



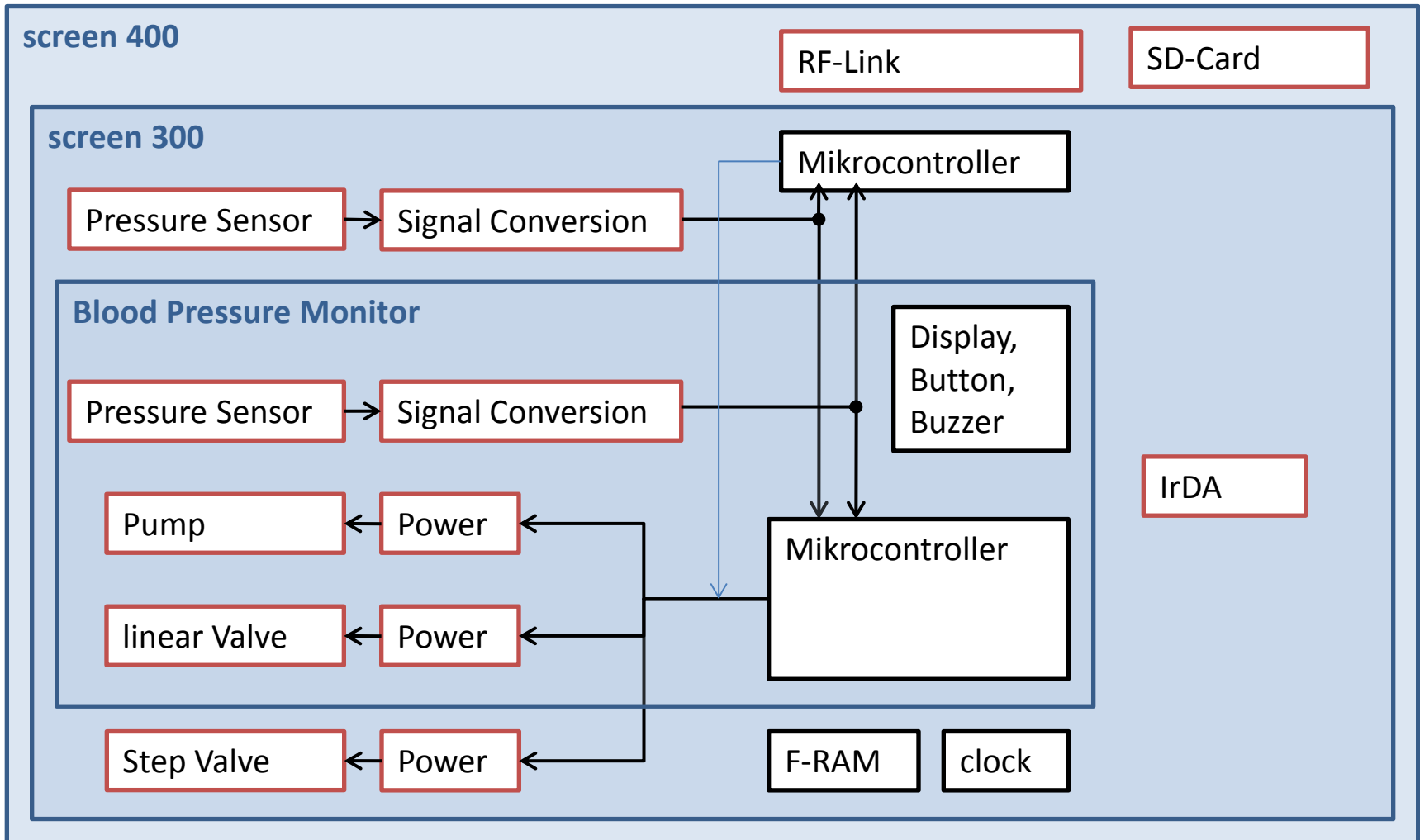
ABPM screen 300/400
Risk Assessment

Highlights of custo screen400 ABPM



- 24 hours Synchronized ABPM and Holter ECG recordings in combination with custo guard 3
- 72 hours for ABPM recordings alone
- To our knowledge, the custo screen 400 device is the first to pass the revised ESH-IP 2010

