iOSA: A Data Management System to Assist in Obstructive Sleep Apnea Diagnosis

User Guide

Version 5.3.0

Contenido

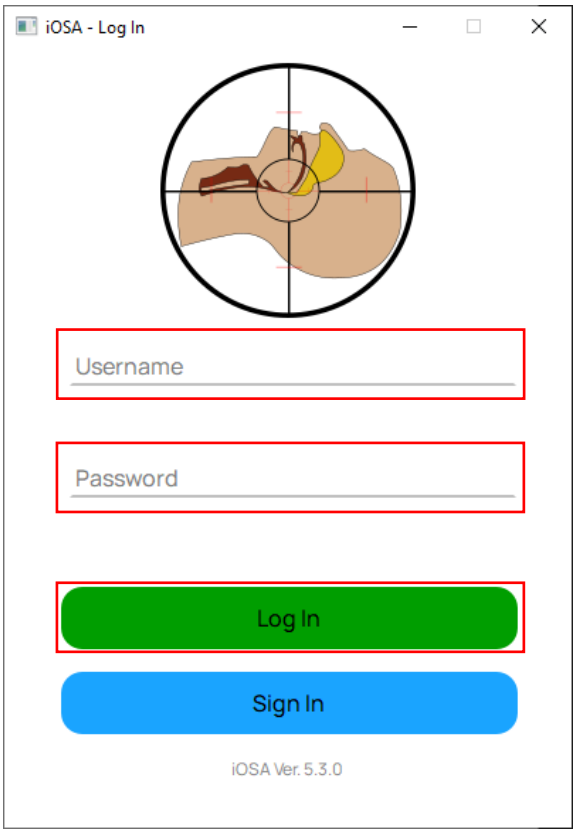
Patient Management

Default Log In Credentials

Firstly, a valid user credentials are required. If the system was installed according to the “Installing Manuel”, then the default credentials are already registered:

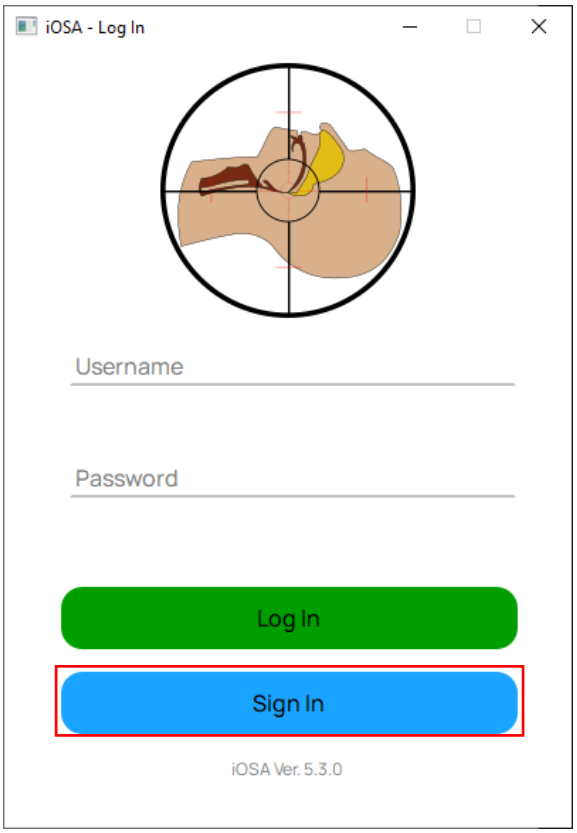
- Username: Admin
- Password: Admin

Therefore, enter the username and password and click on the green “Log In” button.

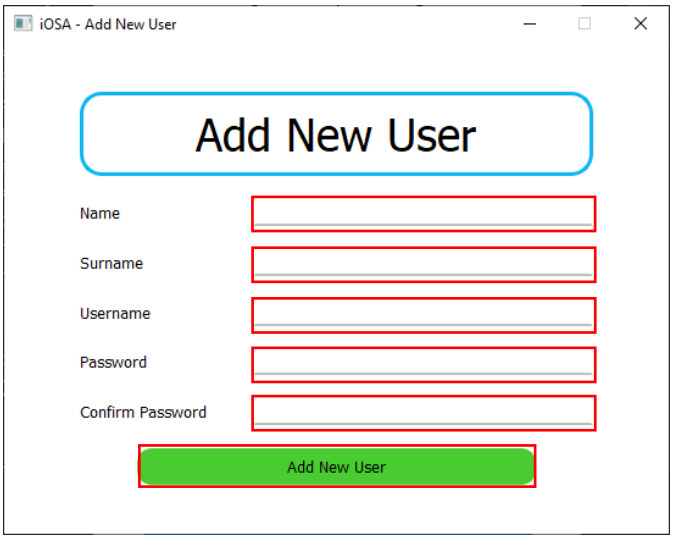


Add New Users

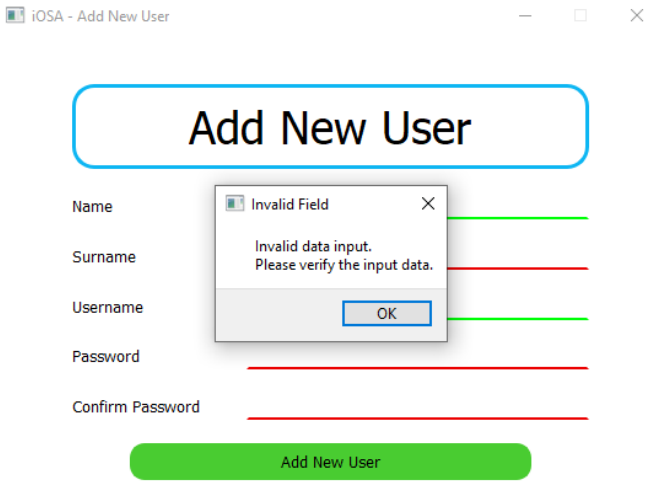
In case more than one medic uses the system it’s possible to create more medic users. For this, click on the blue “Sign In” button.



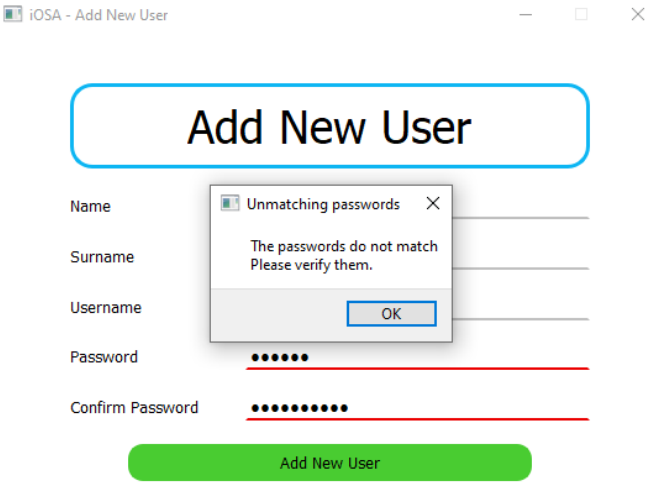
To create a new user, the five fields are obligatory require: the name of the medic, the surname of the medic, a username to identify the medic and a password. Once the data is input, click on the green “Add New User” button.



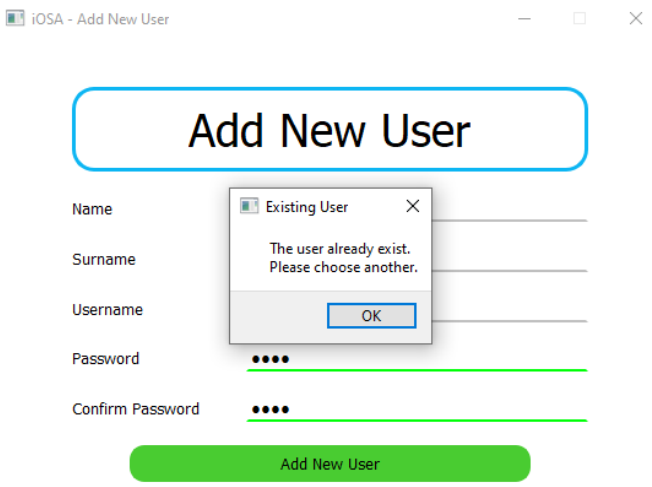
In case a field is left blank, the system will display a notification. The wrong fields will be red highlighted.



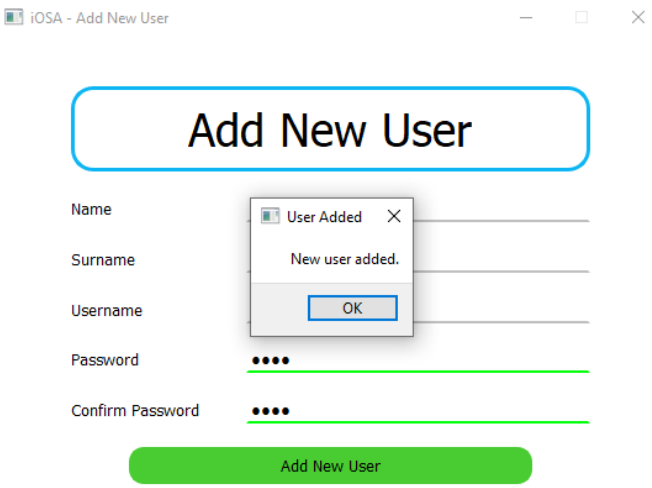
Another warning will appear if the password does not match.



In case the provided user already exists, the system will notify the existence.



If all the data is correct, then the user will be created and now can be used to log in into de iOSA system.



Some considerations while creating a new user:

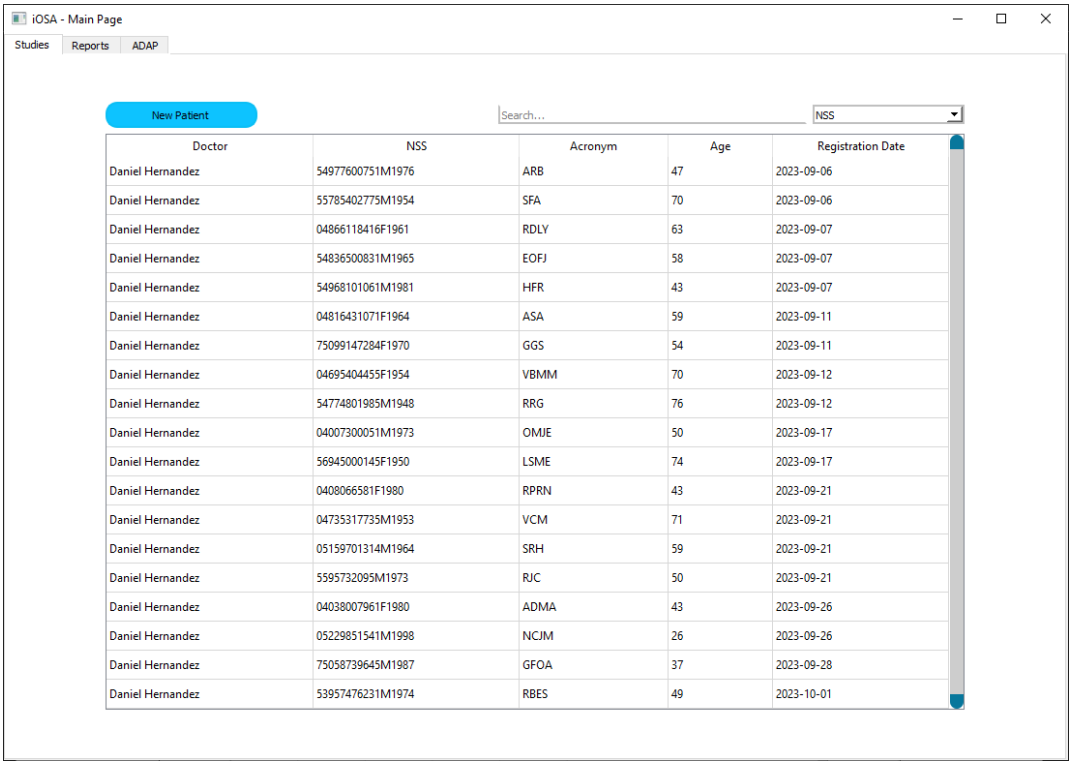
- Please leave the username with less than 15 characters.
- Please leave the password with less than 15 characters.

