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# Statin initiation by GPs in WA

## A structured vignette study

**Background**
Statins are recommended for all patients with known coronary heart disease. This pilot study investigated statin initiation by a Western Australian general practitioner cohort and the influence of prescriber and patient characteristics on prescribing.

**Methods**
A structured vignette questionnaire was posted to members of the Fremantle GP Network. Respondents indicated their prescribing decisions for nine hypothetical patients who had recently suffered a myocardial infarction. Data analysis utilised logistic regression analyses and a generalised linear model with a logit link function.

**Results**
Fifty-five GPs responded (16.0% response rate). In over 20% of cases a statin was not prescribed. Male (OR 4.71; 95% CI: 1.24–17.87) and GPs with fewer years in practice (4.50; 1.21–16.77) were more likely to prescribe appropriately. Younger patients (2.21; 1.38–3.53), and those with diabetes (1.74; 1.09–2.76) or hypercholesterolaemia (4.81; 2.88–8.03) were more likely to receive therapy.

**Discussion**
Prescribing practices failed to comply with current guidelines in a significant number of cases. Further research to confirm these findings is warranted.

**The National Heart Foundation of Australia (NHF) and the Cardiac Society of Australia and New Zealand Reducing Risk in Heart Disease 2007 guidelines state that 'statin therapy is recommended for all patients with coronary heart disease (apart from in exceptional circumstances)'.[1] This recommendation is supported by the results of numerous randomised controlled clinical trials: statins (HMG-CoA reductase inhibitors) have been shown to be of benefit in the secondary prevention of cardiovascular disease in patients with documented dyslipidaemia, those with previously 'normal' cholesterol levels and also in elderly patients.[2–4] Early initiation of statins in the management of acute coronary syndromes (ACS) has been proven to offer additional benefits.[5,6]**

While statin therapy is usually initiated in hospital for patients with ACS, studies have continued to demonstrate suboptimal prescribing on discharge both in Australia[7] and overseas.[8,9] When these patients present after discharge it falls to the general practitioner to recognise the indications for, and initiate, statin therapy where appropriate. General practitioners also play an important role in identifying and addressing statin nonadherence. Both prescriber characteristics and patient specific risk factors have been demonstrated to influence statin prescribing by GPs and thus the likelihood of appropriate statin initiation.[10]

Clinical judgment analysis offers a quantitative method of probing the judgments of doctors and identifying systematic differences in their perceptions of risk and benefit.[11] This technique is widely used and includes the presentation of 'hypothetical' or 'paper' cases. This has the major advantage of allowing comparison of different respondents' behaviour over the same set of cases and estimating the independent effects of specific information on a person's judgments.

This study aimed to determine the rate of appropriate statin initiation for a series of 'paper cases' with a recent history of non-ST elevation myocardial infarction (NSTEMI) among a cohort of Western Australian GPs. The influences of a number of prescriber

and patient characteristics on appropriate statin initiation were also investigated in an attempt to highlight:

- a potential target GP population for educational intervention, and
- patients most at risk of not being prescribed a statin post-NSTEMI.

## Methods

Ethics approval for the study was obtained from the Human Research Ethics Committees of Curtin University of Technology and the South Metropolitan Area Health Service, Western Australia. Return of a completed questionnaire was considered as indicating consent to participate.

The authors calculated that the questionnaire would need to be answered by 98 respondents to model up to six prescriber or patient characteristics for one outcome variable (either statin initiation or intensity). Allowing for an anticipated response rate of 30%, a self administered postal questionnaire was mailed to all of the estimated 350 members of the Fremantle GP Network in April 2007. The questionnaire was designed to facilitate easy completion to optimise response rate[12] and was face validated by one of the authors.

Anonymity was assured as the questionnaire was self administered and the mailout was conducted by a local division of general practice. As the researchers had no access to the member identities there was no option of sending a reminder to nonresponders. In addition, time and logistical constraints prevented a second mailing to all members.

The questionnaire incorporated a randomly generated series of nine 'vignettes' or short stories. Each vignette described a hypothetical patient who had recently been discharged from hospital after a NSTEMI but not yet commenced on lipid lowering therapy. Respondents were asked to indicate their prescribing intentions for each patient – which statin (if any) they would prescribe for the patient described and at what dosage.

Each vignette was constructed to comprise six clinical details describing recognised cardiovascular risk factors, each with two possible variations, thus there were 64 ($2^6$) potential scenarios to cover each of the possible combinations. In theory, the lifelike quality of vignettes stimulates more meaningful and considered answers, which are more likely to be predictive of behaviour than surveys that do not offer this format.[13] The vignettes were presented to respondents in an 'incomplete within blocks' design to reduce the number of vignettes presented to each GP to nine. An example of a vignette is seen in *Figure 1*.

