Efficacy of penicillin V versus amoxicillin in clinical trials performed outside of hospitals. A review of literature.

A student project thesis by:
Philip Lawrence Skarpeid (PLS)

Supervised by:
Sigurd Høyøe
Abstract:

**Background:**
Bacteria’s resistance to antibiotics is an increasing problem that has been shown to correlate with the use of said medication, and broad-spectrum antibiotics give more resistance than narrow spectrum antibiotics. Most antibiotics are prescribed in primary health care, and in this setting mostly for upper airway infections. In Scandinavian countries narrow spectrum penicillin V is recommended, while most other countries have broad-spectrum amoxicillin as the recommended medication for these kinds of infections. We did a review of literature to identify what is known regarding treatment with penicillin V vs. amoxicillin for any diagnosis in primary health care.

**Basis of knowledge:**
We searched for relevant literature in both PubMed/Medline and Embase, with no time limits. This was done, and completed, on the 24 of May 2016. 1553 different studies were identified. 20 of these fulfilled the inclusion criteria. One further study was found as a reference, and so a total of 21 studies were included in this review.

**Results:**
Many of the studies were performed in the 70s and 80s, and are of a low to medium quality. The results for GAS support penicillin V as the recommended antibiotic. For acute sinusitis, acute otitis media, and borreliosis no significant difference was found between penicillin V and amoxicillin.

**Conclusion:**
The current recommendation of penicillin V is supported for GAS. For the other diagnoses there is no significant difference, contradicting results, or not enough evidence. We recommend other countries to consider penicillin V as the treatment of choice because of it narrower spectrum.
**Table of contents:**

- Introduction ................................................................................................................. 4
- Method ......................................................................................................................... 4
- Results ......................................................................................................................... 6
- Table 1 ......................................................................................................................... 10
- Discussion .................................................................................................................. 13
- Conclusion .................................................................................................................. 15
- Appendices ................................................................................................................. 16
- References ................................................................................................................... 20
Introduction:

Antibiotics are one of the great inventions of medicine, and its discovery has without a doubt saved countless lives. If we were to lose the ability to successfully use this type of medication in the treatment of disease, the consequences would be nothing short of devastating.

Bacterial resistance is the main challenge when it comes to the successful use of antibiotics, and it has been proven to be higher in countries where such medication is used more frequently (23). A reduction in the use of antibiotics also lowers the incidence of bacterial resistance (24). It has also been shown that the use of broad-spectrum antibiotics leads to a greater rise in bacterial resistance than the use of narrow spectrum antibiotics (25). With this in mind, the use of antibiotics should be kept low, and when used one should try to use narrow spectrum antibiotics in order to maintain antibiotics as an effective treatment for bacterial infections.

Studies also suggest that antibiotics might not have as strong an effect as perhaps believed for sore throat (26), acute otitis media (27), sinusitis (28) and bronchitis (29). Norway is in a position where narrow spectrum penicillin V is still the recommended treatment for most upper airway infections, as well as erythema migrans and more (30), but this is not the case in all countries. In England, penicillin V is only recommended for sore throat, and the more broad-spectrum amoxicillin is the recommended antibiotic for sinusitis and acute otitis media (31), even though there is little study on the appropriateness of antibacterial use (32), and the English guidelines informs prescribers to use narrow spectrum antibiotics where this is possible (31). In Norway most antibiotics are prescribed outside of hospital and nursing homes, and mostly by general practitioners (35). Of these prescriptions, around 60% are for common acute respiratory tract infections, where penicillin V is the recommended treatment (30).

The overall use of penicillin V is today declining relatively (33). This might be due to a number of causes, but regardless it is important to know what the efficacy of this antibiotic is. Where penicillin V is still an effective treatment, it should be chosen above broad-spectrum antibiotics, such as amoxicillin, to help prevent further unnecessary development of bacterial resistance. The aim of this review was to identify if there is any known difference in cure rates for bacterial infections in primary care, when treated with penicillin V or amoxicillin.

