

# Emerging challenges in the health systems of Kerala, India: qualitative analysis of literature reviews

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## Abstract

**Purpose** – The substantial increase in non-communicable diseases (NCDs) is considered a major threat to developing countries. According to various international organizations and researchers, Kerala is reputed to have the best health system in India. However, many economists and health-care experts have discussed the risks embedded in the asymmetrical developmental pattern of the state, considering its high health-care and human development index and low economic growth. This study, a scoping review, aims to explore four major health economic issues related to the Kerala health system.

**Design/methodology/approach** – A systematic review of the literature was performed using PRISMA to facilitate selection, sampling and analysis. Qualitative data were collected for thematic content analysis.

**Findings** – Chronic diseases in a significant proportion of the population, low compliance with emergency medical systems, high health-care costs and poor health insurance coverage were observed in the Kerala community.

**Research limitations/implications** – The present study was undertaken to determine the scope for future research on Kerala's health system. Based on the study findings, a structured health economic survey is being conducted and is scheduled to be completed by 2021. In addition, the scope for future research on Kerala's health system includes: (1) research on pathways to address root causes of NCDs in the state, (2) determine socio-economic and health system factors that shape health-seeking behavior of the Kerala community, (3) evaluation of regional differences in health system performance within the state, (4) causes of high out-of-pocket expenditure within the state.

**Originality/value** – Given the internationally recognized standard of Kerala's vital statistics and health system, this review paper highlights some of the challenges encountered to elicit future research that contributes to the continuous development of health systems in Kerala.

**Keywords** Kerala health system, Kerala health insurance, Kerala public health, Heart disease, Health economics, Emergency healthcare

**Paper type** Review



**Introduction**

In India, health care follows a decentralized approach in which implementing and executing health facilities is the responsibility of each state, with considerable overlook from the central government. Health-care financing and policymaking are the responsibilities of the central government, whereas implementing the policy is the responsibility of the state government [1–3]. The national health policy established in 1983 was the first initiative toward implementing a structured health-care system and introducing various national health programs in the country. Records indicate that because of the decentralization and health care being a state’s responsibility, a considerable disparity can be observed in the health-care delivery standards among different states; some states are still struggling, whereas others display enormous improvements [4].

Kerala has a gross domestic product (GDP) per capita of US\$3,200 and is classified as a lower-middle-income state. Kerala is well known for maintaining one of the best health-care systems in the country for decades [5]. The “Kerala model of development” became a widely used term after the survey conducted by the Center for Developmental Studies on poverty and unemployment in 1975. According to experts, irrespective of its low per capita income, Kerala’s health system has excelled and continuously garnered national and international attention. As stated by various health surveys, including the central government’s analysis reports, Kerala leads many other states in having high health-care standards and life expectancy rates, low maternal mortality rate and the lowest infant mortality rate in the country (Table 1). High literacy rates and women empowerment have contributed significantly toward this achievement. However, numerous past experiences and studies indicate that Kerala is in the era of an emerging puzzle because of its high morbidity rate with low mortality rate, besides having a significant increase in non-communicable diseases (NCDs) [3, 6–11].

This unique community has taken enormous steps to reduce mortality by implementing robust primary care facilities, resulting in a significant increase in chronic degenerative diseases among the middle-aged and adult population [12, 13]. A significant proportion of adults in Kerala are living with chronic morbidities, especially illnesses such as hypertension, diabetes and atherosclerosis, which are known to develop chronic complications such as heart failure and kidney diseases [9, 11, 14]. Moreover, previous studies state that the approach of the Kerala population toward seeking timely emergency medical attention was questionable [8, 9, 15]. Golden hour treatment is the most effective option during the acute phase of a stroke or coronary event and is possible only during the early hours of these illnesses. Golden hour treatment protocols are advised by medical authorities such as the American Heart Association and American Stroke Association. The golden hour is 4 h 30 min for an acute stroke and 6 h for an acute coronary event [16]. Delayed treatment or consultation

Measure	National	Kerala
Maternal mortality rate	130/100,000	46/100,000
Infant mortality rate	32/100,000	10/100,000
Literacy rate (%)	70.04	93.91
Life expectancy (years)	68.56	74.9
Per capita GDP (US\$)	2,009.979	3,200
CVD death rate	272/100,000	Male: 382; Female: 184
Diabetes prevalence (%)	11–12	18–20
Hypertension prevalence (%)	28–30	30–38

