Children exhibit more rapid clearance of linezolid than adults; half-life is reported to range from about 2 to 4 hours, increasing with age.

◊ References.


1. MacGowan AP. Pharmacokinetic and pharmacodynamic profile of linezolid in healthy volunteers and patients with Gram-positive infections. *J Antimicrob Chemother* 2003; **51** (suppl S2): ii17–ii25.
2. Stalker DJ, Jungbluth GL. Clinical pharmacokinetics of linezolid, a novel oxazolidinone antibacterial. *Clin Pharmacokinet* 2003; **42:** 1129–40.
3. Whitehouse T, *et al*. Pharmacokinetic studies of linezolid and teicoplanin in the critically ill. *J Antimicrob Chemother* 2005; **55:** 333–40.


### Uses and Administration

Linezolid is an oxazolidinone antibacterial used for the treatment of Gram-positive infections of the skin and respiratory tract, including those due to vancomycin-resistant enterococci and meticillin-resistant *Staphylococcus aureus*.

It is given, orally or by intravenous infusion (over 30 to 120 minutes), in a usual adult dose of 600 mg every 12 hours for 10 to 14 days; treatment for up to 28 days may be necessary if there is vancomycin resistance. In uncomplicated skin and skin structure infections an oral dose of 400 mg every 12 hours for 10 to 14 days is usually sufficient.

For doses in neonates and children, see below.

◊ Reviews.


1. Plouffe JF. Emerging therapies for serious gram-positive bacterial infections: a focus on linezolid. *Clin Infect Dis* 2000; **31**(suppl 4): S144–S149.
2. Perry CM, Jarvis B. Linezolid: a review of its use in the management of serious gram-positive infections. *Drugs* 2001; **61:** 525–51.
3. Bain KT, Wittbrodt ET. Linezolid for the treatment of resistant gram-positive cocci. *Ann Pharmacother* 2001; **35:** 566–75.
4. Paladino JA. Linezolid: an oxazolidinone antimicrobial agent. *Am J Health-Syst Pharm* 2002; **59:** 2413–25.
5. Birmingham MC, *et al*. Linezolid for the treatment of multidrug-resistant, Gram-positive infections: experience from a compassionate-use program. *Clin Infect Dis* 2003; **36:** 159–68.
6. Wilcox MH. Efficacy of linezolid versus comparator therapies in Gram-positive infections. *J Antimicrob Chemother* 2003; **51** (suppl S2): ii27–ii35.
7. Falagas ME, *et al*. Linezolid for the treatment of patients with endocarditis: a systematic review of the published evidence. *J Antimicrob Chemother* 2006; **58:** 273–80.
8. Ntziora F, Falagas ME. Linezolid for the treatment of patients with central nervous system infection. *Ann Pharmacother* 2007; **41:** 296–308.
9. Falagas ME, *et al*. Linezolid for the treatment of adults with bone and joint infections. *Int J Antimicrob Agents* 2007; **29:** 233–9.
10. Manfredi R. Le prospettive terapeutiche di linezolid nelle infezioni da patogeni Gram-positivi multiresistenti. *Recenti Prog Med* 2007; **98:** 143–54.
11. Falagas ME, *et al*. Linezolid versus glycopeptide or beta-lactam for treatment of Gram-positive bacterial infections: meta-analysis of randomised controlled trials. *Lancet Infect Dis* 2008; **8:** 53–66.


**Administration in children.** UK licensed product information does not recommend the use of linezolid in children and adolescents below 18 years of age. However, the *BNFC* suggests the following doses of linezolid in the treatment of pneumonia or *complicated* skin and soft-tissue infections, given orally or by intravenous infusion over 30 to 120 minutes:

- neonates up to 7 days old: 10 mg/kg every 12 hours, increasing to every 8 hours if response is poor
- 7 days to 12 years of age: 10 mg/kg (to a maximum of 600 mg) every 8 hours
- 12 to 18 years: usual adult doses (see above).