As per NHF guidelines, prescribing a statin after a NSTEMI was defined as 'appropriate', while a decision not to prescribe was defined as 'inappropriate'. Due to a modest response rate, prescriber and patient factors were analysed separately to counter the effect of prescriber bias. The influence of prescriber factors was investigated with univariate and multivariate logistic regression utilising SPSS for Windows® (version 15.0).[14]

Respondents were classified into two groups for analysis. 'Appropriate prescribers' were defined as those who initiated a statin in response to all nine vignettes, and 'less appropriate prescribers' were those who failed to initiate statins in all nine situations. The influence of patient characteristics was investigated with a generalised linear model with a logit link function.

Figure 1. Example of a vignette (binary variables are in bold)

A new patient comes to your surgery for consultation and follow up after a recent hospital visit. The patient is a **42/78** year old **man/woman**, recently diagnosed with a NSTEMI who has not been commenced on lipid lowering therapy. The patient is a **smoker/nonsmoker** and **has type 2 diabetes/ is not a diabetic**. The patient also has **a/no** family history of ischaemic heart disease. The patient's latest blood test indicates an LDL-C level of **1.7/3.5** mmol/L. What is your assessment?

Would you prescribe a statin for THIS PATIENT at this time?

Yes ☐ No ☐

If you would choose to write a prescription, please specify your drug of choice and preferred initial dosage in THIS PATIENT:

| Drug | | Dose | |
|---|---|---|---|
| | Atorvastatin ☐ | | 5 mg ☐ |
| | Fluvastatin ☐ | | 10 mg ☐ |
| | Pravastatin ☐ | | 20 mg ☐ |
| | Simvastatin ☐ | | 40 mg ☐ |
| | Rosuvastatin ☐ | | 80 mg ☐ |

## Results

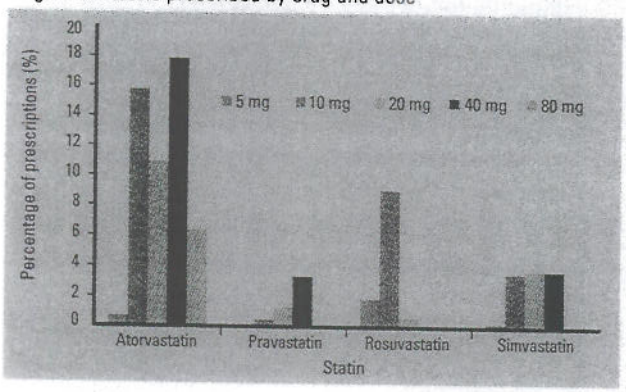
### Characteristics of respondents

Completed questionnaires were received from 56 GPs, representing a response rate of 16.0%. One GP respondent was excluded from the analysis as they indicated that they did not routinely prescribe statins; 55 GPs formed the cohort for data analysis. The majority of the respondents were aged more than 45 years (39/55; 70.9%) and had been in clinical practice for more than 10 years (46/55; 83.6%). This small cohort thus demonstrated similar overall characteristics to the Australian GP population based on 2006–2007 BEACH data.[15] There was a higher proportion of female respondents than might have been expected based on BEACH data (22/50; 44.0%), but this was reflective of the current gender distribution of GPs within the local GP Network (119 of an estimated 285 practising GPs; 41.8%).[16]

### Appropriateness of prescribing and prescribing patterns

Respondents appropriately prescribed statins for the hypothetical NSTEMI patients on 385 (77.8%) of 495 prescribing occasions. Three respondents (5.5%) failed to prescribe a statin for any of their nine hypothetical NSTEMI patients. The most frequently prescribed drug was atorvastatin, which was prescribed in just over half of cases, and most commonly at a dosage of 40 mg. The newest agent in the statin class, rosuvastatin, was prescribed second most commonly, in 11.5% of cases. The statins prescribed, by drug and dose, are shown in *Figure 2*. Among the 52 respondents who prescribed a statin at least once, there was strong evidence of a personal prescribing formulary, with 44 respondents (84.6%) restricting their prescribing to one drug. Twenty respondents (38.5%) prescribed the same dose of the same drug for each hypothetical patient.

Figure 2. Statins prescribed by drug and dose




### Influence of prescriber factors

*Table 1* displays the univariate and multivariate associations between the respondent (prescriber) characteristics and their likelihood of being designated as 'appropriate prescribers' (ie. those who initiated a statin in response to all nine vignettes). In both the univariate and multivariate analyses, being male and having fewer than 20 years experience in clinical practice resulted in approximately five-fold increases in the likelihood of a respondent demonstrating appropriate prescribing habits. Respondent age however, was not a significant predictor of appropriate prescribing ($p$=0.704).