Block diagram of the device

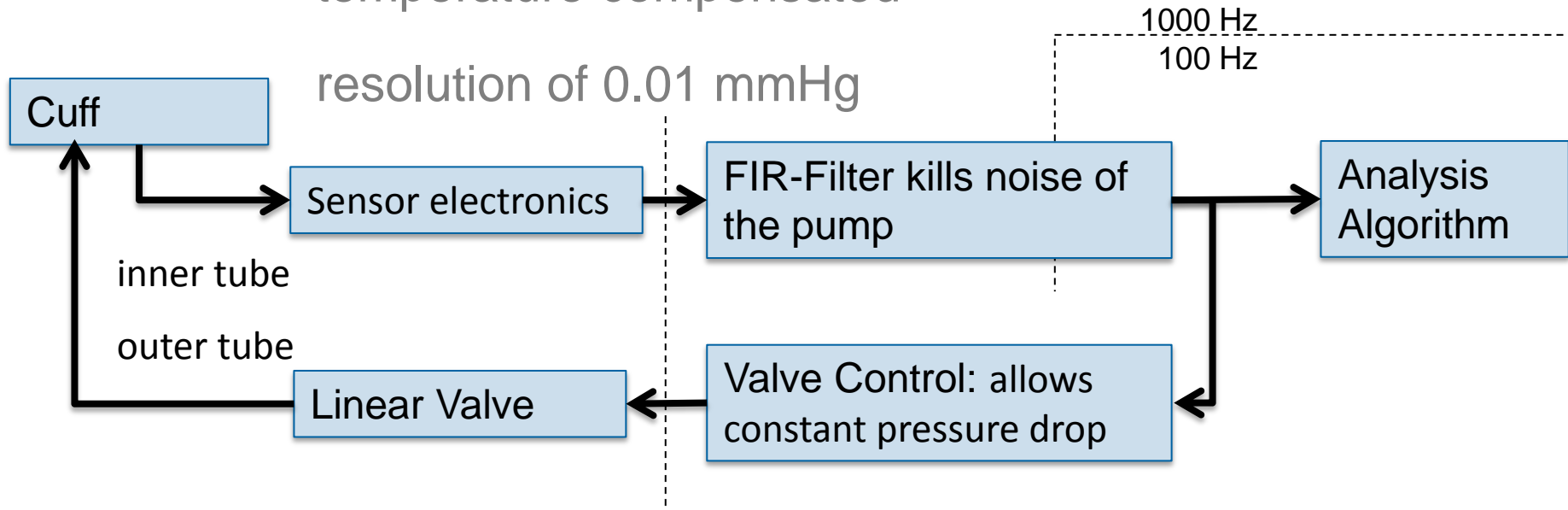


Pressure signal



temperature compensated

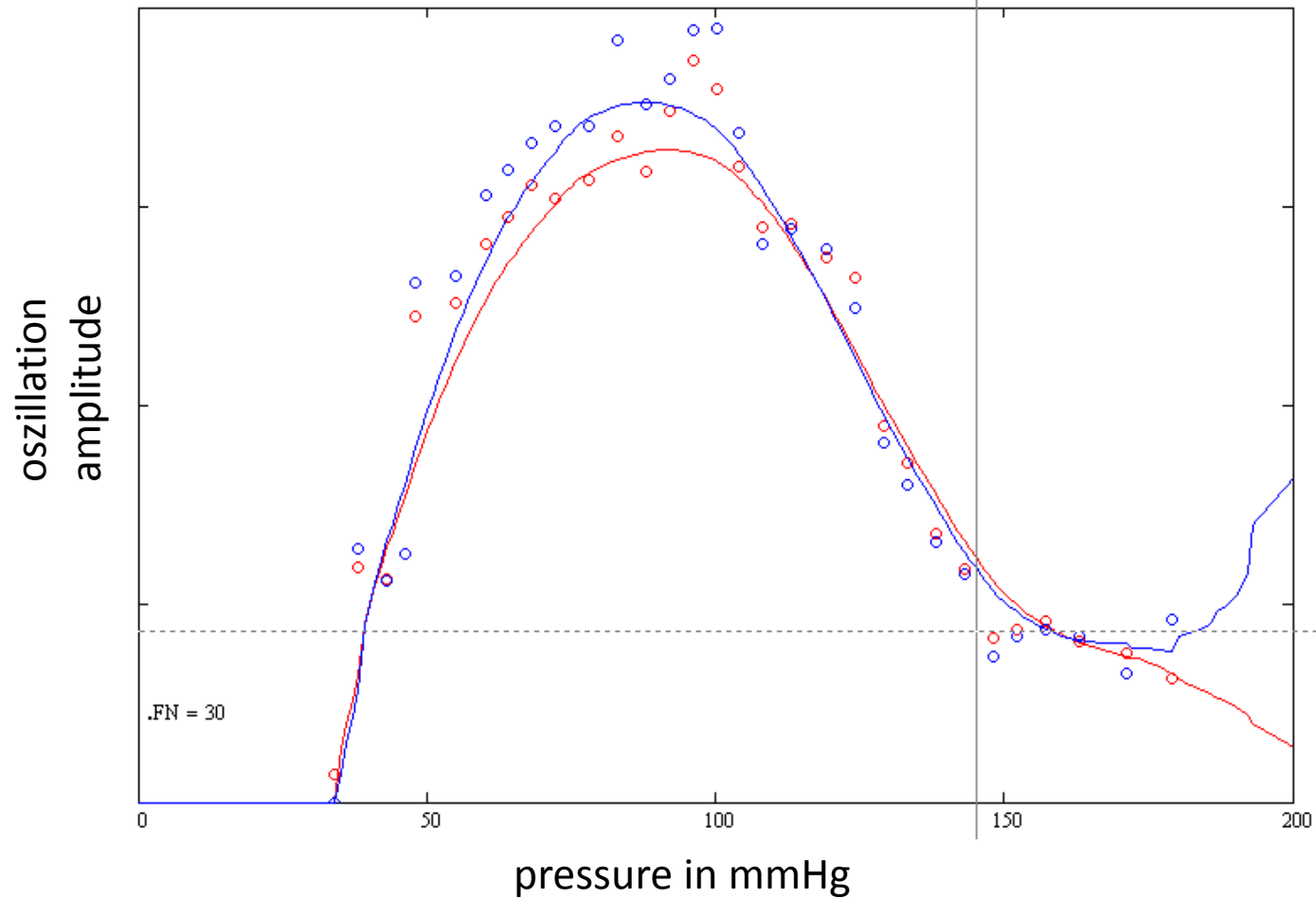
resolution of 0.01 mmHg



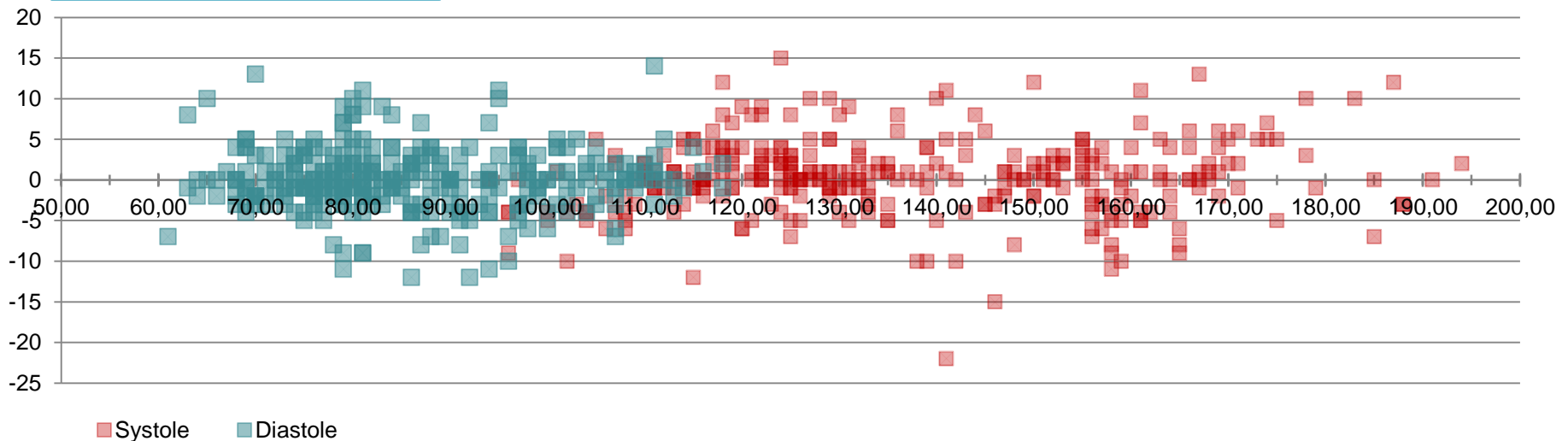
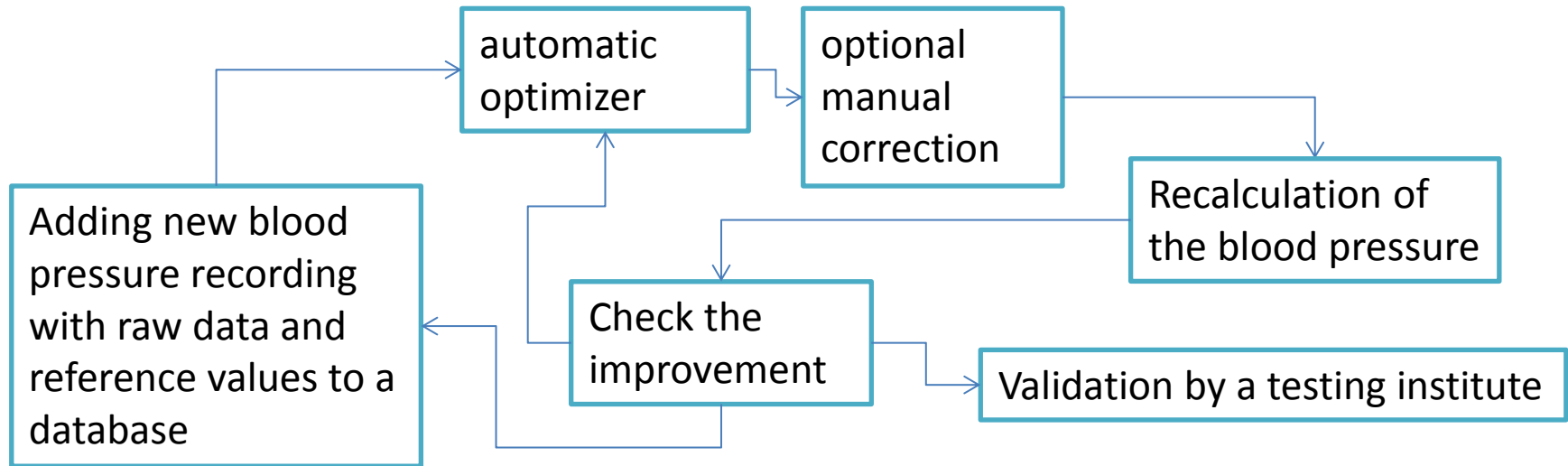
1000 Hz
100 Hz

- no turbulence caused by air flowing
- hardly interference by valve movement or pump

Envelope curve for calculation of BP



Internal Validation, 318 Measurements



Validation Results (ESH-IP 2010)



Part 1	≤5 mmHg	≤10 mmHg	≤15 mmHg	Grade 1	Mean (mmHg)	SD (mmHg)
