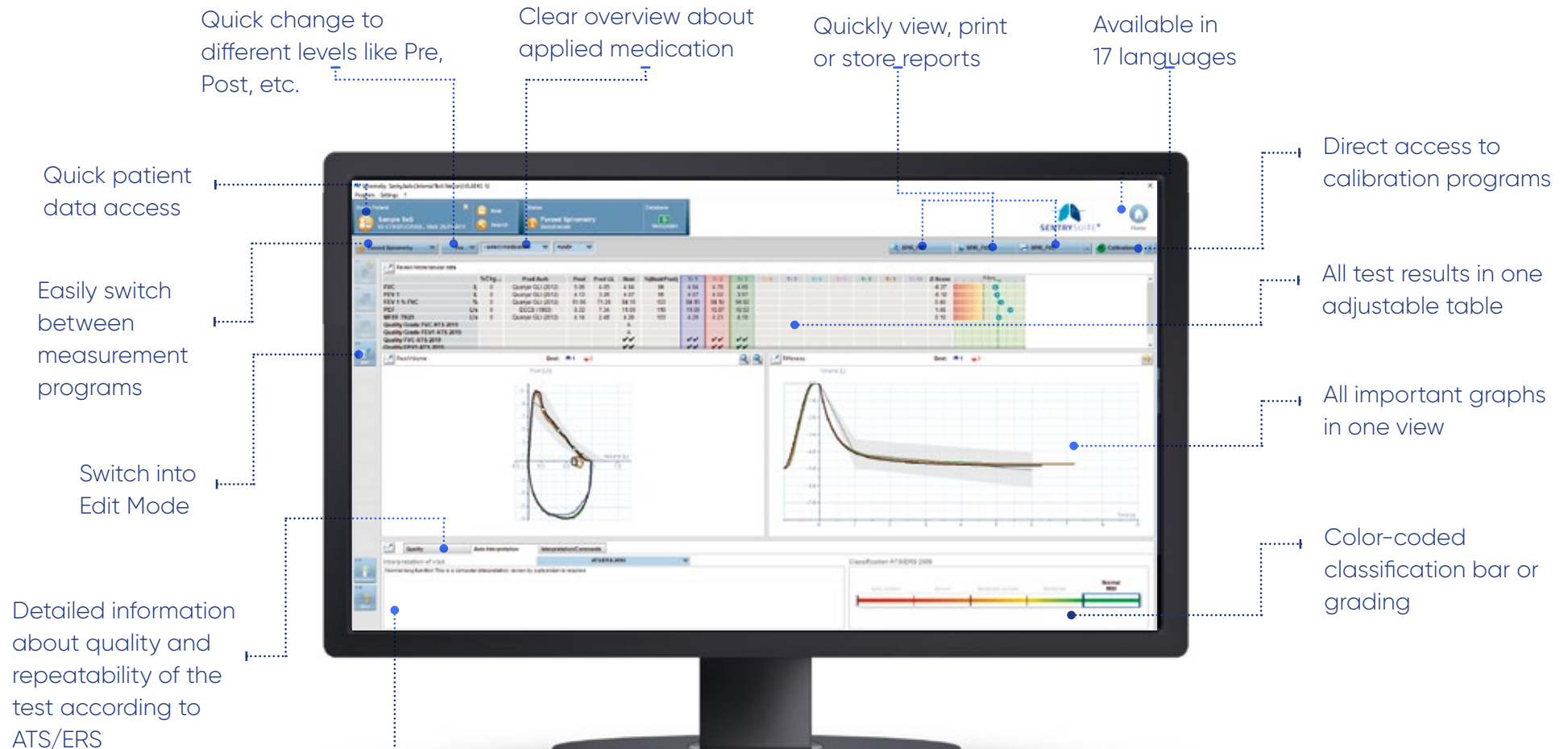




**SentrySuite<sup>®</sup>**

software platform for intelligent respiratory diagnostics

# SentrySuite 360°– one screen, all in

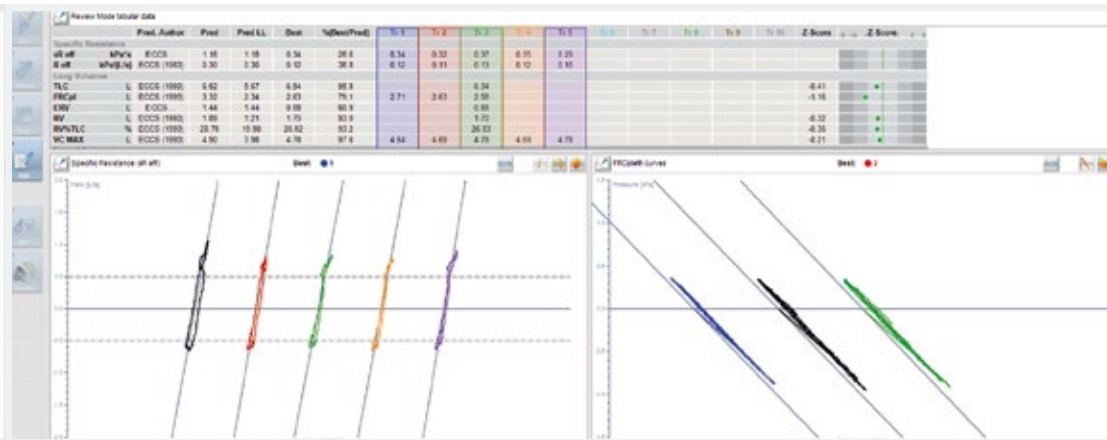


## Ease-of-use measurement concept

Keep the overview without switching programs. All important steps; calibration, patient data entry, measurements, interpretation and reporting can be navigated **within ONE screen**.

