Cardiology in the Young

cambridge.org/cty

Global incidence of Kawasaki disease: a systematic review

Cho Ryok Kang[1,2], Jue Seong Lee[1,3] and Young June Choe[1,3]

[1]Allergy and Immunology Center and Department of Pediatrics, Korea University College of Medicine, Seoul, Korea; [2]Department of Nursing, Wonkwang University, Iksan, Korea and [3]Department of Pediatrics, Korea University College of Medicine and Korea University Anam Hospital, Seoul, Korea

Original Article

Cite this article: Kang CR, Lee JS, and Choe YJ (2025). Global incidence of Kawasaki disease: a systematic review. *Cardiology in the Young*, page 1 of 12. doi: 10.1017/S104795112500191X

Received: 7 November 2024
Revised: 15 February 2025
Accepted: 25 March 2025

Keywords:
Mucocutaneous lymph node syndrome (Kawasaki disease); incidence; global health; epidemiologic studies; review literature as topic

Corresponding author:
Young June Choe; Email: choey@korea.ac.kr

Abstract

Background: Kawasaki disease is a systemic vasculitis that primarily affects young children and represents a major cause of acquired heart disease in children in developed countries. The incidence of Kawasaki disease exhibits significant global variation, and the worldwide burden remains limited. *Methods:* A systematic review was conducted to investigate the global incidence of Kawasaki disease in children under 5 years of age. A comprehensive literature search was performed in PubMed, Embase, and KoreaMed up to July 15, 2024. Studies reporting population-level Kawasaki disease incidence were included. Data extraction and quality assessment were performed independently by two reviewers. *Results:* The search yielded 3,197 articles, of which 105 met the inclusion criteria. These studies examined Kawasaki disease incidence in children under 5 years of age across 34 countries, with the majority focusing on the Western Pacific Region and the Region of the Americas. The results demonstrated a wide range of Kawasaki disease incidence globally, with significant geographic variations. The highest incidence rates were observed in Japan, Korea, and Taiwan, with a trend of gradual increase over time. *Conclusions:* This study represents the most comprehensive review of global Kawasaki disease incidence to date. The substantial variation in incidence underscores the need to understand the factors influencing regional differences.

Introduction

Kawasaki disease is an acute systemic vasculitis of unknown aetiology that predominantly affects young children.[1] The disease's hallmark feature is inflammation of medium-sized arteries, with a particular predilection for the coronary arteries.[2] This can lead to coronary artery aneurysms and other cardiovascular complications, making Kawasaki disease the leading cause of acquired heart disease in children in developed countries.[3] While timely treatment with intravenous immunoglobulin and aspirin significantly reduces the risk of coronary artery involvement, a subset of patients remains unresponsive or develop complications despite treatment.[4]

The global epidemiology of Kawasaki disease has been characterised by marked geographic and temporal variations, with the highest incidence consistently reported in East Asia, particularly Japan and Korea.[5,6] However, a comprehensive understanding of the global burden of Kawasaki disease remains elusive, hindering the development of targeted prevention strategies, optimal allocation of healthcare resources, and a deeper understanding of the disease's aetiology.

To address this knowledge gap, we conducted a systematic review to investigate the global incidence of Kawasaki disease. By synthesising data from diverse populations and geographic regions, we aim to provide a more comprehensive picture of the worldwide burden of Kawasaki disease, which could inform clinical practice, public health initiatives, and future research directions.

Methods

Search strategy and data sources

A comprehensive literature search was conducted in PubMed, Embase, and KoreaMed by a trained medical librarian (Eun-Ji Kang) from inception up to July 15, 2024. The search strategy, developed initially for MEDLINE using the keywords and MeSH terms, was adapted for other databases. The exact search strategies for PubMed, Embase, and KoreaMed are outlined in Table S1. There were no language restrictions. Reference lists of included articles and relevant literature identified through manual searches were also screened for additional publications. The study protocol has been registered and published with PROSPERO.[7] This study was exempt from Institutional Review Board approval as a systematic review.

Study selection

Titles and abstracts of identified articles were screened according to the inclusion and exclusion criteria by two reviewers (CRK, YJC). Full-text review was conducted by the same reviewers for all identified articles. Two authors independently reviewed articles for inclusion, resolving disagreements by consensus. Inclusion criteria for selecting articles include studies whose aim is to describe Kawasaki disease incidence in children under 5 years of age in any country or area of a country, including original papers of observational studies, cross-sectional studies, case–control studies, and prospective and retrospective studies. Studies based on Kawasaki disease-relevant ICD-9/ICD-10 codes or guidelines for the diagnosis of Kawasaki disease were included. The exclusion criteria were a) duplicate studies; b) systematic review ± meta-analysis; c) non-original studies including reviews, comments, editorials, case reports, guidelines, and book chapters; d) intervention studies (randomized and clinical controlled trials); e) selected populations of participants with other basic diseases; f) no population-level incidence data of Kawasaki disease; and g) no data available for children under 5 years of age.

Data extraction and quality assessment

Two reviewers (CRK, YJC) independently extracted data on study details, such as first author, publication year, country, study period, study design, data source, and incidence (including incidence rate and admission rate) per 100,000 children under 5 years of age. Discrepancies were resolved through discussion. Studies that met the inclusion criteria were assessed for the risk of bias tool established by Hoy et al.[8]

Results

Study selection

In a systematic search of sources, 3,197 articles were identified. A total of 677 articles were duplicated, and 2,373 were excluded after screening the title and abstract of the articles. After reviewing full-text articles, 42 articles were excluded. Finally, 105 studies were included in the systematic review. Figure 1 shows the identified and retrieved articles in the study.

Study characteristics

The major characteristics of the studies are listed in Table 1. Eligible studies examined Kawasaki disease incidence in children under 5 years of age in 34 countries (Fig 2). A total of 105 studies were published from 1986-2024, mainly concentrated in 2011–2024. The studies were conducted between 1976 and 2021. Dividing the studies by WHO regions, 28 (26.7%) were from the Region of the Americas,[9–36] 22 (21.0%) from the European Region,[37–58] 2 (1.9%) from the Eastern Mediterranean Region,[59,60] 2 (1.9%) from the South-East Asia Region,[61,62] and 51 (48.6%) from the Western Pacific Region.[63–113] The majority of studies focused on countries in the Western Pacific Region and the Region of the Americas, and most studies were from the United States (n = 19, 18.1%),[11,12,14–19,21–26,28–30,34,36] Japan (n = 18, 17.1%),[63–65,78,89–91,93–96,103,106–111] Korea (n = 10, 9.5%),[72,79–82,84,98–101] and Taiwan (n = 7, 6.7%).[67,75–77,85,87,88] Regarding the methodology, of the total 105 studies, 4 were prospective and 101 were retrospective studies. Among the 101 retrospective studies, 3 were conducted with additional prospective studies, and 29 were conducted together with cross-sectional studies. The quality assessment of each study is shown in Table S2.

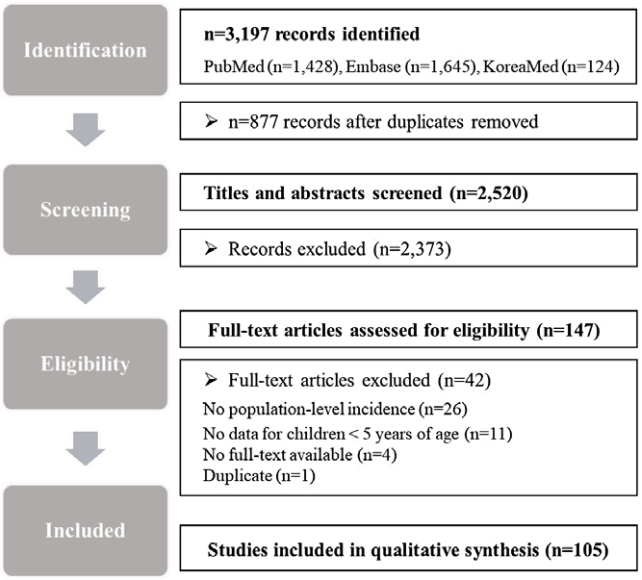

Figure 1. PRISMA flow diagram.