Pass requirements						
Two of	73	87	96			
All of	65	81	93			
Achieved						
SBP	84	98	99	Passed	-0.5	4.5
DBP	93	99	99	Passed	-0.1	3.3
Part 2	2/3 ≤5 mmHg	0/3 ≤5 mmHg		Grade 2		Grade 3
Pass requirements	≥24	≤3				
Achieved						
SBP	30	0		Passed		
DBP	32	1		Passed		
Part 3						Result



http://www.dovepress.com/articles.php?article_id=16808

<http://www.dovepress.com/getfile.php?fileID=20019>

Comparison with other ABPM devices



99 Measurements

	Values in:	DIFFERENCE \leq 5		MEAN DIFFERENCE		STANDARD DEV.	
		SBP	DBP	SBP	DBP	SBP	DBP
custo screen 300/400 (ESH-IP 2010)	absolut	84	93	-0,4	-0,4	4,1	2,7
Device 2 (ESH-IP 2002, Mallion 2005)	absolut	78	70	-0,7	-3	4,7	4,1
Device 3 (ESH-IP 2002, Ragazzo 2010)	absolut	68	79	-1,7	-1,1	6,9	4,3
Device 5 (ESH-IP 2002, Denchev 2007)	absolut	68	63	N/A	N/A	N/A	N/A
Device 6 (ESH-IP 2002, Haensel 2005)	absolut	83	80	-0,7	-0,8	4,6	4,4
Device 7 (ESH-IP 2002, Jones 2004)	absolut	71	72	N/A	N/A	N/A	N/A
Device 8 (ESH-IP 2002, Langewitz 2009)	absolut	87	85	-0,12	1,11	3,41	3,94