## SentrySuite supports a comprehensive list of PFT and CPET measurements

### Body Plethysmography



### CO Diffusion SB Real-time



Whether the **MasterScreen** series or the new **Vyntus®** series, they are all **powered by SentrySuite** – from small PC spirometers to high-end PFT to ECG and CPET devices.

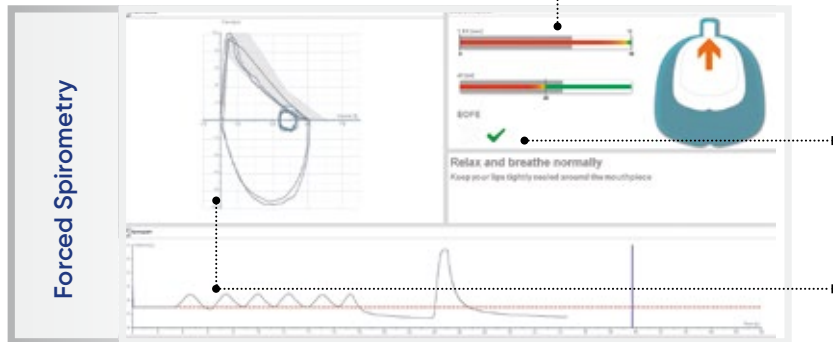
All PFT measurement programs show the same graph and table arrangement with a **consistent user interface**. **Intuitive operation** and **quick learning** of new measurements are guaranteed.

## Measurement capabilities:

- Slow Spirometry
- Forced Spirometry
- MVV
- Bronchial Challenge Testing
- Body Plethysmography
- FRC N<sub>2</sub> Washout
- FRC HE Rebreathing
- SB Diffusion Real-time
- SB Diffusion Intrabreath
- NO Diffusion
- Rocc
- Impulse Oscillometry (IOS)
- Rhinomanometry
- PO.1
- MIP/MEP
- SNIP
- Compliance
- Resting ECG
- Stress ECG
- CPET breath-by-breath
- CPET mixing chamber
- CPET High/Low FIO<sub>2</sub>
- REE Canopy

# Guidance and Quality

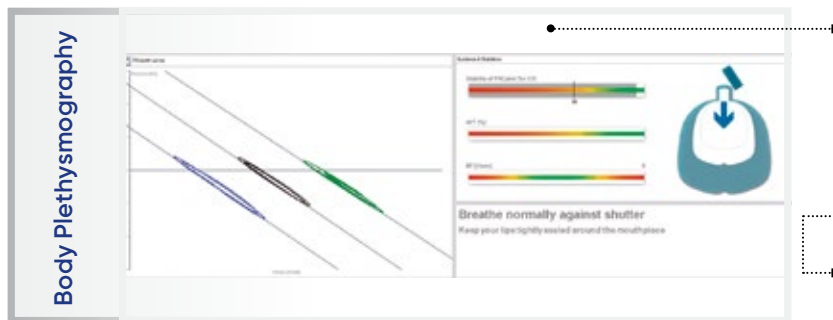
Coaching for operator and patient



Colored **guidance bar** for in-test exhalation time and plateau recognition

**Check marks** for spirometry end-of-forced-expiration criteria

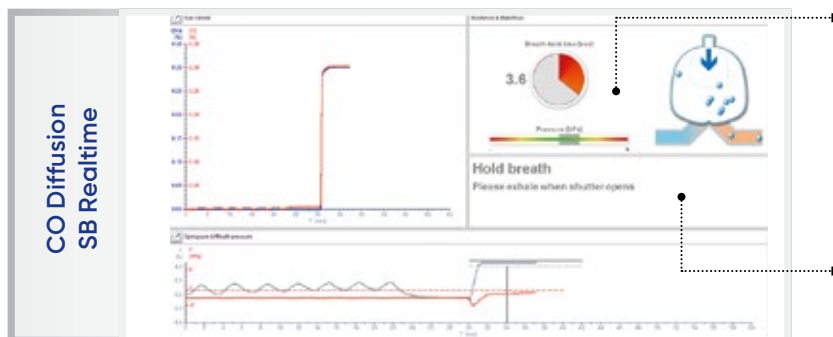
**Online breathing curves**



Colored **stability bar** for VT, BF, sRaw and FRCpleth during body plethysmography

