Australian Government
Department of Health
Therapeutic Goods Administration

Contamination of ranitidine medicines with the nitrosamine NDMA

TGA laboratory testing

Version 1.0, October 2019

TGA Health Safety Regulation

Ranitidine is a medicine marketed in Australia and overseas to treat heartburn by reducing stomach acid. It is also used in the treatment and prevention of gastric reflux and ulcers.

Following international reports of contamination of ranitidine medicines with an impurity called N-nitrosodimethylamine (NDMA), the TGA published an alert on our website in September 2019, which was updated in October. NDMA belongs to a class of chemicals called nitrosamines and is classified as a probable human carcinogen.

As part of the TGA's response to this issue, the TGA Laboratories have tested samples of the ranitidine medicines available on the Australian market. The purpose of this testing was to determine if NDMA was present in these medicines and to quantify the amounts present.

Sponsors of ranitidine medicines on the Australian market provided batch samples for TGA testing. Ten sponsors provided samples of the 34 products of ranitidine medicines on the market. The TGA Laboratories analysed a selection of the batch samples provided by sponsors in order to assess the extent of the problem.

Results are reported as parts per million NDMA in the ranitidine active ingredient rather than as content per tablet. Thus, for example, a result of 1 ppm NDMA in a 300 mg ranitidine tablet corresponds to 300 nanograms of NDMA per tablet.

The TGA Laboratories adapted a publically available US Food and Drug Administration test method using LC-HRMS (liquid chromatography with high resolution mass spectrometric detection) to test for NDMA in the samples. This method has a limit of quantitation of 0.1 parts per million (ppm) NDMA, equivalent to 0.1 microgram of NDMA per gram of ranitidine active ingredient. There is an internationally agreed limit of 0.3 ppm NDMA in the ranitidine active ingredient.

A total of 135 batch samples of ranitidine medicines have being tested by the TGA Laboratories. The nitrosamine contents of the ranitidine batches tested are shown in the Tables below. All of the products with levels of NDMA at or above 0.3 ppm (Table 1) have been recalled and removed from pharmacy shelves. The batches of ranitidine products with levels of NDMA below the 0.3 ppm limit (Table 2) are still available for sale. Please note that NDMA values above 3 ppm are considered to be estimates only. The method does not give a fully linear response above 3 ppm, hence there is greater uncertainty associated with these higher results.

Table 1: Ranitidine medicine batches with levels of NDMA at or above the acceptable limit (0.3ppm)

ARTG No	Product Name	Sponsor	Batch No*	Expiry Date*	Result (ppm NDMA)
285693	RANI 2 ranitidine 300mg (as hydrochloride) tablet blister pack	Alphapharm Pty Ltd	370653	Jun-20	3.7
			370654	Jun-20	5.4
			830251	Feb-21	1.2
			830412	Mar-21	2.5
			830411	Mar-21	4.1
			830656	May-21	1.4
			830914	Aug-21	1.7
			831277	Nov-21	3.0
			831374	Nov-21	3.1
			831373	Nov-21	3.2
			930189	Jan-22	0.4
			930376	Mar-22	0.8
			930377	Mar-22	0.9
			930480	Apr-22	0.3
			930481	Apr-22	0.3
			930597	Apr-22	0.4
285696	RANI 2 ranitidine 150mg (as hydrochloride) tablet blister pack	Alphapharm Pty Ltd	370651	Jun-20	7.7
			370652	Jun-20	14
			830246	Feb-21	1.0
			830409	Mar-21	1.0
			830410	Mar-21	1.1
			830408	Mar-21	1.2

ARTG No	Product Name	Sponsor	Batch No*	Expiry Date*	Result (ppm NDMA)
			830509	Apr-21	0.9
			830610	May-21	1.2
			830609	May-21	1.4
			831275	Nov-21	0.5
			831276	Nov-21	1.1
			831274	Nov-21	1.2
			930374	Mar-22	0.5
			930375	Mar-22	0.6
			930478	Apr-22	0.6
			930479	Apr-22	0.7
122013	APO-RANITIDINE ranitidine 150 mg (as hydrochloride) tablet blister pack	Apotex Pty Ltd	NW5096	Aug-21	1.1
			NW5098	Aug-21	2.0
			PV2244	Aug-21	2.0
			NW5097	Aug-21	2.1
			NW5095	Aug-21	2.2
			PJ8132	Sep-21	1.0
			RF0005	Jun-22	0.4
			RF0006	Jun-22	0.4
122014	APO-RANITIDINE ranitidine 300mg (as hydrochloride) tablet blister pack	Apotex Pty Ltd	NW5121	Aug-21	2.1
			NW5122	Sep-21	0.9
			PJ8126	Sep-21	1.0
			NW5123	Sep-21	1.2
			PZ3423[&]	Jan-22	1.1
			PZ3422	Jan-22	1.6
			RF0038	Jun-22	0.5