http://www.dablededucational.org/sphygmomanometers/devices_3_abpm.html

Why ABPM?



„Hypertension is one of the most important preventable causes of premature morbidity and mortality in the UK [...] “

„If the clinical blood pressure is 140/90 mmHg or higher, offer ambulatory blood pressure monitoring to confirm the diagnosis of hypertension“

National Institute for Health and Clinical Excellence (NICE), clinical guideline, 127, 2011

Treatment of Hypertension



- Know Your Blood Pressure
 - ABPM as a Gold Standard
- Know Your cardio-vascular Risks
 - Risk Assessment: A tool to predict a person's chance of having a heart attack in the next 10 years
- Know how both variables are changing over time

Risk Assessment



Blood Pressure Stages - DHL



Definition and classification of blood pressure range

3-69

Classification	Systolic (mmHg)		Diastolic (mmHg)	
	Practice-blood pressure	ABPM-Day-average value	Practice-blood pressure	ABPM-Day-average value
Optimum	< 120	< 115	< 80	< 75
Normal	120 - 129	115 - 124	80 - 84	75 - 79
High-Normal	130 - 139	125 - 134	85 - 89	80 - 84
Grade 1	140 - 159	135 - 146	90 - 99	85 - 89
Grade 2	160 - 179	147 - 156	100 - 109	90 - 95
Grade 3	>= 180	>= 157	>= 110	>= 96
Isolated syst. hypertension	>= 140	>= 135	< 90	< 85

Confirm

Cancel

Blood Pressure Stages - NICE



Definition and classification of blood pressure range

3-69

▼ nice ▲	Systolic (mmHg)		Diastolic (mmHg)	
	Practice-blood pressure	ABPM-Day-average value	Practice-blood pressure	ABPM-Day-average value
Classification				
Normal	< 140	< 135	< 90	< 85
Grade 1	140 - 160	135 - 149	90 - 100	85 - 94
Grade 2	161 - 179	150 - 169	101 - 109	95 - 109
Grade 3	>= 180	>= 170	>= 110	>= 110
Isolated syst. hypertension	>= 140	>= 135	< 90	< 85

