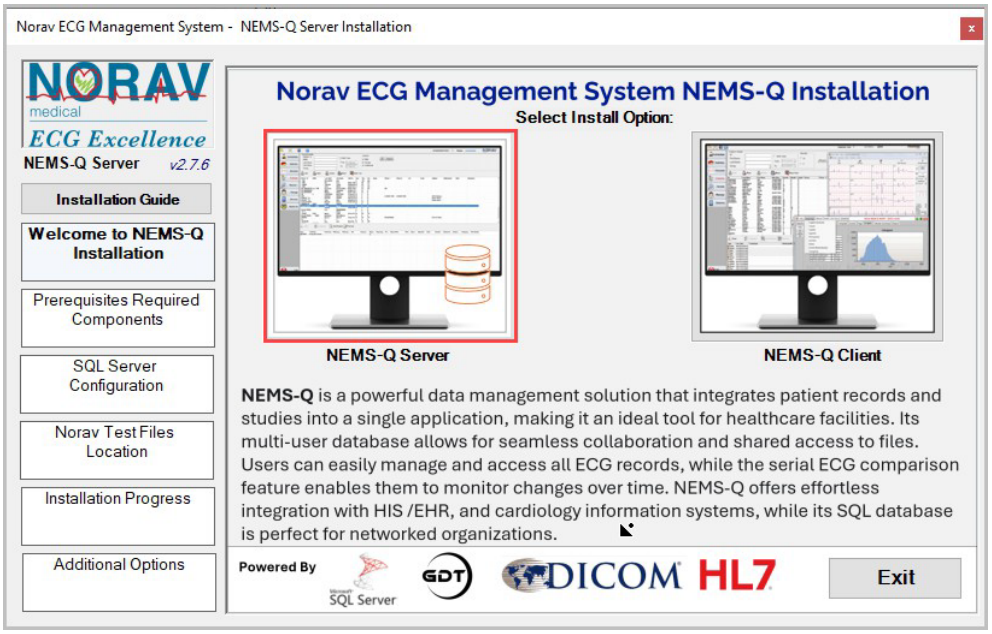
> **Note**
>
> To avoid any issues during installation, carefully follow the provided installation instructions. Complete the initialization process as described in this step, then close the dialog box.



5. After this, you will be prompted with the NEM-Q Server/NEMS-Q Client installation dialog box, which displays installation options and steps:
    - 5.1. **1:** NEMS-Q Server installation button. This button launches the Server installation process.
    - 5.2. **2:** NEMS-Q Client installation button. This button launches the Client installation process.
    - 5.3. **3:** Installation steps menu. This menu indicates the current installation step.
    - 5.4. **4:** Installation Guide button. Click this button to access the Installation Guide.



6. **Welcome to NEMS-Q Installation**: Click the NEMS-Q Server button (icon) to proceed with the installation of the NEMS-Q server. Follow the on-screen instructions until the installation is successfully completed.



Note

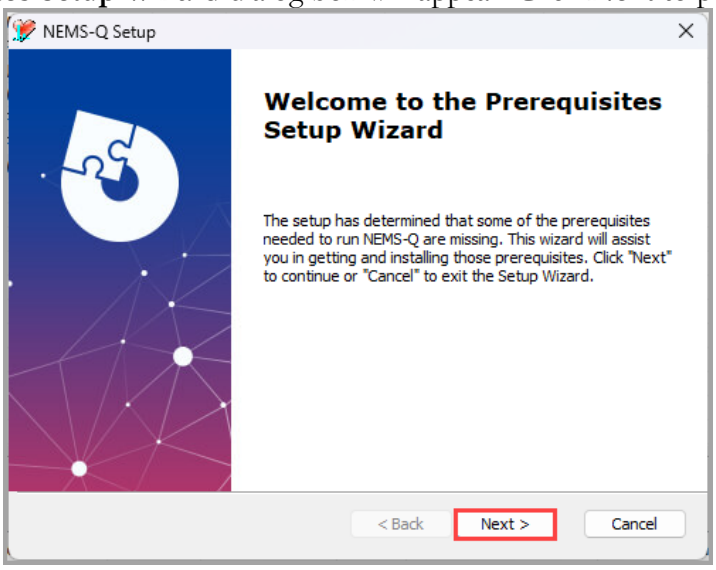
If needed, you can click the **Installation Guide** button located right above the "**Welcome to NEMS-Q Installation**" text on the left side of the installation screen, to open the Installation Guide.

NEMS-Q Client Installation

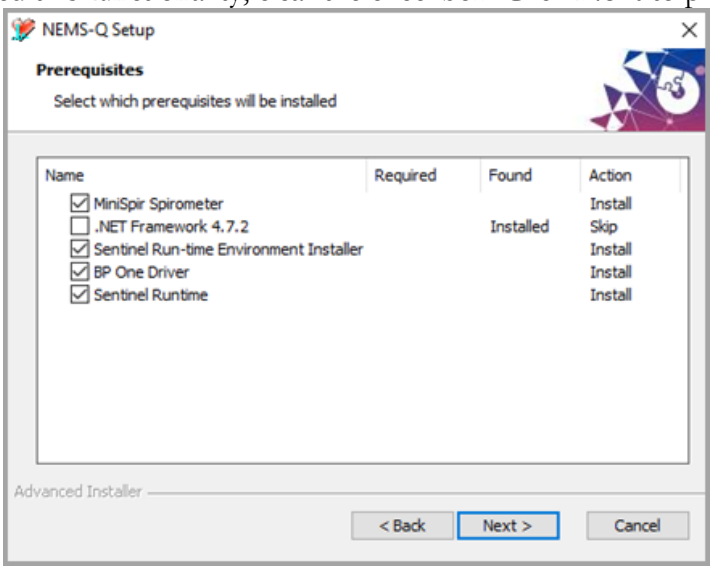
To install the NEMS-Q Client, it is advised to close all active programs. This will prevent potential errors during the installation and setup.

Follow these steps for a smooth installation:

1. Locate the NEMS-Q_Client.exe file in the NEMSClient folder (default path: [Drive Name:]\Program Files (x86)\Norav Medical\NEMS-Q ECG Management System\NEMS-Q DataBase\InstallFiles\NEMSClient).
2. Right-click on the file and select **Run as administrator** to start the installation process.
3. A **Prerequisites Setup Wizard** dialog box will appear. Click **Next** to proceed.



4. On the next screen, review the checkboxes. Select the **MiniSpir Spirometer** module checkbox to install the software application for using the MiniSpir spirometry device. If you do not need this functionality, clear the checkbox. Click **Next** to proceed.



5. Once the prerequisites are installed, you will be prompted with the NEMS-Q Setup wizard. Click **Next** to proceed with the Client installation. Follow the on-screen instructions until the installation is successfully completed.

4. Getting Started

Overview

Norav Medical ECG Management System (NEMS) is a comprehensive management solution that combines studies and patient records in a single application, allowing automation of processes, data storage, and ECG display, which improves patient care while reducing processing times and costs.

NEMS supports a wide range of cardiac medical devices and records such as Resting ECG, Stress ECG, Holter ECG, Ambulatory Blood Pressure, and Spirometry, including non-Norav PDF Reports (see Figure 1).

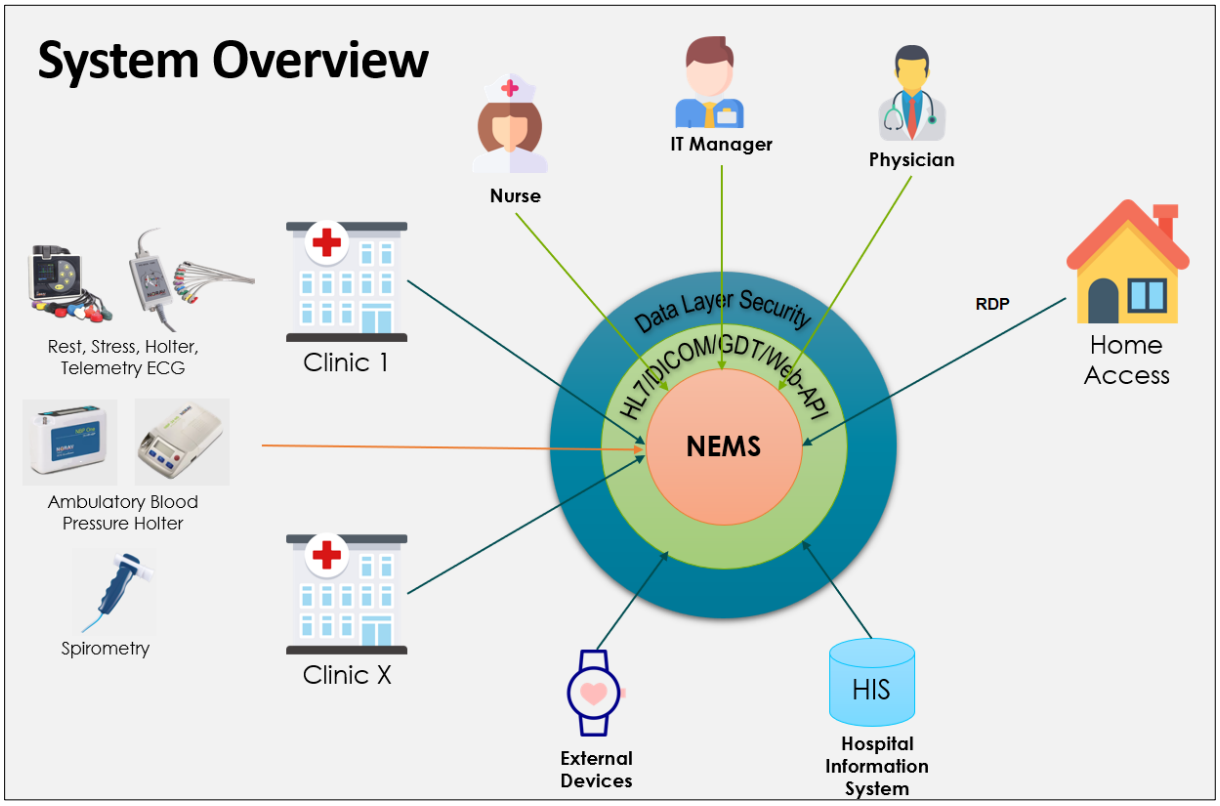


Figure 1: NEMS-Q System Overview

Features

- Patient management
- Records management
- Advanced search engine for patients and records
- Holter device management
- HL7 and DICOM® support
- User access levels: Administrator, Physician, Report Viewer, and Technician
- Multisite support
- Data statistics
- Back-office management system for creating users, groups, sites, physicians, etc.
- Support for Mobile ECG App integration

5. Operation

Log in to the NEMS-Q System

When opening the NEMS-Q client, you are prompted to provide login information that includes the username and password you received from your system administrator (see Figure 2).

1. Type your username.
2. Type your password.
3. Click OK.

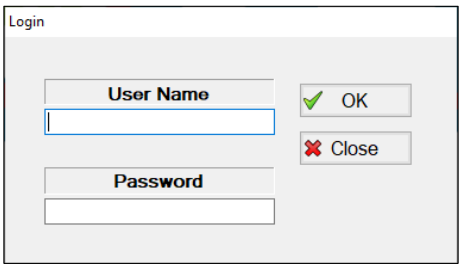


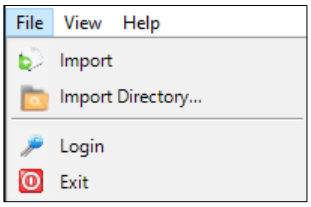
Figure 2: Login to NEMS-Q Dialog Box

Tip: If you forget your username or password, contact your IT System Manager.

Log in as a Different User

When you have **already logged in** to NEMS-Q and you want to log in as a different user (without exiting the software):

1. Click File on the **Menu Bar** (see Figure below).
2. Click Login on the menu items (see Figure below).



The **Login to NEMS-Q Dialog Box** is displayed (see Figure 2).

3. Enter the new login details.

NEMS-Q Main Screen Operations

The **NEMS-Q Main Screen** includes the following areas (see Figure 3):

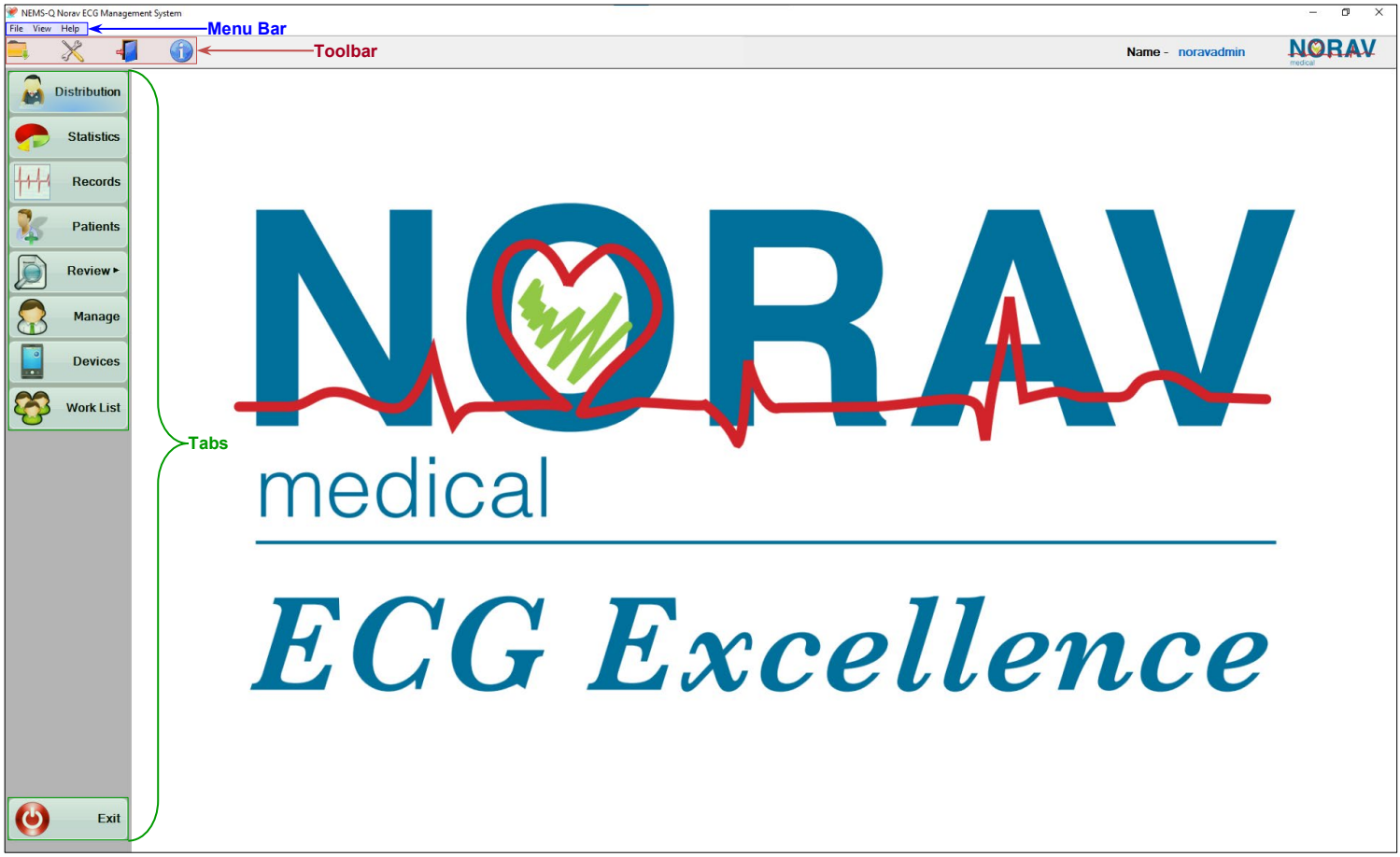


Figure 3: NEMS-Q Main Screen

Menu Bar Operations

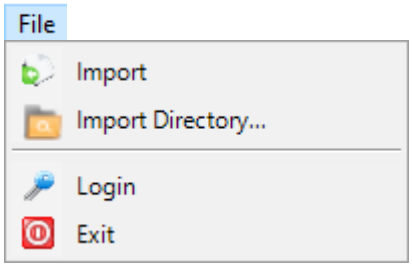
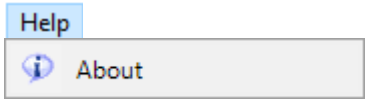
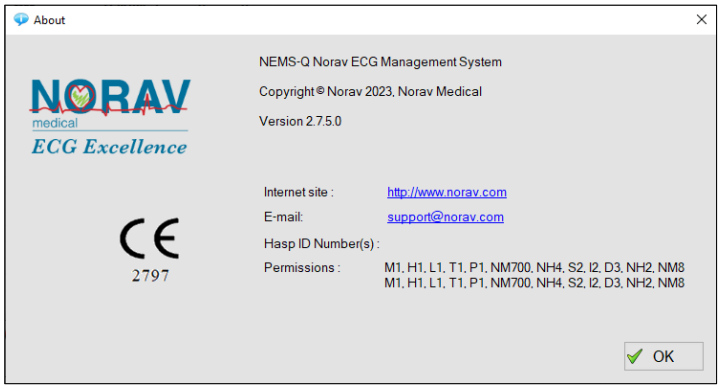
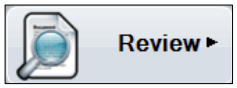
Button	Description
	Click File: • To import a record, click Import. • To import a directory, click Import Directory.... • To log in to NEMS-Q, click Login . • To exit NEMS-Q, click Exit.
	Click View: • To view or hide the Menu Bar, click Toolbar. • To set up NEMS-Q, click Setup (see Section NEMS-Q Setup on page 55).
	Click Help, and then click About to view the **About** page:  This menu is important for viewing the NEMS-Q version and Norav Software Permissions.

Table 1: NEMS-Q Toolbar

Button	Description
	Click to import a record (test) file. File types allowed: ECG files (*.rst;*.str;*.hlt;*.hl4;*.lp;*.mnt;*.hrv;*.mnr;*.res;*.dat;*.erf;*.zip;*.nrr;*.xml;*.bp;*.nbp). • rst – Rest test file • str – Stress test file • hlt – Holter test file (NH-301 v.3.0.0 app) • hl4 – Holter test analyzed file (NH-301 v.3.0.0 app) • hl5 - Holter test analyzed file (NH-301 v.4.0.0 app or later) • lp – Late Potential test file • mnt – Monitoring ECG test file • hrv – Heart Rate Variability test file • mnr – Telemetry file • res – Holter DL-800/900 source file • dat – EDAN (Rest) file • erf – Norav Event Recorder file • zip – ZIP file • nrr – Holter test source file • xml – XML file • bp – Oscar 2 Blood Pressure test file • nbp – NBP One Blood Pressure test file • bp2 – NBP-24 NG Blood Pressure test file
	Click to open the **Setup Dialog Box** (see Section NEMS-Q Setup on page 55).
	Click to exit NEMS-Q.
	Click to view the **About** page.

Table 2: NEMS-Q Tabs

Tab	Description
	Displaying new tests to be distributed for review by physician(s) – (see Section Distribution Tab on page 26).
	Statistics Module (see Section Statistics Tab on page 27).
	Finding tests using various parameters (see Section Records Tab on page 28).
	Searching for patients by patient ID, MRN, First Name, Last Name, Group, Birth Date range, and/or Gender as well as editing patient details, adding and deleting patients, moving patients to another group, performing new tests, viewing tests, comparing Resting ECG tests, viewing reports, and reviewing test results (see Section Patients Tab on page 36).
	Reviewing Rest/Stress test results (see Section Review Tab on page 46).
	Manage users and passwords, groups, sites, Referring Departments, Referring Physicians, and Test Categories (see Section Manage Tab on page 47).
	Downloading ECG and BP recordings from the recorder (see Section Devices Tab on page 52).
	Scheduled tests: viewing the test order list, searching for tests by Test Type, Ward, Order, Visit Number, Birth Date range, Patient ID, MRN, First Name, and Last Name (see Section Work List Tab on page 53).
	Exiting NEMS-Q.

Distribution Tab

The Distribution module allows **attaching new tests to a physician** for review purposes, to reduce the number of tests for review per physician, usually used in scanning centers (see Figure 4).

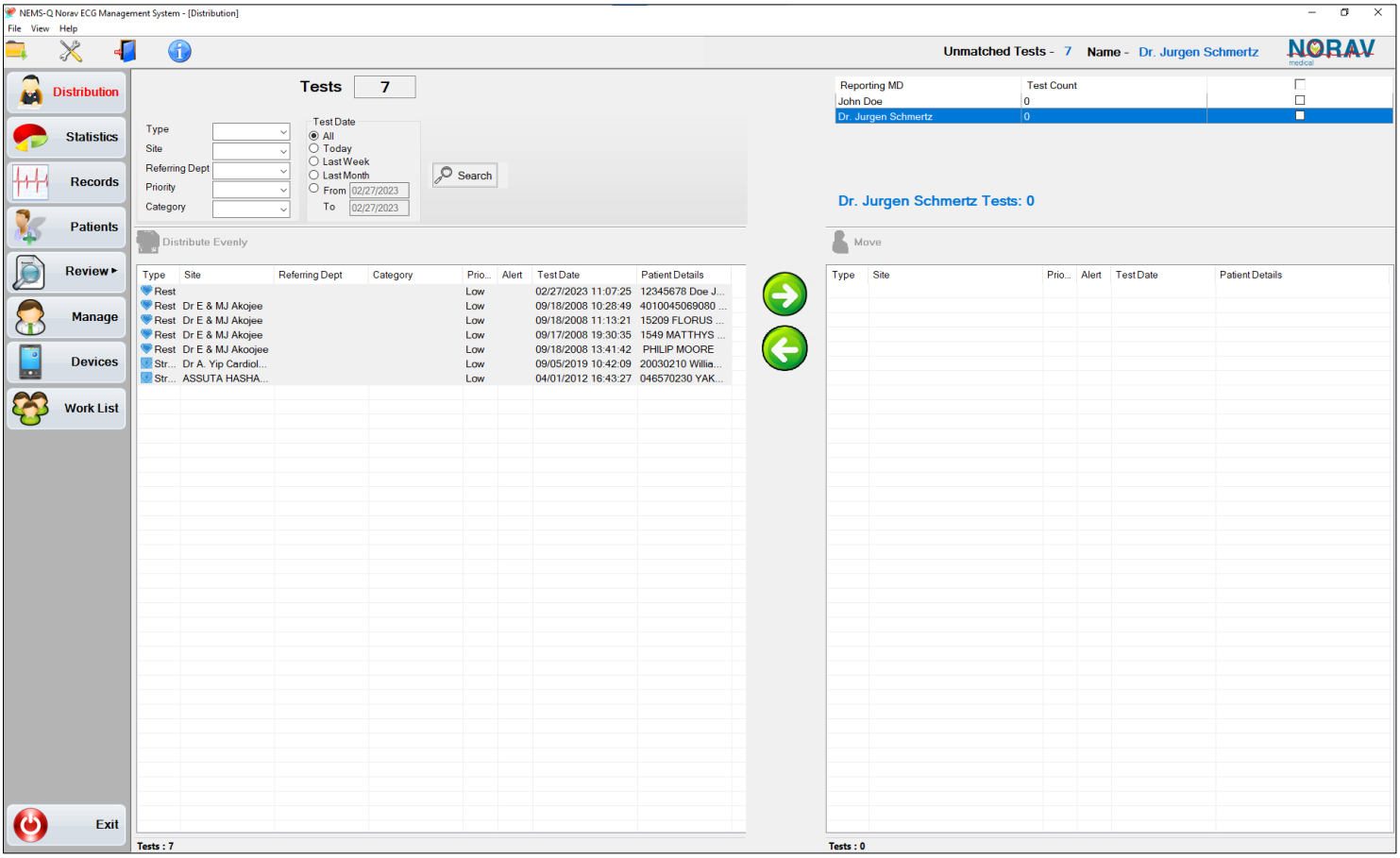


Figure 4: Distribution Screen

To distribute tests to physicians:

1. Log in with your physician details.
2. Select (highlight) your details in the top-right corner of the screen (see below).

3. Select the test(s) for distribution.
4. Click  .

   The selected test(s) are moved to the selected physician's list on the right pane.

Note

Each physician can distribute tests ONLY to the selected physician.

Statistics Tab

The Statistics Tab allows displaying data statistics about the test type, status, confirmation. Statistics can be displayed by **Site** or by **Reporting Physician**.

The results can be filtered by **Test Date, Site, and Reporting Physician** (see Figure 5).

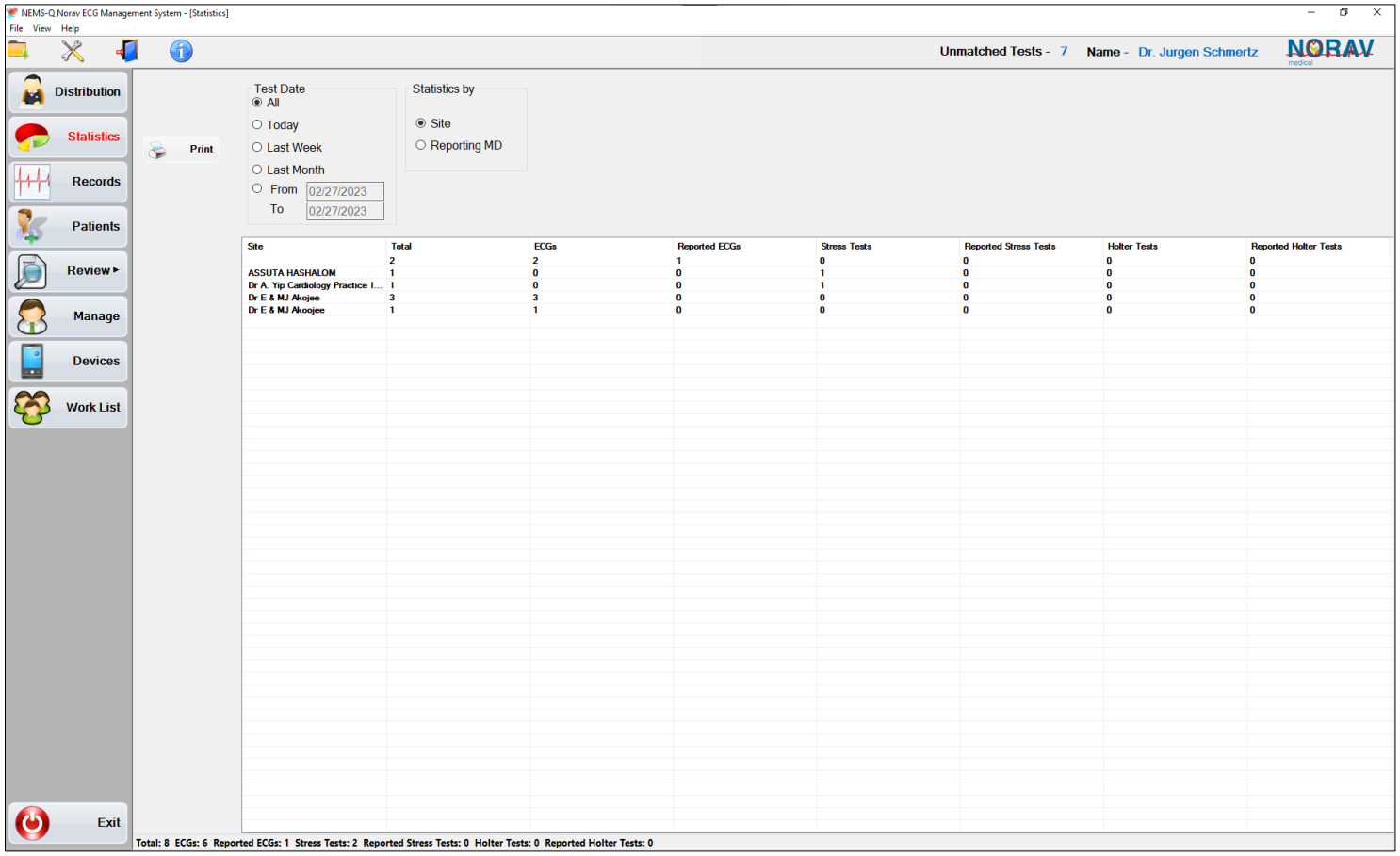


Figure 5: Statistics Screen

Records Tab

The purposes of the Records screen are:

- Search records by different filter types.
- Search for a record by scanning a barcode.
- Record operations – In addition to opening, reviewing, deleting, right-click to view details.

The Records Tab allows you to display records by applying filters in the top pane (see Table 3) and performing actions on a selected record (see Figure 6 and Table 4).

Measurements for the selected record are displayed in the bottom pane (see Figure 6).

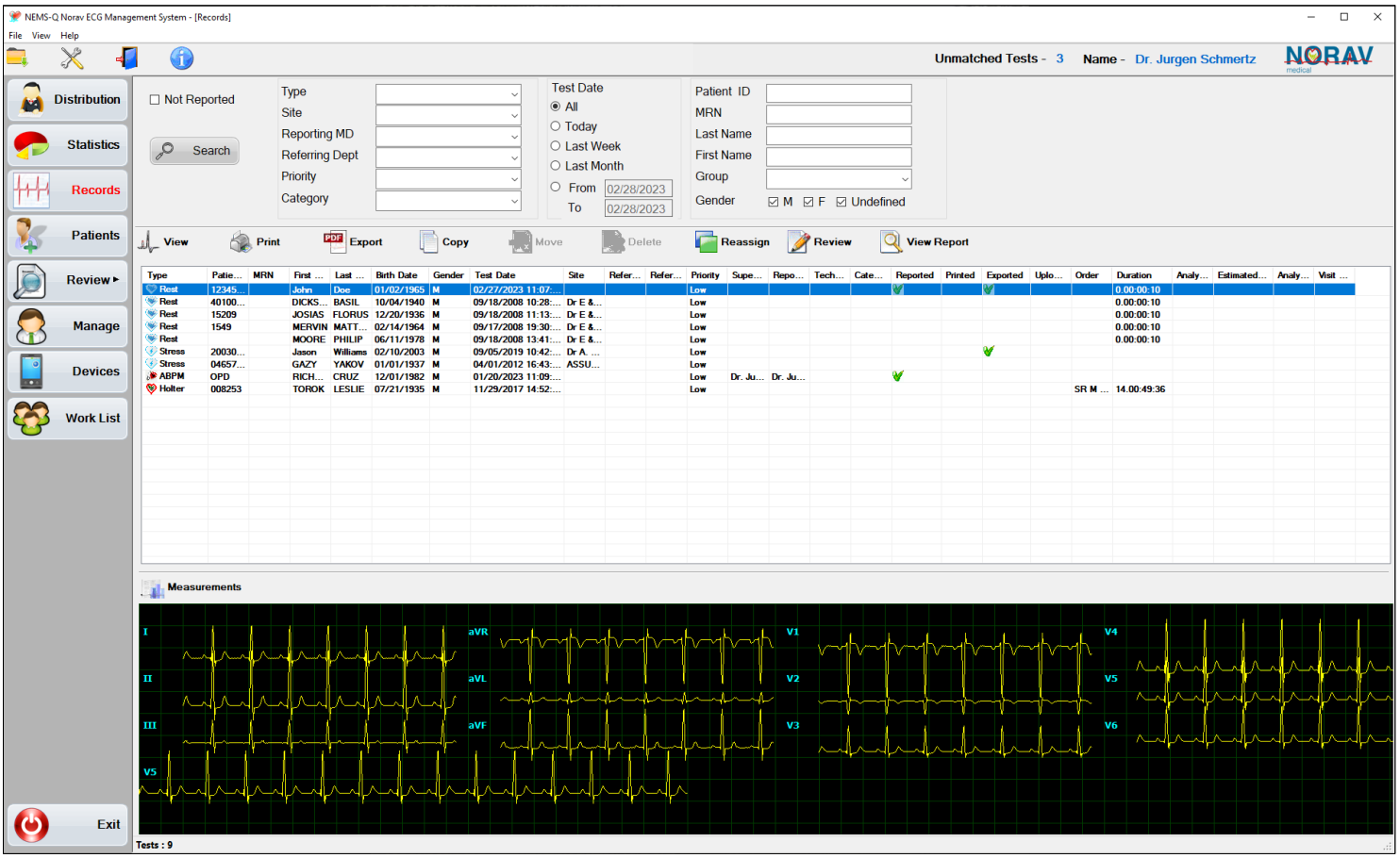


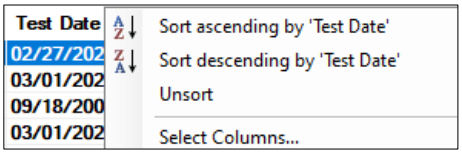
Figure 6: Records Screen

Table 3: Filter Types

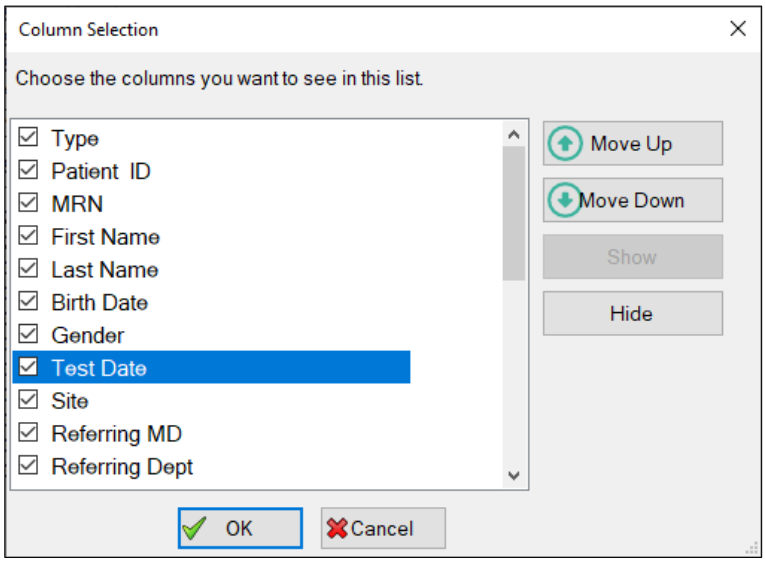
Filter	Description
Type	Filter by Test Type (**Rest**, **Stress**, **SPIRO**, **Holter**, or **ABPM**).
Site	Filter by Test Site (a site can be a clinic in a specific location e.g., Delray Clinic, Miami Beach Clinic).
Reporting MD	Filter by the reviewing physician (MD) who writes the conclusions.
Referring Dept.	Filter by the department that referred the patient for the test (e.g., Cardiology, ER).
Priority	Filter by priority of the test (**Low**, **Normal**, or **High**).
Category	Filter by category (a group of patients with a common characteristic, e.g., pneumonia, high BP, used for CRO).
Test Date	Filter by Test Date (**All**, **Today**, **Last Week**, **Last Month**, or **From** date **To** date).
Patient ID	Filter by the patient's ID.

Filter	Description
MRN	Filter by Medical Record Number.
Last Name	Filter by last name.
First Name	Filter by first name.
Group	Filter by User Group (**Customers**, **Administrators**, **Physicians**, **Report Viewers**, **Technicians**, or **All**).
Gender	Filter by **Male**, **Female**, or **Undefined**.

1. To sort each column in the tests table, right-click on the column header (**Test Date,** for example), and select **Sort ascending**, **Sort descending**, or **Unsort** to cancel sorting (see the Figure below).



2. To select the columns to display in the tests table and change their order in the table, click Select Columns....
   The **Column Selection Dialog Box** is displayed (see the Figure below).

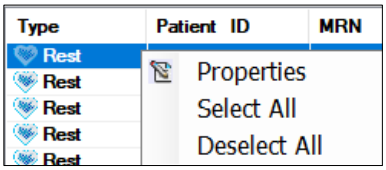


3. Select the ☑ next to the column you wish to view.
4. To change the placement of the column in the table, select (highlight) the column, and then click Move Up to move the column to the left, or select Move Down to move the column to the right.
5. Click OK.
6. To hide a column in the table, click Hide.
7. Click OK.
8. To view the hidden column again, click Show.
9. Click OK.

Table 4: Records Tab Buttons

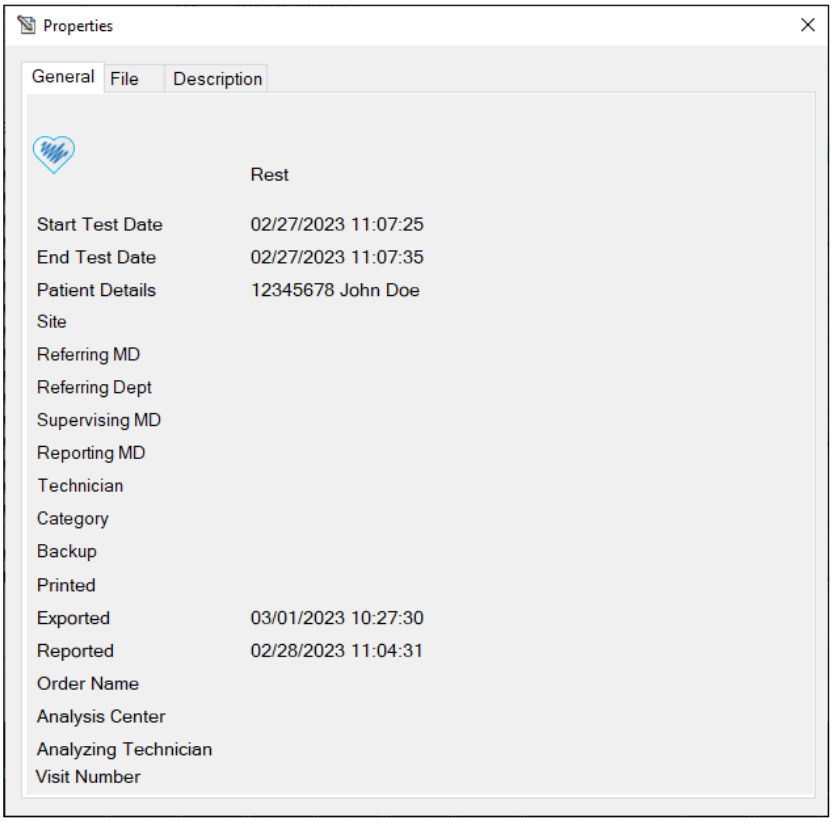
Tab	Description
View	Viewing the selected record within the relevant app (see Section Viewing Patient Test on page 44).
Print	Printing the selected record.
Export	Exporting the selected record (marked as Exported).
Copy	Copying the selected record to a backup (see Section Copying a Record on page 30).
Move	Moving the selected record to a backup (administrator only) (see Section Removing a Record on page 33).
Delete	Deleting the selected record (administrator only) (see Section Deleting a Record on page 34).
Reassign	Reassigning the selected record to another patient (see Section Reassigning a Record on page 34).
Review	Reviewing the selected record (physician only) (see Section Reviewing a Record on page 35).
View Report	Viewing the selected report (see Section Viewing Report on page 46).

10. To view record details, right-click the record (see the Figure below).

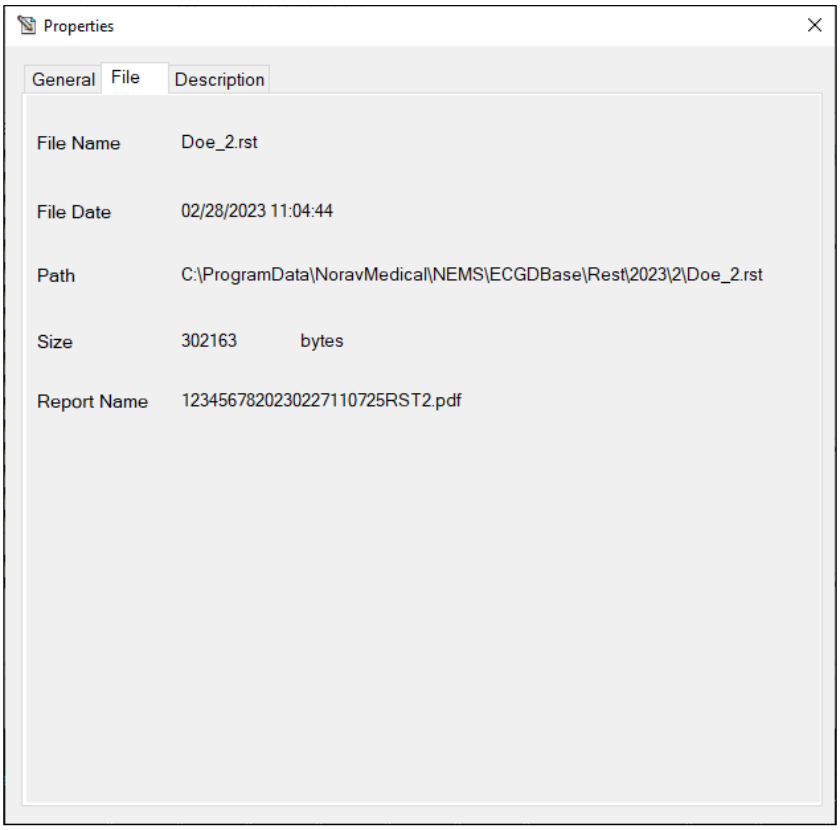


11. Click Properties.

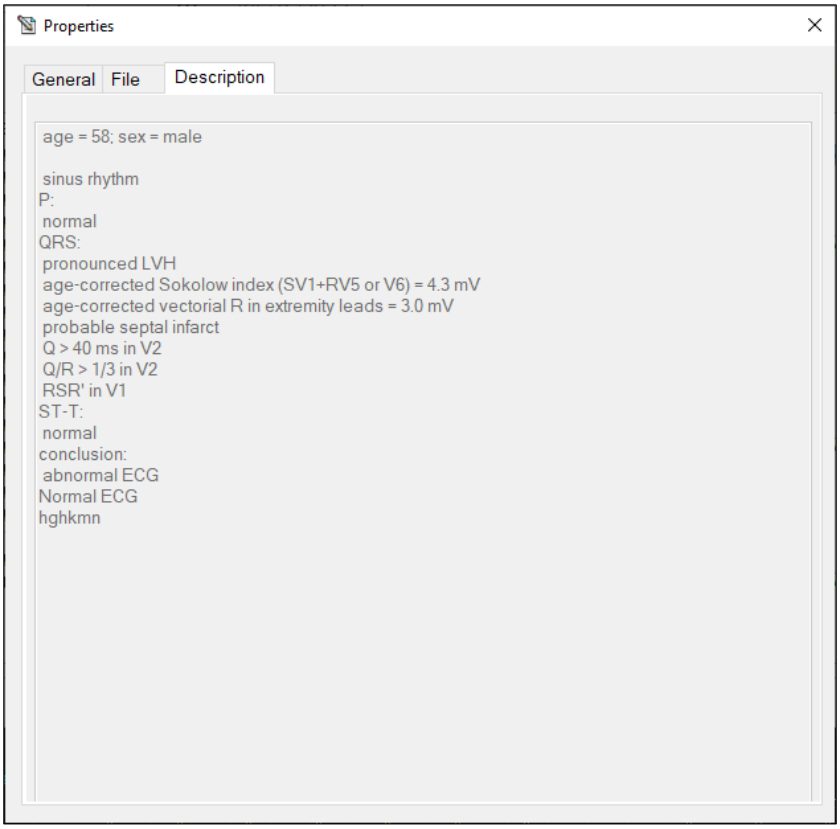
The **Properties** window is displayed, showing all the test details under the General Tab (see the Figure below).



