Towards evidence based emergency medicine: best BETs from the Manchester Royal Infirmary

Edited by K Mackway-Jones

Best evidence topic reports (BETs) summarise the evidence pertaining to particular clinical questions. They are not systematic reviews, but rather contain the best (highest level) evidence that can be practically obtained by busy practising clinicians. The search strategies used to find the best evidence are reported in detail in order to allow clinicians to update searches whenever necessary.

The BETs published below were first reported at the Critical Appraisal Journal Club at the Manchester Royal Infirmary. Each BET has been constructed in the four stages that have been described elsewhere. The BETs shown here together with those published previously and those currently under construction can be seen at http://www.bestbets.org.

Eight topics are covered in this issue of the journal:
- Lorazepam or diazepam for generalised convulsions in adults
- Capillary blood gases in COPD
- Salbutamol and ipratropium in COPD
- Nebulised epinephrine or corticosteroids in croup
- SimpliRed and diagnosis of deep venous thrombosis
- Prophylactic magnesium in myocardial infarction
- Monophasic or biphasic defibrillation
- Antibiotics for otitis media

Lorazepam or diazepam for generalised convulsions in adults
Report by John Butler, Specialist Registrar
Search checked by Mark Lewis, Specialist Registrar

Clinical scenario
A 45 year old woman epileptic presents after sustaining a grand mal convulsion at home. She starts fitting again on arrival in the emergency department; the fit does not stop spontaneously after five minutes. The paramedics have secured intravenous access before arrival but have not given any anticonvulsants. You wonder whether lorazepam is more effective than diazepam as a first choice drug to safely terminate this convulsion.

Three part question
In [an adult epileptic patient suffering a grand mal fit] is [intravenous lorazepam safer and more effective than intravenous diazepam] at [safely terminating the convulsions].

Search strategy
Medline 1966–09/00 using the OVID interface. [(exp epilepsy OR exp epilepsy, generalised OR exp epilepsy, tonic-clonic OR epilepsy.mp OR fits.mp OR exp convulsions OR convolution$.mp OR exp seizures OR exp alcohol withdrawal seizures OR seizure$.mp)] AND (exp lorazepam OR lorazepam$.mp)] LIMIT to human AND english.

Search outcome
Altogether 133 papers found of which 131 were irrelevant or of insufficient quality. The remaining two papers are shown in the table 1.

Comments
The incidence of status epilepticus is given as 15–30 per 100 000 per year. It carries a considerable mortality (approximately 10%). The best first line treatment remains controversial. The use of diazepam is limited by its rapid redistribution out of the CNS. The duration of action of diazepam is approximately 20–30 minutes. Pharmacokinetic studies of lorazepam have shown it has an elimination half life of 13 hours. Lorazepam has a much longer duration of anticonvulsant action than diazepam and has an equivalent onset of action. Studies in healthy volunteers suggest it has reduced cardiorespiratory side effects compared with other benzodiazepines. There may be an increased risk of thrombophlebitis when compared with intravenous diazemuls.
Clinical bottom line
Intravenous lorazepam is effective and safe in the treatment of status epilepticus. It should be the first line of treatment.

Capillary blood gases in COPD

Report by Ross Murphy, Senior Clinical Fellow
Search checked by Magnus Harrison, Clinical Research Fellow

Clinical scenario
A 60 year old man presents to the emergency department with an acute exacerbation of COPD. Analysis of blood gases is required. You wonder whether a capillary blood sample will be as accurate as an arterial blood sample.

Three part question
In [a patient with an acute exacerbation of COPD] is [a capillary blood sample as good as an arterial blood sample] at measuring [PaO\textsubscript{2}, PaCO\textsubscript{2} and pH]?

Search strategy
Medline 1966–11/00 using the OVID interface. {[Capillary$$.mp AND (exp blood gas analysis OR blood gas$$.mp OR blood gas$$.mp)] AND [(exp arteries OR arter$$$.mp) AND (exp blood gas analysis OR blood gas$$.mp OR blood gas$$.mp)]} LIMIT to human AND english.

