

## AstraZeneca's Environmental Risk Summaries

As part of AstraZeneca's commitment to data transparency, this document provides environmental risk summaries for the Active Pharmaceutical Ingredients (API) found in our global brands. The summaries are consistent with the environmental information provided as part of our marketing applications, or where this is not available, from currently available data including scientific literature, where appropriate.

For each API, the potential environmental risk is calculated from the ratio between the Predicted Environmental Concentration (PEC) of the API in the aquatic environment (e.g. rivers) and the Predicted No Effect Concentration (PNEC), which is the concentration, based on available tests, below which no adverse effects on the ecosystem are expected to occur. For human pharmaceuticals, it is primarily the aquatic compartment that is of interest, since human medicines may be excreted partly or wholly unchanged by patients, subsequently entering the sewage system and ultimately rivers and other surface waters. The PEC is calculated using a worst-case scenario, assuming no metabolism by the patient or removal/degradation of the API during sewage treatment and using the total sales volumes for the API in the European country with the highest per capita use<sup>1</sup>. The sales volumes are based on all human medicines containing the API, including products marketed by other companies, where applicable. The PNEC is estimated by division of the lowest value for toxicity with the relevant assessment factor, as outlined by the European Chemicals Agency<sup>2</sup> and European Medicines Agency<sup>3</sup>.

The environmental risk is divided into four different categories depending on the PEC/PNEC ratio. The categories, described below, are consistent with the classification system<sup>4</sup> for environmental information on [www.fass.se](http://www.fass.se), the web version of the Swedish Prescribing guide.

The risk categories are as follows:

PEC/PNEC ≤ 0.1	Use of the substance has been considered to result in <b>insignificant</b> environmental risk.
0.1 < PEC/PNEC ≤ 1	Use of the substance has been considered to result in <b>low</b> environmental risk.
1 < PEC/PNEC ≤ 10	Use of the substance has been considered to result in <b>moderate</b> environmental risk.
PEC/PNEC > 10	Use of the substance has been considered to result in <b>high</b> environmental risk.

### Environmental risk data relating to our medicines

The table below provides an overview of the environmental risk of AstraZeneca's medicines. This information will be updated, if appropriate, as new data become available. The active pharmaceutical ingredients are listed alphabetically by their generic name. Where an API is used in a combination product (a medicine that contains more than one API) the brand name is followed by the generic name of the additional API contained within the product, in parenthesis.

<sup>1</sup> Per capita use calculated from kg sales data provided by IMS Health, MIDAS International Data 2016 ([www.imshealth.com](http://www.imshealth.com)) for 22 European markets (Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Norway, Poland, Romania, Slovakia, Spain, Sweden, Switzerland and United Kingdom), and population data taken from Eurostat (<http://ec.europa.eu/eurostat>).

<sup>2</sup> Guidance on information requirements and chemical safety assessment, 2008, Chapter R.10: Characterisation of dose [concentration]-response for environment  
[http://guidance.echa.europa.eu/docs/guidance\\_document/information\\_requirements\\_en.htm](http://guidance.echa.europa.eu/docs/guidance_document/information_requirements_en.htm)

<sup>3</sup> Guideline on the Environmental Risk Assessment of Medicinal Products for Human Use, 2006, EMEA/CPMP/SWP/4447/00 corr<sup>2</sup>. [http://www.ema.europa.eu/docs/en\\_GB/document\\_library/Scientific\\_guideline/2009/10/WC500003978.pdf](http://www.ema.europa.eu/docs/en_GB/document_library/Scientific_guideline/2009/10/WC500003978.pdf)

<sup>4</sup> Environmental classification of pharmaceuticals at [www.fass.se](http://www.fass.se): Guidance for pharmaceutical companies. 2012.  
[https://www.fass.se/pdf/Environmental\\_classification\\_of\\_pharmaceuticals-120816.pdf](https://www.fass.se/pdf/Environmental_classification_of_pharmaceuticals-120816.pdf)

For detailed information on the environmental fate/degradation/toxicity data as well as the calculation of the potential environmental risk, click on the generic compound name in the table below.

<b>Generic name</b>	<b>AstraZeneca Brand name</b>	<b>Therapy area</b>	<b>Environmental Risk</b>
<a href="#">Acclidium bromide</a>	Eklira Duaklir (formoterol fumerate)	Respiratory	*
<a href="#">Anastrozole</a>	Arimidex	Oncology	Insignificant
<a href="#">Atenolol</a>	Tenormin/Tenormine/Prenormine/ Atenol Nif-Ten (nifedipine) Tenoretic, (chlorthalidone)	Cardiovascular & Metabolic Disease	Insignificant
<a href="#">Bambuterol hydrochloride</a>	Bambec and Oxeol	Respiratory	Insignificant
<a href="#">Bicalutamide</a>	Casodex	Oncology	Insignificant
<a href="#">Budesonide</a>	Pulmicort Rhiocort Symbicort (formoterol fumerate)	Respiratory	Insignificant
<a href="#">Bupivacaine hydrochloride</a>	Marcaine and Sensorcaine	Neuroscience	*
<a href="#">Candesartan cilexetil</a>	Atacand Atacand Duo (Felodipine) Atacand Plus (hydrochlorothiazide)	Cardiovascular & Metabolic Disease	Insignificant
<a href="#">Ceftaroline fosamil</a>	Zinforo	Infection and Vaccines	Insignificant
<a href="#">Chlorthalidone</a>	Tenoretic (atenolol)	Cardiovascular & Metabolic Disease	Insignificant
<a href="#">Dapagliflozin</a>	Forxiga Xigduo (metformin) Qtern (saxagliptin)	Cardiovascular & Metabolic Disease	insignificant
<a href="#">Esomeprazole sodium/magnesium</a>	Nexium Vimovo (naproxen)	Gastrointestinal	Insignificant
<a href="#">Exenatide</a>	Bydureon	Cardiovascular & Metabolic Disease	Insignificant**
<a href="#">Felodipine</a>	Plendil/Modip/Splendil/Munobal/ Flodil Atacand Duo (candesartan)	Cardiovascular & Metabolic Disease	Low
<a href="#">Formoterol fumarate</a>	Oxis Symbicort (budesonide) Duaklir (Acclidium bromide)	Respiratory	Insignificant
<a href="#">Fulvestrant</a>	Faslodex	Oncology	Low