Confirm

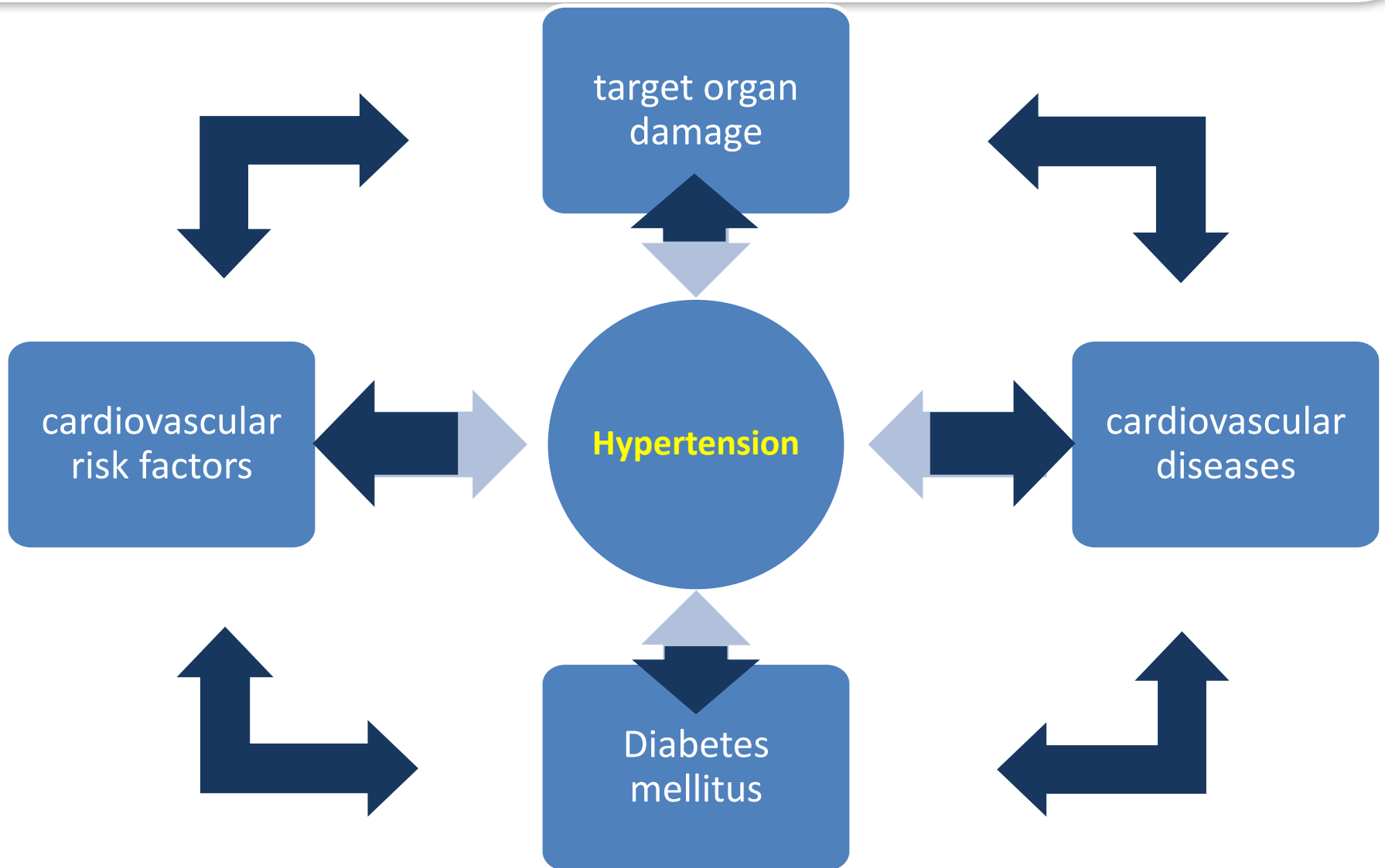
Cancel

Comparison of NICE and DHL



RANGE	NICE -SYS	NICE - DIA	DHL-SYS	DHL-DIA
Optimum	-	-	< 115	< 75
Normal	< 135	< 85	115 – 124	75 – 79
High-Normal	-	-	125 - 134	80 – 84
Grade 1	135 - 149	85 – 94	135 - 146	85 – 89
Grade 2	150 - 169	95 – 109	147 - 156	90 – 95
Grade 3	> = 170	<= 110	> = 157	> = 96
Isolated Systolic Hyp.	> = 135	< 85	> = 135	< 85

Hypertension: Risk factors



Cardio-vascular risk factors



Systolic and diastolic blood pressure

Smoking

Dyslipidaemia

Family history

Abdominal obesity

Glucose level

➔ Life style related factors

Target Organ Damage



Heart

Hypertrophy

Kidney

Proteinuria

Blood vessels

Arteriosclerosis

Retina

Hypertensive retinopathy



Metabolic disorder

- Causes impairment of the kidneys, which is a central part of the blood pressure regulation
- Negative impact on the Renin-Angiotensin II – complex, which has vasoconstrictive effects

→ mid-term to long-term effects on BP

„chronic“ diseases



Cerebro-vascular impairments

- Stroke, TIA,....

Heart related impairments

- Heart attack, H. insufficiency, angina pectoris...