Comments
Different studies have given slightly different results. There have been no statistically significant differences identified. Moreover the differences that have been seen are clinically insignificant as well. Further research in patients with COPD would be useful.

Clinical bottom line
Properly taken capillary blood samples accurately reflect arterial blood gas measures of PaO\textsubscript{2}, PaCO\textsubscript{2} and pH.

Table 1

<table>
<thead>
<tr>
<th>Author, date and country</th>
<th>Patient group</th>
<th>Study type (level of evidence)</th>
<th>Outcomes</th>
<th>Key results</th>
<th>Study weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leppik et al, 1983, USA</td>
<td>78 adult patients with status epilepticus.</td>
<td>PRCT</td>
<td>Clinical control of seizure activity:</td>
<td>Lorazepam 89% within 2 doses v diazepam 76% within 2 doses</td>
<td>Small numbers Many different types of seizure activity Some patients were treated prior to inclusion in trial. No long term follow up of patients.</td>
</tr>
<tr>
<td>Treiman et al, 1998, USA</td>
<td>384 patients with generalised convulsions from 570 patients with status epilepticus.</td>
<td>PRCT</td>
<td>Stopping all motor seizure activity / EEG activity in &lt;20 minutes.</td>
<td>55.8% v 64.9% v 58.2% v 43.6%</td>
<td></td>
</tr>
</tbody>
</table>

Table 2

<table>
<thead>
<tr>
<th>Author, date and country</th>
<th>Patient group</th>
<th>Study type (level of evidence)</th>
<th>Outcomes</th>
<th>Key results</th>
<th>Study weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Langlands JH and Wallace WT, 1965, UK</td>
<td>14 patients under investigation for pulmonary disease and 2 normal patients. Arterial blood v capillary blood from ear</td>
<td>Diagnostic test</td>
<td>Po\textsubscript{2}, Po\textsubscript{3}, pH</td>
<td>Mean difference 0.62 mm Hg (SD 4.1) NS</td>
<td>Small numbers. No power calculation. Do not know if any patients were suffering from COPD</td>
</tr>
<tr>
<td>Begin R et al, 1975, USA</td>
<td>45 patients in acute respiratory distress without circulatory shock. 15 were below age 16. Arterial blood v capillary blood from finger.</td>
<td>Diagnostic test</td>
<td>Po\textsubscript{2}</td>
<td>Mean difference 2.11 mm Hg (SD 4.4) r = 0.97</td>
<td>Small numbers. No power calculation. Do not know if any patients were suffering from COPD</td>
</tr>
<tr>
<td>Pitkin AP et al, 1994, UK</td>
<td>40 patients with chronic lung disease and a variety of arterial blood gas tensions. 29 had COPD and bronchiectasis. Arterial blood v capillary blood from ear.</td>
<td>Diagnostic test</td>
<td>Po\textsubscript{2}, Po\textsubscript{3}, pH</td>
<td>Mean difference 0.17 kPa (CI -1.09 to +0.75)</td>
<td>Small numbers. No power calculation. Patients suffered from a variety of underlying illnesses.</td>
</tr>
<tr>
<td>Dar K et al, 1995, UK</td>
<td>55 patients requiring measurement of blood gases. 22 had exacerbations of COPD. Arterial blood v capillary blood from ear.</td>
<td>Diagnostic test</td>
<td>Po\textsubscript{2}, Po\textsubscript{3}, pH</td>
<td>Mean difference 0.09 kPa (SD 0.59)</td>
<td>Small numbers. No power calculation.</td>
</tr>
</tbody>
</table>

www.emjonline.com
Salbutamol and ipratropium in COPD

Report by Magnus Harrison, Clinical Research Fellow
Search checked by Ross Murphy, Senior Clinical Fellow

Clinical scenario
A 59 year old man presents with an exacerbation of COPD. You wonder whether it is better to nebulise salbutamol or ipratropium bromide alone, or a combination of the two.