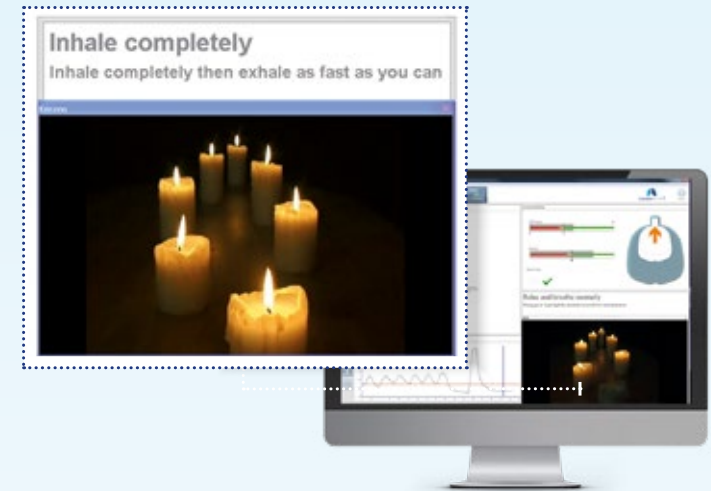


**FRCpleth notification** for reproducibility



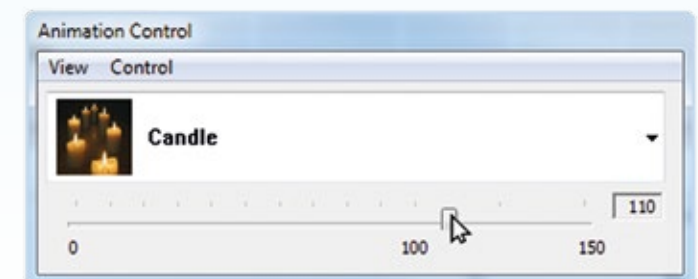
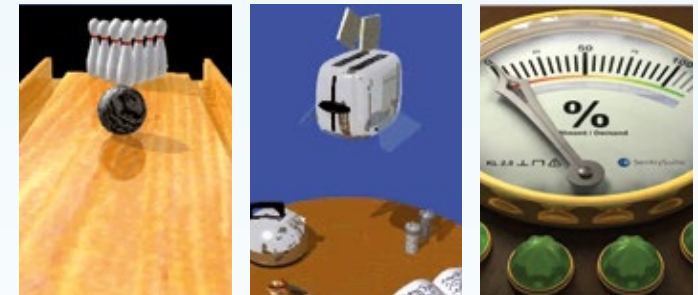
**Breath-hold timer** and **mouth pressure control**

**Online textual guidance** ideal for new personnel



## Animation incentives

Choose from 10 different patient animations for forced spirometry.



Adjust the target scale to your patient needs.

## SentrySuite Quality Assurance—approved results

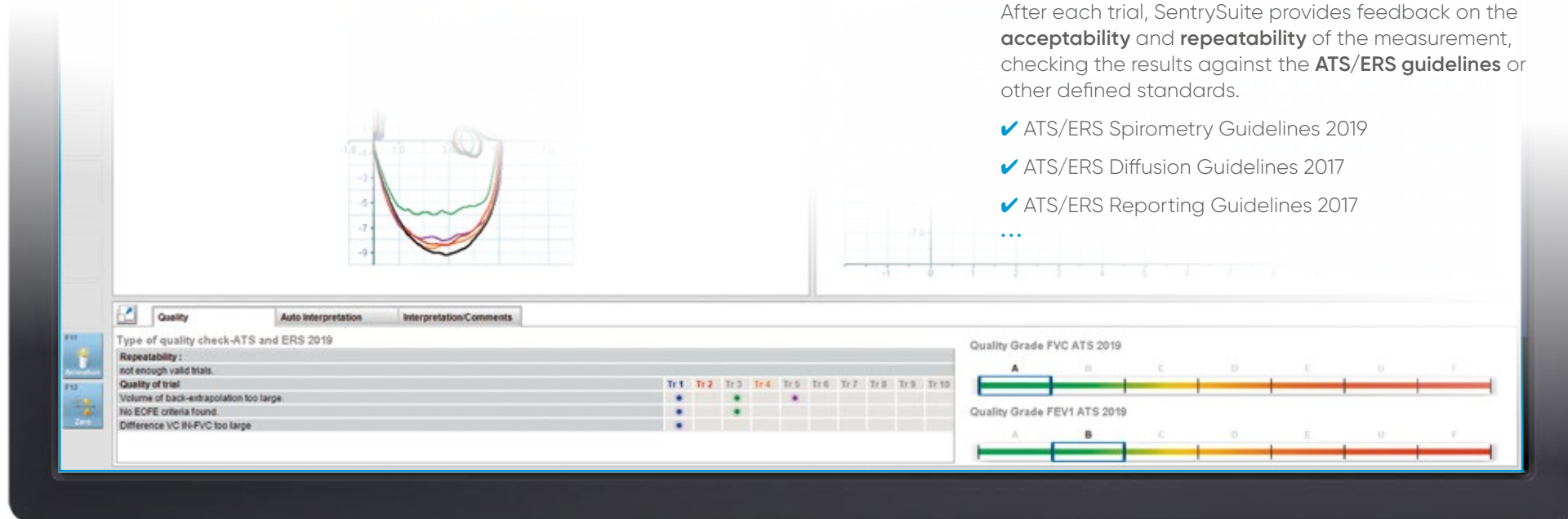
SentrySuite offers many tools to approve the quality and accuracy of your measurements.



## QUALITY CHECK

After each trial, SentrySuite provides feedback on the **acceptability** and **repeatability** of the measurement, checking the results against the **ATS/ERS guidelines** or other defined standards.

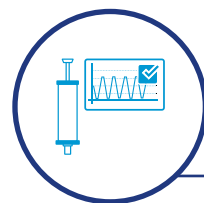
- ✓ ATS/ERS Spirometry Guidelines 2019
- ✓ ATS/ERS Diffusion Guidelines 2017
- ✓ ATS/ERS Reporting Guidelines 2017



## Biological Control

SentrySuite supports biologic control testing with a **separate BIO QC database**. The BIO QC data is easily identified and separated out for trending and further analysis.

*According to the ATS/ERS guidelines, tests should be performed on a "standard subject".*



## Mechanical Quality Control

With **SentrySuite Quality Management** you can validate your measurement device using calibrated syringes, FRCpleth or DLCO simulators. Pre-defined special SeS QM patients automatically switch-off BTPS compensation and correct appropriately for mechanical dead space.