Incidence of Kawasaki disease in the world

The recent Kawasaki disease incidence in Japan and Korea is the highest worldwide (> 200 per 100,000 children <5 years old). Kawasaki disease incidence is also high in Taiwan and a province (Beijing) of China (> 50 per 1000,000 children <5 years old). For time trends of Kawasaki disease incidence in included studies, the incidence gradually increased in Australia, China, Hong Kong, Japan, Korea, New Zealand, Malaysia, and Taiwan, which are included in the WPR. However, during the COVID-19 pandemic, Kawasaki disease incidence tended to decrease in Japan and Korea.[65,98] In the United States, Kawasaki disease incidence differed by administrative region, the incidence in Hawaii was relatively high. There was a slight increase in Kawasaki disease incidence in Canada, Chile, Peru, and the United States, which are included in the AMR. Kawasaki disease incidence in countries included in the European Region, EMR, and South-East Asia Region is nearly constant with low incidence.

Discussion

This systematic review identified 105 studies examining Kawasaki disease incidence in children under 5 years of age from 34 countries. Our review provides the most comprehensive assessment of the global incidence of Kawasaki disease to date. Study findings reveal considerable variation in Kawasaki disease incidence in children under 5 years of age across different populations and geographic regions. The Kawasaki disease incidence in the world reveals substantial variations, highlighting the need for a nuanced understanding of the global burden of Kawasaki disease. The elevated incidence of Kawasaki disease in Japan and Korea, as evidenced in this review, points towards a complex interplay of factors that may contribute to this phenomenon. The prevailing hypothesis suggests a combination of genetic predisposition, environmental influences, and diagnostic practices may be at play. The higher prevalence of certain

https://doi.org/10.1017/S104795112500191X Published online by Cambridge University Press

Table 1. Summary of the characteristics of studies included

WHO region	First author	Publication year	Country	Study period	Incidence per 100,000 children <5 years of age	Study design	Data source characteristics
Region of the Americas (AMR)	Robinson	2021	Canada (Ontario)	1995–2017	18.4 (1995–2001), 25.0 (2002-2016)	retrospective	Ontario health administrative data
	Gorrab	2016	Canada (Quebec, Maghrebi origin)	1996–2013	18.49	retrospective, cross-sectional	Medical records
	Alkanhal	2023	Canada (Nova Scotia)	2007–2018	29.6	retrospective	Medical records
	Borzutzky	2012	Chile	2001–2007	6.3 (2001–2004), 9.3 (2005–2007)	retrospective	National hospital discharge databases
	Hoyos-Bachiloglu	2016	Chile	2001–2011	5.9 (2001–2003), 10.4 (2009–2011)	retrospective	National hospital discharge databases
	Schonhaut	2001	Chile (Santiago)	1987–1999	3.9	retrospective	Medical records
	Pierre	2000	Jamaica	1986–1998	2.7	retrospective	Medical records
	Tourneux	2005	Guadeloupe (French West Indies)	1995–2000	25.4	retrospective	Medical records
	Atamari-Anahui	2023	Peru	2015–2019	0.52 (2015), 1.34 (2016), 2.12 (2017), 2.38 (2018), 2.28 (2019)	retrospective	Hospitalization registry
	Belay	2003	USA	1997–1999	10.2	retrospective	Solucient Hospital discharge database
	Holman	2003	USA	1997–2000	17.1	retrospective	Kids' Inpatient Database
	Holman	2010	USA	1997–2007	17.5 (1997), 17.1 (2000), 19.6 (2003), 20.8 (2006)	retrospective	Kids' Inpatient Database
	Okubo	2017	USA	2003–2012	19.6 (2003), 20.8 (2006), 19.1 (2009), 18.0 (2012)	retrospective	Kids' Inpatient Database
	Vasudeva	2022	USA	2008–2017	17.1 (<1 yo), 16.2 (1–4 years old)	retrospective	National Inpatient Sample (NIS) database
	Holman	1999	USA (American Indian & Alaska Native)	1980–1995	4.3	retrospective	Indian Health Service (IHS) data
	Belay	2000	USA (West Coast HMOs)	1993–1996	9.0 ~ 19.1 (by HMOs)	retrospective	HMO (Health maintenance organization) data
	Chang	2002	USA (California)	1995–1999	15.3	retrospective	OSHPD (Office of Statewide Health Planning and Development) database
	Callinan	2014	USA (California)	2003–2010	20.5 (2003), 24.7 (2010)	retrospective	California State Inpatient Database
	Bronstein	2000	USA (San Diego, California)	1994–1998	8.0 ~ 15.4	retrospective	Medical records
	Taslakian	2021	USA (Olmsted County, Minnesota)	1979-2016	21.4	retrospective	Medical records

(*Continued*)

https://doi.org/10.1017/S104795112500191X Published online by Cambridge University Press

Table 1. (*Continued*)

WHO region	First author	Publication year	Country	Study period	Incidence per 100,000 children <5 years of age	Study design	Data source characteristics
	Davis	1995	USA (Washington)	1985–1989	6.5 (1985-1986), 15.2 (1987-1989)	retrospective	Statewide hospital data set
	Lin	2010	USA (New York)	1990–2009	14.6 (1990) ~ 22.5 (2002)	retrospective	Statewide Planning and Research Cooperative System (SPARCS) database
	Lin	2010	USA (Ontario)	1995–2006	14.4 (1995–1997), 20.4 (1998–2000), 24.1 (2001–2003), 26.2 (2004–2006)	retrospective, cross-sectional	Medical records
	Coustasse	2009	USA (Texas)	2004	13.8	retrospective	Texas Health Information Council
	Holman	2000	USA (Hawaii & Connecticut)	1994–1997	47.7 (Hawaii), 18.8 (Connecticut)	retrospective	Hawaii Health Information Corporation (HHIC), Connecticut Health Information Management and Exchange (CHIME)
	Holman	2005	USA (Hawaii)	1996–2001	45.2	retrospective	Hawaii State Inpatient Database
	Holman	2010	USA (Hawaii)	1996–2006	45.5 ~ 56.5	retrospective	Hawaii State Inpatient Database
	Dawson	2020	USA (Hawaii)	1996–2018	32	retrospective	Medical records
European Region (EUR)	Fischer	2007	Denmark	1981–2004	3.6	retrospective	Danish National Hospital Register
	Salo	1993	Finland	1982–1992	3.1 ~ 7.2	retrospective	Medical records
	Salo	2012	Finland, Norway, Sweden	1998–2009	11.4 (Finland), 5.4 (Norway), 7.4 (Sweden)	retrospective	Hospital discharge databases
	Juliusson	1999	Iceland	1979–1997	8.5	retrospective	Medical records
	Lynch	2003	Ireland	1996–2000	15.2 (9.6 ~ 19.3)	retrospective	Hospital In-Patient Enquiry (HIPE) database
	Olafsdottir	2012	Iceland	1996–2005	10.7	retrospective	Medical records
	Schiller	1995	Sweden	1990–1992	6.5	prospective	Medical records
	Grech	1999	Malta	1992–1997	3.2	retrospective	Medical records
	Bar-Meir	2011	Israel	1996–2009	6.4	retrospective	National Hospital Discharge Database
	Cimaz	2017	Italy	2008–2013	14.7 (2008–2013)	retrospective	National Hospital Discharge Record Database
	Mauro	2016	Italy (Emilia Romagna /Tuscany)	2008–2013	13.8/24.6 (2008–2010), 12.8/28.6 (2009–2011), 12.2/31.5 (2010–2012), 18.5/27.8 (2011–2013)	retrospective	Hospital discharge records database
	Pinto	2017	Portugal	2000–2011	6.5	retrospective	Hospital Discharge Records
	Tacke	2014	Netherlands	2008–2012	6.3 (2008), 5.5 (2009), 5.1 (2010), 6.2 (2011), 6.0 (2012)	retrospective	Dutch Pediatric Surveillance Unit
	Jakob	2016	Germany	2011–2012	7.2	prospective	National Surveillance: German Pediatric Surveillance Unit (ESPED)