### Influence of patient factors

The influences of patient factors on prescribing appropriateness are displayed in *Table 2*. Younger patient age and suffering from type 2 diabetes both approximately doubled a hypothetical patient's likelihood of being appropriately prescribed a statin, while a high low density lipoprotein cholesterol (LDL-C) level of 3.5 mmol/L (as opposed to 1.7 mmol/L) resulted in an almost five times higher likelihood. Patient gender, smoking status and the presence of a family history of heart disease did not influence the appropriateness of prescribing.

## Discussion

Over 20% of the hypothetical NSTEMI patients described in this study's vignettes were not prescribed a statin for secondary prevention, representing a significant level of noncompliance with the NHF guidelines. These results concur with those of recent statin prescribing studies that have revealed suboptimal prescribing rates of 80–90% in ACS patients, even on discharge from hospital.[7,8]

We are hesitant to draw firm conclusions from these findings due to the significant nonresponse rate. A lack of information about the characteristics of nonresponders precluded further examination of this issue.[17] To establish the validity of these responses it would also be necessary to demonstrate that GPs make prescribing decisions that reflect their responses to this questionnaire. It was not possible to establish such predictive validity during the course of the present study.

We present these data as a pilot study. Future studies may allow more robust exploration of other reasons for the suboptimal prescribing rate. Such factors may include the nature and severity of a patient's clinical condition;[18,19] and their comorbidities, concurrent medications and socioeconomic status.[10,18,20–22] Alternatively, future approaches may focus on investigating GPs' prescribing decisions using videotaped consultations, as was recently reported by Milder et al.[23]

Atorvastatin was the statin most commonly prescribed by this small cohort. We speculate that this may relate to the wealth of evidence in existence regarding its ability to lower LDL-C levels and also to improve patients' clinical outcomes. Conversely, there was considerable use of rosuvastatin, despite a lack of clinical outcomes data for this drug at the time of the study. This may reflect the promotion of anecdotal reports of the improved tolerability of this agent and is consistent with the early adoption of new statins that has been observed previously.[24]

Previous studies have suggested that GPs can find guidelines confusing, conflicting and difficult to interpret,[25,26] which offers one potential explanation for the observed suboptimal prescribing practices. The confusion between prescription of statins in primary prevention (which requires an assessment of overall cardiovascular risk) and their use in secondary prevention (where 'statin therapy is recommended for all patients')[1] was evident in this study, where younger, diabetic patients with high LDL-C levels were significantly more likely to be prescribed a statin. Older, nondiabetic patients with low LDL-C levels post-NSTEMI appear from this study to be at risk of not receiving statin therapy. Utilisation of patients' cardiovascular risk factors in therapeutic decision making has also been demonstrated in a large number of statin prescribing studies in a range of clinical settings, with patient age,[18,20,21,24] smoking status,[18,21] and the severity of dyslipidaemia[27] all proven to influence the likelihood of

Table 1. Odds ratios for appropriate prescribing based on prescriber characteristics using binary logistic regression analysis

| Subject characteristic | | Odds ratios (95% CI) | |
|---|---|---|---|
| | | Univariate | Multivariate |
| Age | 45–54 years (vs. ≤44 years) | 0.44 (0.11–1.70) | |
| | ≥55 years (vs. ≤44 years) | 0.40 (0.10–1.54) | |
| Male | | 3.31 (1.02–10.72)* | 4.71 (1.24–17.87)* |
| Fewer years experience in practice (<20 vs. ≥20 years) | | 3.59 (1.18–10.92)* | 4.50 (1.21–16.77)* |

* $p$<0.05

Table 2. Odds ratios for significant influences on appropriate prescribing based on patient characteristics using a generalised linear model with a logit link function

| Patient characteristic | Odds ratios (95% CI) |
|---|---|
| Younger age (42 vs. 78 years) | 2.21 (1.38–3.53)‡ |
| Presence of type 2 diabetes | 1.74 (1.09–2.76)* |
| High LDL-C (3.5 mmol/L vs. 1.7 mmol/L) | 4.81 (2.88–8.03)‡ |

* $p<0.05$, ‡ $p<0.001$

statin prescribing. Gender,[10,18,22] and the presence of diabetes have produced conflicting results.[21,27]

## Conclusion

This study suggests less than optimal statin initiation for patients with a history of NSTEMI among a small cohort of GPs, especially by female GPs and those with more than 20 years clinical experience. General practitioners' estimation of a patient's cardiovascular risk also appeared to influence prescribing decisions. If these results are confirmed, an initiative to optimise secondary prevention in coronary heart disease in the general practice setting is clearly warranted.

## Implications for general practice

- National Heart Foundation guidelines state that 'statin therapy is recommended for all patients with coronary heart disease (apart from in exceptional circumstances)'.
- This study suggested that a significant number of patients with a history of an acute coronary event are at risk of not being prescribed a statin in general practice.
- An estimation of a patient's cardiovascular risk, rather than the NHF guidelines, appeared to influence GPs' prescribing decisions.
- Innovations to improve prescribing habits may be warranted.

Conflict of interest: none declared.

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