Type of Patient

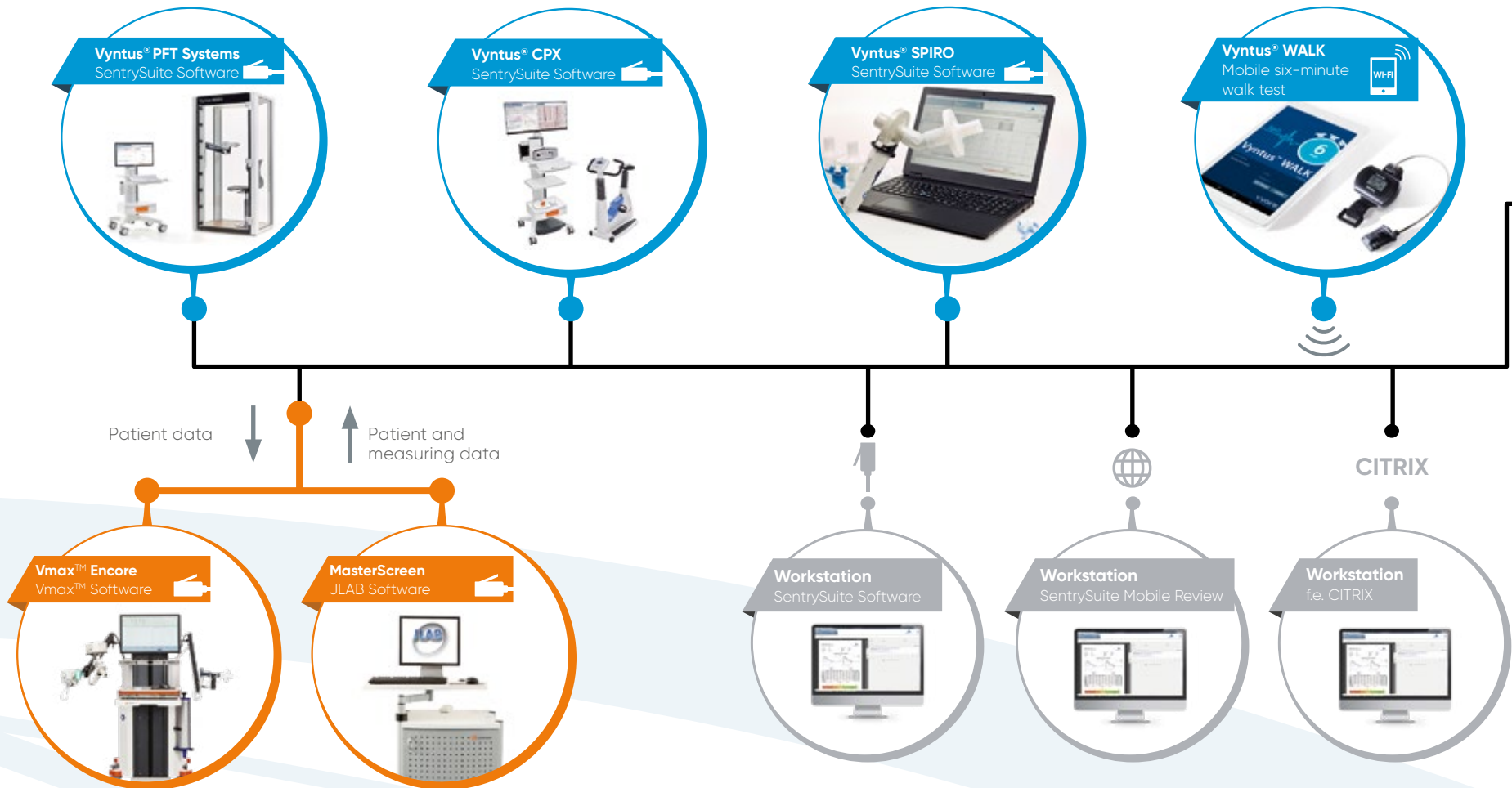
- ☐ Patient
- ☐ Demo Patient
- ☒ BIO QC
- ☐ SeS QM validation



# Networking

The united data of SentrySuite

## Devices powered by SentrySuite Software



### Older Devices

Renew your lab step by step. **Vmax™ Encore** or **JAEGER®** devices running **JLAB Software** connect to the **SentrySuite** database.

### Physician's review workplace

Use your existing network environments: **client-based, web-based, Citrix.**

## Central Patient Database and HIS Interface

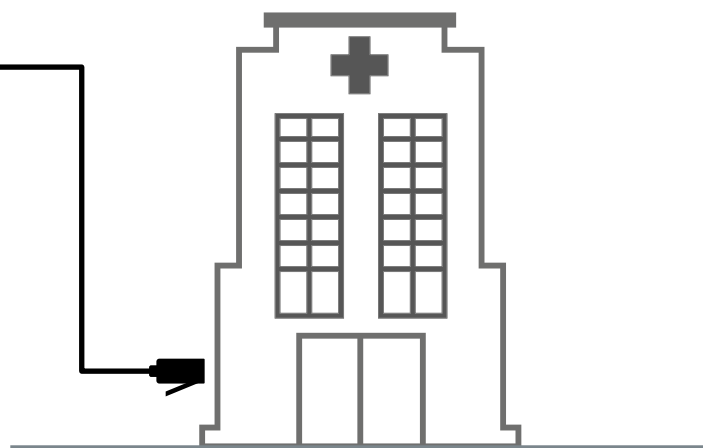
Server – SQL unlimited – HL7 – web-based – HIS – DICOM – GDT

Non-Vyaire  
data import

### SentrySuite SQL Server



### Hospital Information System



## One central patient database, so many advantages:

One-time patient data entry saves time

Several measurements from different devices on **one single report**

Measure **spirometry one time only** and use it for further measurements like SB Diffusion or CPET

**Avoid duplication of effort** – changes or creation of new reports, layouts, predicted sets are globally deployed

**Automatic backup** secures important patient data

## Connect your cardiopulmonary lab with your HIS using SentryConnect

The powerful interoperability solution. Create your individual solution. Our **experienced IT specialists** are there for you every step of the way.