(*Continued*)

https://doi.org/10.1017/S104795112500191X Published online by Cambridge University Press

Table 1. (*Continued*)

WHO region	First author	Publication year	Country	Study period	Incidence per 100,000 children <5 years of age	Study design	Data source characteristics
	Riancho-Zarrabeitia	2018	Spain	2005–2015	11.7	retrospective	Hospital morbidity survey of the Spanish National Institute of Statistics (INE) database
	Sánchez-Manubens	2016	Spain (Catalonia)	2004–2014	8	retrospective (2004-2013), prospective (2014)	Medical records
	Sánchez-Manubens	2017	Spain (Catalonia)	2004–2014	8	retrospective (2004-2013), prospective (2013-2014)	Medical records
	Hall	2016	UK	2008–2012	9.1	retrospective	Health Improvement Network (THIN) database
	Harnden	2009	United Kingdom (England)	1998–2003	8.39	retrospective	Hospital Episode Statistics (HES)
	Odingo	2023	United Kingdom (England)	2006–2021	6.9 ~ 11.8	retrospective	National Disease Registries Directions
	Tulloh	2019	United Kingdom & Ireland	2013–2015	4.55	prospective	British Paediatric Surveillance Unit survey
	Gradoux	2022	Switzerland	2013–2017	8.4	retrospective	Swiss Paediatric Surveillance Unit
Eastern Mediterranean Region (EMR)	Shahbaznejad	2022	Iran	2015–2019	27.16	retrospective	National KD registration system
	Saffar	2005	Iran (East Mazandaran)	1997–2002	7.3	retrospective	Medical records
South-East Asia Region (SEAR)	Panamonta	2004	Thailand (northeast)	1991–2003	2.2	retrospective	Medical records
	Singh	2016	India (Chandigarh)	2009–2014	9.1 (2009), 3.02 (2010), 8.04 (2011), 1.00 (2012), 3.99 (2013), 6.97 (2014)	retrospective	Medical records
Western Pacific Region (WPR)	Royle	1998	Australia	1993–1995	3.7	retrospective, cross-sectional	Australian Paediatric Surveillance Unit (APSU)
	Lucas	2022	Australia	1993–2017	9.39 (1993–1997), 9.39 (1998–2002), 12.14 (2003–2007), 14.79 (2008–2012), 17.51 (2013–2017)	retrospective	National Hospital Morbidity Database
	Saundankar	2014	Australia (Western Australia)	1980–2009	2.82 (1980–1989), 7.96 (1990–1999), 9.34 (2000–2009)	retrospective	Medical records
	Ferreira	2021	Australia (Newcastle)	2015–2016	26.5 (2015), 22.4 (2016)	retrospective	Medical records
	Wang	2000	China (Jiangsu)	1993–1997	1.84 (1993), 2.64 (1994), 2.12 (1995), 2.66 (1996), 3.65 (1997)	retrospective	Medical records
	Du	2002	China (Beijing)	1995–1999	18.2 (1995), 21.1 (1996), 18.6 (1997), 30.6 (1998) and 27.8 (1999)	retrospective, cross-sectional	Medical records

(*Continued*)

https://doi.org/10.1017/S104795112500191X Published online by Cambridge University Press

Table 1. (*Continued*)

WHO region	First author	Publication year	Country	Study period	Incidence per 100,000 children <5 years of age	Study design	Data source characteristics
	Du	2007	China (Beijing)	2000–2004	40.9 (2000), 50.5 (2001), 47.5 (2002), 53.3 (2003), 55.1 (2004)	retrospective, cross-sectional	Medical records
	Li	2008	China (Sichuan)	1997–2001	4.26 (1997), 5.21 (1998), 8.57 (1999), 7.70 (2000), 9.81 (2001)	retrospective, cross-sectional	Medical records
	Huang	2005	China (Shanghai)	1998–2002	16.79 (1998), 25.65 (1999), 28.16 (2000), 28.05 (2001), and 36.76 (2002)	retrospective, cross-sectional	Medical records
	Zhang	2012	China (Jilin)	1999–2008	1.39 (1999), 0.93 (2000), 2.14 (2001), 2.28 (2002), 3.35 (2003), 4.87 (2004), 6.65 (2005), 8.34 (2006), 11.61 (2007), 11.07 (2008)	retrospective	Medical records
	Ng	2005	Hong Kong	1994–2000	26 (1994–1997), 39 (1997–2000)	retrospective (1994-1997), prospective (1997-2000)	Medical records
	Zhang	2016	China (Inner Mongolia)	2001–2013	3.55	retrospective, cross-sectional	Medical records
	Yanagawa	1988	Japan	1985–1986	102 (1985), 172.2 (1986)	retrospective	Medical records
	Yanagawa	1995	Japan	1991–1992	90	retrospective, cross-sectional	Medical records
	Yanagawa	1996	Japan	1993–1994	95.1	retrospective, cross-sectional	Medical records
	Yanagawa	1998	Japan	1995–1996	102.6 (1995), 108.0 (1996)	retrospective, cross-sectional	Medical records
	Yanagawa	2001	Japan	1997–1998	108.0 (1997), 111.7 (1998)	retrospective, cross-sectional	Medical records
	Yanagawa	2006	Japan	1999–2002	119.6 (1999), 141.1 (2000), 138.8 (2001), 151.2 (2002)	retrospective, cross-sectional	Medical records
	Abrams	2018	Japan	1991–2004	89.5 (1991), 174.3 (2004)	retrospective, cross-sectional	Medical records
	Nakamura	2008	Japan	2003–2004	159.2 (2003), 174.0 (2004)	retrospective, cross-sectional	Medical records
	Nakamura	2008	Japan	2005–2006	184.6	retrospective, cross-sectional	Medical records
	Nakamura	2010	Japan	2007–2008	215.3 (2007), 218.6 (2008)	retrospective, cross-sectional	Medical records
	Nakamura	2012	Japan	2009–2010	206.2 (2009), 239.6 (2010)	retrospective, cross-sectional	Medical records
	Sano	2016	Japan	2007–2012	322.45	retrospective	Medical records
	Makino	2015	Japan	2011–2012	243.1 (2011), 264.8 (2012)	retrospective, cross-sectional	Medical records
	Makino	2018	Japan	2013–2014	302.5 (2013), 308.0 (2014)	retrospective, cross-sectional	Medical records

(*Continued*)

https://doi.org/10.1017/S104795112500191X Published online by Cambridge University Press

Table 1. (*Continued*)