Data Management

Patient Profiles Management

The main page list all the patient's profiles that are already registered on the system. They are listed by the lasted registered patient to the newest. From this page

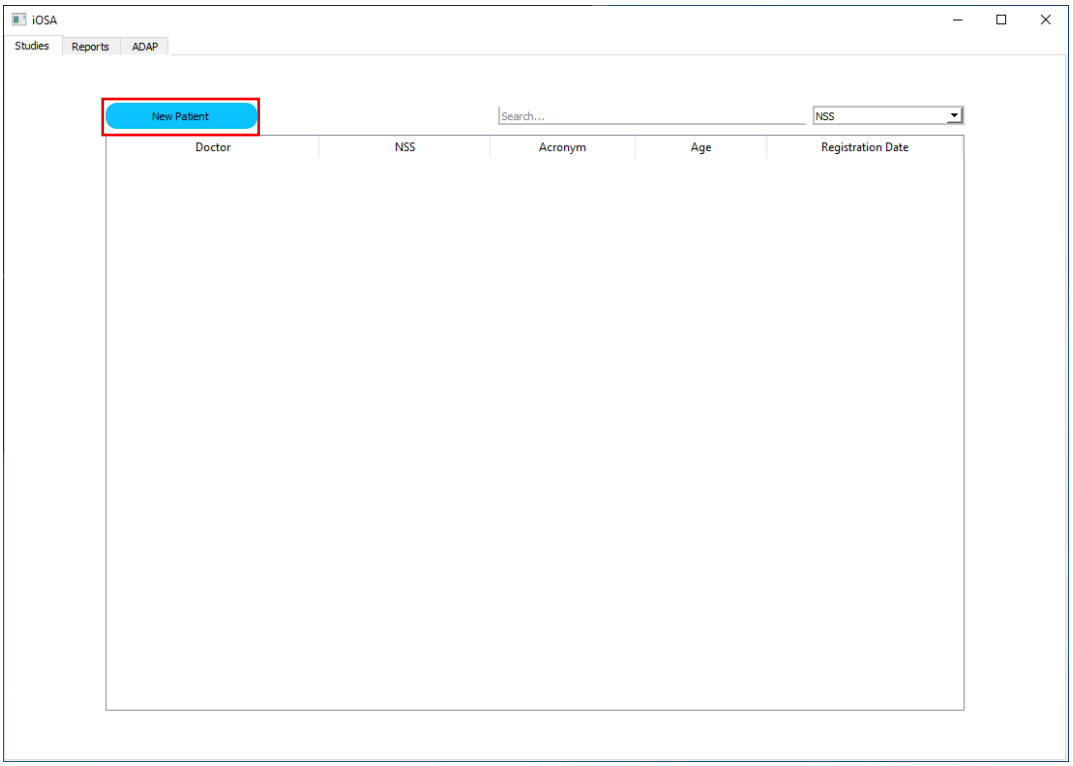
new patients can be created and be search selecting a filter (doctor, NSS, acronym, age or registration date). Being the NSS search de default.



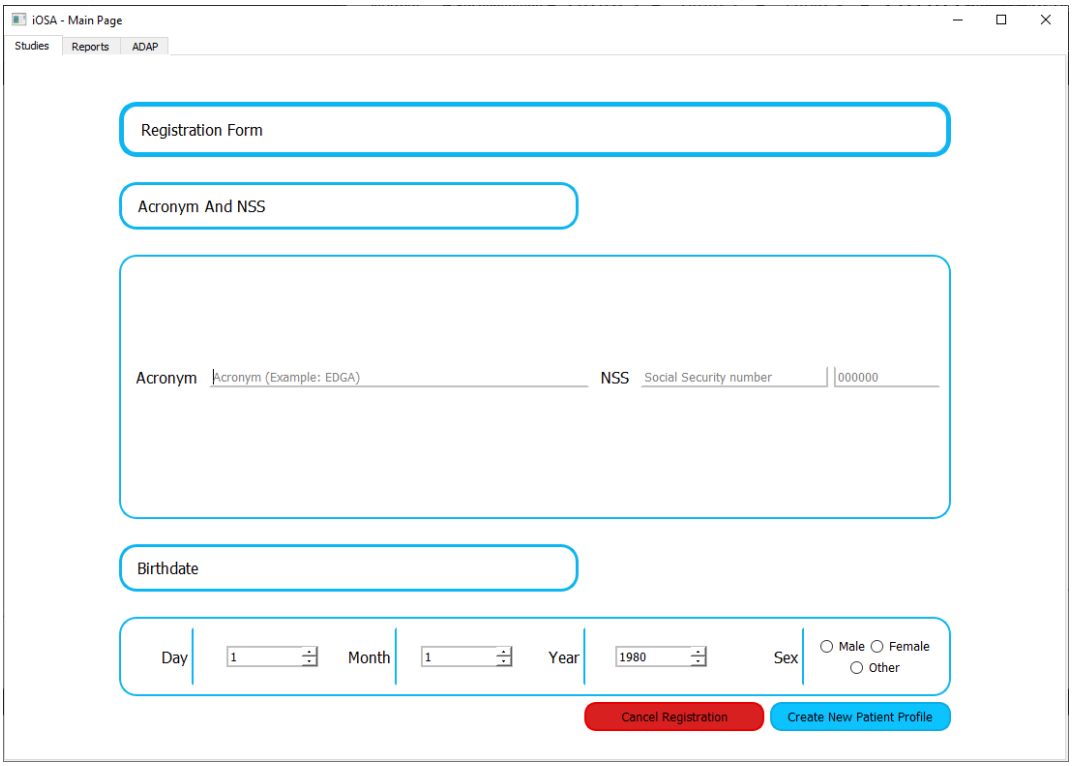
Doctor	NSS	Acronym	Age	Registration Date
Daniel Hernandez	54977600751M1976	ARB	47	2023-09-06
Daniel Hernandez	55785402775M1954	SFA	70	2023-09-06
Daniel Hernandez	04866118416F1961	RDLY	63	2023-09-07
Daniel Hernandez	54836500831M1965	EOFJ	58	2023-09-07
Daniel Hernandez	54968101061M1981	HFR	43	2023-09-07
Daniel Hernandez	04816431071F1964	ASA	59	2023-09-11
Daniel Hernandez	75099147284F1970	GGS	54	2023-09-11
Daniel Hernandez	04695404455F1954	VBMM	70	2023-09-12
Daniel Hernandez	54774801985M1948	RRG	76	2023-09-12
Daniel Hernandez	04007300051M1973	OMJE	50	2023-09-17
Daniel Hernandez	56945000145F1950	LSME	74	2023-09-17
Daniel Hernandez	0408066581F1980	RPRN	43	2023-09-21
Daniel Hernandez	04735317735M1953	VCM	71	2023-09-21
Daniel Hernandez	05159701314M1964	SRH	59	2023-09-21
Daniel Hernandez	5595732095M1973	RJC	50	2023-09-21
Daniel Hernandez	04038007961F1980	ADMA	43	2023-09-26
Daniel Hernandez	05229851541M1998	NCJM	26	2023-09-26
Daniel Hernandez	75058739645M1987	GFOA	37	2023-09-28
Daniel Hernandez	53957476231M1974	RBES	49	2023-10-01

Add New Patient Profiles

To create a new patient profile, click on the blue “New Patient” button on the “Main Page”. This will open the patient “Registration Form”.



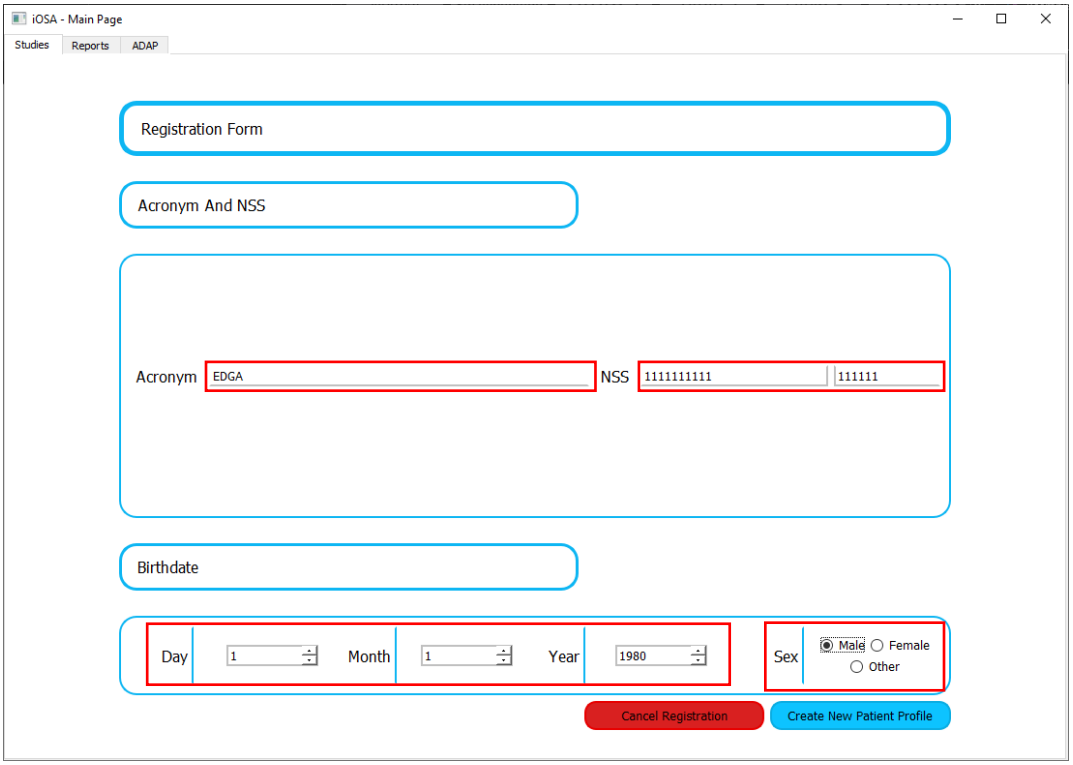
The patients profile requires a designated acronym from the medic, the NSS of the patient with a unique 6-digit number, the birthdate and the patient sex.



