

# Increase in Kawasaki disease incidence observed in 30-year population-based study in Sweden

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## The incidence rate of Kawasaki disease in children <5 years of age increased in Sweden between 1987 and 2018.

### Background

World-wide, Kawasaki disease (KD) is known to affect predominantly children under the age of 5, mostly boys. An increasing incidence has been reported from selected countries, as well as seasonal differences, although with great variation among reports. Sweden has unique population-based health registers which can be linked to population registers via a central person registry number. In this study we utilized population-based data over a period of more than 30 years to investigate demographics and epidemiology of Kawasaki disease in a Scandinavian country.

### Methods

Individuals receiving a diagnosis of KD in Sweden from 1987-2018 were identified by ICD9 and ICD10 discharge diagnoses in the Patient register at the National Board of Health and Welfare, and basic demographic information obtained by crosslinking with population registers at Statistics Sweden. Age-stratified population statistics were also retrieved during the corresponding time period, generating a national cohort.

### Results

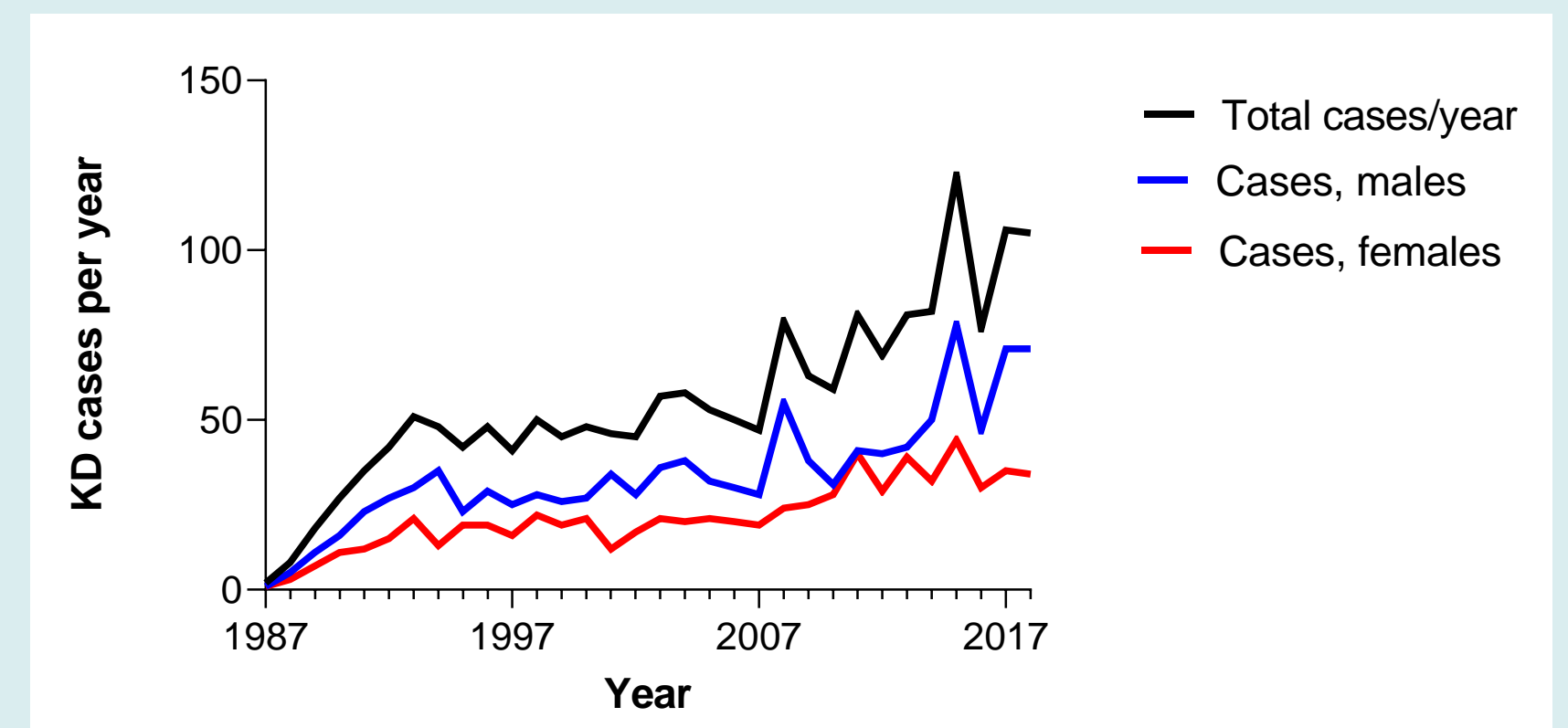
A total of 1,785 individuals with a KD diagnosis were identified during the study period of >30 years, confirming a relatively low occurrence in the Scandinavian population (Fig 1). Notably, the incidence rose from around 6/100,000 <5-year-olds to 15/100,000 <5-year-olds during the 30-year study period. Two years with prominently higher incidence than prior and following years were observed (2008 and 2015) (Fig 1). The majority of cases (78%) occurred before 5 years of age, and there was a male dominance (61%) (Fig 1 and 2). Interestingly, the age at diagnosis during the first year of life remained virtually unchanged after the third month of life. Less than 5% of the cases were born in another country and thus, birth country does not explain the rising total incidence (Fig 3). Sweden has a temperate climate of the northern hemisphere, and analysis of case distribution over the yearly cycle revealed a peak incidence during the winter months (Fig 4). As expected, the number of cases per county represents the total population of the respective county. Seasonality is far from fixed, but varies over the study period, with some years showing peak occurrence in spring or summer (Fig 5).

