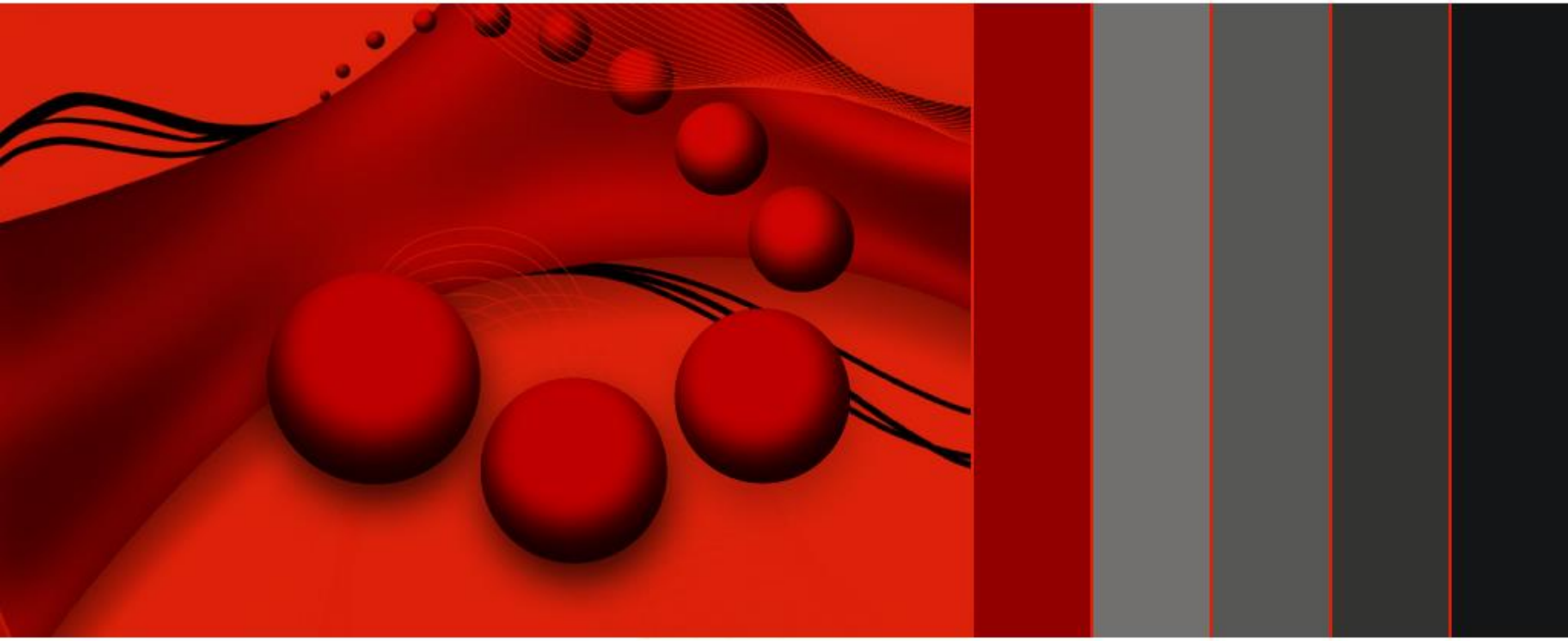
apneABP blood pressure Holter in pre-screening sleep apnea



Meditech

Obstructive sleep apnea syndrome (OSAS)

- Sleep-related breathing disorder causing obstruction of the pharyngeal airway
- Definition: OSAS exists if the obstruction lasts more than 10 sec & it occurs at least 5 times / hour
- 12-14% of the general population is affected

Meditech

OSAS symptoms, risk factros & identification

Symptoms

- Loud snoring (with periods of silence followed by gasps)
- Awakenings, drowning nightmares
- Daytime sleepiness
- Resistant hypertension
- Stroke
- Arrhythmia