**Source(s):** NITI Aayog, National Sample Survey, Kerala 2018 [1], Kerala budget analysis 2020; World Bank national accounts data 2018–2019

**Table 1.**  
Comparison of various socio-economic and health-care indicators of Kerala state and India

for acute coronary syndrome or a stroke may lead to mortality or a high incidence of disability [8, 9, 15]. Delayed treatment can also lead to ineligibility to access the golden hour treatment, which may result in severe heart failure or stroke, often requiring long-term care, medication and rehabilitation [17, 18]. High morbidity status with low coverage of health insurance or other reimbursement facilities can prove lethal to the long-term financial sustainability of a community. Therefore, it is essential to analyze previous studies and reports to explore the loopholes in Kerala's health system.

### Methodology

This study adopted a systematic review design with the purpose of exploring and describing the literature related to the health systems of Kerala and to identify emerging challenges and prospective research areas.

#### Data sources

Journal publications and gray literature such as relevant websites of the Government of India and state government reports available in the public domain.

#### Searching strategy

Data search and identification were done mainly using PubMed, Scopus and Google Scholar to retrieve journal publications. A Boolean search was employed using keywords and operators. The literature search was conducted between October and November 2019. The process of literature identification and refinement are summarized in Figure 1.

#### Data selection (inclusion and exclusion)

Studies and reports between 2010 and 2019 related to health systems of Indian states were included. Within these studies and reports, the following data were selected: socio-economic indicators, health system indicators, emergency health management system data and health financing data. Abstracts only and conference proceedings were excluded.

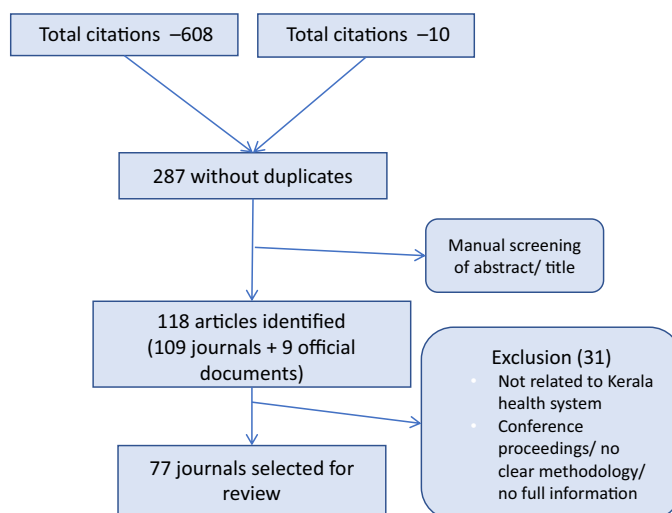


Figure 1.  
PRISMA flow diagram

### *Quality check process*

A reviewer and an external expert independently screened the articles using a standard quality assessment scale. Disparities in the selection of the documents were resolved by manual agreement.

### *Data management*

Mendeley was used for the management of references. The articles were initially stored, categorized and refined in Mendeley based on the date of publication, topic and authenticity. The selected articles were analyzed after converting them to Microsoft Word format. A coding analysis toolkit (CAT) was used for coding the document.

### *Data analysis*

The World Health Organization reports on health system performance were reviewed and used to develop preliminary codes for data analysis. Quantitative data served a descriptive statistical analysis using frequencies and proportions, whereas qualitative data served a thematic content analysis. Dixon–Wood’s critical interpretive synthesis was employed for qualitative data.

A reviewer and an external expert individually coded the articles based on the preliminary codes developed. Operational definitions of codes were adjusted to iron out disparities.