### Conclusions

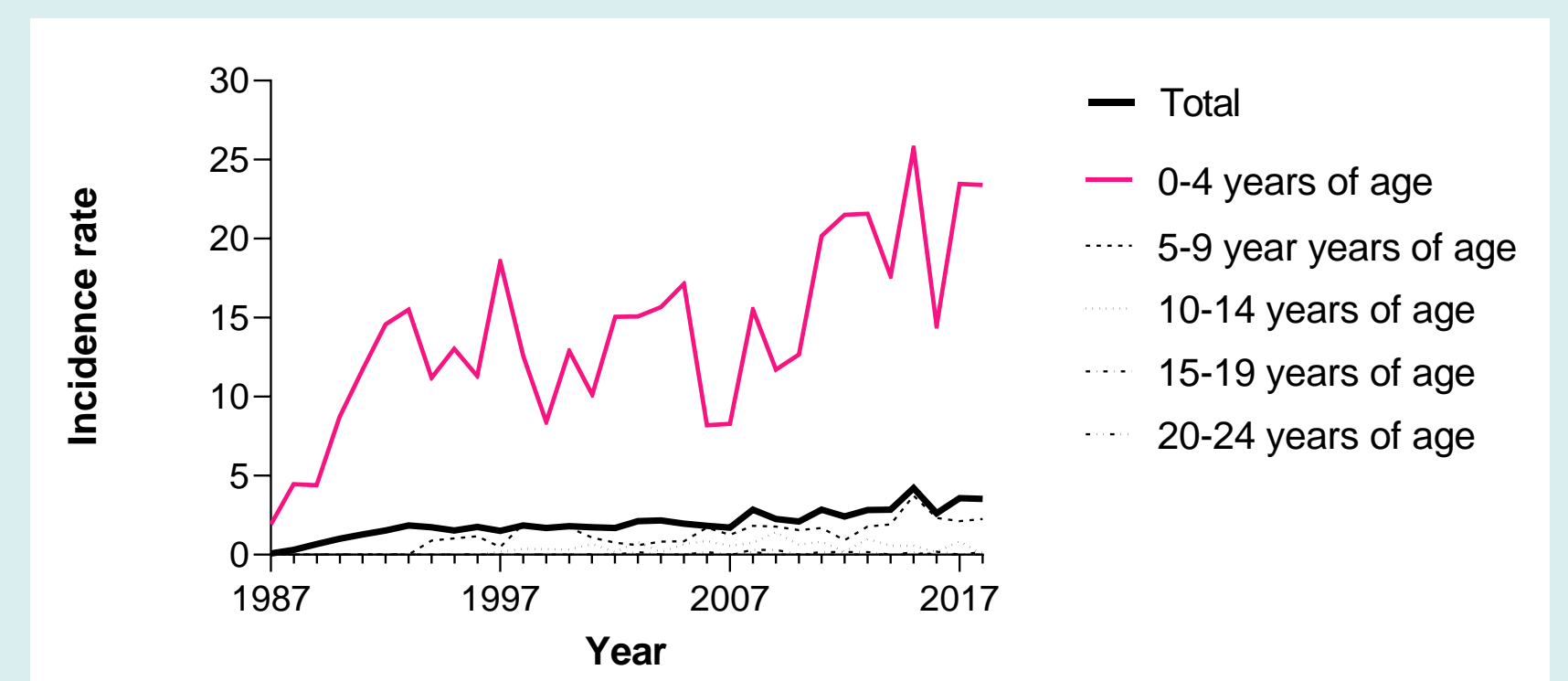
Demographic parameters for Kawasaki disease in Sweden regarding age and sex distribution are similar to previous reports from other countries. Our data from a 30-year study period of population-based observations confirm peak incidence during the cold period, and a rising incidence during recent years. Our data also indicate two peaks in incidence (2008 and 2015).