Easily **retrieve patient data from your HIS and send back** the measurement results

**HL7** messaging with discrete data and **pdf** graphics providing full visual reporting to clinicians

Use **orders with worklists**

Modules for advanced tasks like **billing**

GDT interface for praxis systems

# Save time with the workflow driven physician's review tool

The screenshot displays the SentrySuite interface with search filters at the top and a table of visit data below. The table includes columns for Date, Name, Patient ID, Date of Birth, HIS Order ID, HIS Visit ID, and Visit Status. Two visits are shown, both with 'Preliminary' status. A 'Visit Levels' sidebar on the right lists specific test procedures like Spiro: FVC and Body: Sq Standard.

Date	Name	Patient ID	Date of Birth	HIS Order ID	HIS Visit ID	Visit Status
04/27/2012 11:12 AM	SeS Sample	CFNSPIO750209	02/09/1975	-	-	In Review
	_COMPLETE_PULMONARY		12/10/2020 3:27 PM			Preliminary
	SPIR_FVC		12/23/2020 9:52 AM			Preliminary
09/09/2011 12:57 PM	SeS Sample	CFNSPIO750209	02/09/1975	-	-	Testing Complete
	_COMPLETE_PULMONARY		12/23/2020 9:50 AM			Preliminary

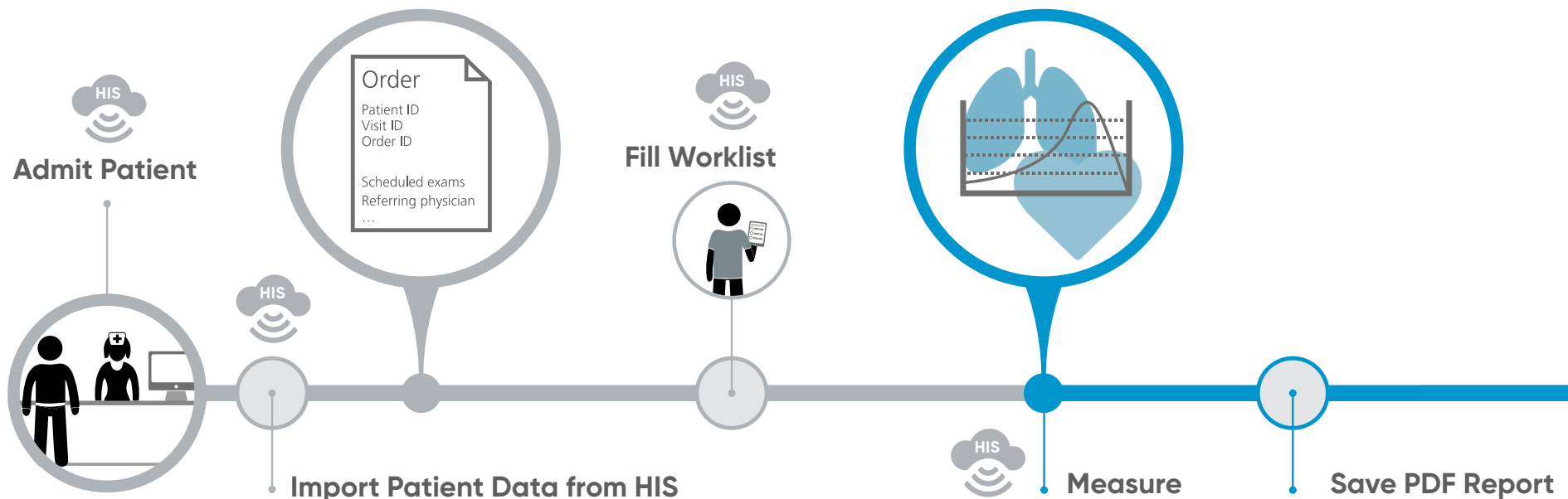
## With SentrySuite, technician and physician work hand in hand

The technician performs the measurement and saves the proper report.

The physician sees all visits with their associated reports for interpretation.

Flexible workflow status design allows for optional steps such as a preliminary interpretation by a fellow, with subsequent confirmation or revision by the attending physician.

Apply filters to create individual work lists.





## Review Tool

A standard with SentrySuite

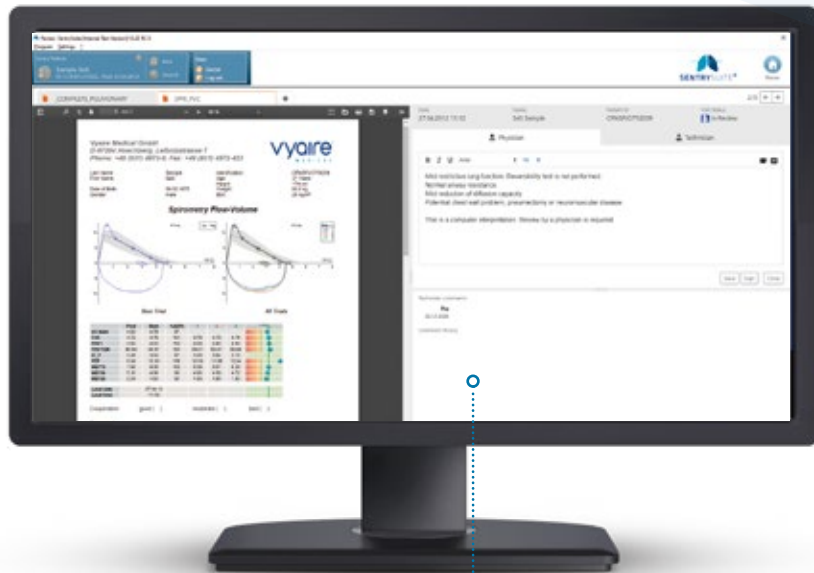
- **Ultra-fast report view** with results on the left and interpretation on the right
- Customized interpretation templates and macros
- **Electronic signature**
- Automated Send-To-HIS functionality
- Status management
- Also available as **web-based solution** named **SentrySuite Mobile Review**

## Artificial Intelligence meets PFT interpretation

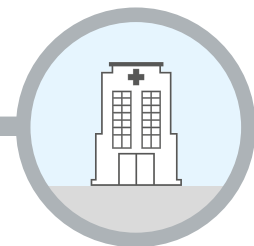
Seamless workflow integration

ArtiQ.**PFT** fully automates the interpretation of pulmonary function tests. Allowing pulmonologists to focus on clinical decision making and patient consultation.