Method:

**Inclusion criteria:** All studies published where the clinical effect of penicillin V and amoxicillin, given per os, have been compared, in either a randomized controlled trial or solely controlled trial, as treatment for any diagnosis.

**Exclusion criteria:** Trials performed in a hospital setting, and trials where amoxicillin is given in combination with clavulanic acid.

The quality of the included randomised controlled trials (RCTs) was assessed by using the first six criteria from a checklist, designed for RCTs, provided by: “The Norwegian
Knowledge centre for the Health Services” (22). The quality was considered strong if five or six of the criteria were met, moderate if three or four of the criteria were met, and low if one, two or none of the criteria were met.

The quality of the included controlled trials (CTs) was assessed by using five of the six criteria used for the RCTs. The quality of these studies was considered strong if four or five criteria were met, moderate if two or three of the criteria were met, and low if one or none of the criteria were met.

The quality assessment was performed by the lead author (PLS), and the results can be seen in the table 1.

Basis of knowledge:
We searched for relevant literature in both PubMed/Medline and Embase, with no time limits. This was done, and completed, on the 24 of May 2016. References in all included studies were gone through to look for more studies, not found in the aforementioned search for literature, to include in this review. One person performed these steps (PLS), and the exclusion by title or abstract was done after going through all titles and/or abstracts twice.

PubMed/Medline:
PubMed/Medline Mesh terms: "Amoxicillin" and "penicillin v"
PubMed/Medline limitations:
Filters: Humans;
Languages: Danish; English; Norwegian; Swedish

PubMed/Medline search string can be found in the appendices.
This yielded a total of 202 hits.

Embase:
Embase subheadings:
Amoxicillin/ and penicillin V/

Embase limitations:
Human, English, Norwegian, Danish, Swedish

Embase search string can be found in the appendices.
This yielded a total of 1499 hits.

The search for literature gave us 1701 hits in total. 148 of these were duplicates, leaving us a total of 1553 different studies. 20 studies were included in regard to the inclusion and exclusion criteria, and one additional study (17) was found as a reference when going through these studies. The steps below describe this process.
Results:

An overview of the different studies included in this review (1-21) is given in table 1. Three controlled trials (4,17,20), and 18 randomized controlled trials were included. Below follows a summarization of the results for the different studies, grouped by diagnosis.

**Group A Streptococci (GAS):**
Eleven studies (1-4, 6, 9, 12, 14, 15, 18, 19) have been published comparing penicillin V with amoxicillin in the treatment of GAS. Of these studies, only one (4, a controlled trial (CT)) is not a randomized controlled trial (RCT). This study concludes that there is a significant difference in favour of amoxicillin for bacteriological eradication and clinical cure rates. One additional study (18) shows a significant difference, again in the favour of amoxicillin, but only as a significantly higher eradication rate on day 14 of follow-up, while the differences in clinical cure rates were non-significant. The remaining studies in this group (1-3,6,9,12,14,15,19) all conclude that there is no significant difference in cure rates between treatment with penicillin V and amoxicillin for GAS.

These studies were published over a period of more than 30 years, with the oldest being published in 1974, and the most recent one being published in 2008. Seven of these studies were performed in the United States (1,2,4,6,12,15,19), two were done in France (3,14), one was performed in Israel (18), and the final one was done in New Zealand (9).
The number of patients completing the trials varies from 55(12) to 503(15), and there are a lot of different treatment regimens (see table 1). Below follows short summarizations of these studies.

The four oldest studies are all RCTs and were performed in the US during the 70s and 80s (1,2,12,19). These studies were assessed to have a medium to low quality, and they all included children. One of these studies (12) also included adults. Three of these studies had between 100 and 200 patients completing their respective trials, but the remaining study only had 55 patients completing the trial. No significant differences in regards to cure rates were found between the two types of antibiotics in any of these studies.