12. To view the test file details and the report name, click the File Tab (see the Figure below).

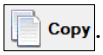


13. To view the test conclusions, click the Description Tab (see the Figure below).



Copying a Record

The purpose of the copy operation (administrator or physician) is to duplicate records for a backup, for review by another physician outside the NEMS-Q system, or for transfer to another location.

1. To copy a record to a backup, select (highlight) it, and click 

.
   The **Copy Dialog Box** is displayed (see Figure 7).

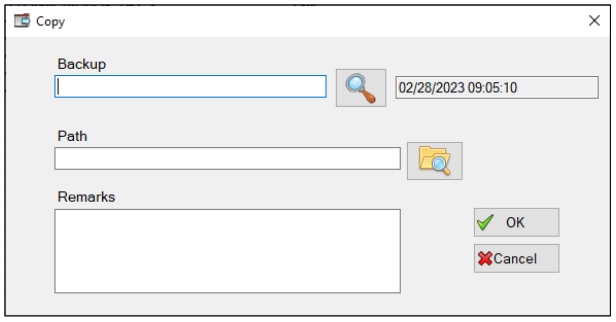


Figure 7: Copy Dialog Box

2. Click 
.
   The **Backup Dialog Box** is displayed (see Figure 8).

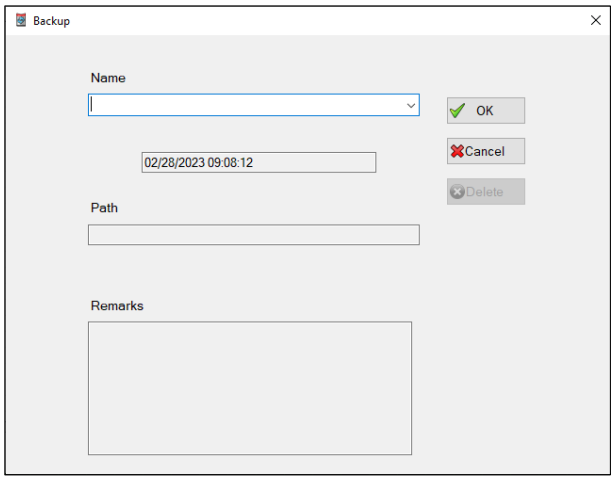
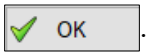
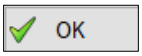


Figure 8: Backup Dialog Box

3. Assign a name to the record and then click 

.
   The **Backup Dialog Box** is closed.
4. Click  on the **Copy Dialog Box**, select a folder, and add remarks in the **Remarks** field.
5. Click 

.

Removing a Record

The purpose of the move operation (administrator only) is to move a record to another location outside the NEMS-Q system due to an unsuccessful test, when the record is required elsewhere, or to transfer a record from an old system to a new system. After removal, the record cannot be viewed in NEMS-Q, and only an indication remains that the record was removed.

1. To move a record to a backup, select (highlight) it, and click Move.

   The **Move Dialog Box** is displayed (see Figure 9).

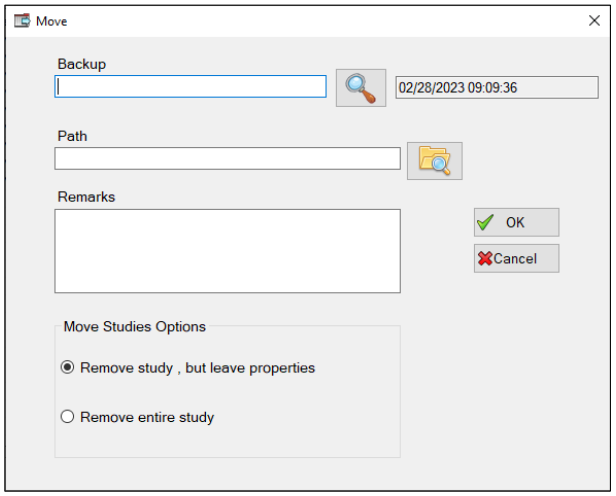


Figure 9: Move Dialog Box

2. Click .

   The **Backup Dialog Box** is displayed (see Figure 10).

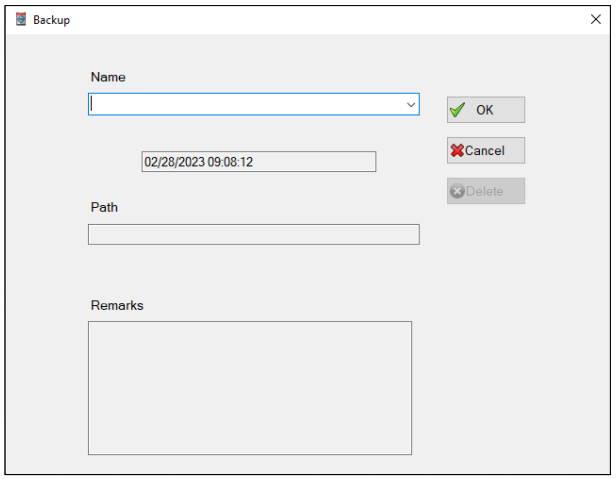


Figure 10: Backup Dialog Box

3. Assign a name to the record and then click OK.

   The **Backup Dialog Box** is closed.

4. Click , select a folder, and add remarks in the **Remarks** field (see Figure 9).

5. Select an option from the Move Studies Options (see Figure 9):

   - Remove study , but leave properties
   - Remove entire study

6. Click OK.

Deleting a Record

1. To delete a record (administrator only), select (highlight) the record, and click Delete.

   The **Delete Dialog Box** is displayed (see Figure 11).

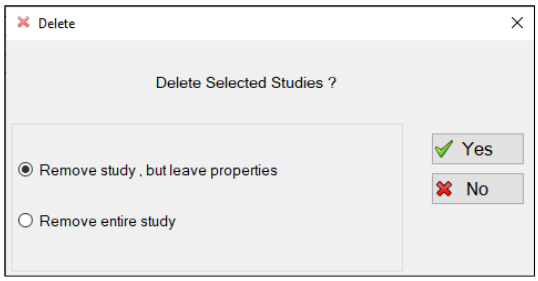


Figure 11: Delete Dialog Box

2. Select one of the **Remove** options.
3. Click Yes.

Reassigning a Record

Reassigning a record is required when a nurse or technician makes a mistake like assigning a record to the wrong patient.

1. To reassign a test to another patient, select (highlight) the destination patient, and click Reassign (see Figure 6).

   The **Reassign Dialog Box** is displayed (see Figure 12).

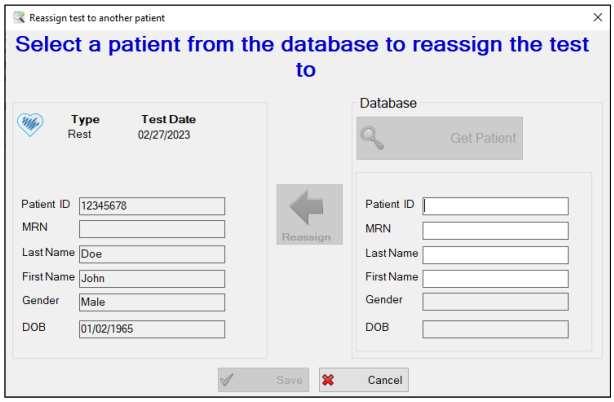


Figure 12: Reassign Dialog Box

2. Type the source **Patient ID** and click Get Patient.

   The **Reassign Dialog Box** with the source patient's details is displayed (see Figure 13).

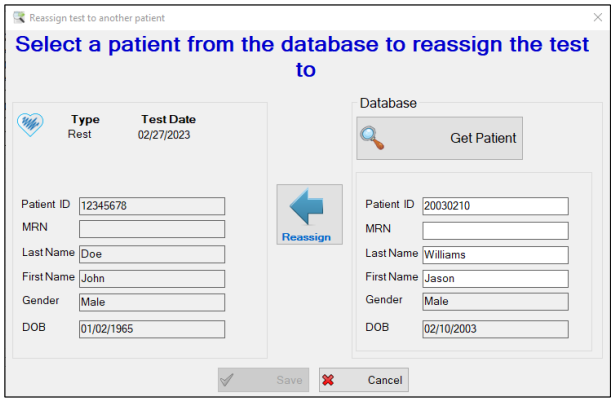


Figure 13: Reassign Dialog Box with Source Patient's Details

3. Click Reassign.

The **Reassign Dialog Box** is displayed with a warning that the destination patient's data will change (see Figure 14).

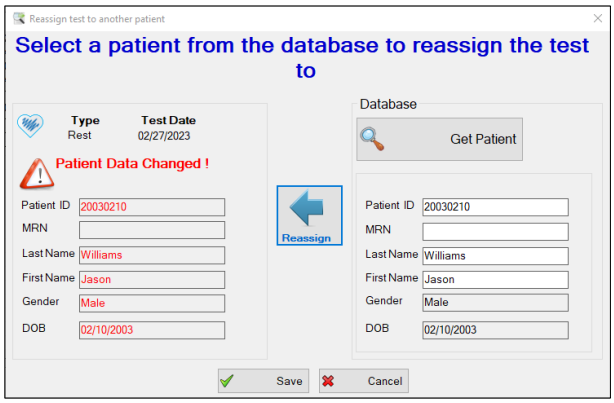


Figure 14: Reassign Dialog Box with Warning of Destination Patient's Data Change

4. Click Save.

Reviewing a Record

1. To review a record, select (highlight) it, and click Review (see Figure 6).

   The selected record is opened within the relevant app. (PC-ECG 1200 for Rest and Stress records, NEMS-Q for ABPM records, and NH-301 for Holter records).

2. Review the record and add remarks in the relevant app.

Patients Tab

The purpose of the Patients tab is to manage patients, search for a specific patient or a group of patient, view patient tests (records), and perform actions on specific tests (for example, View, Compare, Review) – see Figure 15 and Table 5.

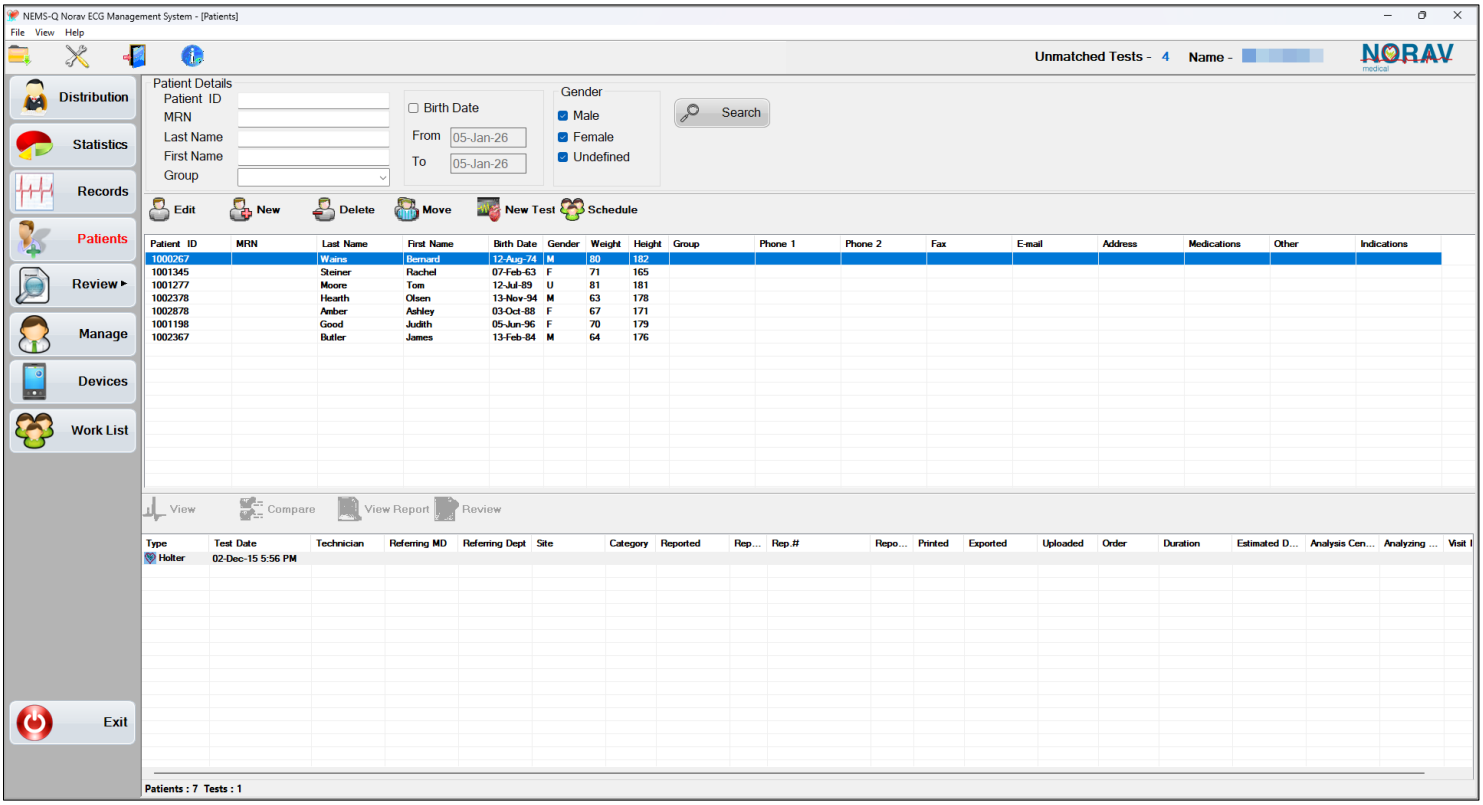


Figure 15: Patients Screen

Table 5: Patients Tab Buttons

Tab	Description
Edit	Editing patient details (administrator only) (see Section Editing Patient on page 37).
New	Adding a new patient (see Section Adding New Patient on page 39).
Delete	Deleting a patient (see Section Deleting Patient on page 41).
Move	Moving a patient to another group (see Section Moving Patient on page 42).
New Test	Creating a new test for the selected patient (see Section Creating New Test on page 43).
Schedule	Scheduling a new test for the selected patient and adding it to the Work List (see Section Scheduling New Test in the Work List Manually on page 44).
View	Viewing the patient's test (see Section Viewing Patient Test on page 44).
Compare	Comparing the patient's tests (see Section Comparing Patient Tests on page 45).
View Report	Viewing the selected report (see Section Viewing Report on page 46).
Review	Reviewing the selected test (see Section Reviewing Test on page 46).

Editing Patient

The system administrator can change patient demographic information if details are missing or incorrect. To change patient information, follow the next steps:

1. To edit the patient details (administrator only), select (highlight) the patient, and click Edit.

   The **Patient Details Dialog Box** is displayed (see Figure 16).

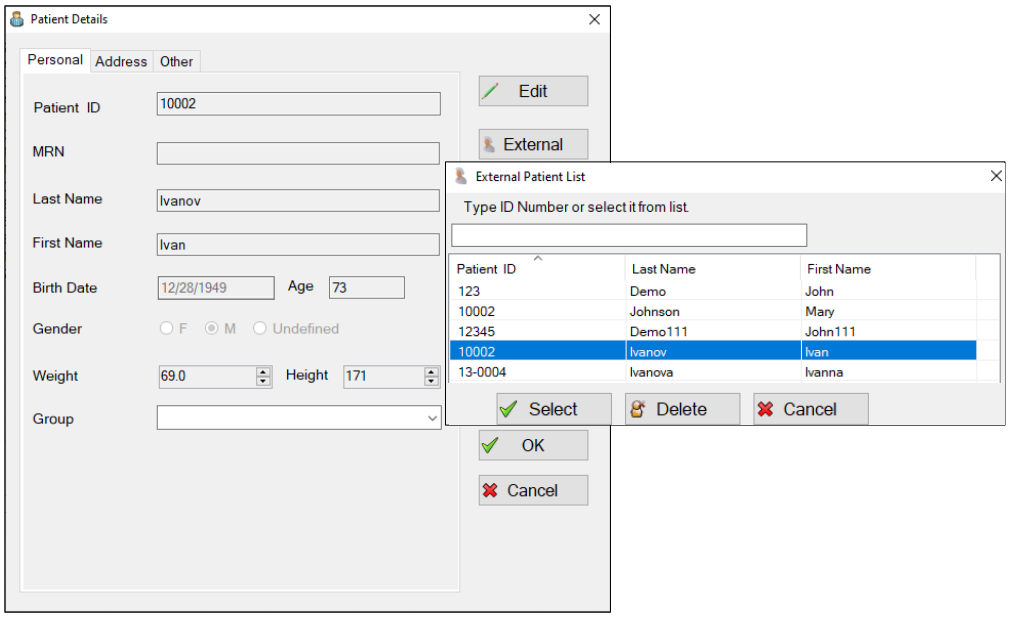


Figure 16: Patient Details Dialog Box

2. Under the **Personal** tab, click Edit and edit the details.

   Or

   Click External, select a patient from the External Patient List dialog box, and then click Select on the External Patient List dialog box.

3. Click OK on the **Patient Details Dialog Box**.
4. To edit the patient address, click the Address tab (see Figure 6).

   The **Address Dialog Box** is displayed (see Figure 17).

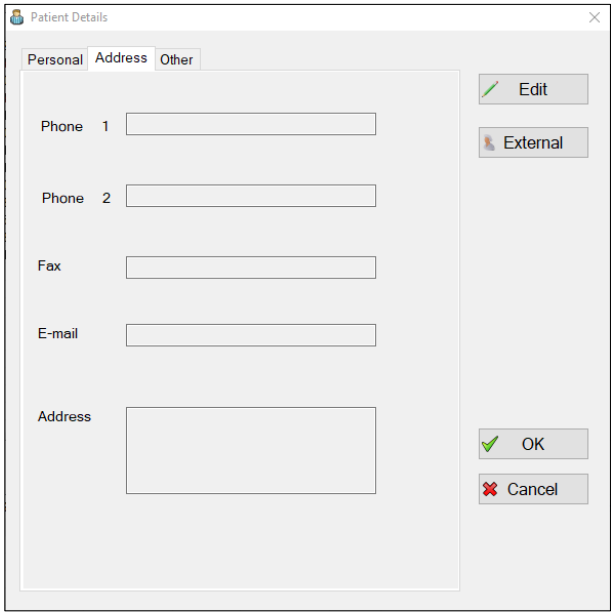


Figure 17: Address Dialog Box

5. Under the **Address** tab, click Edit, then edit the details.
6. Click OK in the **Address Dialog Box**.
7. To edit the patient's **Medications**, **Indications**, and **Other**, click the Other tab (see Figure 18).

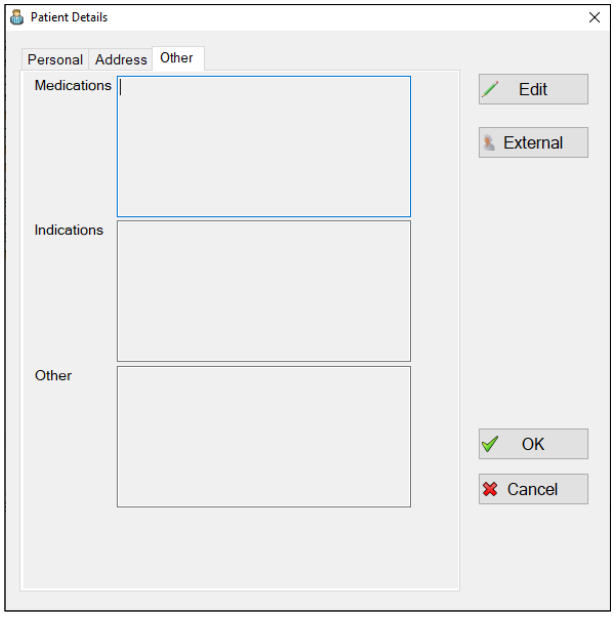


Figure 18: Other Dialog Box

8. Under the **Other** tab, click Edit, then edit the details.
9. Click OK in the **Other Dialog Box**.

Adding New Patient

1. To add a new patient, click New.

   The **Personal Dialog Box** is displayed (see Figure 19).

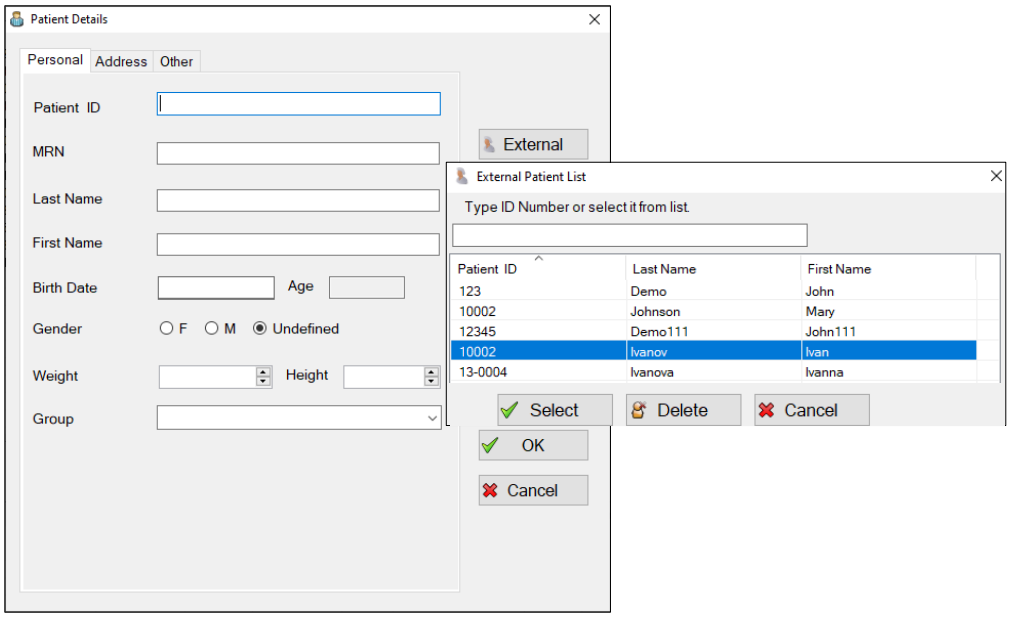


Figure 19: Personal Dialog Box

2. Enter new patient details such as: Patient ID, MRN, Last Name, First Name, Gender, Weight, Height, Birth Date, Address, and Group.
3. To search for an existing patient, open the **Patients Screen** (see Figure 15), enter the **Patient ID**, and then click Search.

   The patient is displayed on the patient list; after selecting the patient please click Select.

   Or

   Click External, select a patient from the External Patient List dialog box, and then click Select in the External Patient List dialog box.
4. Click OK in the **Personal Dialog Box**.
5. To add the patient's address, click the Address tab.

The **Address Dialog Box** is displayed (see Figure 20).

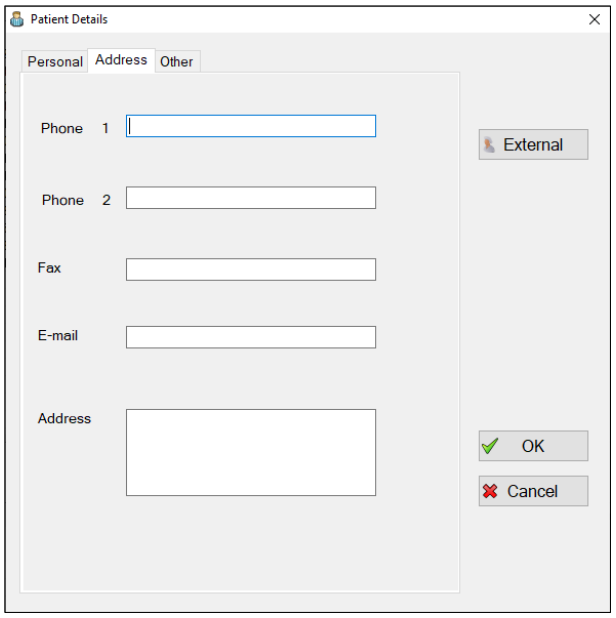


Figure 20: Address Dialog Box

6. Enter the address details.
7. Click OK in the **Address Dialog Box**.
8. To add patient **Medications**, **Indications**, and **Other information,** click the Other tab.

   The **Other Dialog Box** is displayed (see Figure 21).

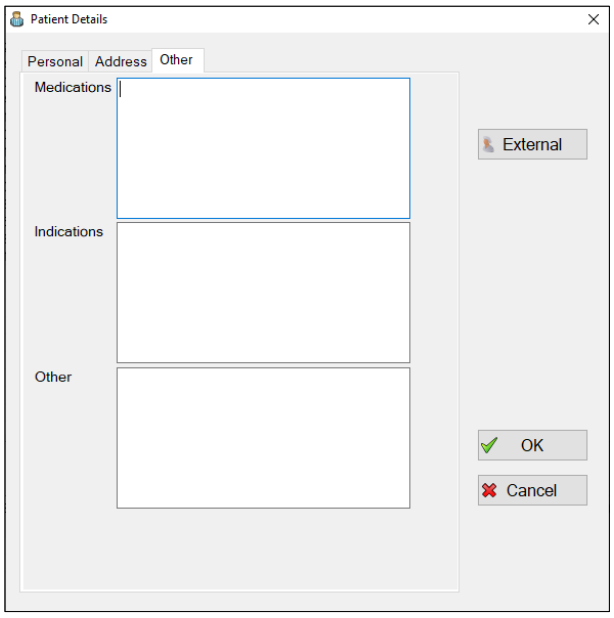


Figure 21: Other Dialog Box

9. Enter the details.
10. Click OK in the **Other Dialog Box**.

Deleting Patient

To delete a patient and all associated tests (administrator only), select (highlight) the patient, and click Delete (see Figure 22).

The selected patient and all associated tests are deleted.

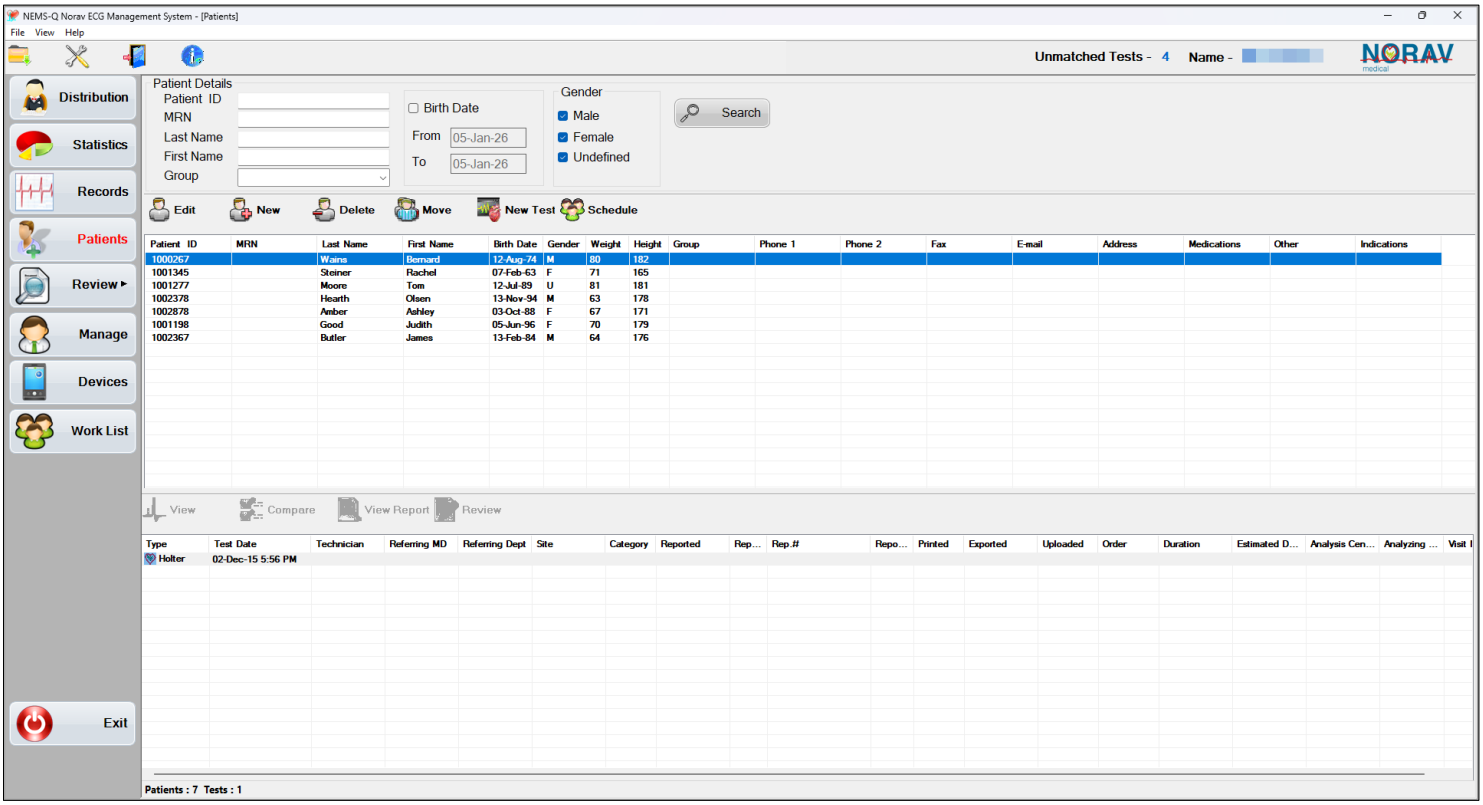


Figure 22: Deleting Patient from Patients Screen

Moving Patient from One Group to Another

1. To move a patient to another group, select (highlight) the patient and click 

   The **Groups Window** is displayed on the screen under the 

button (see Figure 23).

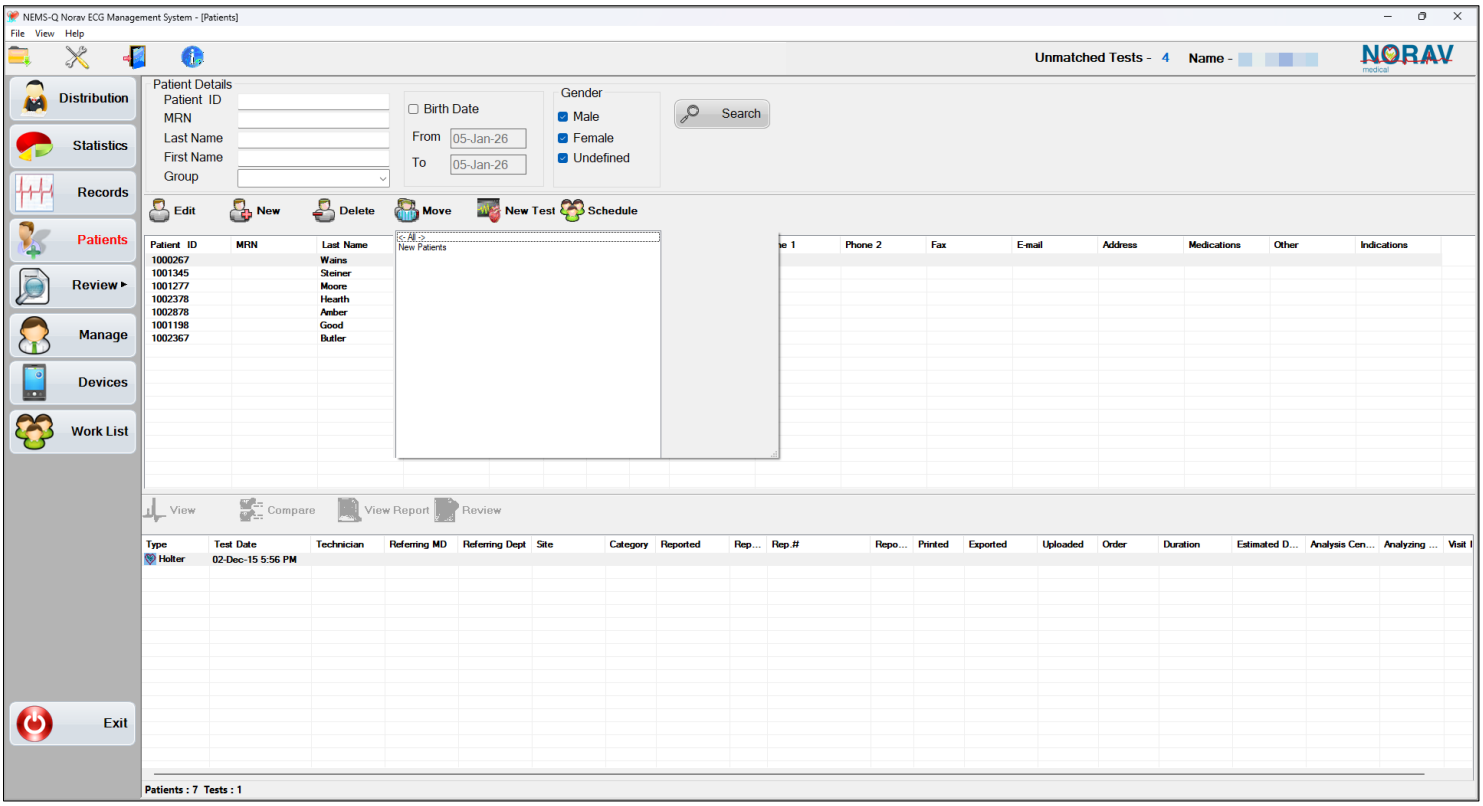


Figure 23: Moving Patient to another Group Screen

2. Click (select) a group in the **Groups Window**.

   The selected patient is moved to the selected group.

Creating New Test

1. To create a new test, select (highlight) the patient and click 

(see Figure 23).

   The **Test Type List Window** is displayed under the 

button (see Figure 24). For test type descriptions, see Table 6.

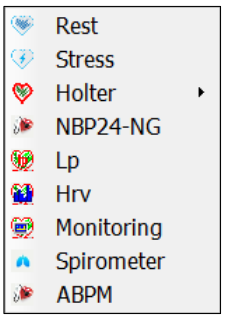


Figure 24: Test Type List Window

Table 6: Test Type Descriptions

Test Type	Description
Rest	ECG test through repeated cardiac cycles during rest (minimum 10 seconds) at the clinic.
Stress	ECG test through repeated cardiac cycles during exercise at the clinic.
Holter	ECG test using a portable recorder for 24 hours to 2 weeks at home. Available options: NR Patch (NR-314-P device) or NR (all other NR-series Holter devices, excluding NR-314-P).
NBP-24 NG	24-hour Ambulatory Blood Pressure Monitoring using the NBP-24 NG recorder.
LP	Signal-averaged electrocardiogram (SAECG) testing performed to identify low-amplitude late potentials, typically at the end of the QRS complex, aiding in identifying an increased risk of ventricular tachycardia.
HRV	Heart Rate Variability (time intervals between heartbeats) testing.
Monitoring	ECG Monitoring during activity (ergometer, treadmill, etc.).
Spirometer	Pulmonary Analysis.
ABPM	24-hour Ambulatory Blood Pressure Monitoring using an NBP One or Oscar 2 recorder directly via NEMS-Q, NEMS-A, or NEMS Web.

2. Select the required test type from the list. The corresponding test application opens.

Scheduling New Test in the Work List Manually

1. To schedule a new study (test) for a patient and add it to the **Work List** manually, select (highlight) the patient in the list, and then click the **Schedule** button. The **Test Type List Window** is displayed below the **Schedule** button (see Figure 25). For test type descriptions, see Table 6.

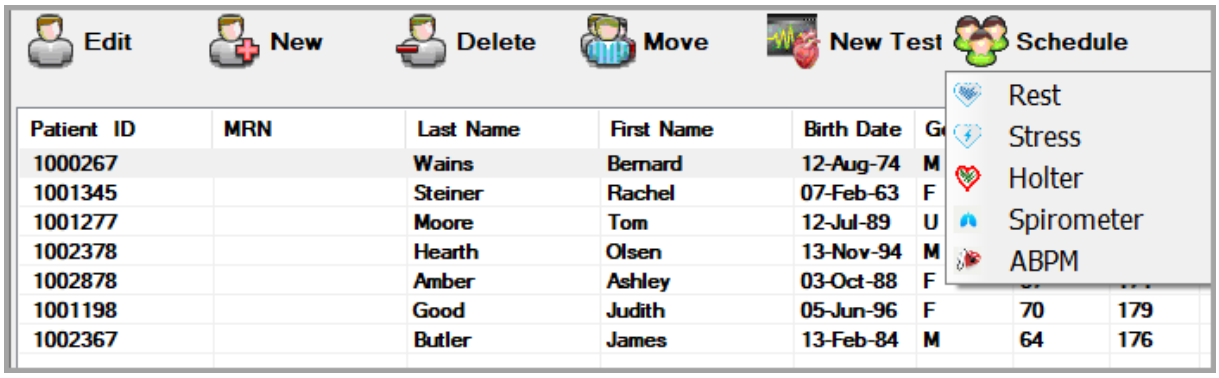


Figure 25: Scheduling New Test

2. Select the required test type from the list. A confirmation dialog box appears, asking you to add the selected test order for the patient to the **Work List**.

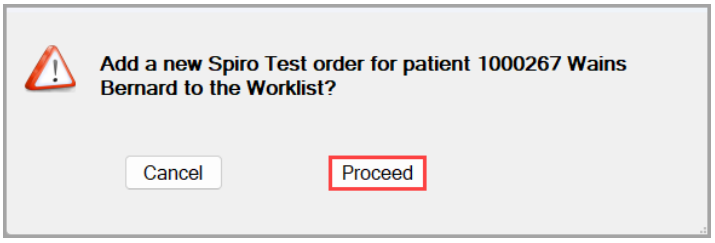


Figure 26: Confirmation Dialog Box

3. Click **Proceed** to confirm. The selected test type is assigned to the patient and the new test is added to the **Work List**.

Viewing Patient Test

To view a patient's test (report), select (highlight) the required test in the bottom pane, and then click View (see Figure 23).
The corresponding test application is opened, allowing you to view the test.

Comparing Patient Tests

To compare two or more patient **Rest** tests, select (highlight) the tests, and then click Compare (see Figure 27).

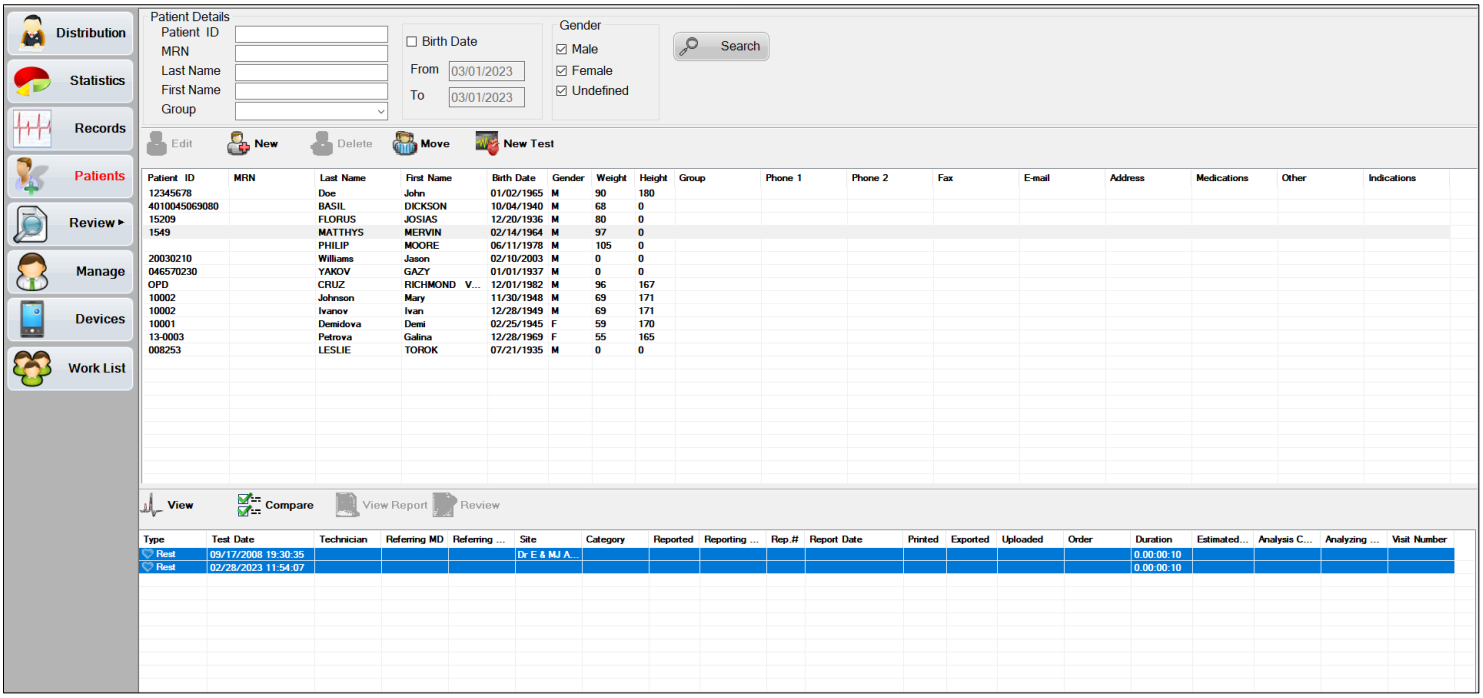


Figure 27: Selecting Tests for Comparison Screen

The Resting ECG application opens, displaying the compared tests (see Figure 28).