Nephropathy

- Diabetic induced nephropathy
- Renal insufficiency

Setting the risk factors



Select risk factors for risk assessment

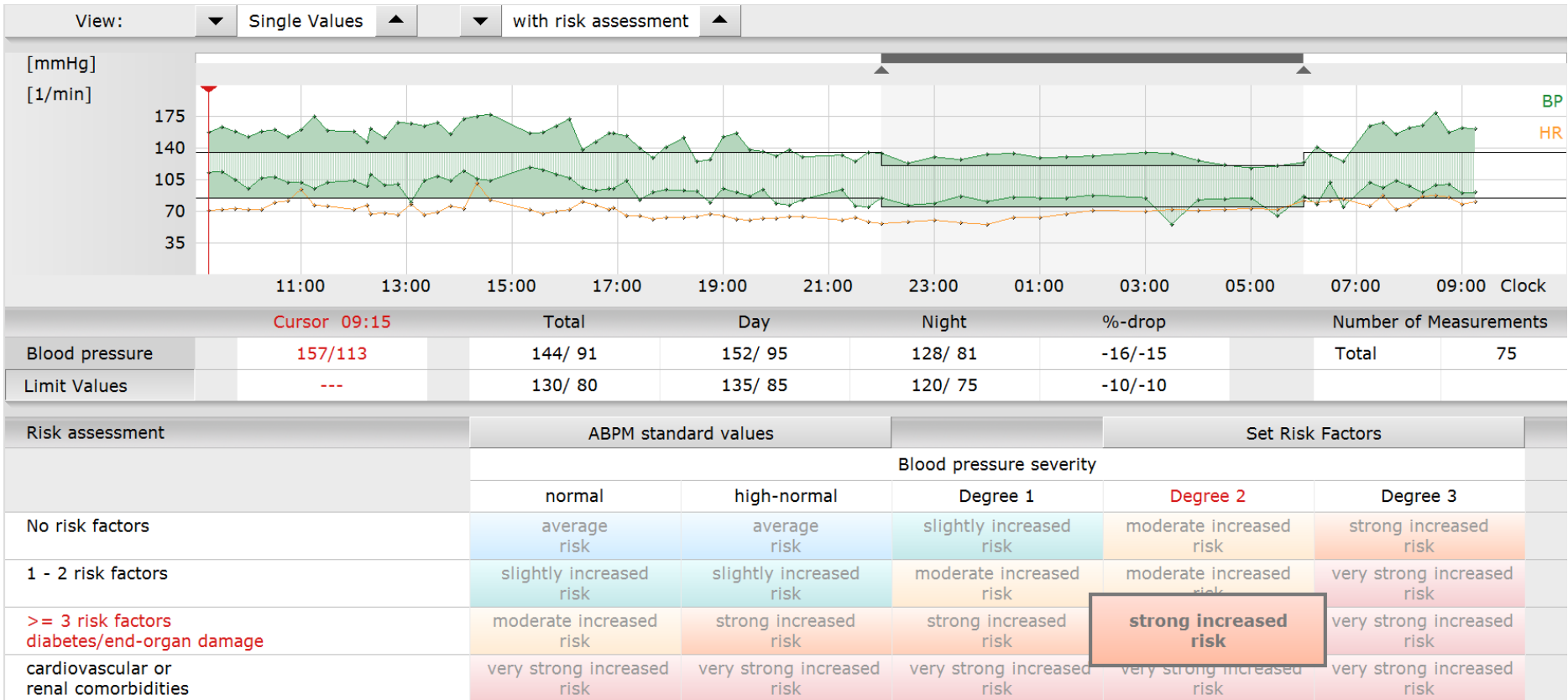
101-69

- Age, Gender
- No further risks
- Positive family history
- Stomach adiposity
- Smoking
- Dyslipidaemia
- Pathologic glucose tolerance
- Left heart hypertrophy
- Atherosclerotic plaques
- Increase of serum-creatinine
- Micro albuminuria
- Lowered creatinine clearance
- Raised pulsewave rate
- Reduced Ankle-Brachial-Index
- Diabetes mellitus
- Clinical manifest cerebrovascular diseases
- Clinical manifest heart disease
- Clinical manifest nephropathy disease
- Clinical manifest peripheral artery disease
- Advanced retinopathy

Confirm

Cancel

Risk Assessment: custo diagnostic view



Report



Doctors' view

Mustermann Franz

Pat. ID		Gender	Male
Date of birth	23.08.1959	Height	178 cm
Age	54	Weight	76.0 kg
		BMI	23.99 kg/m ²

ABPM

Evaluation	14.11.2013	Duration	24.00 h
from	14.11.2013 (09:15)	to	15.11.2013 (09:15)
Number valid Measurements: 75 (of 82)			