Four of the included studies were performed during the 90s, all being RCTs. Two of these studies were performed in France (3,14), one was done in Israel (18), and the last one was carried out in the US (6). These studies were assessed to have a medium to high quality. All of these studies included children, and two of them (14,18) also included adults. Two of these studies had more than 200 patients participating and completing the trials, one had between 100 and 200 patients that completed the trial, and the remaining one had an unspecified number of patients completing the trial (6). Cure rates were not significantly different in any of these studies regarding the two types of antibiotics, situated at around or above 90%, and were generally higher than the cure rates in the older studies, and especially the earliest ones (1,2).

The three remaining studies were all done within the first ten years of the 21st century. The one from 2003 (4) is a CT, while the two from 2008 are both RCTs. Two of these studies were performed in the US (4,15), and one was done in New Zealand (9). All of these studies were assessed to have a high quality, and they all included children. Only one study also included adults, but no older than 20 years of age. All of these studies had more than 250 patients completing their respective trials, and one study had more than 500 patients completing the trial (15). The two RCTs have similar cure rates as the trials performed during the 90s, and show no significant difference in cure rates for the two types of antibiotics. The only CT for GAS included in this review has cure rates more similar to those found in the early 70s (1,2), but in contrast to these studies shows a significant difference in cure rates in favour of amoxicillin with a cure rate of 73% for penicillin V and 84% for amoxicillin.

More information on each study can be found in table 1.

**Acute otitis media:**
Two studies (8, 16) were identified where the treatment of otitis was tested in children with amoxicillin and penicillin V. In the older of the two (8), published in 1976, amoxicillin is shown to have a significantly better cure rate than penicillin V, while in the newer study (16), from 1982, no significant difference between the two types of antibiotics was found.

The oldest study is from USA. The cure rate for penicillin V in this study is somewhere between 72 - 75% (penicillin V was grouped together with other antibiotics tested in this trial (see table 1), and of such the explicit cure rate of penicillin V is not certain) and 92% for amoxicillin. Patient’s ages ranged from three months to five years old, and the
results are based on a total of 318 patients. Of these 79 were treated with penicillin V, and 78 were treated with amoxicillin. The remaining patients were treated with other antibiotics and are not discussed any further in this review. This study was assessed to be of high quality.

The newer study was performed in Finland. Cure rates were 88% for penicillin V and 87% for amoxicillin. Patients included were aged three months to nine years and seven months old. Of 65 patients treated in total, 34 patients were treated with penicillin V, and 31 were treated with amoxicillin. This study was assessed to be of medium quality.

Sinusitis:
The three studies (10, 11, 21) describing treatment of acute sinusitis have all tested treatment based on different information from imaging. Two of these are from Norway (10, 11), and one is from Finland (21).

The oldest study (10) is from 1996, and compared different treatment options for acute sinusitis when this diagnosis was confirmed by computed tomography (showing fluid level or total opacification). There was a significant difference in cure rates between placebo and the given antibiotics, but no significant difference between the two types of antibiotics. Cure rates were 82% for penicillin V and 88.6% for amoxicillin. Patient’s ages ranged from 16 – 74 years old, and results were gathered from 118 patients. This study was assessed to be of high quality.

The author of the above-mentioned study also conducted an investigation to test if antibiotics had a significant better effect than placebo when computed tomography only showed mucosal thickening (no fluid or opacification) (11). This study was published in 1998. There was no significant difference in cure rates between placebo and antibiotics, or between the different types of antibiotics. Cure rates were 75% for penicillin V and 77% for amoxicillin. These results are based on 63 patients with ages ranging from 16 – 83 years old. This study was assessed to be of medium quality.

The most recent study (21), published in 2003, was performed to check if antibiotics were more effective than placebo for the treatment of acute sinusitis diagnosed by the presence of fluid shown on ultrasound in the maxillary sinuses. No significant difference in cure rates between placebo and antibiotics was found, and there was no significant difference between the types of antibiotics. Cure rates were 81% for penicillin V and 78% for amoxicillin. Patient’s ages ranged from 18 – 75 years old, and results were drawn from the 146 patients completing the trial. This study was assessed to be of high quality.