Risk factors

- Obesity
- Male gender
- Smoking
- Alcohol consumption

Identification

- Screening

Sleep questionnaires, ECG, ABPM, pulse oximetry

- Diagnosis

Sleep lab tests

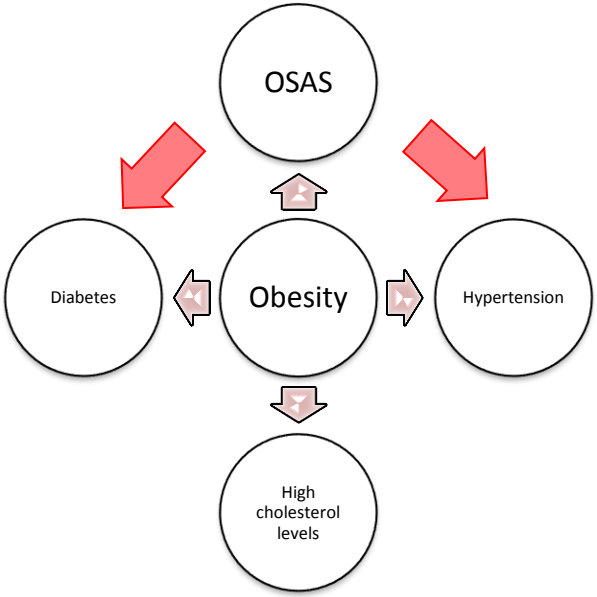
- Treatment

CPAP therapy

Meditech

The OSAS effects

OSAS effects



Risks of undiagnosed OSAS

10-32x
increase in cardiovascular mortality

15-20x
increase in sleep-related traffic accidents

7-10x
increase in cerebrovascular mortality

Meditech

Connenction between OSAS & hypertension

- OSAS = most common cause of secondary hypertension
- ~ 80% of OSAS patients have hypertension
- ~ 40% of hypertensive patients suffer from OSAS, in this case:

  - The hypertension is usually diastolic
  - Night dipping is low or non existent
  - Night blood pressure variability is greater than during the day

Meditech

Main target group of apneABP

- Male
- Between 40 and 60
- With (abdominal) obesity

- Who is hypertensive / suffered a stroke / diabetic
- In whom OSAS must be ruled out due to occupation (pilots, drivers)