- spend your time wisely
- boost consistency
- maximize your diagnostic accuracy
- define your next steps



Send to HIS



Interpret

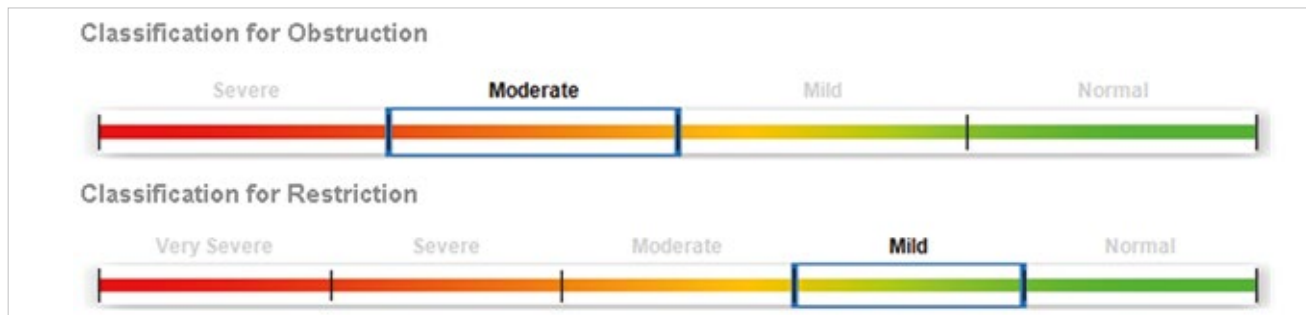
Electronic Signature

# Tools go hand in hand with the workflow

	Pred Auth	Pred	Pred LL	Best	%(Best/Pred)	Tr 1	Tr 2	Tr 3	Z-Score	Z-score
FVC	L	Quanjer GLI (2012)	5.06	4.05	4.84	96	4.84	4.78	4.68	-0.37
FEV 1	L	Quanjer GLI (2012)	4.13	3.28	4.07	98	4.07	4.02	3.97	-0.12
FEV 1 % FVC	%	Quanjer GLI (2012)	81.86	71.28	84.15		84.15	84.10	84.82	0.40
PEF	L/s	ECCS (1993)	9.33	7.34	11.09	119	11.09	10.87	10.53	1.46
MFEF 75/25	L/s	Quanjer GLI (2012)	4.14	2.48	4.26	103	4.26	4.23	4.18	0.10
Quality Grade FVC ATS 2019				A						
Quality Grade FEV1 ATS 2019				A						

## Scoring

SentrySuite offers all important parameter related scores; %Predicted, Lower Limit, Upper Limit, Z-Score, Standard Deviation



## Classification

Each measurement program shows a classification bar indicating the possible limitation

Guidance Quality Auto Interpretation Interpretation/Comments

SeS Sample, a 42 years old male patient, was referred to this laboratory for evaluation dyspnoea. Spirometry data is ACCEPTABLE and REPRODUCIBLE.

The measured FEV1 was 3.98 L, 102.57 % to reference value GLI.  
The Forced Vital Capacity FVC was 4.72 L, 100.55 % reference value GLI.  
The Airway Resistance with 0.12 kPa(L/s) is within normal limits of < 0.3.

## Interpretation Templates

Create your own templates with macros

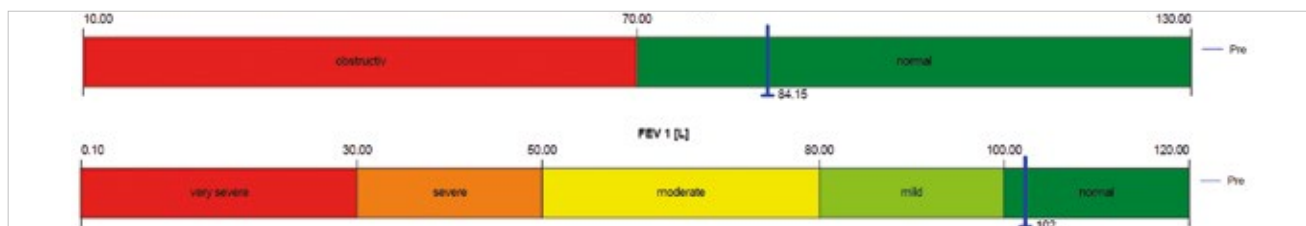
Guidance Quality Auto Interpretation Interpretation/Comments

Interpretation of visit Intermountain Thoracic Society (1984)

This combination of findings is consistent with the following: Moderate Chest Restriction is indicated by the reduced TLC. The Diffusing Capacity (DLCO) is Moderately Reduced. The DLCO (corrected)/VA is reduced. The reduced DLCO may be caused by an altered gas exchanging surface. Spirometric results are within normal limits. This is a computer interpretation, review by a physician is required.