Dental infection and prophylaxis:
Two studies (5, 13) compared the antibiotics of interest in regard to infections in this group. Both were performed in England, and both were published in 1993. One concerning the treatment of acute dentoalveolar abscess (5), and the other on the treatment of acutely abscessed primary teeth (13).

In the treatment of acute dentoalveolar abscess there was no significant difference between the two types of antibiotics. Both treatment groups had a 100% recovery. This was assessed by pain, swelling, temperature and lymphadenopathy on day 2 and 5 after
initial surgery. Patient’s ages ranged from 18 – 65 years old. Results are based on 98 patients completing the trial. Of these 33 were treated with penicillin V, and 32 were treated with amoxicillin. The remaining patients were treated with another antibiotic not discussed any further here (see table 1). This study was assessed to be of medium quality.

Treatment of the acutely abscessed primary teeth was done prior to the first stage of pulpectomy. Efficiency was assessed on day one, two and seven after surgery by pain, swelling, tenderness, mobility and lymphadenitis. Amoxicillin was shown to have a significant higher effect on the amount of teeth that were eligible for a first stage pulpectomy on day seven. Eligibility was 60,6% for penicillin V and 86,1% of amoxicillin on day seven. 58 patients completed this RCT, and of these 29 were given penicillin V, and 29 were given amoxicillin. This study was assessed to be of high quality.

The two remaining studies in this group assessed if there was a prophylactic effect to be attained if antibiotics were given prior to dental extraction (7, 17). This was measured by the incidence of bacteraemia after extraction in both studies. The older of the two studies is a CT performed in England that was published in 1978. It concludes that both types of antibiotics reduce bacteraemia after dental extraction. In direct contrast, the more recent study, a RCT performed in Sweden that was published in 1993, concludes that neither type of antibiotics had an effect on bacteraemia following extraction.

The older of the two studies had a total 120 patient included. 40 patients were given penicillin V, 40 patients were given amoxicillin, and the remaining 40 patients were given no treatment. Patient’s ages are not specified, but they were all adults. Viridans streptococci, anaerobic or both found were isolated from blood in 20% of those treated with penicillin V (4/20), and 25% (5/20) of those treated with amoxicillin. These differences were not significant. This study was assessed to be of medium quality.

The newer study included a total of 60 patients. 20 were given penicillin V, 20 were given amoxicillin and the remaining 20 patients were given placebo. Patient’s ages ranged from 23 – 74 years old. As stated, no reduction in bacteraemia was found (there was no difference between placebo and antibiotics, and no difference between the two types of antibiotics) in any of the treatment groups. This study was assessed to be of medium quality.

**Borreliosis:**

We identified one study (20) comparing penicillin V with amoxicillin in the treatment of borrelial lymphocytoma. No significant difference was found between the two treatment groups. This study is a CT performed in Slovenia over several years prior to it being published in 1996. Results were based on 65 patients. Of these 19 were treated with penicillin V, and six were treated with amoxicillin. The rest of the patients that completed this CT were given other treatment options not discussed any further here. Patient’s ages ranged from one and a half years to 72 years old. This study was assessed to be of medium quality.
Table 1:

