Summary

In this guide

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74. Boron is readily absorbed in the gastrointestinal tract, primarily as boric acid. Once absorbed, it distributes evenly across body fluids and soft tissues

with a higher accumulation in bones (2–3 times higher than in soft tissues). Boron crosses the placenta in humans and has been detected in placental and umbilical cord blood. Boron is not metabolized in the body, instead it is excreted largely unchanged in the urine.

75. Boron toxicity primarily affects the reproductive and developmental systems, as demonstrated in both human and animal studies. Although boron is not considered an essential nutrient for humans, low levels may confer some benefits to bone health and cognitive function. Oral exposure animal studies have demonstrated that the reproductive system and the developing foetus are the most sensitive targets of boron toxicity. Adverse developmental effects have been identified for both acute and intermediate-duration exposures.

76. A number of studies on boron are available, with a wide range of NOAEL/BMDL values reported. The toxicity of boron has been reviewed by a range of authoritative bodies. The differences in the HBGVs derived by these bodies is due to differences in interpretation of the critical studies, NOAEL/BMDL values selected, and uncertainty factors applied. Table 1 below summarises these values and the uncertainty factors used.

Table 1: Comparison of NOAEL/BMDLs, uncertainty factors and HBGV values from different authoritative bodies.

Authority	**NOAEL/BMDL (mg/kg bw/day)**	**Uncertainty factor**	**TDI/MRL (mg/kg bw/day)**
WHO (1993)	8.8	100	0.088
COT (1995)	10	100	0.1
ECETOC (1995)	9.6	30	0.32
EVM (2003)	9.6	60	0.16
WHO (2009)	10.3	60	0.17

ATSDR (2010)	10.3	66	0.2
EFSA (2013)	9.6	60	0.16
Health Canada (2023)	2.90	300	0.01
Health Canada (2023) alternative	10.6	60	0.18