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DESCRIPTION OF PATIENTS HOSPITALIZED WITH MENINGOCOCCAL INFECTIONS IN FRANCE: AN ANALYSIS OF THE NATIONAL HEALTHCARE CLAIM (SNIIR-AM) DATABASE

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BACKGROUND

- Invasive meningococcal disease (IMD) is an uncommon but life-threatening disease.
- French national healthcare insurance database SNIIR-AM (Système National d'Information Inter-Régime de l'Assurance Maladie) includes demographic data, health care encounters, chronic medical condition, hospitalisations with ICD10 code for primary, linked, associated diagnoses and cost coding.

OBJECTIVES

- Describe hospitalized patients with confirmed IMD diagnosis.
- Characterize their care pathway and sequelae.

METHODS

- **Study design:** retrospective SNIIR-AM cohort.
- **Criteria inclusion:** all patients hospitalized related with IMD (ICD10 code A39) between 01 Jan 2012 and 31 Dec 2017 (6 years). The acute episode was defined as the first hospitalization with an ICD10 code of IMD.
- **Follow up:** from first hospitalization due to IMD until death or study end (31 Dec 2017).
- **Sequelae** identified during or after IMD hospitalization. Sequelae were identified through ICD10 codes (for fully covered long-term disease and hospital stays, devices, procedure and drugs for specific diseases, disease related groups (DRG) during hospital stays).
- **Cases/Controls:** cases are subjects who had an episode of IMD hospitalized during the study period (all serogroups are included). Controls are subjects without an IMD episode. The control group was matched with the case group (3 cases for 1 control) on age, sex and residence department.

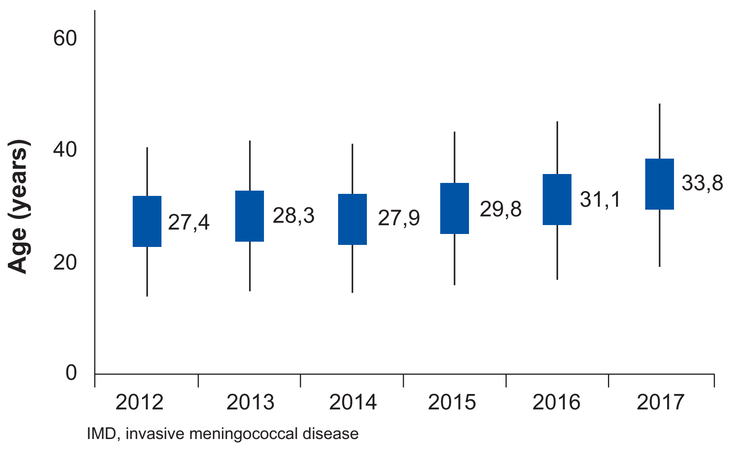
RESULTS

Socio-demographic characteristics

- 3,532 hospitalized patients (52% Male) with IMD diagnosis were identified from 01 Jan 2012 to 31 Dec 2017.
- 642 cases in 2012, 681 in 2013, 501 in 2014, 546 in 2015, 577 in 2016, and 585 cases in 2017; on average 588 cases hospitalized/year.
- Mean age was 29.7 years old.

Hospitalization characteristics

Figure 1. Average age of IMD between 2012 to 2017
⇒ increase in the average age of patients with IMD over the most recent years (31.1 and 33.8 years of age on average in 2016 and 2017)



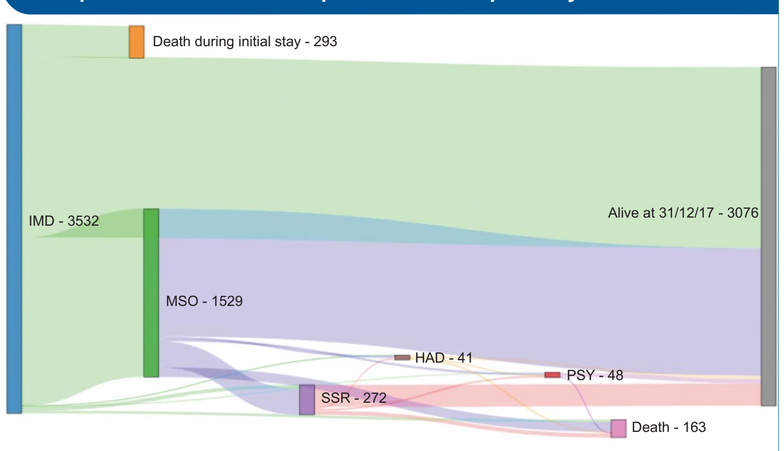
IMD, invasive meningococcal disease

- Two hospitalization peaks: infants under one year of age (13.3%) and adolescents between 15 and 19 years (11.0%).
- Average duration of initial hospitalization was 14.8 days (standard deviation [SD]= 24.0) for all cases and 10.0 days (SD=13.7) for patients under 25 years of age.