Similar doses are licensed in the USA. US licensed product information also suggests that in the treatment of *uncomplicated skin* and *skin structure* infections, oral doses given every 12 hours are sufficient in those aged 5 to 11 years.

Further references.


1. Cuzzolin L, Fanos V. Linezolid: a new antibiotic for newborns and children? *J Chemother* 2006; **18:** 573–81.
2. Velissariou IM. Use of linezolid in children: an overview of recent advances. *Expert Rev Anti Infect Ther* 2006; **4:** 947–52.


**Administration in renal impairment.** Linezolid should be used with caution in patients with renal impairment (creatinine clearance less than 30 mL/minute). Although no dosage adjustment is required, licensed product information states that peak plasma concentrations of linezolid's two major metabolites were about tenfold higher in such patients after several days of treatment. As about 30% of a dose is removed during 3 hours of haemodialysis it is recommended that linezolid should be given after dialysis.

**Mycobacterial infections.** A systematic review[1] noted that linezolid has been used with some success as an adjunct in the treatment of multidrug-resistant tuberculosis (p.196); it has also been tried in nontuberculous mycobacterial infections (p.181). However, serious adverse effects such as peripheral or optic neuropathy (in 11 of 24 patients), and anaemia (10 of 24) were observed. The review concluded that although there was limited evidence suggesting linezolid may be effective as second-line adjunct therapy for patients with mycobacterial infections, its usefulness is limited by the frequent potentially severe complications of prolonged linezolid use.


1. Ntziora F, Falagas ME. Linezolid for the treatment of patients with mycobacterial infections: a systematic review. *Int J Tuberc Lung Dis* 2007; **11:** 606–11. Correction. *ibid.*; 936. (title change)


### Preparations

**Proprietary Preparations** (details are given in Part 3)
***Arg.:*** Zyvox; ***Austral.:*** Zyvox; ***Austria:*** Zyvoxid; ***Belg.:*** Zyvoxid; ***Braz.:*** Zyvox; ***Canad.:*** Zyvoxam; ***Chile:*** Zyvox; ***Cz.:*** Zyvoxid; ***Denm.:*** Zyvoxid; ***Fin.:*** Zyvoxid; ***Fr.:*** Zyvoxid; ***Ger.:*** Zyvoxid; ***Gr.:*** Zyvoxid; ***Hong Kong:*** Zyvox; ***Hung.:*** Zyvox†; Zyvoxid†; ***India:*** Linospan; Linox; Lizolid; ***Indon.:*** Zyvox; ***Irl.:*** Zyvox; ***Israel:*** Zyvoxid; ***Ital.:*** Zyvoxid; ***Malaysia:*** Zyvox; ***Mex.:*** Zyvoxam; ***Neth.:*** Zyvoxid; ***Norw.:*** Zyvoxid; ***NZ:*** Zyvox; ***Philipp.:*** Zyvox; ***Pol.:*** Zyvoxid; ***Port.:*** Zyvoxid; ***Rus.:*** Zyvox (Зивокс); ***S.Afr.:*** Zyvoxid; ***Singapore:*** Zyvox; ***Spain:*** Zyvoxid; ***Swed.:*** Zyvoxid; ***Switz.:*** Zyvoxid; ***Thai.:*** Zyvox; ***UK:*** Zyvox; ***USA:*** Zyvox; ***Venez.:*** Zyvox.

## Lomefloxacin Hydrochloride

*(BANM, USAN, rINNM)*

Hidrocloruro de lomefloxacino; Lomefloksasiinihydrokloridi; Lomefloksasin Hidroklorür; Loméfloxacine, Chlorhydrate de; Lomefloxacinhydroklorid; Lomefloxacini Hydrochloridum; NY-198; SC-47111; SC-47111A (lomefloxacin). (*RS*)-1-Ethyl-6,8-difluoro-1,4-dihydro-7-(3-methylpiperazin-1-yl)-4-oxoquinoline-3-carboxylic acid hydrochloride.