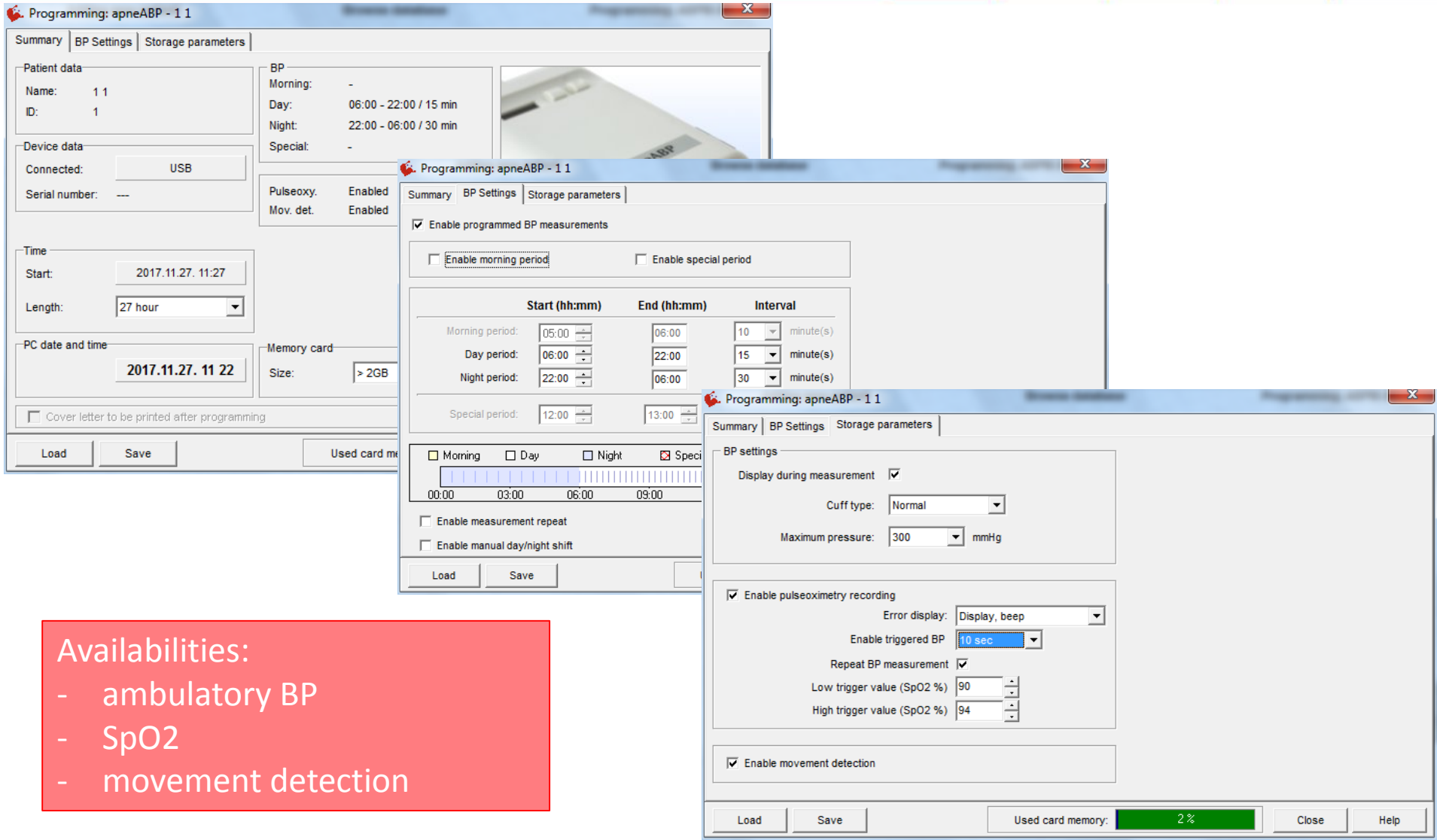
Meditech

apneABP benefits

- to manage/control hypertension
  In case of white-coat hypertension, drug-resistant hypertension, masked hypertension, hypotensive symptoms with antihypertensive medications.
- to screen for sleep apnea
  Sleep apnea is the most common cause of secondary hypertension. If it is left undiagnosed, sleep apnea increases the risk of cardiovascular diseases, sleep-related traffic accidents and stroke.
- to control CPAP therapy
- to assess COPD
- to assess asthma

Meditech

How to use - programming



Availabilities:

- ambulatory BP
- SpO2
- movement detection

How to use – analysis (3in1 view: ABPM+ activity + SpO2)

Data/event list

BP chart (SYS/DIA/pulse)

Activity: intense in the morning

SpO2: critical in the evening

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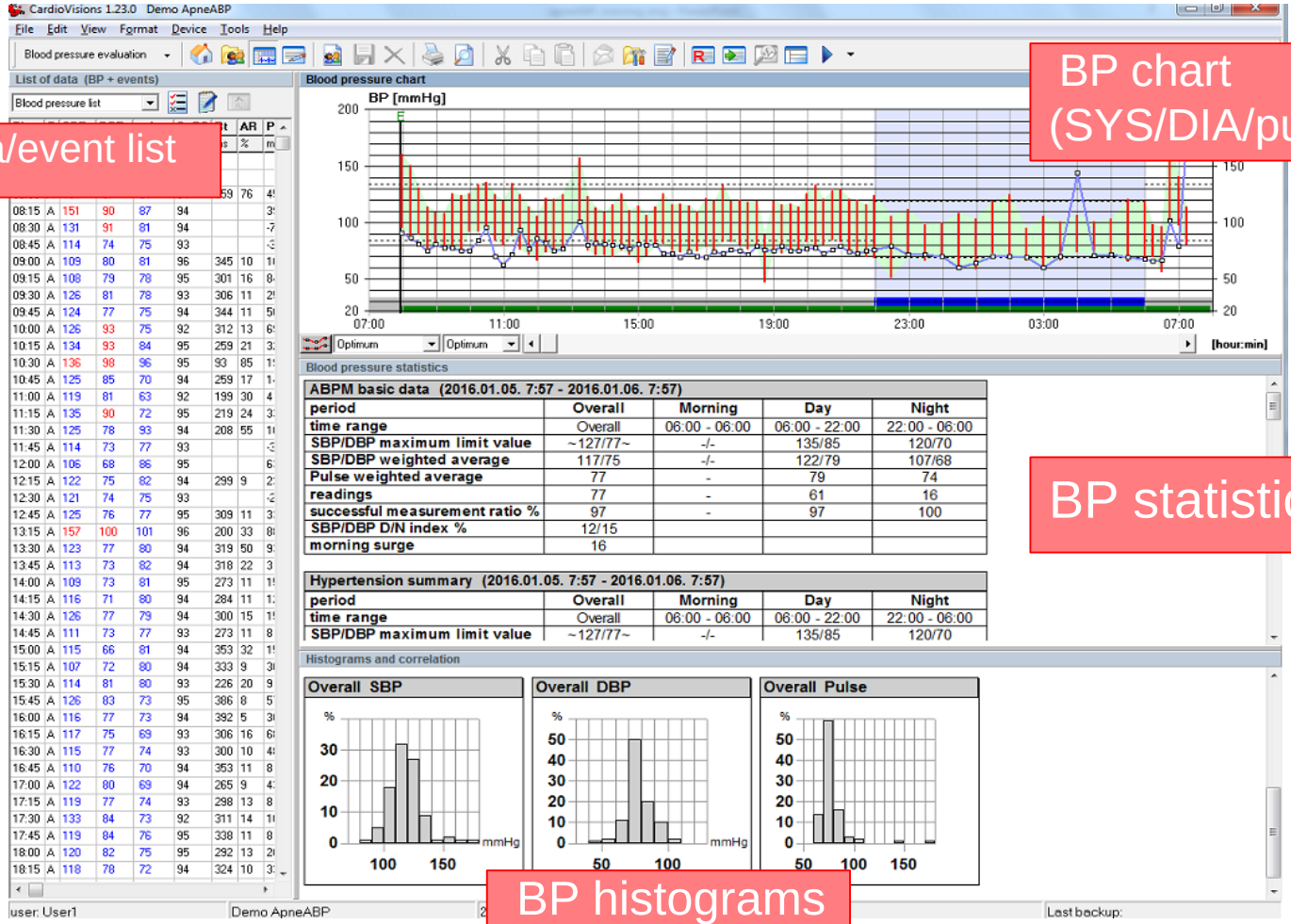
How to use - analysis ABPM