Care pathway

- Out of the 3,532 patients hospitalized with IMD diagnosis:
  - during the initial hospitalization 293 (8.3%) died
  - during their follow-up 1,529 (43.3%) were re-hospitalized in a Medicine Surgery Obstetrics (MSO) unit, 272 (7.7%) were admitted to a follow-up care and rehabilitation unit (SSR), 41 (1.2%) received home hospitalization (HAD) and 48 (1.4%) were admitted in a psychiatric hospital facility. Finally, 163 (4.6%) subjects died during follow-up after the initial hospitalization.
- The proportion of subjects who were re-hospitalized is higher among subjects with sequelae and the most important difference concerns hospitalizations in SSR (Follow Up and rehabilitation unit) (11.3% versus 0.9%; p<0.0001).

Figure 2. Pathway of the IMD population over the study period. Values correspond to the number of patients in each pathway.



IMD, invasive meningococcal disease; MSO, medicine surgery obstetrics; HAD, home hospitalization; PSY, psychiatric hospital facility; SSR, care and rehabilitation unit

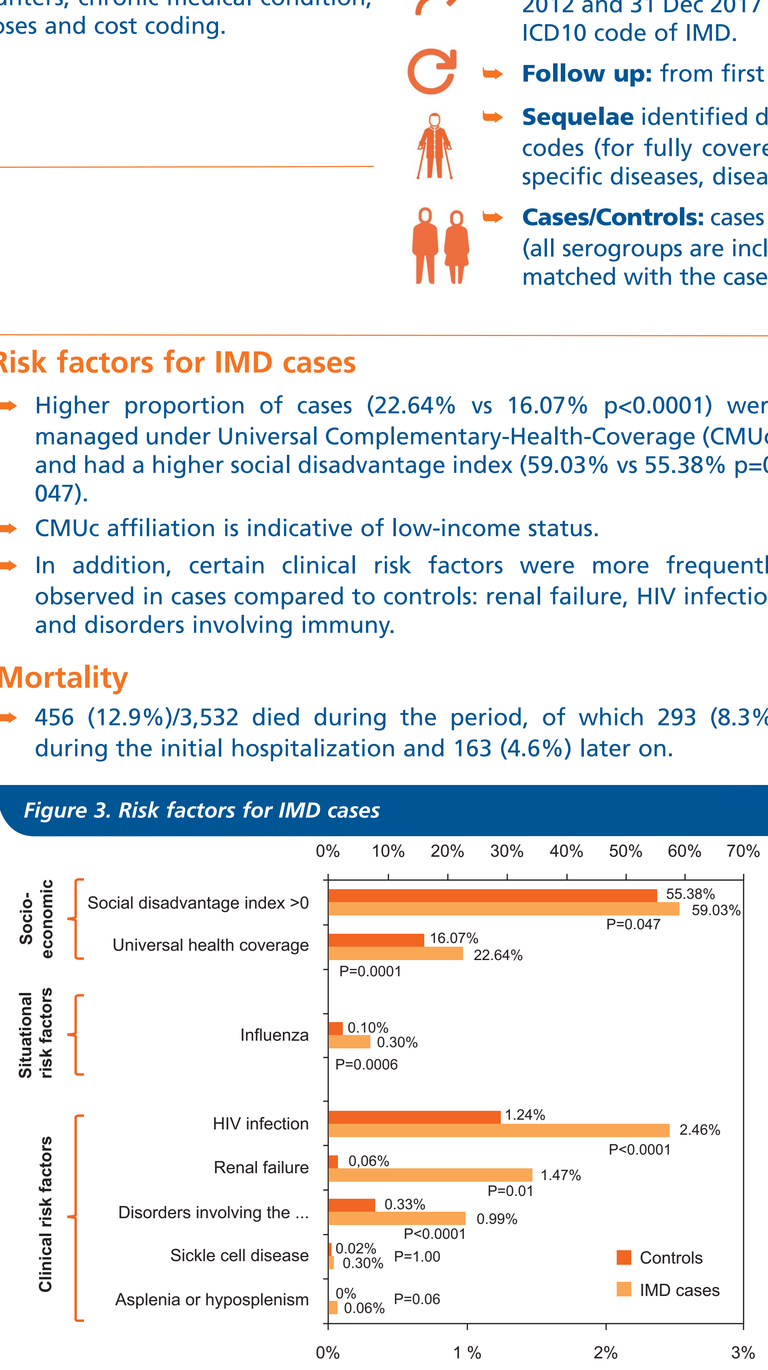
Risk factors for IMD cases

- Higher proportion of cases (22.64% vs 16.07% p<0.0001) were managed under Universal Complementary-Health-Coverage (CMUc) and had a higher social disadvantage index (59.03% vs 55.38% p=0.047).
- CMUc affiliation is indicative of low-income status.
- In addition, certain clinical risk factors were more frequently observed in cases compared to controls: renal failure, HIV infection and disorders involving immuny.

