

## Drug Class Review: Dihydropyridine Calcium Channel Blockers

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### Introduction:

There are currently six dihydropyridine calcium channel blockers on the market used for cardiovascular conditions. DHP CCBs have been shown in clinical trials to have similar efficacy when titrated to effective doses in the treatment of hypertension. They are not recommended as first-line therapy for hypertension. JNC-7 recommends these as an add-on to other hypertensive agents or for monotherapy if there are other compelling indications. There are no head-to-head trials between DHP CCBs that measure clinical outcomes when used in the management of hypertension. Therefore there is no current evidence that any particular agent has a clinical advantage.

DHP CCBs are also used to improve symptoms in chronic stable angina. They are as effective as beta blockers for this indication. The ACC/AHA guidelines recommend aspirin, lipid therapy, and beta blockers as first-line therapy due to improved mortality data. However, DHP CCBs are an alternative for patients with contraindications to beta blockers. Head-to-head trials between amlodipine, nisoldipine, nifedipine and nifedipine showed that these all performed similarly for control of anginal symptoms.

DHP CCBs are not recommended for use in patients with heart failure. However, they can be used in patients with systolic dysfunction without adversely affecting the patient's health. Also, trials of amlodipine and felodipine have shown that they have no significant effect on all-cause mortality, or combined fatal and nonfatal events in patients with heart failure.

DHP CCBs all have similar adverse effects and can lead to edema, flushing, headache, dizziness, and reflex tachycardia. This is a class effect as a whole, though edema may vary between agents.

### Cost:

Currently, pricing of these agents varies considerably, with amlodipine being the most expensive agent and nisoldipine being the least expensive.

Generic name	Trade name	Cost per tablet
Amlodipine	Norvasc®	\$0.83 per 5 mg \$1.30 per 10 mg
Felodipine	Plendil®	\$0.34 per 2.5 mg \$0.35 per 5 mg
Isradipine	DynCirc®, Dynacirc CR®	\$0.45 per 2.5 or 5 mg ER
Nicardipine	Cardene®, Cardene SR®	\$0.40 per 20mg
		\$0.55 per 30mg ER

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Data from the IHS National Supply Services Center shows that in 2005, IHS spent \$6,500,062 on DHP CCBs. Of this \$5,329,886 was spent on amlodipine (82%). This is very concerning in light of the expense of this agent compared to the other choices in the class and the lack of evidence of clinical advantage of amlodipine over other DHP CCBs.

In 2005, \$111,491 was spent on amlodipine by clinics within the Portland Area. Had the patients that received amlodipine been treated with nisoldipine instead, Portland Area would have saved \$78,586.

**Recommendation:**

The IHS National P&T Committee recently added nisoldipine (Sular®) to nifedipine on the IHS National Core Formulary. The Department of Defense has a comprehensive drug formulary. They have chosen to remove amlodipine from their formulary. The IHS National P&T Committee is considering making DHP CCBs a closed class to contain cost related particularly to overuse of amlodipine. However, our first effort will be directed at educating IHS physicians about the pharmacoeconomic issues related to this class of medications.

I recommend that Clinical Directors and Pharmacy Chiefs at each of the area clinics evaluate their current usage of DHP CCBs, educate their staff on the current data outlined above about similarity in indications, efficacy and side effects, but significant difference in cost, and then monitor this for reductions in usage of amlodipine. I will report back on this as I receive new information about this issue.