<table>
<thead>
<tr>
<th>Year</th>
<th>Currency</th>
<th>Key Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>USA</td>
<td>$50 bill removed from circulation.</td>
</tr>
<tr>
<td>1991</td>
<td>USA</td>
<td>$100 bill removed from circulation.</td>
</tr>
<tr>
<td>1992</td>
<td>USA</td>
<td>$20 bill removed from circulation.</td>
</tr>
<tr>
<td>1993</td>
<td>USA</td>
<td>$5 bill removed from circulation.</td>
</tr>
<tr>
<td>1994</td>
<td>USA</td>
<td>$2 bill removed from circulation.</td>
</tr>
<tr>
<td>Condition</td>
<td>Age Group</td>
<td>Dose</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------</td>
<td>------</td>
</tr>
<tr>
<td>Doxycycline 500 mg</td>
<td>Adults</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>100</td>
</tr>
<tr>
<td>Erythromycin (oral)</td>
<td>Medium 65</td>
<td>RCT 5</td>
</tr>
<tr>
<td></td>
<td>Medium 383</td>
<td>RCT 5</td>
</tr>
<tr>
<td></td>
<td>High 150</td>
<td>RCT 5</td>
</tr>
<tr>
<td></td>
<td>Medium 70</td>
<td>RCT 5</td>
</tr>
<tr>
<td></td>
<td>Medium 130</td>
<td>RCT 5</td>
</tr>
<tr>
<td>Bacampicillin 250 mg</td>
<td>Children 1.12</td>
<td>RCT 5</td>
</tr>
<tr>
<td></td>
<td>Medium 157</td>
<td>RCT 5</td>
</tr>
<tr>
<td></td>
<td>High 57.9</td>
<td>RCT 5</td>
</tr>
<tr>
<td></td>
<td>Low 42</td>
<td>RCT 5</td>
</tr>
<tr>
<td></td>
<td>Medium 83</td>
<td>RCT 5</td>
</tr>
<tr>
<td></td>
<td>High 353</td>
<td>RCT 5</td>
</tr>
<tr>
<td></td>
<td>Medium 412</td>
<td>RCT 5</td>
</tr>
<tr>
<td></td>
<td>Medium 589</td>
<td>RCT 5</td>
</tr>
<tr>
<td></td>
<td>High 322</td>
<td>RCT 5</td>
</tr>
<tr>
<td></td>
<td>Medium 321</td>
<td>RCT 5</td>
</tr>
<tr>
<td></td>
<td>Medium 159</td>
<td>RCT 5</td>
</tr>
<tr>
<td></td>
<td>High 172</td>
<td>RCT 5</td>
</tr>
</tbody>
</table>

*Study-type N o. Patients Age range Quality*

Other medication with dosage if any.

*No treatment (control)*
NSD

**Median treatment length:** 1.5 weeks. 7/8 trial shows 6.8% of treatment

**Adherence:** More likely to be achieved in the past. 62% reach the target of 12 times 7/8 trial

**Why do you think this might be happening?**

- **NSD**
  - More likely to achieve the target of 12 times 7/8 trial

**NSD**

- Recovery rates follow up 4 weeks after discharge: 65/79% in 1 week

**NSD**

- Model is statistically better than the other three groups combined (p<0.05) with no rate of 5% or 7.2 to 7.5% 0.0

**NSD**

- Recovery rates follow up 4 weeks after discharge: 65/79% in 1 week

**NSD**

- Model is statistically better than the other three groups combined (p<0.05) with no rate of 5% or 7.2 to 7.5% 0.0

**NSD**

- Recovery rates follow up 4 weeks after discharge: 65/79% in 1 week

**NSD**

- Model is statistically better than the other three groups combined (p<0.05) with no rate of 5% or 7.2 to 7.5% 0.0

**NSD**

- Recovery rates follow up 4 weeks after discharge: 65/79% in 1 week

**NSD**

- Model is statistically better than the other three groups combined (p<0.05) with no rate of 5% or 7.2 to 7.5% 0.0
Discussion:

**Summary of main results:**
Since the 1970s only 21 studies have been performed where penicillin V has been tested directly against amoxicillin for the treatment of any diagnosis, and more than 50% of these studies were done on the treatment of GAS. If the studies on GAS are excluded, it has been 19 years since a study was performed to test the efficacy of penicillin V against that of amoxicillin for any diagnosis, and for acute otitis media no such comparison has been done in the last 30 years.

The results presented in this review for the treatment of GAS shows that both penicillin V and amoxicillin are viable choices of treatment for this diagnosis, and that there is no significant difference between the two. The relevance of the one study showing a significant difference between the two treatment options (4) has been judged as very low. This is due to it being the only CT, and the only study to show these results in the face of a higher number of trials performed in a more trustworthy way (RCT). This is in line with what is already known for the treatment of GAS, as there is little resistance among these bacteria (37). Penicillin V is the recommended treatment in both Norway (33) and England (31).