Three part question
In [patients presenting with an acute exacerbation of COPD] is nebulisation of [a beta 2 agonist alone, ipratropium bromide alone or a combination of the two] more effective at [controlling and improving symptoms].

Search strategy
Medline 1966–11/00 using the OVID interface. [{[(exp chronic disease OR exp hospitals, chronic disease OR chronic.mp) AND (exp lung disease, obstructive OR obstructive.mp)] OR exp emphysema OR exp pulmonary emphysema OR emphysema.mp OR exp bronchitis OR bronchitis.mp OR exp COPD OR exp COAD.mp OR airway obstruction.mp}] AND (acute.mp OR exacerbation.mp)] AND (exp ipratropium OR ipratropium bromide.mp OR atrovent.mp OR antimuscarinic.mp OR exp muscarinic antagonist OR exp bronchodilators agents OR bronchodilators.mp OR exp albuterol OR salbutamol.mp OR beta 2 agonist.mp OR exp terbutaline) AND (exp nebulisers OR vapourises.mp OR exp respiratory therapy OR nebulisers.mp) NOT (exp child OR children.mp OR exp paediatrics OR paediatric.mp) LIMIT to human AND english.

Search outcome
Altogether 162 papers found of which 157 were irrelevant or of insufficient quality. The remaining five papers are shown in table 3.

Comments
There are five randomised trials that address the three part question. All of the studies are of reasonable quality.

Clinical bottom line
Initial treatment can be either salbutamol or ipratropium nebulisers alone. There is no evidence to suggest that using both has additional benefit.

Table 3

<table>
<thead>
<tr>
<th>Author, date and country</th>
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<th>Study type (level of evidence)</th>
<th>Outcomes</th>
<th>Key results</th>
<th>Study weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reubuck AS et al, 1987, Canada</td>
<td>51 patients with an acute exacerbation of COPD (148 asthmatics also recruited) Ipratropium v fenoterol v both (all nebulised).</td>
<td>PRCT</td>
<td>FVC, FEV1, MMEFR, PEFR, cardiovascular markers at 45 min FVC, FEV1, MMEFR, PEFR, cardiovascular markers at 90 min</td>
<td>No significant difference</td>
<td>No sample size calculation. Small groups in each of the treatment arms, thus small differences may go undetected.</td>
</tr>
<tr>
<td>O’Driscoll BR et al, 1989, UK</td>
<td>47 patients with COPD (an asthmatic group also recruited) Salbutamol v salbutamol plus ipratropium bromide</td>
<td>PRCT</td>
<td>PEFR on arrival and at one hour</td>
<td>No difference in improvement (p&gt;0.55)</td>
<td>No sample size calculation, small groups in each treatment arm, thus important effects can be overlooked. No defined inclusion or exclusion criteria. 20 patients admitted, excluded from study. No actual figures given.</td>
</tr>
<tr>
<td>Shrestha M et al, 1991, USA</td>
<td>55 COPD patients with an acute exacerbation (FEV1 &lt;40% of predicted) Isoetharine plus placebo v isoetharine plus ipratropium bromide (inhaled)</td>
<td>PRCT</td>
<td>Times to discharge from ED</td>
<td>Time to discharge 91 minutes less in the salbutamol plus ipratropium group (p=0.05)</td>
<td>No difference Small numbers. Inhaled therapy</td>
</tr>
<tr>
<td>Moayyedi P et al, 1995, UK</td>
<td>62 COPD patients with an acute exacerbation Salbutamol v salbutamol plus ipratropium bromide (nebulised)</td>
<td>PRCT</td>
<td>Length of hospital stay Duration of nebuliser therapy FVC, FEV1, Subjective improvement on days 1, 3, 7 and 14</td>
<td>No significant difference No significant difference No significant difference</td>
<td>Power study retrospectively completed</td>
</tr>
<tr>
<td>Koutsogiannis Z and Kelly A-M, 2000, Australia</td>
<td>50 patients presenting to ED with an acute exacerbation of COPD. All patients started with salbutamol and ipratropium nebulisers and then salbutamol v ipratropium v salbutamol plus ipratropium.</td>
<td>PRCT</td>
<td>Absolute and percentage change in FEV1 at 90 min</td>
<td>No difference between the 2 groups (p=0.36 for absolute change, p=0.56 for % change)</td>
<td>No sample size calculation. Groups are small thus any differences may be overlooked. All patients had both drugs initially.</td>
</tr>
</tbody>
</table>
Nebulised epinephrine or corticosteroids in croup
Report by Angaj Ghosh, Senior Clinical Fellow
Search checked by Rosemary Morton, Consultant