Data/event list

BP chart (SYS/DIA/pulse)

BP statistics

BP histograms

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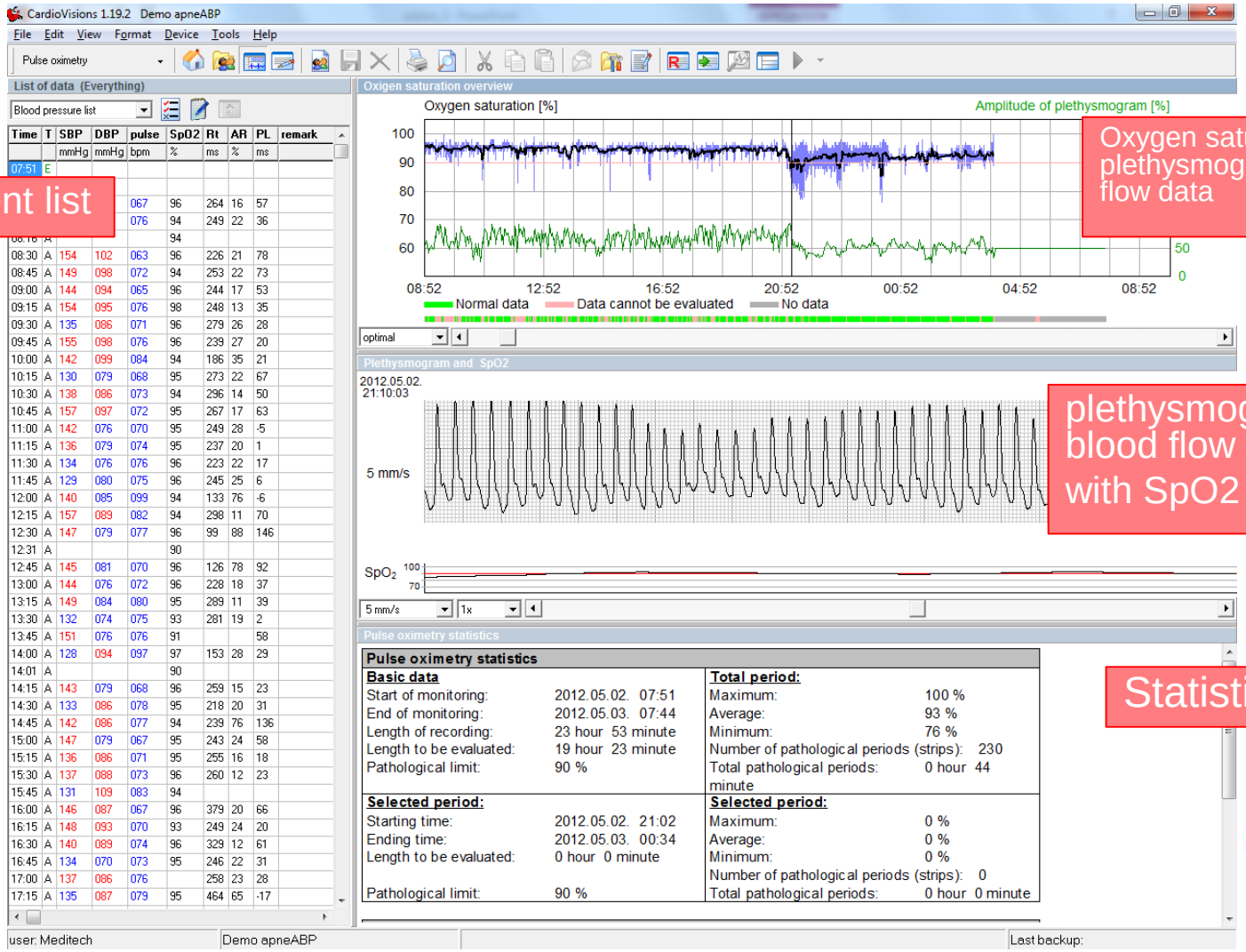
How to use – SpO2 (review)



