

# National survey on prescription of cardiovascular drugs among outpatients with coronary artery disease in Switzerland

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## Summary

**Background:** Secondary prevention of coronary artery disease markedly reduces cardiovascular mortality and non-fatal endpoints. Outpatient care of subjects with coronary artery disease has been assessed in several European countries, but no current data is available for Switzerland.

**Methods:** A random sample of office-based physicians across Switzerland recorded current drug prescription of outpatients with coronary artery disease in the years 2000/2001 by means of a mail questionnaire. We assessed treatment frequencies according to different patient characteristics.

**Results:** 565 patients were included (mean age  $68 \pm 11$  years, 75% male). There was no evidence for differences in drug utilisation among the regions. Drug prescription rates for antithrombotic agents, beta-blockers, ACE-inhibitors/angiotensin receptor blockers and lipid lowering drugs were 91%, 58%, 50% and 63% respectively. Lower treatment rates were observed among pa-

tients >70 years and in those without a history of myocardial infarction or coronary revascularisation. Forty-nine percent of the patients had a blood pressure >140/>90, and 60% had lipid readings above the intervention cut-off according to the Swiss recommendations. Among those without a history of myocardial infarction or coronary revascularisation, the respective figures were 60% and 80%.

**Conclusions:** Compared to former surveys evidence based drug prescription has improved in Switzerland. Despite this, therapeutic goals for cholesterol levels and blood pressure are not being reached in a large proportion of patients. A high risk group for under use of evidence based drugs are patients without a history of myocardial infarction or coronary revascularisation.

**Key words:** cardiovascular drugs; coronary artery disease; prescriptions

## Introduction

Advances in secondary prevention of coronary heart disease have contributed significantly to the decline in cardiovascular mortality in the past decades [1]. Antithrombotic agents, betablockers, ACE inhibitors as well as lipid lowering drugs are associated with a clinically significant reduction in subsequent acute coronary syndromes, need for revascularisation and mortality [2–9]. Several studies have found an under use of cardiovascular drugs among outpatients with CHD [10–13]. A recent

survey conducted among outpatients with a history of acute coronary syndromes or coronary revascularisation <70 years of age in Europe (EURO-ASPIRE [14,15]) has shown that drug therapy has improved over time, but that blood pressure and lipid goals still have not been reached in a large proportion of the study population. Comparable data for Switzerland is lacking. We, therefore, assessed drug therapy in a representative sample of outpatients in Switzerland.

## Methods

In Autumn 2000, we sent a letter to 650 Swiss office-based general practitioners, internists and cardiologists, who had been randomly selected from a list of all office-based Swiss physicians. In this survey they were asked to record the next two patients with coronary heart disease (CHD) presenting in their office. Participants filled in a questionnaire on these patients including important patient characteristics and medications. Physicians who did not respond within six weeks were reminded with a second letter. Of the physicians who still did not respond, we drew a random sample of 100 and motivated them to participate. With this procedure, crude participation rate was 45% (n = 290) and 50% after correction for non-eligible physicians. There were no differences between patients of physicians who answered to the first and second letter and those who did not respond until the phone call. We also

externally validated this enrolment procedure with a traditional chart review in 30 medical offices with 202 patients. There was no difference among the samples with respect to age, sex, risk factors and drug prescription rates (all p >0.2).

### Statistical analysis

We calculated proportions and mean values  $\pm$  SD of the patient characteristics. For the different cardiovascular drugs, crude and age-standardised proportions were calculated overall and according to different patient characteristics. The groups were compared with the Pearson  $\chi^2$  test and logistic regression respectively. Analyses were performed with SAS 8.1. All p-values are two-sided. P-values <0.05 were viewed as significant.

## Results

565 patients were included. Patient characteristics are given in table 1. Mean age was  $68 \pm 11$  years and 75% were male. 53% of the patients had a history of myocardial infarction and 62% had had a coronary revascularisation.

The prescription rates of antithrombotic agents, beta-blockers, ACE-inhibitors/angiotensin receptor blockers and lipid lowering drugs were 91%, 58%, 50% and 63% respectively. Drug prescription according to different characteristics is shown in table 2. There were no significant differences in drug utilisation between the French, Italian and German speaking regions of Switzerland. In patients >70 years of age beta-blockers and particularly lipid lowering drugs were less often prescribed compared to those <70 years of age. Among women, utilisation of antithrombotic agents was lower in the unadjusted and age-adjusted analysis compared to men but when results were stratified according to history of myocardial infarction or revascularisation, there was no material difference in treatment between men and women (results not shown). For the other cardio-

vascular drugs, the age-adjusted prescription rates were virtually identical between the sexes (58% vs. 58%, 50% vs. 50% and 63% vs. 62% for beta-blockers, ACE-inhibitors/angiotensin receptor blockers and lipid lowering drugs respectively). Among patients with a recent myocardial infarction, beta-blocker use was 87%, whereas of those with a remote or no history of myocardial infarction about 50% received a beta-blocker. In patients with myocardial infarction, prescription of antithrombotic agents and lipid lowering drugs was also higher as was true for patients who had had a prior coronary revascularisation. For antithrombotic agents and lipid lowering drugs, the largest differences in drug prescription were observed between patients who had either a history of myocardial infarction or coronary revascularisation compared to those who had neither. Patients who had a history of these conditions received antithrombotic agents and lipid lowering drugs in 96% and 71% respectively, whereas those without received the respective drugs in only 73% and 36% (table 2).