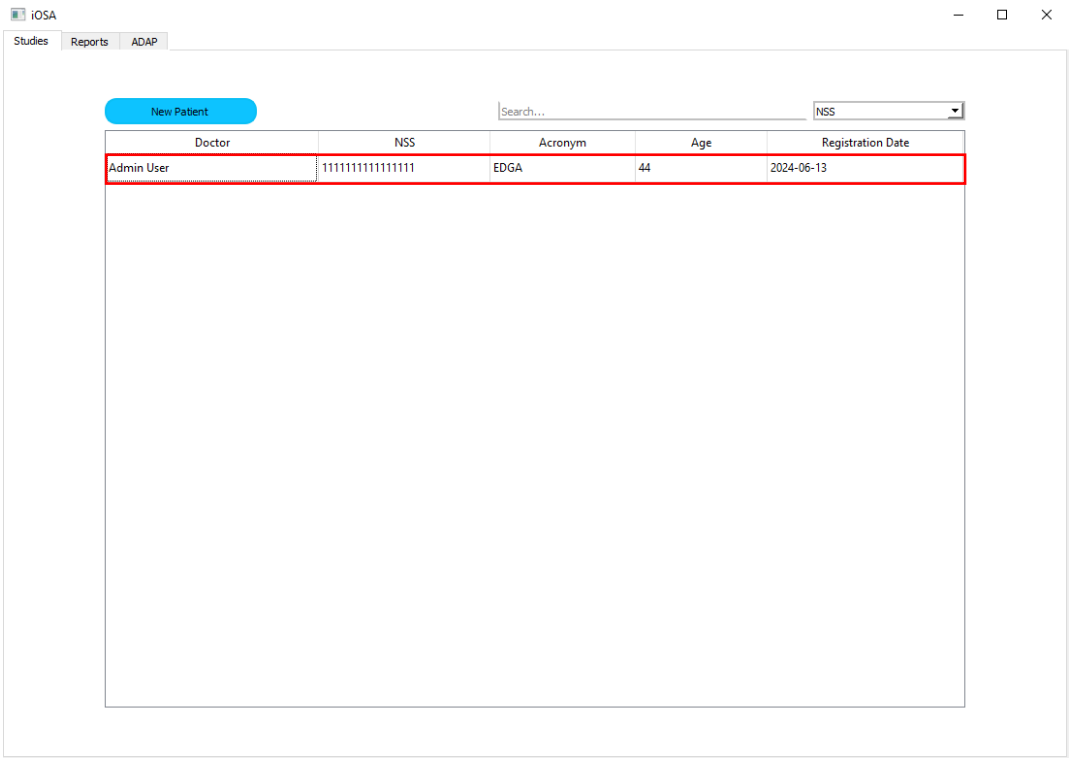
The use of an acronym is to avoid saving the patient's full name, this because some hospitals and facilities are not allowed to store this information on any database.

The NSS is a governmental insurance code provided to any person of the country and the 6-digit number is an internal patient number for the hospital or the medic. With this combination, the patient duplication is avoided.

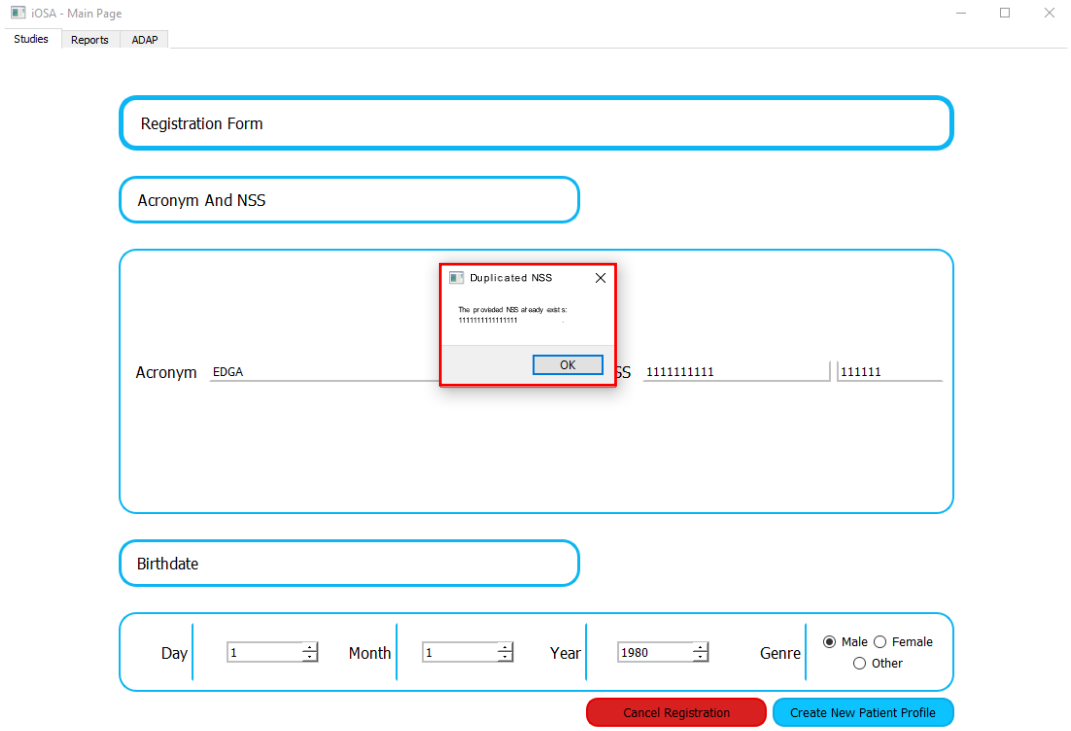
Once all the data is provided, click on the blue "Create New Patient Profile" button or on the red "Cancel Registration" button to cancel the operation.



Now the new profile will appear on the registered patients list on the "Main Page".

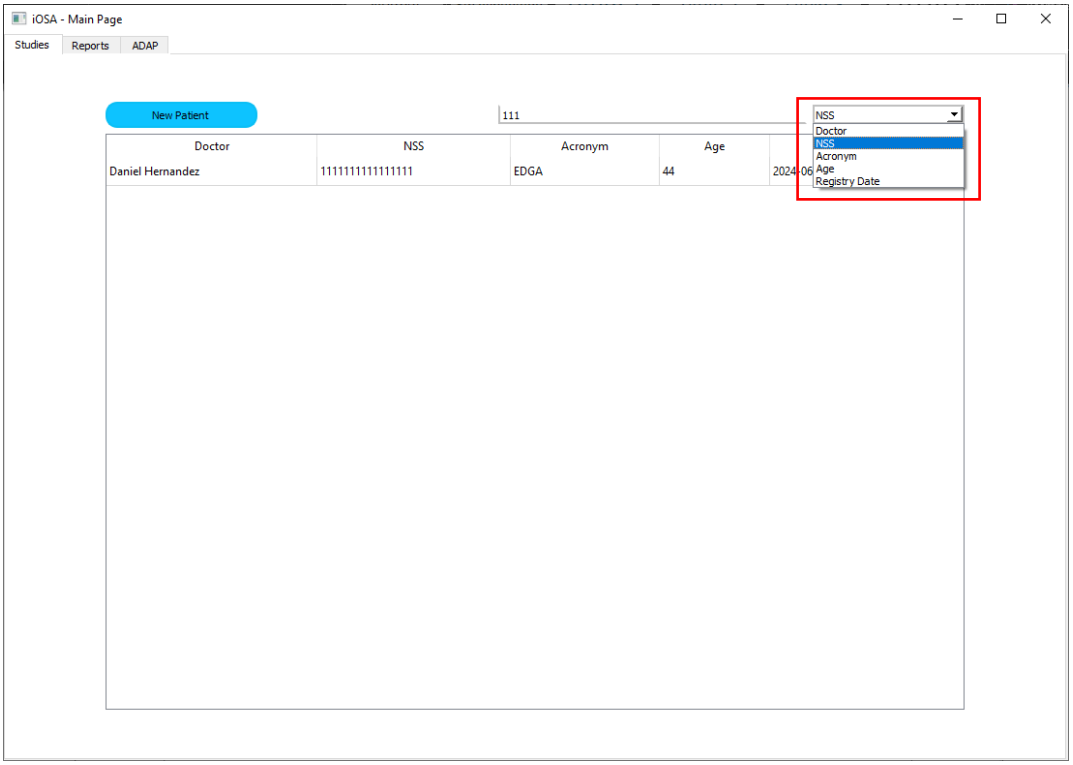


In case the NSS is already registered, the screen will show an alert notifying the existence of the patient profile. Click on the “Ok” button and enter another NSS.



Search Patient Profile

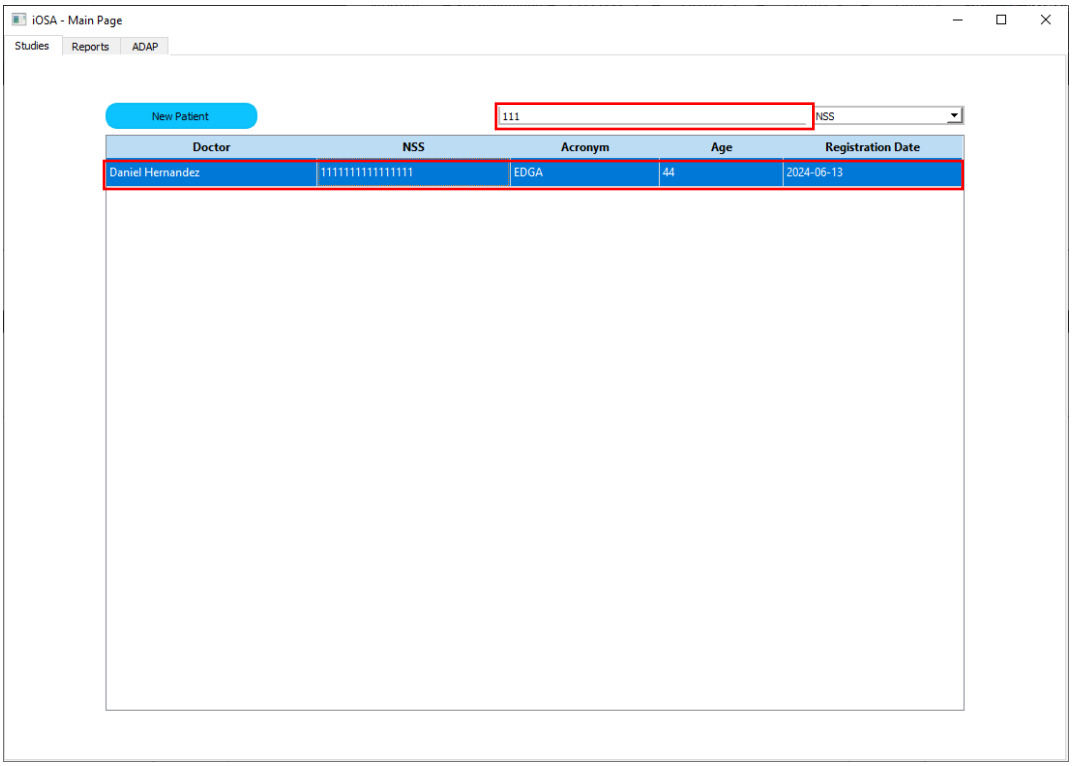
For search a patient is necessary to select a search filter. Then, input the search pattern of the patient.