**Table 1. Swedish national cohort characteristics.**

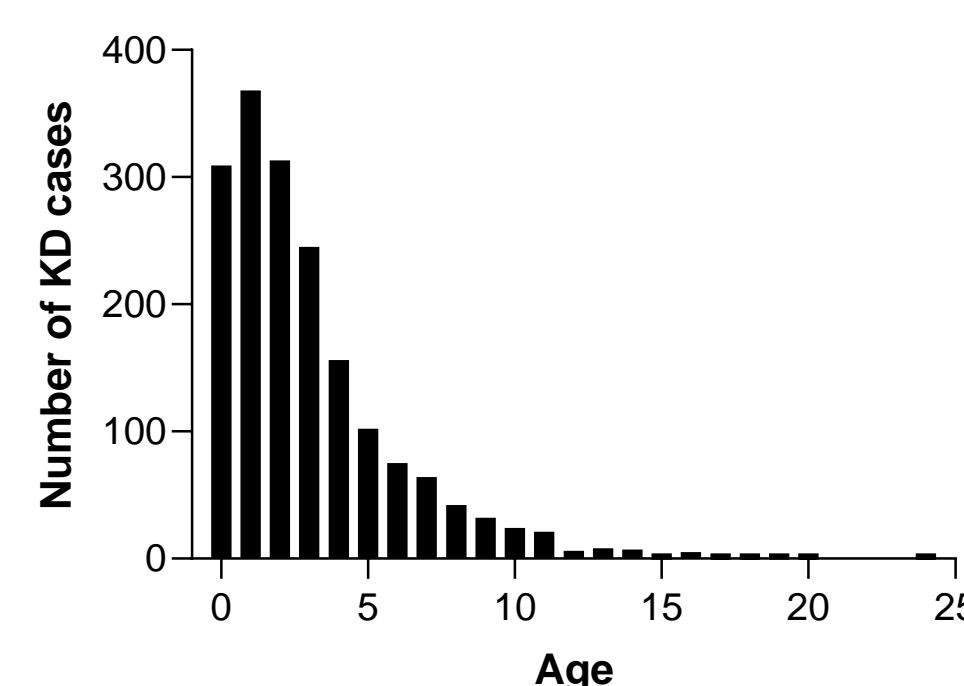
Study period (calendar range)	32 years (1978-2018)
Number of KD cases total	1785
Males, N (%)	1096 (61%)
Females, N (%)	689 (39%)
Incidence rate* in whole population, median (95% CI)	2.06 (1.76-2.37)
Incidence rate* in <5-year-olds, median (95% CI)	13.8 (12.4-16.2)
Age at diagnosis, Median (95% CI)	2 (1.9-2.4)
*KD cases/100.000 individuals/year	