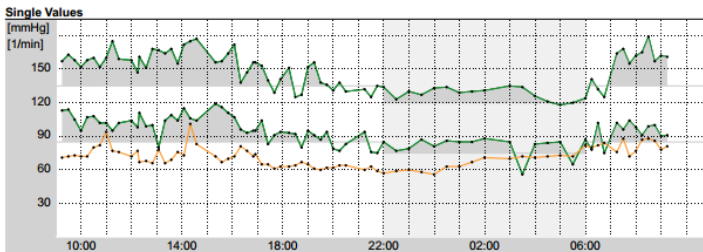


Table of Measurement Values

Blood pressure [mmHg]	Day (06:00 - 22:00)	Night (22:00 - 06:00)	Total	% drop
Average	152 / 95	128 / 81	144 / 91	-16 / -15
min.	124 / 75	118 / 56	118 / 56	---
max.	179 / 119	135 / 88	179 / 119	---
Standard value	< 135 / 85	< 120 / 75	< 130 / 80	-10 / -10

* ABPM: Statement of the "Sektion Hochdruck-Diagnostik der Deutschen Hochdruckliga, Dtsch Med Wochenschr. 2005"

Risk assessment

	Blood pressure severity				
	normal	high-normal	Degree 1	Degree 2	Degree 3
No risk factors	average risk	average risk	slightly increased risk	moderate increased risk	strong increased risk
1 - 2 risk factors	slightly increased risk	slightly increased risk	moderate increased risk	moderate increased risk	very strong increased risk
>= 3 risk factors diabetes/end-organ damage	moderate increased risk	strong increased risk	strong increased risk	strong increased risk	very strong increased risk
cardiovascular or renal comorbidities	very strong increased risk	very strong increased risk	very strong increased risk	increased risk	very strong increased risk

Unconfirmed Report

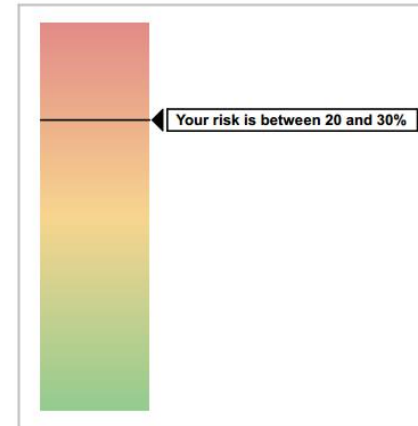
- Current medication: none
- Classification: Isolated systolic-diastolic hypertension
- Severity: Due to systolic (152 mmHg) and diastolic (95 mmHg) ABPM-Day-Average value a hypertension Severity code 2 is existing.
- Nightly blood pressure characteristics: Nightly hypertension. The nightly blood pressure depression is -16/-15% (normal dipper).
- Specified cardiovascular risk factors or accessory symptoms: Smoking; Left heart hypertrophy; Lowered creatinine clearance.
- Risk assessment: The risk of serious cardiovascular disease in the next 10 years (such as heart attack or stroke) is about 20 - 30%.
- Trend analysis: Compared to unconfirmed report (on 30.10.2013) the following has been changed: systolic +8, diastolic +4 mmHg.

Patients' view

Dear Sir Mustermann,

Your long-term blood pressure measurement from 14.11.2013 (09:15) to 15.11.2013 (09:15) with 75 measurements:

- Averaged values:**
The averaged daily values are 152 / 95 mmHg (normal below 135 / 85 mmHg).
The averaged nightly values are 128 / 81 mmHg (normal below 120 / 75 mmHg).
Assessment of daily values: Your blood pressure values were moderately heightened.
- Night lowering:**
There was a real drop in blood pressure during the night.
- Risk assessment:**
The following statistically 10-year risk for serious cardiovascular disease is calculated due to the determined blood pressure as well as the specified risk factors:



No drugs have been taken at the time of measurement.

Please discuss the report with your doctor and ask him for advice on how to minimize your risk, e.g. due to a healthy lifestyle.

With best regards

Benefits of Risk Assessment



Identify patients with high risks

Start with intervention asap

Direct patients' attention on possible risks AND options of intervention

Risk Assessment could be an effective and efficient tool for making prevention real

thank you for your attention



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