The themes developed were as follows:

- (1) Theme 1: Increasing burden of NCDs and chronic morbidity
- (2) Theme 2: Low utilization of emergency health-care facilities
- (3) Theme 3: Inequalities in the performance of the health system
- (4) Theme 4: High out-of-pocket expenditure

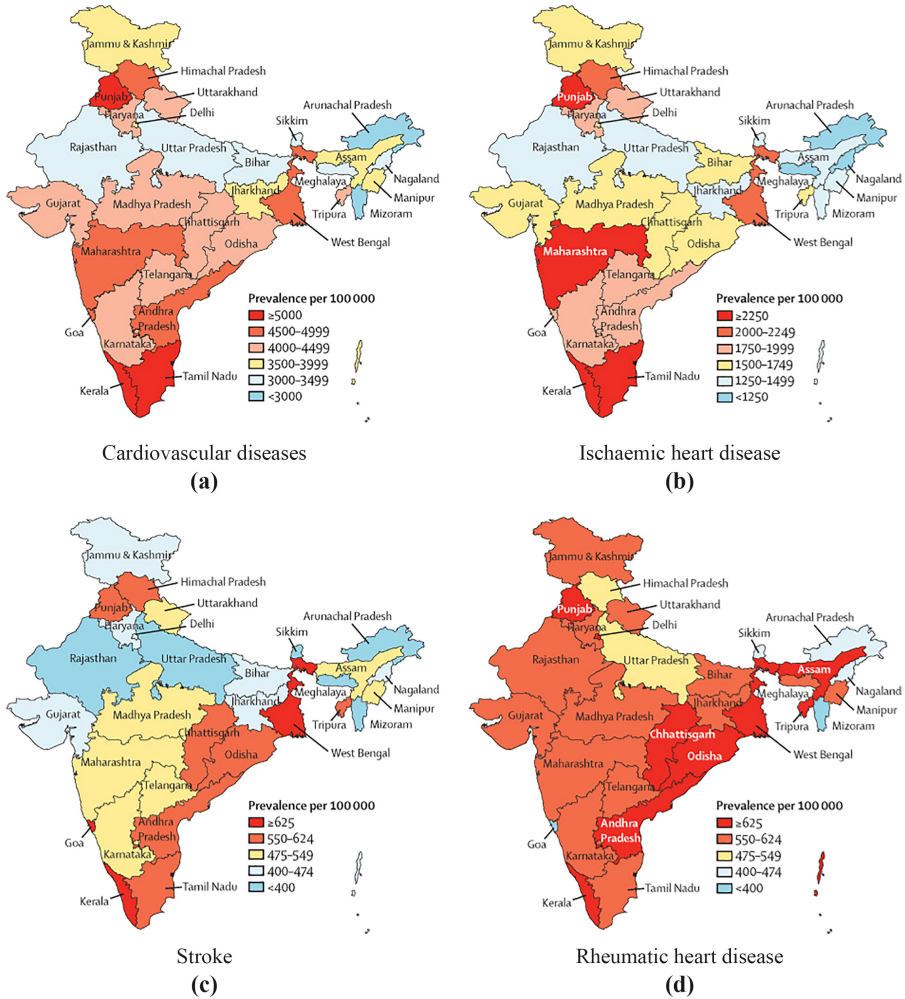
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## **Results**

### *Theme 1: increasing burden of non-communicable diseases and chronic morbidity*

Various records and experts have discussed the issue of high morbidity and low mortality in Kerala state and the long-term effects and complications associated with this [5, 6, 11, 19, 20]. The prevention of communicable diseases and NCDs was one of the major objectives of the 12th five-year plan developed by Kerala state, 2012–2017. The case fatality rate of acute heart failure, which was up to 25% in the 1980s, is as low as 4% at the moment [15, 21, 22]; the same trend was observed for several similar NCDs [23]. This prevented a significant proportion of mortality among the middle and old-age population, which resulted in a higher number of people suffering from chronic illnesses [24, 25]. Studies have shown that 74% of the morbid population suffers from chronic illnesses [7, 9–11]. The substantial rise of chronic illnesses such as hypertension and diabetes in the middle-aged population was reported as a significant concern, and many medical practitioners and researchers considered the state as the diabetes capital of India [9–11, 26, 27].

The prevalence of diabetes among people in Kerala was projected to be around 14%, while it was around 40% for hypertension [11]. A recent study [28] mapped the prevalence of major NCDs of various Indian states (Figure 2). The map shows a high prevalence of cardiovascular diseases, ischemic heart diseases, stroke and rheumatic heart diseases in Kerala compared with other states in the country. However, it is important to consider that a high literacy rate and awareness can be directly related to a higher reporting of diseases [29]. However, none of the literature or official reports showed any decline in the NCD statistics for 25 years.