WHO region	First author	Publication year	Country	Study period	Incidence per 100,000 children <5 years of age	Study design	Data source characteristics
	Makino	2019	Japan	2015–2016	330.2 (2015), 309.0 (2016)	retrospective	Medical records
	Ae	2020	Japan	2017–2018	359 (2018)	retrospective, cross-sectional	Medical records
	Ae	2022	Japan	2019–2020	324.5 (2019), 219.8 (2020)	retrospective, cross-sectional	Medical records
	Iio	2021	Japan (Kobe)	2016–2020	315 (2016), 300 (2017), 353 (2018), 347 (2019), 188 (2020)	retrospective, cross-sectional	Medical records
	Park	2005	Korea	2000–2002	86.4	retrospective, cross-sectional	Medical records
	Park	2007	Korea	2003–2005	104.2 (2003), 106.4 (2004), 104.6 (2005)	retrospective, cross-sectional	Medical records
	Park	2011	Korea	2006–2008	108.7 (2006), 118.3 (2007), 112.5 (2008)	retrospective, cross-sectional	Medical records
	Ha	2016	Korea	2007–2014	139.1 (2007), 131.0 (2008), 143.0 (2009), 161.7 (2010), 163.6 (2011), 163.9 (2012), 178.8 (2013), 188.4 (2014)	retrospective	Health Insurance Review & Assessment Service (HIRA) claims
	Kim	2022	Korea	2008–2017	254.5 (2008), 266.8 (2009), 314.3 (2010), 294.4 (2011), 300.6 (2012), 351.8 (2013), 327.4 (2014), 328.3 (2015), 396.8 (2016), 374.5 (2017)	retrospective	National Health Insurance Service data
	Kim	2014	Korea	2009–2011	127.7	retrospective, cross-sectional	Medical records
	Kim	2017	Korea	2012–2014	170.9 (2012), 194.9 (2013), 194.7 (2014)	retrospective, cross-sectional	Medical records
	Kim	2020	Korea	2015–2017	202.2 (2015), 197.1 (2016), 191.0 (2017)	retrospective, cross-sectional	Medical records
	Lim	2021	Korea	2015–2018	172.4	retrospective	Health Insurance Review and Assessment (HIRA) Open Access Big Data Platform
	Oh	2024	Korea	2012–2020	201.7 (2012), 224.0 (2013), 236.9 (2014), 231.2 (2015), 222.0 (2016), 217.3 (2017), 238.9 (2018), 230.0 (2019), 141.2 (2020)	retrospective	National Health Insurance Service data
	Heaton	2006	New Zealand	2001–2002	8	prospective	New Zealand Paediatric Surveillance Unit (NZPSU) Reports
	Gee	2023	New Zealand	2000–2017	15.6 (2000), 23.1 (2017)	retrospective	National Minimum Dataset
	Mat Bah	2021	Malaysia (Johor)	2006–2019	5.7 (2006), 10.5 (2007), 8.9 (2008), 9 (2009), 10.1 (2010), 14.4 (2011), 20.7 (2012), 19 (2013), 19 (2014), 14 (2015), 16.2 (2016), 19.2 (2017), 21.1 (2018), 19.5 (2019)	retrospective	National Medical Research Register

(*Continued*)

https://doi.org/10.1017/S104795112500191X Published online by Cambridge University Press

Table 1. (*Continued*)

WHO region	First author	Publication year	Country	Study period	Incidence per 100,000 children <5 years of age	Study design	Data source characteristics
	Celis-Seposo	2024	Philippines	2009–2019	16.3 (2009), 23.2 (2010), 20.3 (2011), 18.7 (2012), 17.8 (2013), 16.5 (2014), 18.5 (2015), 14.9 (2016), 22.0 (2017), 20.5 (2018), 19.9 (2019)	retrospective	Philippine Pediatric Society (PPS) disease registry
	Lue	2014	Taiwan	1976–2007	0.06 ~ 8.88 (1976-1985), 16.79 ~ 35.50 (1986-1995), 42.40 ~ 66.24 (1996-2007)	retrospective	National Health Insurance (NHI), medical records
	Chang	2004	Taiwan	1996–2002	66	retrospective	National Health Insurance (NHI)
	Lue	2014	Taiwan	1996–2007	59 (1996), 52 (1997), 72 (1998), 68 (1999), 69 (2000), 76 (2001), 71 (2002), 59.9 (2003), 66.9 (2004), 74.8 (2005), 77.1 (2006), 70 (2007)	retrospective	National Health Insurance (NHI)
	Lin	2015	Taiwan	1997–2010	48.46 ~ 57.56 (1997-2003), 65.52 ~ 82.77 (2004-2010)	retrospective	National Health Insurance Research Database (NHIRD)
	Huang	2019	Taiwan	1997–2011	29 ~ 44 (1997-2003), 32 ~ 65 (2004-2011)	retrospective	National Health Insurance Research Database (NHIRD)
	Huang	2009	Taiwan	2003–2006	69	retrospective	National Health Insurance (NHI)
	Huang	2013	Taiwan	2000–2010	61 (2000), 67 (2001), 63 (2002), 56 (2003), 62 (2004), 68 (2005), 71 (2006), 68 (2007), 76 (2008), 69 (2009), 79 (2010)	retrospective	National Health Insurance (NHI)

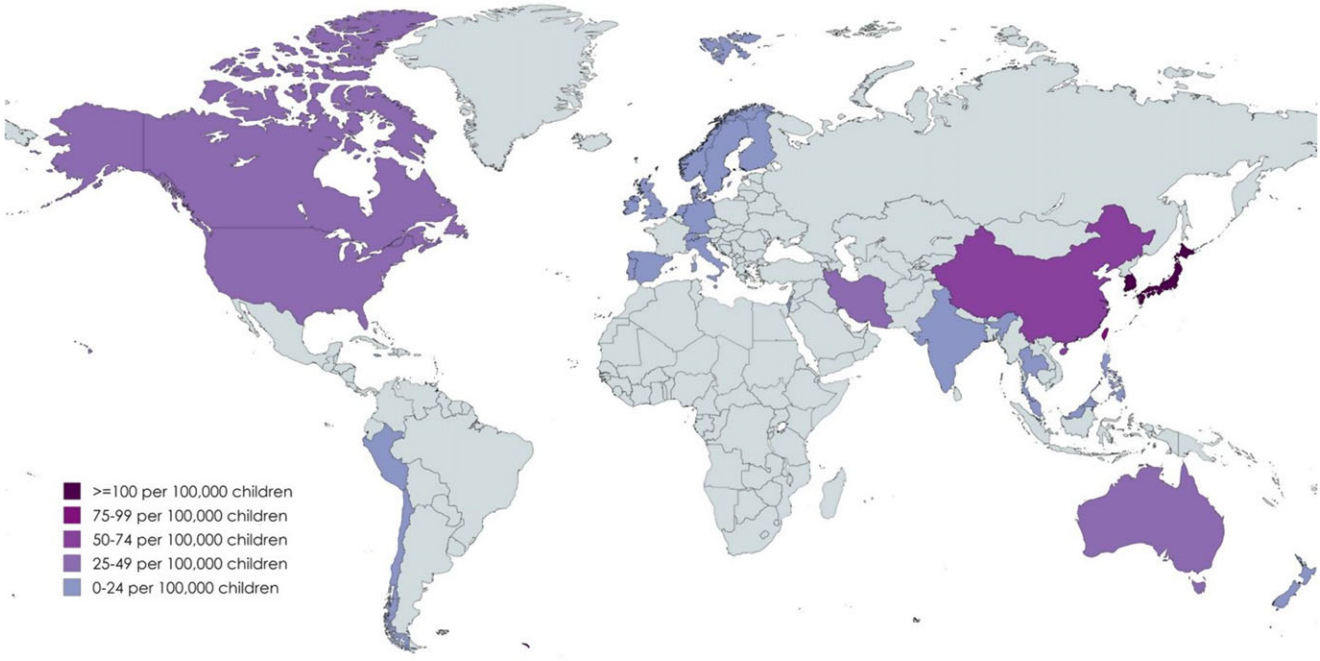

Figure 2. Global incidence of Kawasaki disease in children <5 years.

https://doi.org/10.1017/S104795112500191X Published online by Cambridge University Press

genetic markers in these populations, particularly specific HLA alleles, suggests a genetic susceptibility to Kawasaki disease.[114] The notably higher incidence observed in studies from California and Hawaii, regions with a larger proportion of Asian populations within the United States of America, further suggests the potential influence of genetic factors in Kawasaki disease susceptibility.[15,23] The rapid industrialisation and improved sanitation in these countries align with the 'hygiene hypothesis,' which proposes that reduced exposure to infectious agents in early childhood may increase the risk of immune-mediated diseases like Kawasaki disease.[115] The well-established diagnostic criteria and heightened awareness of Kawasaki disease in Japan and Korea likely contribute to the higher reported incidence, as healthcare professionals in these countries may be more adept at recognising and diagnosing the disease.[116] The complex aetiology of Kawasaki disease necessitates further research to elucidate the precise contribution of each factor to the high incidence in Japan and Korea.