Mortality

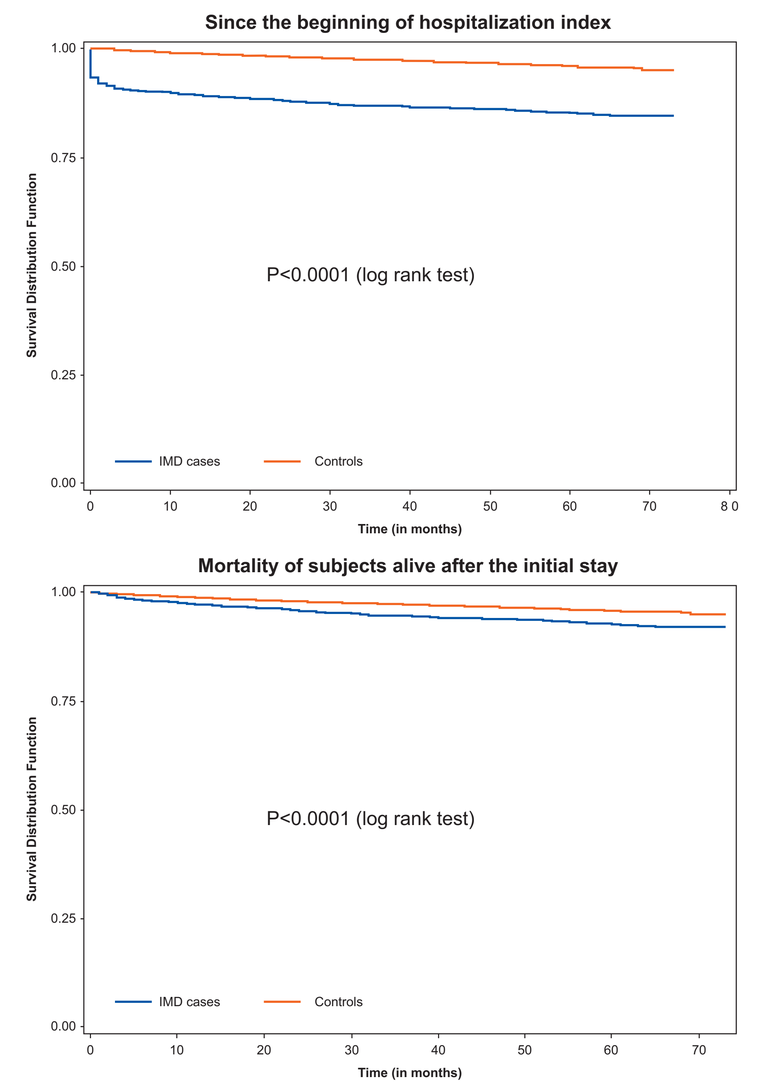
- 456 (12.9%)/3,532 died during the period, of which 293 (8.3%) during the initial hospitalization and 163 (4.6%) later on.

Figure 3. Risk factors for IMD cases



IMD, invasive meningococcal disease; HIV, human immunodefiency virus.

Figure 4. Survival curve of IMD population (cases) and controls from IMD and along their follow-up



- The population with IMD has a higher mortality rate than the controls without IMD.

Sequelae

- Sequelae (n = 1,714) were identified for 1,139 patients (32.2%); 21.7% cases had only one identified sequelae, while 10.5% had more than one sequelae (up to 7 sequelae).

Table 1. List and frequency of sequelae in all ages and <25 years (by decreasing order in all ages)

Sequelae	All cases	Cases <25 years
Renal impairment	11.3%	7.2%
Epilepsy	7.4%	7.1%
Anxiety	5.5%	3.8%
Severe neurological impairment	5.5%	3.5%
Hearing loss requiring an implant	1.9%	1.2%
Motor deficit	3.5%	1.9%
Depression	2.5%	1.1%
Skin disorders	2.3%	2.9%
Hearing reduction unilateral	1.9%	1.5%
Blindness	1.7%	1.4%
Language disorder	1.7%	0.7%
Amputation	1.5%	1.6%
Hearing reduction bilateral	0.8%	0.8%
Mental retardation	0.5%	0.5%
Attention deficit	0.4%	0.6%
Separation anxiety	0.03%	0.1%

- Costs of sequelae vary significantly according to the type and severity (from 6,000€ to 38,000€ for the first year)
- Costs seem to decrease between the first year after the acute episode and the following years.

CONCLUSIONS

- **These data confirm the morbi-mortality of IMD, especially in population < 25 years. They reveal new views on risk factors as well as on sequelae nature and their frequencies.**
- **These have direct implication in tailoring preventive strategies and in identification and management of sequelae.**

This data set has important implications for vaccine implementation and clinical practices which may help reduce IMD burden.

Disclosures

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