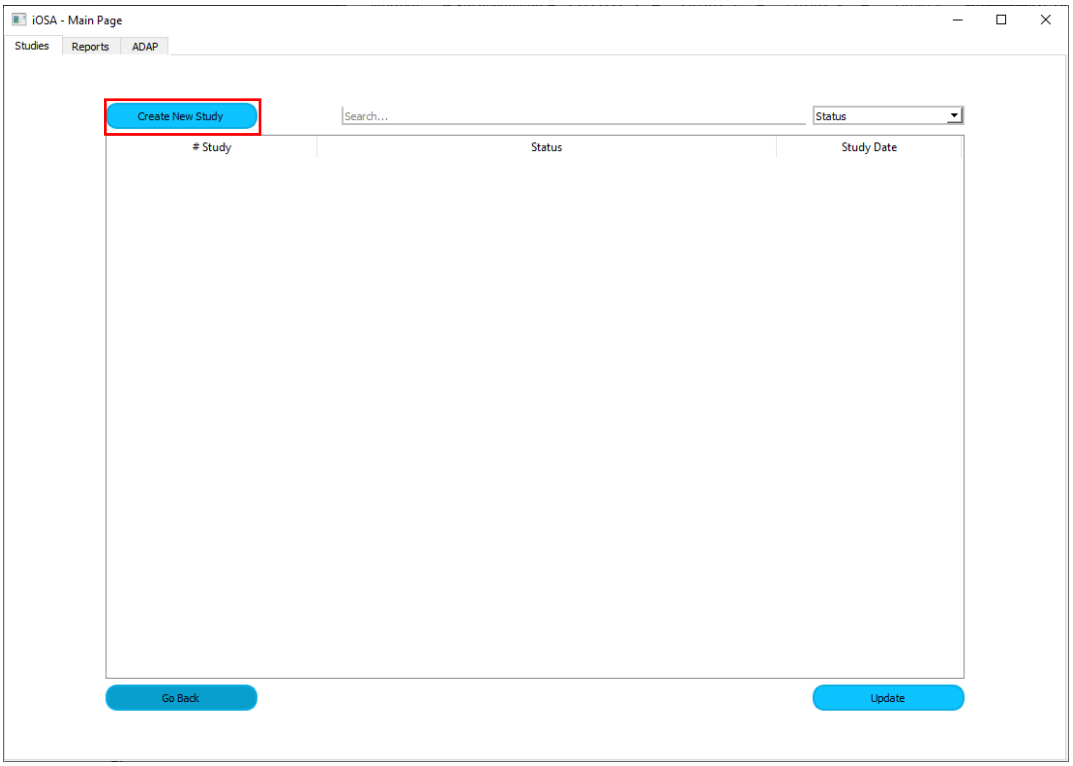
Patient Studies Management

Each patient has one or more studies. These studies are a combination of a medical record, a frontal and a lateral image, a video, a polygraphy PDF file and a OSA/EDF file.

To access a patient studies list, go to the “Main Page”, create or search for the patient profile and double click on it.

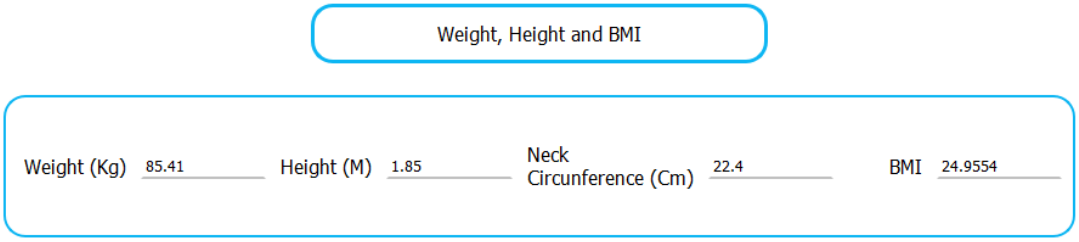


If the patient profile is new, no studies will be listed, therefore, click on the blue “Create New Study” button to start the creation of the study.

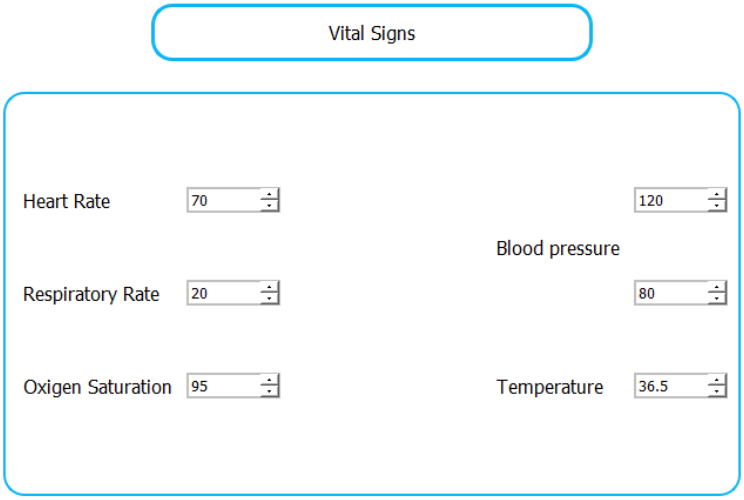


Add Medical Record Data

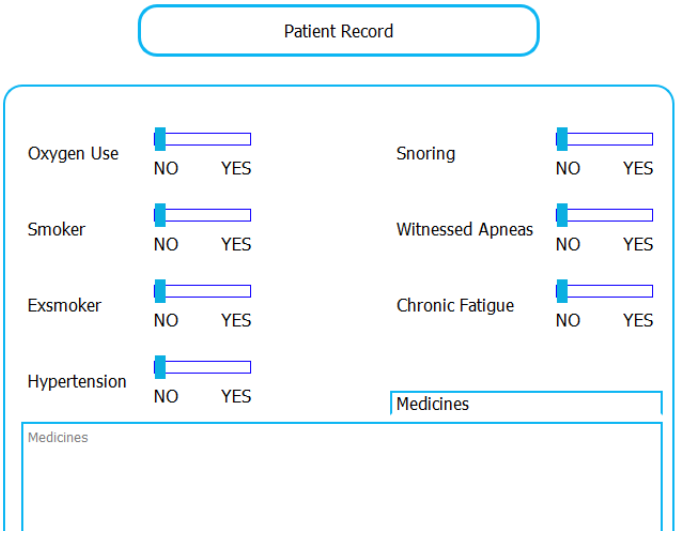
The medical record consists of several metrics that the medic takes in the medical appointment to the patient. The weight is registered in kilograms, the height in meters and the neck circumference in centimeters. With this data, the patient BMI is calculated.



Next are the vital signs, the temperature is registered in Celsius.



Next is some yes/no questions and if the patient is taking some prescribed medicines. The medicines field can be left blank.

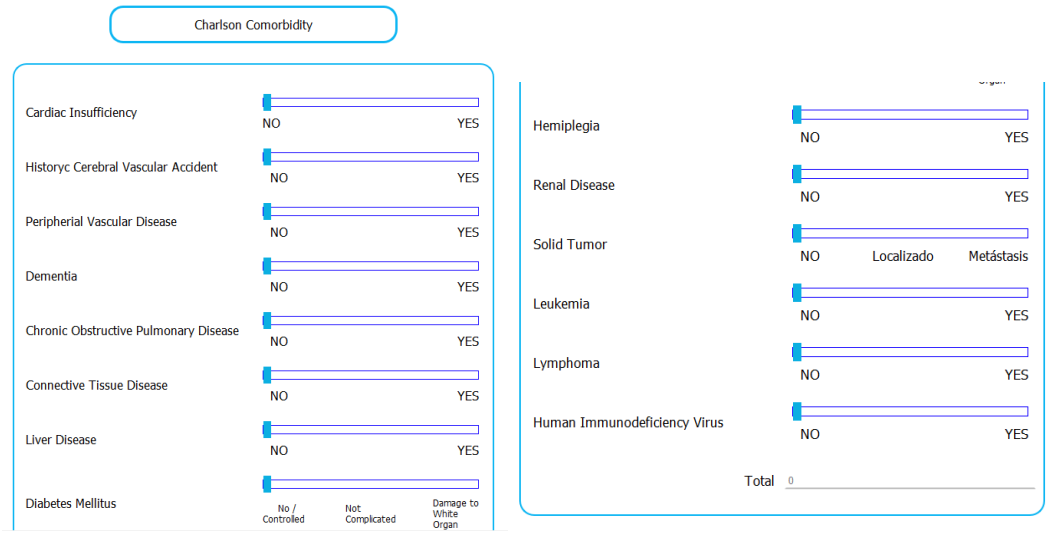


The next part is another questionary known as the “Charlson Comorbidity”, this questionary is known related to OSA. Each field have a score value, shown at the next table

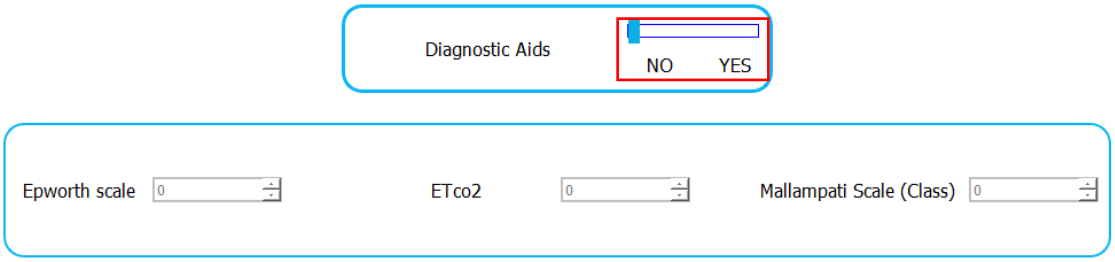
Field	No	Yes	Third
Cardiac Insufficiency	0	1	Null
Historyc Cerebral Vascular Accident	0	1	Null
Peripherial Vascular Disease	0	1	Null
Dementia	0	1	Null
Chronic Obstructive Pulmonary Disease	0	1	Null
Connective Tissue Disease	0	1	Null
Liver Disease	0	1	Null
Diabetes Mellitus	0	1	2
Hemiplegia	0	2	Null
Renal Disease	0	2	Null
Solid Tumor	0	2	3
Leukemia	0	2	Null
Lymphoma	0	2	Null
Human Immunodeficiency Virus	0	6	Null

The age is also a score value following the ranges:

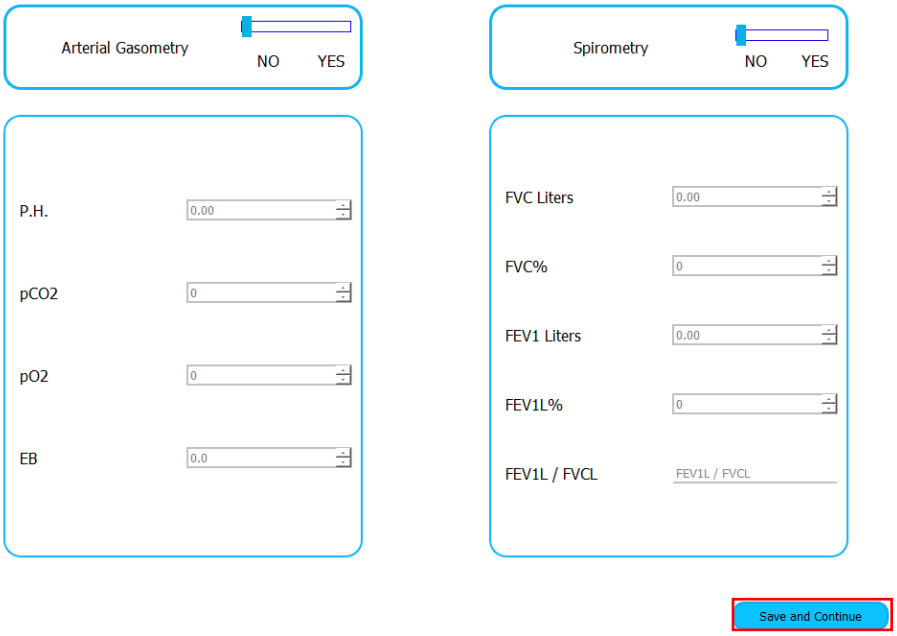
- Less than 50 years old = 0
- More than 50 year old but less than 60 years old = 1
- More than 60 year old but less than 70 years old = 2
- More than 70 years old = 3



The next three sections require of studies previously carried out, for that reason they can be left without value selecting the “No” option. This will save the fields as “Null” values. In case of having the studies, just select the “Yes” option and enter the values.