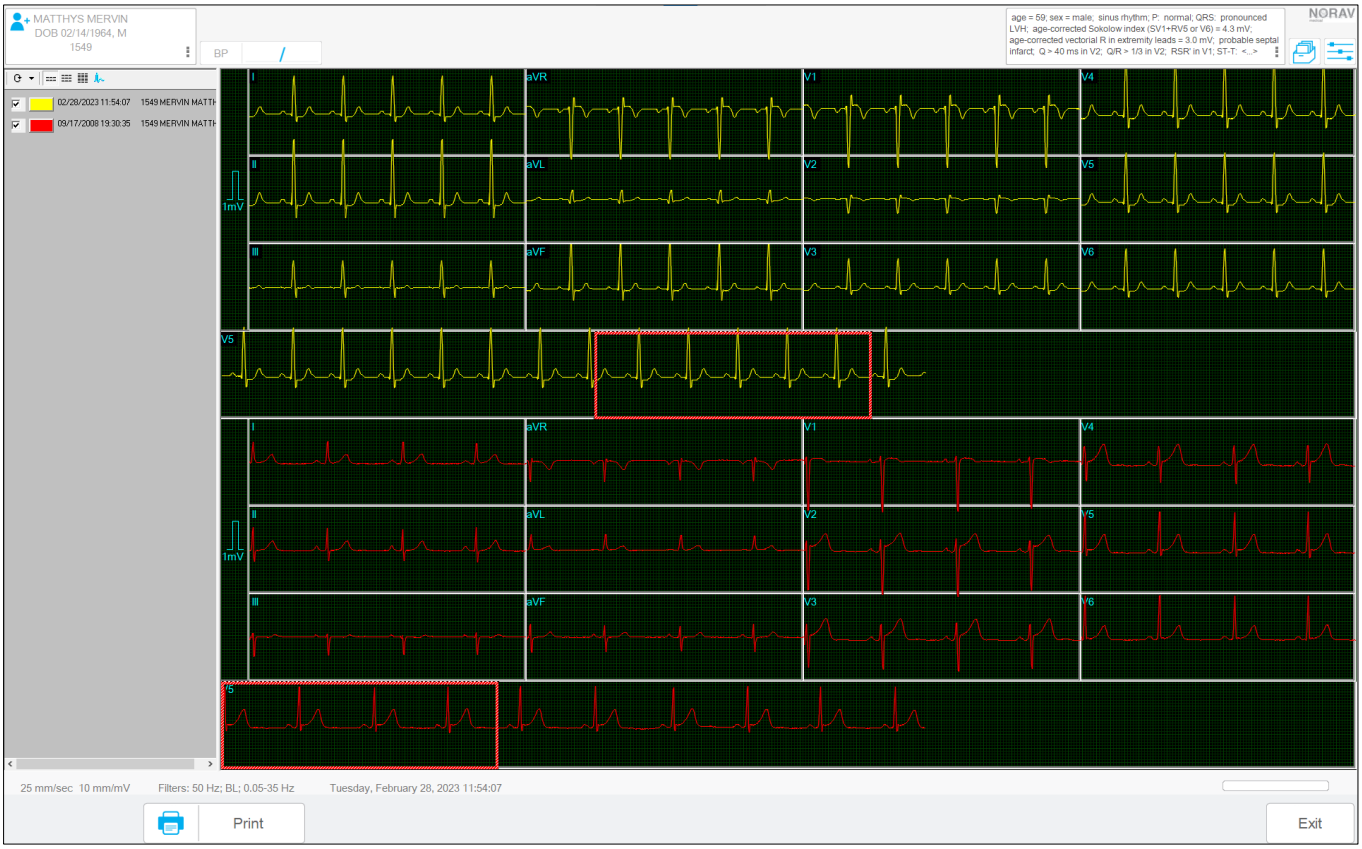


Figure 28: Comparing Tests Screen

Viewing Report

To view patient test report, select (highlight) the test, and then click View Report (see Figure 27). The report of the selected test is displayed.

Reviewing Test

To review patient test report (physician only), select (highlight) the test, and then click Review (see Figure 27).

The corresponding application is opened, displaying the test for physician review, and allowing adding remarks.

Review Tab

The Review Tab allows a physician to open the **Rest** or **Stress** applications for reviewing several test files and writing conclusions (see Figure 29).

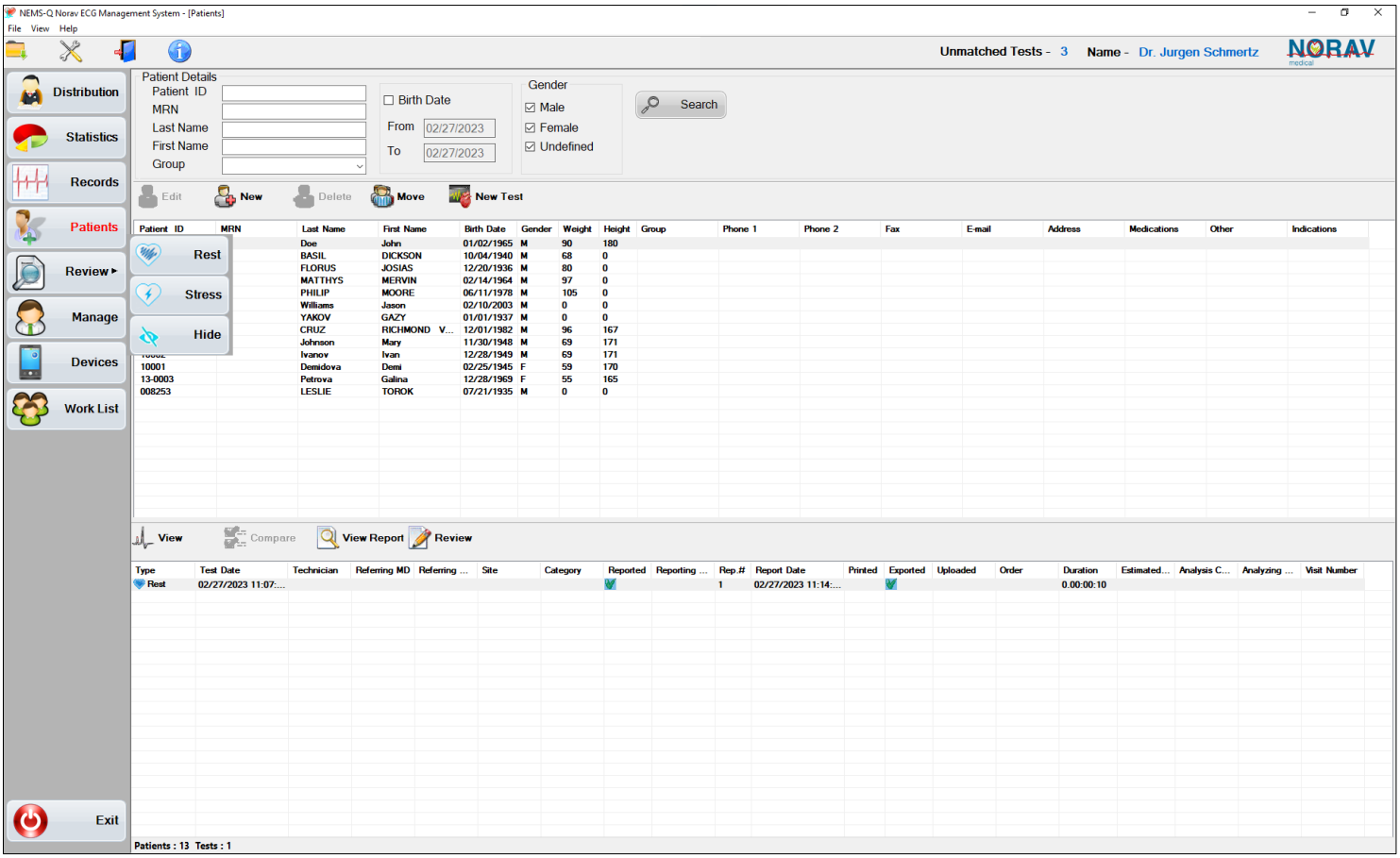


Figure 29: Review Screen

Click the Review tab, and then select from the following options:

- To review Rest tests, click Rest.
- To review Stress tests, click Stress.
- To hide these options, click Hide.

Manage Tab

The Manage Tab allows the administrator to Add, Edit, and Delete users and passwords, groups, sites, referring departments, referring physicians, and test categories (see Figure 30, Table 7, and Table 8).

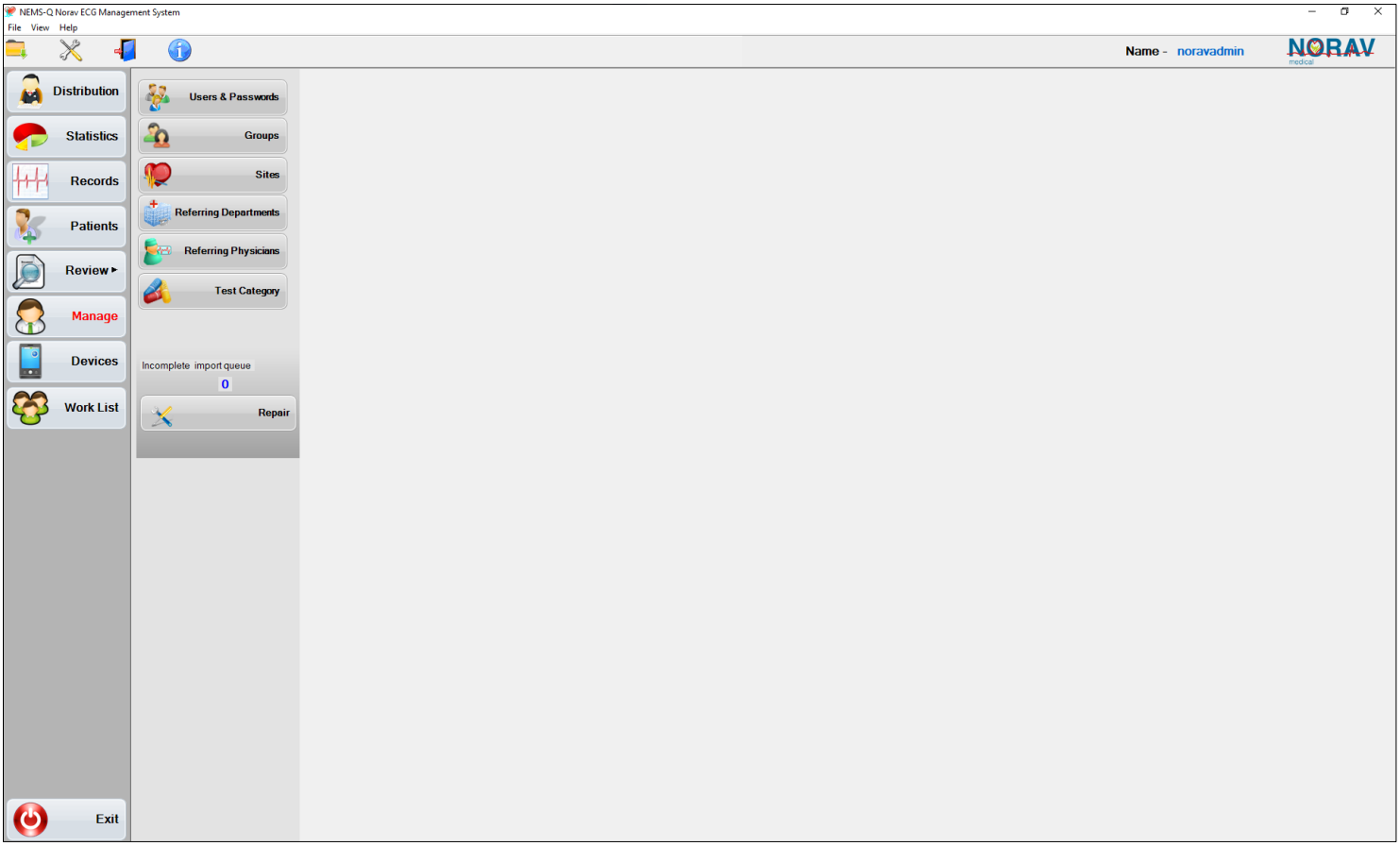
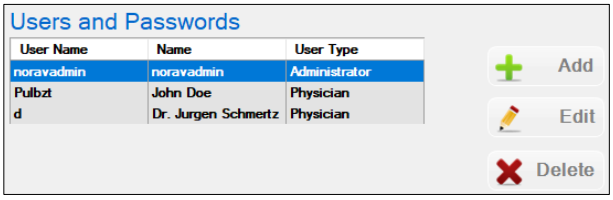
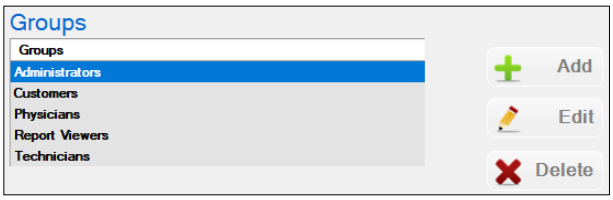
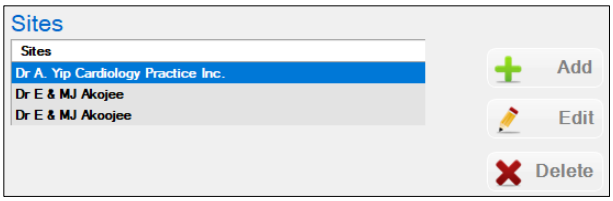
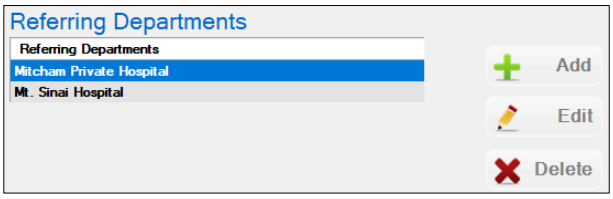
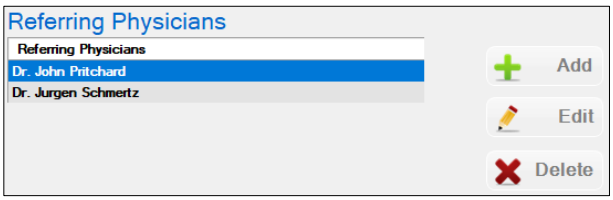
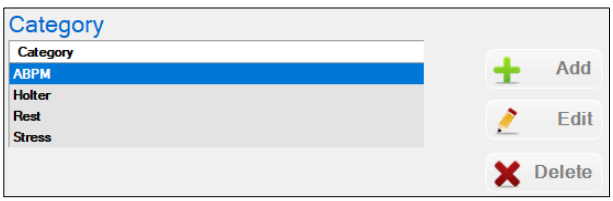
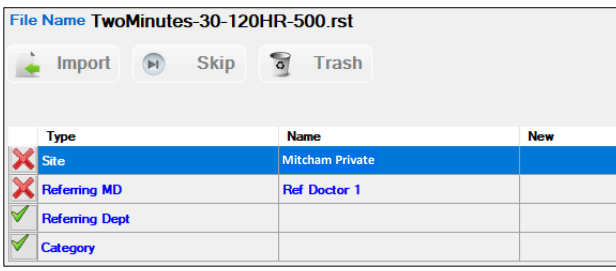


Figure 30: Manage Screen

Table 7: User Group Permissions

User Group	Permissions
Administrators	Responsible for all management activities, thus have all permissions excluding review tests and distribute tests.
Customers	View confirmed reports, patients, unconfirmed recordings, worklist, download devices, scan recorders, create a patient, open existing test, search patients, search a record, change own password, and search a worklist.
Physicians	View and edit confirmed reports, patients, unconfirmed recordings, worklist, download devices, scan recorders, create a patient, open existing test, start new test, search patients, compare, confirm, and review a record, search records, change own password, search a worklist, and start a new test.
Report Viewers	View confirmed reports, visitors, persons outside the organization, QA persons, patients, unconfirmed recordings, worklist, view patient, search patients, and search a record.
Technicians	View confirmed reports, patients, unconfirmed recordings, worklist, download devices, scan recorders, create a patient, open existing test, start new test, search patients, compare, confirm, and review a record, search records, change own password, search a worklist, and start a new test.

Table 8: Manage Tabs

Tab	Description
Users & Passwords	
Groups	
Sites	
Referring Departments	
Referring Physicians	
Test Category	
Incomplete import queue 1 Repair	

1. To add a user, click Users & Passwords and then click Add.

   The **Add User Dialog Box** is displayed (see Figure 31).

   - ◊ **Name** – Full name of the user.
   - ◊ **User Name** – NEMS-Q login username.
   - ◊ **Password** – User password.
   - ◊ **Confirm Password** – Re-enter password for confirmation.
   - ◊ **Title** – User title.
   - ◊ **Address** – User or organization address.
   - ◊ **E**-mail – User email address.
   - ◊ **Phone** – User phone number.
   - ◊ **Fax** – Fax number.
   - ◊ **Signature** – User's signature, which can be used by physicians to sign ABPM, Rest, and Stress reports

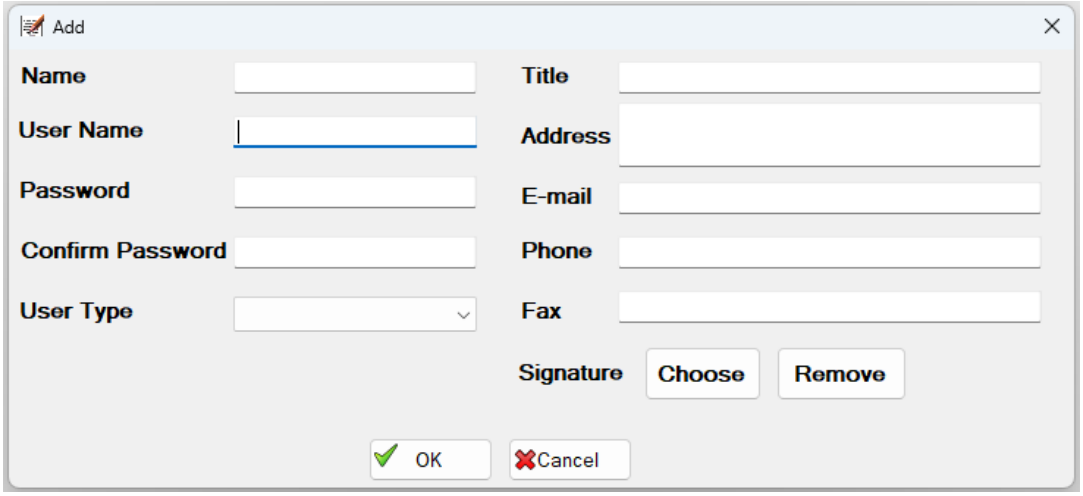


Figure 31: Add User Dialog Box

2. Fill the required fields. If needed, upload a user signature. Select the user type from the drop-down list, and then click OK.

3. To edit a user, click Edit.

   The **Edit User Dialog Box** is displayed (see Figure 32).

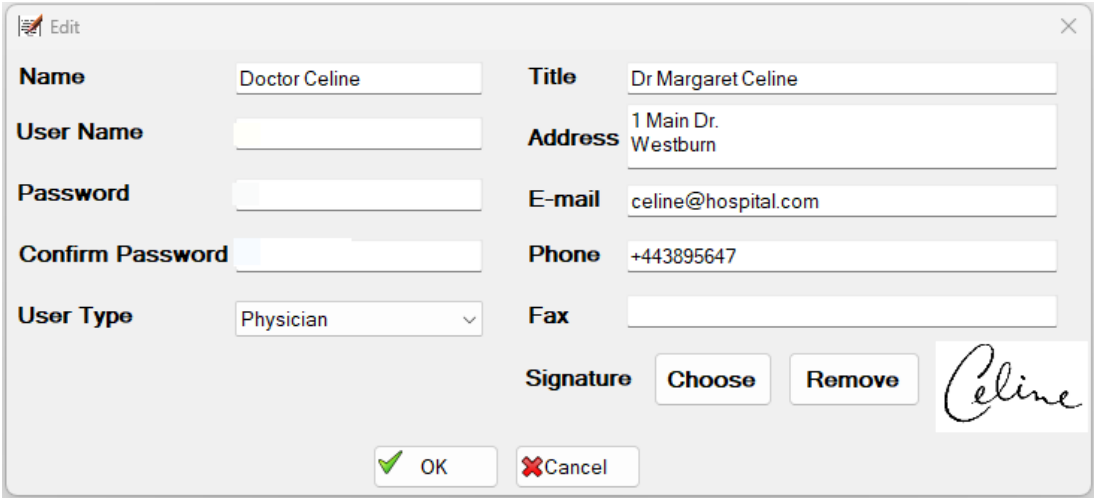


Figure 32: Edit User Dialog Box

4. Edit the required fields, select the user type from the drop-down list, and then click OK.

5. To delete a user, click Delete.

   The **Delete User Dialog Box** is displayed (see Figure 33).

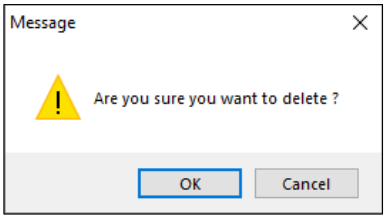


Figure 33: Delete User Dialog Box

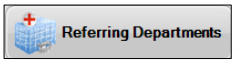
6. Click OK.

Note

Only physicians can use their signature to confirm and sign ABPM, Rest, and Stress reports through the Review function.

To manage 

, 

, 

, 

,

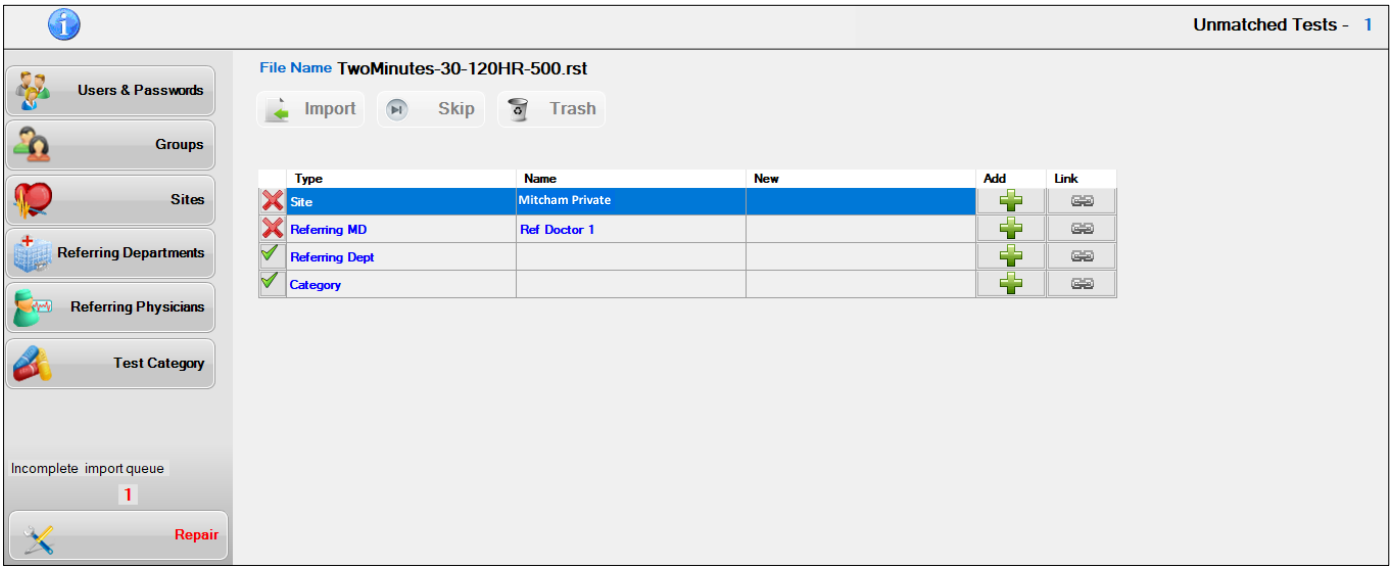
and 

, click the corresponding tab (see Figure 30), and perform

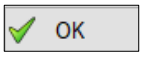
Step 1 through Step 6 above.

The 

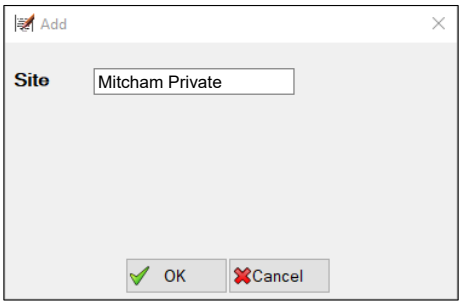
button allows correcting incomplete import queues (see following Figure).



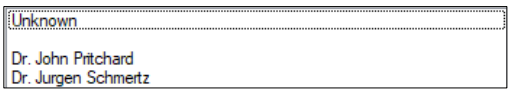
You can either **Add** a **Site**, **Referring MD**, **Referring Dept.**, or **Category** instead of the erroneous **Type**, or **Link** another one.

1. To **Add** the missing or mismatching **Site** click  and then click 

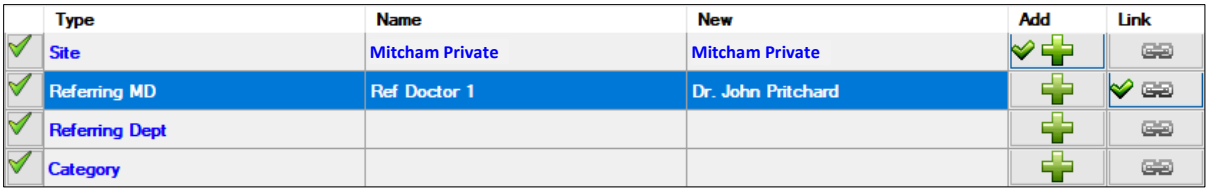
(see Figure below).



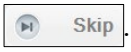
2. To **Link** the missing or mismatching **Referring Physician (MD)** click  and select the physician from the list (see Figure below).

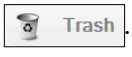


The errors are corrected (see Figure below).



- To import a test file, click 

.
- To skip a test file, click 

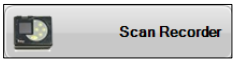
.
- To delete an incomplete imported test file, click 

.

Devices Tab

The Devices Tab allows scanning connected Holter Recorder and downloading patient test to NEMS-Q (see Figure 34).

Figure 34: Devices Screen

1. Connect the recorder to the PC and click the 

button.

   The **Patient Details Screen** is displayed (see Figure 35).

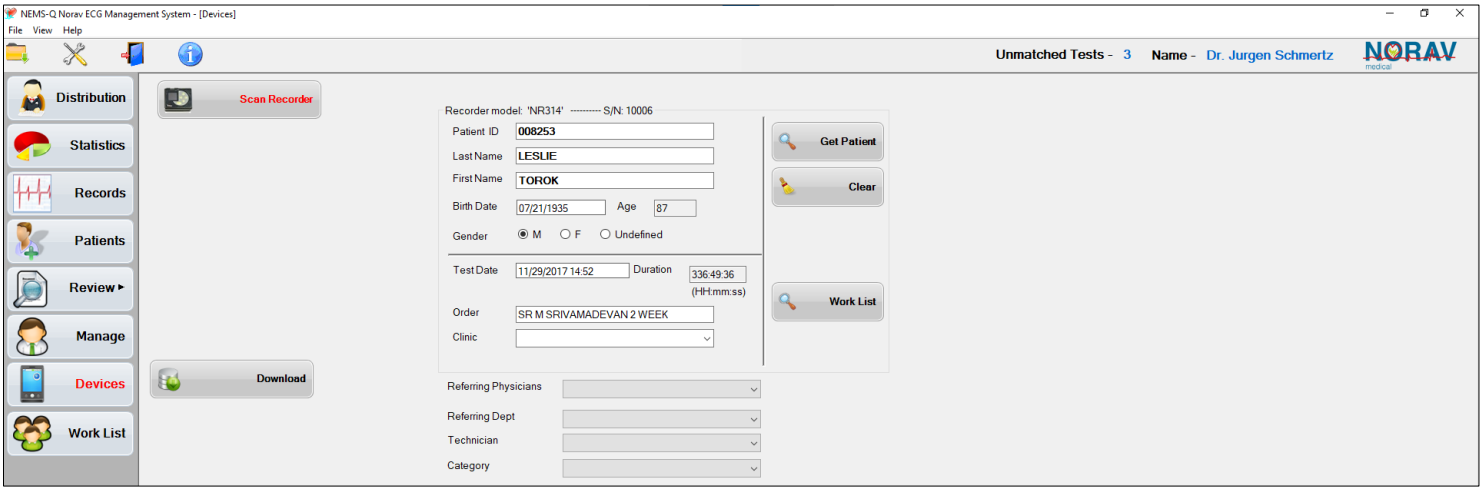
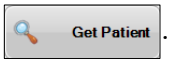


Figure 35: Patient Details Screen

2. To download the test (record) to NEMS-Q, click 

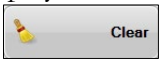
.
3. To replace the patient details if the patient already exists in the DB, type the first digit of the patient's ID and click 

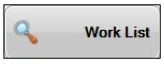
.

   The **Patient List Window** is displayed (see Figure 36).

Figure 36: Patient List Window

4. Select the patient from the list.

   The selected patient's details are displayed on the **Patient Details** screen (see Figure 35).
5. To **clear** the patient's details, click 

(see Figure 35).
6. To search and attach patient from Work List, click 

(see Figure 35).

Work List Tab

The Work List contains the list of patients with pending tests (see **Figure 37**), displaying which test is pending for each patient and allowing the operator to initiate a test by clicking the 

button.

The Work List sources are the DICOM® Modality Worklist Server and HL7 ORM. You can also create a worklist manually in the NEMS-Q application.

When clicking the **Rest**, **Stress** or Spirometer test type, the corresponding testing tool is opened and displays the patient and test demographics.

When clicking the **Holter ECG** or **ABPM** test type, the **Patient Details** window is opened, prompting the user to prepare the device:

- See Section Preparing Holter Recorder for New Patient on page 64.
- See Section Preparing NBP One Recorder for New ABPM Test on page 103
- See Section Preparing NBP-24 NG Recorder for New ABPM Test on page 111

The Work List tab also allows viewing the list of patient tests (see Figure 37).

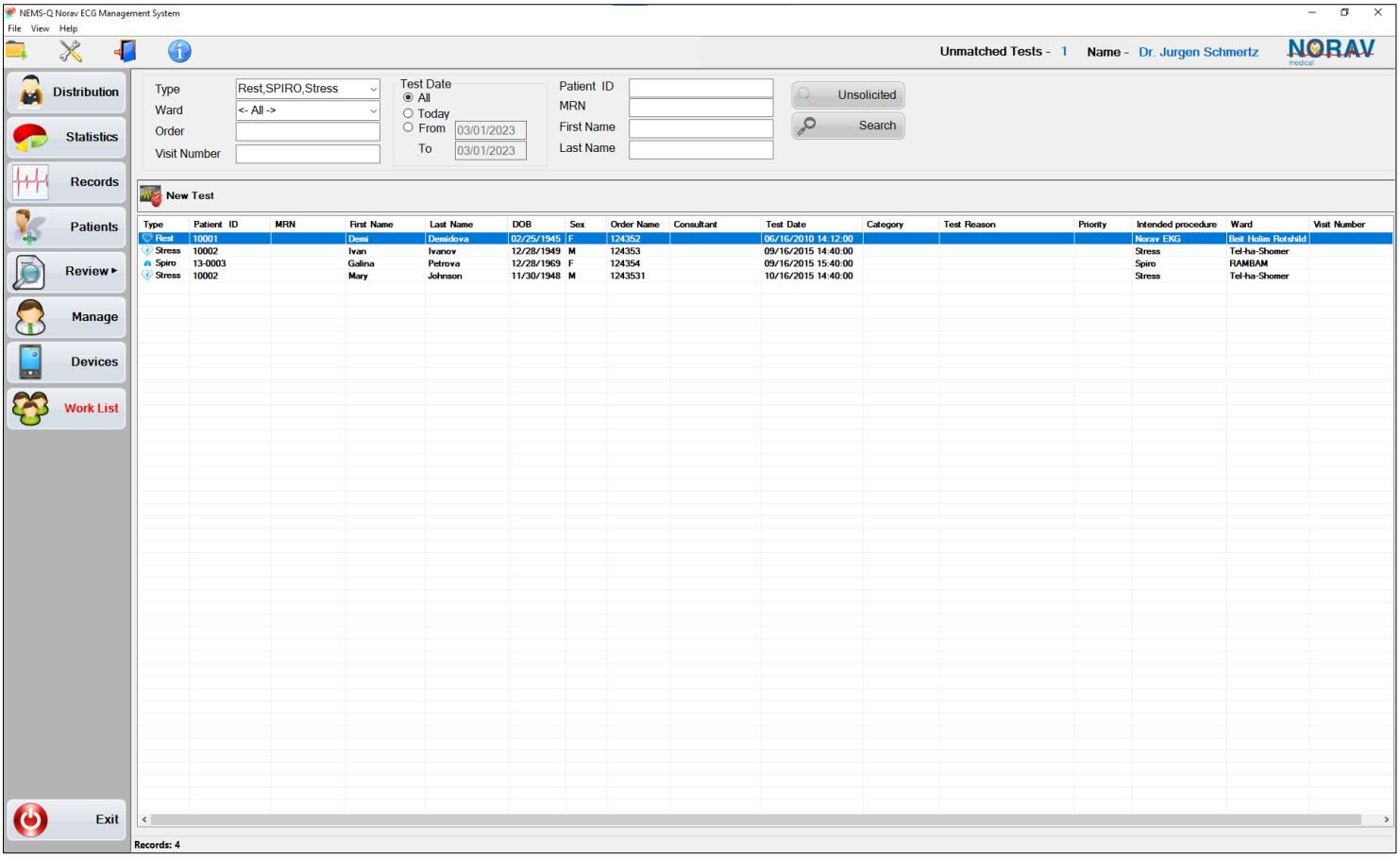


Figure 37: Work List Screen

To start a test from the Work List:

1. Select (highlight) a patient in the list and click 

.
2. The corresponding test application opens and displays the patient's details (see Figure 38).

   The following test applications are supported:

- ◊ PC-ECG application (Rest, Stress)
- ◊ NH-301 (Holter tests)
- ◊ ABPM (Blood Pressure tests with NBP One or NBP-24 NG recorder selection)
- ◊ MIR Spiro or NSpiro™ (Spirometry tests)

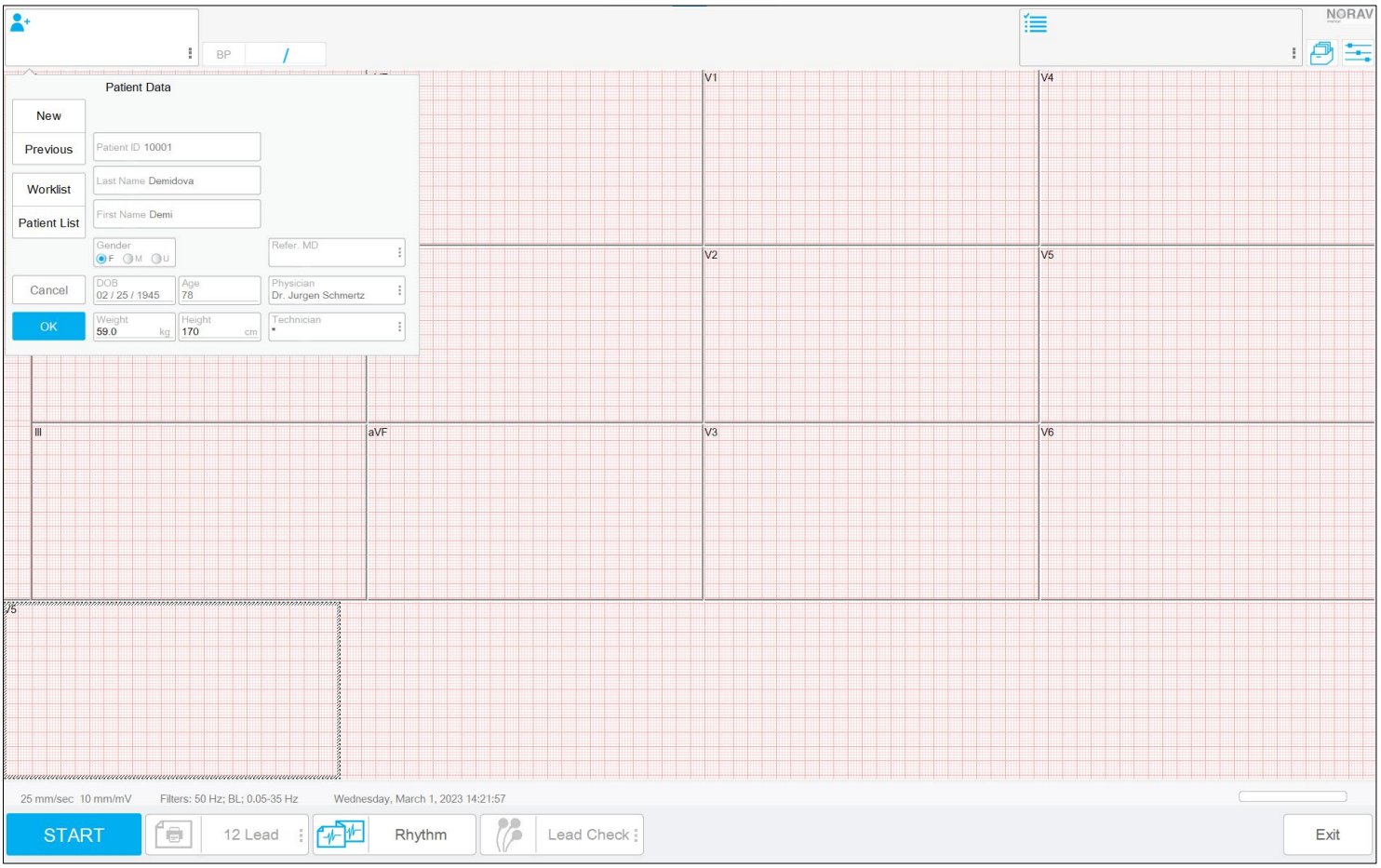


Figure 38: Test Screen with Patient Details

3. Verify the patient's details.
4. Begin the test.

Note

A spirometry test added to the Work List will be removed from it only if it is performed on the same day.

NEMS-Q Setup

To set up NEMS-Q, click View on the **Menu Bar** at the top left, and select Setup from the drop-down list (see Figure 3).

Or

Click on the **Toolbar** (see Figure 3).

The **Setup Dialog Box** is displayed (see Figure 39).