The results presented in this review for acute otitis media are not as clear as those for GAS. The most recent study shows no significant difference between the two types of antibiotics, while the six-year-older study shows a significant difference in the favour of amoxicillin. Both studies were based on children, but the number of patients treated with the antibiotics in question was more than double the number in the oldest study. The oldest study was also assessed to be of a higher quality than the newer one. The two studies were also performed in different countries. It is not easy to come to any sort of conclusion based on only these two studies. In England, amoxicillin is the preferred treatment (31), and in Norway penicillin V is the treatment of choice (30).

The three studies identified for acute sinusitis all concluded that there was no significant difference between penicillin V and amoxicillin. These studies were not tested on the same diagnostic criteria, and only one of them concluded that antibiotics were any better than placebo. Whether penicillin V or amoxicillin should be used for the situations where antibiotics are better than placebo cannot be decided based on one independent study. The Norwegian guidelines list that penicillin V is the treatment of choice when antibiotics are required (30) while the English guidelines again recommend amoxicillin (31).

The studies on dental health showed no significant difference between penicillin V and amoxicillin for the post surgical treatment of acute dentoalveolar abscess, but a significant difference in favour of amoxicillin for the treatment of acutely abscessed primary teeth before first stage pulpectomy. The studies performed to assess if antibiotics could reduce post dental extraction bacteraemia contradict each other, but there was no difference between the two administered antibiotics in any of the two studies. The studies are of different design, and are both quite old. Again, to base the decision of treatment on so few, and even contradicting studies, cannot be done.
The one study identified where penicillin V and amoxicillin were tested against each other for the treatment of borreliosis showed no significant difference between the two types of antibiotics. This study was a CT, and the authors were very aware that these findings should not be interpreted without caution because of the way the study was performed. In Norway this condition is treated with penicillin V (30), but in England it is recommended to treat with amoxicillin, doxycycline or cefuroxime (34). Why these countries have different treatment regimens is a question we have been unable to find an answer to.

For GAS, there are many studies of high quality, some performed within the last 10 years, and a good basis of knowledge to recommend penicillin V as the antibiotic of choice for this diagnosis.

The remaining studies were performed on four more diagnoses/areas, and some of these are the only study done for a specific diagnosis where these antibiotics have been tested against each other. Furthermore, all of these studies are quite old. In the situation where there are two studies done, they contradict each other, and so for all of these diagnoses there is a combination of not enough studies done to conclude on what the best treatment is, and/or conflicting results. The choice of medication might have historical, microbiological or economical reasons, but is not based on clinical trials.

It has been shown that amoxicillin has several effects on the bacteria in our intestinal micro flora (36). Amoxicillin both supresses enterobacteria and gives rise to resistant enterobacteria. In addition, amoxicillin gives overgrowth of Candida or C. difficile in some patients. Penicillin V only supresses the bacteria in the intestinal flora a little, and gives none of the other complications as stated for amoxicillin (36).

One of the strengths of this review is how broad and systematic the search for literature was. By not using many limitations, and searching in two databases, the probability for having most of the relevant literature included in the combined number of hits should be quite high. The fact that only one reference was found by going through all the included studies supports this.

The literature found by the initial search was gone through two times to decrease the probability of missing out on relevant literature, but it was gone through twice by the same person (PLS), and so the identification process might be a weak point in this review. When going through the literature for the second time, one additional study was identified that had been overlooked in the first read-through.