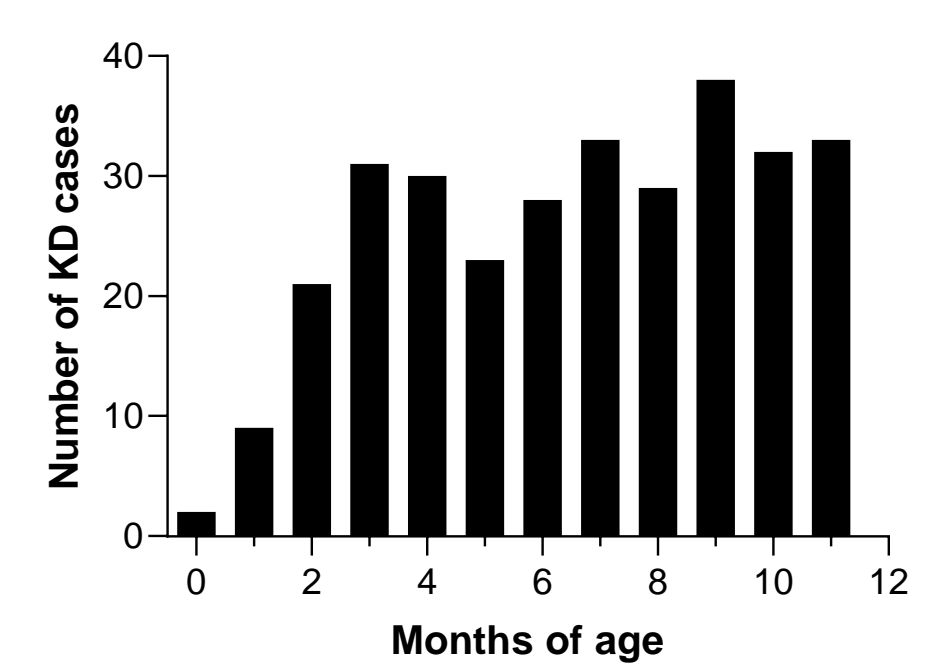
**Fig 1a. Kawasaki disease cases per year during study period**



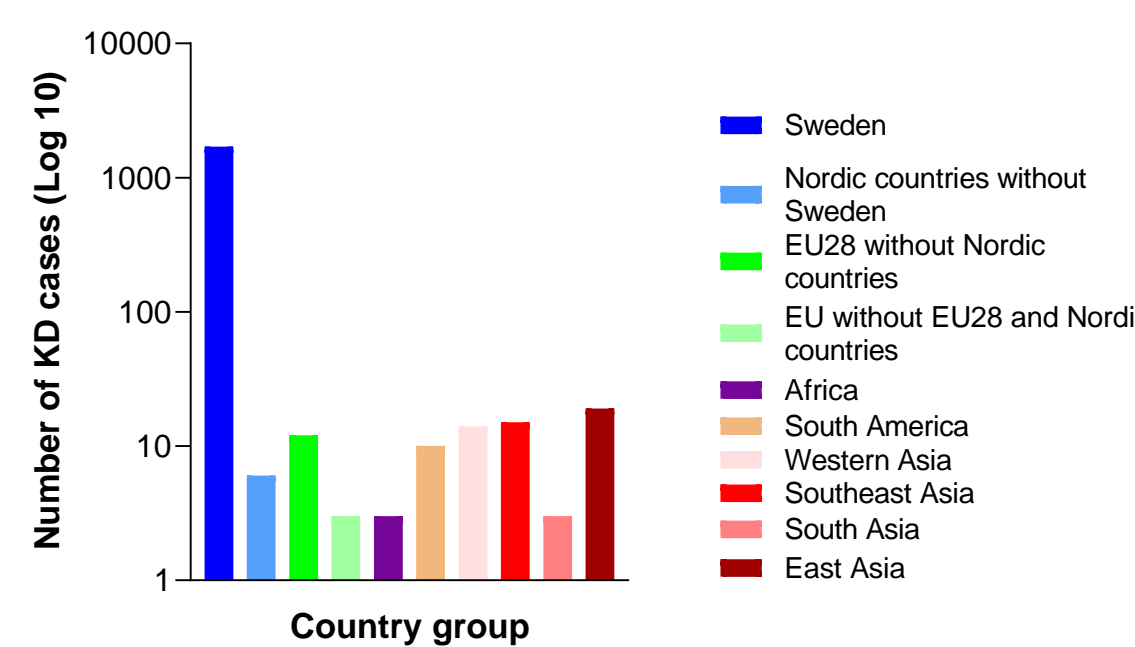
**Fig 1b. Kawasaki disease incidence rate per age group**