Clinical scenario
A 4 year old girl attends the emergency department with moderately severe croup. You have heard that croup responds to corticosteroid therapy, but wonder whether it is more effective than nebulised epinephrine

Three part question
In a [child with croup] is [nebulised epinephrine or nebulised budesonide] more effective at [reducing croup score and length of stay].

Search strategy
Medline 1966–11/00 using the OVID interface. [(exp croup OR croup.mp OR exp tracheitis OR laryngotracheitis.mp OR laryngotracheobronchitis.mp OR Stridor.mp) AND (exp epinephrine OR adrenaline.mp OR exp budesonide OR budesonide.mp)] LIMIT to human AND english.

Search outcome
Altogether 119 papers found of which 118 were irrelevant or of insufficient quality. The remaining paper is shown in table 4.

Comments
This study shows that there are no significant clinical differences between the two treatments. In such a case the relative cost of the treatment is an important factor in deciding which should be prescribed.

Clinical bottom line
Nebulised epinephrine and nebulised budesonide are as effective as each other in moderately severe croup.


Table 4

<table>
<thead>
<tr>
<th>Author, date and country</th>
<th>Patient group</th>
<th>Study type (level of evidence)</th>
<th>Outcomes</th>
<th>Key results</th>
<th>Study weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fitzgerald D et al, 1996, Australia</td>
<td>66 hospitalised children with viral or spasmodic croup. Budesonide 2 mg v epinephrine 4 mg</td>
<td>PRCT</td>
<td>Change in total croup symptom score</td>
<td>7.1 (1.2) v 7.7 (1.1) (not significant)</td>
<td>Sample size calculated to be 66 but only 53 completed the 24 h study. No follow up</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Duration of croup attack in hours</td>
<td>31 (21) v 26 (21) (not significant)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Side effects</td>
<td>No significant difference</td>
<td></td>
</tr>
</tbody>
</table>

Prophylactic magnesium in myocardial infarction
Report by Mark Davies, Senior Clinical Fellow
Search checked by Angaj Ghosh, Senior Clinical Fellow

Clinical scenario
You see a 50 year old man with a two hour history of cardiac chest pain and an ECG suggestive of acute myocardial infarction. You decide to thrombolise. The cardiology registrar suggests that you also give intravenous magnesium to reduce the incidence of ventricular fibrillation. You wonder whether there is any evidence to support this.

Three part question
In [patients with suspected acute myocardial infarction] is [magnesium] effective at [reducing the incidence of ventricular fibrillation].

Search strategy
Medline 1966–11/00 using the OVID interface. [(exp myocardial infarction OR myocardial infarction.mp OR MI.mp) AND (exp magnesium sulfate OR magnesium sulfate.mp OR magnesium sulphate.mp OR exp magnesium OR exp magnesium.mp OR exp magnesium chloride OR magnesium chloride.mp) AND (exp arrhythmia OR arrhythmia.mp OR dysrhythmias.mp OR exp ventricular fibrillation OR ventricular fibrillation.mp OR VF.mp) or (exp mortality/ or mortality.mp)] AND maximally sensitive RCT filter LIMIT to human AND english.

Search outcome
Altogether 103 papers found of which 86 were irrelevant and 12 of insufficient quality for inclusion. The remaining five papers are shown in table 5.

Comments
A number of small studies published have suggested that magnesium therapy significantly improves mortality following myocardial infarction. While the two larger studies show a trend to reduction in the incidence of ventricular fibrillation but also demonstrates that this benefit is outweighed by an increased incidence of detrimental effects.