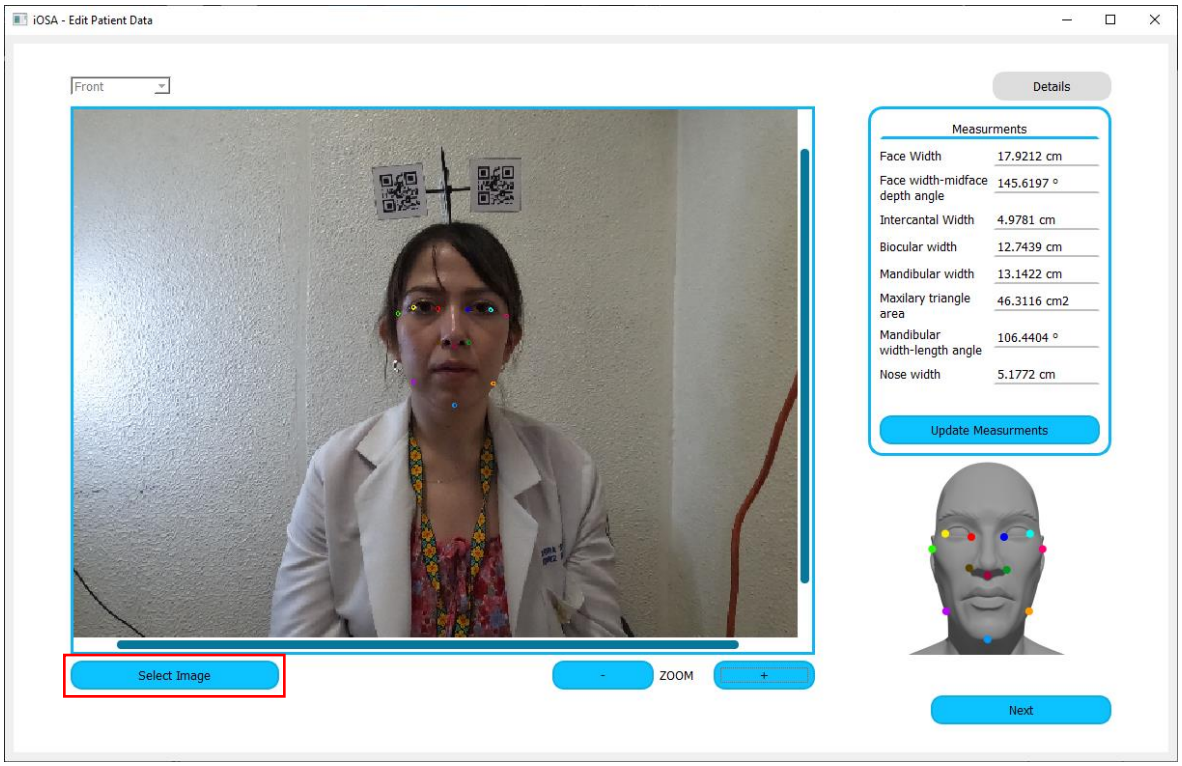


Once all the data is already entered, click on the blue “Save and Continue” button.

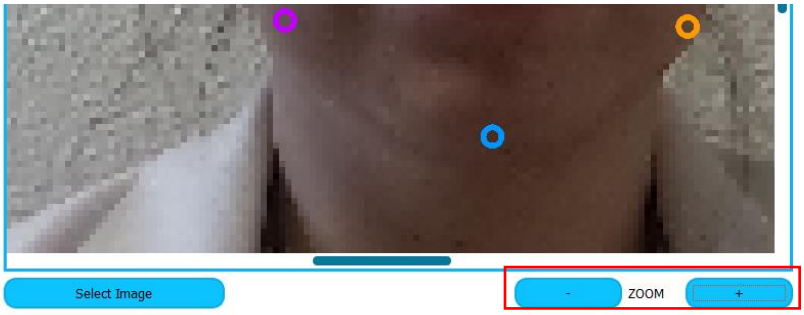


Add Frontal Image

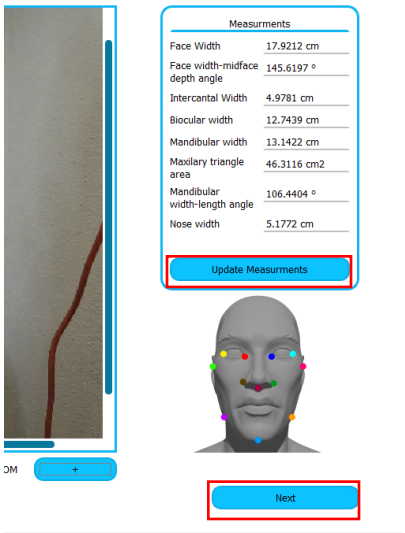
The next section is for upload a frontal image of the patient. For upload the image, select the “Select Image” button and find the image to upload.



In this section the medic must move the landmarks according to the reference figure. To facilitate the landmark placement, the image can be zoom.

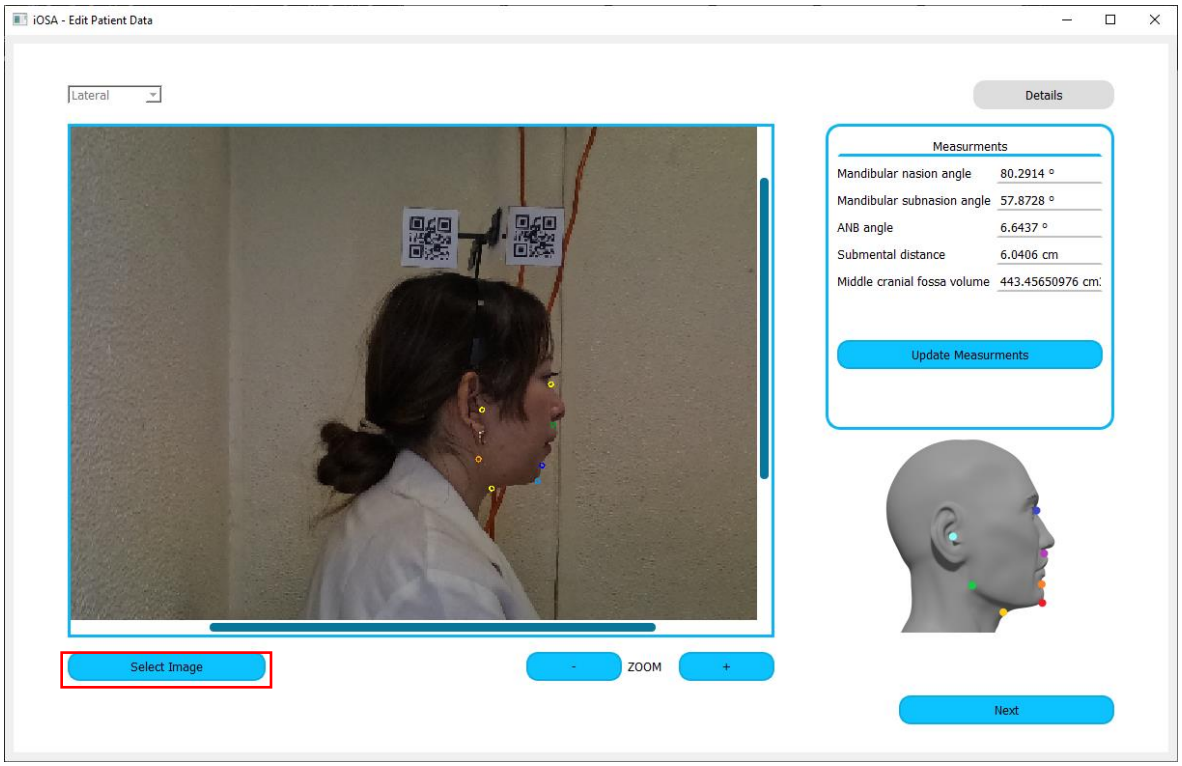


Once the landmarks are placed correctly, click the “Update Measurements” button to calculate the new measurements. When finished, click the “Next” button.

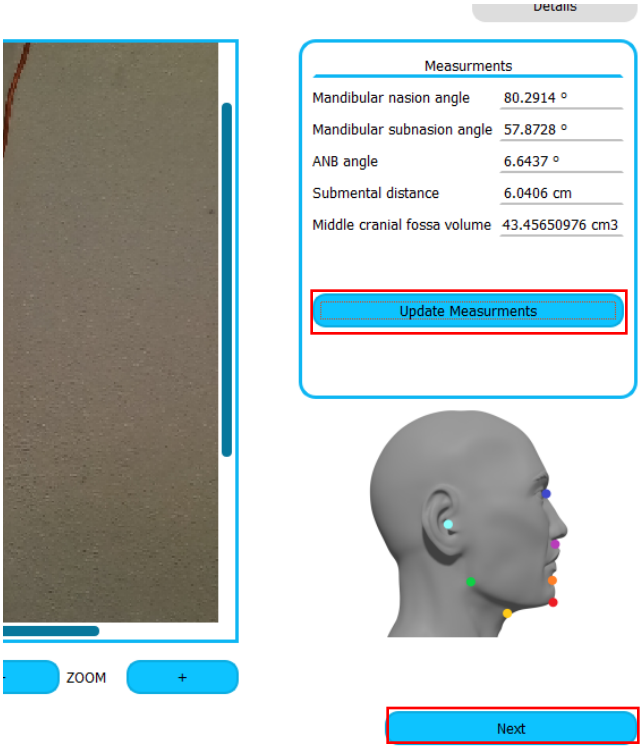


Add Lateral Image

For the lateral image is the same process as the frontal image. First, select the patient image.



Then move the landmarks as the reference image, click on the “Update Measurements” and finally click on the “Next” button.

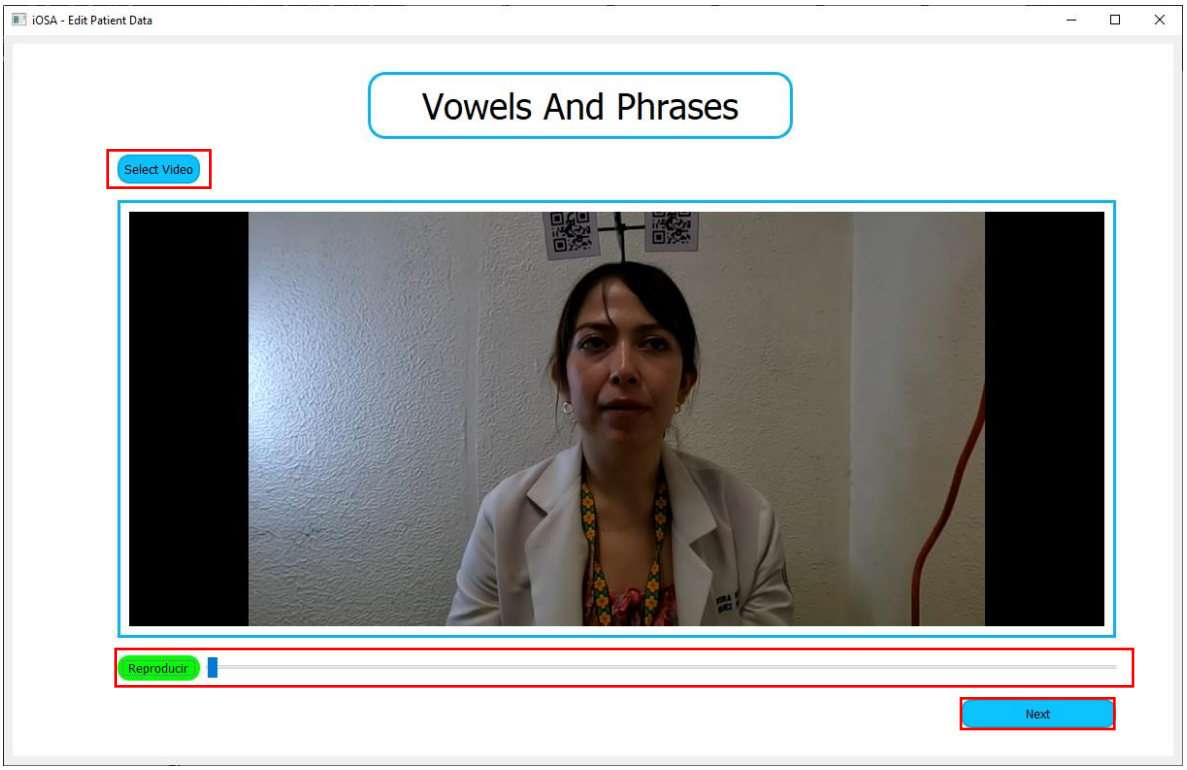


Add Patient Video

The video is of the patient repeating some vowels and phrases, this is a new feature for future work, but it is already attached to the iOSA system.