ARTG No	Product Name	Sponsor	Batch No*	Expiry Date*	Result (ppm NDMA)
254412	APOHEALTH RANITIDINE ACID & HEARTBURN RELIEF 150 mg (as hydrochloride) tablet blister pack	Apotex Pty Ltd	831050	Sep-21	1.6
			930112	Jan-22	0.3
			930409	Mar-22	0.7
			930704	May-22	0.6
254413	APOHEALTH RANITIDINE ACID & HEARTBURN RELIEF EXTRA STRENGTH 300 mg (as hydrochloride) tablet blister pack	Apotex Pty Ltd	830342	Feb-21	5.3
			831258	Nov-21	1.9
			930114	Jan-22	0.3
			930705	May-22	0.3
97354	AUSRAN ranitidine 150mg (as hydrochloride) tablet blister pack	Arrow Pharma Pty Ltd	7701349A	Feb-20	1.5
			CK807	Feb-20	2.2
			CM029	May-20	3.9
			7702666A	Dec-20	2.9
97355	AUSRAN ranitidine 300mg (as hydrochloride) tablet blister pack	Arrow Pharma Pty Ltd	CK719	Dec-19	0.4
			7701350A	Feb-20	1.0
			CL712	May-20	3.8
123658	CHEMISTS' OWN RANITIDINE FORTE ranitidine 300mg (as hydrochloride) tablet blister pack	Arrow Pharma Pty Ltd	CK361	Dec-19	0.4
			CL713	May-20	3.4
123670	CHEMISTS' OWN RANITIDINE 150mg (as hydrochloride) tablet blister pack	Arrow Pharma Pty Ltd	CK852	Feb-20	2.3
			CK853	Feb-20	2.4
			CL956	May-20	3.0
			CL957	May-20	3.4
12536	ZANTAC ranitidine 50mg/2mL (as hydrochloride) injection ampoule	Aspen Pharmacare Australia Pty Ltd	CA2L	Oct-20	0.3
			2U3U-B	Nov-20	0.3

ARTG No	Product Name	Sponsor	Batch No*	Expiry Date*	Result (ppm NDMA)
35188	ZANTAC ranitidine 150mg/10mL (as hydrochloride) oral liquid bottle	Aspen Pharmacare Australia Pty Ltd	17N001	Dec-19	1.0
			18M001	Nov-20	0.6
			19B001	Feb-21	3.2
45993	ZANTAC ranitidine 150mg (as hydrochloride) effervescent tablet tube	Aspen Pharmacare Australia Pty Ltd	1601908301	Nov-19	1.1
			190007038	Apr-22	1.1
			190007039	Apr-22	1.2
53323	ZANTAC ranitidine 300mg (as hydrochloride) tablet blister pack	Aspen Pharmacare Australia Pty Ltd	AJF6004A	Jun-19	5.1
			AJF9003A	Feb-22	0.7
53324	ZANTAC ranitidine 150mg (as hydrochloride) tablet blister pack	Aspen Pharmacare Australia Pty Ltd	AJE8021A	Nov-21	0.5
			AJE9005A	Feb-22	0.7
71786	ZANTAC ranitidine 150mg (as hydrochloride) tablet blister pack	Aspen Pharmacare Australia Pty Ltd	AJE8021B	Nov-21	0.5
			AJE8020A	Nov-21	2.0
			AJE9001A	Dec-21	0.5
			AJE9002A	Dec-21	0.6
			AJE9003A	Jan-22	0.7
			AJE9004A	Jan-22	0.9
			AJE9006A	Mar-22	0.6
			AJE9007A	May-22	0.9
95076	ZANTAC DOUBLE STRENGTH ranitidine 300mg (as hydrochloride) tablet blister pack	Aspen Pharmacare Australia Pty Ltd	AJF8012A	Oct-21	2.7
			AJF9001A	Dec-21	0.9
			AJF9002A	Feb-22	0.8
			AJF9005A	Mar-22	0.6
			AJF9004A	Mar-22	0.8
			AJF9006A	May-22	0.9