Clinical bottom line
Routine prophylactic magnesium in patients with myocardial infarction is not indicated.

SimpliRed and diagnosis of deep venous thrombosis

Report by Steve Jones, Clinical Research Fellow
Search checked by Magnus Harrison, Clinical Research Fellow

Clinical scenario
A patient attends the emergency department with signs and symptoms consistent with a deep venous thrombosis. Somebody suggests that there is a new bedside blood test, called SimpliRed, that may help to rule out the diagnosis in your patient. You know that ruling out a diagnosis is possible by having a test with a high sensitivity or negative predictive value. You wonder what evidence there is to suggest that SimpliRed fulfils these criteria?

Three part question
In a [patient with a suspected DVT] does the [SimpliRed test] reliably [rule out the diagnosis]?

Search strategy
Medline 1966–11/00 using the OVID interface. [(exp thrombosis or exp venous thrombosis or thrombosis.mp OR venous thrombosis.mp deep venous thrombosis.mp) AND (exp fibrin fibrinogen degradation products or simplired.mp OR d-dimer$.mp)] LIMIT to human and english language OR Medline 1966–11/00 using the OVID interface. simplired.mp.

Search outcome
Altogether 741 and 37 papers found of which 13 were relevant and of sufficient quality. These 13 remaining papers are shown in table 6.

Comments
The “gold standard” investigation for DVT is contrast venography. This has now been replaced in many centres with a strategy of single or serial compression ultrasound, hence the use of different reference standard tests.

If an investigation is to be used in order to rule out a diagnosis, then it must have a sensitivity of 95% or above. In some of the studies mentioned this is the case, however such is the variability of the results obtained in the other studies the safety of SimpliRed as a lone exclusionary test must be in question. The reasons for this variability may include the operators of the assay or the various techniques used. Many of the results however are still inadequate.

Clinical bottom line
It is not safe to use SimpliRed as a lone exclusionary test for a patient presenting to the emergency department with a possible DVT.
Table 6