The observed temporal trends in Kawasaki disease incidence, as revealed in our systematic review, offer valuable insights into the evolving understanding and recognition of this disease. The general upward trajectory of Kawasaki disease incidence, particularly in the Americas and Europe, likely reflects improved diagnostic capabilities and heightened awareness among healthcare professionals. The increasing familiarity with Kawasaki disease's clinical presentation and the refinement of diagnostic criteria may have led to more accurate identification and reporting of cases, contributing to the observed rise in incidence.[117,118] For instance, the gradual increase in Kawasaki disease incidence in the United States, Canada, Chile, and Peru exemplifies this trend. The growing recognition of Kawasaki disease in these regions, coupled with improved diagnostic accuracy, likely plays a significant role in the upward trajectory. Furthermore, the admixture of populations and increased migration may have contributed to the rising incidence in certain regions.[119] The introduction of new genetic susceptibilities and environmental exposures through population mixing could potentially influence the occurrence of Kawasaki disease. The relatively high incidence observed in Hawaii, a region known for its diverse population, might be attributed, in part, to this phenomenon.[23,24,26] Conversely, the notable decline in Kawasaki disease incidence in Japan and Korea during the COVID-19 pandemic suggests the potential role of preceding infections in triggering Kawasaki disease.[65,98] The reduced circulation of common respiratory viruses during the pandemic might have contributed to this decrease, implying that exposure to certain infections may play a role in the development of Kawasaki disease. The decrease in incidence observed in these countries during the pandemic provides compelling evidence supporting this hypothesis. These temporal trends underscore the dynamic nature of Kawasaki disease epidemiology and highlight the importance of ongoing surveillance and research. The evolving understanding of Kawasaki disease, coupled with the potential influence of population dynamics and infectious triggers, necessitates continuous efforts to monitor and analyse incidence patterns. Such efforts will be crucial for developing effective prevention and treatment strategies and ultimately reducing the global burden of this disease.

This study is the first systematic review to assess the global incidence of Kawasaki disease comprehensively. However, several limitations warrant acknowledgement. Grey literature, which includes unpublished studies, conference abstracts, and reports, was excluded from our review due to the potential for publication bias and the difficulty in assessing the quality of these studies Additionally, the quality of included studies was variable, with quite a few studies demonstrating low methodological rigour. Future research should focus on identifying the specific factors driving the observed geographic and temporal variations in Kawasaki disease incidence. Large-scale, population-based studies with standardised diagnostic criteria and rigorous methodologies are needed to generate more precise estimates for specific populations. Investigations into genetic, environmental, and infectious triggers of Kawasaki disease are crucial for developing targeted prevention and treatment strategies.

Understanding the burden of Kawasaki disease has significant clinical implications. Comprehensive incidence data can inform the allocation of healthcare resources, guide public health interventions, and aid in the design of clinical trials for novel therapies. Recent evidence suggests that Kawasaki disease has surpassed rheumatic fever as the leading cause of acquired heart disease among children globally, not just in developed countries (Pilania RK, et al., Cardiology in the Young, In Press). This highlights the growing burden of Kawasaki disease worldwide and the need for increased awareness and research to address this evolving challenge. Our review highlights the need for further research on the incidence of Kawasaki disease in underrepresented regions, such as the Arab world. Also, scarcity of studies from the Eastern Mediterranean Region and the South-East Asia Region suggests that the true incidence of Kawasaki disease in these regions may be underestimated and warrants further investigation. Understanding the regional variations in Kawasaki disease incidence can help tailor diagnostic and treatment algorithms to specific populations, potentially improving patient outcomes.[120] Furthermore, recognising the geographic variability in Kawasaki disease incidence can help tailor diagnostic and treatment algorithms to specific populations, potentially improving patient outcomes.

This systematic review highlights the substantial global burden of Kawasaki disease and underscores the significant variation in incidence rates across different populations. It is crucial to recognise and address the regional variations in disease burden. Future research should prioritise elucidating the factors contributing to these variations, ultimately leading to more effective prevention, diagnosis, and management of Kawasaki disease worldwide.

Supplementary material. The supplementary material for this article can be found at https://doi.org/10.1017/S104795112500191X.

Data availability statement. The data that support the findings of this study are available on request from the corresponding author, YJC.

Acknowledgements. The authors thank Eun-Ji Kang from the Medical Library, Korea University, for searching abstracts and articles related to this study.

Author contributions. YJC conceived and designed the study. CRK gathered, processed, and cleaned the data. CRK analysed the data. CRK and YJC had full access to all the data in the study. JSL worked on project administration and methodology. CRK wrote the first draft of the manuscript followed by iterative revision with JSL. All authors substantially contributed to discussion of content and reviewed and edited the manuscript before submission. All authors were involved in the decision to submit and agreed to publish the paper.

Competing interests. All authors declare no competing interests.

