

Human Botulism, Belgium NRC data: 10 years observation.

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Botulism is a life threatening paralyzing and potentially fatal disease caused by botulinum neurotoxins (BoNTs) produced by the *Clostridium botulinum* bacterium and more rarely by *C. argentinense*, *C. baratii* and *C. butyricum*. Since 1988, Sciensano (former WIV-ISP) performs the role of National Reference Center (NRC) for *C. botulinum* and *C. perfringens* and since 2020 also *C. tetani*, with key assignments such as the diagnosis, confirmation and surveillance of human botulism.

Human botulism

Mean incubation period	Main symptoms	Complications
1 – 10 days Usually 1 – 3 days	<ul style="list-style-type: none"> Digestive disorders (vomiting, diarrhea) during early stages of the disease Constipation frequent in final stages Paralysis of the accommodation muscles: blurred vision, double vision, mydriasis Facial paralysis: dry mouth, swallowing and speaking difficulties Limb paralysis (limb weakness to paraplegia) and respiratory muscle paralysis 	Mortality by respiratory failure
Duration of the symptoms		Causative agents
A few days to 8 months		<ul style="list-style-type: none"> <i>C. botulinum</i> <ul style="list-style-type: none"> Group I (proteolytic): BoNT types A, B and F Group II (non-proteolytic): BoNT types B, E and F Others (rare) <ul style="list-style-type: none"> <i>C. butyricum</i> (type E), <i>C. baratii</i> (type F), ...

Types of human botulism

- Foodborne botulism
- Infant botulism
- Wound botulism
- Iatrogenic botulism



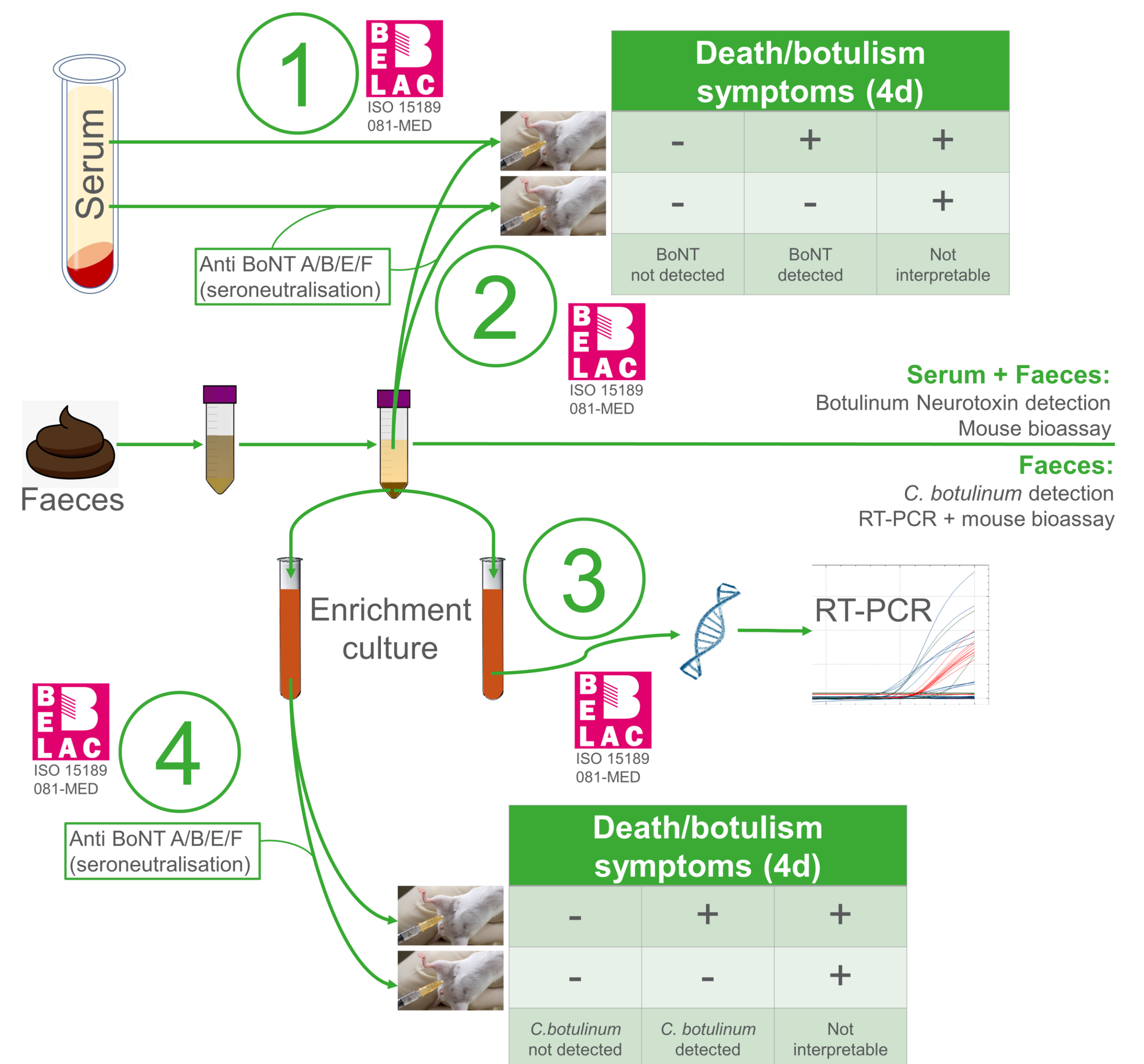
Botulism analyses at the NRC between 2011 - 2021

Year	N° of samples (N° of patients)	Confirmed cases	BoNT type	Source
2011	17 (9)	2	B / B ^a	Not confirmed
2012	15 (10)	0	-	-
2013	15 (9)	0	-	-
2014	22 (13)	1	B	Not confirmed
2015	24 (15)	2	B / B	Not confirmed / Artisanal ham
2016	19 (14)	1 + 1 ^b	B ^a / E ^b	Not confirmed / sausage
2017	15 (10)	0	-	-
2018	21 (18)	0	-	-
2019	22 (17)	1	B	Not confirmed
2020	13 (11)	1	B	Not confirmed
2021	11 (6)	0	-	-

^aInfant botulism

^bNon-Belgian case (Luxembourg)

Laboratory analyses for botulism at the NRC



- Botulinum neurotoxin (BoNT) detection (faeces + serum)
 - Mouse bioassay (MBA; golden standard) (1) + (2)
- C. botulinum* detection (faeces – after enrichment culture)
 - RT-PCR (3)
 - Mouse bioassay (MBA; golden standard) (4)

Confirmed cases – lab results

Reference	BoNT detection		<i>C. Botulinum</i> detection	
	Serum MBA (1)	Faeces MBA (2)	Faeces PCR (3)	Faeces MBA (4)
2011 – 1	+	-	ND	-
2011 – 2	-	+	ND	+
2014 – 1	-	+	ND	+
2015 – 1	-	-	+	+
2015 – 2	+	+	+	-
2016 – 1	+	ND	ND	ND
2016 – 2	ND	+	+	+
2019 – 1	-	+	+	+
2020 – 2	-	+	-	+

+ (Detected); - (Not detected); ND (Not done); MBA (Mouse Bioassay)

Conclusions

- Case-to-case variation between which analyses give a positive result
 - important to perform a maximum of complementary analyses
- Limited sensitivity on serum samples
 - Advised to also send a faeces sample in case of botulism suspicion
- Mouse bioassay remains important for laboratory confirmation of *C. botulinum* in case PCR is negative (eg case 2020 – 2)