<table>
<thead>
<tr>
<th>Author, date and country</th>
<th>Patient group</th>
<th>Study type (level of evidence)</th>
<th>Outcomes</th>
<th>Key results</th>
<th>Study weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wells PS et al, 1995, Canada</td>
<td>214 consecutive patients referred for investigation of DVT</td>
<td>Prospective cohort</td>
<td>Prevalence</td>
<td>25%</td>
<td>No sample size calculation</td>
</tr>
<tr>
<td>Brenner B et al, 1995, Israel</td>
<td>86 consecutive patients referred for investigation of DVT</td>
<td>Prospective cohort</td>
<td>Prevalence</td>
<td>58%</td>
<td>Small patient numbers. No sample size calculation. No confidence intervals</td>
</tr>
<tr>
<td>Turkstra F et al, 1996, Netherlands</td>
<td>234 consecutive patients referred for DVT or PE</td>
<td>Prospective cohort</td>
<td>Prevalence</td>
<td>27%</td>
<td>No sample size calculation (but good numbers)</td>
</tr>
<tr>
<td>Janssen MC et al, 1997, Netherlands</td>
<td>132 patients referred to ED or OPD for investigation of DVT</td>
<td>Prospective cohort</td>
<td>Prevalence</td>
<td>67%</td>
<td>No sample size calculation. Technique of assay may have affected results. Reference standard not applied to all patients</td>
</tr>
<tr>
<td>Ginsberg FS et al, 1997, Canada</td>
<td>398 consecutive patients referred to thromboembolic OPD as first episode of DVT</td>
<td>Prospective management study</td>
<td>NPV d-dimer alone</td>
<td>97.1% (CI 94.5, 98.8)</td>
<td>No sample size calculation. Reference standard not applied to all patients</td>
</tr>
<tr>
<td>Mayer W et al, 1997, Austria</td>
<td>108 consecutive patients referred to vascular laboratory as DVT</td>
<td>Prospective cohort</td>
<td>Prevalence</td>
<td>31%</td>
<td>Small patient numbers. No sample size calculation. Used single ultrasound as reference standard</td>
</tr>
<tr>
<td>Wildberger JE et al, 1998, Germany</td>
<td>250 consecutive patients referred for venography</td>
<td>Prospective cohort</td>
<td>Sensitivity</td>
<td>96%</td>
<td>No sample size calculation. Patient selection bias. No confidence intervals</td>
</tr>
<tr>
<td>Wells PS et al, 1998, Canada</td>
<td>496 consecutive outpatients referred with DVT</td>
<td>Prospective cohort</td>
<td>Overall sensitivity</td>
<td>94%</td>
<td>No sample size calculation. Patient selection bias. No confidence intervals</td>
</tr>
<tr>
<td>Mauron T et al, 1998, Switzerland</td>
<td>45 consecutive outpatients referred with DVT</td>
<td>Prospective cohort</td>
<td>Prevalence</td>
<td>33%</td>
<td>Small patient numbers. No sample size calculation. Wide confidence intervals</td>
</tr>
<tr>
<td>Carter CJ et al, 1999, Canada</td>
<td>200 consecutive patients referred to diagnostic radiology department with DVT</td>
<td>Prospective cohort</td>
<td>Prevalence</td>
<td>28%</td>
<td>No sample size calculation. Used single ultrasound as reference standard. Wide confidence intervals</td>
</tr>
<tr>
<td>Lennox AF et al, 1999, UK</td>
<td>200 consecutive patients referred to diagnostic radiology department with DVT</td>
<td>Prospective cohort</td>
<td>Prevalence</td>
<td>23%</td>
<td>No sample size calculation. Incorrect test procedure likely to give falsely high sensitivities. No confidence intervals</td>
</tr>
<tr>
<td>Farrell S et al, 2000, USA</td>
<td>173 consecutive patients referred to ED with DVT (48) or PE (125)</td>
<td>Prospective clinical trial</td>
<td>Prevalence</td>
<td>33%</td>
<td>Did not recruit all patients required. Used single ultrasound as reference standard. Wide confidence intervals</td>
</tr>
<tr>
<td>Van der Graaf F et al, 2000, Netherlands</td>
<td>112 outpatients referred to department</td>
<td>Prospective cohort</td>
<td>Prevalence</td>
<td>80%</td>
<td>Small patient numbers. No sample size calculation. Wide confidence intervals</td>
</tr>
</tbody>
</table>

NPV = Negative predictive value, NLR = Likelihood ratio for negative result.

Monophasic or biphasic defibrillation
Report by Russell Boyd, Consultant
Search checked by Angaj Ghosh, Senior Clinical Fellow

Clinical scenario
You have just finished an unsuccessful cardiac resuscitation in a patient who had an initial presenting rhythm of ventricular fibrillation. You wonder if one of the new biphasic defibrillators would have increased the possibility of successful defibrillation.

Three part question
In [an adult patient with ventricular fibrillation] is [biphasic or monophasic D/C shock] better [at restoring sinus rhythm]?

Search strategy
Medline 1966-11/00 using the OVID interface. (biphasic.mp OR monophasic.mp) AND (exp.defibrillation OR exp electric counter shock OR cardioversion.mp).

Table 7

<table>
<thead>
<tr>
<th>Author, date and country</th>
<th>Patient group</th>
<th>Study type (level of evidence)</th>
<th>Outcomes</th>
<th>Key results</th>
<th>Study weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greene HL et al, 1995, USA</td>
<td>171 patients undergoing electrophysiological studies for ventricular arrhythmias with induced VT and VF requiring external defibrillation. Monophasic vs biphasic</td>
<td>PRCT</td>
<td>Success of first shock in VT</td>
<td>85.2% (75/88) vs 97.6% (81/83)</td>
<td>Laboratory conditions for fresh arrhythmias</td>
</tr>
<tr>
<td>Mittal S et al, 1999, USA</td>
<td>184 patients undergoing electrophysiological testing for ventricular arrhythmias producing an induced VF. Monophasic vs biphasic</td>
<td>PRCT</td>
<td>Success of first shock</td>
<td>93% (80/86) vs 99% (97/98) (p=0.05)</td>
<td>Laboratory conditions for fresh arrhythmias</td>
</tr>
<tr>
<td>Bardy G et al, 1996, USA</td>
<td>294 patients with induced VF/VT during implantation of cardioversion devices Monophasic vs biphasic</td>
<td>PRCT</td>
<td>Success of first shock</td>
<td>86% (143/166) vs 86% (144/167)</td>
<td>Laboratory conditions for fresh arrhythmias. Results for VF and VF combined</td>
</tr>
</tbody>
</table>