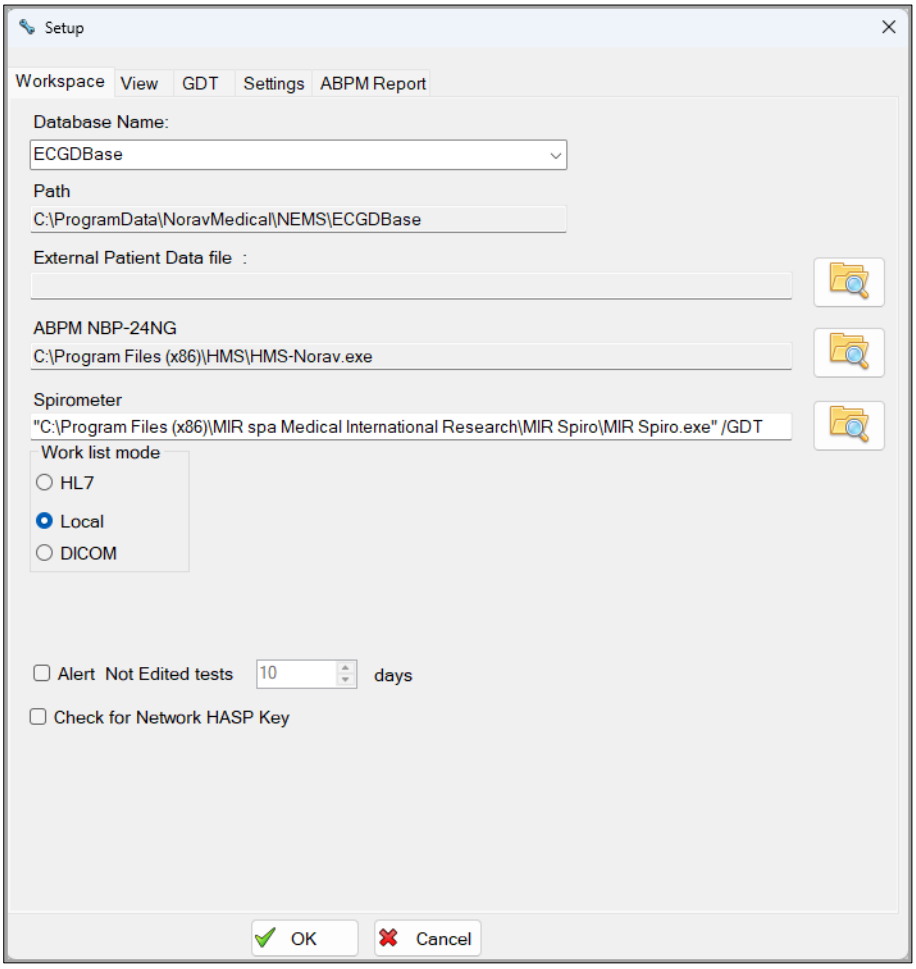


Figure 39: Setup Dialog Box - Workspace Tab

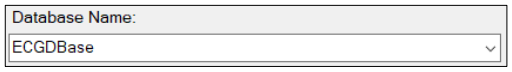
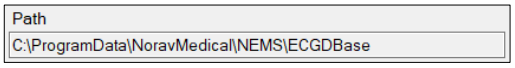
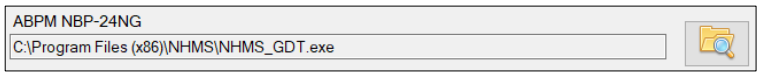
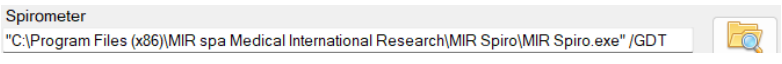
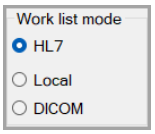
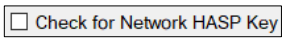
The Setup dialog box includes the following tabs:

- **Workspace Tab** on page 56
- **View Tab** on page 56
- **GDT Tab** on page 58
- **Settings Tab** on page 59

Workspace Tab

The Workspace tab includes the following options (see Figure 39 and Table 9).

Table 9: Workspace Tab Options

Workspace Tab Options	Description
	The NEMS-Q database name (see Table 10).
	Default data directory. This folder contains tests and report files.
	Location of the PatientFile.ini external patient data file used for creating the Work List (see Table 16). The PatientFile.ini contains patients' data used in the Work List when Work list mode is set to Local.
	Location of the main executable of NHMS blood pressure monitoring program (see Table 10). NHMS is a third-party software operating with the NBP-24 NG ABPM Recorder.
	Location of the main executable file for the spirometry software (see Table 10).
	Selects Work List preparation mode: via HL7 orders, DICOM or by reading the PatientFile.ini.
	Select the checkbox and select the number of days for alerting on unedited tests.
	Select the checkbox for prompting to check for the NetHASP key.

The following parameters are taken from the **Settings.xml** file on your PC in the following path: **C:\ProgramData\NoravMedical\NEMS** (see Table 10).

Table 10: Workspace Tab Parameters in Settings.xml Fileну

Parameter	Settings.xml File
Database Name	`<DatabaseName>ECGDBase</DatabaseName>`
ABPM NBP-24 NG	`<NBP>C:\Program Files (x86)\NHMS\NHMS_GDT.exe</NBP>`

Spirometer	`For MiniSpir:`
	`<NSpiro> C:\Program Files (x86)\MIR spa Medical International Research\MIR Spiro\MIR Spiro.exe /GDT </NSpiro>`
	`For NSpiro:`
	`<NSpiro>C:\Program Files (x86)\Norav Medical\NSPIRO\NSPIRO.exe</NSpiro>`

View Tab

The View tab includes the following options (see Figure 40 and Table 11).

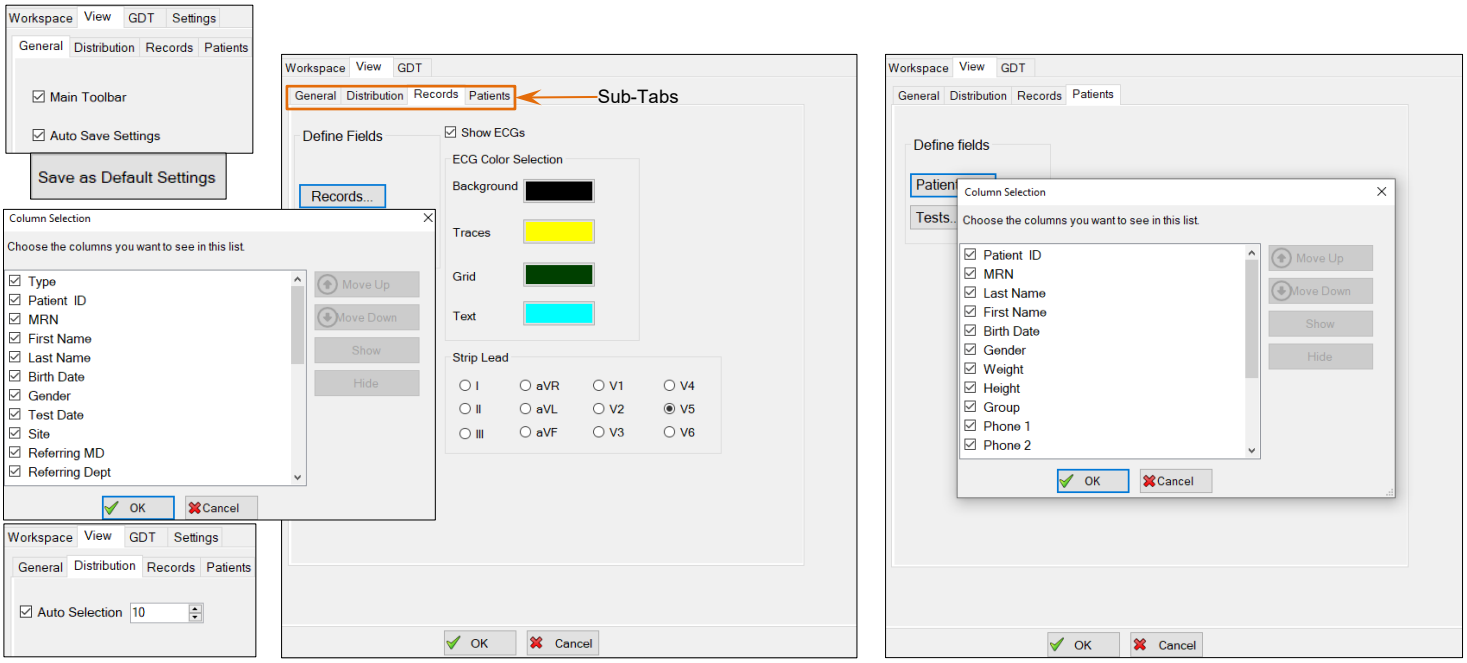


Figure 40: View Tab

Table 11: View Tab Options

Sub-Tab	Options	Description
General	Main Toolbar	Show the main toolbar buttons.
	Auto Save Settings	Remember the user adjusted screen layout upon exiting the program.
	Save as Default Settings	Save settings as default settings.
Distribution	Auto Selection 10	Number of recordings selected automatically on Distribution screen.
Records	Show ECGs	Preview waveforms of Resting ECG tests.
	ECG Color Selection Background Traces Grid Text	Set color scheme of ECG waveforms preview window.
	Strip Lead I aVR V1 V4 II aVL V2 V5 III aVF V3 V6	Set default strip lead on ECG waveforms preview window.
	Define Fields Records...	Select and arrange data columns for display on Records... screen table.
Patients	Define fields Patients... Tests...	Select and arrange data columns for display on Patients... and Tests... screen tables.

GDT Tab

GDT is a communication protocol between the entity that orders the test and NEMS-Q that transfers the test results file (GDT report files generated by NEMS-Q) – see Table 12 bottom row.

The entity that orders the test places the file (patient details and test type) in a specific location from which NEMS-Q reads and displays the file onscreen.

Then the user performs the test after which the test results file is created, and the entity that orders the test receives the test results file.

The GDT tab includes the following options (see Figure 41 and Table 12).

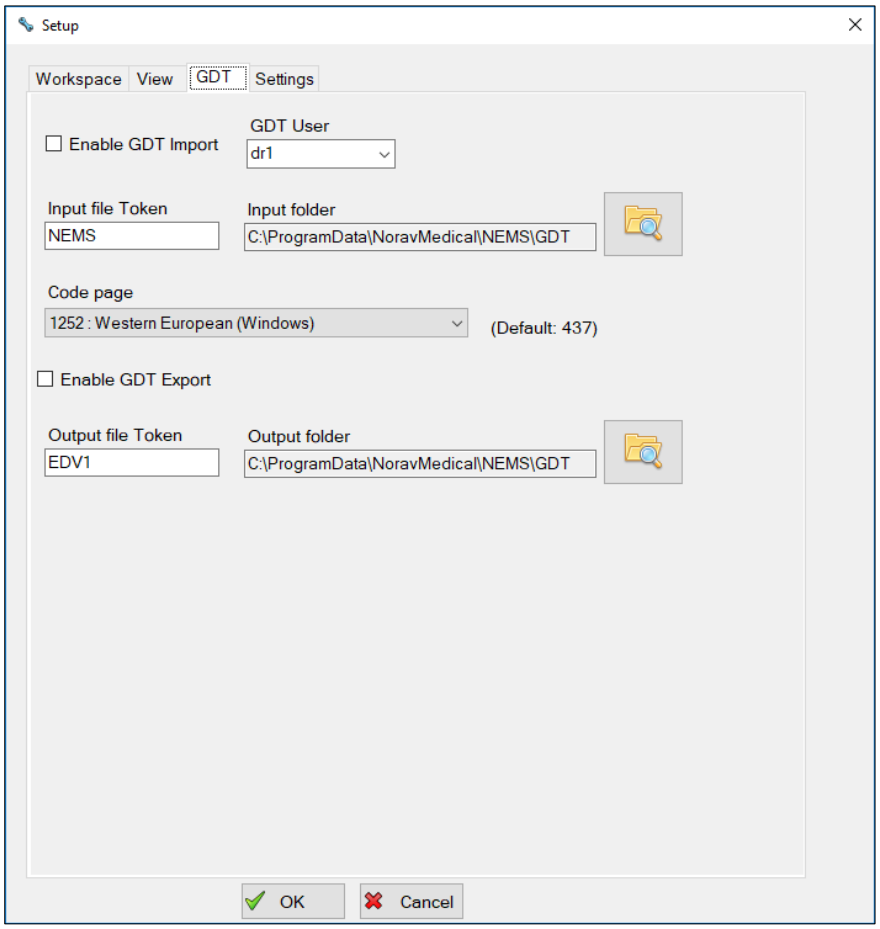
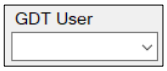
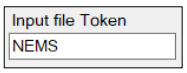
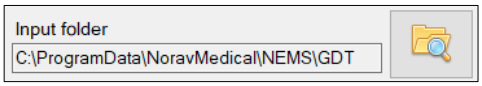
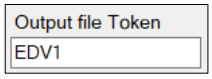
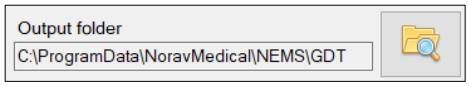


Figure 41: GDT Tab

Table 12: GDT Tab Options

GDT Tab Options	Description
	Select checkbox to receive GDT commands from EMR.
	Select the NEMS-Q username to associate it with procedures started via GDT.
	First four characters expected in filename of GDT inbound files generated by EMR.
	Inbound folder to accept GDT inbound files received from EMR (see Table 13).
	Select the Code page, used in the country or related to the country.
	Select to send GDT reports from NEMS-Q to EMR (NBP-24 NG reports only).
	First four characters in filename of GDT report files generated by NEMS-Q.
	Output folder for placing the GDT report files generated by NEMS-Q (see Table 13).

The following parameters are taken from the **Settings.xml** file on your PC in the following path: **C:\ProgramData\NoravMedical\NEMS** (see Table 13).

Table 13: Input Folder & Output Folder in Settings.xml File

Parameter	Settings.xml File
Input Folder and Output Folder	<GDT_CodePage>1250</GDT_CodePage> <GDT_Import enabled="TRUE"> <GDT_InputToken>NEMS</GDT_InputToken> <GDT_InputFolder>C:\ProgramData\NoravMedical\NEMS\GDT</GDT_InputFolder> <GDT_User>noravadmin</GDT_User> </GDT_Import> <GDT_Export enabled="TRUE"> <GDT_OutputToken>EDV1</GDT_OutputToken> <GDT_OutputFolder>C:\ProgramData\NoravMedical\NEMS\GDT</GDT_OutputFolder> </GDT_Export>

Settings Tab

The settings are used for connecting a NEMS-Q Client to the NEMS DB using SQL-Server.

The settings tab includes the following options (see Figure 42 and Table 14).

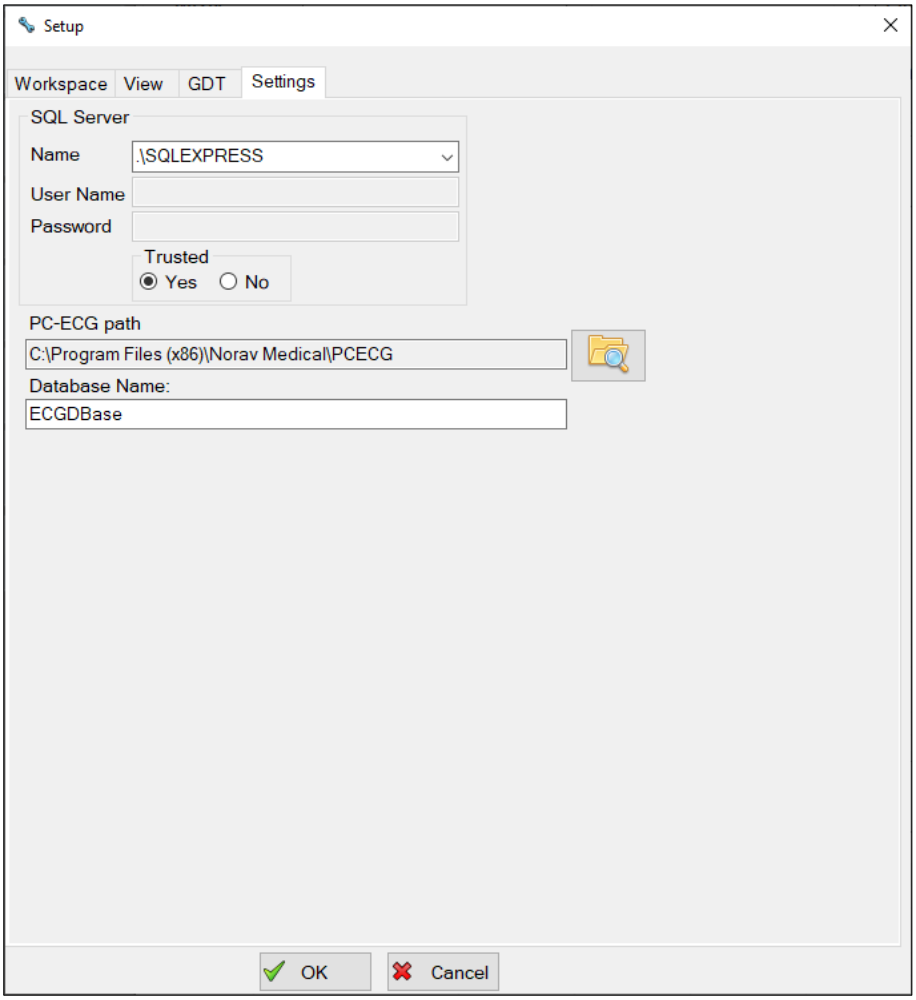


Figure 42: Settings Tab

Table 14: Settings Tab Options

Settings Tab Options	Description
SQL Server Name .\SQLEXPRESS	The instance name of the SQL server where the NEMS-Q database is installed (see Table 15).
User Name	Username to login to the NEMS-Q SQL server (see Table 15).
Password	User password to login to the NEMS-Q SQL server (see Table 15).
Trusted Yes No	Select the trusted or mixed authentication mode of NEMS-Q SQL server user login (see Table 15).
PC-ECG path C:\Program Files (x86)\Norav Medical\PCECG	PC-ECG 1200 Stress ECG and Resting ECG applications executable files path (see Table 15).
Database Name: ECGDBase	The name of SQL database where the NEMS-Q data tables are located (see Table 15).

The following parameters are taken from the **Settings.xml** file on your PC in the following path: **C:\ProgramData\NoravMedical\NEMS** (see Table 15).

Table 15: Settings Tab Parameters in Settings.xml File

Parameter	Settings.xml File
SQL Server Name	<SQLServer>.\SQLEXPRESS</SQLServer>
Username	<UserName />
Password	<Password />
Trusted	<Trusted>Yes</Trusted>
PC-ECG path	<StressPdfFolder>C:\Program Files (x86)\Norav Medical\PCECG</StressPdfFolder>
Database Name	<DatabaseName>ECGDBase</DatabaseName>

ABPM Report Tab

The **ABPM Report** tab contains options enabling layout adjustments for this specific type of reports in NEMS-Q:

- **Date Format**
- **Header Alignment**

Date Format

The **Date Format** option determines how the date and time will be presented in the ABPM test record. It offers a set of date and time formats to choose from, as shown below.

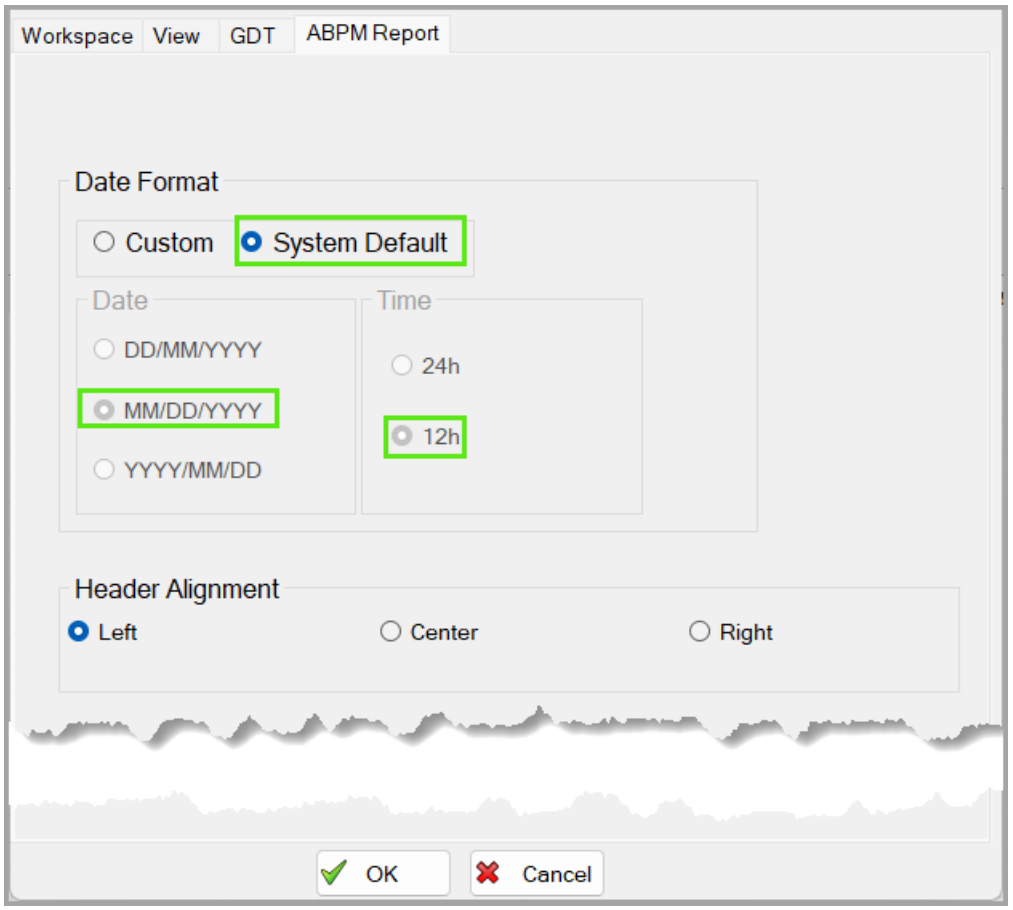


Figure 43: Setup - ABPM Report Tab - System Default Settings

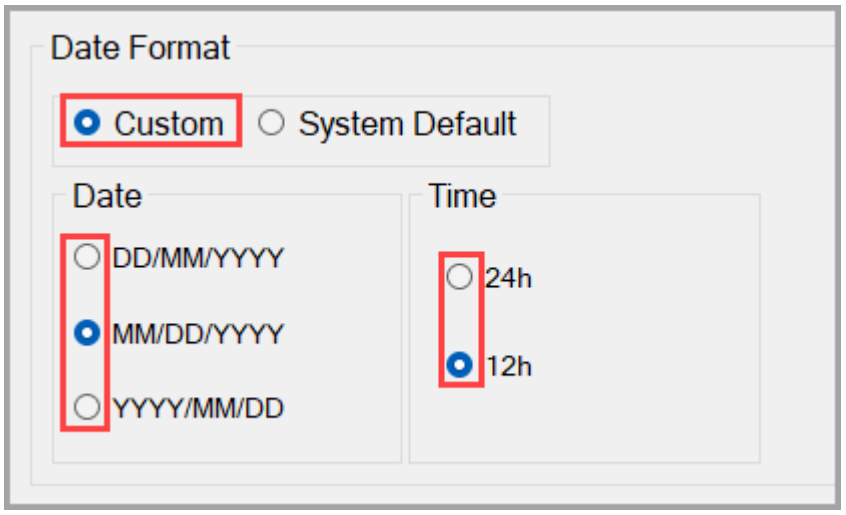
System default date and time formats are:

- **Date:** MM/DD/YYYY
- **Time:** 12h

To adjust the **Date** or **Time** format:

1. Click the **Custom** radio button under the **Date Format** option to unlock the **Date** and **Time** radio buttons.

Figure 44: Setup - ABPM Report Tab - Custom Date and Time



2. Click on the relevant radio button:
   - **Under the Date option:** To select the desired **Date** format.
   - **Under the Time option:** To select the desired **Time** format.
3. Click **OK** to apply the changes.

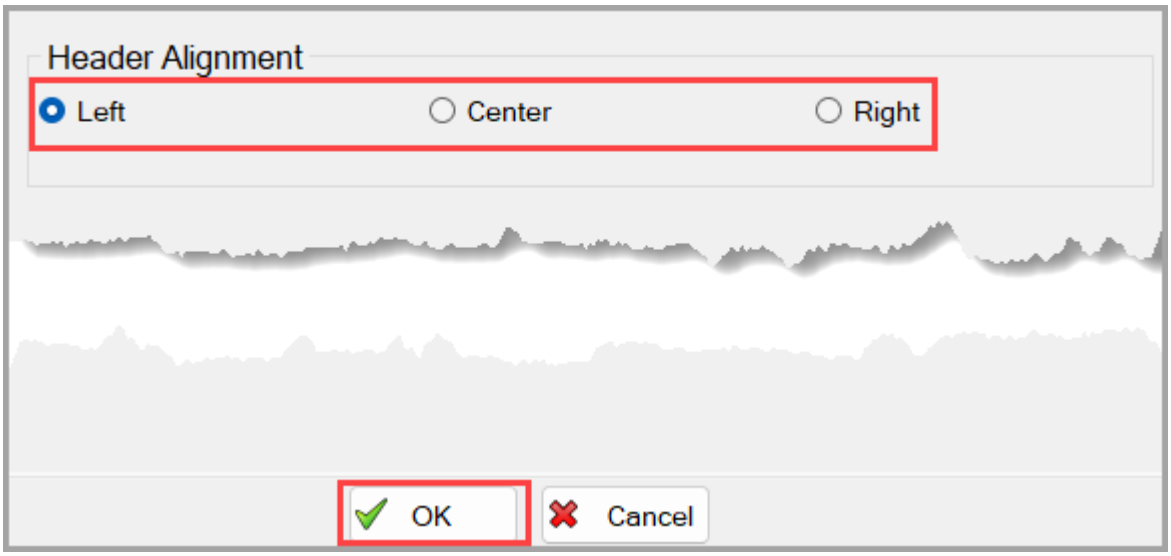
Header Alignment

The **Header Alignment** option determines how the report header will align in the ABPM test record. It provides three standard choices: **Left**, **Center**, and **Right**. By default, **Header Alignment** is set to **Left**.

To adjust the **Header Alignment**:

1. Click on the appropriate radio button within the **Header Alignment** section.

Figure 45: Setup - ABPM Report Tab - Header Alignment



2. Click on **OK** to apply the changes.

Working with the NH-301 Holter Analysis System

The following operations are specific for operating NEMS-Q together with the NH-301 app.

Preparing Holter Recorder for New Patient

Preparing a Holter recorder involves sending patient data to the recorder before starting the test. The NEMS-Q application supports two preparation flows:

- **Via USB connection** – used when the recorder is physically connected to the PC or when its memory card is inserted via a card reader.
- **Via Bluetooth connection** – used when the recorder is paired with the PC via Bluetooth. This method enables the **Check ECG** function, which allows users to verify the quality of the ECG signal and the electrode connections in real time before sending data to the recorder. For more details on connecting recorders to the PC, refer to the **Pairing Norav Devices via Bluetooth** section of the **NH-301 Instructions for Use**.

Both methods follow similar steps for selecting a patient and assigning test details, but the Bluetooth-based flow includes optional signal verification using the **Check ECG** button.

To prepare the recorder using a USB connection:

1. To perform the test from the **Work List**, select a patient in the **Work List** tab and then click the **New Test** button (see **Figure 37: Work List Screen**).
   Or
   To perform the test from the **Patients Screen**, select a patient in the **Patients Screen**, and then click **New Test** (see **Figure 46: Start New Test**).

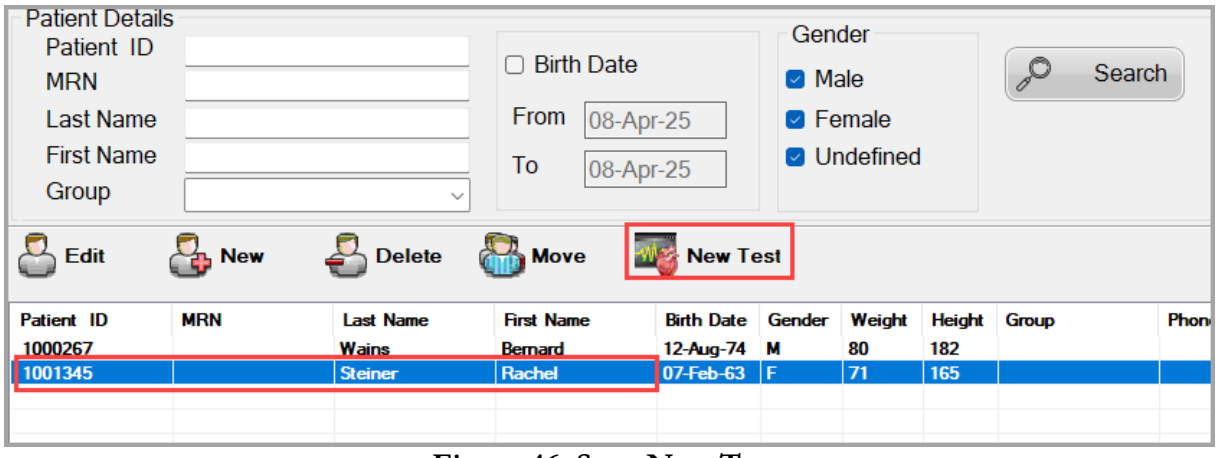


Figure 46: Start New Test

2. In the **New Test** drop-down menu, hover over **Holter**, and then select either:

   - **NR** to prepare any of the NR recorder models **except** NR-314-P;

- **NR Patch** to prepare **specifically the NR-314-P** recorder model.

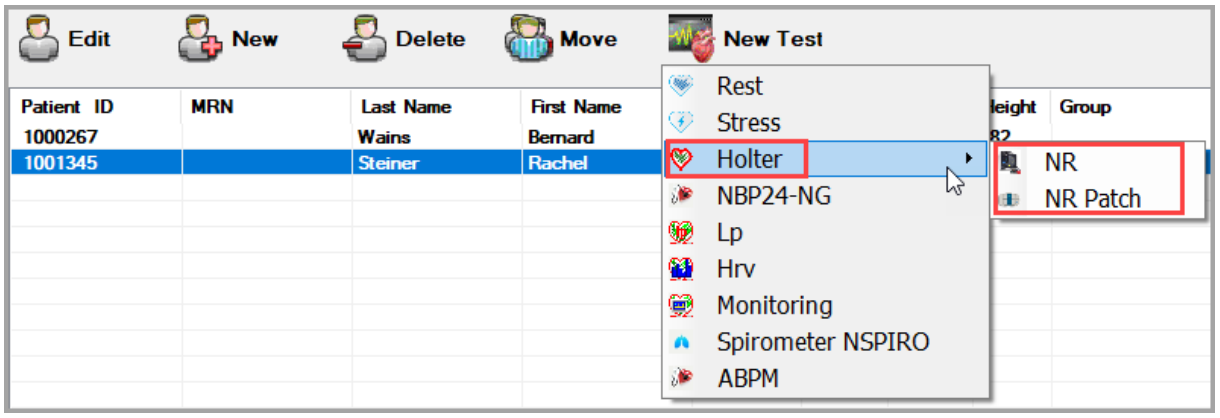


Figure 47. Select Recorder Type

3. The **Patient Details** window is displayed. Verify and complete patient demographics, including **Patient ID**, **First Name**, **Last Name**, **Birth Date**, and **Order**, if available (see **Figure 48: Patient Details Window**).

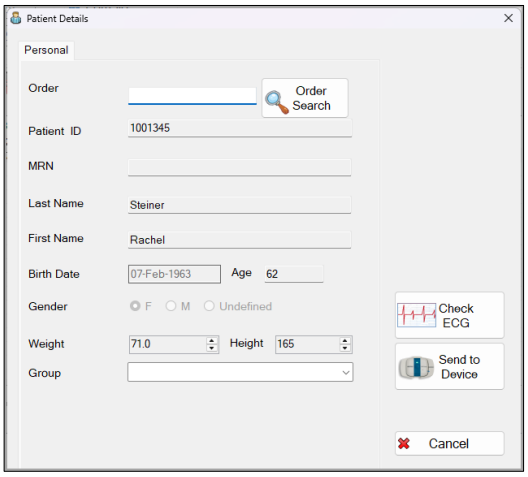


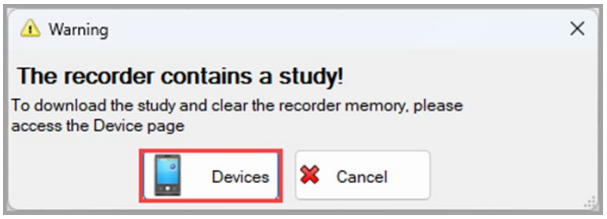
Figure 48: Patient Details Window

Note

It is important to complete patient demographics (**Patient ID**, **First Name**, **Last Name**, **Birth Date**, and **Order** if available).

Note

If the recorder memory contains a test record, a warning message will appear (see below). Click **Devices**, switch to the **Devices** tab and download the existing record. For more details, refer to **Downloading ECG Recording from Holter Recorder**.



4. Once the patient's demographics are complete and verified, click **Send to Device** in the NEMS-Q app.

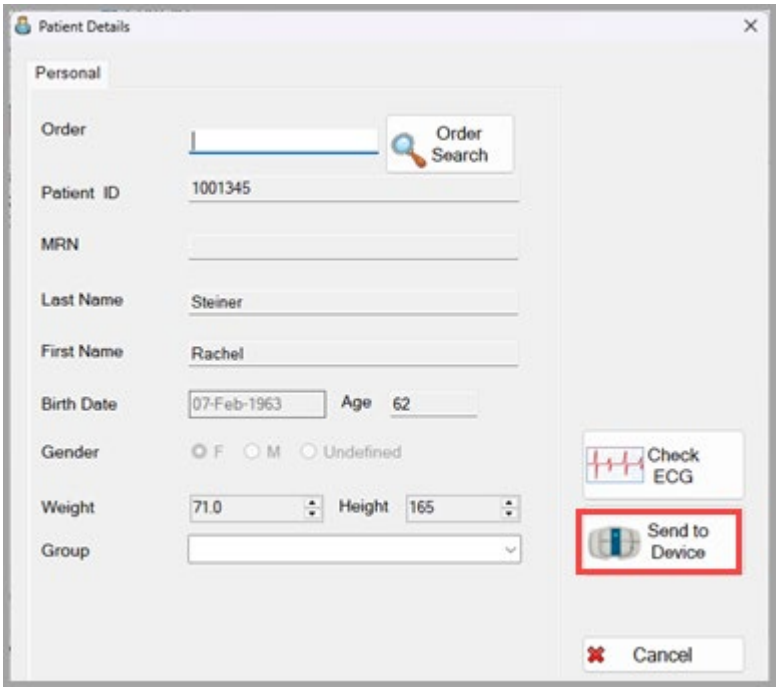


Figure 49: Send to Device

5. Wait until the recorder preparation is complete. A status message will be displayed. Click **OK** to dismiss the message. Now you may disconnect the **Holter recorder** or the **memory card** from the PC.

Figure 50: Status Message - NEMS-Q

6. Hook up the patient. Once everything is ready and the electrodes are properly connected, you may proceed with the test.

To prepare the recorder using a Bluetooth connection:

1. Connect the recorder via Bluetooth and follow **Steps 1-3** of the instruction above on how to prepare the recorder using a USB connection.
2. **(Optional) For a Bluetooth connection:** When the patient is hooked up, you may click the **Check ECG** button to verify electrode connection and signal quality:

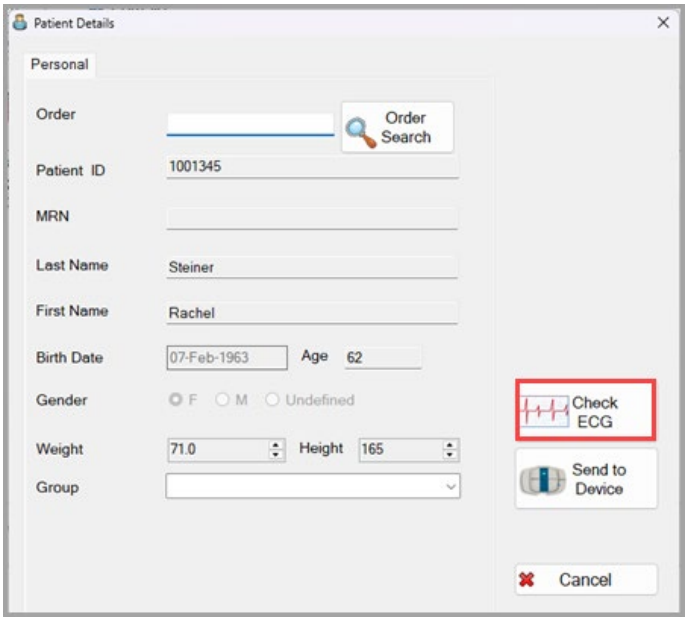


Figure 51: Check ECG – NEMS-Q

1. Click **Check ECG**. The **Norav Holter Device Manager** application will launch. Wait until the recorder selection screen is displayed.

Figure 52: Norav Holter Device Manager Launcher

2. Select the Bluetooth-connected recorder from the list. If the recorder does not appear, click **Refresh** in the bottom-left corner and recheck. If it still does not appear, verify your Bluetooth connection.

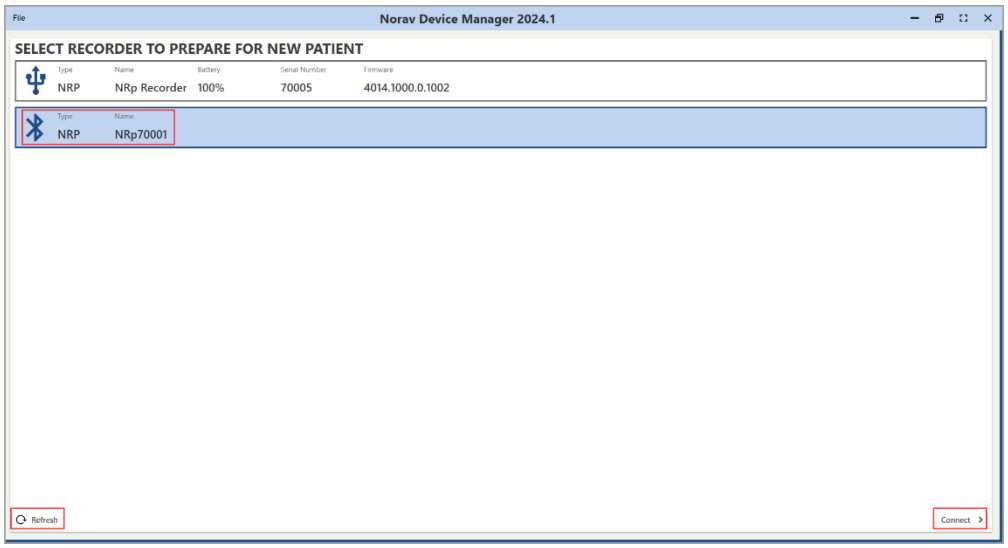


Figure 53: Select Recorder

3. Click **Connect** in the bottom-right corner. The **Record Information** screen will appear, containing **Personal Information** of the patient and **Record Information**.

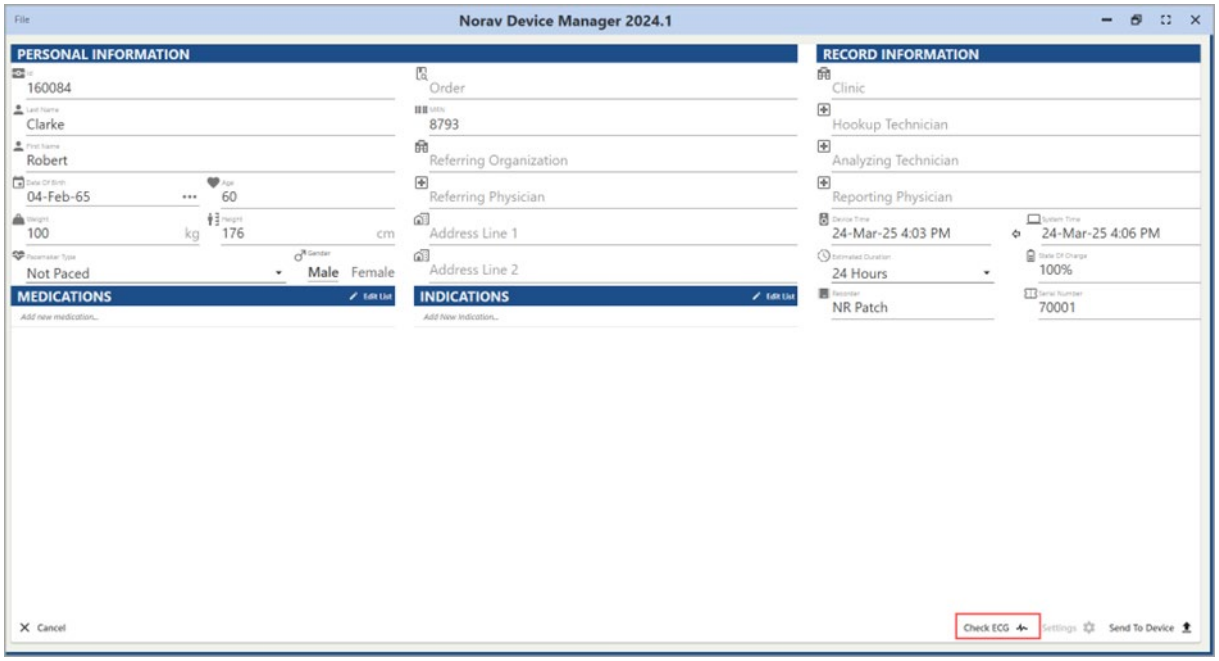


Figure 54: Click Check ECG

4. Click **Check ECG** again in the bottom-right corner. A pop-up window will stream the ECG signal and indicate the electrode connection status. If any electrode is marked **OFF** and the signal is absent or distorted, adjust the connection and retry.