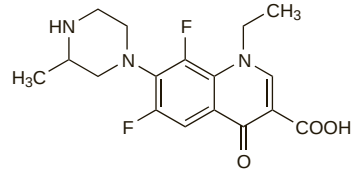
Ломефлоксацина Гидрохлорид

$C_{17}H_{19}F_2N_3O_3,HCl$ = 387.8.

*CAS — 98079-51-7 (lomefloxacin); 98079-52-8 (lomefloxacin hydrochloride).*

*ATC — J01MA07; S01AX17.*

*ATC Vet — QJ01MA07; QS01AX17.*




*(lomefloxacin)*

### Adverse Effects and Precautions

As for Ciprofloxacin, p.244.

A relatively high incidence of phototoxic reactions has been seen in patients taking lomefloxacin. Patients should be advised to avoid exposure to sunlight during, and for a few days after, lomefloxacin therapy, and to stop the drug immediately if phototoxicity occurs. Risk of phototoxicity may be reduced by taking lomefloxacin in the evening.

**Effects on the skin.** Lomefloxacin has been associated with a higher incidence of phototoxic reactions, particularly in patients over 60 years of age and/or with a history of fluoroquinolone treatment; the incidence was also high when used for 30 days or longer.[1] Experimental results[2] suggest that use of sunscreens to protect against lomefloxacin-induced phototoxicity may be feasible.


1. Arata J, *et al*. Photosensitivity reactions caused by lomefloxacin hydrochloride: a multicenter survey. *Antimicrob Agents Chemother* 1998; **42:** 3141–5.
2. Reinhardt P, *et al*. Broad-spectrum sunscreens prevent the secretion of proinflammatory cytokines in human keratinocytes exposed to ultraviolet A and phototoxic lomefloxacin. *Can J Physiol Pharmacol* 2006; **84:** 221–6.


### Interactions

As for Ciprofloxacin, p.246.

Lomefloxacin does not appear to interact significantly with theophylline or caffeine.

### Antimicrobial Action

As for Ciprofloxacin, p.246.

Most streptococci, including *Streptococcus pneumoniae*, are relatively resistant to lomefloxacin.

### Pharmacokinetics

Lomefloxacin is rapidly and almost completely absorbed after oral doses with peak plasma concentrations of about 3 micrograms/mL occurring about 1.5 hours after a 400-mg dose. Lomefloxacin is about 10% bound to plasma proteins. It is widely distributed into body tissues including the lungs and prostate.

The elimination half-life of lomefloxacin is about 7 to 8 hours, and is prolonged in patients with renal impairment. Lomefloxacin is excreted in the urine, about 65% as unchanged drug, 9% as the glucuronide, and less than 0.5% as other metabolites. Small amounts (about 10%) are also eliminated unchanged in the faeces. Negligible amounts of lomefloxacin are removed by haemodialysis or peritoneal dialysis.

◊ References.


1. Freeman CD, *et al*. Lomefloxacin clinical pharmacokinetics. *Clin Pharmacokinet* 1993; **25:** 6–19.


### Uses and Administration

Lomefloxacin is a fluoroquinolone antibacterial with actions and uses similar to those of ciprofloxacin (p.247).

It is given orally for the treatment of susceptible infections, including bronchitis due to *Haemophilus influenzae* or *Moraxella catarrhalis* (*Branhamella catarrhalis*), and urinary-tract infections. It is also used for surgical infection prophylaxis. Lomefloxacin is given as the hydrochloride but doses are expressed in terms of the base; lomefloxacin hydrochloride 441.5 mg is equivalent to about 400 mg of lomefloxacin. The usual dose is 400 mg once daily for 10 to 14 days. A dose of 400 mg once daily for 3 days is suitable in women with acute uncomplicated cystitis. Dosage in the evening may minimise the risk of phototoxic reactions.

For details of reduced doses in renal impairment, see below.

A single dose of 400 mg is used for surgical infection prophylaxis, given 1 to 6 hours before the procedure.