**Table 1**  
Patient characteristics of the study population.

Characteristics	number/mean	percent/ $\pm$ SD
Total sample	565	100%
Age (years)	68	$\pm 11$
Male sex	422	75%
<b>Cardiovascular risk factors</b>		
Hypertension	368	65%
Diabetes mellitus	124	22%
Hyperlipidaemia	403	71%
Current smoking	97	17%
<b>History of coronary artery disease (CAD)</b>		
Myocardial infarction	297	53%
Coronary revascularisation	349	62%
Hospital stay for CAD within the past 12 months	180	32%

**Table 2**

Unadjusted and age-adjusted prescription rates of cardiovascular drugs among outpatients with coronary artery disease according to different characteristics, Switzerland 2000/2001.

Characteristics	antithrombotic agents (%)		beta-blockers (%)		ACE-I/ARBs (%)		lipid-lowering drugs (%)	
	crude	age-adjust.	crude	age-adjust.	crude	age-adjust.	crude	age-adjust.
German-speaking part of CH	93	93	60	60	51	51	61	61
French-speaking part of CH	89	89	51	50	54	57	68	69
Italian-speaking part of CH	88	88	62	63	38	41	67	66
Age ≤70 years	92	–	65*	–	48	–	77*	–
Age >70 years	90	–	51	–	52	–	46	–
Male	93*	93**	59	58	50	50	67*	63
Female	86	85	55	58	50	50	50	62
Myocardial infarction <12 months	94**	95***	86*	87*	52	55	77**	75**
Myocardial infarction >12 months	95	95	59	56	52	55	69	69
Myocardial infarction, time unknown	97	87	60	53	55	51	61	52
No prior myocardial infarction	87	87	51	52	44	45	55	56
Coronary revascularisation	97*	97***	62‡	60	51	50	79*	75*
No coronary revascularisation	80	80	52	54	49	48	37	44
Myocardial infarction or coronary revascularisation	96*	96*	61†	60	48	48	73*	71*
Neither myocardial infarction nor coronary revascularisation	74	73	48	51	50	50	30	36
Total	91	91	58	58	50	50	63	63

\*: p <0.001, \*\*: p <0.01, \*\*\*: p <0.05

**Table 3**

Blood pressure and lipid levels among Swiss outpatients with coronary heart disease.

Blood pressure/lipid parameters	Number/ Mean	Percent/ ±SD
Systolic blood pressure	136	±16
Diastolic blood pressure	80	±9
Blood pressure >140/>90 mm Hg	274	49%
Total cholesterol (mmol/L)	5.3	±1.1
Total cholesterol >5 mmol/L	363	64%
LDL cholesterol >3 mmol/L	342	62%
Lipid readings above Swiss lipid lowering drug intervention cut-off	337	60%

**Table 4**

Drug prescription in Switzerland among patients <70 years of age with a history of myocardial infarction or coronary revascularisation (n = 260) as compared to the therapy in other European countries (EUROASPIRE II).

Medications	Switzerland, 2000/2001	EUROASPIRE II 1999/2000
Antiplatelet agents	84%*	86%
Anti-coagulants	15%	7%
Beta-blockers	71%	63%
ACE-inhibitors	35%**	38%
Lipid lowering drugs	82%	61%
<b>Blood pressure/lipid levels</b>		
Blood pressure >140/>90 mm Hg	43%	51%***
Cholesterol >5 mmol/L	56%	58%

\* antiplatelet agents or oral anticoagulants 95%

\*\* ACE-inhibitors or renin-angiotensin receptor blockers 47%.

\*\*\* Classification derived from the mean values of 2 measurements.

In table 3, blood pressure and lipid readings are shown. Forty nine percent of the patients had a blood pressure >140/>90, 64% had cholesterol levels >5 mmol/L and 60% were above the intervention cut-off according to the Swiss guidelines for lipid lowering drugs [16]. In patients >70 years, blood pressure control was comparable to the overall study population (blood pressure >140/>90: 50%), but a higher proportion of older patients had lipid levels above the intervention cut-off according to the Swiss guidelines (66%). As expected from drug prescription, blood pressure and lipid control was particularly unfavourable among patients without prior myocardial infarction or revascularisation. Sixty-four percent had blood pressure levels above the cut-off of 140/90, 83% had a cholesterol level >5 mmol/L and 80% were above the Swiss intervention cut-off for lipid lowering drugs.