## Automatic Interpretation

Several authors come standard: Ellis, Jaeger (1994), ATS/ERS 2005, Intermountain Thoracic Society (1984), Methodist Hospital (1994), IOS, CPET Eschenbacher/Mannina (1990), Fukuda Sangyo



## Individual Bar Graphs

Create your own interpretation bar with the flexible Report Designer

# Trending—monitor patient results over time

Measurement Parameter		Spiro			
Date	Time	Medication	FVC (L)	FEV1 (L)	MMEF (L/s)
21.07.2010	16:26:28	Salbutamol	4.85	4.07	3.81
21.07.2010	16:32:53		4.87	4.05	3.70
25.01.2011	13:22:44		4.84	4.07	3.99
09.09.2011	12:57:24		4.72	4.02	4.26
27.04.2012	11:12:17		4.79	4.03	4.19
13.04.2013	10:55:39		4.57	3.73	3.64
Mean value			4.77	3.99	3.93
Standard dev.			0.10	0.12	0.23
Var. coeff. [%]			2.13	2.94	5.96



Trending reports are standard in SentrySuite. Show your long term data with one click for any parameter.

# Questionnaires

Digitally integrated into SentrySuite—  
paperless and mobile solutions

Collect patient answers electronically and integrate them seamlessly into the SentrySuite database. The completed questionnaires are saved into the patient's database and can become part of your report.

Choose from our standard questionnaires or create your own with the optional Questionnaire Designer with six different question types.

SentrySuite even brings scoring  
functionality to your questionnaires.

1 Tobacco smoking		
1 Have you ever smoked cigarettes? (NO means less than 20 packs of cigarettes lifetime or less than 1 cigarette a day for 1 year.)		
✓ 1 Yes		0 ✓
2 No		0 ✓
2 Do you now smoke cigarettes (as of 1 month ago)?		2 ✓
✓ 1 Yes		
2 No		
3 Does not apply		
3 How old were you when you first started cigarette smoking? (-1 = Does not apply)		0 ✓
15	Age in Years	
4 How many cigarettes do you smoke per day now? (-1 = Does not apply)		0 ✓
20	Cigarettes/day	
5 Do or did you inhale the cigarette smoke?		2 ✓
1 Does not apply		
2 Not at all		
3 Slightly		
✓ 4 Moderate		
5 Deeply		
Thank you		
Total score: 8		

## Vyntus® QUESTIONNAIRE App

Go mobile with tablet or phone



- Mobile multi-platform—iOS or Android
- Multilingual and intuitive menu navigation
- Secure communication
- Integration of patient image



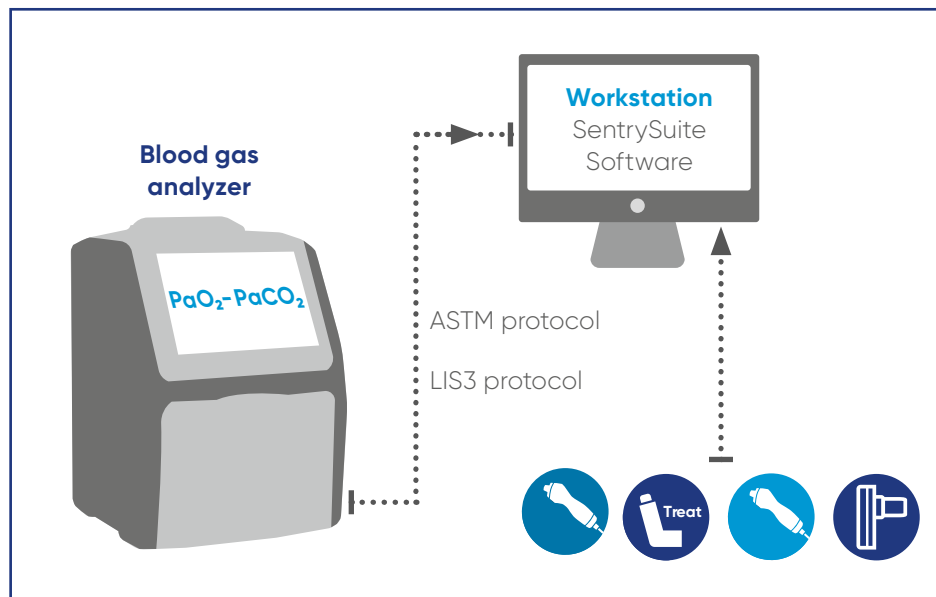
# Blood gas online connection

Connect your blood gas analyzer with SentrySuite

- Automate import and storing of blood gas measurements into the SentrySuite patient data record
- PFT / CPET and blood gas results on one report ready for interpretation
- Supports many types of blood gas analyzers

# Respiratory data transfer




Connect your Fenom Pro (R) and stand alone Vyaire spirometry devices with SentrySuite.



# Offline data input

Offline data input – a standard in SentrySuite

Extend and feed your SentrySuite database with further external measurements like exhaled NO, lactate values and blood gases.

- 1  Create a new parameter set or use implemented parameter sets like blood gases
- 2  Type in and save your measurement results into the SentrySuite database
- 3  Interpret, view and print together with your PFT / CPET data on one common report

		Pred	Best	%(B/P)	1	2	3	-3	-2	-Z-Score	2	3
<b>Spirometry</b>												
FVC	L	4.69	4.57	97	4.57	4.31	4.46					
FEV 1	L	3.89	3.73	96	3.73	3.54	3.71					
FEV 1 % VC MAX	%	80.37	81.67	102	81.67	77.38	81.17					
<b>Exhaled NO</b>												
NO	ppb		23									
Level date			13.04.13									
Level time			10:55									

Example of a spirometry report showing also an offline typed in Nitric Oxide measurement





# Clinical research

## Sentry CIS DataCube

Access your lung function data for clinical research and statistics using the **Sentry CIS DataCube**

Define and deploy tailored research databases, based on SentrySuite patient demographics and visit data, standard questionnaires, predicted information and measurement parameters.