<b>Generic name</b>	<b>AstraZeneca Brand name</b>	<b>Therapy area</b>	<b>Environmental Risk</b>
<a href="#">Gefitinib</a>	Iressa	Oncology	Insignificant
<a href="#">Goserelin acetate</a>	Zoladex	Oncology	Insignificant**
<a href="#">Hydrochlorothiazide</a>	Zestoretic (lisinopril dehydrate) Atacand Plus (candesartan cilexetil)	Cardiovascular & Metabolic Disease	Insignificant
<a href="#">Influenza vaccine, live, attenuated</a>	Fluenz Tetra/ Flumist Quadrivalent	Infection and Vaccines	Low**
<a href="#">Isosorbide-5-mononitrate</a>	Imdur/Duronitrin	Cardiovascular & Metabolic Disease	*
<a href="#">Lidocaine hydrochloride</a>	Xylocaine EMLA (prilocaine)	Neuroscience	Insignificant
<a href="#">Lisinopril dihydrate</a>	Zestril Zestoretic (hydrochlorothiazide)	Cardiovascular & Metabolic Disease	Insignificant
<a href="#">Mepivacaine hydrochloride</a>	Carbocaine	Neuroscience	*
<a href="#">Meropenem</a>	Merrem/Meronem	Infection and Vaccines	Insignificant
<a href="#">Metformin hydrochloride</a>	Kombiglyze (saxagliptin) Xigduo (dapagliflozin)	Cardiovascular & Metabolic Disease	Low
<a href="#">Metoprolol succinate/tartrate</a>	Seloken/Seloken ZOK/Toprol-XL/ Betaloc/Betaloc ZOK Logimax (felodipine)	Cardiovascular & Metabolic Disease	Low
<a href="#">Naloxegol</a>	Movantik/Moventig	Neuroscience	Insignificant
<a href="#">Naproxen</a>	Vimovo (esomeprazole)	Gastrointestinal	Low
<a href="#">Nifedipine</a>	Nif-Ten (atenolol)	Cardiovascular & Metabolic Disease	*
<a href="#">Olaparib</a>	Lynparza	Oncology	Insignificant
<a href="#">Omeprazole</a>	Losec/Gastroloc/Mopral/Omepral/ Prilosec	Gastrointestinal	Insignificant***
<a href="#">Osimertinib mesylate</a>	Tagrisso	Oncology	Insignificant
<a href="#">Palivizumab</a>	Synagis	Infection and Vaccines	Insignificant**
<a href="#">Pramlintide</a>	Symlin	Cardiovascular & Metabolic Disease	Insignificant**

Generic name	AstraZeneca Brand name	Therapy area	Environmental Risk
<a href="#">Prilocaine hydrochloride</a>	Citanest Citanest Adrenaline (adrenaline) EMLA (lidocaine)	Neuroscience	Insignificant
<a href="#">Propofol</a>	Diprivan	Neuroscience	Low
<a href="#">Propranolol hydrochloride</a>	Inderal	Cardiovascular & Metabolic Disease	Low
<a href="#">Quetiapine fumarate</a>	Seroquel	Neuroscience	Low
<a href="#">Ramipril</a>	Ramace/Hypren/Pramace/Unipril/Vesdil. Unimax (felodipine)	Cardiovascular & Metabolic Disease	Insignificant
<a href="#">Roflumilast</a>	Daxas	Respiratory	Insignificant
<a href="#">Ropivacaine hydrochloride monohydrate</a>	Naropin	Neuroscience	Insignificant
<a href="#">Rosuvastatin calcium</a>	Crestor	Cardiovascular & Metabolic Disease	Low
<a href="#">Saxagliptin</a>	Onglyza Kombiglyze (metformin) Qtern (dapagliflozin)	Cardiovascular & Metabolic Disease	Insignificant
<a href="#">Tamoxifen citrate</a>	Nolvadex	Oncology	Low
<a href="#">Terbutaline sulphate</a>	Bricanyl Respules	Respiratory	Insignificant
<a href="#">Ticagrelor</a>	Brilinta/Brilique	Cardiovascular & Metabolic Disease	Insignificant
<a href="#">Vandetanib</a>	Caprelsa	Oncology	Insignificant
<a href="#">Zafirlukast</a>	Accolate/Accoleit/Vanticon	Respiratory	Insignificant
<a href="#">Zolmitriptan</a>	Zomig/Zomig Rapimelt/Zomig Nasal Spray/Zomigon	Neuroscience	Insignificant

\* Insufficient data available, see PDF document.

\*\* A PEC/PNEC ratio has not been calculated. The active pharmaceutical ingredient consists of amino acids/peptides/proteins/carbohydrates/lipids, due to their nature, these products are expected to undergo very rapid and extensive degradation and are unlikely to result in a significant risk to the environment.

\*\*\* Omeprazole is the R-enantiomer of the racemate Esomeprazole (S-enantiomer). In the absence of comprehensive environmental data for omeprazole, the more scientifically robust long-term data set for esomeprazole has been used to calculate the PNEC and total sales of both esomeprazole and omeprazole are included in the calculation of the PEC.