

Taking anticholinergic medicines can increase older people's risk of falling. At Ealing Hospital, a pocket guide and handy mnemonic, "MAP", are helping pharmacists to assess patients' risk

# Using a "MAP" to steer patients away from medicines-related falls

By Navila Chaudhry, MRPharmS

Falls are an increasingly common complication in patients over the age of 65 years. In 2001, the National Service Framework for Older People dedicated one of its standards to the treatment and prevention of falls, owing to the high costs of falls-associated treatment for the NHS. Despite this, alarming statistics have emerged in recent years:

- 35% of people aged 65 years or over experience one or more falls every year<sup>1</sup>
- During 2005, 2,200 UK patients over the age of 65 years have been reported dead due to accidental falls
- 60% of patients admitted to hospitals due to a fall are aged 65 years or older; 40% are aged 80 years or older<sup>2</sup>

Falls have historically been the most reported incident at Ealing Hospital NHS Trust (EHT). Research has shown a relationship between the risk of falls and the use of anticholinergic medicines<sup>3</sup> — so it was important to identify whether

anticholinergic drug use had been implicated in the trust's falls incidence.

Consequently, an audit was conducted at EHT (over a three-week period during October 2011) to determine the anticholinergic medication burden (see below) for all inpatients aged over 65 years. For each patient, the ward pharmacist was asked to document:

- Which anticholinergic drugs were being taken (if any)
- Which anticholinergic side effects were being experienced (if any)
- Whether the anticholinergic drug was started before or during admission
- The outcome of the patient's falls risk assessment — this is

completed on admission to EHT; patients are deemed to be at no risk, low risk or high risk