Data/event list

Oxygen saturation and plethysmograph/blood flow data

plethysmograph/ blood flow chart with SpO2

Statistics

Meditech

How to use – SpO2 (statistics)

General SPO2 overview:

Total 391 apnea events have been recorded during 2 hours and 21 mins.

Pulse oximetry statistics (Total period:)			
Start of monitoring:	2016.01.05. 07:57	Minimum:	63 %
End of monitoring:	2016.01.06. 07:30	Maximum:	100 %
Length of recording:	23 hour 33 min	Average:	93 %
Length to be evaluated:	23 hour 7 min	Number of pathological periods:	391
Pathological limit:	90 %	Total pathological periods:	2 hour 21 min

Desaturation events (Total period:)			
Number of apnoe events:	383	Avg. minimum of apnoe events:	84 %
Event index (ODI):	28,2 /hour	Avg. events period:	0 min 47 sec
Event limit:	4 %	Max. (22:05:32):	7 min 18 sec
Event period:	min. 10 sec	Time in events:	507 min 29 sec

ODI/Oxigen desaturation event index

is available for each hour. On the basis of ODI apnea severity can be judged.

General limits for apnea severity:

<5/hr: NA

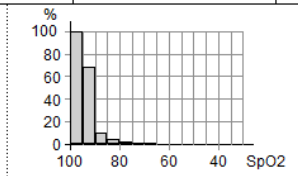
5-15/hr: mild

15-30/hr: moderate

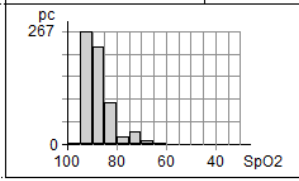
>30/hr: severe

Total 10,1% of the monitoring period was pathological (=SpO2 is below 90%)

Desaturation periods (Total period:)		
SpO_2 limit (%)	Time	%
< 100	23:06:02	99,9
< 95	15:49:46	68,5
< 90	02:20:30	10,1
< 85	00:55:20	4,0
< 80	00:27:18	2,0
< 75	00:11:29	0,8
< 70	00:01:31	0,1
< 65	00:00:08	0,0
< 60	00:00:00	0,0
< 55	00:00:00	0,0
< 50	00:00:00	0,0
< 45	00:00:00	0,0
< 40	00:00:00	0,0
< 35	00:00:00	0,0



Number of events	
SpO_2 level (%)	Number
99 - 95	1
94 - 90	267
89 - 85	230
84 - 80	97
79 - 75	18
74 - 70	30
69 - 65	7
64 - 60	1
59 - 55	0
54 - 50	0
49 - 45	0
44 - 40	0
39 - 35	0
34 - 30	0

