Table 1

Author, date and country	Patient group	Study type	Outcomes	Key results	Study weaknesses
Perry HE, *et al*, 1998, USA	25 patients (<16 years) attending an emergency department less than 24 hours after a single, potentially toxic overdose of paracetamol, given IV N-acetylcysteine (NAC). 29 patients previously given oral NAC were used as historical controls.	Observational	Hepatotoxicity (transaminases >1000 u/l) Encephalopathy Coagulopathy requiring FFP	8% IV; 6.9% oral; 0% either group when treated <10 hours after ingestion 0% IV; 3.4% oral None noted	Small non-randomised study
Buckley NA, *et al*, 1999, Australia	5 observational studies	Meta-analysis	Hepatotoxicity	There was no significant difference in the hepatotoxicity rates between IV and oral NAC.	Meta-analysis IV data was pooled from 4 studies (total of 341 patients) but oral data was taken from only one (1462 patients) of the 3 eligible studies (248 patients excluded)

Vomiting in paracetamol overdose

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Abstract
A short cut review was carried out to establish whether vomiting was a significant consequence of paracetamol (acetaminophen) overdose. Altogether 48 papers were found using the reported search, of which two presented the best evidence to answer the clinical question. The author, date and country of publication, patient group studied, study type, relevant outcomes, results and study weaknesses of these best papers are tabulated. A clinical bottom line is stated.

Clinical scenario
A 27 year old woman presents to the emergency department having taken a paracetamol overdose; she is not vomiting. You have been told that people with a significant overdose of paracetamol will vomit. You wonder whether this is true.

Three part question
In [patients who have taken an overdose of paracetamol] what [is the incidence] of [vomiting]?

Search strategy
Medline 1966–12/01 using the OVID interface. [exp overdose OR overdos$.mp OR exp poisons OR poison$.mp OR acute intoxic$.mp OR toxic$.mp] AND [exp acetaminophen OR acetaminophen.mp OR exp paracetamol OR paracetamol.mp OR (co-codamol OR co-dydramol OR co-proxamol).mp] AND [exp vomiting OR vomit$.mp OR nause$.mp OR emesis.mp] LIMIT to human AND English.

Search outcome
Altogether 48 papers of which two were relevant (table 2).

Comment(s)
Adams' paper quoted two further estimates of vomiting: the first (77%) referred to an anecdotal report in another paper [3]; the second (16%) was a value obtained from a prospective, observational study of 132 patients with four hourly levels above the 22 mg/l level all treated with methionine, only 5% vomited after the antidote.[4] The paper quotes two further sources that describe frequent vomiting.

No mention was made about any delay in starting antidote therapy in this group. Neither study addresses other factors such as adsorption of oral antidote by activated charcoal, nor the fact that oral therapy lasts longer than IV (72 and 24 hours respectively).

▸ CLINICAL BOTTOM LINE
The incidence of vomiting after paracetamol is relatively low and is amenable to antiemetic therapy.

Adams RA, Dallas V, Daniels RG, *et al*. Vomiting in paracetamol poisoning. *BMJ* 1980;**280**:560–1.
Scharman EJ. Use of ondansetron and other antiemetics in the management of toxic acetaminophen ingestions. *J Toxicol Clin Toxicol* 1998;**36**:19–25.

Table 2

Author, date and country	Patient group	Study type	Outcomes	Key results	Study weaknesses
Adams RA, *et al*, 1980, UK	392 patients with paracetamol overdose of whom 120 took paracetamol alone	Observational	Vomiting	11.7% vomited before the onset of antidote therapy	Does not report the incidence of vomiting in the paracetamol alone group Cannot exclude the confounding influence of co-ingestants (eg dextropropoxyphene in 112 patients)
Scharman EJ, 1998, USA	1009 adult patients with a paracetamol ovedose, who were reported to a poisons centre.	Observational	Vomiting	12.5% vomited (61% were in the toxic range and 41% had taken co-ingestants)	No attempt to assess the proportion of patients in the non-vomiting group who had taken co-ingestants or who were in the toxic range
			Antiemetic used and its effectiveness	33% failed first line antiemetic therapy and were given ondansetron: of these 16% failed (ie 4% required IV antidote)	