



# FORMALIZED 2003 EUROPEAN GUIDELINES ON CARDIOVASCULAR DISEASE PREVENTION AND FOR MANAGEMENT OF HYPERTENSION

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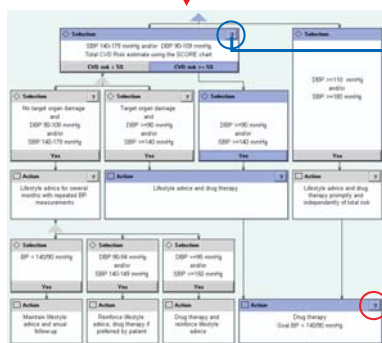
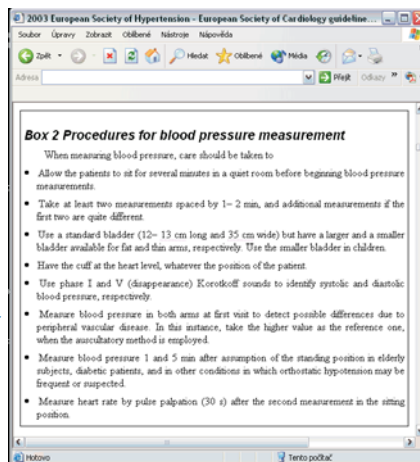
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## Objective

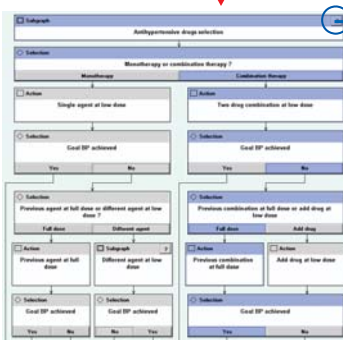
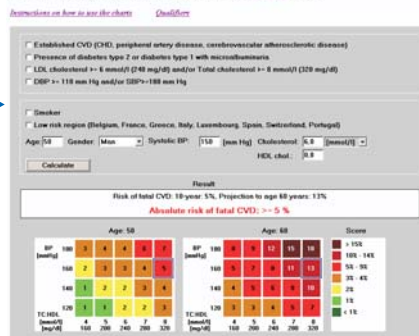
Primary care faces the problem of new increasing and quickly changing knowledge in the field of preventive cardiology. Recent surveys have shown that in the vast majority of cases methodological standards were not complied with guidelines. Therefore, the new methods for better knowledge implementation of the joint 2003 European Guidelines on Cardiovascular Disease Prevention in Clinical Practice (CDPGL) in primary care are mandatory. The main point is to learn the quickly updated correct decision algorithm in diagnostics of several diseases, total cardiovascular risk estimation using the SCORE Model and appropriate treatment given by the CDPGL. At least for hypertension, it seems to be useful to add the more detailed information about the treatment as it is given by 2003 ESH/ESC Hypertension Guidelines (HGL).

## Design and Methods

The logical structure of the decision algorithm used in CDPGL can be clearly shown by means of the GLIF model. Moreover, it can show both the basic information and the complete text of guidelines belonging to the selected GLIF model element. A parallel system serves for calculation of total cardiovascular risk using Framingham data or the SCORE Model from entered data of an individual patient.



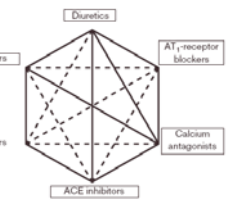
## Estimation of total cardiovascular (CVD) risk - SCORE chart



Class	Conditions favoring the use	Contraindications
Diuretics	Essential hypertension, Mild to moderate hypertension, Heart failure, Chronic kidney disease, Gout, Osteoporosis, Diabetes mellitus, Hyperuricemia, Renal impairment, Pregnancy, Breastfeeding	None
Beta-blockers	Essential hypertension, Myocardial infarction, Angina pectoris, Heart failure, Chronic kidney disease, Gout, Osteoporosis, Diabetes mellitus, Hyperuricemia, Renal impairment, Pregnancy, Breastfeeding	None
Calcium antagonists (dihydropyridines)	Essential hypertension, Myocardial infarction, Angina pectoris, Heart failure, Chronic kidney disease, Gout, Osteoporosis, Diabetes mellitus, Hyperuricemia, Renal impairment, Pregnancy, Breastfeeding	None
ACE inhibitors	Essential hypertension, Myocardial infarction, Angina pectoris, Heart failure, Chronic kidney disease, Gout, Osteoporosis, Diabetes mellitus, Hyperuricemia, Renal impairment, Pregnancy, Breastfeeding	None

Class	Conditions favoring the use	Contraindications
Diuretics (loop)	Essential hypertension, Myocardial infarction, Angina pectoris, Heart failure, Chronic kidney disease, Gout, Osteoporosis, Diabetes mellitus, Hyperuricemia, Renal impairment, Pregnancy, Breastfeeding	None
Beta-blockers	Essential hypertension, Myocardial infarction, Angina pectoris, Heart failure, Chronic kidney disease, Gout, Osteoporosis, Diabetes mellitus, Hyperuricemia, Renal impairment, Pregnancy, Breastfeeding	None
Calcium antagonists (dihydropyridines)	Essential hypertension, Myocardial infarction, Angina pectoris, Heart failure, Chronic kidney disease, Gout, Osteoporosis, Diabetes mellitus, Hyperuricemia, Renal impairment, Pregnancy, Breastfeeding	None
ACE inhibitors	Essential hypertension, Myocardial infarction, Angina pectoris, Heart failure, Chronic kidney disease, Gout, Osteoporosis, Diabetes mellitus, Hyperuricemia, Renal impairment, Pregnancy, Breastfeeding	None

- Diuretics (loop)
- Diuretics (anti-aldosterone)
- Beta-blockers
- Calcium antagonists (dihydropyridines)
- ACE inhibitors
- Beta-blockers
- ACE inhibitors
- Calcium antagonists (dihydropyridines)
- AT1-blockers
- Alpha-blockers



Possible combinations of different classes of antihypertensive agents. The most rational combinations are represented as thick lines. ACE, angiotensin-converting enzyme. The frames indicate classes of antihypertensive agents proven to be beneficial in controlled interventional trials.

## Results

The computer system using patients' data and going through GLIF model graph of HGL evaluating conditions of decision steps was demonstrated previously. The system for direct gaining values of GLIF model parameters from a structured electronic health record (EHR) of an existing hospital information system is being tested. The system enables a complex information based on CDPGL and HGL with a possible extension on other guidelines on associated diseases, such as dyslipidaemia and diabetes.

## Conclusions

The GLIF model of formalized 2003 European Guidelines on Cardiovascular Disease Prevention in Clinical Practice and those of related diseases offers to physicians an automated system for a decision support and check their decision algorithms in comparison with those of guidelines. The system offers an extraction of GLIF model parameters from a structured EHR.

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