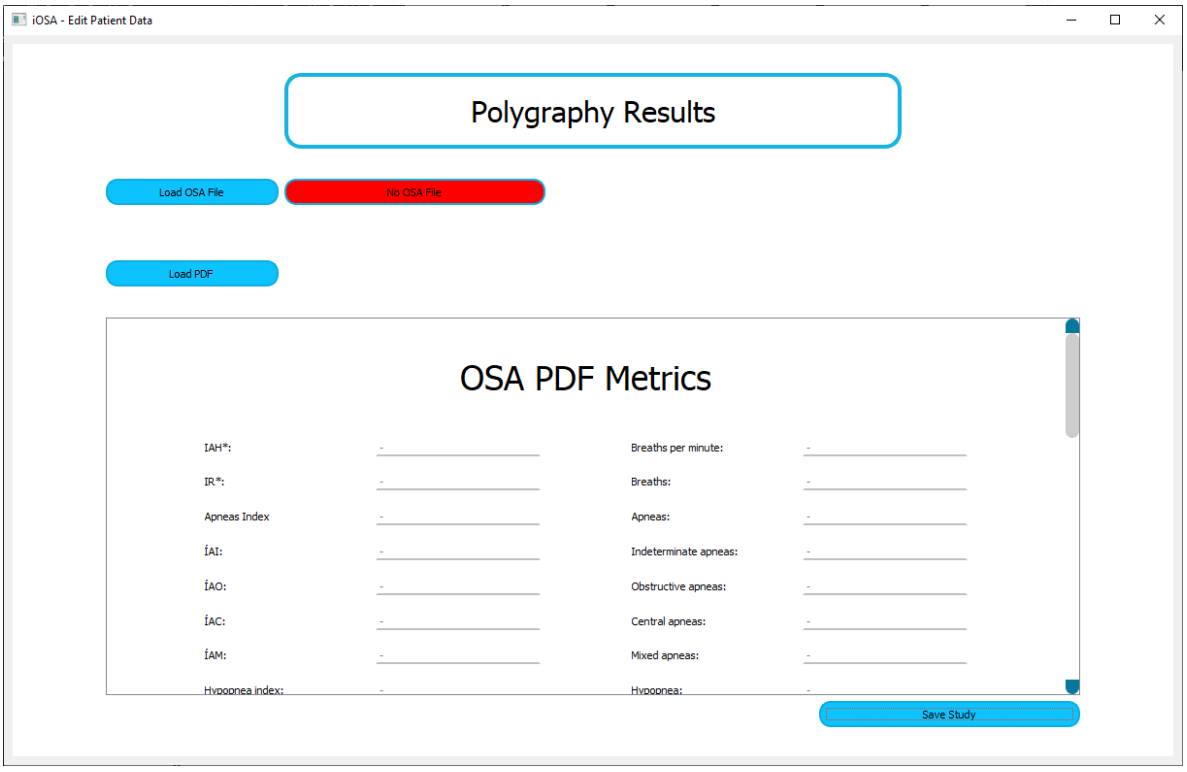
To upload the video, click on the “Select Video” button and select the patient video.

Once the video is uploaded, video can be play, stop and advance to a certain point. Finally, click on the “Next” button. This will proceed to separate the audio from the video and save them separately.



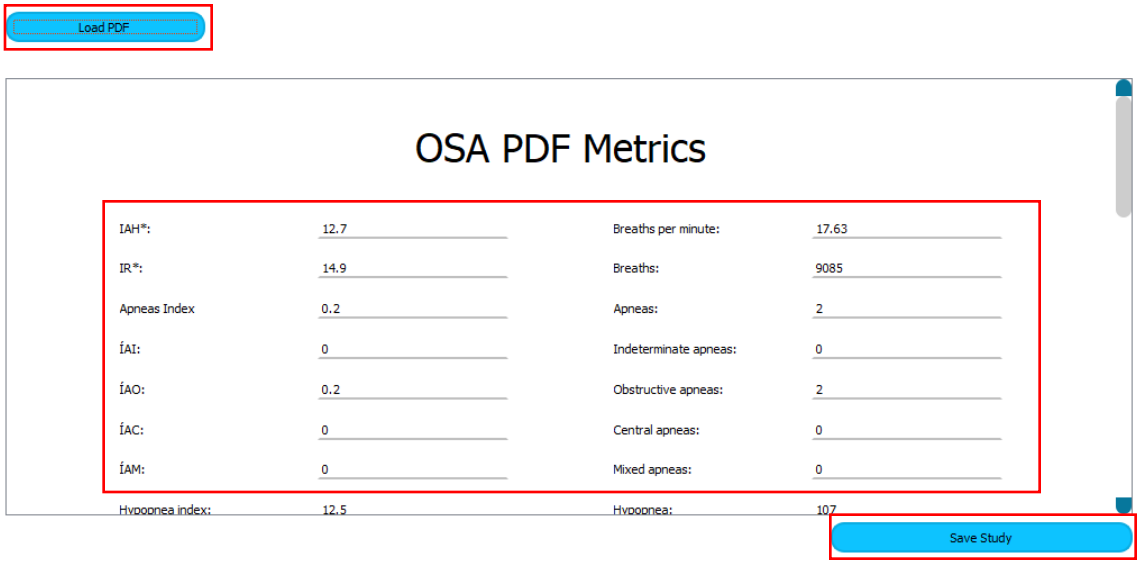
Add Polygraphy PDF and OSA File

This is the final study section; it consists of the upload of an OSA/EDF file and the resulting PDF of that OSA/EDF file.



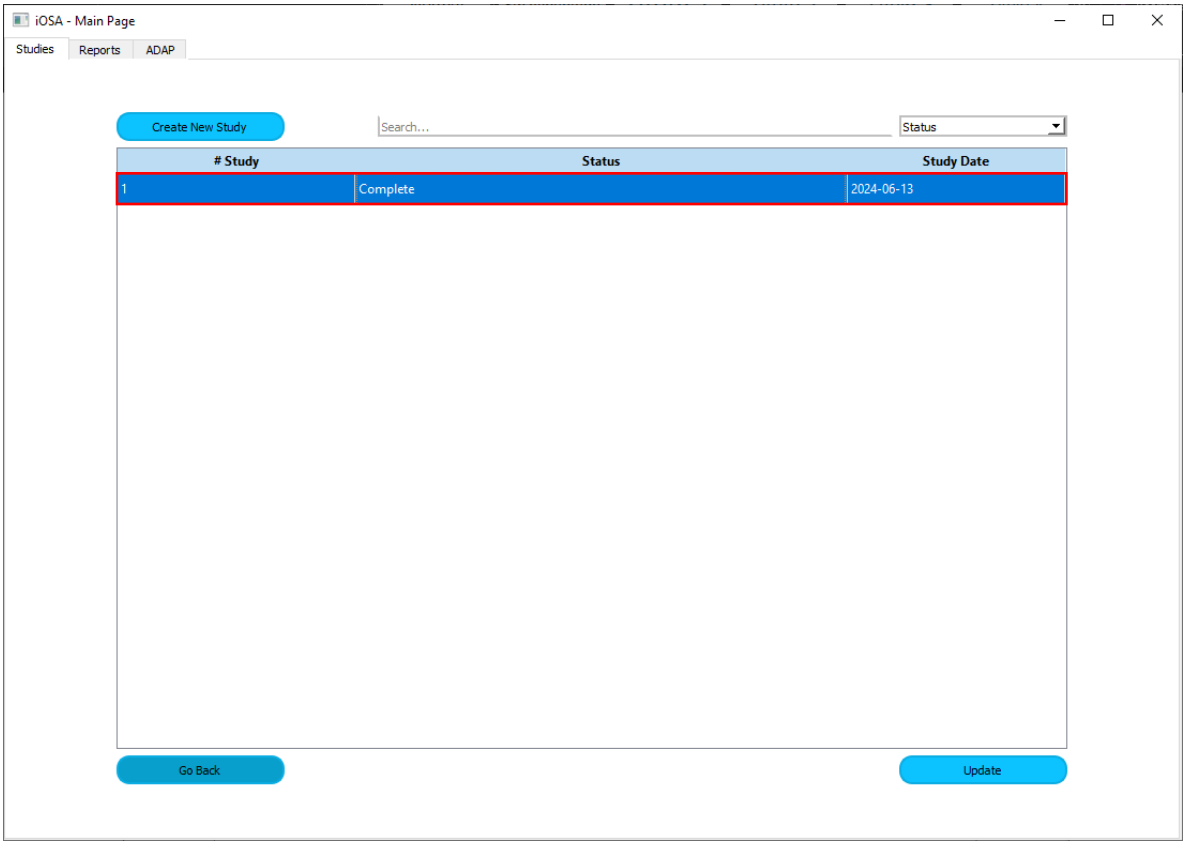
For the OSA/EDF file upload, select the “Load OSA File” and select the OSA file for that patient. Once an OSA/EDF file is uploaded, the red “No OSA File” will change to a green “OSA file uploaded”.

Then, for the PDF upload, select the “Load PDF” button and select the PDF file of the patient. Once the PDF file is uploaded, the iOSA system will extract the OSA relevant metrics and display them. Finally click on the “Save Study” button to finish the patient study.

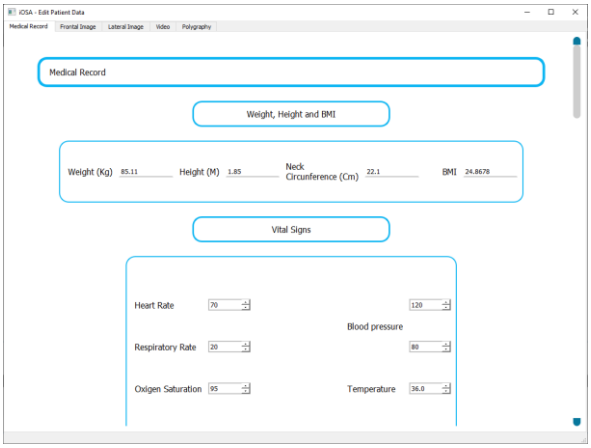


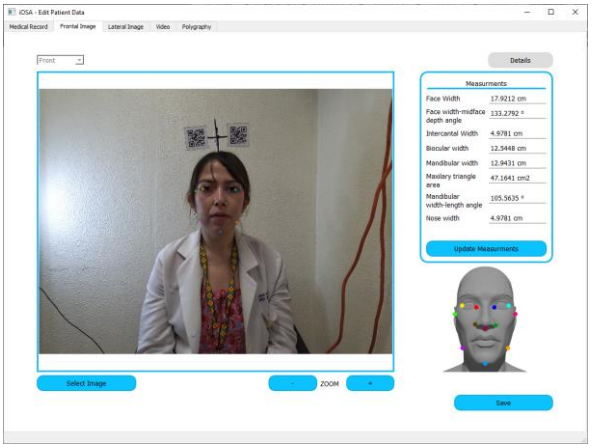
Edit Patient Study

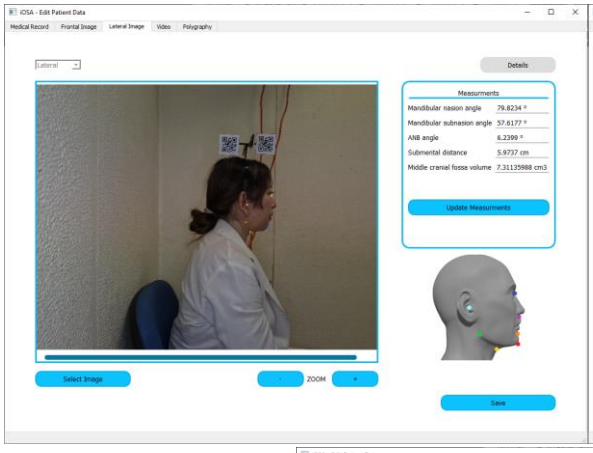
In the case that a study needs to be consulted or edited, go to the patient recorded studies an double click on the study to edit.