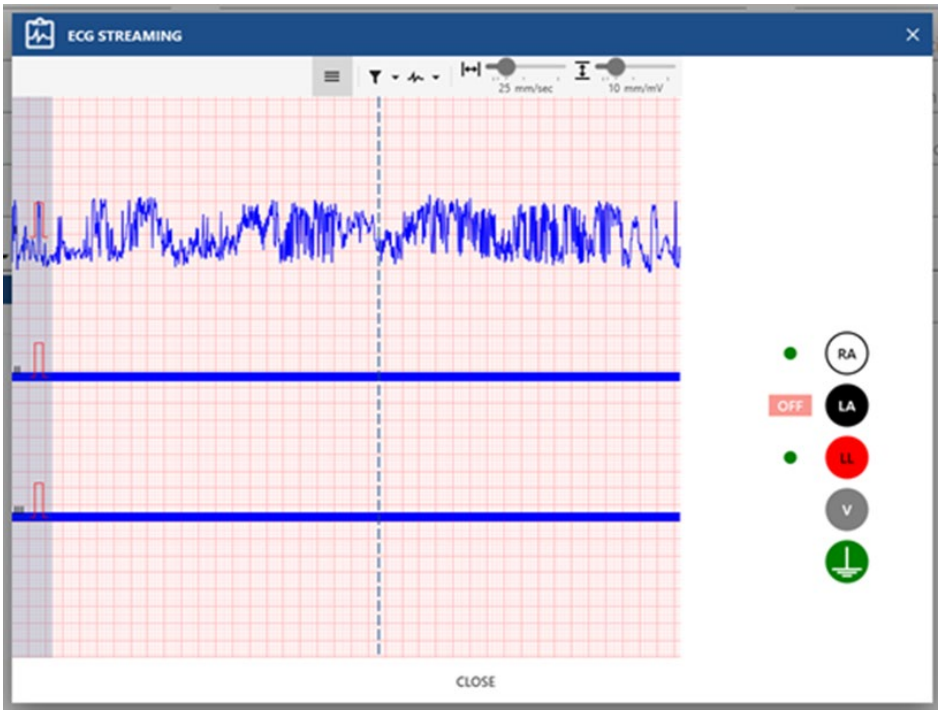


Figure 55: ECG Streaming

4. Once electrode connections are verified and rectified if needed, click **Send To Device** in the Device Manager app.

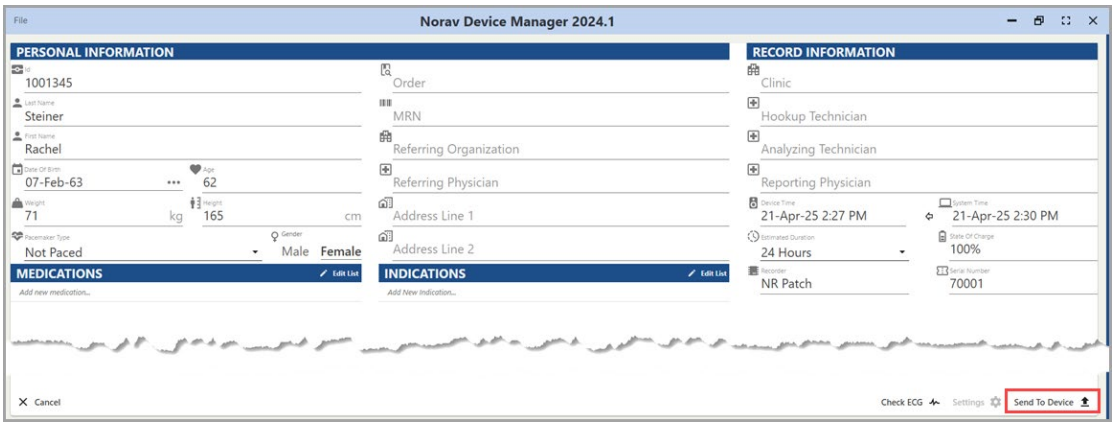


Figure 56: Send to Device – Device Manager

5. Wait until the recorder preparation is complete. A status message will be displayed. Click **OK** to dismiss the message.

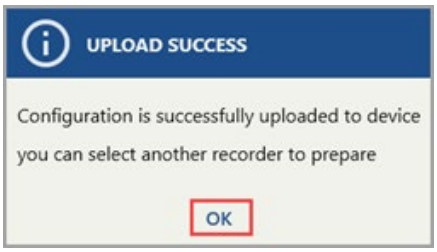


Figure 57: Status Message – Device Manager

6. Once everything is ready and the electrodes are properly connected, you may proceed with the test.

Downloading ECG Recording from Holter Recorder

1. After the test is complete, make sure the Holter recorder is connected to the PC, or the Holter Memory Card is connected to the PC via the Card Reader device.
2. Click the Devices tab, and then click the Scan Recorder button.

   The **Patient Details Screen** is displayed (see Figure 58).

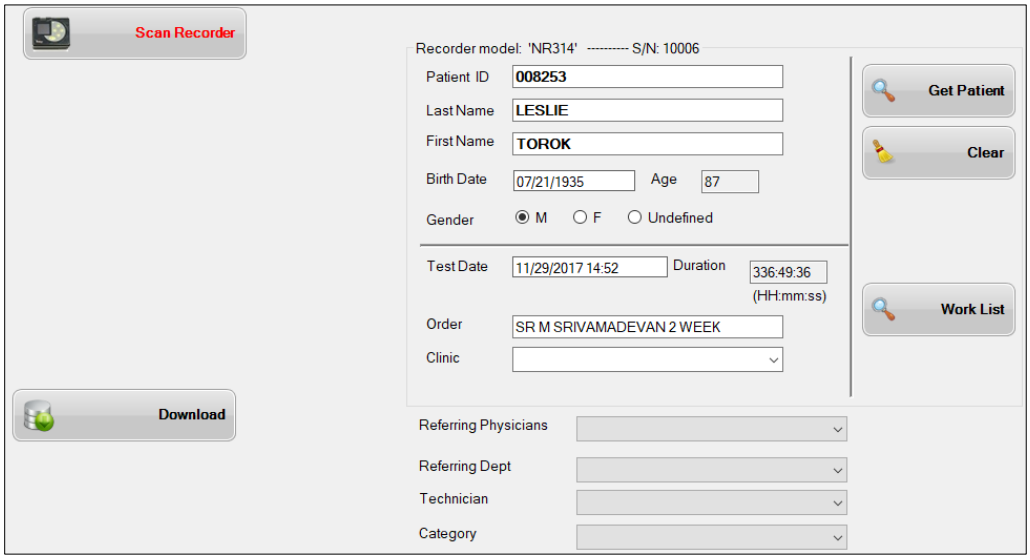
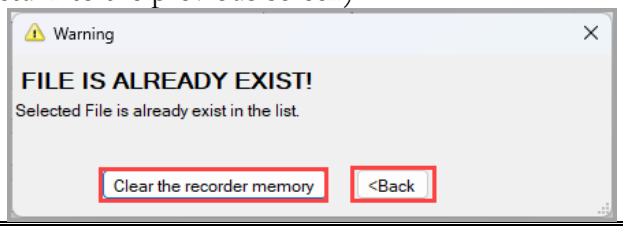


Figure 58: Patient Details Screen

3. Validate or edit the patient details, and then click the Download button.

Note

If a record already exists in the system, a warning message (see the image below) will appear with two options: **Clear the recorder memory** (to remove the record) or **<Back** (to return to the previous screen).



4. You will be prompted with the **Download Complete** dialog box, indicating that the test was successfully downloaded to the NEMS-Q system.

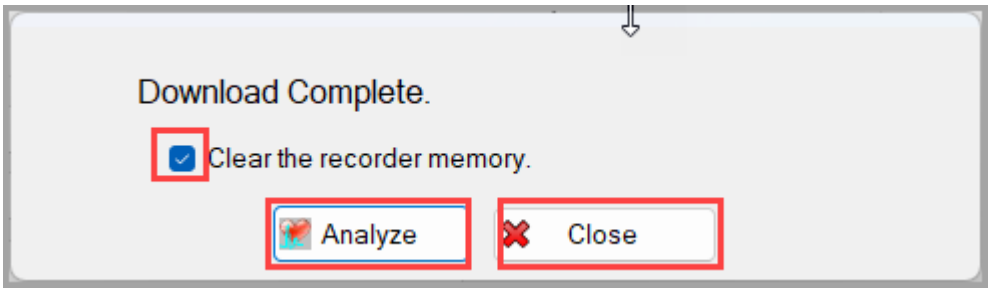


Figure 59: Download Complete Dialog Box

5. **(Optional)** To remove the downloaded record from the recorder, leave the **Clear recorder memory** option checked. To keep the record in the recorder memory, uncheck the **Clear recorder memory** option.

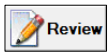
6. Click **Close** to proceed without analyzing the downloaded record, or **Analyze** to analyze the record immediately. Depending on whether the **Clear recorder memory** option is checked, the record will either be removed from the recorder memory or kept intact..
7. Disconnect the **Holter Recorder** or the **Memory Card** from the PC.

Reviewing ECG Record using NH-301 Software

Note

The NH-301 Holter software license is required.

To open a Holter recording, click the 

tab, select a Holter test, and then click the 

button on the record list toolbar.

For detailed description, refer to the NH-301 IFU – Reviewing and Editing ECG Recording.

Working with the PC-ECG 1200 System

The PC-ECG 1200 software is required with the PC-ECG 1200 software license.

The following operations are specific for operating NEMS-Q with the PC-ECG 1200 system.

Starting New ECG Test

1. To start a new test (Rest, Stress) from the **Patients** screen, select (highlight) the patient, click the New Test button, and then select the test type from the drop-down list (see Figure 60).

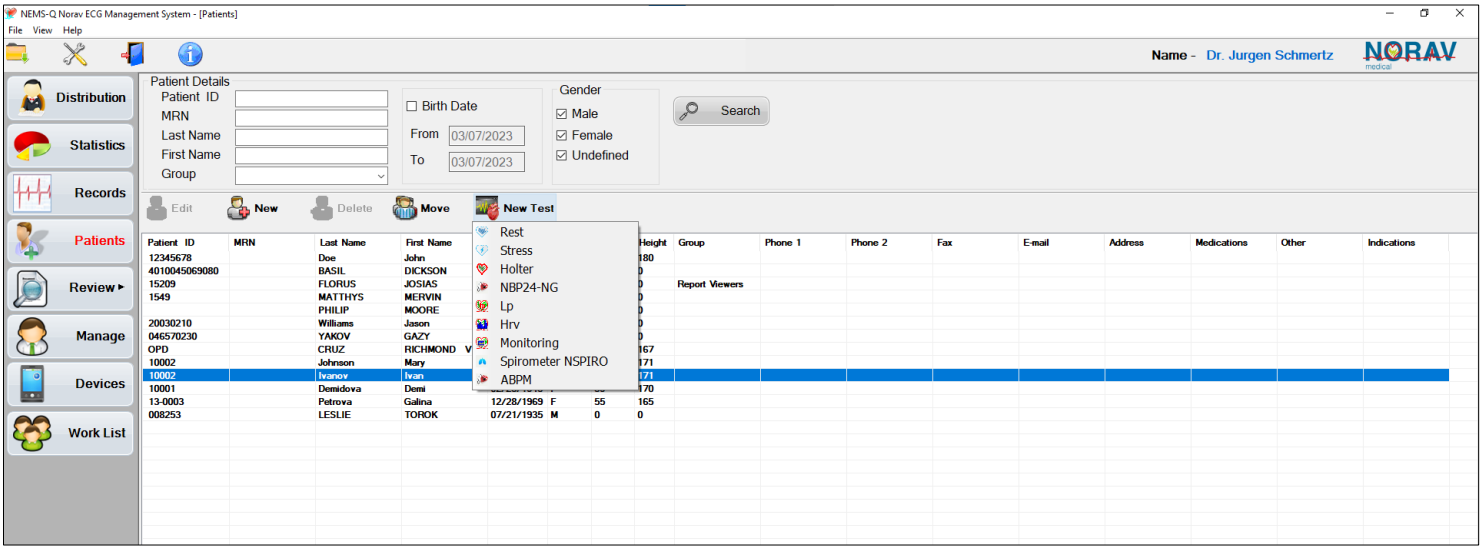


Figure 60: Starting New Test from Patients Screen

Or

To start a new test from the **Work List Screen**, select (highlight) the patient and click the New Test button, which opens a new test of the existing test type (see Figure 61).

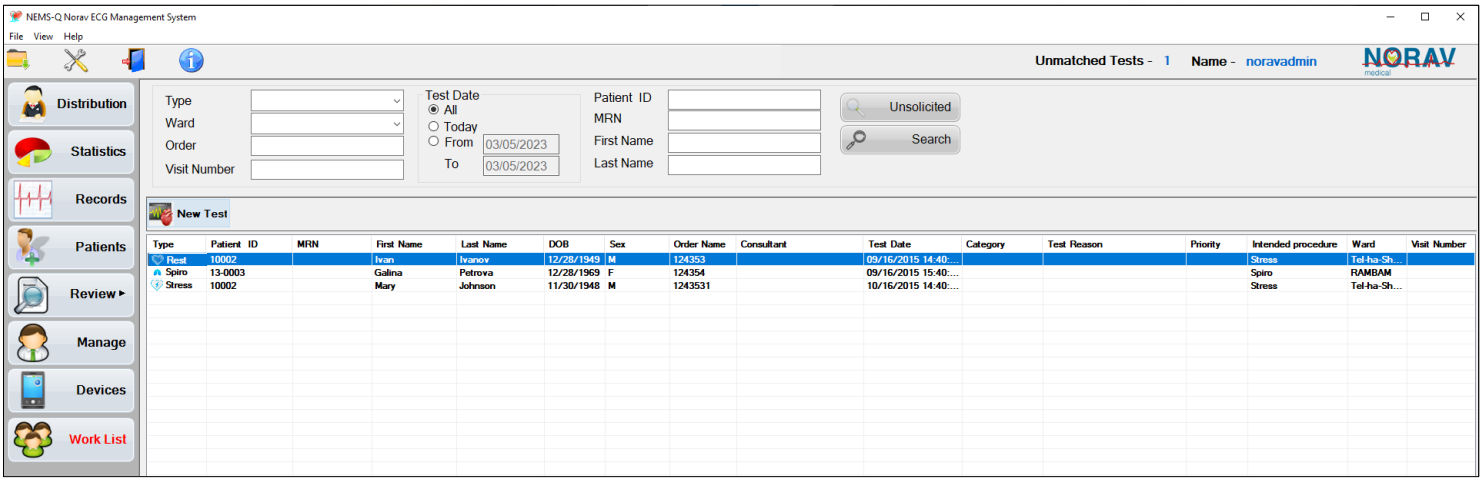


Figure 61: Starting New Test from Work List Screen

2. After the ECG recording is finished, click Exit to close the application.

   The ECG recording (Rest, Stress) is automatically added to the database and displayed on the Records list.

Opening Rest ECG Record for Review

1. Select a Rest ECG test (physician only) from the recording list and then click the Review button (see Figure 62).

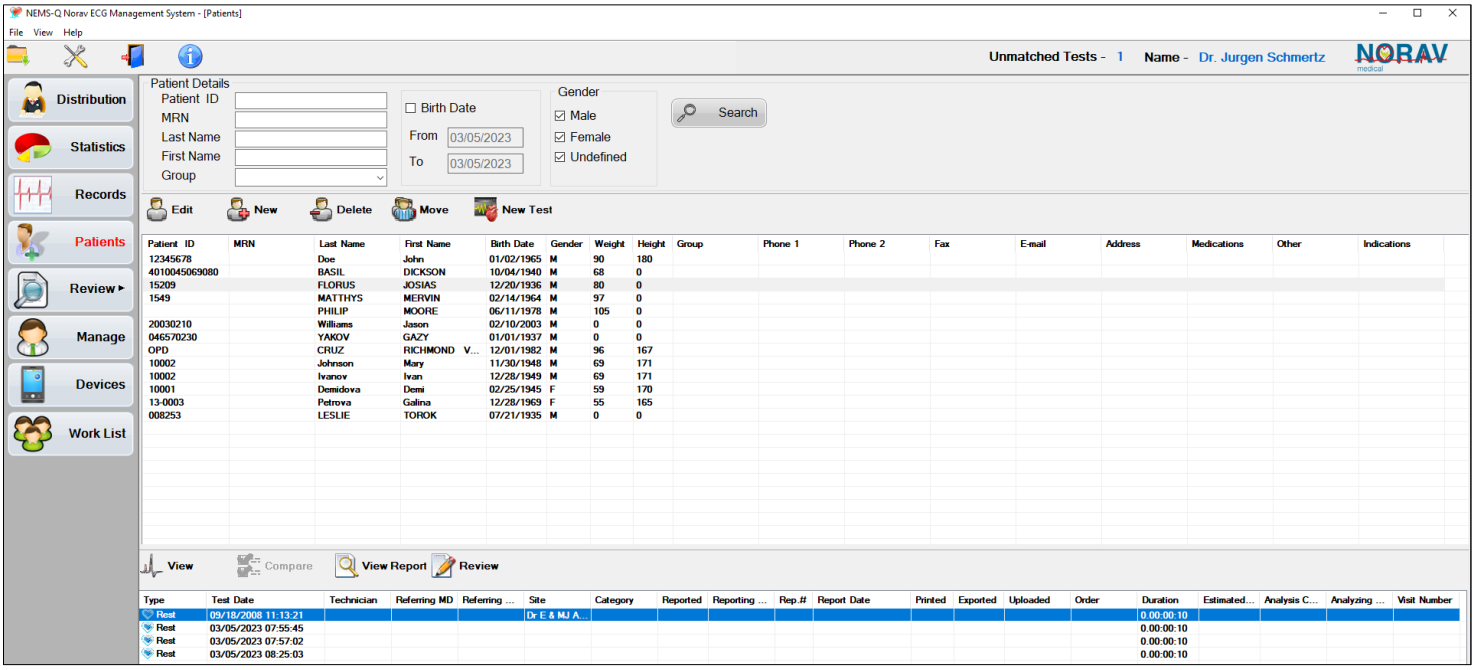


Figure 62: Opening Rest ECG Recording for Review

The Rest ECG recording is opened in the PC-ECG 1200 program interface (see Figure 63).

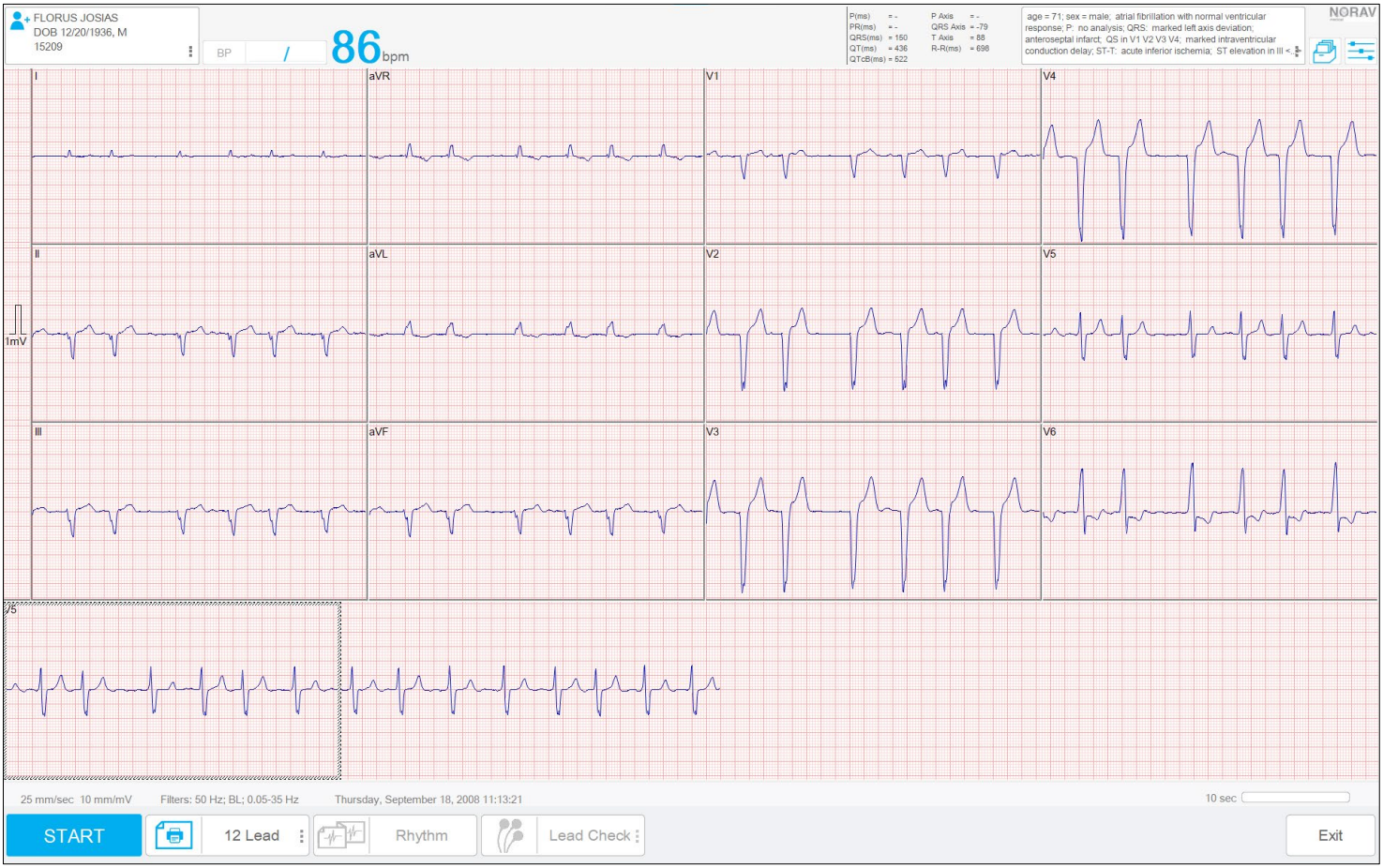


Figure 63: Rest ECG Recording Opened for Review

2. Click on the Interpretation window (with automatic Interpretation and Remarks) on the top right of the screen (highlighted blue) – see Figure 64.

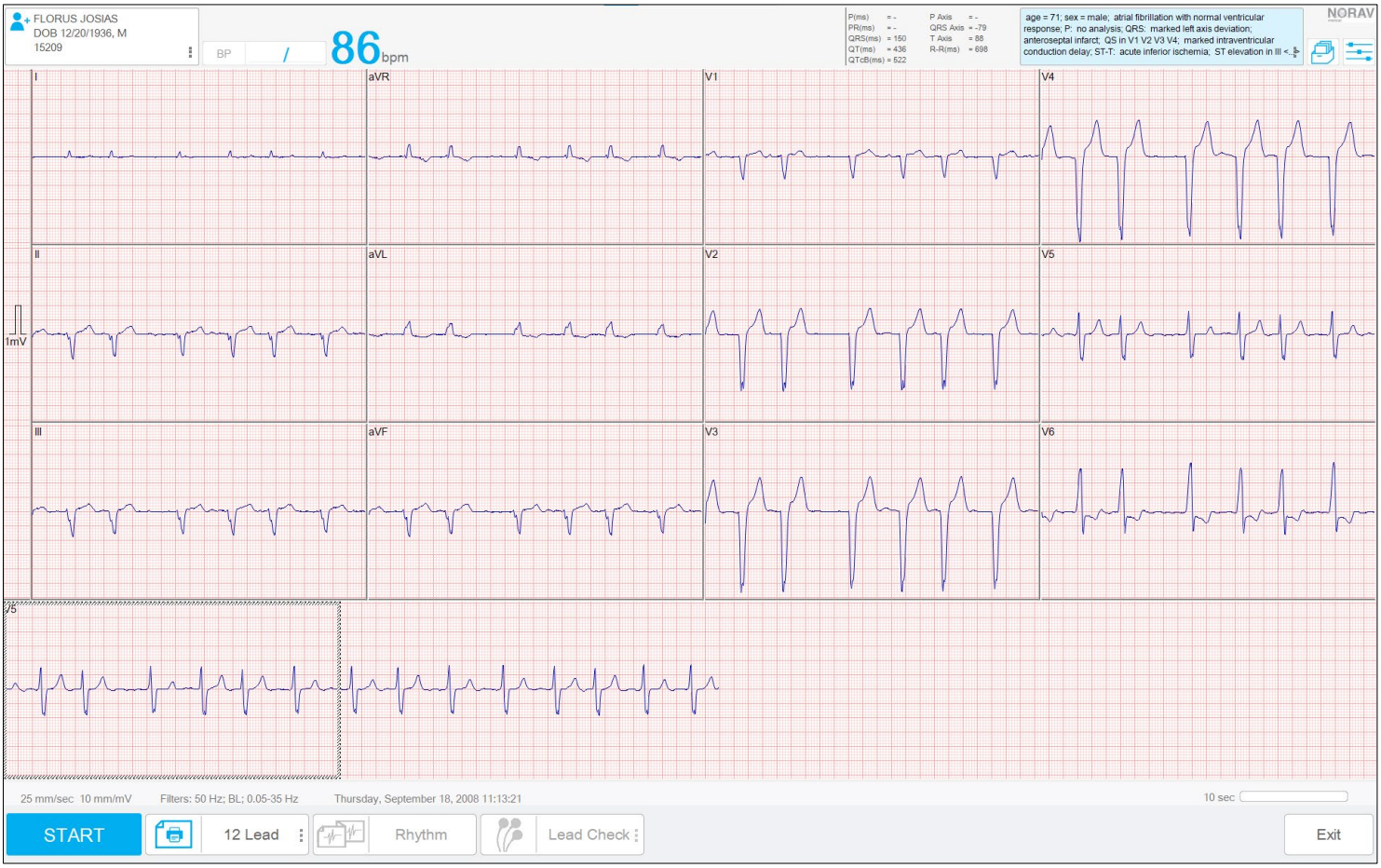


Figure 64: Adding Remarks to Rest ECG Recording

The **Remarks Dialog Box** is displayed (see Figure 65).

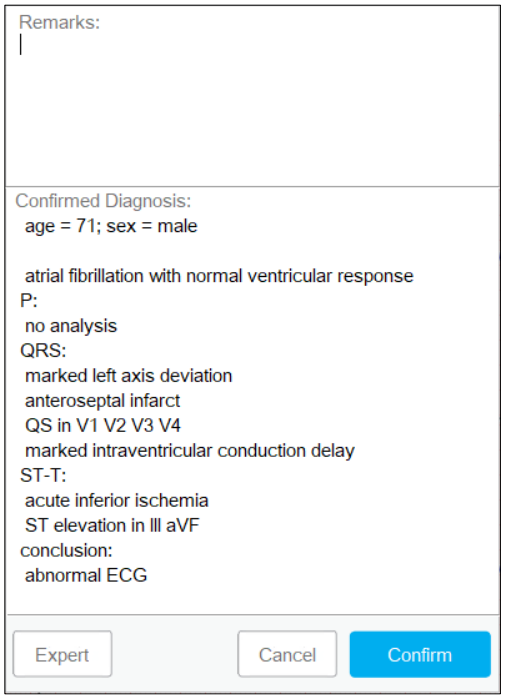


Figure 65: Remarks Dialog Box

3. Write remark(s) and click Confirm.

The written remark(s) are added.

Or

To add remark template(s), click Expert.

The **Expert Interpretation Dialog Box** is displayed (see Figure 66).

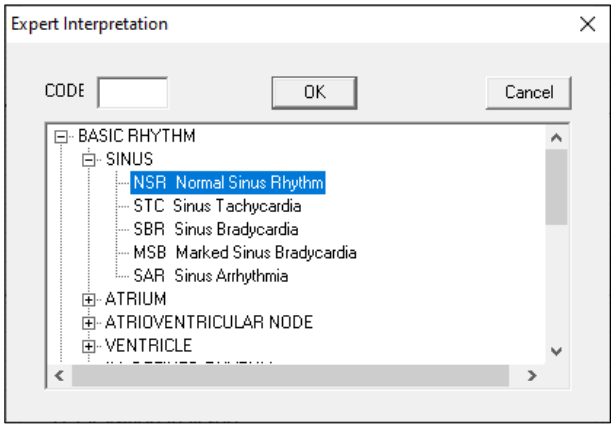


Figure 66: Expert Interpretation Box

4. Select the appropriate remark template(s) from the ⊞ folder(s) and click OK.

   The selected remark template(s) is displayed on the **Remarks Dialog Box** (see Figure 67).

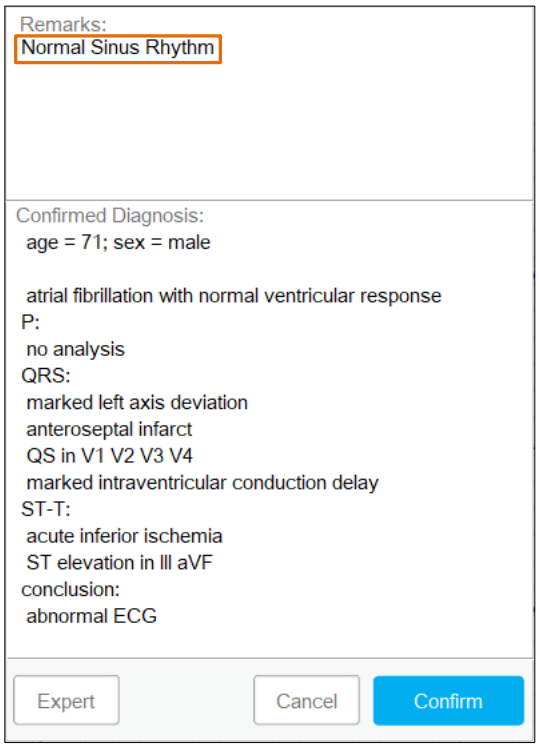


Figure 67: Remarks Dialog Box with Added Remark

5. To save the added remark template(s), click Confirm.
6. Click Exit to close the application.

If a Rest record has been confirmed by a physician whose signature already exists, the corresponding report is automatically signed with that signature.

Opening Stress ECG Record for Review

1. Select a Stress ECG test (physician only) from the records list, and then click the **Review** button.

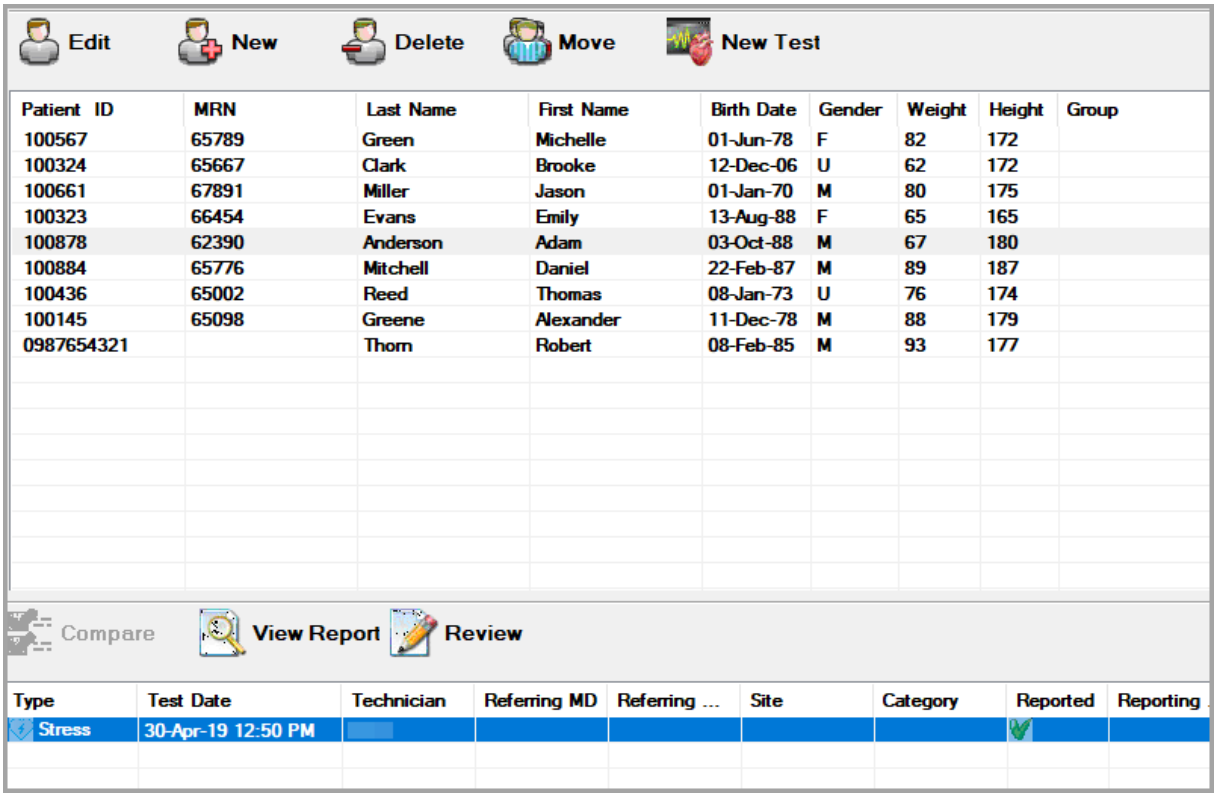


Figure 68: Opening Rest ECG Recording for Review

2. The Stress ECG recording opens in the PC-ECG 1200 program interface.

Figure 69: Adding Remarks to Stress ECG Recording

3. Enter the required information in the **Remarks** window, including the **Conclusions** and **Medications** fields.

4. Click the **Confirm** button to save the changes.

5. Close the application.

If a Stress record has been confirmed by a physician whose signature already exists, the corresponding report is automatically signed with that signature.

Downloading ECG+ Recordings from NR-1207-3

1. Connect the NR-1207-3 recorder, which contains the data acquired in the ECG+ mode, to the PC using a USB cable or insert the NR-1207-3 recorder Memory Card into the card reader.
2. Click the Devices tab and then click the Scan Recorder button.

   The list of ECG records in the NR-1207-3 recorder Memory Card is displayed.
3. Validate or edit the records one-by-one on the download list. The edited data is displayed in red.
4. To apply the changes after editing the patient data, click the button.
5. To select the records for download, mark the checkbox(es), and then click the Download Selected button (see Figure 70).

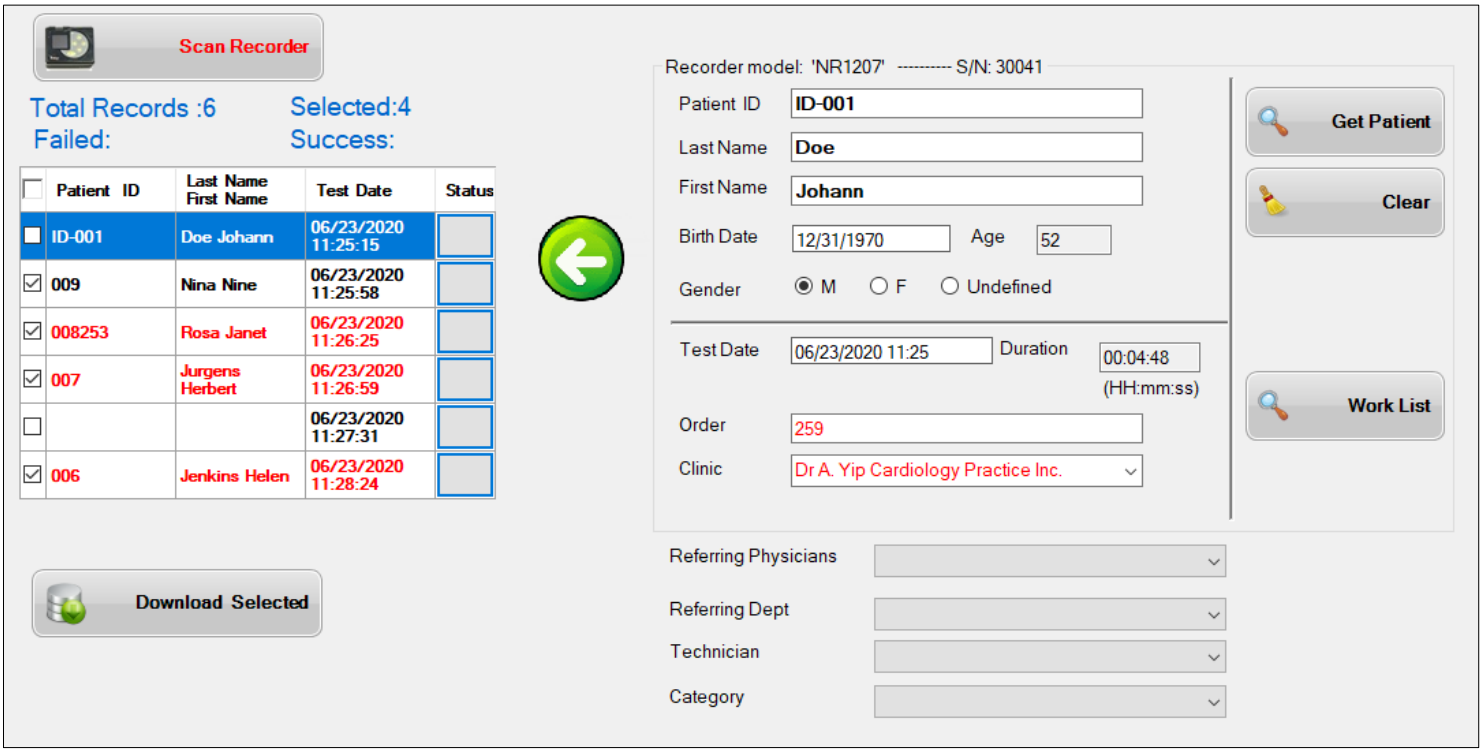


Figure 70: Selecting Records for Download

6. Wait until the procedure ends.

   The successfully downloaded records are marked on the **Status** column,

   and any unsuccessful downloaded records are indicated .
7. Disconnect the NR-1207-3 recorder or the Memory Card from the PC.
8. Click the Records tab and validate that all new Resting ECG records appear on the list.

Working with External ECG Devices via DICOM Protocol

This section explains how to set up communication between NEMS-Q and external ECG devices using the DICOM protocol. The setup ensures seamless workflows, allowing devices to retrieve worklists, perform REST tests, and upload results to the NEMS-Q database for analysis.

Workflow Overview

1. Create a worklist in NEMS-Q.
2. Request the worklist on the ECG device by tapping the **Download** button.
3. The **Norav.Service.Dicom** service, using NEMS-Q IP settings, queries the **Norav.NEMS.Connector** service to fetch the worklist from the NEMS-Q database.
4. **Norav.NEMS.Connector** retrieves the worklist from NEMS-Q and transmits it to **Norav.Service.Dicom**.
5. **Norav.Service.Dicom** delivers the worklist to the ECG device.
6. Perform tests on the ECG device using the worklist.
7. Upload test results from the ECG device to the NEMS-Q **Import** folder on the NEMS-Q server by tapping the **Upload** button.
8. **Norav.Service.Dicom** exports test files in a .zip archive to a predefined folder.
9. NEMS-Q imports test files from the **Import** folder into its database in REST ECG format.

Note

The **export settings** on the ECG device must match the **import folder settings** in NEMS-Q to ensure seamless file transfer (see examples below).

To facilitate communication between the NEMS-Q application and an external ECG device, ensure that both **Norav.Service.Dicom** and **Norav.NEMS.Connector** are **running** with the configurations specified below.

Configuration

Prerequisites

ASP.NET Core 6.0 Runtime and **.NET 6.0.36 Desktop Runtime (x64)** must be installed on the server running **Norav.Service.Dicom**.

Setting Up the ECG Device

1. Access the **DICOM Settings** on the ECG device and configure the following:

    - **Worklist server - for retrieving worklists:**
        - Enable **DICOM Worklist** by checking the checkbox.
        - **Server IP**: XXX.XXX.XXX.XXX
        - **Server Port**: Use any open port or the one specified in **Norav.Service.Dicom** settings (see below).
        - **Server AE**: NORAV-AE
        - **Client AE**: NORAV-AE
    - **Storage server - for file storage:**
        - Enable **DICOM Worklist** by checking the checkbox.
        - Enable **Generate Structured Report** by checking the checkbox.

- **Server IP**: XXX.XXX.XXX.XXX
- **Server Port**: Use any open port or the one specified in **Norav.Service.Dicom** settings (see below).
- **Server AE**: NORAV-AE
- **Client AE**: NORAV-AE

  Note: Use the same settings as the **Worklist Server** if a single server is used for both functions.

2. In the **Settings** menu set **File Format** to **DICOM (ECG Waveform)**. Other formats, including DICOM (Encapsulated PDF), are not supported.
3. In the **Settings** menu set the **TCP/IP** value to **DICOM**.
4. In the **Settings** menu set the file **Modality** to REST ECG, if applicable.

Setting Up Norav.Service.Dicom Service

1. Locate the appsettings.Development.json file.
2. Open the file in a text editor. You will see the following configuration (example):

```
{
 "DicomSettings": {
   "WorkListUpdateCron": "0 */5 * * * ?",
   "NemsUrl": "http://XXX.XXX.X.XXX/",
   "Port": XXXXX,
   "LogFolder": "C:\\Norav\\DICOM\\Logs",
   "TempFolder": "C:\\Norav\\DICOM\\Temp",
   "UploadFolder": "C:\\Norav\\DICOM\\Upload",
   "LogFileTemplate": "Dicom-{Date}.txt"
}
```

3. Configure the following settings under **"DicomSettings"** – refer to the table below:

Key	Description	Value
WorkListUpdateCron	Cron expression for scheduling worklist updates.	`"0 */5 * * * ?"` (updates every 5 minutes). Change the value under the / symbol to define update frequency.
NemsUrl	IP address of the NEMS-Q server.	`"http://XXX.XXX.X.XXX/"`
Port	Port number for DICOM communication with the NEMS-Q server.	`XXXXX`
LogFolder	Path for storing log files.	`"[EXTERNAL DRIVE]:\\Norav\\DICOM\\Logs"`
TempFolder	Path for intermediate file storage and processing.	`"[EXTERNAL DRIVE]:\\Norav\\DICOM\\Temp"`
UploadFolder	Path for uploading DICOM files. It should match the import folder in NEMS-Q for seamless file transfer.	`"[EXTERNAL DRIVE]:\\ProgramData\\NoravMedical\\NEMS\\Import"`

4. Save the file after making changes.

Operating Instructions

Performing Tests with the External ECG Device

1. Create or import a worklist in NEMS-Q.
2. Tap the **Download** button on the ECG device to retrieve the worklist. The device displays all scheduled tests for the day.