Lomefloxacin is also used topically as the hydrochloride in eye drops and ear drops containing the equivalent of 0.3% of lomefloxacin for the treatment of bacterial conjunctivitis and for the treatment of otitis externa and otitis media, respectively.

◊ General references.


1. Wadworth AN, Goa KL. Lomefloxacin: a review of its antibacterial activity, pharmacokinetic properties and therapeutic use. *Drugs* 1991; **42:** 1018–60.
2. Neu HC, ed. Lomefloxacin: development of a once-a-day quinolone. *Am J Med* 1992; **92** (suppl 4A): 1S–137S.


**Administration in renal impairment.** Dosage of lomefloxacin should be reduced in patients with renal impairment; the initial dose of 400 mg should be followed by maintenance doses of 200 mg daily in those with a creatinine clearance of 10 to 40 mL/minute per 1.73m$^2$ and in those on haemodialysis.

### Preparations

**Proprietary Preparations** (details are given in Part 3)
***Arg.:*** Okacin; ***Austria:*** Okacin; Uniquin; ***Belg.:*** Okacin; ***Braz.:*** Maxaquin; Meflox†; Okacin†; ***Chile:*** Okacin†; ***Cz.:*** Maxaquin†; Okacin; ***Denm.:*** Okacin; ***Fin.:*** Okacin; ***Fr.:*** Decalogiflox; Logiflox; ***Ger.:*** Okacin; ***Gr.:*** Okacin; ***Hong Kong:*** Lomeflox; Maxaquin; Okacin; ***Hung.:*** Okacin; ***India:*** Lomef; Lomflox; Ontop; ***Israel:*** Okacin; ***Ital.:*** Chimono; Lomebact; Maxaquin; Okacin; Uniquin; ***Jpn:*** Lomeflon; ***Malaysia:*** Lomaday†; Okacin†; ***Mex.:*** Lomacin; Maxaquin; ***Philipp.:*** Okacin; ***Pol.:*** Okacin; ***Port.:*** Basab†; Floxaquil†; Loransil; Loxina†; Maxaquin; Monoquin†; Okacin; Uniquin; ***Rus.:*** Ksenakvin (Ксенаквин); Lomflox (Ломфлокс); Maxaquin (Максаквин)†; Okacin (Окацин); ***S.Afr.:*** Maxaquin; Okacyn; Uniquin; ***Singapore:*** Lomflox; Okacin; ***Spain:*** Ocacin; ***Switz.:*** Maxaquin; Okacin; ***Thai.:*** Maxaquin†; Okacin; ***Turk.:*** Okacin; ***UAE:*** Lomax; ***USA:*** Maxaquin; ***Venez.:*** Liexina†; Loflox; Lomaday†; Lomex; Maxaquin; Okacin.

**Multi-ingredient:** ***Rus.:*** Lomecomb (Ломекомб); Protiocomb (Протиокомб).

## Loracarbef *(BAN, USAN, rINN)*

KT-3777; Loracarbefum; Lorakarbef; Lorakarbefi; LY-163892. (6*R*,7*S*)-3-Chloro-8-oxo-7-D-phenylglycylamino-1-azabicyclo[4.2.0]oct-2-ene-2-carboxylic acid monohydrate.

Лоракарбеф

$C_{16}H_{16}ClN_3O_4,H_2O$ = 367.8.

*CAS — 76470-66-1 (anhydrous loracarbef); 121961-22-6 (loracarbef monohydrate).*

*ATC — J01DC08.*

*ATC Vet — QJ01DC08.*

**Pharmacopoeias.** In *US*.

**USP 31** (Loracarbef). pH of a 10% suspension in water is between 3.0 and 5.5. Store in airtight containers.

### Adverse Effects and Precautions

Adverse effects of loracarbef are generally similar to those of other beta lactams (see Benzylpenicillin, p.213, and Cefalotin, p.219). They include gastrointestinal disturbances, particularly diarrhoea, and hypersensitivity reactions such as skin rashes. In-