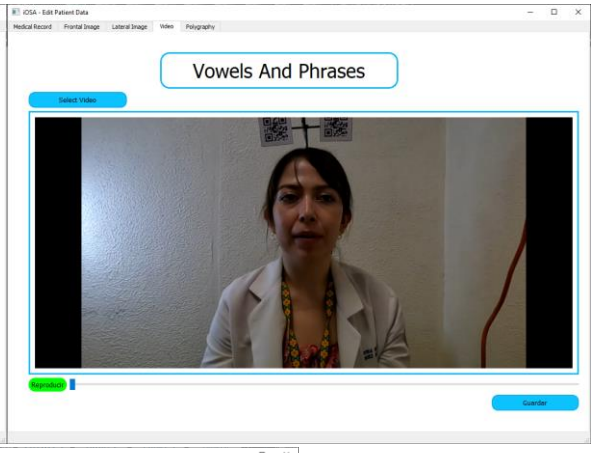


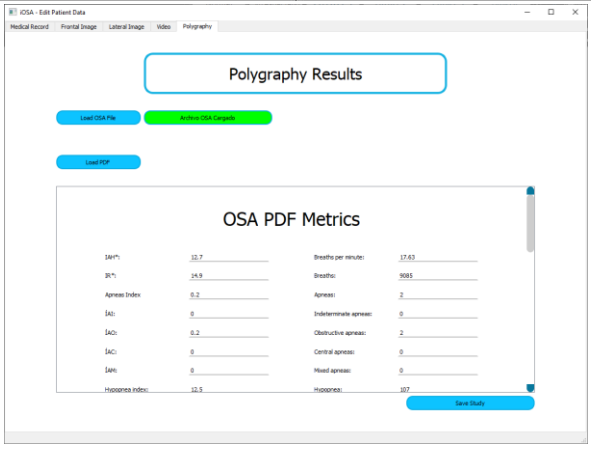
Once the edit window appears, select the section to edit (medical record, frontal image, lateral image, video, OSA/EDF file or PDF file).











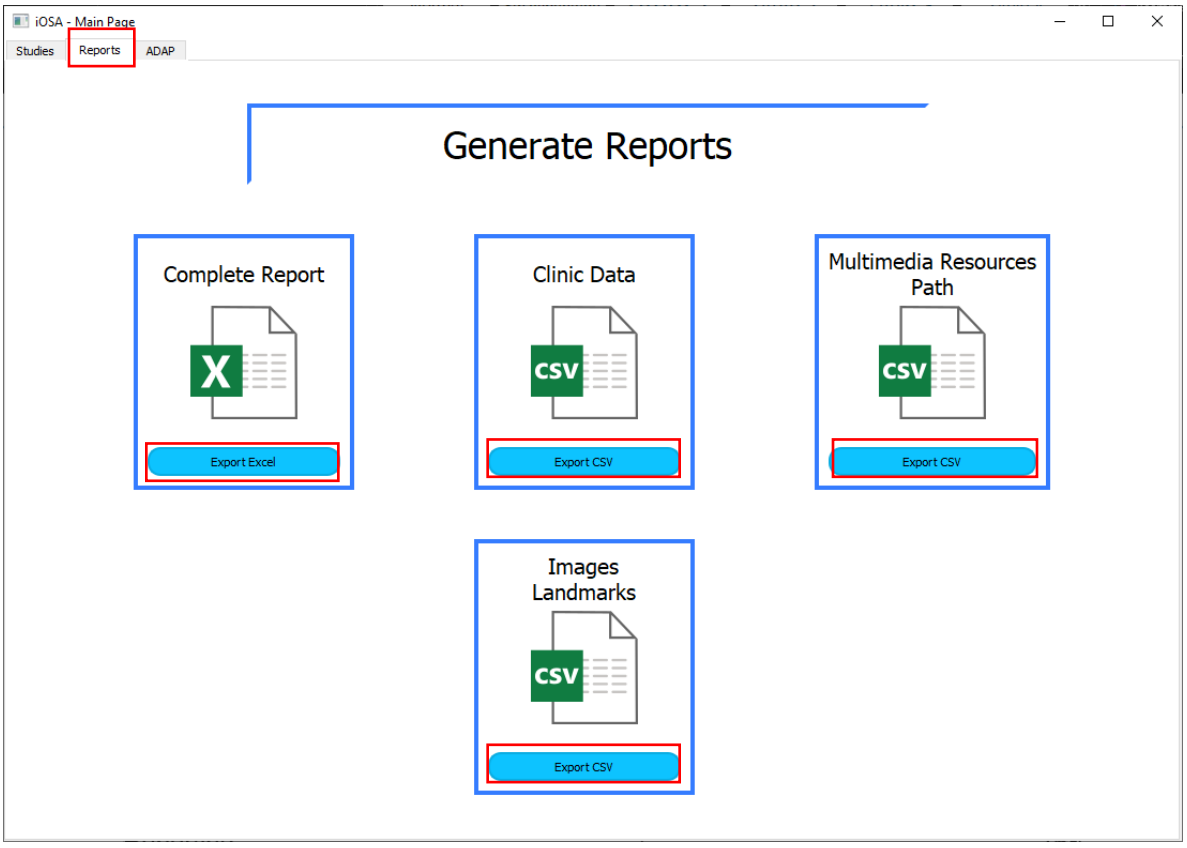
Be sure to click on the “Save” button if the data was edited, otherwise, the modifications will not be saved.

Reporting

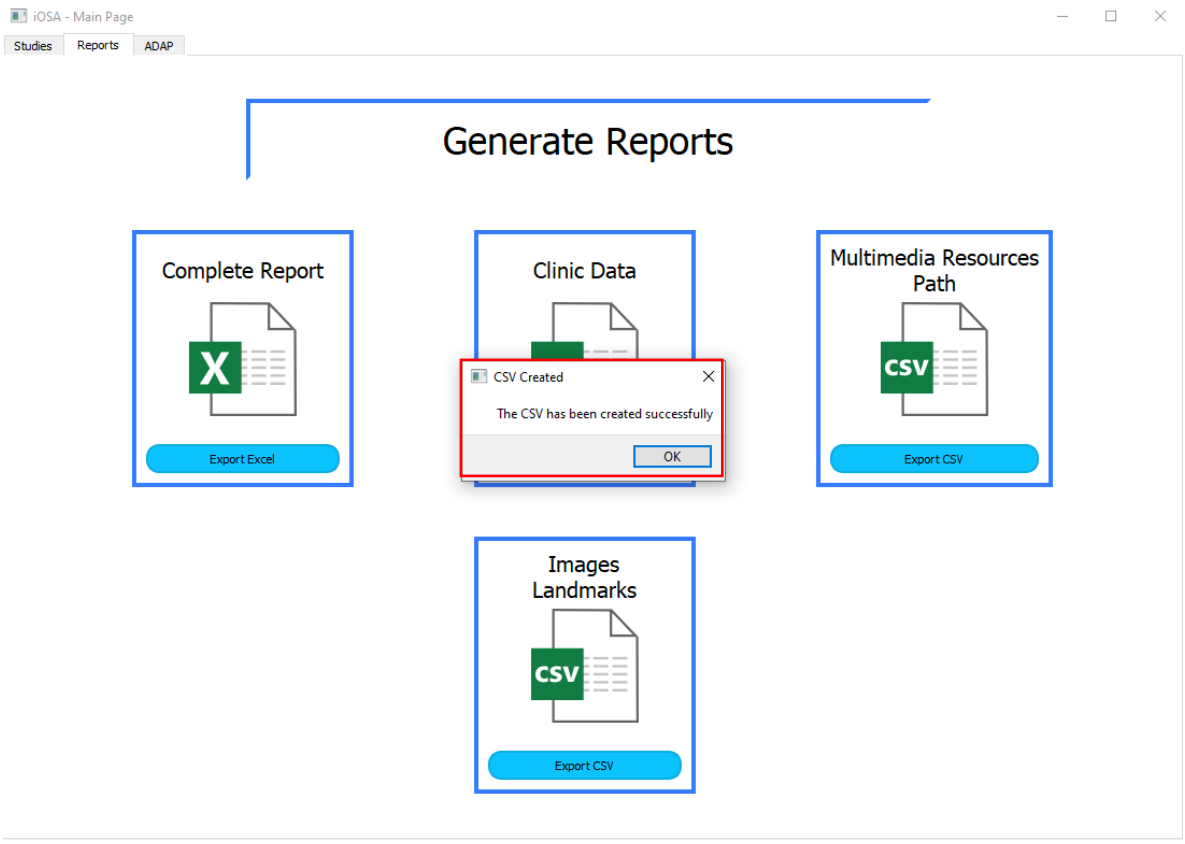
On the “Main Page”, on the second tab, is where the iOSA system reporting module can be found.

This module generates four different reports: one that downloads the complete database to an excel file, other with the clinical data, a third with the path to all the multimedia files (frontal and lateral images, videos, OSA/EDF files and PDF files) and the last one are the coordinates of each landmark for the frontal and lateral images.

To generate the reports just click on the “Export” button of the desired report, select the destination and then wait for the report to be generated.



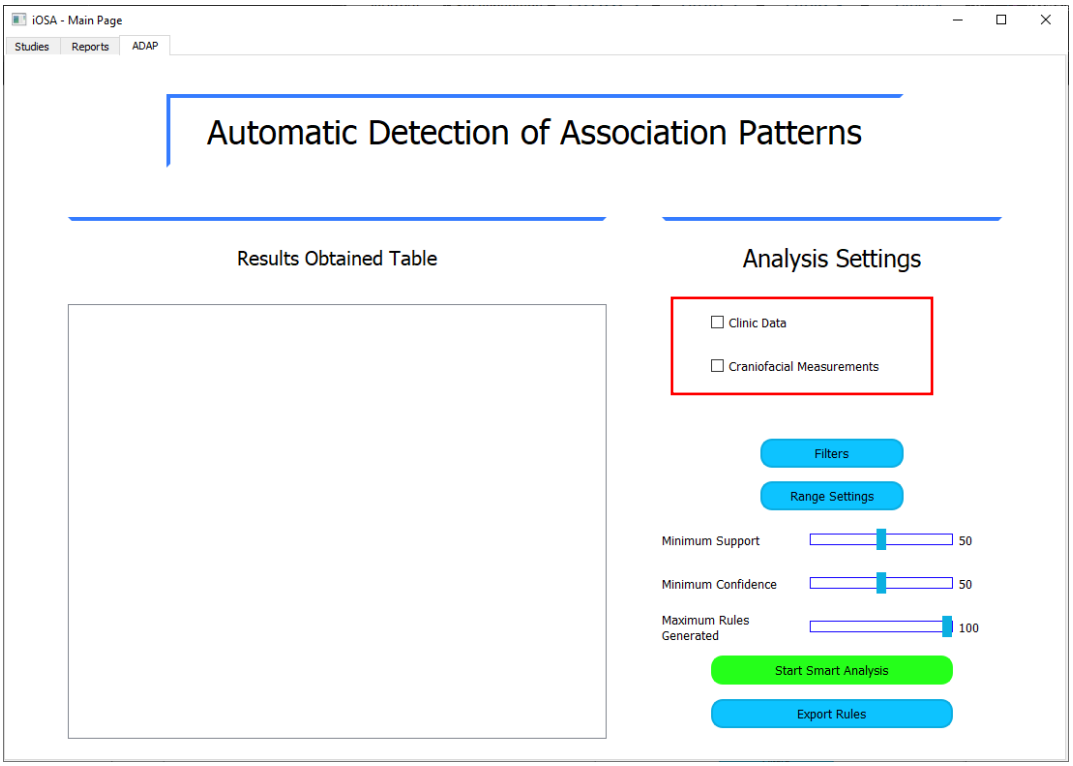
When the report is generated, a notification will appear. In case an error occurs, another notification will be displayed.