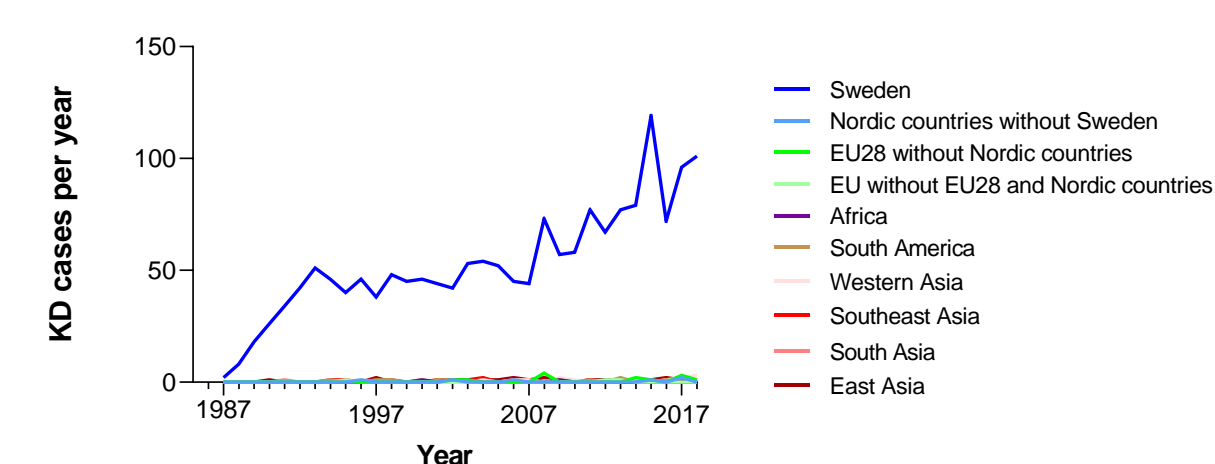
**Fig 2a. KD age distribution**



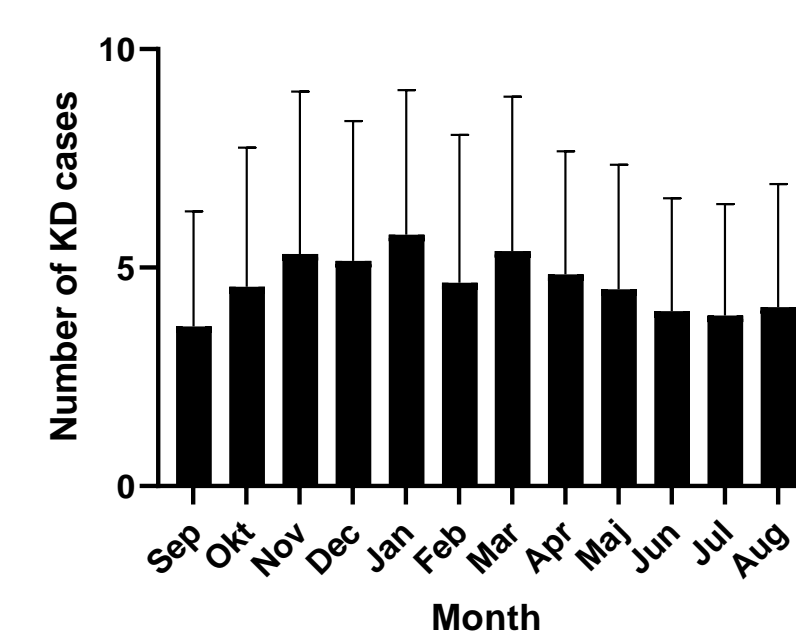
**Fig 2b. Age at KD diagnosis (0-12m)**