In table 4, we present drug prescription in the Swiss subset comparable with the selection criteria of the EUROASPIRE II study population (age <70 years, history of myocardial infarction or revascularisation). In the Swiss sample the proportion that received antithrombotic agents, beta-blockers and lipid lowering drugs tended to be higher compared to the EUROASPIRE II study population. Blood pressure control was slightly better in the Swiss study population. Despite the superior prescription rate of lipid lowering drugs, however, the proportion of patients with a cholesterol level >5 mmol/L was similar.

## Discussion

This survey assessing drug therapy among outpatients with coronary artery disease in Switzerland shows that evidence-based drug prescription has improved compared to former surveys. Despite this, guideline goals for blood pressure and lipid levels were only reached in a minority of patients. Moreover, those without a history of myocardial infarction or coronary revascularisation had a clearly inferior drug therapy.

Antithrombotic agents, beta-blockers, ACE-inhibitors/ARBs and lipid lowering drugs were prescribed to 91%, 58%, 50% and 63% of the study population respectively. There is only limited data from previous Swiss studies with which to compare the current results [17, 18]. In a small series of outpatients five years after PTCA in 1994, 83%, 61%, 11% and 33% had been prescribed antithrombotic agents, beta-blockers, ACE-inhibitors and lipid lowering drugs respectively [17], indicating that, with the exception of beta-blockers, prescription of these drugs has increased. In comparison to the EUROASPIRE II study [14, 15] representing current drug therapy in other European countries, drug prescription in Switzerland was slightly higher. Nevertheless, 49% of the study population had blood pressure readings above 140/90, and 60% had lipid values above the intervention cut-off of the Swiss recommendations for intervention of lipid lowering drugs.

Analysis of specific patient groups demonstrated a homogeneous prescription pattern of cardiovascular drugs across Switzerland. In line with a Swiss survey among outpatients with heart failure [19] there was no evidence of an under-prescription in women compared to men. Patients older than 70 years had lower prescription rates of beta-blockers and lipid lowering drugs, but the use of antithrombotic agents and ACE-inhibitors/ARBs was similar in younger and older patients. Blood pressure control was similar in older and younger subjects, whereas a higher proportion of older patients had increased lipid levels compared to those who were younger. These findings do not suggest that there is a *de facto* rationing of medical care in the elderly due to advanced age in general as previously suggested [20]. For beta-blockers assumed or real side effects in older patients may have accounted for the reduced prescription rate. Since lipid lowering drugs have an excellent tolerability, this potential explanation does not apply to these drugs. A possible cause is that in contrast to antihypertensive drugs, the broad indication for lipid lowering drugs is relatively new. The first large scale clinical trial of statins dating back to 1994 included patients up to 70 years of age [6]. In subsequent studies the benefit was confirmed among patients up to 75 years [7, 8] and 80 years [9], respectively. Therefore there is no rationale to withholding lipid lowering drugs from older patients.

As in previous studies [18] patients with history of myocardial infarction and coronary revascularisation had higher treatment rates of evidence-based cardiovascular drugs compared to those without. Indeed, patients without a history of these conditions had surprisingly low treatment rates for antithrombotic agents and lipid lowering drugs. Two thirds had a blood pressure >140/>90 and 80% had lipid readings above the intervention cut-off for lipid lowering drugs. The cause for this large gap is not quite clear. A defined coronary event or a coronary intervention may be a time point for reconsideration of the established drug therapy and the patients may be better motivated to use additional medications. Moreover, patients with a cardiovascular event are hospitalised and treatment with relatively new drugs such as lipid lowering drugs is likely to be more rapidly implemented than in outpatient care. It is important that primary care physicians are made aware of the tendency to under treat patients without myocardial infarction and coronary revascularisation. Secondary prevention should be implemented early to prevent a first acute coronary syndrome and to reduce not only the risk of sudden death but also of non-fatal consequences such as subsequent chronic heart failure after a myocardial infarction.

Our study has potential limitations. We had a response rate of 50% of the eligible physicians. This is an average response rate to surveys addressing physicians [21] but we cannot exclude the possibility that the true prescription rate of drugs may deviate to some extent from the current results. It is often assumed that respondents have a better quality of care than non-respondents. If so, this would suggest that there is an even higher number of patients in whom the therapeutic goals are not being reached. The mail-questionnaire design with enrolment of two consecutive patients could result in a bias if physicians had selected cases with above average quality of care. However, a validation study, assessing drug prescription by means of chart review by an external reviewer, rendered similar results. Non-standardisation of measurements may increase the variability of the results, but is unlikely to importantly affect them.

In summary, our study demonstrates that compared to former surveys prescription rates for cardiovascular medications among outpatients with coronary artery disease in Switzerland have improved, but it also shows that control of blood pressure and lipid levels is still limited. In patients without prior myocardial infarction or revascularisation drug prescription was inferior. Better awareness regarding the need for early treatment of patients without a history of hard cardiovascular endpoints and refined drug therapy among the remaining patients could not only further reduce

cardiovascular mortality but also non-fatal cardiovascular endpoints with subsequently reduced quality of life.

We are indebted to the participating physicians for their detailed records.

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