Easy **Query Builder** user interface

- Direct output into Microsoft Excel or others
- Profit from various table configurations
- Customize, save and load your queries

SentrySuite provides access to your patient data for clinical research.

From SentrySuite Query Builder to Excel Outcome

Save filter Load filter

All\_Best

Visit Date is after 2012-01-01

AND Visit Date is before 2016-10-01

AND Gender is male

AND FEV 1 %PRED less than 60

	A	B	C	D	E	F	G	H	I	GT	HC	HI	JK	JN	LA	LD	LI	LY
1	Visit Date	Patient ID	Gender	Race	Test Date	Age	Height	Weight	LevelType	FEV 0.5	FEV 1	FEV 1 % FVC	FVC	FVC in	MEF 25	MEF 50	MEF 75	MFEF 75/25
4	27.11.2014	GAB10031963	male	Caucasian	27.11.2014	51	1,74	90	1	3,492	4,255	83,613	5,089	5,484	1,137	4,788	11,253	4,643
5	13.04.2013	CFNSPIO750209	male	Caucasian	13.04.2013	38	1,74	80	1	3,129	3,986	84,485	4,718	4,691	1,974	4,819	8,318	4,179
6	27.04.2012	CFNSPIO750209	male	Caucasian	27.04.2012	37	1,74	80	1	3,24	4,139	84,014	4,965	5,002	1,868	4,898	9,183	4,188
7	09.09.2011	CFNSPIO750209	male	Caucasian	12.09.2011	36	1,74	80	1	3,145	4,024	85,226	4,721	4,766	2,015	4,785	8,101	4,339
8	25.01.2011	CFNSPIO750209	male	Caucasian	25.01.2011	36	1,74	80	5	2,984	3,779	91,57	4,127	3,408	2,506	5,183	7,748	4,733
9	25.01.2011	CFNSPIO750209	male	Caucasian	25.01.2011	36	1,74	80	5	3,022	3,873	91,855	4,216	3,622	2,642	5,196	7,761	4,748
10	25.01.2011	CFNSPIO750209	male	Caucasian	25.01.2011	36	1,74	80	5	1,424	1,848	91,439	2,021	1,399	1,2	2,424	3,628	2,276
11	25.01.2011	CFNSPIO750209	male	Caucasian	25.01.2011	36	1,74	80	6	3,041	3,911	82,642	4,732	4,485	1,74	4,502	7,489	3,997
12	25.01.2011	CFNSPIO750209	male	Caucasian	25.01.2011	36	1,74	80	5	2,752	3,378	91,721	3,683	2,956	2,252	4,986	7,813	4,558





# SentrySuite (Cyber-)security

SentrySuite software protects you against cybersecurity threats by implementing a whole set of technical safeguards.

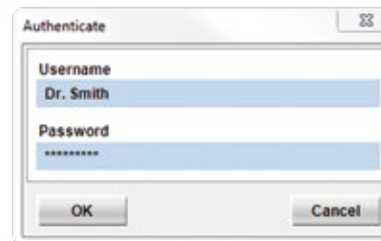
Data security and access control are the keys to protecting health information. SentrySuite offers several security features and comprehensive user administration.

Three steps to secure your patient data:



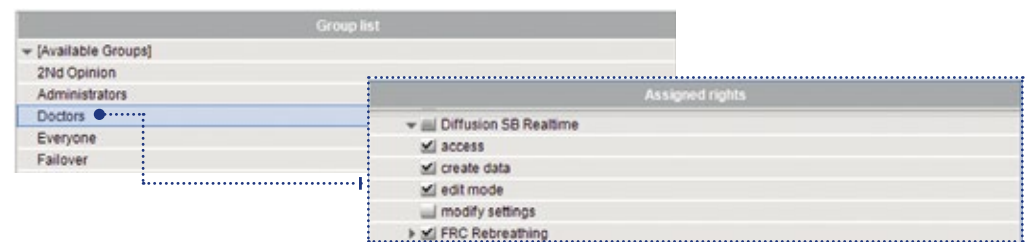
## 1. AUTHENTICATION

SentrySuite offers **comprehensive settings for your password protection** including the use of Single Sign On and Active Directory linking through **LDAP**.



## 2. AUTHORIZATION

The SentrySuite program **User Administration** allows easy to **create user and user groups** with their **assigned rights**. Make sure that only authorized users have access to the different sub programs.



## 3. AUDIT

The program **Log File Viewer** reports all proceeded steps within the SentrySuite Software with their appropriate user.

Date Time	User name	Workstation ID	Site	Event ID	Event text	Application
2017-02-14 10:59:26.070	Dr. Smith	LWIDEU073XL56R1	n/a	4021	Startup program	Bodyplethysmography
2017-02-14 10:59:26.250	n/a	LWIDEU073XL56R1	n/a	4013	Dr. Smith	Session Manager
2017-02-14 10:59:24.090	Dr. Smith	LWIDEU073XL56R1	n/a	4021	Exit program	Spirometry
2017-02-14 10:20:25.890	Dr. Smith	LWIDEU073XL56R1	n/a	4021	Startup program	Spirometry
2017-02-14 10:20:25.150	n/a	LWIDEU073XL56R1	n/a	4013	Dr. Smith	Session Manager
2017-02-14 10:20:23.890	n/a	LWIDEU073XL56R1	n/a	4021	Starting Application 'Spirometry'	SentryDesktop
2017-02-14 10:20:14.030	n/a	LWIDEU073XL56R1	n/a	1000	Run Automatic: Completed Task 'Start up database'	SentryDesktop






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