References

1. McCrindle BW, Rowley AH, Newburger JW, et al. Diagnosis, treatment, and long-term management of Kawasaki disease: a scientific statement for health professionals from the American heart association. circulation 2017; 135: e927–e999.
2. Takahashi K, Oharaseki T, Yokouchi Y. Pathogenesis of Kawasaki disease. Clin Exp Immunol 2011; 164 (Supplement_1): 20–22.
3. Singh S, Vignesh P, Burgner D. The epidemiology of Kawasaki disease: a global update. Arch Dis Child 2015; 100: 1084–1088.
4. Skochko SM, Jain S, Sun X, et al. Kawasaki disease outcomes and response to therapy in a multiethnic community: a 10-year experience. J pediatr 2018; 203: 408–415.e3, e403.
5. Kim GB. Reality of Kawasaki disease epidemiology. Korean j pediatr 2019; 62: 292–296.
6. Burns JC, Cayan DR, Tong G, et al. Seasonality and temporal clustering of Kawasaki syndrome. Epidemiology 2005; 16: 220–225.
7. Schiavo JH. PROSPERO: an international register of systematic review protocols. Med Ref Serv Q 2019; 38: 171–180.
8. Hoy D, Brooks P, Woolf A, et al. Assessing risk of bias in prevalence studies: modification of an existing tool and evidence of interrater agreement. J Clin Epidemiol 2012; 65: 934–939.
9. Alkanhal A, Saunders J, Altammar F, et al. Unexpectedly high incidence of Kawasaki disease in a Canadian Atlantic province- an 11-year retrospective descriptive study. Pediatr Rheumatol Online J 2023; 21: 30.
10. Atamari-Anahui N, Cabello-Coca S, Alvarado-Gamarra G, del Aguila O, Candela-Herrera J. Characteristics, seasonality, and trend of hospitalizations for Kawasaki disease in children from Peru, 2015–2019. Anales de la Facultad de Medicina 2023; 84: 76–80.
11. Belay ED, Holman RC, Clarke MJ, et al. The incidence of Kawasaki syndrome in West Coast health maintenance organizations. Pediatr Infect Dis J 2000; 19: 828–832.
12. Belay ED, Holman RC, Maddox RA, Foster DA, Schonberger LB. Kawasaki syndrome hospitalizations and associated costs in the United States. Public Health Rep 2003; 118: 464–469.
13. Borzutzky A, Hoyos-Bachiloglu R, Cerda J, Talesnik E. Rising hospitalization rates of Kawasaki disease in Chile between 2001 and 2007. Rheumatol Int 2012; 32: 2491–2495.
14. Bronstein DE, Dille AN, Austin JP, Williams CM, Palinkas LA, Burns JC. Relationship of climate, ethnicity and socioeconomic status to Kawasaki disease in San Diego County, 1994 through 1998. Pediatr Infect Dis J 2000; 19: 1087–1091.
15. Callinan LS, Holman RC, Vugia DJ, Schonberger LB, Belay ED. Kawasaki disease hospitalization rate among children younger than 5 years in California, 2003–2010. Pediatr Infect Dis J 2014; 33: 781–783.
16. Chang RK. Epidemiologic characteristics of children hospitalized for Kawasaki disease in California. Pediatr Infect Dis J 2002; 21: 1150–1155.
17. Coustasse A, Larry JJ, Migala W, Arvidson C, Singh KP. Kawasaki Syndrome in Texas. Hosp Top 2009; 87: 3–10.
18. Davis RL, Waller PL, Mueller BA, Dykewicz CA, Schonberger LB. Kawasaki syndrome in Washington state: race-specific incidence rates and residential proximity to water. Arch Pediatr Adolesc Med 1995; 149: 66–69.
19. Dawson TJ, Vuong CT, Ma SCY, Russell CR, Melish ME, Bratincsak A. Mapping the trends of Kawasaki disease in Hawai'i from 1996 to 2018. Hawaii J Health Soc Welf 2020; 79 (5 Suppl 1): 104–111.
20. Gorrab AA, Fournier A, Bouaziz AA, et al. Incidence rate and epidemiological and clinical aspects of Kawasaki disease in children of maghrebi origin in the province of Quebec, Canada, compared to the country of origin. Glob Pediatr Health 2016; 3: 2333794x16630670.
21. Holman RC, Belay ED, Christensen KY, Folkema AM, Steiner CA, Schonberger LB. Hospitalizations for Kawasaki syndrome among children in the United States, 1997–2007. Pediatr Infect Dis J 2010; 29: 483–488.
22. Holman RC, Belay ED, Clarke MJ, Kaufman SF, Schonberger LB. Kawasaki syndrome among American Indian and Alaska native children, 1980 through 1995. Pediatr Infect Dis J 1999; 18: 451–455.
23. Holman RC, Christensen KY, Belay ED, et al. Racial/ethnic differences in the incidence of Kawasaki syndrome among children in Hawaii. Hawaii Med J 2010; 69: 194–197.
24. Holman RC, Curns AT, Belay ED, et al. Kawasaki syndrome in Hawaii. Pediatr Infect Dis J 2005; 24: 429–433.
25. Holman RC, Curns AT, Belay ED, Steiner CA, Schonberger LB. Kawasaki syndrome hospitalizations in the United States, 1997 and 2000. Pediatrics 2003; 112 (3 Pt 1): 495–501.
26. Holman RC, Shahriari A, Effler PV, Belay ED, Schonberger LB. Kawasaki syndrome hospitalizations among children in Hawaii and connecticut. Arch Pediatr Adolesc Med 2000; 154: 804–808.
27. Hoyos-Bachiloglu R, García Á., Morales PS, Cerda J, Talesnik E, Borzutzky A. Geographic distribution of Kawasaki disease throughout Chile. Revista chilena de infectología : órgano oficial de la Sociedad Chilena de Infectología 2016; 33: 12–18.
28. Lin RY, Krata LM. Trends in kawasaki disease hospitalizations: New York state 1990–2009. Internet J Asthma Allergy Immunol 2010; 8: 1–7.
29. Lin YT, Manlhiot C, Ching JC, et al. Repeated systematic surveillance of Kawasaki disease in Ontario from 1995 to 2006. Pediatr Int 2010; 52: 699–706.
30. Okubo Y, Nochioka K, Sakakibara H, Testa M, Sundel RP. National survey of pediatric hospitalizations due to Kawasaki disease and coronary artery aneurysms in the USA. Clin Rheumatol 2017; 36: 413–419.
31. Pierre R, Sue-Ho R, Watson D. Kawasaki syndrome in Jamaica. Pediatr Infect Dis J 2000; 19: 539–543.
32. Robinson C, Chanchlani R, Gayowsky A, et al. Incidence and short-term outcomes of Kawasaki disease. Pediatr Res 2021; 90: 670–677.
33. Schonhaut LB, Herrera PL, Acevedo KG, Alvarez PZ. Kawasaki's disease in the hospital Roberto del Rio: a clinico-epidemiological analysis. Revista Chilena de Pediatria 2001; 72: 319–327.
34. Taslakian EN, Wi CI, Seol HY, et al. Long-term incidence of Kawasaki disease in a North American community: a population-based study. Pediatr Cardiol 2021; 42: 1033–1040.
35. Tourneux P, Dufillot D, Belloy M, Boralevi F, Cevallos L, Krim G. Kawasaki disease epidemiology in Guadeloupe. Presse Med 2005; 34: 25–28.
36. Vasudeva R, Poku FA, Thommana M, et al. Trends and resource utilization in Kawasaki disease hospitalizations in the United States, 2008–2017. Hosp Pediatr 2022; 12: 257–266.
37. Bar-Meir M, Haklai Z, Dor M. Kawasaki disease in Israel. Pediatr Infect Dis J 2011; 30: 589–592.
38. Cimaz R, Fanti E, Mauro A, Voller F, Rusconi F. Epidemiology of Kawasaki disease in Italy: surveillance from national hospitalization records. Eur J Pediatr 2017; 176: 1061–1065.
39. Fischer TK, Holman RC, Yorita KL, Belay ED, Melbye M, Koch A. Kawasaki syndrome in Denmark. Pediatr Infect Dis J 2007; 26: 411–415.
40. Gradoux E, Bernardo SD, Bressieux-Degueldre S, et al. Epidemiology of Kawasaki disease in children in Switzerland: a national prospective cohort study. Swiss Med Wkly 2022; 152: w30171.
41. Grech V. Kawasaki disease in Malta. Eur J Epidemiol 1999; 15: 501–502.
42. Hall GC, Tulloh LE, Tulloh RM. Kawasaki disease incidence in children and adolescents: an observational study in primary care. Br J Gen Pract 2016; 66: e271–276.
43. Harnden A, Mayon-White R, Perera R, Yeates D, Goldacre M, Burgner D. Kawasaki disease in England: ethnicity, deprivation, and respiratory pathogens. Pediatr Infect Dis J 2009; 28: 21–24.
44. Jakob A, Whelan J, Kordecki M, et al. Kawasaki disease in Germany: a prospective, population-based study adjusted for underreporting. Pediatr Infect Dis J 2016; 35: 129–134.
45. Juliusson PB, Helgason H, Thorsson AV. Kawasaki disease in Iceland 1979–1997.. Laeknabladid 1999; 85: 120–194.
46. Lynch M, Holman RC, Mulligan A, Belay ED, Schonberger LB. Kawasaki syndrome hospitalizations in Ireland, 1996 through 2000. Pediatr Infect Dis J 2003; 22: 959–963.
47. Mauro A, Fabi M, Da Frè M, et al. Kawasaki disease: an epidemiological study in central Italy. Pediatr Rheumatol Online J 2016; 14: 22.

https://doi.org/10.1017/S104795112500191X Published online by Cambridge University Press

