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**Nationales Referenzzentrum
für Meningokokken und *H. influenzae***



Data from the NRZMHi for *H. influenzae* in 2020

1. Introduction

The tasks of the National Reference Laboratory for Meningococci and *Haemophilus influenzae* (NRZMHi) assigned by the Robert Koch Institute for the surveillance of **invasive *Haemophilus influenzae* disease** include serotyping of clinical isolates from blood or cerebrospinal fluid (CSF) and the detection of antibiotic resistance against β -lactam antibiotics. In 2020, all in all 488 submissions were analyzed including bacterial isolates from 392 patients with invasive infections. The NRZMHi could confirm the diagnosis *Haemophilus influenzae* in 380 cases with invasive disease. In five cases *H. parainfluenzae* from blood was detected. Furthermore, seven *H. influenzae* isolates derived from primarily sterile sites other than blood or CSF. These cases do not meet the criteria of the reference definition for a notifiable invasive infection. In 362 invasive cases, *H. influenzae* was isolated from blood, in 15 invasive cases from cerebrospinal fluid (CSF) only. Additionally there were three invasive cases where *H. influenzae* was isolated from both, blood and cerebrospinal fluid (CSF). Detection of *H. influenzae* from these materials must be notified according to the German Infection Protection Act (IfSG).

In 2020, the statutory notification system registered 487 invasive *H. influenzae* infections. Since the NRZMHi transmits all laboratory results to the local health authorities in charge, the coverage of the laboratory surveillance can be estimated based on these data. Thus, a coverage of 78% can be assumed for 2020.

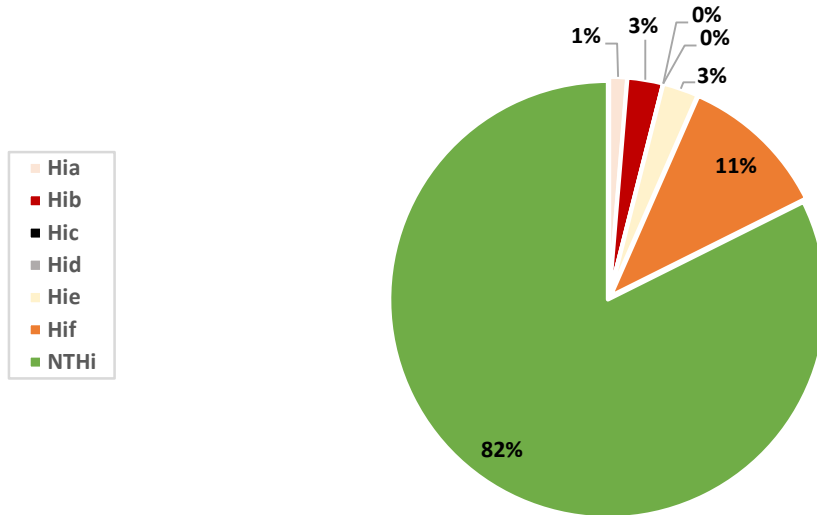
The Covid-19 pandemic had a remarkable impact on invasive *H. influenzae* disease: submissions to the NRZMHi and registered invasive cases, which both had been constantly increasing in previous years, dropped significantly in 2020. The observation has been analysed in an international study, where the NRZMHi participated, as well as by the Robert Koch Institute. The reduced rate of invasive *H. influenzae* infections could mainly be explained by effects of COVID-19 containment measures leading to decreased droplet transmission [1, 2].

As in previous years, the majority of blood or CSF isolates were non-typeable *H. influenzae* (NTHi, 313 isolates, 82 %), followed by Hif as the most frequent capsular serotype (42 cases; 11 %). Hie as well as Hib showed the third highest frequency among the serotypes (both 10 cases; 3 %). Compared to last year's results, Hib was one percentage more frequent. In comparison, Hia-cases slightly descended (5 cases, 1%). Neither Hic, nor Hid were isolated.

