

Appendix to paper in NZMJ 14 March 2003 ‘Response from PHARMAC: difficult choices

Analysis of HealthPAC data suggests that between March 2001 (when simvastatin was both (1) fully funded again under Special Authority on the same basis as fluvastatin and atorvastatin and (2) was less expensive than atorvastatin) and October 2002, there were 166,658 patient-months (some 13,900 patient-years) of atorvastatin treatment beyond February 2001 levels. These extra patients using atorvastatin ‘cost’ a nominal extra \$2.49 million more (excluding rebates) than if they had been instead treated with simvastatin (see Figures 1 and 2).

Figure 1

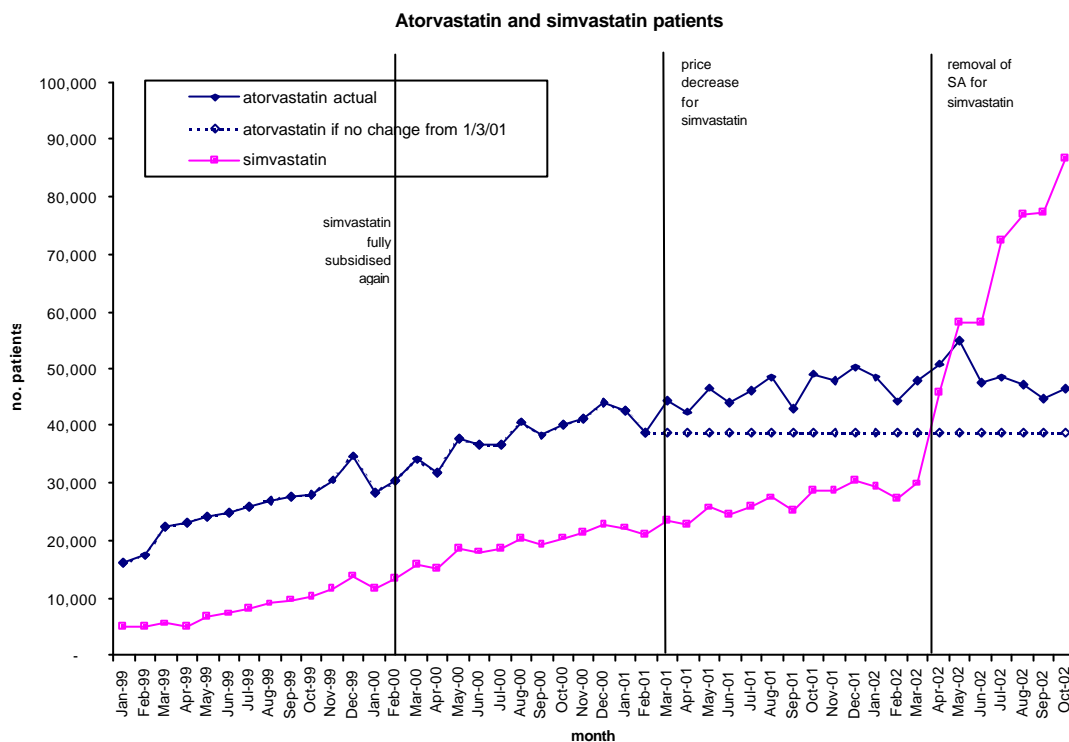
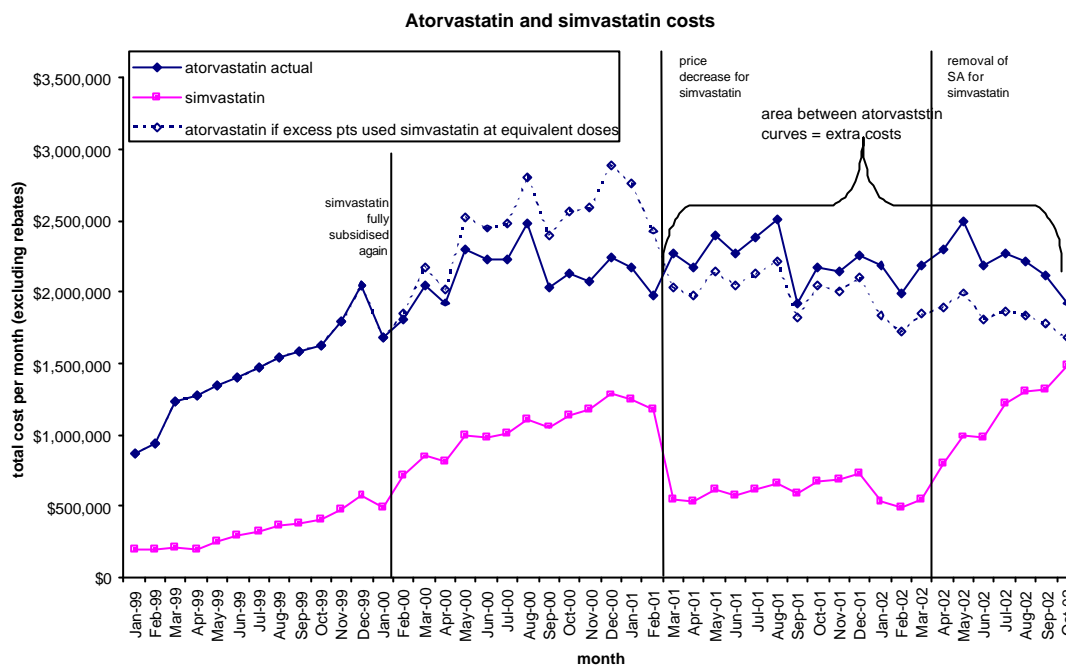