48. Odingo M, Rutter M, Bowley J, et al. The incidence of Kawasaki disease using hospital admissions data for England 2006–2021. Rheumatology (Oxford) 2023; 62: 3117–3125.
49. Olafsdottir HS, Oskarsson G, Haraldsson A. Kawasaki disease in Iceland 1996–2005, epidemiology and complications. Laeknabladid 2012; 98: 91–95.
50. Pinto FF, Laranjo S, Mota Carmo M, Brito MJ, Cruz Ferreira R. Twelve years of Kawasaki disease in Portugal: epidemiology in hospitalized children. Pediatr Infect Dis J 2017; 36: 364–368.
51. Riancho-Zarrabeitia L, Rasilla DF, Royé D, Fdez-Arroyabe P, Santurtún A. Kawasaki disease in Spanish paediatric population and synoptic weather types: an observational study. Rheumatol Int 2018; 38: 1259–1266.
52. Salo E. Kawasaki disease in Finland in 1982–1992. Scand J Infect Dis 1993; 25: 497–502.
53. Salo E, Griffiths EP, Farstad T, et al. Incidence of Kawasaki disease in northern European countries. Pediatr Int 2012; 54: 770–772.
54. Sánchez-Manubens J, Antón J, Bou R, Iglesias E, Calzada-Hernandez J. Incidence, epidemiology and clinical features of Kawasaki disease in Catalonia, Spain. Clin Exp Rheumatol 2016; 34 (3 Suppl 97): S139–144.
55. Sánchez-Manubens J, Antón J, Bou R, et al. Kawasaki disease is more prevalent in rural areas of Catalonia (Spain). An Pediatr 2017; 87: 226–231.
56. Schiller B, Fasth A, Björkhem G, Elinder G. Kawasaki disease in Sweden: incidence and clinical features. Acta Paediatr 1995; 84: 769–774.
57. Tacke CE, Breunis WB, Pereira RR, Breur JM, Kuipers IM, Kuijpers TW. Five years of Kawasaki disease in the Netherlands: a national surveillance study. Pediatr Infect Dis J 2014; 33: 793–797.
58. Tulloh RMR, Mayon-White R, Harnden A, et al. Kawasaki disease: a prospective population survey in the UK and Ireland from 2013 to 2015. Arch Dis Child 2019; 104: 640–646.
59. Saffar MJ, Reshidighader F. Kawasaki disease in East Mazandaran, Islamic Republic of Iran, 1997–2002. East Mediterr Health J 2005; 11: 28–35.
60. Shahbaznejad L, Hosseininasab A, Mahboobi L, et al. Epidemiological data of national Kawasaki disease registry in Iran, 2007–2019. Front Pediatr 2022; 10: 988371.
61. Panamonta M, Chaikitpinyo A, Durongpisitkul K, et al. Kawasaki disease in central area of Northeast Thailand. J Med Assoc Thai 2004; 87: 887–890.
62. Singh S, Bhattad S. Kawasaki disease incidence at Chandigarh, North India, during 2009–2014. Rheumatol Int 2016; 36: 1391–1397.
63. Abrams JY, Blase JL, Belay ED, et al. Increased Kawasaki disease incidence associated with higher precipitation and lower temperatures, Japan, 1991–2004. Pediatr Infect Dis J 2018; 37: 526–530.
64. Ae R, Makino N, Kosami K, Kuwabara M, Matsubara Y, Nakamura Y. Treatments, and cardiac complications in patients with Kawasaki disease: the nationwide survey in Japan, 2017–2018. J Pediatr 2020; 225: 23–29.e22.
65. Ae R, Makino N, Kuwabara M, et al. Incidence of Kawasaki disease before and after the COVID-19 pandemic in Japan: results of the 26th nationwide survey, 2019 to 2020. JAMA Pediatr 2022; 176: 1217–1224.
66. Celis-Seposo AK, Madaniyazi L, Seposo X, Hashizume M, Yoshida LM, Toizumi M. Incidence and seasonality of Kawasaki disease in children in the Philippines, and its association with ambient air temperature. Front Pediatr 2024; 12: 1358638.
67. Chang LY, Chang IS, Lu CY, et al. Epidemiologic features of Kawasaki disease in Taiwan, 1996–2002. Pediatrics 2004; 114: e678–682.
68. Du ZD, Zhang T, Liang L, et al. Epidemiologic picture of Kawasaki disease in Beijing from 1995 through 1999. Pediatr Infect Dis J 2002; 21: 103–107.
69. Du ZD, Zhao D, Du J, et al. Epidemiologic study on Kawasaki disease in Beijing from 2000 through 2004. Pediatr Infect Dis J 2007; 26: 449–451.
70. Ferreira D, Ng R, Lai E, et al. Kawasaki disease in the Australian population: an Australian tertiary hospital experience. Heart Lung Circ 2021; 30: 996–1001.
71. Gee P, Burgner D, Gee W, Forbes A, Frampton CMA, McCombie A. Rising Kawasaki disease incidence in New Zealand: analysis of national population incidence and outcomes 2000–2017. Arch Dis Child 2023; 108: 916–921.
72. Ha S, Seo GH, Kim KY, Kim DS. Epidemiologic Study on Kawasaki Disease in Korea, 2007–2014: Based on Health Insurance Review & Assessment Service Claims. J Korean Med Scii 2016; 31: 1445–1449.
73. Heaton P, Wilson N, Nicholson R, Doran J, Parsons A, Aiken G. Kawasaki disease in New Zealand. J Paediatr Child Health 2006; 42: 184–190.
74. Huang GY, Ma XJ, Huang M, et al. Epidemiologic pictures of Kawasaki disease in Shanghai from 1998 through 2002. J Epidemiol 2005; 16: 9–14.
75. Huang SK, Lin MT, Chen HC, Huang SC, Wu MH. Epidemiology of Kawasaki disease: prevalence from national database and future trends projection by system dynamics modeling. J Pediatr 2013; 163: 126–131.e121.
76. Huang WC, Huang LM, Chang IS, et al. Epidemiologic features of Kawasaki disease in Taiwan, 2003, 2006. Pediatrics 2009; 123: e401–e405.
77. Huang YH, Lin KM, Ho SC, Yan JH, Lo MH, Kuo HC. Increased incidence of Kawasaki disease in Taiwan in recent years: a 15 years nationwide population-based cohort study. Front Pediatr 2019; 7: 121.
78. Iio K, Matsubara K, Miyakoshi C, et al. Incidence of Kawasaki disease before and during the COVID-19 pandemic: a retrospective cohort study in Japan. BMJ Paediatr Open 2021; 5: e001034.
79. Kim GB, Eun LY, Han JW, et al. Epidemiology of Kawasaki disease in South Korea: a nationwide survey 2015–2017. Pediatr Infect Dis J 2020; 39: 1012–1016.
80. Kim GB, Han JW, Park YW, et al. Epidemiologic features of Kawasaki disease in South Korea: data from nationwide survey, 2009–2011. Pediatr Infect Dis J 2014; 33: 24–27.
81. Kim GB, Park S, Eun LY, et al. Epidemiology and clinical features of Kawasaki disease in South Korea, 2012–2014. Pediatr Infect Dis J 2017; 36: 482–485.
82. Kim J, Hong K, Yoo D, Chun BC. Spatiotemporal clusters of Kawasaki disease in south Korea from 2008 to 2017: a municipal-level ecological study. Front Pediatr 2022; 10: 1054985.
83. Li XH, Li LJ, Li H, Xu M, Zhou M. Epidemiological survey of Kawasaki disease in Sichuan province of China. J Trop Pediatrics 2008; 54: 133–136.
84. Lim JH, Kim YK, Min SH, Kim SW, Lee YH, Lee JM. Seasonal trends of viral prevalence and incidence of Kawasaki disease: a Korea public health data analysis. J Clin Med 2021; 10: 3301.
85. Lin MC, Lai MS, Jan SL, Fu YC. Epidemiologic features of Kawasaki disease in acute stages in Taiwan, 1997–2010: effect of different case definitions in claims data analysis. J Chin Med Assoc 2015; 78: 121–126.
86. Lucas R, Dennington P, Wood E, et al. Epidemiology of Kawasaki disease in Australia using two nationally complete datasets. J Paediatr Child Health 2022; 58: 674–682.
87. Lue HC, Chen LR, Lin MT, et al. Estimation of the incidence of Kawasaki disease in Taiwan. A comparison of two data sources: nationwide hospital survey and national health insurance claims. Pediatr Neonatol 2014; 55: 97–100.
88. Lue HC, Chen LR, Lin MT, et al. Epidemiological features of Kawasaki disease in Taiwan, 1976–2007: results of five nationwide questionnaire hospital surveys. Pediatr Neonatol 2014; 55: 92–96.
89. Makino N, Nakamura Y, Yashiro M, et al. Descriptive epidemiology of Kawasaki disease in Japan, 2011–2012: from the results of the 22nd nationwide survey. J Epidemiol 2015; 25: 239–245.
90. Makino N, Nakamura Y, Yashiro M, et al. Nationwide epidemiologic survey of Kawasaki disease in Japan, 2015–2016. Pediatr Int 2019; 61: 397–403.
91. Makino N, Nakamura Y, Yashiro M, et al. Epidemiological observations of Kawasaki disease in Japan, 2013–2014. Pediatr Int 2018; 60: 581–587.
92. Mat Bah MN, Alias EY, Razak H, Sapian MH, Foo FH, Abdullah N. Epidemiology, clinical characteristics, and immediate outcome of Kawasaki disease: a population-based study from a tropical country. Eur J Pediatr 2021; 180: 2599–2606.
93. Nakamura Y, Yashiro M, Uehara R, Oki I, Kayaba K, Yanagawa H. Increasing incidence of Kawasaki disease in Japan: nationwide survey. Pediatr Int 2008; 50: 287–290.