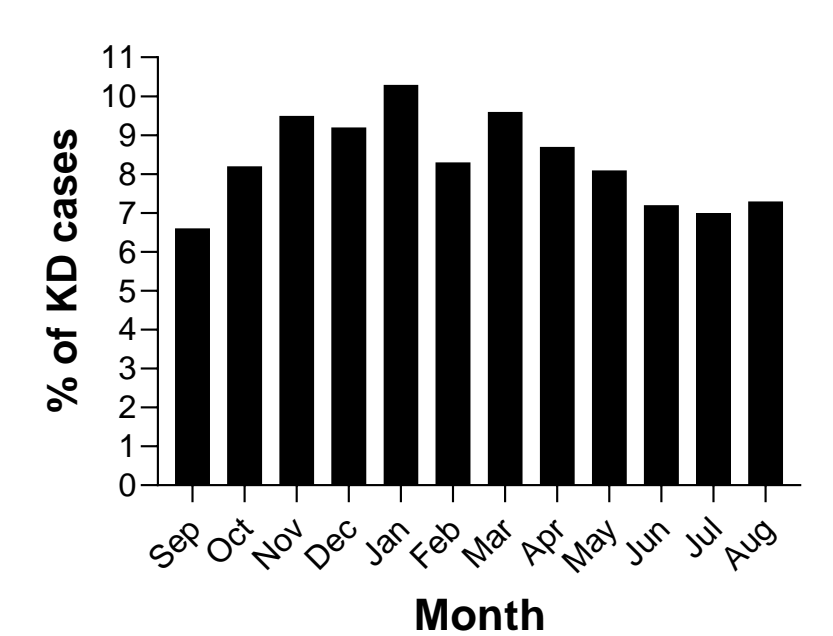
**Fig 3a. KD case birth country/region**



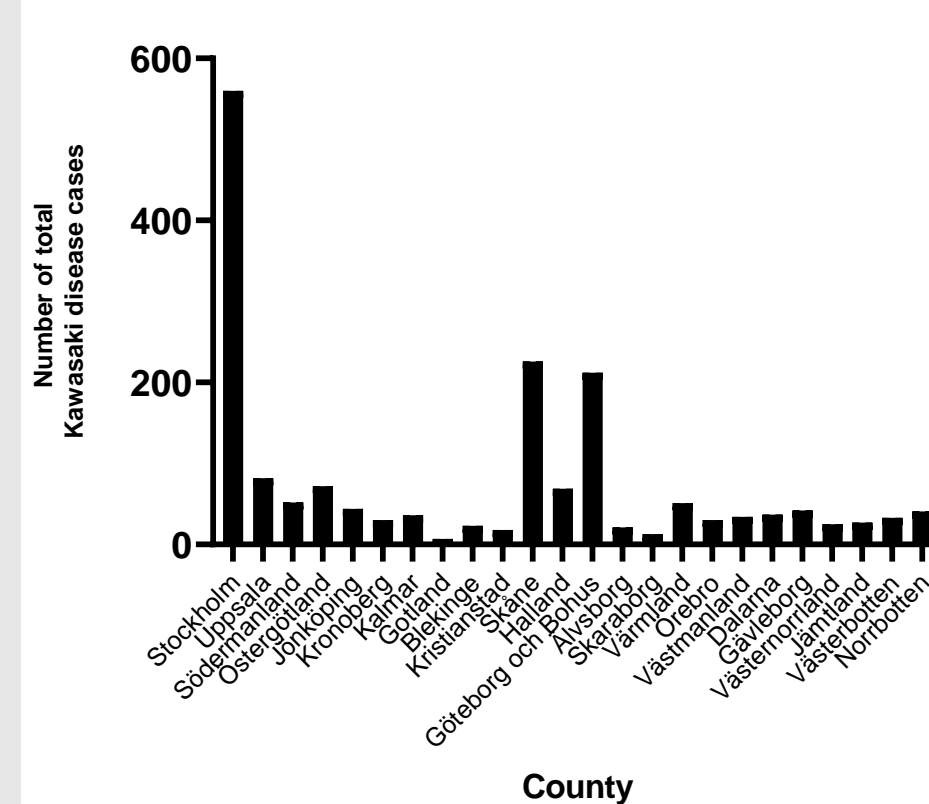
**Fig 3b. Birth country/region over time**