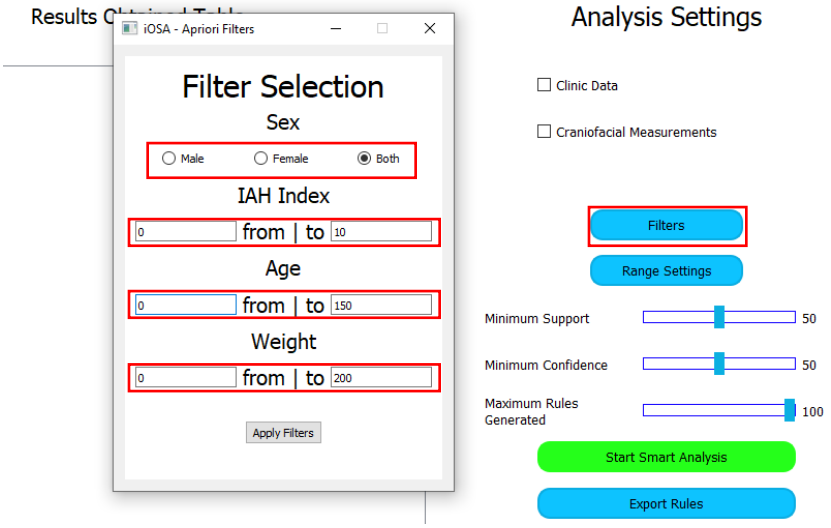
Pattern Detection

On the “Main Page”, on the third tab, is where the iOSA system detection patterns module can be found.

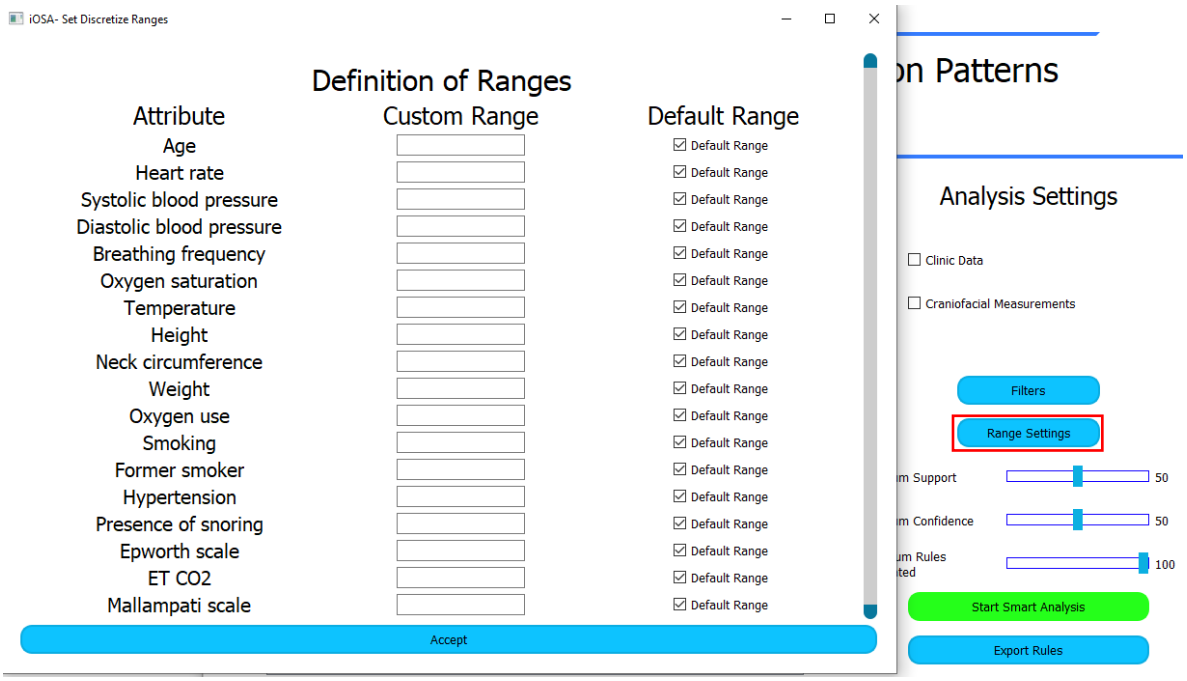
This module search for association rules that are related to OSA. The first step is to select which data the analysis will use. The system can perform analysis for the clinical data, the images measurements or with both sets of data.



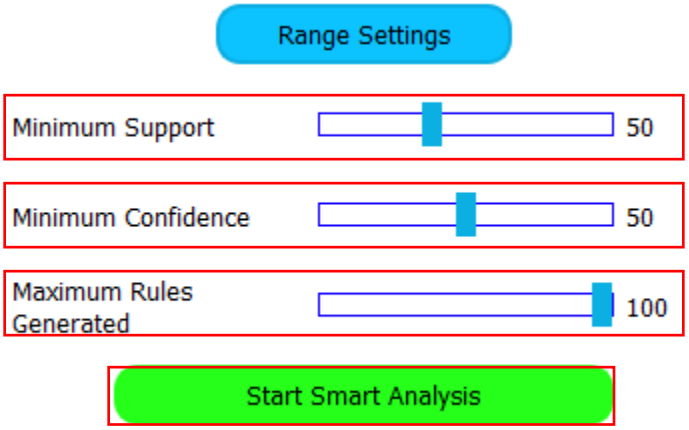
The system requires to specify three ranges and the sex of the patients. The configurations can be made as the medic own discretion. Once the values are enter, click on the “Apply Filters” button.



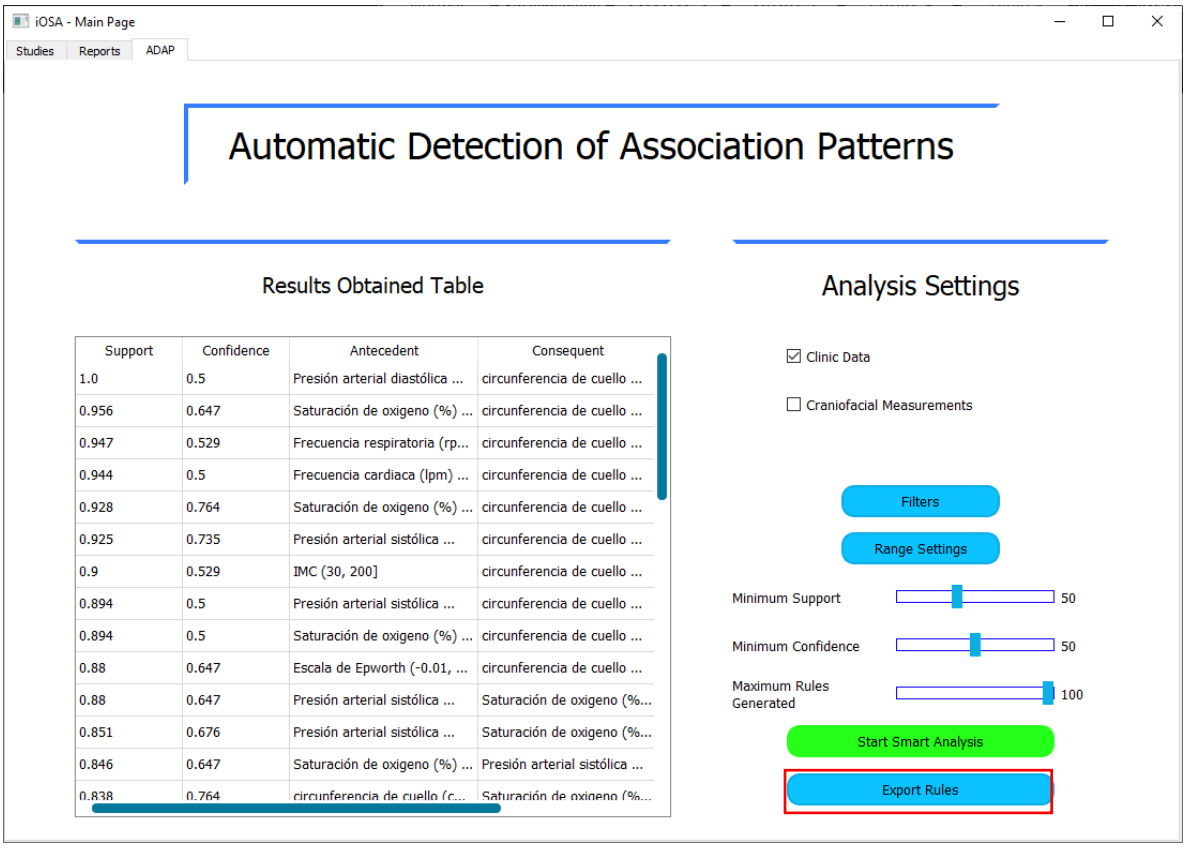
The “Ranges Settings” is an optional spec where the discretized ranges can be set. This is an specialize option, therefore, is recommended to leave all the ranges on their default values.



The algorithm the iOSA system use to find the association rules is call Apriori, and this algorithm requires of two parameters, the minimum support and the minimum confidence. These parameters can be set with the slide bars. Once everything is setup, click on the green “Start Smart Analysis” button and wait until the rules are generated and displayed on the left panel.



The rules resulting rules can be exported to a .txt file so that the medic can save all the analysis that have perform. This file header describes the parameters the algorithm used on the analysis.


iOSA - Main Page
Studies
Reports
ADAP
Automatic Detection of Association Patterns
Results Obtained Table
Support
Confidence
Antecedent
Consequent
1.0
0.5
Presión arterial diastólica ...
circunferencia de cuello ...
0.956
0.647
Saturación de oxigeno (%) ...
circunferencia de cuello ...
0.947
0.529
Frecuencia respiratoria (rp...
circunferencia de cuello ...
0.944
0.5
Frecuencia cardiaca (lpm) ...
circunferencia de cuello ...
0.928
0.764
Saturación de oxigeno (%) ...
circunferencia de cuello ...
0.925
0.735
Presión arterial sistólica ...
circunferencia de cuello ...
0.9
0.529
IMC (30, 200]
circunferencia de cuello ...
0.894
0.5
Presión arterial sistólica ...
circunferencia de cuello ...
0.894
0.5
Saturación de oxigeno (%) ...
circunferencia de cuello ...
0.88
0.647
Escala de Epworth (-0.01, ...
circunferencia de cuello ...
0.88
0.647
Presión arterial sistólica ...
Saturación de oxigeno (%...
0.851
0.676
Presión arterial sistólica ...
Saturación de oxigeno (%...
0.846
0.647
Saturación de oxigeno (%) ...
Presión arterial sistólica ...
0.838
0.764
circunferencia de cuello (c...
Saturación de oxigeno (%...
Analysis Settings
Clinic Data
Craniofacial Measurements
Filters
Range Settings
Minimum Support
50
Minimum Confidence
50
Maximum Rules Generated
100
Start Smart Analysis
Export Rules