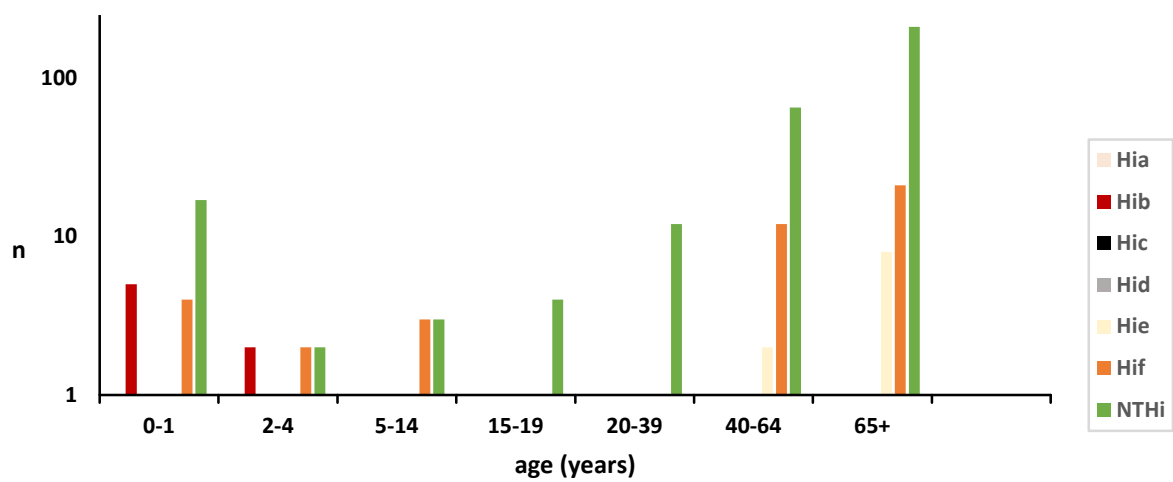
Among the analyzed cases, the age group most affected was > 40 years (322 cases; 85 % of all cases). In addition, a significant percentage of cases (33 cases; 9 %) was found in children aged <5 years.

The NRZMHi analyzed the frequency of ampicillin resistance using gradient agar diffusion tests. Ninety seven (25,5 %) were ampicillin resistant (MIC > 1 μ g/ml), of which 49 (12,9 % of all isolates) showed β -lactamase production. The NRZMHi has tested all isolates for cefotaxime susceptibility. Resistance to cefotaxime was found in four isolates (1%).

2. Serotype distribution of *H. influenzae* isolates from blood or CSF in 2020



3. Age distribution of patients with *H. influenzae* detected in blood or CSF

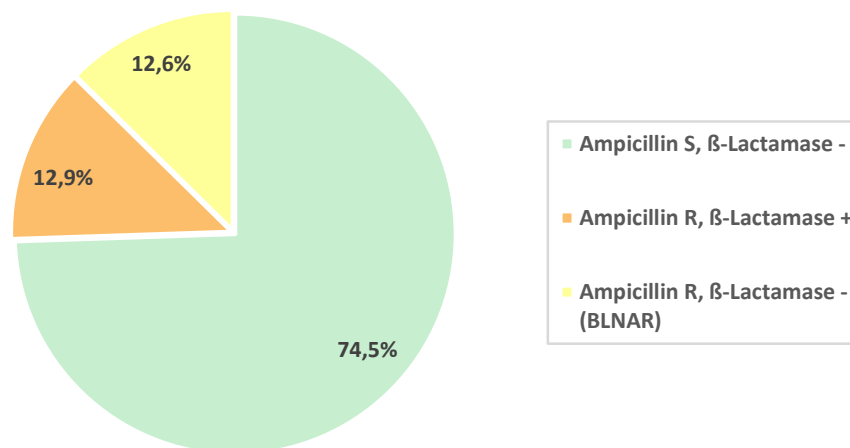


4. Serotype distribution in Federal States

	BW	BY	BE	BB	HB	HH	HE	MV	NI	NW	RP	SL	SN	SA	SH	TH	Summe
Hia	0	0	1	0	0	0	0	0	0	1	2	0	0	1	0	0	5
Hib	1	1	0	1	0	1	0	0	0	1	5	0	0	0	0	0	10
Hic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hie	3	1	0	0	0	0	0	1	0	0	2	0	1	0	2	0	10
Hif	5	7	2	3	0	1	2	0	3	10	3	0	1	1	1	3	42
NTHi	36	58	22	10	1	12	16	4	30	71	20	1	7	8	10	7	313
Total	45	67	25	14	1	14	18	5	35	88	25	1	10	9	13	10	380

BW: Baden-Württemberg, BY: Bavaria, BE: Berlin, BB: Brandenburg, HB: Bremen, HH: Hamburg, HE: Hessen, MV: Mecklenburg-Western Pomerania, NI: Lower Saxony, NW: North Rhine-Westfalia, RP: Rhineland-Palatinate, SL: Saarland, SN: Saxony, ST: Saxony-Anhalt, SH: Schleswig-Holstein, TH: Thuringia

5. Ampicillin resistance in isolates *H. influenzae* from blood or CSF



References

1. Robert Koch-Institut (2021). *Die Auswirkungen der COVID-19-Pandemie und assoziierter Public-Health-Maßnahmen auf andere meldepflichtige Infektionskrankheiten in Deutschland*. Epidemiologisches Bulletin. 2021(7): p. 5.
2. Brueggemann, A.B., van Rensburg, M.J.J., Shaw, D., McCarthy, N., Jolley, K.A., et al. (2020). *The Invasive Respiratory Infection Surveillance (IRIS) Initiative reveals significant reductions in invasive bacterial infections during the COVID-19 pandemic*. medRxiv. p. 2020.11.18.20225029.