Julius-Maximilians-
UNIVERSITÄT
WÜRZBURG

Institut für Hygiene und Mikrobiologie
Vorstand: Prof. Dr. med. Oliver Kurzai

Nationales Referenzzentrum
für Meningokokken und *H. influenzae*

Data from the NRZMHi for *H. influenzae* in 2022

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 2022, all in all 952 submissions were analyzed including submissions from 821 patients with invasive infections. The NRZMHi could confirm the diagnosis *Haemophilus influenzae* in 803 cases where disease isolates were available. In one case, *H. influenzae* was detected and serotyped by PCR from submitted DNA. In five cases, *H. parainfluenzae* from blood was detected, in other cases no bacteria were cultivated. Furthermore, two *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 762 invasive cases, *H. influenzae* was detected from blood, in 50 invasive cases from cerebrospinal fluid (CSF) only. Additionally, there were six 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).

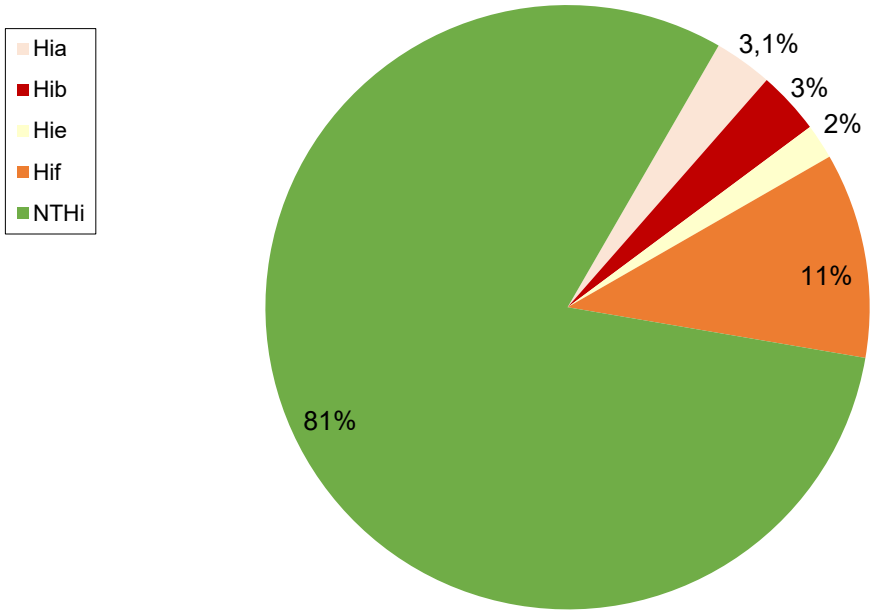
As in previous years, the majority of blood or CSF isolates were non-typeable *H. influenzae* (NTHi, 647 isolates, 81%), followed by Hif as the most frequent capsular serotype (88 cases; 11%). Hib showed the third highest frequency among the serotypes (27 cases; 3%), followed by Hia (25 cases, 6%). Hie was found in 13 cases (5%). Neither Hic, nor Hid were isolated.

Among the analyzed cases, the age group most affected was >40 years (684 cases; 84% of all cases). In addition, a significant percentage of cases (65 cases; 8%) was found in children aged <5 years.
The NRZMHi analyzed the frequency of ampicillin resistance using gradient agar diffusion tests. In nine of 803 cases, no viable isolate was available for testing. 163 (21%) were ampicillin resistant (MIC>1µg/ml), of which 96 (12% of all tested isolates) showed β-lactamase production. The NRZMHi has tested all isolates for cefotaxime susceptibility. Resistance to cefotaxime was found in five isolates (2%).