3. Select (tap) a patient from the worklist to proceed with the ECG test.
4. Verify electrode placement and signal quality before starting.
5. Start the test by tapping the appropriate button. The device records a 10-second REST ECG.
6. Review the preliminary results displayed on the device.
7. Tap the **Upload** button to send results to the NEMS-Q **Import** folder on the NEMS-Q server:

    1. **Norav.Service.Dicom** transmits the file to the predefined folder (for example, C:\\ProgramData\\NoravMedical\\NEMS\\Import).

    2. NEMS-Q imports the file from that predefined folder into its database, making it available in the **Records** tab.

Note

Ensure that all required services (**Norav.Service.Dicom** and **Norav.NEMS.Connector**) are running on the server side.

Note

Verify server IPs, ports, and folder paths in **Norav.Service.Dicom** settings match the ECG device's configuration.

Note

Use the correct file format: **DICOM (ECG Waveform)**.

6. ABPM Module

Operating Environment

- Windows 10 Pro 32/64 bit or Windows 11 Pro
- 4 GB RAM
- Core i5 CPU
- .Net Framework 4.7.2
- SQL Server Express 2019
- USB port

Product Functions

1. Connect to ABPM device (Oscar 2, NBP One) via USB.
2. Select/Create Patient
   A. Select Patient -> New Test -> Select ABPM test.
   B. Later – Select NBP-24 NG test.
3. Prepare recorder for ABPM test (see Section Preparing NBP One Recorder for New ABPM Test on page 103).
4. Download the ABPM recording from the recorder (see Section Downloading ABPM Recording from NBP One Recorder on page 103).
5. Preview the ABPM results in Record List (see Section Previewing Test Results on page 90).
6. Review the ABPM examination results (see Section Reviewing ABPM Recording in NEMS-Q on page 105).
7. Report types (see Section Report Types on page 92):
   - Ambulatory Blood Pressure Report
   - Patient Information
   - BP Profile
   - Bar Chart
   - Measurements
   - Diastolic vs Systolic Graph
   - Pie Chart
   - Summary Report

Setup

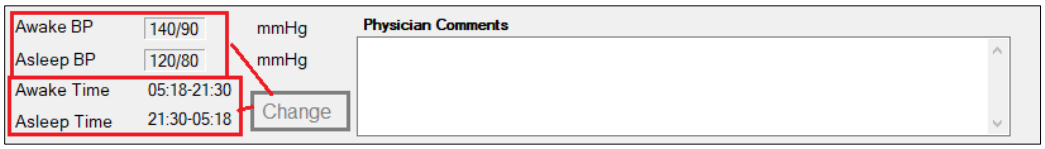
- ABPM-related parameters
- Measurement Schedule

  Specifies when and how often the monitor takes readings.

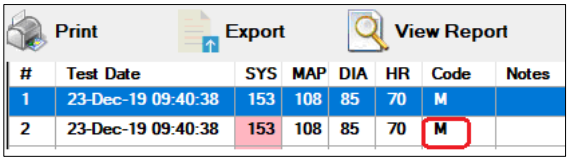
  For Awake Time and Asleep Time, select from the Hour drop-down menu to establish the start time for these periods.

  From the Brachial BP Interval drop-down menus, select the desired interval between readings (5, 10, 15, 20, 30, 45, 60, 90, or 120 minutes.

- When downloading a test from the BP device, you can change the Awake Time, Asleep Time, or change the values (see following Figure).



- Start study in 5 minutes option: the study starts automatically after programming.
- The physician is allowed to change day and night intervals (Prepare, Download, Edit).
- The measurements table out of limits is in red based on limit settings (see following Figure).
- Manual Measurement events are displayed in the Events field (see following Figure).



- Advanced Options:
  - **Max. Pressure** – Establishes the maximum inflation pressure for the monitor (160 mmHg to 280 mmHg).
    Suggested setting is 30 mmHg above the highest expected systolic BP.
  - **Display Results** – When ON, allows viewing the results immediately after a measurement.
  - **Manual Readings** - When ON, allows the taking measurements outside the scheduled program using the Start/Stop button.
  - **Day/Night button** – When ON, enables the Day/Night button on the monitor allowing the patient to start the Awake and Asleep periods according to their daily schedule.
    A period can be started up to four hours before the programmed period begins.
  - **Audible Alerts** – Play an alert sound at the beginning and upon completion of each reading, during the Awake period only.
  - **Retry Attempts** – The monitor reattempts a measurement that initially failed.
  - Automatically open a patient file directly after the data is retrieved.
- Viewing an Ambulatory Blood Pressure study:
  - **ABP Data** – ABP measurement data from the monitor and relevant graphs.
  - **Patient Info** – Demographic info: patient name, DOB, sex, patient ID, contact information, physical description, medications, indications.
  - **Clinic Info** – Clinical information (site).
  - **Statistics** – Statistical analysis of the ABP study.
  - **Summary** –Interpretative summary settings and results for current study.
- Events Diary, containing managed list with Date and Time.

Note

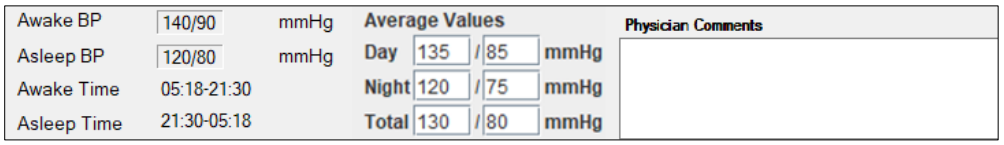
After changing, the raw data is saved.

- Blood Pressure Limits for existing patients & global system limits (see following Figure).

  The source of average values is the SQL tables (children and adults) hypertension limits.

  The values can be changed by the user and have a button for Standard (which restores the values from SQL).

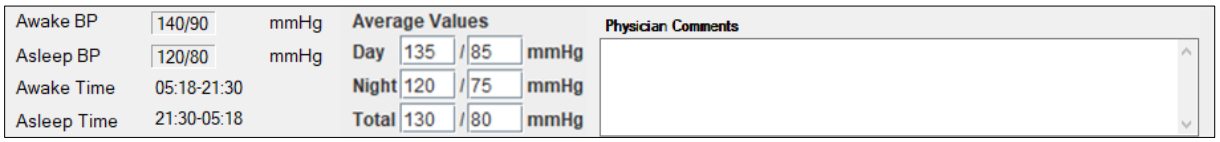
  The average values are included in the review pane (Total = Round (Day+Night)/2).



- Various Export File types: CSV, PDF, NBP (Norav Blood Pressure)
- The ABPM module allows comparing current patient record(s) with multiple history records.
- Connection with other systems: HL7
- Ordering the ABPM devices:
  - NBP-24 NG
  - NBP One
  - Oscar 2

ABPM Settings Screen

See following Figure.



You can specify global thresholds for Systolic and Diastolic blood pressure.

When these values are exceeded, the measurements are marked accordingly in the analysis.

These values are automatically stored as limits for new patients.

Recent studies (Blood Pressure percentiles by Age and Height) have shown that the limit depends on age and gender in children and adolescents. The European Society for Hypertension (ESH) published comprehensive tables, which constitute the basis of the thresholds set for the Norav ABPM.

The thresholds are determined based on 95% percentile curve. The limit value can then be defined as one which is either equal or lower for 95% of a whole study (statistic report on children). Any values above this limit are defined as hypertension.

Working with the percentile curve: To display the percentile curve (P95) (only for children and adolescents from 4 to 18 years of age), the patient's date of birth must be entered; then this data will be the basis for the calculation of the patient's age.

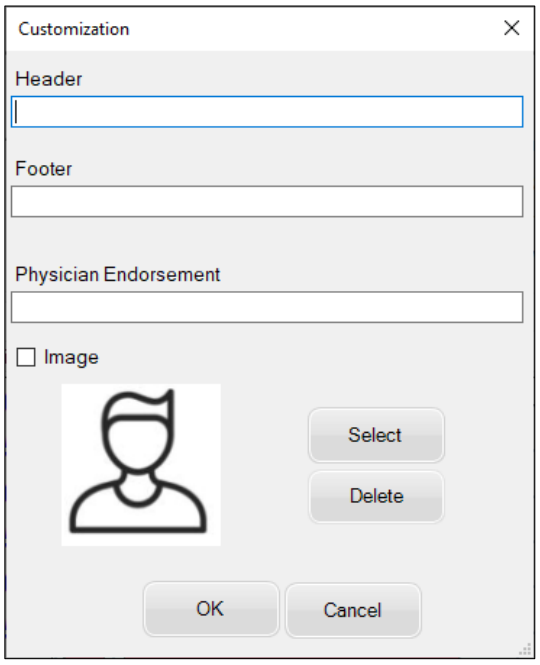
Important: The analysis **always** refers to the **current** age of the patient.
Displaying a patient's history requires one print per appointment.

Note

You can set BP limits for each patient individually on the Patient Information pane. BP Limits affect the calculation for the graphs and reports.

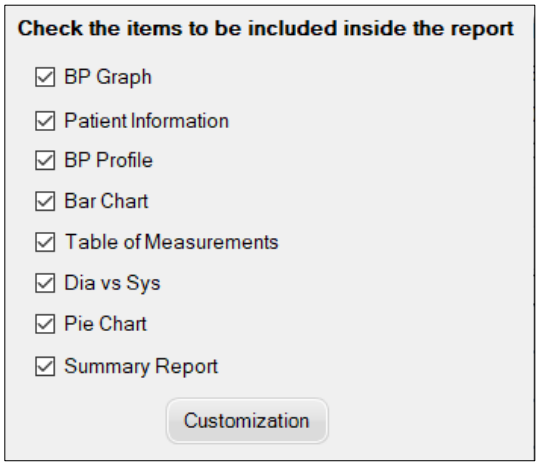
ABPM Customized Report

Customization allows defining the report **Header title**, **Footer title**, and **Physician Endorsement** with an option for digital signature (see following Figure).



1. On the **ABPM Review Screen** (see Figure 73), click the Customized Report button.

   The **Customization Dialog Box** is opened (see following Figure).



2. Select the ☑ of the items to be included in the report (see Figure above).

   The selected items are saved (as global settings). Default settings include all reports.

3. Click Customization (see Figure above).

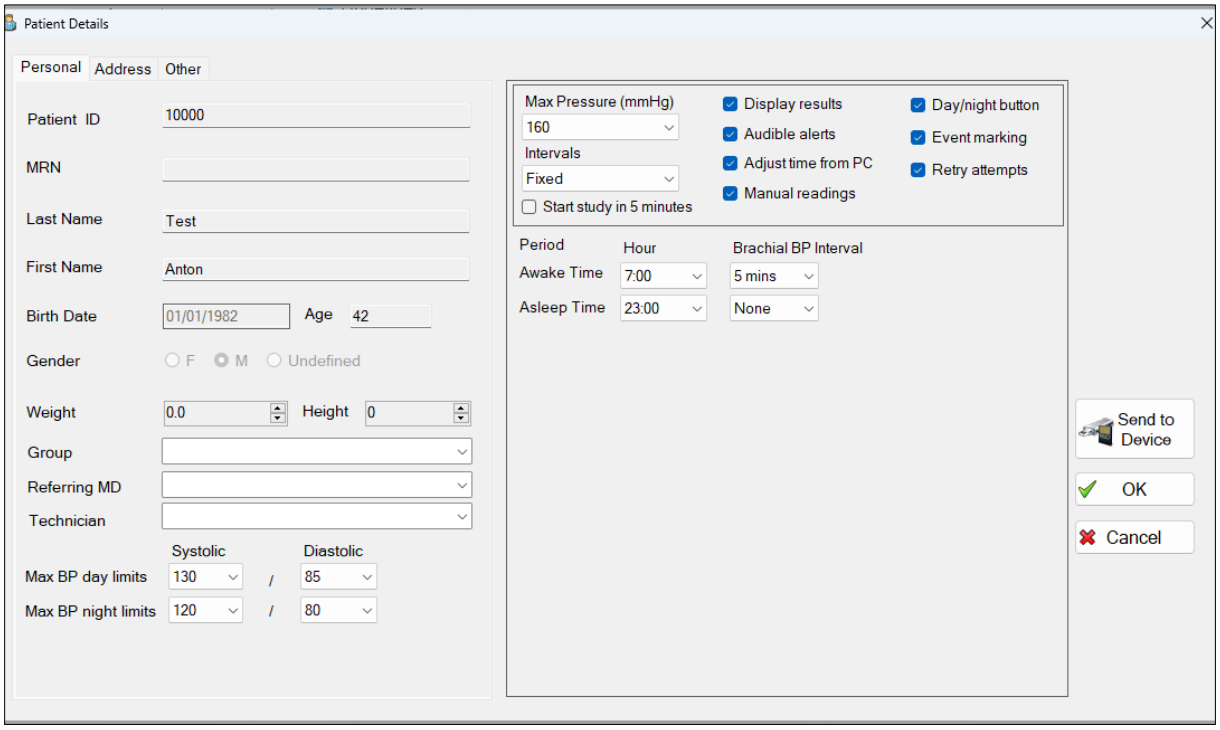
Preparing ABPM Recorder for Test

See following Figures.

Preparing the ABPM recorder for an ABP study involves filling out an onscreen form to set the parameters for your study to be programmed into the monitor.

You can also use a template to fill out the form. Templates help ensure consistent programming and adherence to specific protocols. The NBP One Software provides default templates, or you can create your own.

UI Item	Description
Patient ID	Patient ID for reporting and referencing data.
Patient name	Enter patient name (first, middle, last).
Measurement Schedule:	Specifies when and how often the monitor takes readings. For Awake time and Sleep time, select from the Hour pull-down menu to establish the start time for these periods. From the BP Interval pull-down menu, select the desired interval between readings (none, 5, 10, 15, 20, 30, 45, 60, 90 or 120 minutes).
Start study in 5 minutes:	Slider denotes that the study will start automatically after programming; unchecked denotes that the study will be started with the first press of the Start/Stop button when the monitor is powered ON.
Max Pressure	Establishes the maximum inflation pressure for the monitor (options between 160 and 280 mmHg). Suggested setting is 30 mmHg above the highest expected systolic BP. NOTE: The ABP monitor will not inflate to Max Pressure with each reading; instead it inflates to 30 mmHg above the previous systolic reading.
Intervals	Set interval type. Select **Fixed** to set the intervals to exact times. Select **Standard** for +/- 5 minutes around the selected intervals.
Display results	When on, allows the patient to view the results immediately after a measurement. NOTE: Display Results is always on for the first 30 minutes of study.
Manual readings	When on, allows the patient to take measurements outside of the scheduled program using the Start/Stop key. If manual readings are disabled/off, ***Start Study in 5 minutes MUST be enabled/on.*** If Start study in 5 minutes is enabled/on, user can elect to enable/on or disable/off manual readings NOTE: Start study in 5 minutes requires the batteries to be inserted during programming. NOTE: Manual Readings is always ON for the first 30 minutes of the study.
Audible alerts	Play an alert sound at the beginning and upon completion of each reading, during the awake period only.
Retry attempts	The monitor will reattempt a measurement that initially fails.
Day/night button	When on, enables the Day/Night button on the monitor, allowing the patient to start the Awake and Sleep periods according to their daily schedule. A period can be activated to four hours before the programmed period begins. The monitor will also record the time the day/night button is pressed.
Event marking	When enabled, allows the patient to mark up to 30 events during the study.

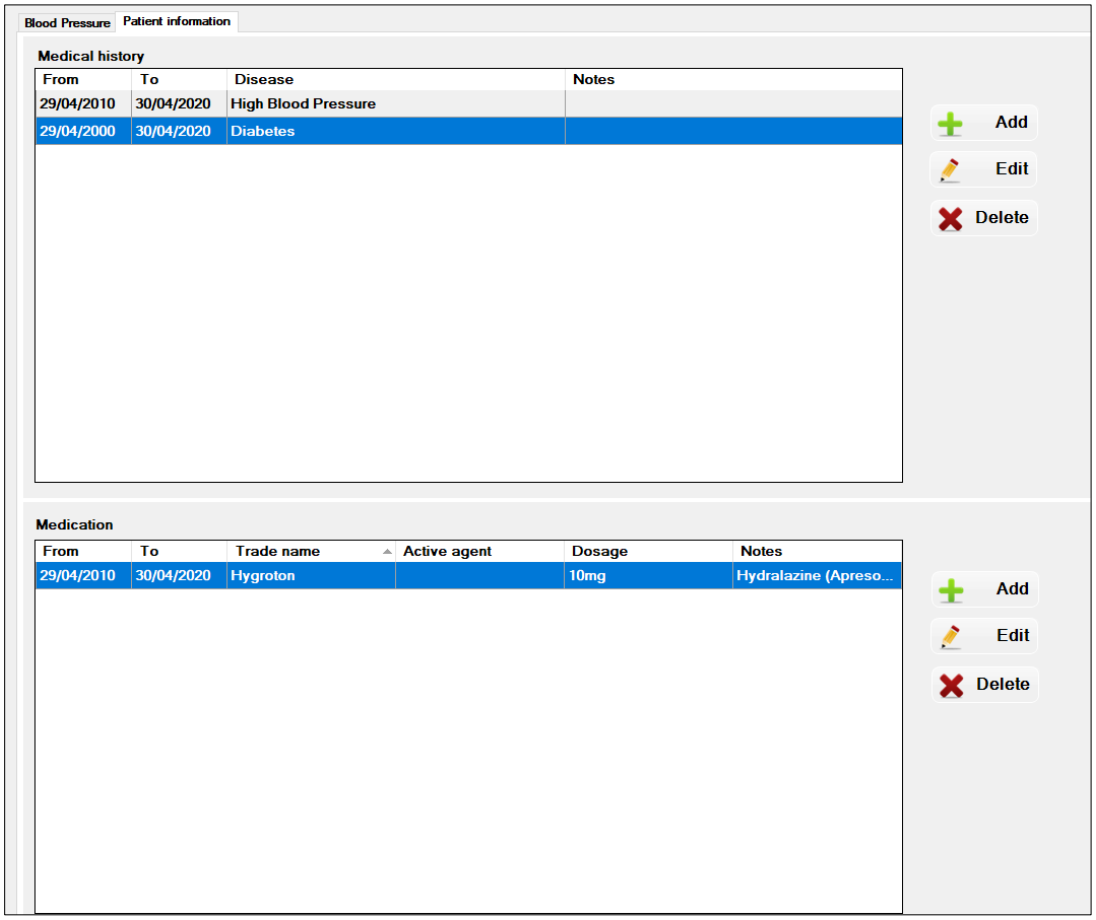

Patient Details
Personal
Address
Other
Patient ID
10000
MRN
Last Name
Test
First Name
Anton
Birth Date
01/01/1982
Age
42
Gender
F
M
Undefined
Weight
0.0
Height
0
Group
Referring MD
Technician
Systolic
Diastolic
Max BP day limits
130
/
85
Max BP night limits
120
/
80
Max Pressure (mmHg)
160
Intervals
Fixed
Start study in 5 minutes
Display results
Audible alerts
Adjust time from PC
Manual readings
Day/night button
Event marking
Retry attempts
Period
Hour
Brachial BP Interval
Awake Time
7:00
5 mins
Asleep Time
23:00
None
Send to Device
OK
Cancel

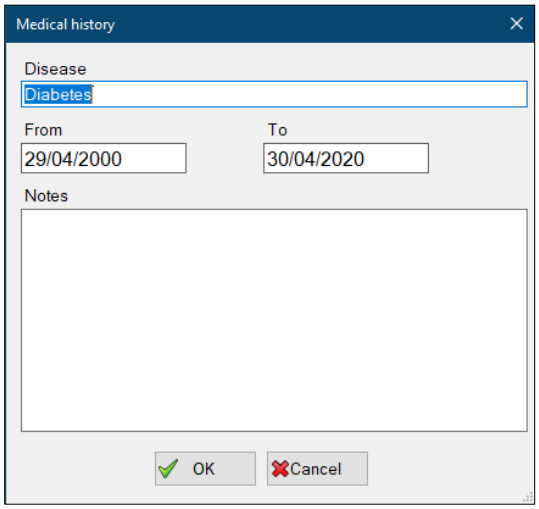
Editing Patient Medical Info History

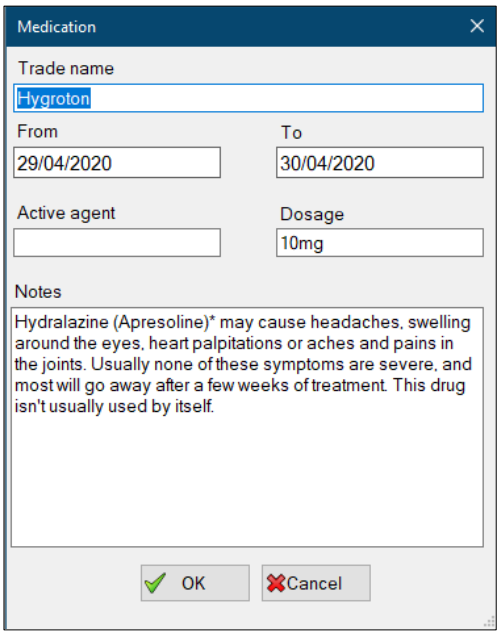
(See Section Patient Information on page 95).

The purpose is allowing the user to modify medical history and medications for awareness of the physician/clinicians (see Figure below).

The user can add/edit/delete medical history (diseases) and medications (see Figures below).



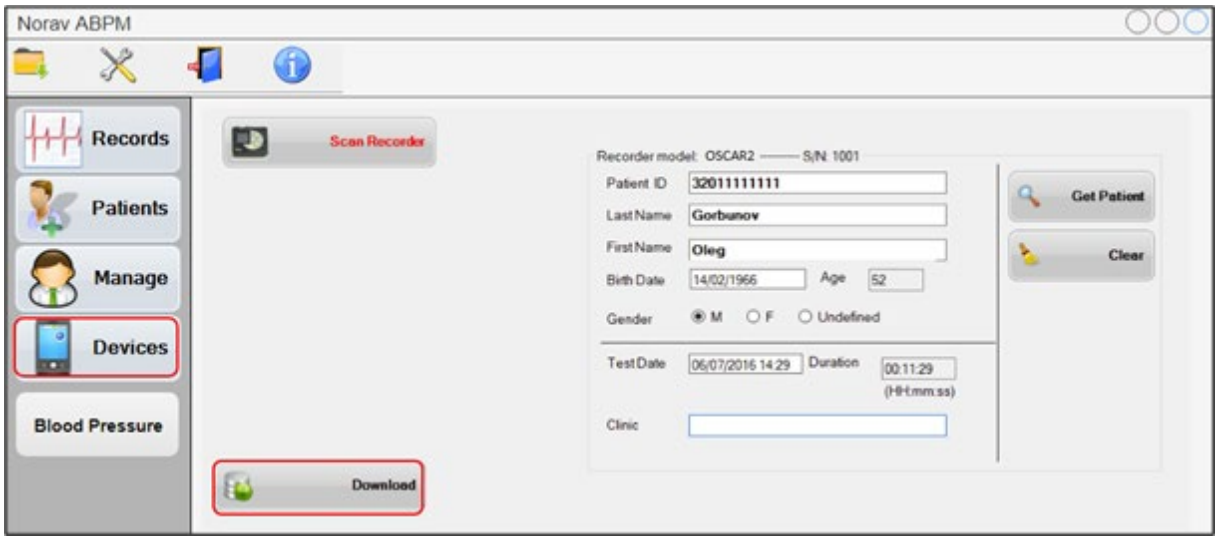




1. To add **Medical History** and **Medication**, click the Add button.
2. Enter the **Disease** name in the **Disease field** and/or **Medication Trade Name** in the **Trade name** field.
3. Enter the **From** and **To** dates in the **Medical History** and in the **Medication** dialog boxes.
4. On the **Medication Dialog Box**, enter the **Agent's Name** in the **Active Agent** field, and the **Medication Dosage** in the **Dosage** field.
5. Enter notes in the **Medical History** and in the **Medication** dialog boxes.
6. To save, click OK or click Cancel to abort.
7. To edit existing Diseases and/or Medications click Edit, make changes, and then click OK to save.
8. To delete existing Diseases and/or Medications, select (highlight) the Diseases and/or Medications for deletion, and click Delete.

Downloading ABPM Recording

See following Figure and Section Downloading ABPM Recording from NBP One Recorder on page 103.

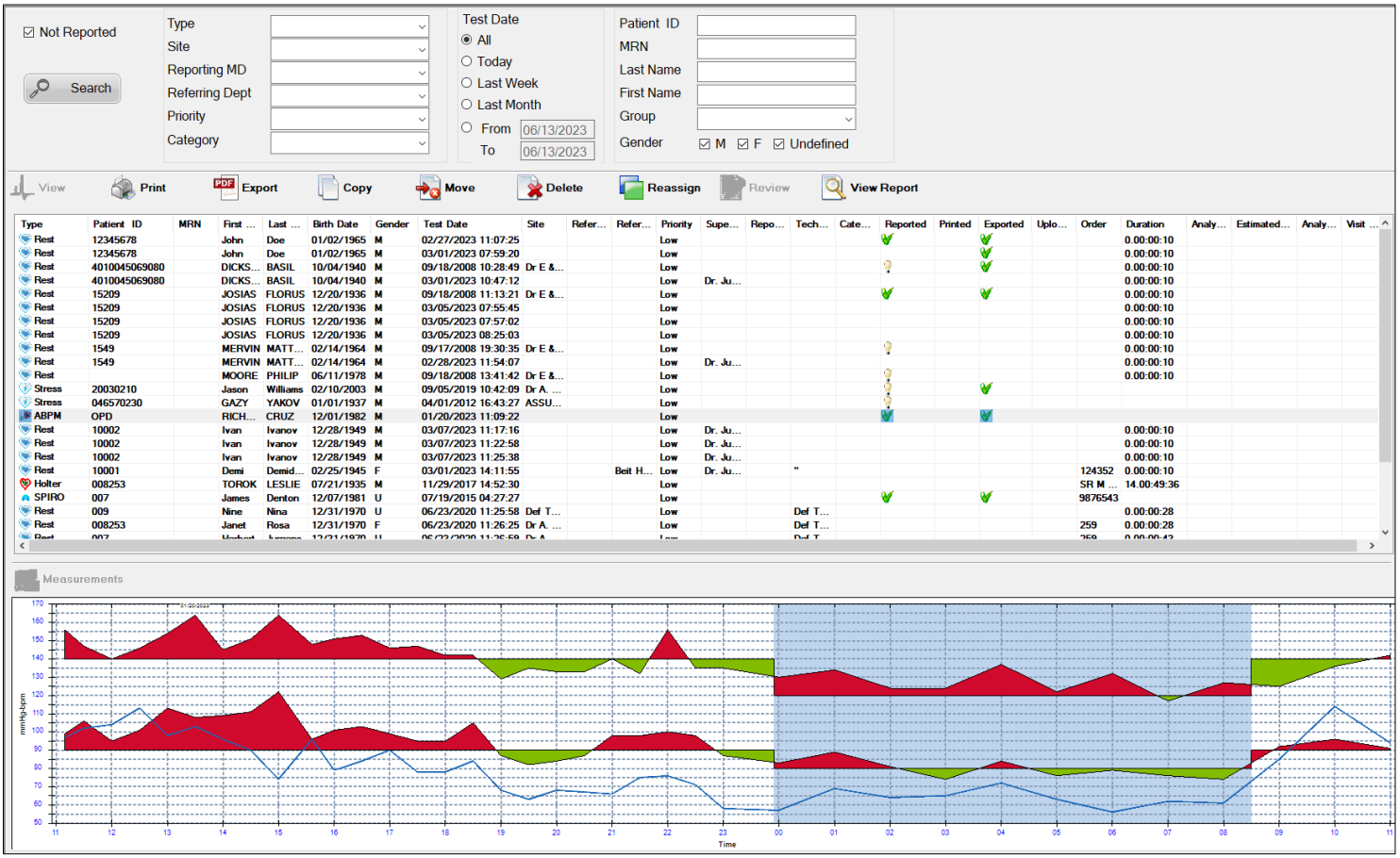


Previewing Test Results

See following Figure.

Preview the ABPM results in the Records window. The blood pressure profile graph is displayed when clicking on a specific patient record.

The common layout is like the Resting ECG preview window (setup-enabled).



The white areas represent **Awake Time**, and the blue-highlighted area represent **Asleep Time**.

The top chart is the **Systolic BP chart**, and the bottom chart is the **Diastolic BP chart**.

The **red** areas represent **BP higher than the BP Limit** (preset per patient before ABPM), which is represented by the straight horizontal line on the bottom of the **red** areas.

The **green** areas represent **BP lower than the BP Limit** (preset per patient before ABPM), which is represented by the straight horizontal line above the **green** areas.

The **blue** chart, which is superimposed on the bottom Diastolic BP chart, is the HR chart.

Reviewing ABPM Recording

See Section Reviewing ABPM Recording in NEMS-Q on page 105.

You can access all functions from the main ABPM window (see Figure below). More windows may appear depending on the function.

Patient & Test Information Panel (left side)

Patient ID, MRN, Last Name, First Name, Birth Date, Age, Gender, Weight, Height, Order (Test-ID), Test Date, ABPM Recorder Type, Serial Number

Common Actions Toolbar (on top of BP measurements table)

Print, Export, Preview Report, View Report, Customized Report, Send Report, Save Report

ABPM Review Panel

BP Measurements Table

Referring MD, Reporting MD, Technician drop-down menus

Physician Comments text field

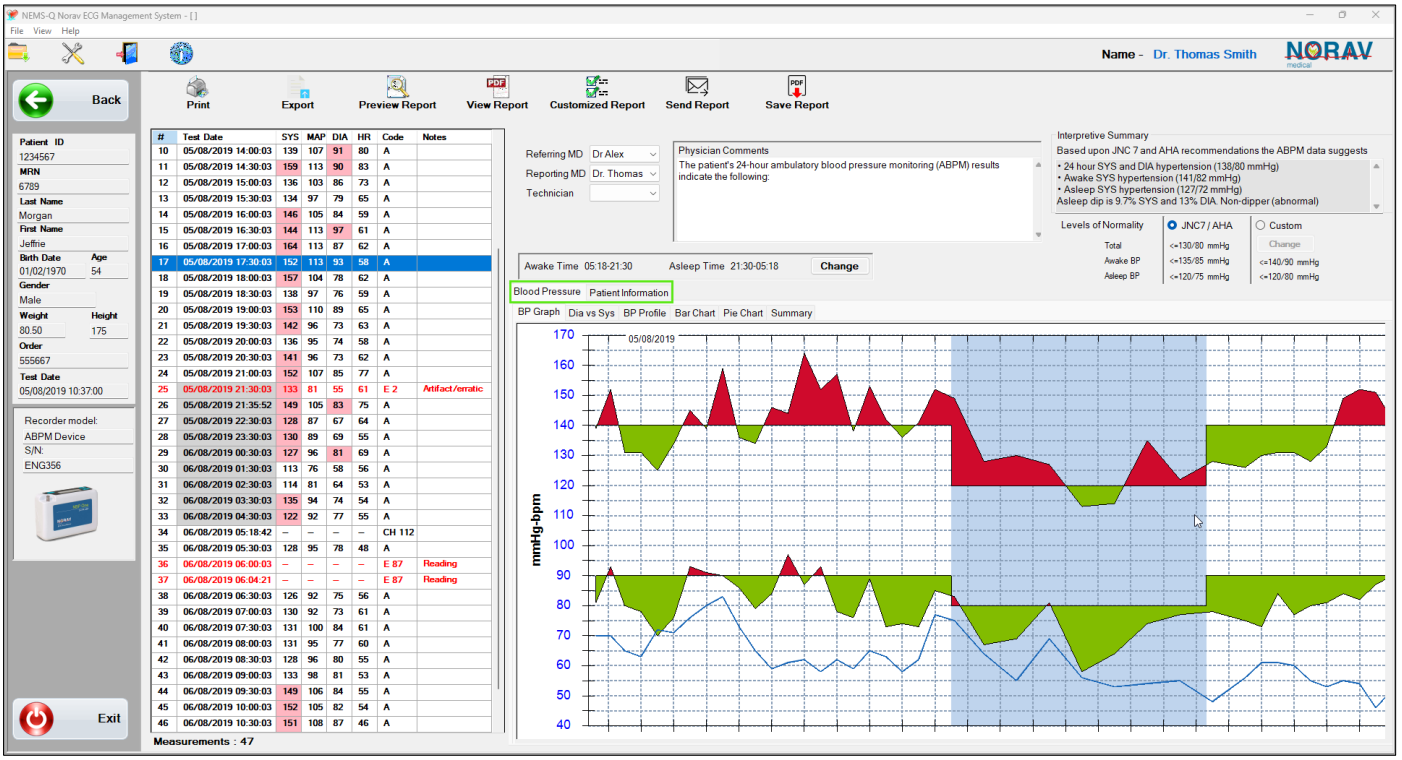
Awake Time, Asleep Time parameters

Interpretive Summary (automatically generated based on the test results)

BP Limits as JNC7/AHA or Custom blood pressure thresholds.

Blood Pressure Tab with BP Graph (default) and related subtabs.

Patient Information Tab, containing Medical History and Medication sections.

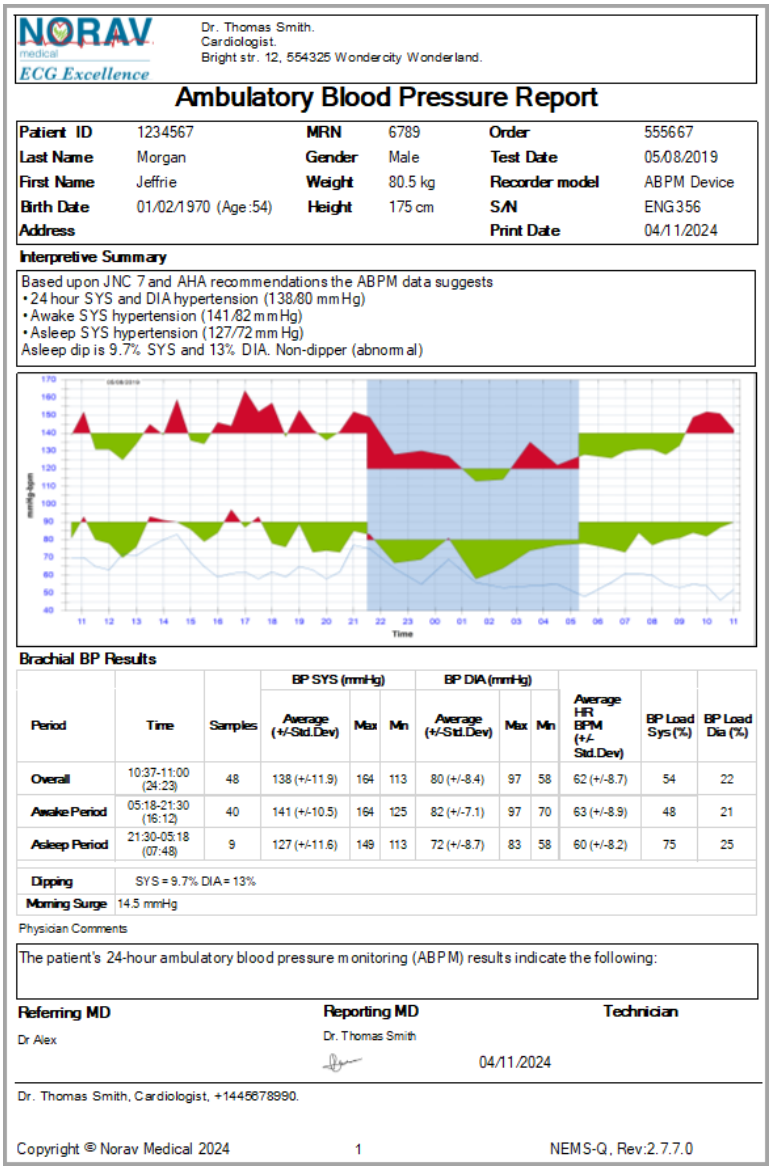


Report Types

Ambulatory Blood Pressure Report

The Ambulatory Blood Pressure Report page contains the following sections:

- Header: Contains the credentials of the specialist reviewing the report.
- Patient Information: Displays patient details relevant to the report.
- Interpretive Summary: An automatically generated summary based on the test results.
- Blood Pressure Graph: Visual representation of the patient's blood pressure over time.
- Brachial BP Results Table: Summarizes brachial blood pressure measurements.
- Physician Comments: Section for physician observations and notes.
- Signatures: Area for signatures to validate the report.



NORAV medical ECG Excellence

Dr. Thomas Smith.
Cardiologist.
Bright str. 12, 554325 Wondercity Wonderland.

Ambulatory Blood Pressure Report

Patient ID	1234567	**MRN**	6789	**Order**	555667
Last Name	Morgan	**Gender**	Male	**Test Date**	05/08/2019
First Name	Jeffrie	**Weight**	80.5 kg	**Recorder model**	ABPM Device
Birth Date	01/02/1970 (Age:54)	**Height**	175 cm	**S/N**	ENG356
Address				**Print Date**	04/11/2024

Interpretive Summary

Based upon JNC 7 and AHA recommendations the ABPM data suggests
• 24 hour SYS and DIA hypertension (138/80 mmHg)
• Awake SYS hypertension (141/82 mmHg)
• Asleep SYS hypertension (127/72 mmHg)
Asleep dip is 9.7% SYS and 13% DIA. Non-dipper (abnormal)

Brachial BP Results

Period	Time	Samples	BP SYS (mmHg)			BP DIA (mmHg)			Average HR BPM (+/- Std.Dev)	BP Load Sys (%)	BP Load Dia (%)
			Average (+/-Std.Dev)	Max	Min	Average (+/-Std.Dev)	Max	Min			
Overall	10:37-11:00 (24:23)	48	138 (+/-11.9)	164	113	80 (+/-8.4)	97	58	62 (+/-8.7)	54	22
Awake Period	05:18-21:30 (16:12)	40	141 (+/-10.5)	164	125	82 (+/-7.1)	97	70	63 (+/-8.9)	48	21
Asleep Period	21:30-05:18 (07:48)	9	127 (+/-11.6)	149	113	72 (+/-8.7)	83	58	60 (+/-8.2)	75	25

Dipping	SYS = 9.7% DIA = 13%
Morning Surge	14.5 mmHg

Physician Comments

The patient's 24-hour ambulatory blood pressure monitoring (ABPM) results indicate the following:

Referring MD Dr Alex

Reporting MD Dr. Thomas Smith

Technician

04/11/2024

Dr. Thomas Smith, Cardiologist, +1445678890.

BP Graph (Middle Pane)

See following Figure.

The left-hand Y-axis with the mmHg units applies to systolic, diastolic, and mean BP values.

The X-axis applies to time (hour).

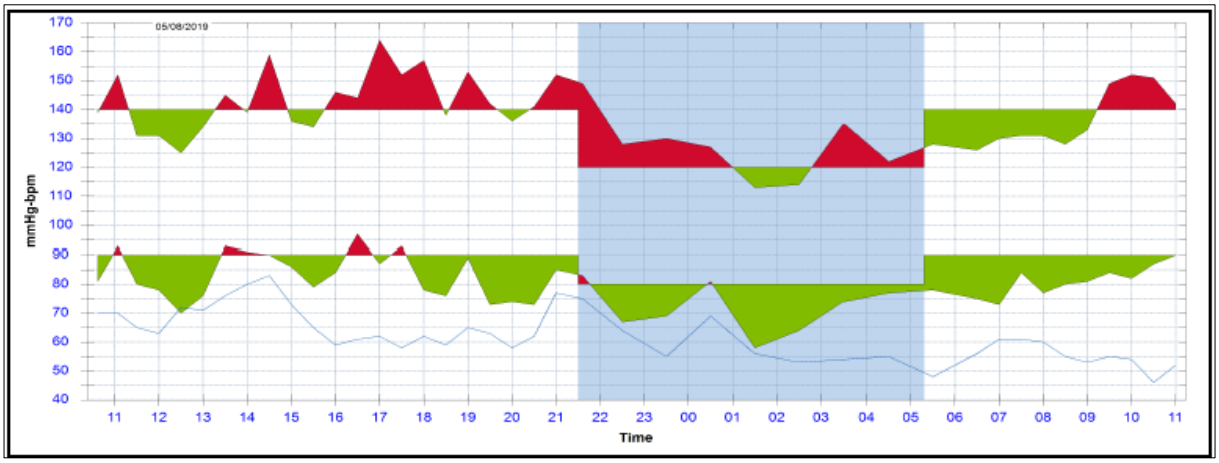
The daily intervals are highlighted (Awake Time in white, Asleep Time in light blue).

Day counts all daytime intervals together.

The blue-line (Y-axis) with the HR units (BPM) applies to heart rate.

Note

You can set these values when preparing for a new ABPM test.



Brachial BP Results (Bottom Pane)

See following Figure.