**Figure 2.** Crude prevalence of cardiovascular diseases and major component causes in the states of India (2016). The changing patterns of cardiovascular diseases and their risk factors in the states of India and the global burden of disease [30]

An increase in chronic morbidity is a real burden to any community. Hence, it is important to study Kerala's population characteristics in-depth and to intervene early [3, 20].

*Theme 2: low utilization of emergency health-care facilities*

A recent survey by the directorate of economics and statistics of Kerala concluded that only around 11% of the total registered deaths were medically certified, indicating that most of the deaths occurred outside medical environments. The survey also indicated that more than 30% of the deaths found among the young and middle-aged population were aged below 64 years [28]. However, the study did not reveal the causes for deaths that occurred outside the medical environment. Further study is needed, especially because of the higher mortality found among young and middle-aged people. Another noticeable fact is the low utilization of the golden hour treatment for any vascular illness, especially for stroke and cardiovascular

diseases [5, 8, 9, 22, 31]. Studies related to emergency cardiac or stroke treatment in the Kerala population are scarce [8, 9, 32]. One of the studies concluded that the pre-hospital delay in acute stroke patients is significantly high compared to other communities. A similar study done on an acute cardiac event group exhibited concurrent findings of low utilization of pre-hospital emergency services in Refs. [8, 33].

The higher pre-hospital delay was associated with multiple stops the victims took before reaching the specialty center [8]. However, the reasons behind this observation were not revealed by the previous studies. According to some studies, awareness of the population regarding recognizing symptoms of a cardiac or cerebrovascular illness was contentious [5, 8, 32]. Patients with more disturbing symptoms such as limb weakness or chest pain arrived at hospital facilities earlier compared with subtle or vague symptoms [5, 8, 32, 34]. Some studies reported the issue of under-reporting of less severe or benign illnesses, especially among the poor [14, 35]. Higher education and better socio-economic status were factors for recognizing symptoms of vascular illnesses [34, 36]. Most studies from India and other countries concluded that people with higher educational qualifications tended to visit the hospital early in the event of an acute cardiac attack or stroke [37–40]. Regarding the pre-hospital emergency services in the state, some were termed as “not satisfactory” by some studies [9, 21, 28, 41, 42]. Additionally, organization-level management nicks play a role in the failure of emergency management in case of vascular ailments [9, 32]. Kerala’s health system has achieved tremendous success in its primary care strategies; however, their emergency care efficiency is contentious. Only a few studies and limited data are available in this aspect, and most of them are limited to a particular disease or region.

### *Theme 3: inequalities in the performance of the health system*

Kerala is a relatively small state compared with other territories in India [43, 44]. The living standards and socio-economic inequalities were found to be higher in the urban areas compared to rural areas [14, 20, 45, 46]. Sometimes, this variation was observed in the same rural or urban territory, and regions occupied by lower financial class people seemed to utilize medical facilities at a lower rate [27]. Another interesting observation in the literature was the disparity between the north and south regions of the state, which was more evident in the past and is gradually narrowing down [47]. The southern part of the state is considered better in many areas of development, including living status and health-care consumption [20, 47]. Some studies revealed that certain regions lagged in the process of health-care improvement. For example, the Malabar region was far behind in the mortality reduction programs in the early stage [12], whereas higher morbidity was observed in the developed regions [43, 48].

This disproportionality is vividly depicted in the comparison of health-care infrastructure distribution in various districts [47]. A large geographical area in northern Kerala is still dependent on a few tertiary care public medical centers for specialty treatment and has no active tertiary care institutions in two major districts, Kasargod and Wayanad. On the contrary, a small geographical area in southern Kerala possesses a relatively large number of medical institutions. Trivandrum is the southernmost district and is flooded with several national and state-level specialty centers. Table 2 illustrates the disparities in the distribution of health-care facilities in the state. The northernmost districts of Kasargod and Wayanad have no low density of specialty medical facilities, and the bed ratio was low at 6.3 and 8.69, respectively. On the other hand, Trivandrum had a bed ratio of 18.48, with multiple specialty centers. Apart from this, all major private health-care players were concentrated in cities with a high population density. Quality of care and ease of access made private health facilities a primary choice in Kerala [49]. Public health-care facilities in Kerala are still struggling with financial and infrastructure crises. Although this was a nationwide observation, Kerala has also not made any differences [50–55]. Some studies have evidenced the caste or community-based stratification with poor health security coverage and higher health risks over certain