Figure 2



Recent HealthPAC data (for October 2002) indicate there are some 46,417 patients using atorvastatin at a nominal cost of \$23.1 million each year (excluding rebates). Simvastatin at equivalent doses would cost some \$17.8 million.

Although atorvastatin may have a place in the management of patients with very high cholesterol levels, special authority data have shown that less than 1% of patients with pre-existing CHD had total cholesterol levels of 10 mmol/l and over - maybe 1,600 patients.* In fact 20% of atorvastatin patients are currently using very high doses at greater than 40 mg/day - some 9,202 patients.

At higher doses simvastatin is said to increase HDL-C and Apo A-I significantly more than atorvastatin.¹ While atorvastatin 80 mg/day decreases LDL-C/HDL-C ratios by 54.0%^{2,3}, simvastatin has largely comparable LDL-C/HDL-C lowering ability for the few patients needing very high doses - 49.5% for simvastatin 80 mg/day.⁴ Put another way, atorvastatin 80 mg/day confers maybe an additional 6% absolute decrease in LDL-C (53% minus 47%) when compared with simvastatin 80 mg/day. Other clinical trial data suggest identical LDL-C/HDL-C ratio lowering with simvastatin 80mg /day when compared with atorvastatin 40 mg/day.^{5,6}

The above 9% greater ability of atorvastatin to reduce LDL/HDL (54.0%/49.5% RR = 1.09) does not seem overly large for what is a surrogate endpoint and a much more expensive agent. Simvastatin 80 mg/day is stated to both provide additional LDL-C and triglyceride reductions compared to the 40 mg dose and have an excellent safety and tolerability profile.⁷

Simplistically, even at high doses of atorvastatin for patients at highest risk (here, patients with total cholesterol >7.5 mmol/l with pre-existing CHD), we would need to treat 49 patients with atorvastatin for 5 years to prevent one more CHD event than if we were to use simvastatin. [This calculation is based on 5-year absolute CHD risk of 62% for patients with total cholesterol >7.5 mmol/l with CHD; simvastatin relative risk reduction (RRR) 36%; putative atorvastatin RRR 40% (based on change in LDL/HDL for atorvastatin 80 mg/day compared with simvastatin 80 mg/day), i.e. 9% greater RRR];

*Based on 190,200 patients estimated from FCUAHHS [age/ sex/ CHD status] prevalence, applied to age/sex-specific intercensal estimates for NZ population; and HealthPAC special authority data for statins, where of 26,045 approvals where patients were identified as being in group A1:1 and where total cholesterol (TC) was stated and, 216 had TC of 10 mmol/l or more (0.83%)

hence 5-year absolute risk reduction of 23% for simvastatin, 24% for atorvastatin; hence excess ARR for atorvastatin over simvastatin of 2%; hence 5-year NNT 49.3.]