Brachial BP Results

Period	Time	Samples	BP SYS (mmHg)			BP DIA (mmHg)			Average HR BPM (+/- Std.Dev)	BP Load Sys (%)	BP Load Dia (%)
			Average (+/-Std.Dev)	Max	Min	Average (+/-Std.Dev)	Max	Min			
Overall	10:37-11:00 (24:23)	48	138 (+/-11.9)	164	113	80 (+/-8.4)	97	58	62 (+/-8.7)	54	22
Awake Period	05:18-21:30 (16:12)	40	141 (+/-10.5)	164	125	82 (+/-7.1)	97	70	63 (+/-8.9)	48	21
Asleep Period	21:30-05:18 (07:48)	9	127 (+/-11.6)	149	113	72 (+/-8.7)	83	58	60 (+/-8.2)	75	25

Dipping	SYS = 9.7% DIA = 13%
Morning Surge	14.5 mmHg

Physician Comments

The patient's 24-hour ambulatory blood pressure monitoring (ABPM) results indicate the following:

Referring MD

Dr Alex

Reporting MD

Dr. Thomas Smith

04/11/2024

Technician

Dr. Thomas Smith, Cardiologist, +1445678990.

Period – **Overall** (awake & asleep periods) **Awake Period**, **Asleep Period**, **Dipping** (the percentage of low systolic and diastolic BP during night relative to daytime), and **Morning Surge** (the increase in systolic and diastolic BP during early morning hours relative to nighttime)

Time – **from** hour - **to** hour (number of hours)

Samples – The number of samples

BP SYS [mmHg]: Average (+/-Std.Dev), Max, Min – Average systolic BP in mmHg (±BP deviation), Maximum and Minimum values.

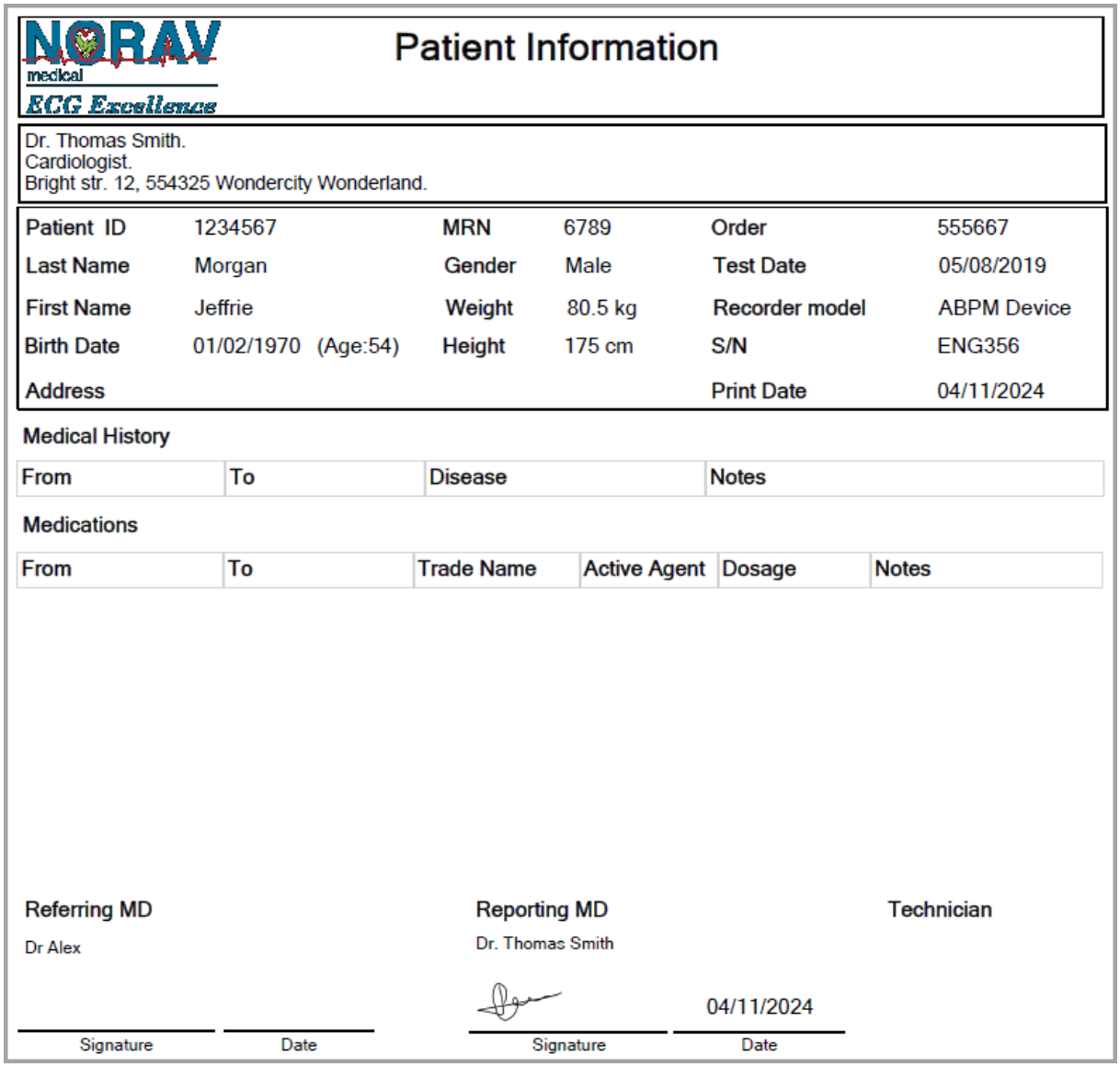
BP DIA [mmHg] (+/-Std.Dev) – Average diastolic BP in mmHg (±BP deviation),), Maximum and Minimum values.

Average HR BPM (+/-Std.Dev) – Average HR in BPM (±BPM deviation)

BP Load Sys (%) –Percentage of abnormally elevated systolic BP readings relative to normal

BP Load Dia (%) –Percentage of abnormally elevated diastolic BP readings relative to normal

Patient Information



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ECG Excellence

Patient Information

Dr. Thomas Smith.
Cardiologist.
Bright str. 12, 554325 Wondercity Wonderland.

Patient ID	1234567	MRN	6789	Order	555667
Last Name	Morgan	Gender	Male	Test Date	05/08/2019
First Name	Jeffrie	Weight	80.5 kg	Recorder model	ABPM Device
Birth Date	01/02/1970 (Age:54)	Height	175 cm	S/N	ENG356
Address				Print Date	04/11/2024

Medical History

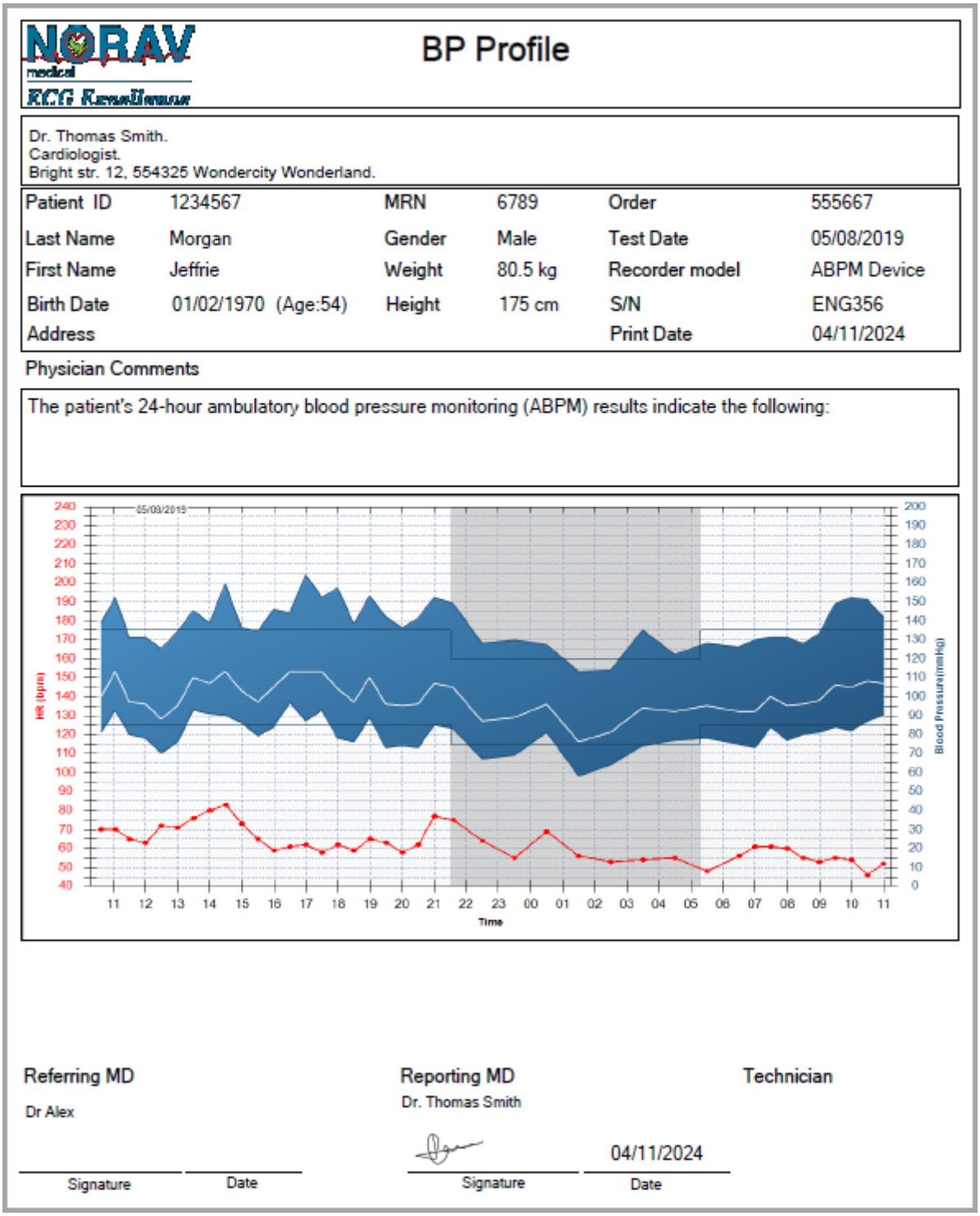
From	To	Disease	Notes

Medications

From	To	Trade Name	Active Agent	Dosage	Notes

Referring MD		Reporting MD		Technician
Dr Alex		Dr. Thomas Smith		
Signature	Date	Signature	Date	
			04/11/2024	

BP Profile



BP Profile

Dr. Thomas Smith.
Cardiologist.
Bright str. 12, 554325 Wondercity Wonderland.

Patient ID	1234567	MRN	6789	Order	555667
Last Name	Morgan	Gender	Male	Test Date	05/08/2019
First Name	Jeffrie	Weight	80.5 kg	Recorder model	ABPM Device
Birth Date	01/02/1970 (Age:54)	Height	175 cm	S/N	ENG356
Address				Print Date	04/11/2024

Physician Comments

The patient's 24-hour ambulatory blood pressure monitoring (ABPM) results indicate the following:

Referring MD
Dr Alex
Signature Date

Reporting MD
Dr. Thomas Smith
Signature
04/11/2024
Date

Technician

The right-hand Y-axis with mmHg units applies to Systolic, Diastolic, and mean BP values.

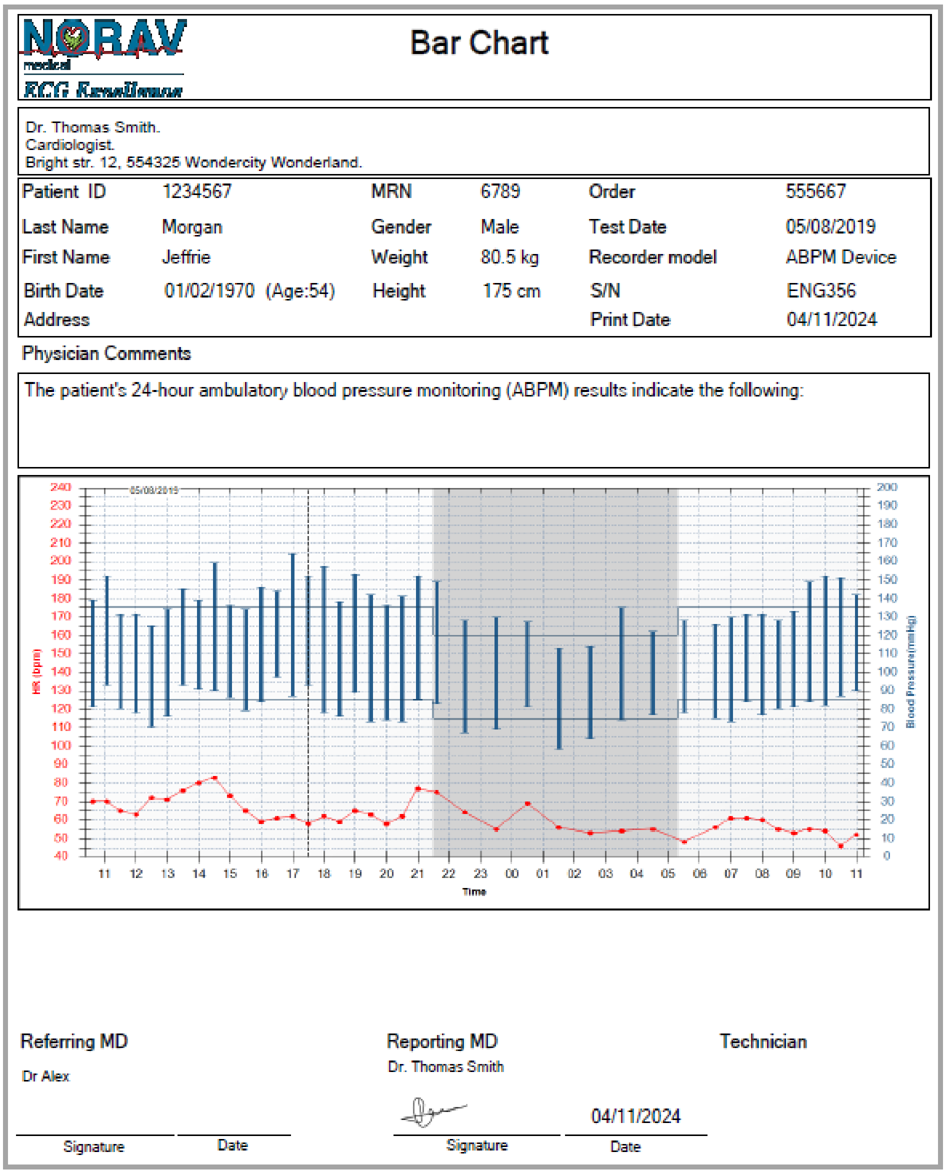
The left-hand Y-axis with the BPM units applies to heart rate (HR).

The X-axis applies to time.

The daily intervals are highlighted (Awake Time in white, Asleep Time in gray).

Day counts all three daytime intervals together.

Bar Chart



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Bar Chart

Dr. Thomas Smith.
Cardiologist.
Bright str. 12, 554325 Wondercity Wonderland.

Patient ID	1234567	MRN	6789	Order	555667
Last Name	Morgan	Gender	Male	Test Date	05/08/2019
First Name	Jeffrie	Weight	80.5 kg	Recorder model	ABPM Device
Birth Date	01/02/1970 (Age:54)	Height	175 cm	S/N	ENG356
Address				Print Date	04/11/2024

Physician Comments

The patient's 24-hour ambulatory blood pressure monitoring (ABPM) results indicate the following:

Referring MD
Dr Alex
Signature Date

Reporting MD
Dr. Thomas Smith
Signature
04/11/2024
Date

Technician

In this profile, the following values of the test series are displayed graphically in a bar chart as a function of time:

- Systolic values
- Median values
- Diastolic values
- Heart rate

The right-hand BP Y-axis with mmHg units applies to Systolic, Diastolic, and mean BP values.

The left-hand HR Y-axis with BPM units applies to heart rate.

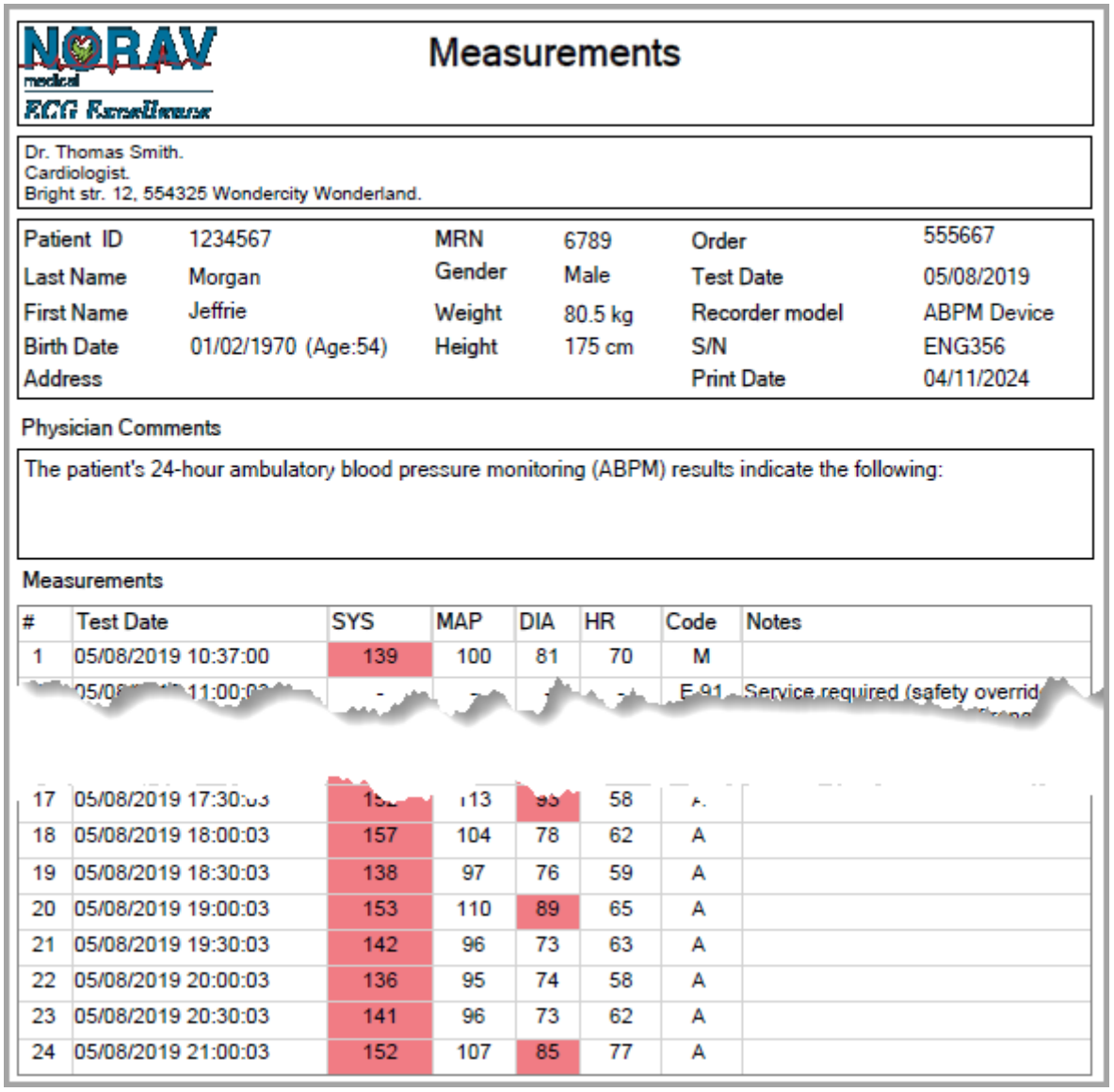
The X-axis applies to time (hours).

The daily intervals are highlighted (Awake Time in white, Asleep Time in gray).

Day counts all three daytime intervals together.

Note You can set these values when preparing for a new ABPM Test.

Measurements



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Measurements

Dr. Thomas Smith.
Cardiologist.
Bright str. 12, 554325 Wondercity Wonderland.

Patient ID	1234567	MRN	6789	Order	555667
Last Name	Morgan	Gender	Male	Test Date	05/08/2019
First Name	Jeffrie	Weight	80.5 kg	Recorder model	ABPM Device
Birth Date	01/02/1970 (Age:54)	Height	175 cm	S/N	ENG356
Address				Print Date	04/11/2024

Physician Comments

The patient's 24-hour ambulatory blood pressure monitoring (ABPM) results indicate the following:

Measurements

#	Test Date	SYS	MAP	DIA	HR	Code	Notes
1	05/08/2019 10:37:00	139	100	81	70	M	
	05/08/2019 11:00:03	-	-	-	-	E-91	Service required (safety overrid
17	05/08/2019 17:30:03	152	113	93	58	A	
18	05/08/2019 18:00:03	157	104	78	62	A	
19	05/08/2019 18:30:03	138	97	76	59	A	
20	05/08/2019 19:00:03	153	110	89	65	A	
21	05/08/2019 19:30:03	142	96	73	63	A	
22	05/08/2019 20:00:03	136	95	74	58	A	
23	05/08/2019 20:30:03	141	96	73	62	A	
24	05/08/2019 21:00:03	152	107	85	77	A	

The measurement in red indicates exceeding the defined limit for both systolic and diastolic BP.

The **Notes** column in the **Measurements** table is important, notifying the user about error(s) occurred during taking measurement(s).

Diastolic vs Systolic Graph

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ECG Kardiograf

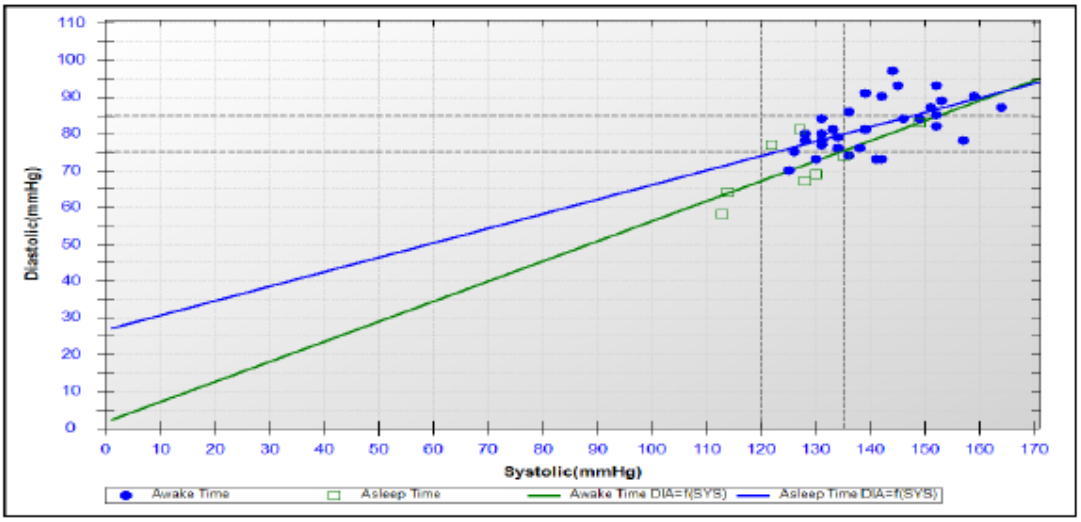
Dia vs Sys

Dr. Thomas Smith.
Cardiologist.
Bright str. 12, 554325 Wondercity Wonderland.

Patient ID	1234567	MRN	6789	Order	555667
Last Name	Morgan	Gender	Male	Test Date	05/08/2019
First Name	Jeffrie	Weight	80.5 kg	Recorder model	ABPM Device
Birth Date	01/02/1970 (Age:54)	Height	175 cm	S/N	ENG356
Address				Print Date	04/11/2024

Physician Comments

The patient's 24-hour ambulatory blood pressure monitoring (ABPM) results indicate the following:

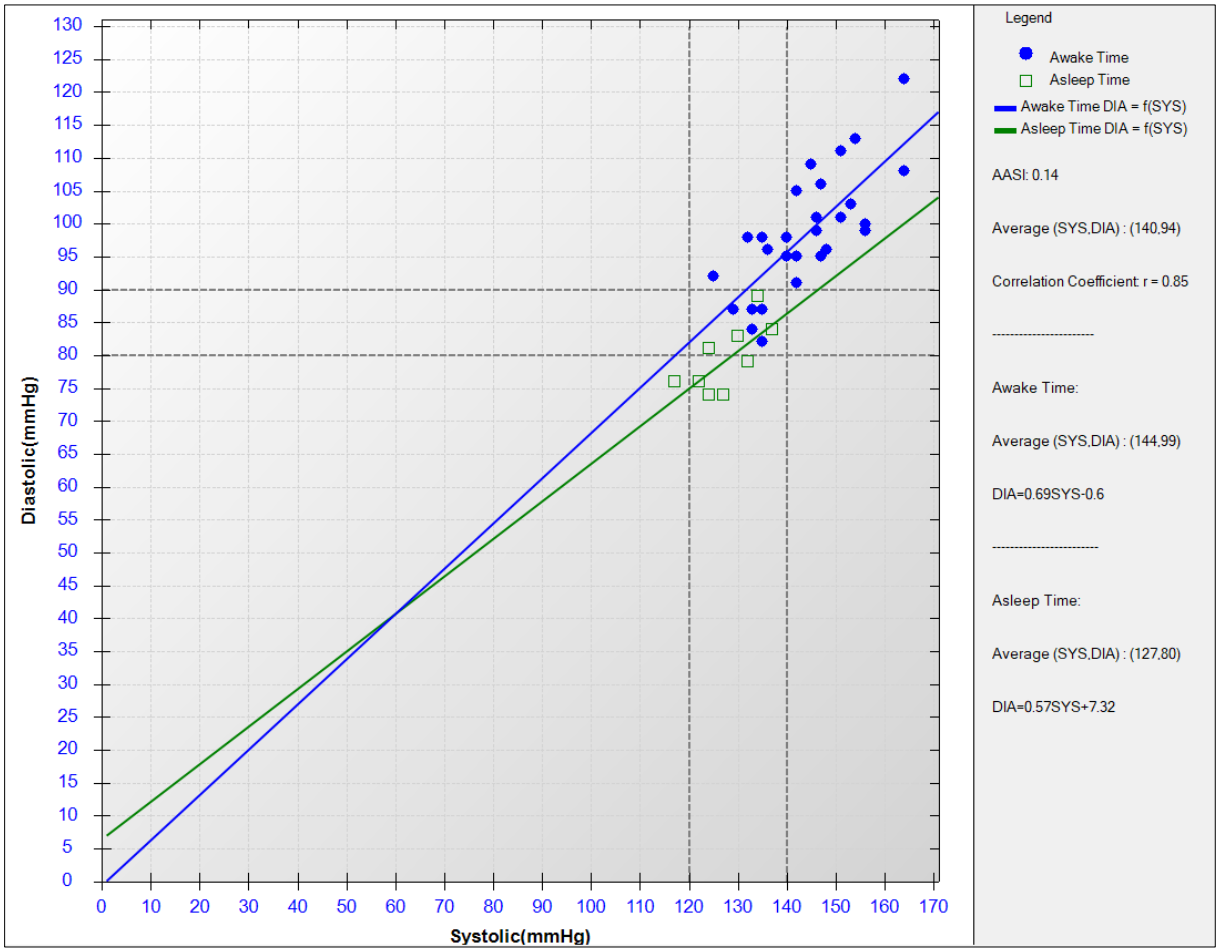


DIA=0.39SYS+27.28 DIA=0.55SYS+1.82

AASI 0.5 Correlation Coefficient r = 0.71 Average (SYS,DIA):(138,80)

Referring MD	Reporting MD	Technician
Dr Alex	Dr. Thomas Smith	
Signature / Date	Signature / 04/11/2024 Date	

This diagram shows the correlation of diastolic to systolic blood pressure (see following Figure). Each ● and □ corresponds to one measurement. You can see the BP limits as horizontal (Systolic) and vertical (Diastolic) set-point curves.



Legend ● Awake Time □ Asleep Time Awake Time DIA = f(SYS) Asleep Time DIA = f(SYS)	The ● dots are BP measurements taken during the Awake Time and the **blue** chart line represents the average of the blue dots. The □ squares are BP measurements taken during the Asleep Time and the **green** chart line represents the average of the green squares.
AASI: 0.14 Average (SYS,DIA) : (140,94) Correlation Coefficient: r = 0.85	**AASI: 0.14** – Ambulatory Arterial Stiffness Index, calculated from a set of data collected during a 24-hour ABPM, is defined as 1 minus the regression slope of diastolic on systolic blood pressure (BP) values. **Average (SYS,DIA): (140.94)** – Overall average of Systolic and Diastolic BP **Correlation Coefficient: r=0.85** – A numerical measure of correlation between Systolic and Diastolic BPs, meaning a statistical relationship between two variables.
Awake Time: Average (SYS,DIA) : (144,99) DIA=0.69SYS-0.6	Awake Time: **Average (SYS,DIA): (144.99)** – Average of Systolic and Diastolic BP during Awake Time **DIA=0.69SYS-0.6** – Awake-Time graph equation
Asleep Time: Average (SYS,DIA) : (127,80) DIA=0.57SYS+7.32	Asleep Time: **Average (SYS,DIA): (127.80)** – Average of Systolic and Diastolic BP during Asleep Time **DIA=0.69SYS-0.6** – Asleep-Time graph equation

Pie Chart

The values of one measurement series are analyzed according to the BP limits set.

The Systolic and Diastolic pie charts show the percentages of measurements as follows:

- Acceptable
- Too High
- Normal

Summary Report

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Summary Report

Dr. Thomas Smith.
Cardiologist.
Bright str. 12, 554325 Wondercity Wonderland.

Patient ID	1234567	MRN	6789	Order	555667
Last Name	Morgan	Gender	Male	Test Date	05/08/2019
First Name	Jeffrie	Weight	80.5 kg	Recorder model	ABPM Device
Birth Date	01/02/1970 (Age:54)	Height	175 cm	S/N	ENG356
Address				Print Date	04/11/2024

Summary

Period	Time	Samples	Valid Samples	Valid Samples (%)	BP Load Sys (%)	BP Load Dia (%)	Maximum SYS	Maximum DIA	Minimum SYS	Minimum DIA
Overall	05/08/2019 10:37 06/08/2019 11:00 (24:23)	48	41	85	54	22	164	97	113	58
Awake Period	05:18-21:30 (16:12)	40	33	82	48	21	164	97	125	70
Asleep Period	21:30-05:18 (07:48)	9	8	89	75	25	149	83	113	58
Dipping	SYS = 9.7% DIA = 13% <0% Inverted; <10% Non-Dipper; <20% Normal; >=20% Extreme									
Morning Surge	14.5 mmHg									

Average Values

	Awake Period		Asleep Period		Overall	
Measurements	Value	Goal	Value	Goal	Value	Goal
SYS (mmHg)	141	<135	127	<120	138	<130
DIA (mmHg)	82	<85	72	<75	80	<80
MAP (mmHg)	141		127		138	
HR (BPM)	63		60		62	
PP (mmHg)	140		127		138	

Referring MD
Dr Alex

Signature _____ Date _____

Reporting MD
Dr. Thomas Smith

Signature _____ Date 04/11/2024

Technician

Working with the NBP One ABPM Recorder

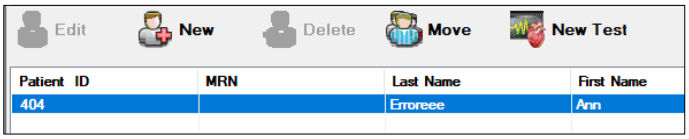
The following operations are available for operating NEMS-Q with the NBP One ABPM recorder:

1. Preparing NBP One Recorder for New ABPM Test on page 103.
2. Downloading ABPM Recording from NBP One Recorder on page 103.
3. Reviewing ABPM Recording in NEMS-Q on page 105.

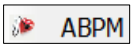
Preparing NBP One Recorder for New ABPM Test

1. Make sure the **NBP One recorder** is connected to the PC USB port.
2. To open the **Patients Screen**, click the 

tab and search for the patient whose NBP One recorder you want to prepare.
3. Click on the selected patient on the list (the row is highlighted in blue) – see Figure below.



4. Select the ABPM test type from the Work List or select the patient from the Patients screen, click the 

button, and then select the 

test type.

   The **Patient Details Dialog Box** is displayed (see Figure 71).

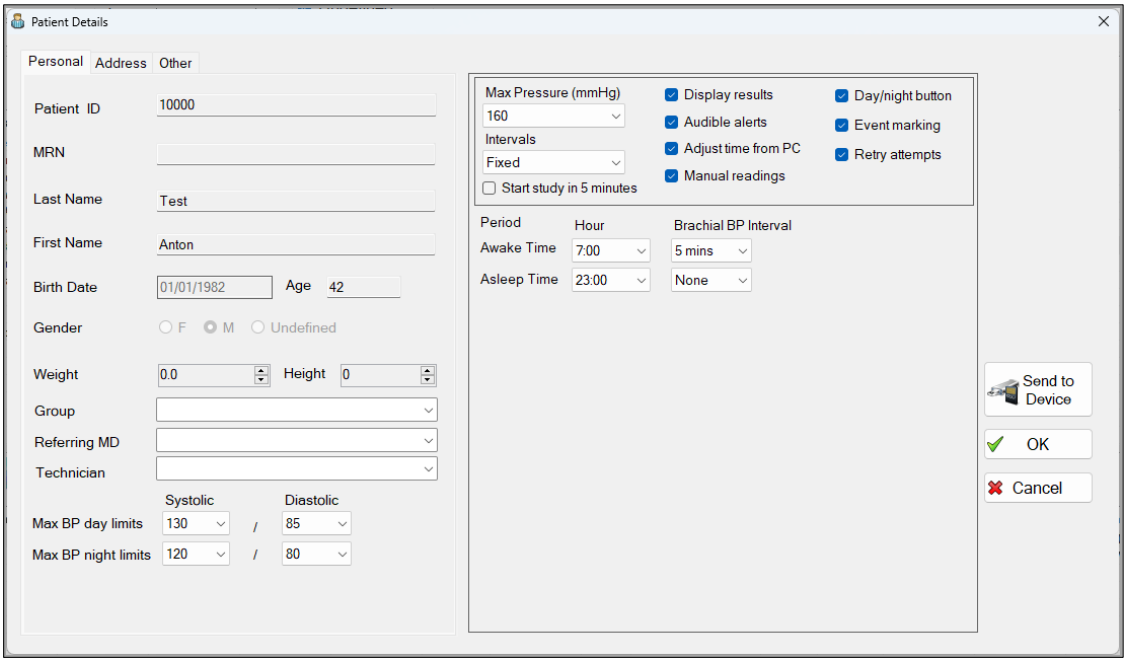
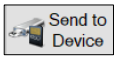


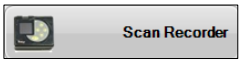
Figure 71: Patient Details Dialog Box

5. Validate the patient details, configure the ABPM protocol settings, and then click the 

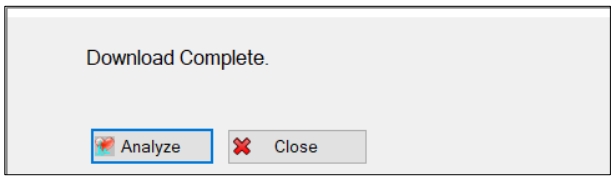
button.
6. Wait until the **Prepare** operation is finished.
7. Disconnect the NBP One recorder from the PC.

Downloading ABPM Recording from NBP One Recorder

1. Make sure the NBP One recorder is connected to the PC USB port.



2. Click the Devices tab, and then click the button.
3. Validate or edit the patient details, and then click the Download button. When downloading is finished, the **Download Complete** dialog box is displayed (see Figure below).



4. After the **Download Complete** dialog box appears, disconnect the NBP One recorder from the PC.

Reviewing ABPM Recording in NEMS-Q

1. Click the Records tab.
2. Search for a specific recording.
3. Select (highlight) the recording, and then click the Review button (see Figure 72).

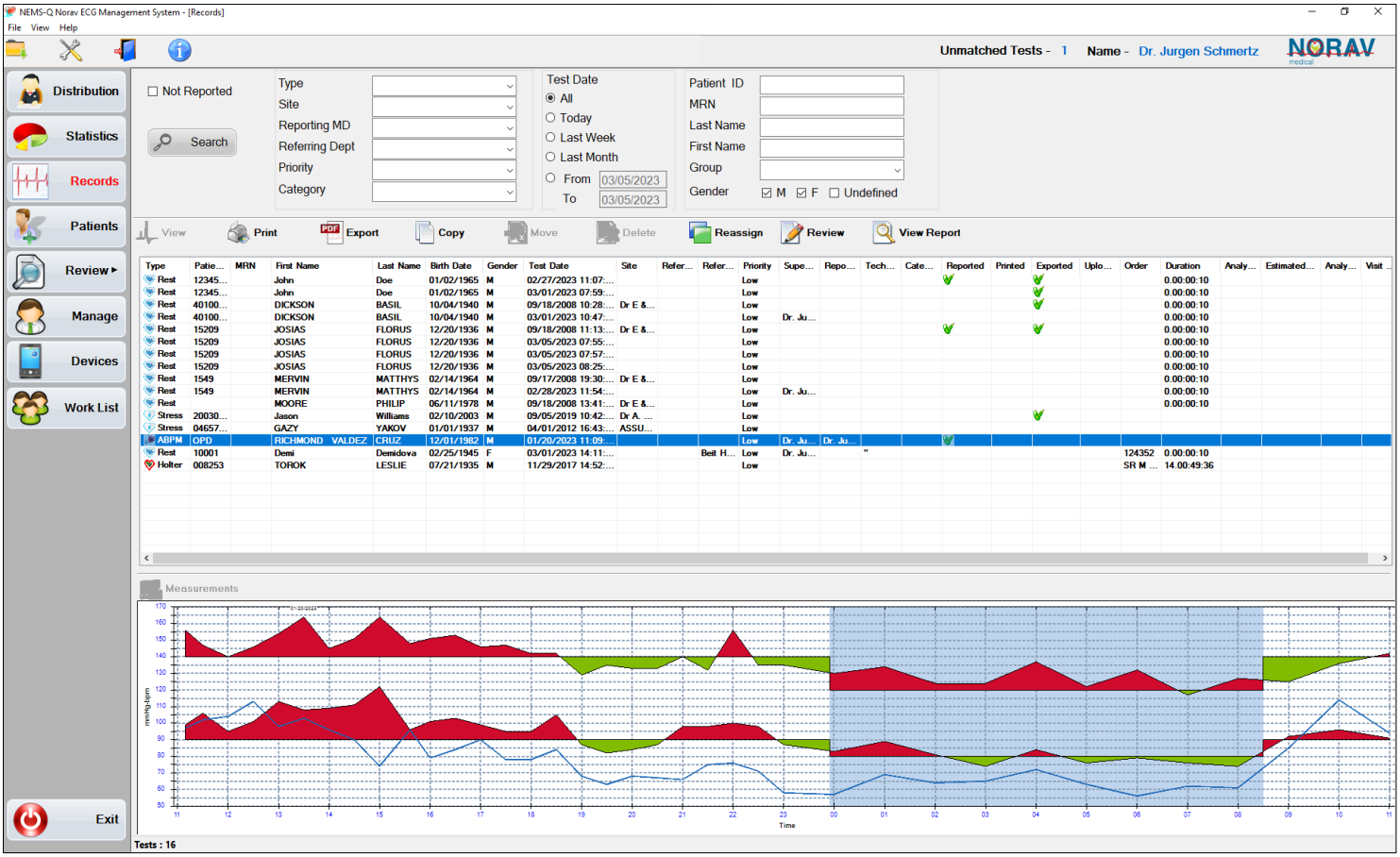


Figure 72: Selecting ABPM Test for Review

The **ABPM Review Screen** is displayed (see Figure 73).