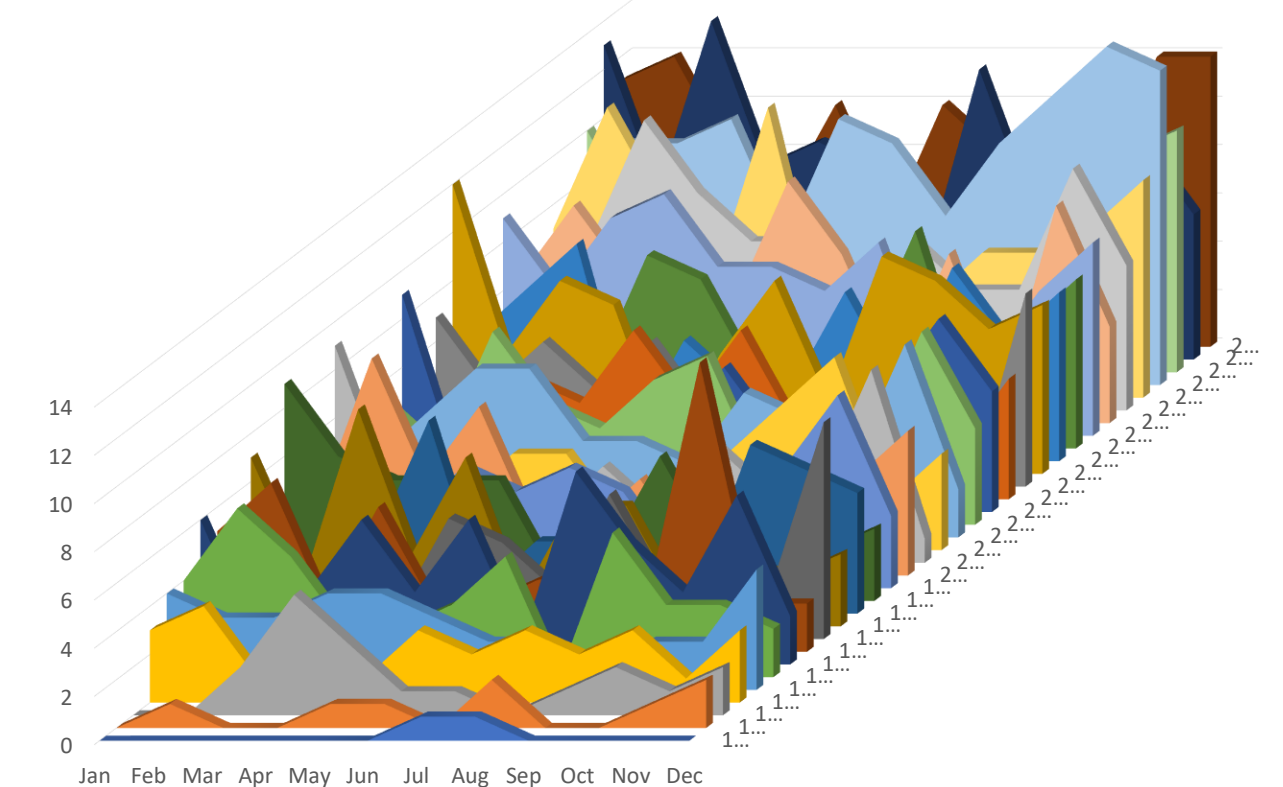
**Fig 4a. Seasonality of KD cases, total**



**Fig 4b. Seasonality of KD cases, %**



**Fig 5a. Geographical distribution**



**Fig 5b. Seasonality over time**

Future research:  
Kawasaki disease (PhD project),  
MIS-C, Brugada syndrome (clinical projects)



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