https://doi.org/10.1017/S104795112500191X Published online by Cambridge University Press

94. Nakamura Y, Yashiro M, Uehara R, Oki I, Watanabe M, Yanagawa H. Epidemiologic features of Kawasaki disease in Japan: results from the nationwide survey in 2005–2006. J Epidemiol 2008; 18: 167–172.
95. Nakamura Y, Yashiro M, Uehara R, et al. Epidemiologic features of Kawasaki disease in Japan: results of the 2007–2008 nationwide survey. J Epidemiol 2010; 20: 302–307.
96. Nakamura Y, Yashiro M, Uehara R, et al. Epidemiologic features of Kawasaki disease in Japan: results of the 2009–2010 nationwide survey. J Epidemiol 2012; 22: 216–221.
97. Ng YM, Sung RY, So LY, et al. Kawasaki disease in Hong Kong, 1994 to 2000. Hong Kong Med J 2005; 11: 331–335.
98. Oh KJ, Lee SY. Decreased incidence of Kawasaki disease in South Korea during the SARS-CoV-2 pandemic. Front Pediatr 2024; 12: 1307931.
99. Park YW, Han JW, Hong YM, et al. Epidemiological features of Kawasaki disease in Korea, 2006–2008. Pediatr Int 2011; 53: 36–39.
100. Park YW, Han JW, Park IS, et al. Kawasaki disease in Korea, 2003–2005. Pediatr Infect Dis J 2007; 26: 821–823.
101. Park YW, Han JW, Park IS, et al. Epidemiologic picture of Kawasaki disease in Korea, 2000–2002. Pediatr Int 2005; 47: 382–387.
102. Royle JA, Williams K, Elliott E, et al. Kawasaki disease in Australia, 1993–95. Arch Dis Child 1998; 78: 33–39.
103. Sano T, Makino N, Aoyama Y, et al. Temporal and geographical clustering of Kawasaki disease in Japan: 2007–2012. Pediatr Int 2016; 58: 1140–1145.
104. Saundankar J, Yim D, Itotoh B, et al. The epidemiology and clinical features of kawasaki disease in australia. Pediatrics 2014; 133: e1009–e1014.
105. Wang D, Hu B, Wang F, Zhang T, Liu C. Study on the epidemiological features of Kawasaki disease in Jiangsu. Zhonghua liu xing bing xue za zhi = Zhonghua liuxingbingxue zazhi. 2000; 21: 94–96.
106. Yanagawa H, Nakamura Y, Yashiro M, et al. A nationwide incidence survey of Kawasaki disease in 1985–1986 in Japan. J Infect Dis 1988; 158: 1296–1301.
107. Yanagawa H, Nakamura Y, Yashiro M, Ojima T, Koyanagi H, Kawasaki T. Update of the epidemiology of Kawasaki disease in Japan–from the results of 1993–94 nationwide survey. J Epidemiol 1996; 6: 148–157.
108. Yanagawa H, Nakamura Y, Yashiro M, et al. Results of the nationwide epidemiologic survey of Kawasaki disease in 1995 and 1996 in Japan. Pediatrics 1998; 102: E65–e65.
109. Yanagawa H, Nakamura Y, Yashiro M, et al. Incidence survey of Kawasaki disease in 1997 and 1998 in Japan. Pediatrics 2001; 107: E33–e33.
110. Yanagawa H, Nakamura Y, Yashiro M, Uehara R, Oki I, Kayaba K. Incidence of Kawasaki disease in Japan: the nationwide surveys of 1999–2002. Pediatr Int 2006; 48: 356–361.
111. Yanagawa H, Yashiro M, Nakamura Y, Kawasaki T, Kato H. Epidemiologic pictures of Kawasaki disease in Japan: from the nationwide incidence survey in 1991 and 1992. Pediatrics 1995; 95: 475–479.
112. Zhang X, Liang Y, Feng W, Su X, Zhu H. Epidemiologic survey of Kawasaki disease in inner Mongolia, China, between 2001 and 2013. Exp Ther Med 2016; 12: 1220–1224.
113. Zhang X, Zhang Z, Liu S, Sun J. Epidemiologic survey of Kawasaki disease in Jilin from 1999 through 2008. Pediatr Cardiol 2012; 33: 272–279.
114. Kwon Y-C, Sim BK, Yu JJ, et al. HLA-B*54:01 Is Associated With Susceptibility to Kawasaki Disease. Circ Genom Precis Med 2019; 12: e002365.
115. Burgner D, Carter K, Webster R, Kuijpers TW. Kawasaki disease, childhood allergy and the hygiene hypothesis. Pediatric allergy and immunology : official publication of the European Society of Pediatric Allergy and Immunology 2011; 22: 751–751.
116. Yamazaki Y, Sugawara Y, Nakajima K, Adachi E, Hasegawa T. Parental awareness of Kawasaki disease features. Pediatr Int 2023; 65: e15416.
117. Burns JC. History of the worldwide emergence of Kawasaki disease. Int J Rheum Dis 2018; 21: 13–15.
118. Cox JR, Sallis RE. Recognition of kawasaki disease. The Permanente journal 2009; 13: 57–61.
119. Piram M. Epidemiology of Kawasaki disease in Europe. Front Pediatr 2021; 9: 673554.
120. Mohamed M, Harahsheh A, Choueiter N, et al. Advancing Kawasaki disease research in the arab world: scoping literature review analysis with emphasis on giant coronary aneurysms. Pediatr Cardiol 2024 Jul 22. doi: 10.1007/s00246-024-03589-4. [Epub ahead of print].

https://doi.org/10.1017/S104795112500191X Published online by Cambridge University Press