**Table 2.**  
Distribution of public  
modern medicine  
institutions across  
Kerala

District	MCH	GH	DH	TH	Beds/10,000
Trivandrum	1	2	2	6	18.48
Kollam	1*	0	1	8	6.59
Kottayam	1	4	0	3	15.37
Alappuzha	1	1	1	7	16.35
Pathanamthitta	1*	2	1	4	11.31
Idukki	1*	0	1	4	7.28
Ernakulam	1	2	1	11	9.92
Thrissur	1	2	1	6	11.23
Malappuram	1	1	3	6	8.6
Kozhikode	1	1	1	7	12.35
Palakkad	1*	0	1	6	4.88
Kannur	1	1	1	7	21.63
Wayanad	0	1	1	2	8.69
Kasaragod	0	1	1	2	6.3

**Source(s):** Directorate of health sciences 2011, 2013 [58]  
Abbreviations: MCH – Medical college hospital, GH – general hospital, DH – district hospital, TH – taluk hospital, \* – not fully functional

marginalized groups in Kerala [14, 45, 56]. In addition, some studies reported gender-based inequalities, which were more evident in marginalized social groups [43, 57].

*Theme 4: high out-of-pocket expenditure*

The health system of Kerala has proved to be the best in India and is considered a model health system to be followed to achieve a high human development index for a struggling economy. However, the literature reveals that health financing in the state has been criticized because of the high rate of catastrophic expenditure on health and poor insurance coverage. Some surveys reported the financial status as a reason for restricting people from seeking health care [14, 59]. Recent reports based on various surveys showed that only a small percentage (less than 40%) of India’s population availed themselves of any kind of health insurance protection [60–62]; Kerala is also struggling to improve its health insurance coverage [59]. The private health-care sector plays a significant role in Kerala’s health-care system and is considered to be the highest compared to other states [31]. Some reports claim that it was slightly above 90%. Moreover, it was revealed that the people in Kerala fell below the poverty line because of costly treatment-related expenses, which are the highest in the country [10, 31, 63]. Catastrophic health expenditure after an acute heart failure treatment was reported in around 80% of the families [10]. An increase in early-onset lifestyle and vascular illnesses have propelled a large number of families toward financial crisis [64].

The 12th five-year plan aimed to provide comprehensive financial risk protection to the public and emphasized various health insurance and reimbursement schemes under state and central governments. Nevertheless, many recent surveys reported that Kerala has not yet achieved significant improvement in this sector [10, 46, 65]. Most of the government initiatives failed to reach the poor and needy communities in the state [65]. The official report states that the outreach of ambitious public health insurance programs under the aegis of Comprehensive Health Insurance Agency, Kerala (CHIAK) is making substantial progress, with a total enrolment of around 4,100,000 families [66]. However, the scope of this scheme has limited penetration and restricted specialty treatment access and financial support [46, 65, 67–70].

Sometimes, the disease event itself was high in the population group, leading to un-availed health security [10]. Despite all the efforts made by the government and private insurance facilities, socio-economic status, employment and disease profile have an adverse impact on insurance coverage in the state [46, 48, 65, 68]. One of the futuristic approaches the state

government recently implemented is offering emergency care to all without the immediate payment of hospital bills, even in the private sector, but some of the reported limitations of this program include confusion among the public and late catastrophic issues [53, 71]. Apart from its highest educational achievements and robust health system, Kerala is known for its low GDP; this can impact insurance coverage. In reality, experts state that the neediest marginal population is devoid of financial protection during an adverse disease event [14, 46, 48, 65, 72, 73].