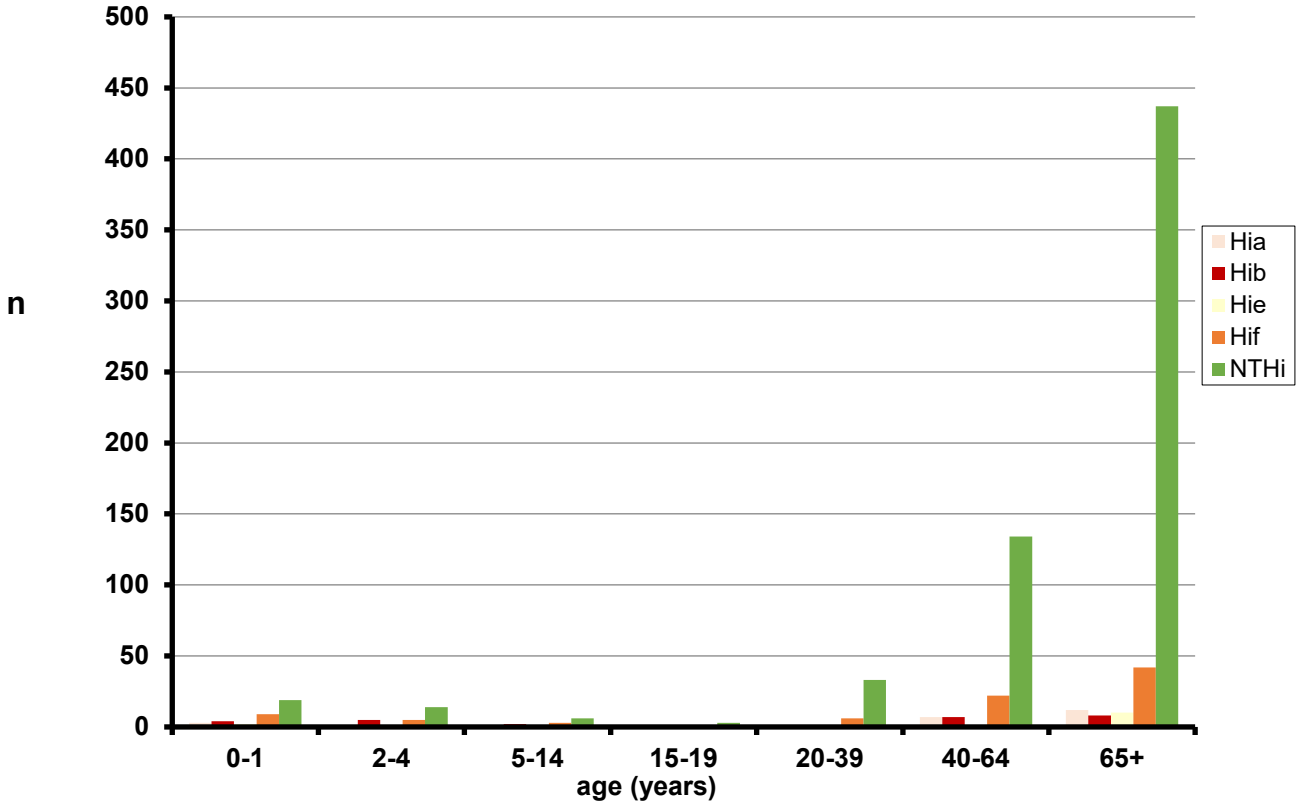
In 2022, the statutory notification system registered 1000 invasive *H. influenzae* infections. Since the NRZMHi transmits all laboratory results to the local health authorities in charge, the coverage of the laboratory surveillance can be estimated based on these data. Thus, a coverage of 80,3% can be assumed for 2022.

In 2022, invasive cases of *H. influenzae* infections were increased compared to the pandemic years in 2020-2021 and even exceeded pre-pandemic levels. The percentage of unencapsulated strains has augmented compared to 2021 due to cases in the age groups of >40 years. Ampicillin-resistance rates also increased.

2. Serotype distribution of *H. influenzae* isolates from blood or CSF in 2022



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	ST	SH	TH	n.n.	Summe
Hia	**4**	**3**	**3**	0	0	0	**1**	**1**	**3**	**5**	**1**	0	**4**	0	0	0	0	25
Hib	**5**	**5**	**1**	**1**	**1**	0	**1**	0	**2**	**6**	**1**	0	**1**	0	**1**	0	**2**	27
Hic	0	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	0
Hie	**3**	**3**	**1**	**1**	0	**1**	**1**	0	0	**3**	**1**	0	0	**1**	0	0	0	15
Hif	**20**	**13**	**3**	**5**	0	**4**	**5**	**1**	**6**	**20**	**2**	0	**5**	**1**	**4**	0	0	88
NTHi	**87**	**118**	**38**	**29**	**7**	**15**	**30**	0	**50**	**142**	**32**	**4**	**35**	**7**	**25**	**16**	**8**	647
Total	119	142	38	36	8	20	38	12	61	176	37	4	45	9	30	16	10	802

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