This means that, after taking into account the effects of prevented CHD and stroke events on life expectancy and quality of life, patients using atorvastatin might save 0.0200 extra QALYS for every 5-years' treatment beyond what they might have using simvastatin. This equals needing to treat 50 patients for 5 years to gain one extra quality-adjusted year or life. At \$52,100 per QALY gained[†] this compares poorly with other opportunities to improve population health through funding medicines.

The removal of the special authority requirements for statins in April 2002 potentially 'saved' in just the three months to June 2002 an estimated 37 'statistical lives' and freed up a nominal \$531,000 to the health sector by preventing cardiovascular events (see Table 3 of 14 March 2003 NZMJ viewpoint article⁸).[‡]

References

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- ³ [Jones P, Kafonek S, Laurora I, Hunninghake D Comparative dose efficacy study of atorvastatin versus simvastatin, pravastatin, lovastatin, and fluvastatin in patients with hypercholesterolemia \(the CURVES study\). *Am J Cardiol* 1998;81:582-7.](#)
- ⁴ Silva JM. Statins, high-density lipoprotein, and the low-density lipoprotein/high-density lipoprotein ratio. *Am J Cardiol* 2000 Sep 1;86(5):593-4
- ⁵ [Crouse JR 3rd, Frohlich J, Ose L, Mercuri M, Tobert JA. Effects of high doses of simvastatin and atorvastatin on high-density lipoprotein cholesterol and apolipoprotein A-I. *Am J Cardiol* 1999;83:1476-7.](#)
- ⁶ [Kastelein JJ, Isaacsohn JL, Ose L, Hunninghake DB, Frohlich J, et al. Comparison of effects of simvastatin versus atorvastatin on high-density lipoprotein cholesterol and apolipoprotein A-I levels. *Am J Cardiol.* 2000;86:221-3.](#)
- ⁷ Davidson MH, Stein EA, Hunninghake DB, Ose L, Dujovne CA, et al. Lipid-altering efficacy and safety of simvastatin 80 mg/day: worldwide long-term experience in patients with hypercholesterolemia. *Nutr Metab Cardiovasc Dis.* 2000;10:253-62.
- ⁸ Metcalfe S, Dougherty S, Brougham M, Moodie P. PHARMAC measures savings elsewhere to the health sector. *NZ Med J* 2003;116(1170). URL: <http://www.nzma.org.nz/journal/116-1170/362/>

[†]\$52,069 based on nominal atorvastatin price of \$1.30/day versus simvastatin \$0.45/day, using the same model as for simvastatin (<http://www.pharmac.govt.nz/pdf/statin02CUA.pdf>) with 54% improvement in LDL/HDL with atorvastatin versus 49% with simvastatin (RR 1.09). Includes 4% offsets from potential savings to DHBs through fewer cardiovascular events because of the small surrogate advantages of atorvastatin over simvastatin. QALYs and costs discounted at 10%.

[‡]357.9 quality-adjusted years of life saved (QALYS) for 70,073 extra person-months treated, based on discounted cost/QALYs of \$2111/QALY for simvastatin (see <http://www.pharmac.govt.nz/pdf/statin02CUA.pdf>, >10% 5-year cardiovascular risk excluding pre-existing CHD) and \$7690 for atorvastatin (as for simvastatin, but atorvastatin price), hence volume-weighted discounted offsets at 37% of pharmaceutical spending. Net extra costs and patient-year equivalents are above that predicted from simvastatin and atorvastatin individual trends for the previous 12 months, hence total QALYS (the total gain in quality-adjusted years of life amongst patients), discounting both costs and QALYS at 10%. The \$531,152 nominal potential 'savings' to the health sector are hospitalisation and other DHB costs averted by preventing cardiovascular events, permitting those funds to be used to treat other health needs.

Total QALYS can translate to 'statistical lives saved', where each saved life is equivalent to living a full quality of life for 36.4 remaining years expected for the average New Zealand citizen, which with discounting has a present value of 9.7 years (10% discount rate); no. 'statistical lives saved' = no. total discounted QALYs / 9.7. Hence, the above 358 QALYs translate to 36.9 'statistical lives saved'.