Comments
There is some laboratory evidence that biphasic defibrillation has higher first shock success rates for defibrillation of VF/VT. A theoretical advantage exists with biphasic devices but there is no clinical evidence of increased survival in cardiac arrest occurring outside the cardiac arrhythmia laboratory.

Clinical bottom line
The advantages of biphasic devices are currently mainly theoretical. No real world data exist that would suggest an immediate conversion to using biphasic devices.
Antibiotics for otitis media

Report by Angaj Ghosh, Senior Clinical Fellow
Search checked by Rupert Jackson, Specialist Registrar

Clinical scenario
A 2 year old child is brought into the emergency department with general malaise and irritability for the past 24 hours. Examination of the right ear reveals a diffusely red bulging ear drum. A diagnosis of acute otitis media is made. You wonder whether there is any evidence that oral antibiotics would decrease the time to recovery and prevent secondary complications.

Three part question
In [a systemically well child with otitis media] are [oral antibiotics better than placebo] at [decreasing time to recovery and reducing the incidence of secondary complications]? 

Search strategy
Medline 1966–11/00 using the OVID interface. Cochrane database. ([exp otitis media OR otitis media.mp OR acute otitis media.mp OR acute red ear.mp) AND (exp antibiotics OR antibiotic$.mp OR exp amoxycillin OR amoxycillin.mp OR exp amoxicillin-potassium clavulanate combination OR augmentin.mp OR co-amoxyclav.mp OR exp erythromycin OR exp erythromycin estolate OR erythromycin.mp OR exp penicillins OR penicillin.mp OR non-antibiotic treatment.mp OR placebo.mp]) AND maximally sensitive RCT filter LIMIT to human AND english.

Search outcome
Altogether 865 papers found of which 10 were relevant and had been meta-analysed by the Cochrane review group, which was last updated on the 28 April 2000. No further relevant papers have been published since. A meta-analysis done in 1994 was also selected. Details are shown in table 8.

Comments
Most cases of otitis media will spontaneously resolve.

Clinical bottom line
There is some benefit from the use of antibiotics in otitis media.

<table>
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<th>Study weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rosenfeld RM et al, 1994, USA</td>
<td>33 trials including 5400 children with acute otitis media</td>
<td>Meta-analysis</td>
<td>Complete clinical resolution of signs (primary control)</td>
<td>Compared with placebo or no drug, antimicrobial therapy increased primary control by 13.7% (8.2% to 19.2%) (NNT=7)</td>
<td>Outcome not patient oriented</td>
</tr>
<tr>
<td>Antibiotics v no antibiotics</td>
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</tr>
<tr>
<td>Glasziou PP et al, 2000, UK</td>
<td>7 trials with patient related outcomes. Total inclusion of 2202 children with acute otitis media</td>
<td>Systematic review</td>
<td>Pain at 24 hours</td>
<td>No difference</td>
<td>Only one episode of mastoiditis in all the trials</td>
</tr>
<tr>
<td>Antibiotics v no antibiotics</td>
<td></td>
<td></td>
<td>Pain between 2 and 7 days</td>
<td>28% (CI 15%, 38%) relative reduction with antibiotics (NNT=17)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Hearing between 1 and 3 months</td>
<td>No significant difference</td>
<td></td>
</tr>
</tbody>
</table>