In this review we have only included studies with information on clinical efficacy. This might be a strength considering it has provided us with studies that can more easily be compared with one another, but we cannot deny the possibility that studies with relevant information were excluded because of this limitation.
Conclusion:

This review has uncovered that there seems to be a lack of evidence as to which treatment should be recommended for acute otitis media, acute sinusitis and borreliosis, while supporting the current recommendations for the treatment of GAS. To reduce the usage of broad-spectrum antibiotics, and in such a way reduce the rate of bacterial resistance, we have all reason to maintain narrow spectrum penicillin V as first line treatment where this is possible. In countries where amoxicillin is the current recommended treatment there is a potential and a need for new comparing studies of a high quality to see if penicillin V can be used as the treatment of choice.
Appendices:

PubMed/Medline search string:

Search (((penicillin v) OR (((((((((((((((((((((Phenoxymethylpenicillin) OR Fenoxymethylpenicillin) OR Penicillin, Phenoxymethyl) OR Phenoxymethyl Penicillin) OR Beromycin, Penicillin) OR Penicillin Berromycin) OR Beromycin, Penicillin) OR Penicillin Beromycin) OR Betapen) OR Pen VK) OR Penicillin VK) OR Penicillin V Sodium) OR Sodium, Penicillin V) OR V Sodium, Penicillin) OR V-Cillin K) OR V Cillin K) OR VCillin K) OR Vegacillin) OR Apocillin) OR Penicillin V Potassium) OR Potassium, Penicillin V)))) AND ((amoxicillin) OR (((((((((((((((((((((Amoxycillin) OR Amoxicillin Trihydrate) OR Trihydrate, Amoxicillin) OR Hydroxyampicillin) OR Amoxicillin Monopotassium Salt) OR Amoxicillin Sodium) OR Sodium, Amoxicillin) OR Amoxicillin Monosodium Salt) OR Amoxicillin, (R*)-Isomer) OR Amoxicillin Anhydrous) OR Anhydrous, Amoxicillin) OR Amoxicillin) OR Amoxicilline) OR BRL-2333) OR BRL 2333) OR BRL2333) OR Clamoxyl) OR Penamox) OR Clamoxyl G.A.) OR G.A., Clamoxyl) OR Pfizer Brand of Amoxicillin Sodium Salt) OR SmithKline Beecham Brand of Amoxicillin Sodium Salt) OR Clamoxyl parenteral) OR parenteral, Clamoxyl) OR Polymox) OR Trimox) OR Wymox) OR Actimoxi) OR Clariana Brand of Amoxicillin) OR Amoxicillin Clariana Brand) OR Amoxil))

Embase search string:

penicillin V/
OR
Phenoxymethylpenicillin.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Fenoxymethylpenicillin.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Penicillin, Phenoxymethyl.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Phenoxymethyl Penicillin.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Beromycin, Penicillin.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Berromycin, Penicillin.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Penicillin Berromycin.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Beromycin, Penicillin.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
Penicillin Beromycin.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Betapen.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Pen VK.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Penicillin VK.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Penicillin V Sodium.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Sodium, Penicillin V.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
V Sodium, Penicillin.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
V-Cillin K.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
V Cillin K.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
VCillin K.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Vegacillin.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Apocillin.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Penicillin V Potassium.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Potassium, Penicillin V.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]

AND

amoxicillin/
OR
Amoxycillin.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Amoxicillin Trihydrate.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Trihydrate, Amoxicillin.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Hydroxyampicillin.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Amoxicillin Monopotassium Salt.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Amoxicillin Sodium.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Sodium, Amoxicillin.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Amoxicillin Monosodium Salt.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Amoxicillin Anhydrous.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Anhydrous, Amoxicillin.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Amoxicilline.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
BRL-2333.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
BRL 2333.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
BRL2333.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Clamoxyl.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Penamox.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Pfizer Brand of Amoxicillin Sodium Salt.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Philip Lawrence Skarpeid

SmithKline Beecham Brand of Amoxicillin Sodium Salt.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Clamoxyl parenteral.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
parenteral, Clamoxyl.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Polymox.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Trimox.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Wymox.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Actimoxi.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Clariana Brand of Amoxicillin.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Amoxicillin Clariana Brand.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
OR
Amoxil.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
References:

(1)