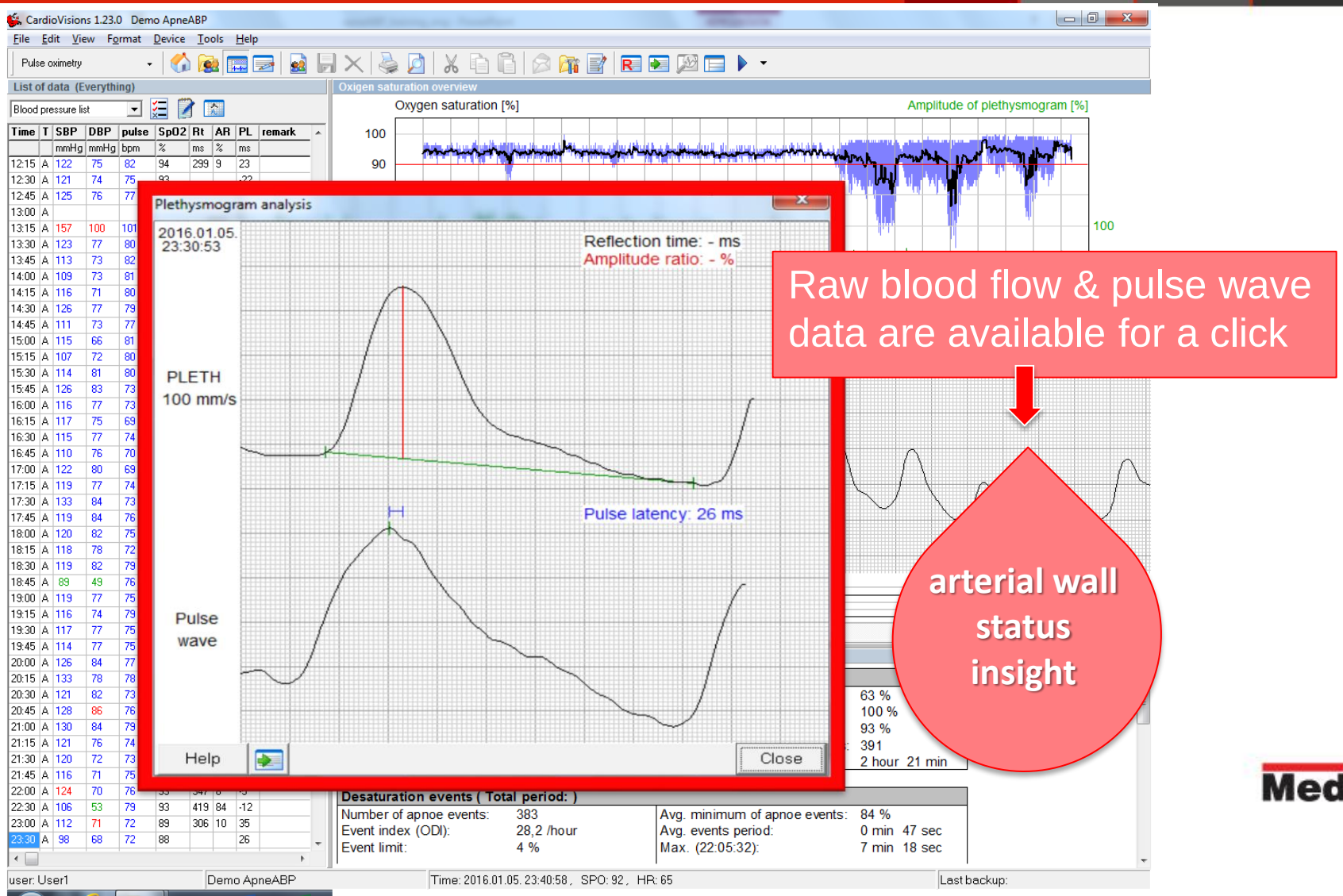


Raw pulse wave data statistics (artery status)

Plethysmogram analysis (Total period:)				
	Maximum:	Average:	Minimum:	Deviation:
Reflection time:	419	279	51	66
Amplitude ratio:	171	27	5	28
Pulse latency:	195	1	-30	50

Meditech

How to use – SpO2 (raw data analysis)



Meditech

Summary

OSAS & apneABP

OSAS: frequent but barely diagnosed and treated.

Treating OSAS not only decreases **hypertension** but also other **cardiovascular risks** & **sleep-related traffic accidents**.

With apneABP OSAS can be screened on an ambulatory/outpatient basis.

Distribution channels

General practices

In many countries: screening for OSAS is necessary for having a driving license!

Heart centers, cardiology departments

University research departments

Sleep diagnostic centers *(before expensive sleep studies are done)*

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