ARTG No	Product Name	Sponsor	Batch No*	Expiry Date*	Result (ppm NDMA)
219924	AMCAL HEARTBURN RELIEF EXTRA STRENGTH ranitidine (as hydrochloride) 300mg tablet strip pack	Cipla Australia Pty Ltd	EC90535	May-22	3.6
191837	PHARMACY ACTION Heartburn & Acid Indigestion Relief ranitidine 150mg tablets (as hydrochloride) blister pack	Generic Health Pty Ltd	830102	Dec-20	1.2
			830779	Jun-21	1.0
191838	PHARMACY ACTION Heartburn & Acid Indigestion Relief Forte ranitidine (as hydrochloride) 300mg tablet blister pack	Generic Health Pty Ltd	830232	Jan-21	1.6
210000	MEDIX HEARTBURN & ACID INDIGESTION ranitidine hydrochloride 167.5 mg tablets blister pack	Nova Pharmaceuticals Pty Ltd	JQ8003	Nov-21	0.5
281344	COLES HEARTBURN & ACID INDIGESTION ranitidine 150 mg (as hydrochloride) tablet blister pack	Nova Pharmaceuticals Pty Ltd	JQ9001	Mar-22	0.8
70356	RANITIDINE SANDOZ ranitidine 300mg (as hydrochloride) tablet blister pack	Sandoz Pty Ltd	JK8814	Oct-21	0.3
			JP7293	Jan-22	0.3
219142	RANITIDINE GH ranitidine (as hydrochloride) 300 mg film-coated tablet blister pack	Sandoz Pty Ltd	JE8892	Jul-21	0.4

ARTG No	Product Name	Sponsor	Batch No*	Expiry Date*	Result (ppm NDMA)
298409	PHARMACY HEALTH REFLUX RELIEF EXTRA STRENGTH ranitidine (as hydrochloride) 300 mg tablet blister pack	Soul Pattinson Manufacturing Pty Ltd	830435	Apr-21	1.4
298410	PRICELINE PHARMACY REFLUX RELIEF EXTRA STRENGTH ranitidine (as hydrochloride) 300 mg tablet blister pack	Soul Pattinson Manufacturing Pty Ltd	830436	Apr-21	1.0
			930113	Jan-22	0.4
303346	TERRYWHITE CHEMMART HEARTBURN RELIEF EXTRA STRENGTH ranitidine (as hydrochloride) 300 mg tablet blister pack	Soul Pattinson Manufacturing Pty Ltd	831052	Sep-21	1.8
192601	PHARMACY CHOICE ACID & HEARTBURN RELIEF ranitidine (as hydrochloride) 150mg tablets blister pack	Symbion Pty Ltd	831372	Nov-21	3.1
194056	PHARMACY CHOICE ACID & HEARTBURN RELIEF EXTRA STRENGTH ranitidine (as hydrochloride) 300 mg tablet blister pack	Symbion Pty Ltd	930593	Apr-22	0.4

* Batch number and expiry date information is usually printed or embossed on the end flaps of the tablet cartons.

Table 2: Ranitidine medicine batches with levels of NDMA within the acceptable limit (0.3ppm)

ARTG No	Product Name	Sponsor	Batch No*	Expiry Date*	Result (ppm NDMA)
97354	AUSRAN ranitidine 150mg (as hydrochloride) tablet blister pack	Arrow Pharma Pty Ltd	CJ603	Oct-19	0.1
			CJ923	Oct-19	0.1
			7702729A	Jan-21	<0.1
			7702826B	Feb-21	<0.1
			7702932B	Feb-21	<0.1
			5900022	Mar-21	<0.1
			5900045	Nov-21	0.2
			5900046	Nov-21	0.2
			7704325A	Dec-21	<0.1
97355	AUSRAN ranitidine 300mg (as hydrochloride) tablet blister pack	Arrow Pharma Pty Ltd	7702667A	Dec-20	<0.1
			7702730A	Jan-21	<0.1
			5900023	Mar-21	<0.1
			7703045A	Apr-21	<0.1
			7704367A	Dec-21	<0.1
			7705633A	May-22	<0.1
			7705645A	May-22	<0.1

ARTG No	Product Name	Sponsor	Batch No*	Expiry Date*	Result (ppm NDMA)
123658	CHEMISTS' OWN RANITIDINE FORTE ranitidine 300mg (as hydrochloride) tablet blister pack	Arrow Pharma Pty Ltd	7703045B	Apr-21	<0.1
			7704367B	Dec-21	<0.1
			7705645B	May-22	<0.1
123670	CHEMISTS' OWN RANITIDINE 150mg (as hydrochloride) tablet blister pack	Arrow Pharma Pty Ltd	CJ602	Oct-19	0.1
			CJ601	Oct-19	0.1
			7702826A	Feb-21	<0.1
			7702932A	Feb-21	<0.1
			7704325B	Dec-21	<0.1
75771	RANITIDINE SANDOZ ranitidine 50mg/5mL (as hydrochloride) concentrated injection ampoules	Sandoz Pty Ltd	JL6422	Oct-20	<0.1
			JN4108	Oct-20	<0.1

* Batch number and expiry date information is usually printed or embossed on the end flaps of the tablet cartons.

Version history

Version	Description of change	Author	Effective date
V1.0	Original publication	Therapeutic Goods Administration	22 October 2019

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Reference/Publication #