**Discussion**

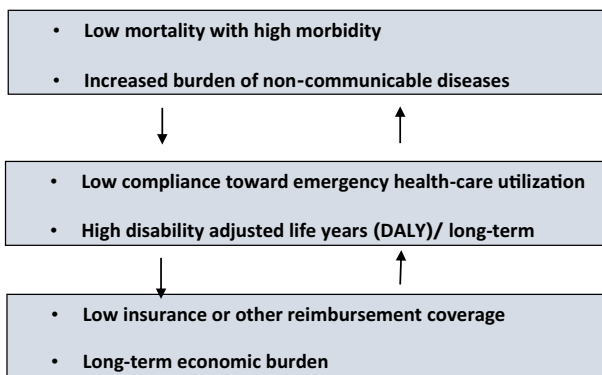
Kerala’s health system is unique, not only in India but also at a global level because it has accomplished more from less [74]. Its asymmetrical development has been one of the most discussed topics for decades, considering that it maintained high health-care standards while struggling with sluggish economic growth. However, experts reveal that some risks have emerged in this unique community, the most obvious being the increase in the number of morbid populations with a lower mortality rate. Various studies have mentioned the increasing burden of NCDs and the challenges in managing them.

From the data obtained, a model illustrating inter-related health system issues was synthesized (Figure 3). These issues are discussed in detail under the results section. The authors believe that these represent a potential research agenda on the Kerala health system.

Several studies and reports stated the higher prevalence of NCDs in the state such as heart disease, stroke, hypertension and diabetes. Often, this observation is explained as the result of increased life expectancy as a higher number of aged individuals suffer from chronic illnesses. However, the life-course perspective is often overlooked. Future studies related to risk factors and an upstream determinant of NCDs is necessary for the community.

From the data obtained, it is clear that about 30% of the total mortality in Kerala involves people below 64 years of age. Unfortunately, medically certified deaths represent only 11% of all registered deaths. As a result, less is known about the cause of deaths that occurred outside medical environments. Improving mortality data is important not only to enrich data but also to shed light on reasons for not seeking medical care during terminal illnesses.

Studies show that emergency health-care utilization of the public in the state is low. This will create socio-economic shifts like increased disability-adjusted life years and long-term care costs. Factors embedded in the population for this behavior are infrequently studied and mentioned. Some of the literature reported reduced awareness and socio-economic factors as the reasons; however, most of the data are limited due to a narrow target population or limited sample size.



**Figure 3.**  
Synthesized health  
economic model



One major study [8] suggested that patients took multiple stops before reaching the appropriate specialty center. However, it remained unclear whether delays were due to health system inefficiencies, or patient-related factors, or patient's family-related factors. Studies related to the efficiency of the health system, including the referral system, in managing emergency vascular diseases are important. Further, public awareness about and access to specialty centers needs to be studied to inform health system development efforts. We suggest future studies on emergency medical care in Kerala to focus on the socio-economic status, access and quality of care, as suggested by the widely used three delays concept. Based on the results presented, it is clear that delay in the golden hour treatment can result in disability or long-term medical care. One study showed that 80% of the families faced catastrophic health spending in the state after a cardiac failure. Further studies to compare the medical expenses in patients who availed themselves of golden treatment and those who did not receive it could enhance insight into the cost-benefit of golden treatment, including a comparison of mortality rates, length of hospital stay and quality of life after treatment.

Another interesting factor is the observable disparity in the socio-economic status and health-care delivery in various regions of the state, such as rural–urban and north–south regional disparities. Differences are observed even within certain rural or urban communities based on the financial strata. Based on the evidence, high out-of-pocket expenditure is considered one of the major issues, which is making health financing more complex in the state.

Although government-provided health insurance and reimbursement made significant progress in the state, out-of-pocket health-related expenses remain high. Studies related to the various health insurance schemes are needed. These should include coverage of diseases and a co-payment policy for health expenditures. Further, homogeneity of the health-care cost across the state within and between public and private health-care providers is another recommended research area.

Finally, the interactions of the various issues raised were not clearly discussed in the selected literature. Future studies could include a focus on the relationship between insurance coverage and health-care utilization, and insurance coverage versus subscriber and disease profile.

## Conclusion

This scoping review revealed emerging challenges in Kerala's health system in relation to the rise of NCDs and identified various research needs that could contribute to further the development of Kerala's health system. Based on the study findings, a structured health economic survey study is already under process and has been planned to be completed by 2021. In addition, the scope for future research on Kerala's health system includes: (1) research on pathways to address root causes of NCDs in the state, (2) determine socio-economic and health system factors that shape health-seeking behaviors of the Kerala community, (3) evaluation of regional differences in health system performance within the state and (4) causes of high out-of-pocket expenditure within the state.

Conflict of Interest: None

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