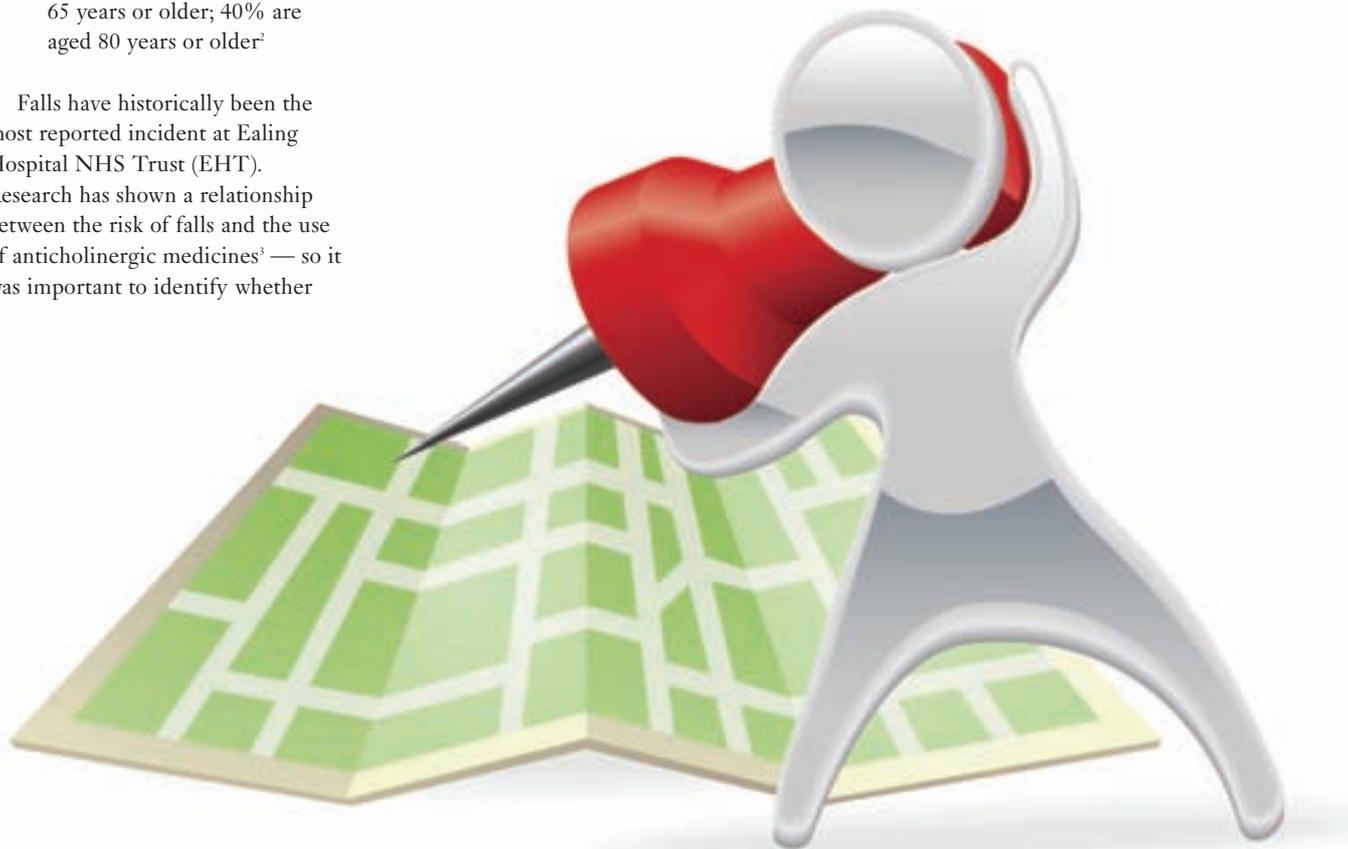
## Anticholinergic burden

Anticholinergic burden (ACB) is determined by identifying all anticholinergic medicines that a patient is taking. A guideline has been produced at EHT that assigns each anticholinergic medicine with a score of 1 to 3 according to its level of anticholinergic activity (see Figure, p120), in line with the recommendations of Boustani *et al.*<sup>4</sup> Where we identified a medicine with anticholinergic properties that was not listed in Boustani's research, it was given a score of 1.

ACB is calculated by totaling the scores for all anticholinergic medicines that the patient is taking.



**A GUIDELINE HAS BEEN PRODUCED THAT ASSIGNS EACH ANTICHOLINERGIC MEDICINE WITH A SCORE OF 1 TO 3, ACCORDING TO ITS LEVEL OF ANTICHOLINERGIC ACTIVITY**



It has been shown that an increase in the number of anticholinergic drugs taken by patients directly increases their ACB.<sup>3</sup> Increasing a patient's ACB by one point has shown to increase the risk of mortality by 26%. Furthermore, patients with an ACB score greater than 3 have a "high risk" of mortality.<sup>3</sup>

### Audit results

Of the 87 patients assessed during the audit, 55 were taking at least one anticholinergic medicine. Of these 55 patients:

- 46 (84%) had an ACB of 1 or 2 — 31 of whom were at high risk of falls
- Nine (16%) had an ACB of 3 or more — three of whom were at high risk of falls

In total, 69% of all patients were at a high risk of falls, 21% were at a low risk of falls and 10% had no risk documented. Of the patients

deemed to be at risk of falls, 65% were women.

There may be a link between the risk of falls and the length of time patients have been taking anticholinergic medicines, since 85% of patients were taking these medicines before admission. In total, 22% of patients who had a high risk of falls had an ACB of 3 — requiring review as a matter of priority.

During the audit, the most common medicines with anticholinergic effects being taken were furosemide, codeine, warfarin, isosorbide mononitrate and ranitidine.

### ACB guideline

Following the audit, a pocket-sized guideline was produced to help doctors and pharmacists review anticholinergic drug treatment in patients at high risk of falls (see Figure, below).

The guideline includes lists of medicines with anticholinergic

effects (listed according to their ACB), instructions on how to calculate a patient's ACB and common symptoms that patients might experience while taking these medicines.

Where patients are found to be at high risk of falls and are taking anticholinergic medicines, healthcare teams are encouraged to review the patient in the following way:

- Medication — is the anticholinergic medicine indicated?
- Alternatives — can the anticholinergic medicine be replaced with an alternative treatment that does not have an ACB?
- Patient monitoring — if there is no alternative, patient symptoms should be monitored

At EHT, these questions have been emphasised using the simple mnemonic "MAP".

#### Reproduction of the pocket-sized guideline piloted at Ealing Hospital NHS Trust

## Calculating the anticholinergic burden for patients over the age of 65 years

If you have any questions contact the pharmacy team.

To calculate the anticholinergic burden (ACB), find the drug's ACB score from the relevant tables and add the scores up. If the patient's ACB is 3 or more, then try to review the anticholinergic medicines by using the mnemonic MAP:

- 1 Medication — Is it essential? If so . . .
- 2 Alternatives — Is there an alternative medicine with lower ACB? If not, then . . .
- 3 Patient monitoring — Monitor patient symptoms (and side effects they could potentially suffer from)

Follow the three simple steps to reduce the risk of falls by reducing the patient's ACB. For more information contact your ward pharmacist.