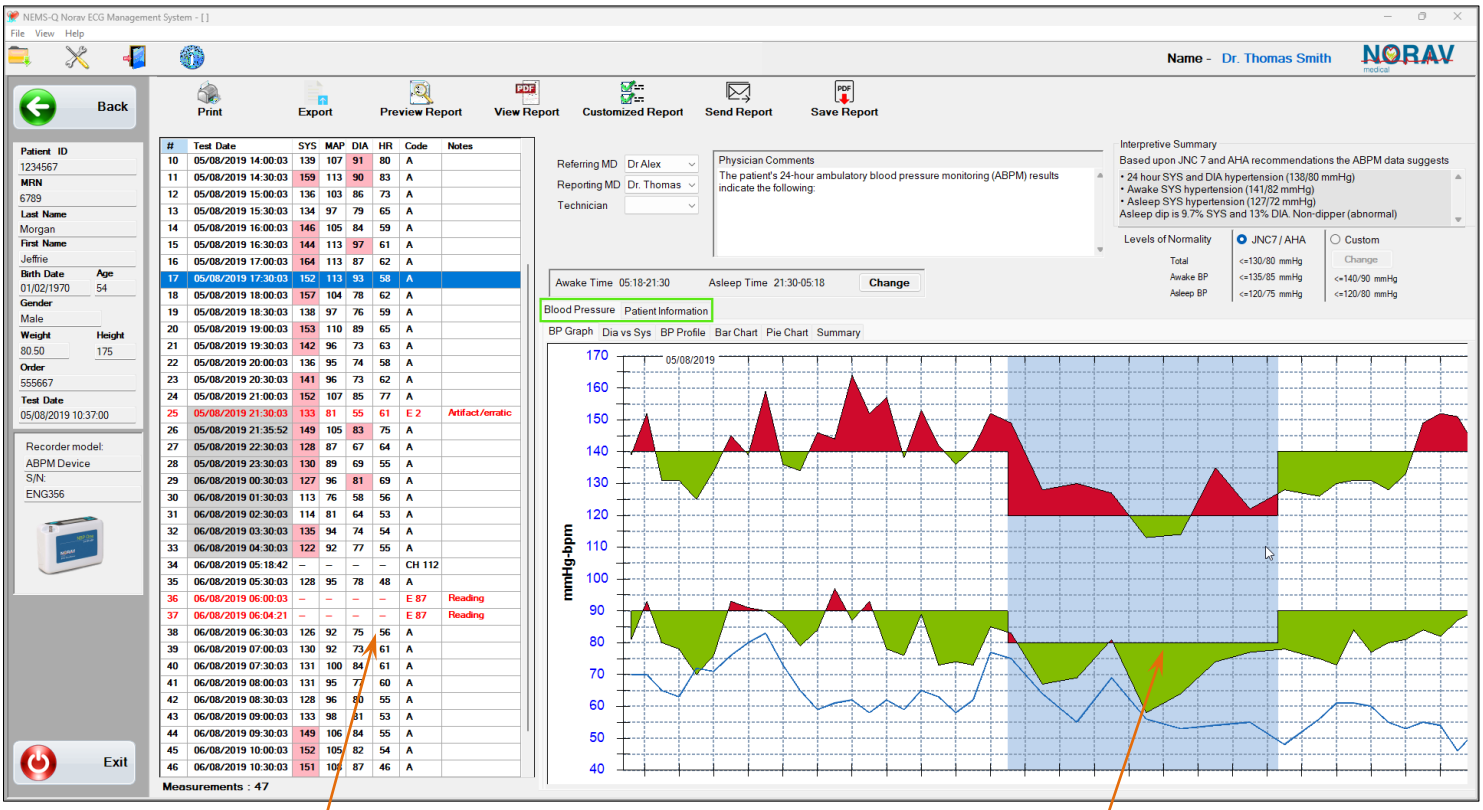
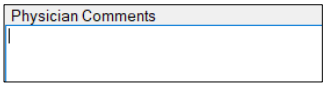
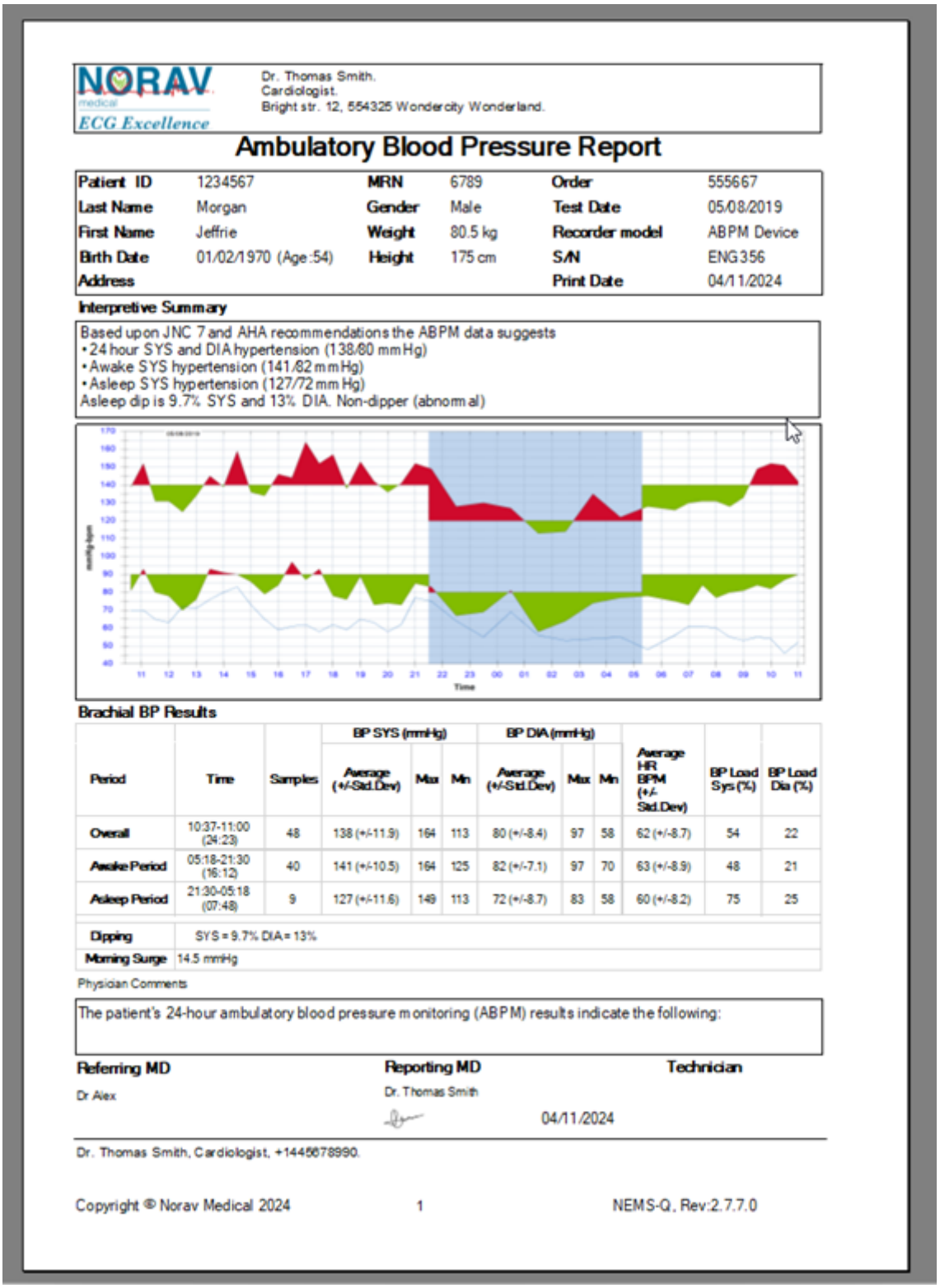


Figure 73: ABPM Review Screen

4. Review the ABPM measurements and write comments in the  field.

5. To generate the report preview, click the  button above the ABPM measurement list.

The **ABPM Report Preview** is displayed (see Figure 74).



NORAV medical
ECG Excellence

Dr. Thomas Smith.
Cardiologist.
Bright str. 12, 554325 Wondercity Wonderland.

Ambulatory Blood Pressure Report

Patient ID	1234567	**MRN**	6789	**Order**	555667
Last Name	Morgan	**Gender**	Male	**Test Date**	05/08/2019
First Name	Jeffrie	**Weight**	80.5 kg	**Recorder model**	ABPM Device
Birth Date	01/02/1970 (Age:54)	**Height**	175 cm	**S/N**	ENG356
Address				**Print Date**	04/11/2024

Interpretive Summary

Based upon JNC 7 and AHA recommendations the ABPM data suggests
- 24 hour SYS and DIA hypertension (138/80 mmHg)
- Awake SYS hypertension (141/82 mmHg)
- Asleep SYS hypertension (127/72 mmHg)

Asleep dip is 9.7% SYS and 13% DIA. Non-dipper (abnormal)

Brachial BP Results

Period	Time	Samples	BP SYS (mmHg)			BP DIA (mmHg)			Average HR BPM (+/- Std.Dev)	BP Load Sys (%)	BP Load Dia (%)
			Average (+/-Std.Dev)	Max	Min	Average (+/-Std.Dev)	Max	Min			
Overall	10:37-11:00 (24:23)	48	138 (+/-11.9)	164	113	80 (+/-8.4)	97	58	62 (+/-8.7)	54	22
Awake Period	05:18-21:30 (16:12)	40	141 (+/-10.5)	164	125	82 (+/-7.1)	97	70	63 (+/-8.9)	48	21
Asleep Period	21:30-05:18 (07:48)	9	127 (+/-11.6)	149	113	72 (+/-8.7)	83	58	60 (+/-8.2)	75	25

Dipping	SYS = 9.7% DIA = 13%
Morning Surge	14.5 mmHg

Physician Comments

The patient's 24-hour ambulatory blood pressure monitoring (ABPM) results indicate the following:

Referring MD
Dr Alex

Reporting MD
Dr. Thomas Smith
04/11/2024

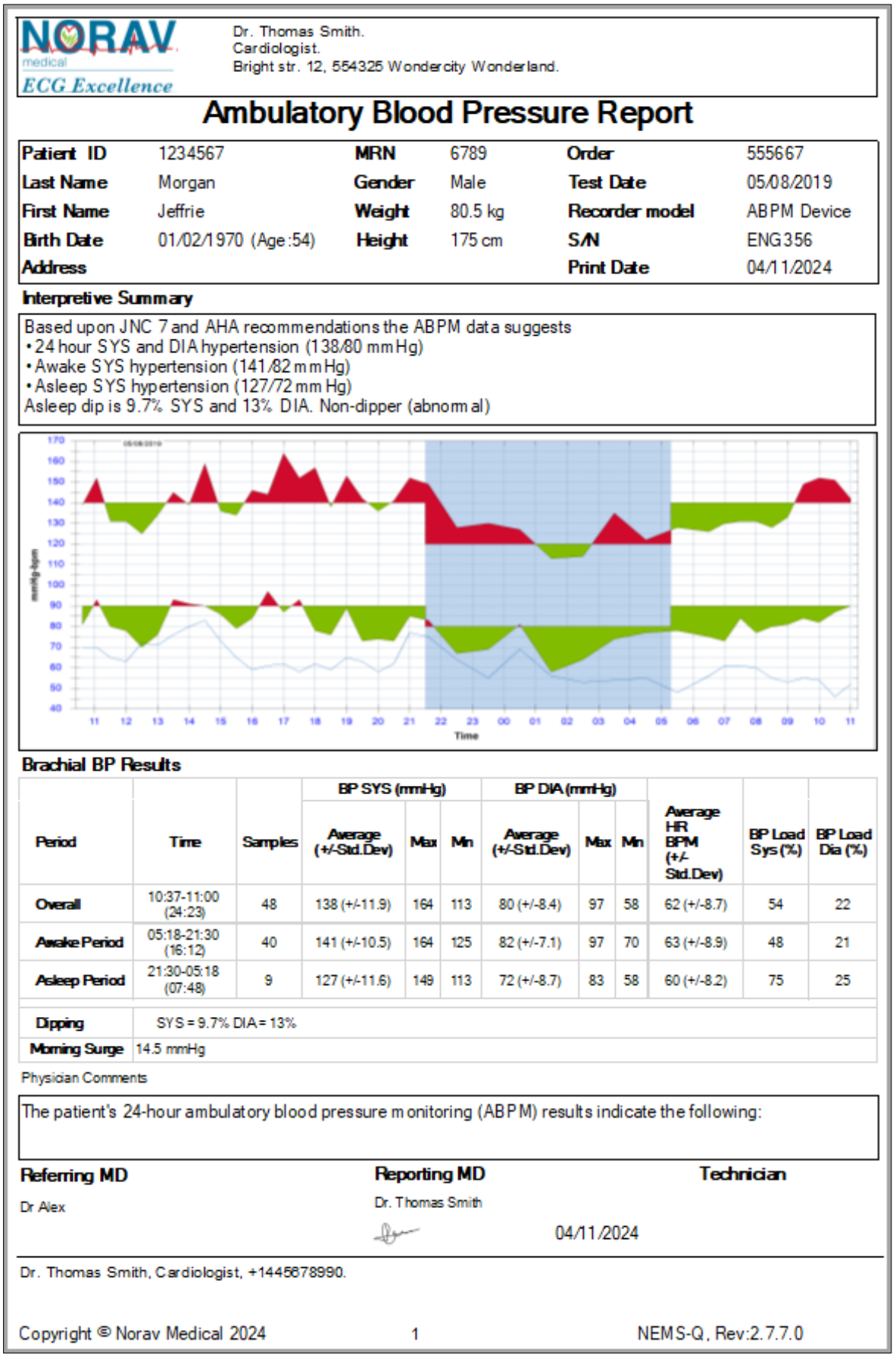
Technician

Dr. Thomas Smith, Cardiologist, +1445678990.

Figure 74: ABPM Report Preview

6. To view the report, click the View Report button.

The **ABPM Report** is displayed (see Figure 75).



NORAV medical
ECG Excellence

Dr. Thomas Smith.
Cardiologist.
Bright str. 12, 554325 Wondercity Wonderland.

Ambulatory Blood Pressure Report

Patient ID	1234567	**MRN**	6789	**Order**	555667
Last Name	Morgan	**Gender**	Male	**Test Date**	05/08/2019
First Name	Jeffrie	**Weight**	80.5 kg	**Recorder model**	ABPM Device
Birth Date	01/02/1970 (Age:54)	**Height**	175 cm	**S/N**	ENG356
Address				**Print Date**	04/11/2024

Interpretive Summary

Based upon JNC 7 and AHA recommendations the ABPM data suggests
- 24 hour SYS and DIA hypertension (138/80 mmHg)
- Awake SYS hypertension (141/82 mmHg)
- Asleep SYS hypertension (127/72 mmHg)

Asleep dip is 9.7% SYS and 13% DIA. Non-dipper (abnormal)

Brachial BP Results

Period	Time	Samples	BP SYS (mmHg)			BP DIA (mmHg)			Average HR BPM (+/- Std.Dev)	BP Load Sys (%)	BP Load Dia (%)
			Average (+/-Std.Dev)	Max	Min	Average (+/-Std.Dev)	Max	Min			
Overall	10:37-11:00 (24:23)	48	138 (+/-11.9)	164	113	80 (+/-8.4)	97	58	62 (+/-8.7)	54	22
Awake Period	05:18-21:30 (16:12)	40	141 (+/-10.5)	164	125	82 (+/-7.1)	97	70	63 (+/-8.9)	48	21
Asleep Period	21:30-05:18 (07:48)	9	127 (+/-11.6)	149	113	72 (+/-8.7)	83	58	60 (+/-8.2)	75	25

Dipping	SYS = 9.7% DIA = 13%
Morning Surge	14.5 mmHg

Physician Comments

The patient's 24-hour ambulatory blood pressure monitoring (ABPM) results indicate the following:

Referring MD	Reporting MD	Technician
Dr Alex	Dr. Thomas Smith	
		04/11/2024

Dr. Thomas Smith, Cardiologist, +1445678990.

NEMS-Q, Rev:2.7.7.0

Figure 75: ABPM Report

7. To print the report, click the Print button.

8. To export the BP measurements table to Excel file, click the Export button, which prompts to location on your PC for saving the Excel file.
9. To customize the report, click the Customized Report button.

   The **Customization Dialog Box** is displayed (see Figure 76).

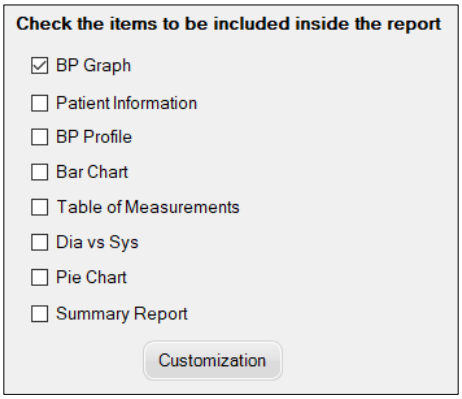


Figure 76: Customization Dialog Box

10. Select the items for inclusion in the report from the drop-down list, and click Customization.
11. To send the report by email, click the Send Report button, which opens a message in MS Outlook with the report PDF ready to be sent.
12. To save the report PDF, click the Save Report button, which prompts to location on your PC for saving the PDF file.
13. Finally, click the Back button to return to the Patient List main screen.

Working with the NBP-24 NG ABPM Recorder

1. Click  on the **Toolbar**.

   The **Setup Dialog Box** is displayed (see Figure 77).

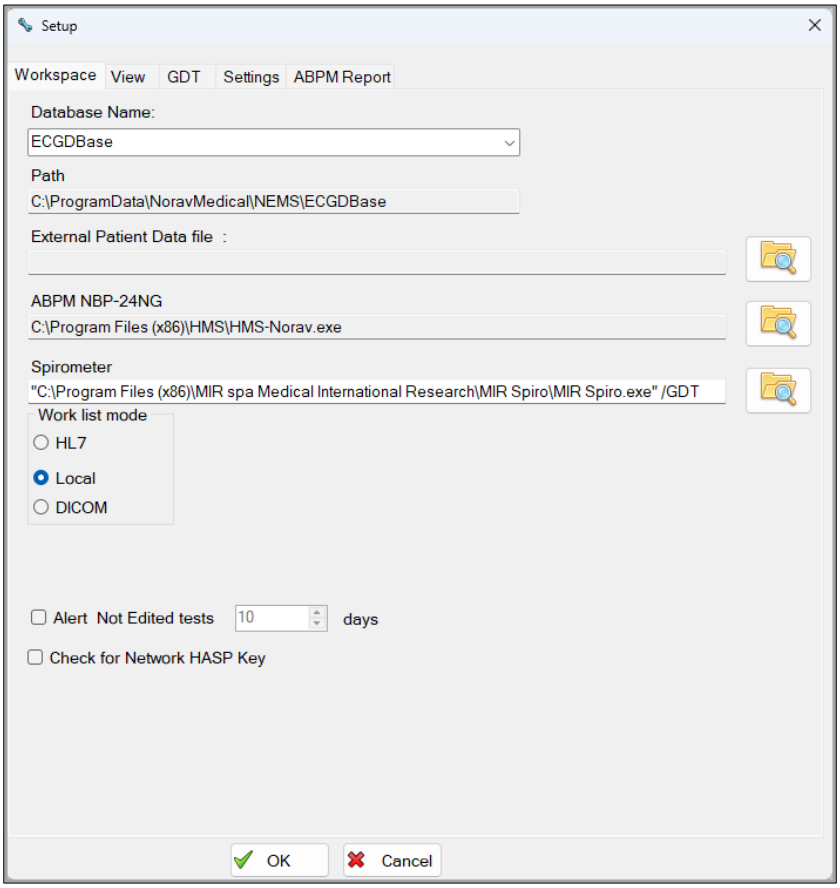


Figure 77: Setup Dialog Box

Preparing NBP-24 NG Recorder for New ABPM Test

1. Make sure the NBP-24 NG recorder is connected to the PC USB port.
2. Select the ABPM test from the **Work List** or select the patient from the **Patients Screen**, click the New Test button, and then select the NBP24-NG test type. The **Patient Details Dialog Box** is displayed (see Figure 78).

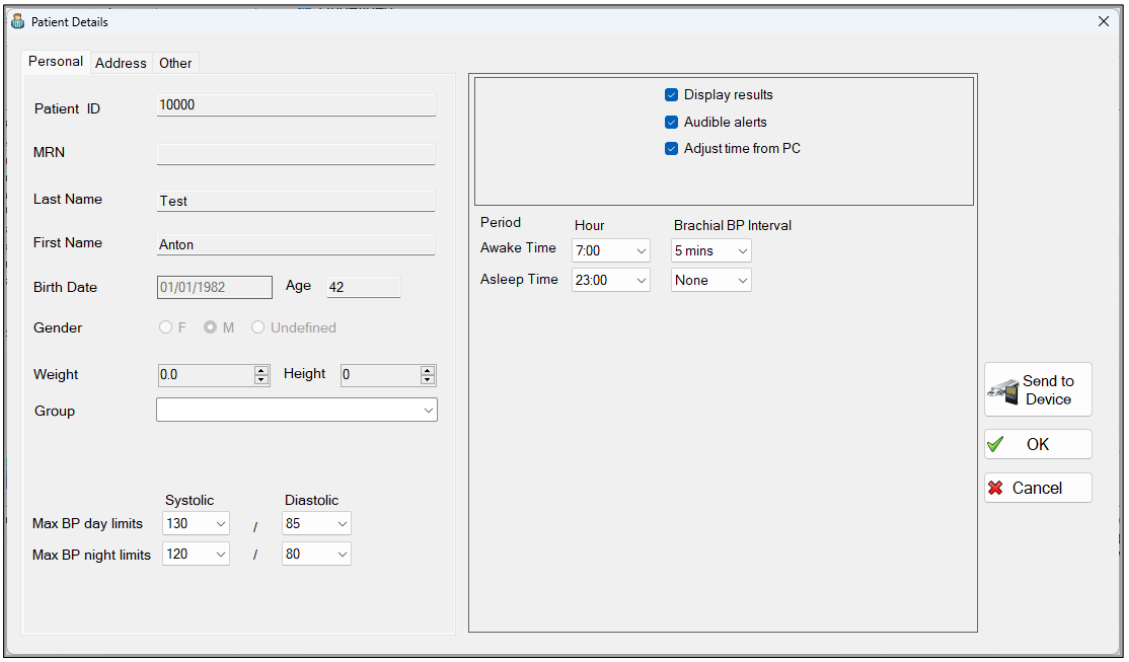


Figure 78: Patient Details Dialog Box

3. Validate the patient details, configure the ABPM protocol settings, and then click the Send to Device button.
4. Disconnect the NBP-24 NG recorder from the PC.

Downloading ABPM Recording from NBP-24 NG Recorder

See Section Downloading ABPM Recording from NBP One Recorder on page 103.

Reviewing ABPM Recording

Note

Reviewing ABPM recording is identical for NBP One and NBP-24 NG.

See Section Reviewing ABPM Recording in NEMS-Q on page 105.

7. Working with the MiniSpir Spirometer

For detailed instructions, refer to the **MIR Spiro Software User Manual** or the built-in application **Help**.

Before working with the **MiniSpir** device, install the spirometry software on your PC. After installation, adjust the software settings in the NEMS-Q application:

1. Click  on the **Toolbar**. The **Setup Dialog Box** is displayed (see Figure 79).

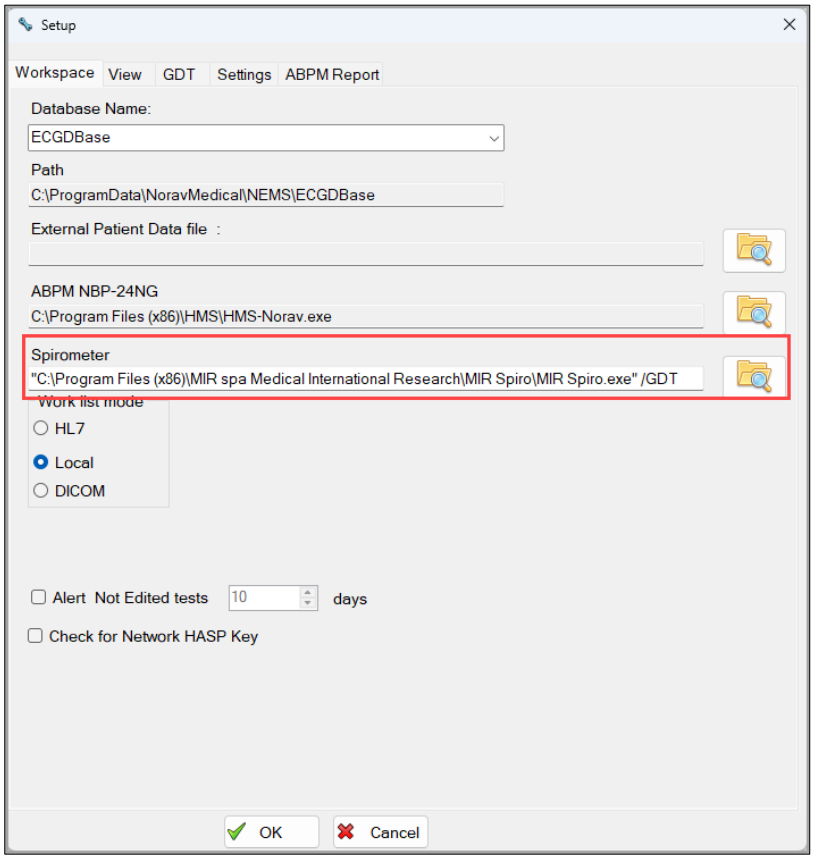
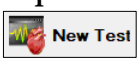


Figure 79: Setup Dialog Box

2. To adjust the software settings, click  , then browse and select the **MIR SPIRO.exe** file on your PC. Click **Open**.
3. The **Spirometer** path will be updated. Do not remove "/GDT" from the **Spirometer** path.
4. Click **OK** to save the changes.

To perform a spirometry test using this application:

1. Connect the **MiniSpir** device to your PC via USB.
2. Select the **Spirometer** test from the **Work List**, or select a patient from the **Patients Screen**, click the 

button, and then select the **Spirometer** test type. The software opens, displaying the main screen. Ensure that the patient's **Date of Birth, Height, and Weight** values are entered before performing the test.
3. Select the required test type in the right pane (for example, **FVC** or **SVC**). The test screen opens.

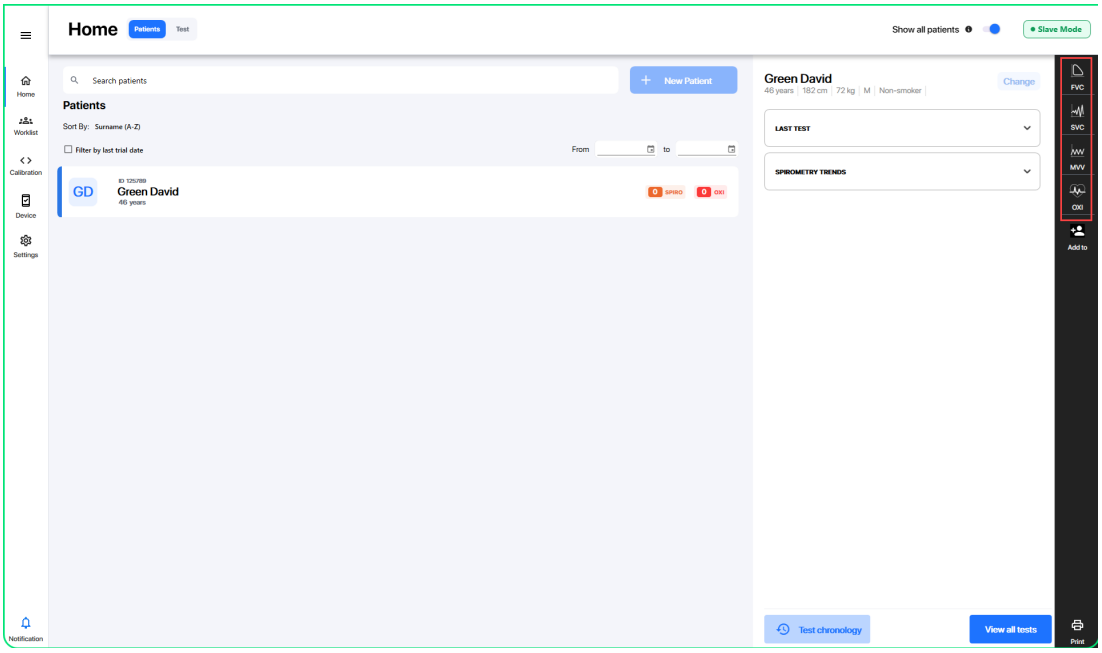


Figure 80: Spirometry Software Main Screen

4. Click **START** to perform the test.
5. When the test is complete, or when the **TEST ENDED** button is clicked, the test report screen appears.
6. Close the application. The **SPIRO** test appears in the **NEMS-Q Records** tab.
7. To review the test (physician only):

   a. Click the Records tab and select (highlight) a SPIRO recording.

   The **SPIRO Recording Selection for Review Screen** is displayed (see Figure 81).

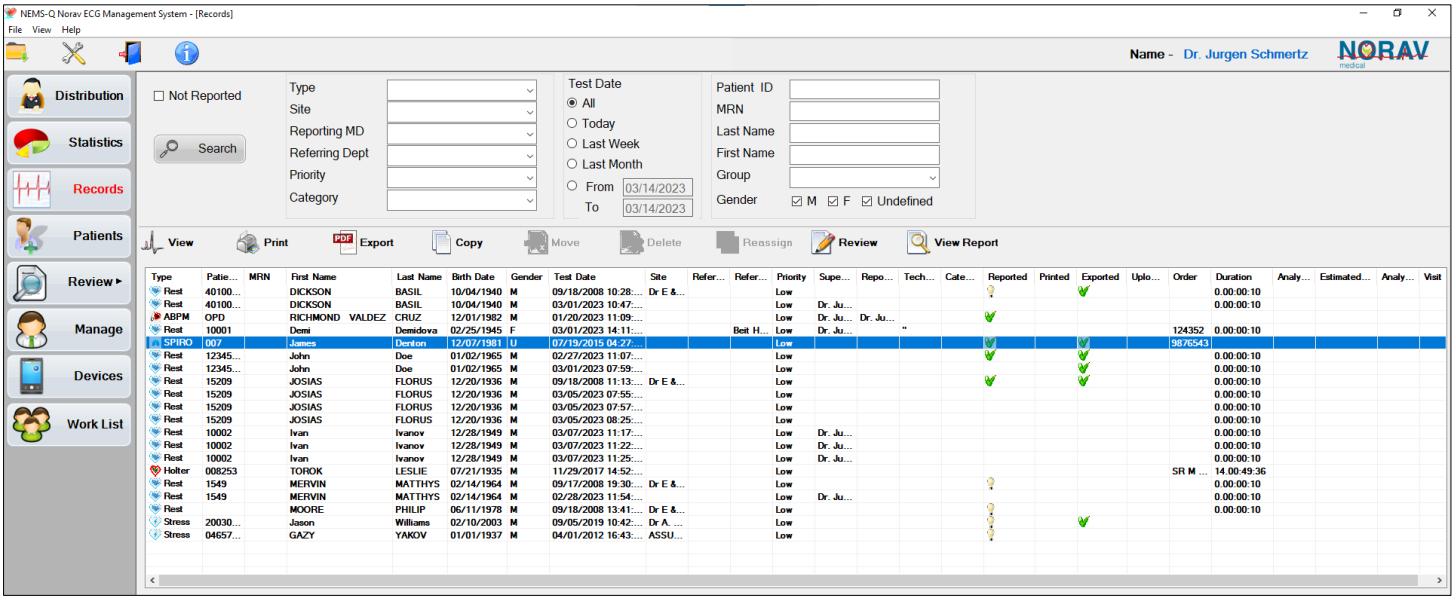


Figure 81: SPIRO Recording Selection for Review

   b. Click the Review button. The spirometry software main screen is displayed.

8. Review the test within the application.
9. When the review is complete, close the application.

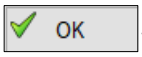
8. Working with the NSpiro™ Application

For detailed description, refer to the NSpiro™ Quick Guide and the NSpiro™ Software IFU.

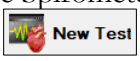
Before working with the NSpiro™ device, install the NSpiro™ software on your PC (see the NSpiro™ Software IFU Section 1.3 – Installing the Software).

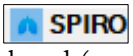
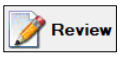
After the NSpiro™ Software is installed, adjust the software settings in the NEMS-Q application:

1. Click  on the **Toolbar**.

   The **Setup Dialog Box** is displayed (see Figure 79).
2. To open the NSpiro™ software, click  , then browse and select the **NSPIRO.exe** file on your PC.
3. Click  .

To perform a spirometry test using this application:

1. Connect the device to your PC via USB.
2. Select the Spirometer test from the Work List, or select a patient from the **Patients Screen**, click the  button, and then select the **Spirometer** test type.

   The **NSpiro™ Software** is opened, displaying the **NSpiro™ Main Screen**.
3. Calibrate the device (see the NSpiro™ Quick Guide Chapter 4 – Calibrating the Device).
4. Enter patient details (see the NSpiro™ Quick Guide Chapter 5 – Enter Patient Details).
5. Perform the test (see the NSpiro™ Quick Guide Chapter 6 – Perform a Test).
6. To review the test (physician only):
   a) Click the  tab and select (highlight) a  recording. The **SPIRO Recording Selection for Review Screen** is displayed (see Figure 81).
   b) Click the  button.
7. The **NSpiro™ Main Screen** is displayed.
8. Review the test (see the NSpiro™ Quick Guide Chapter 7 – Review Tests).
9. Print the report (see the NSpiro™ Quick Guide Chapter 8 – Print Final Report).

9. Troubleshooting

Problem	Cause	Corrective Action
When attempting to perform an action, an onscreen error message appears indicating there is a failure in connecting database.	Network connection.	If you are working on the network, consult your system administrator and then examine the network connection.
When selecting a file on the NEMS-Q interface, indication appears that the file is not found.	Network connection.	Verify network connections.
Encrypted NBP-24 NG devices stopped connecting with PC during work.		Uninstall the COM port, used for connection with device.
Device is not connected… message is displayed when preparing NBP-24 NG device or downloading from it in Windows 11.	Prolific PL2303TA USB to Serial driver is not supported by Windows 11 or later.	Open Device Manager, where the **…not supported…** message is displayed and update the driver or reinstall it. A new driver can be easily found on the Internet (or provided by Norav). The action may be required for each new used USB port or USB cable of the NBP-24 NG device.
Not clear where to find and how to use configuration files.	Configuration problem	**Settings.xml** items are explained in the NEMS-Q Installation Guide as follows: • NVDataPump Settings – on page 15. • NEMS-Q Client Settings – on page 20.
How to check HASP when license-related issues occur: (software key not found, missing some permissions).	HASP is connected to PC or server, but the application cannot be opened or used correctly.	• The first-line test for both HASP and NetHASP issues is checking the **http://localhost:1947** address via Internet browser. Here you can immediately see all HASP and NetHASP keys visible on a current PC locally and in network. The Norav dongle VendorID=47559. • To check the licenses on Norav HASP/NetHASP dongles, we use the HaspLicenseRadar tool. Use is simple: Run the tool on the computer where the HASP/NetHASP key is connected to USB. This shows the list of licenses on the dongle. Ask Support team for the tool, if needed

Appendix – Interfacing with Information Systems

There are several ways to exchange information between NEMS-Q and Hospital Information System (HIS). These are described below.

Demographic Data

HIS Preparing Patient Demographic Data for NEMS

This uses a text file named PatientFile.ini. The file location is defined in NEMS-Q setup.

The file consists of patient data segments. Maximum length is 999 patients (see Table 16).

Table 16: PatientFile.ini Format

Field Name	Type	Max. Length	Format	Comments
[PatientDataXXX**]**	Header	Fixed	[PatientData001] to [PatientData999]	Segment counter
ID	Alphanumeric	30	Cannot contain \ / ? * " < > | _ symbols	ID number (MRN)
LastName	Alphanumeric	30	Cannot contain \ / ? * " < > | _ symbols	
FirstName	Alphanumeric	30	Cannot contain \ / ? * " < > | _ symbols	
BirthDay	Number	2	01 to 31 or 1 to 31	
BirthMonth	Number	2	01 to 12 or 1 to 12	
BirthYear	Number	4	YYYY	
Sex	Number	1	0 - Female, 1 - Male, 2 - Undefined	
Weight	Number	3	0 to 500 (integer)	kilograms
Height	Number	3	0 to 300 (integer)	centimeters
Address	String	256	Any text	
Phone1	String	15	Any text	
Phone2	String	15	Any text	
Fax	String	15	Any text	
E-Mail	String	30	Any text	
Medications	String	256	Any text	
Other	String	256	Any text	Any textual data
TechName	String	30	Cannot contain \ / ? * " < > | _ symbols	Performing person
PhysName	String	30	Cannot contain \ / ? * " < > | _ symbols	Attending physician
IDR	Alphanumeric	30	Cannot contain \ / ? * " < > | _ symbols	Accession number
Case_ID	Alphanumeric	30	Cannot contain \ / ? * " < > | _ symbols	Visit number
Employee_Resp	String	30	Any text	
Type	String	30	ECG, Stress, Rest, Holter, ABPM, SPIRO	Examination type
ScheduledDate	Number	12	YYYYMMDDHHMM	Scheduled date
Status	Number	1	0 - scheduled, 1 - in process, 2 - completed	Examination status
Location	String	30	Any text	Examination office
ReferPhys	String	30	Any text	Reference physician
AlternateID	String	30	Cannot contain \ / ? * " < > | _ symbols	Alternate ID number

At least one of the **ID**, **LastName**, or **FirstName** fields must be completed.

When all these fields are blank, the section of this patient is ignored.

Example

[PatientData002]
ID=10002
LastName=Johnson
FirstName=Mary
BirthDay=30
BirthMonth=11
BirthYear=1948
Sex=1
Weight=69
Height=171
Address=25 Wightman Street, San Diego, USA
Phone1=858-6577000
Phone2=858-6577001
Fax=858-6576000
E-Mail=b@a.com
Medications=aspirin, analgen
Other=OtherDetail-2
TechName=Technician@21
PhysName=Physician@21
IDR=1243531
Case_Id=Case#2
Employee_Resp=Employee_Resp#21
Type=Stress
ScheduledDate=201510161440
Status=1
Location=UC San Diego Medical Center

HL7 Orders and Reports

The HL7 interface enables NEMS-Q to receive test orders from HIS and return observation results to HIS. This exchange of data can be done via a TCP/IP socket or using a Shared Folder method.

Interface via TCP/IP

The HL7 Integration Engine optional software module is required.

Shared Folder Method

Communication is through two shared folders:

- **Inbound** folder (where HIS is sending the ORM^O01 format HL7 files)
- **Outbound** folder (where NEMS-Q is returning the observation results as ORM^R01 format HL7 files).

GDT Interface

GDT interface enables NEMS-Q to communicate with EMR programs. The patient is always selected in the EMR program. NEMS-Q should be called after the patient's electronic recording file in the EMR program is selected. Patient data management is done in the EMR program, whereas medical signals (ECG, ABPM, spirometry data, etc.) are handled in NEMS-Q.

New procedures are created via NEMS-Q. Existing procedures can be edited via NEMS-Q. Upon completion of a new procedure or after review of the existing procedure, the EMR program adopts the most important data of all new and edited procedures.

Calling NEMS-Q from EMR via GDT

Adjust the EMR configuration to call the NEMS-Q Client with **/GDT** command line switch.

Example: **C:\Program Files (x86)\Norav Medical\NEMS\EMSApplication.exe /GDT**

Functionality

1. EMR prepares a GDT command file and then places it to the GDT Inbound folder.
2. Launch the NEMS-Q Client application with **/GDT** command line switch.
3. NEMS-Q starts and performs the procedure defined in the GDT command file.
4. After the procedure is complete the GDT report is generated in the GDT Outbound folder.
5. Exit the NEMS-Q Client application, which can be done automatically or by operator.

Opening Patient Data in NEMS-Q Interface via GDT

1. Initiate the EMR program and select a patient.
2. Perform **Open Patient History** whatever command in the EMR program interface.
3. NEMS-Q starts with the selected patient record or automatically creates a new patient record.
4. Start new procedure or review existing recordings in appropriate software application.
   When the action is complete, the software application sends results to the EMR.
   The EMR program automatically adopts the updated data.

Performing New Test via GDT

1. Initiate the EMR program and select a patient.
2. Start the desired procedure in the EMR interface that initiates a NEMS-Q application.
   NEMS-Q displays the initiated procedure details to be validated by the user.
   The user must confirm the selected procedure or select another procedure type for the patient.
   Upon confirmation of the procedure type, NEMS-Q starts the appropriate software application.
3. Perform the procedure (acquire ECG, spirometry test, prepare ABPM recorder, etc.).
   When the procedure is complete, the software application sends results to the EMR.
   The EMR program automatically adopts the new results.

Displaying Existing Procedure via GDT

1. Initiate the EMR program, select a patient, and then select the existing procedure from the list.
2. Perform **Review** or **Open** whatever command in the EMR interface.
   This activates the NEMS-Q that displays the test details to be validated by the user.
3. Open the selected record, review, and then save the record.
   When review is complete, the software application sends results to the EMR.
   The EMR program automatically adopts the updated review report.

Document History

Version	Date	Updates	Changed by
1.0.0.0		IFU created	
2.7.5.0 Rev. 02	05.07.2023	Updated ABPM Reports and Graphs by removing all irrelevant measurements, unselected from the beginning of the test. Added functionality to Updated PDF Report for Rest and Stress tests after reviewing the records (adding Remarks or Conclusion)	Alex K.
2.7.5.0 Rev. 03	21.12.2023	Images updates to reflect the UI changes within certain screens.	Anton B.
2.7.6.0	28.12.2023	Added Multiple Report Date Format (Europe, USA), Header alignment to the Setup menu. Added Referring Physician, Reporting Physician and Technician dropdowns to the Review screen for ABPM (and to the reports). Added support for the new NH301 v4.0.0 Holter format (HL5)	Anton B.
2.7.7.0	03.09.2024	All changes are related to the Review ABPM screen: Introduced the Interpretative summary, also within ABPM report; Changed "Average" to "JNC7/AHA" thresholds + Custom option for the thresholds; New layout for ABPM reports + Header centering. Added new parameter - Morning BP Surge for ABPM Test Review screen and PDF Report. NR-314-P recorder support. Prepare device with existing study warning notification. Download from recorder (clear recorder memory notification). NEMS ABPM Report front page changes (mainly header and footer areas)	Anton B.
2.7.8.0	30.04.2025	General Information section updated; Document reference information format updated; Preparing Holter Recorder for New Patient section updated (Check ECG section introduced). "Working with External ECG Devices via DICOM Protocol" section created	Anton B.
2.7.8.0 Rev. 02	06.08.2025	General Information section update.	Anton B.
2.7.9.0	09.02.2026	Added MIR Spiro Software Intended Use section. Added Working with the MiniSpir Spirometer section. Updated the Manage Tab section: revised User Dialog Box fields and added information about the Signature. Temporarily removed LP, HRV, and Monitoring sections. Updated the Opening Stress ECG Record for Review section. Updated NEMS-Q Installation section: Norav DICOM Service and MiniSpir Spirometer.	Anton B.