### ACB score = 1

Alverine	Diazepam	Morphine
Atenolol	Digoxin	Nifedipine
Beclometasone	Dipyridamole	Olanzapine
Bupropion	Fentanyl	Prednisolone
hydrochloride	Fluvoxamine	Quinidine
Captopril	Furosemide	Ranitidine
Chlordiazepoxide	Haloperidol	Theophylline
Chlortalidone	Hydralazine	Timolol maleate
Cimetidine	Hydrocortisone	Trazodone
hydrochloride	Isosorbide	Triamterene
Codeine	preparations	Warfarin
Colchicine	Loperamide	
Cyclobenzaprine	Metoprolol	

### ACB score = 2

Amantidine	Hyoscyamine	Procyclidine
Belladonna alkaloids	Imipramine	Promazine
Carbamazepine	Nortriptyline	Promethazine
Cyproheptadine	Orphenadrine	Propantheline
Diphenhydramine	Oxcarbazepine	Scopolamine
Disopyramide	Oxybutynin	Tolterodine
Doxepin	Paroxetine	Trifluoperazine
Flavoxate	Perphenazine	Trihexyphenidyl
Hydroxyzine	Pethidine	Trimipramine
	Prochlorperazine	

### ACB score = 3

Clozapine	Homatropine
Dicyclomine	Atropine
Chlorphenamine	Benztropine
Amitriptyline	Clomipramine
Clemastine	

### Side effects of anticholinergic medication:

Palpitations	Memory impairment
Dizziness	Drowsiness
Blurred vision	Increased heart rate
Confusion	Hyperthermia
Delirium	Constipation
Sedation	Increased number of falls (due to hypotension)
Dry mouth/lips/eyes	Decreased sweating
Urinary retention	

Monitor the patient for any side effects listed above.

## Implementation

After piloting the ACB guideline on an acute medical ward at EHT, a reaudit is to be conducted to establish whether it generates a reduction in the risk of falls for patients aged 65 years and over.

A team is to be set up to help determine suitable alternative treatments (with lower ACBs) to those listed in the guideline and to ensure patients with high ACBs, along with other complicated cases, are reviewed to reduce their risk of falling. The team will contain elderly care consultants, pharmacists and specialist nurses.

The guideline is easy to use and gives doctors and pharmacists a focus when reviewing the medicines taken by elderly patients.

Hopefully, along with reducing patients' risk of falling, it will lead to the discontinuation of unnecessary medicines. This reduction in polypharmacy could result in better adherence to treatment, and thus better outcomes for patients.

The author dedicates this article to her father Talib Hussain Chaudhry.

## References

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**THE GUIDELINE IS EASY TO USE AND GIVES DOCTORS AND PHARMACISTS A FOCUS WHEN REVIEWING THE MEDICINES TAKEN BY ELDERLY PATIENTS**



## Reflections of an independent prescriber

# Weighing your options

By **Emma Graham-Clarke**, MPhil, MRPharmS



The problem with critical care is that the usual standards and guidance have a tendency to disappear out of the window. Take weights. All patients should be weighed on admission to hospital, which is fine for elective patients and those who are reasonably fit. But this is impracticable for many patients we admit, such as those undergoing resuscitation.

This is the situation we found ourselves in the other day with a 64-year-old man who had collapsed with myocardial infarction. He had subsequently been admitted to the intensive care unit and, unsurprisingly, his admission clerking didn't include a weight.

With no previous notes to go on, we did the usual ICU thing and "guesstimated" a weight. This is usually not a problem with your average-sized patient where you're not so worried about drug doses, such as for this chap. However, we were having trouble sedating him to assess his brain function. We wanted to use a short-acting sedative — the drug of choice in this case was remifentanyl.

Now I don't know what it is, but as soon as you introduce the nanogram into a calculation everyone starts to sweat. It should not be any different from the conversion, say, between grams and milligrams but there must be a psychological barrier. So, I know what the dose should be (in ng/kg/min), I know the strength (5mg in 50ml), I have the patient's guesstimated weight (that's 95kg) and all I need to do is calculate the rate in ml per hour.

Several minutes, one bit of paper and a calculator later and I triumphantly produce a dose range of 5.7–8.4ml/h. A nurse colleague had done his own calculation and we compared results. Shock horror — he had calculated a dose range of 6–9ml/h. What was going on? Was he better at maths than me? (Surely not.) I rechecked my calculations and I looked at his.

The answer was simple: I had calculated on the basis of a weight of 95kg and he was working with a weight of 100kg.

Would this have made a difference? Not in this case, because we were titrating the dose according to response and we ended up giving him a far higher dose, and adding in a second drug, to sedate him (and, strictly speaking, we should really have used ideal body weight). Nonetheless, there are some weight-crucial medicines with which you could not take such an ad hoc approach.

Are there solutions? Yes. Some emergency departments have a type of weighbridge (where you can wheel the patient on and get a weight) and some beds have inbuilt scales. In our ICU we have access to some blocks that go under each wheel of the bed that can measure a patient's weight. It's just a matter of remembering that these are available — and knowing where to find them.

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**I DON'T KNOW WHAT IT IS, BUT AS SOON AS YOU INTRODUCE THE NANOGRAM INTO A CALCULATION EVERYONE STARTS TO SWEAT**



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