



THE IMPACT OF CONFLICT IN YEMEN ON VACCINE-PREVENTABLE DISEASES: THE EXAMPLE OF MEASLES.

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BACKGROUND AND OBJECTIVES

Eight years of ongoing conflict in Yemen have had a profound impact on the nation's healthcare system, leading to a severe humanitarian crisis. Measles, a vaccine-preventable disease, has seen a resurgence and is becoming a major cause of childhood mortality. This literature review examines the relationship between conflict and measles prevalence in Yemen, incorporating the social determinants of health framework.

RESULTS

The conflict has led to a significant drop in measles vaccination rates, with 27% of children not receiving or completing the required doses. The social determinants such as limited access to healthcare services, infrastructure damage, insecurity, population displacement, education, and political and economic instability have significantly impacted vaccination rates, resulting in a measles outbreak. Between January 2015 and September 2023, 84,440 clinically suspected measles cases were reported, compared to 78,673 in the two decades preceding the conflict as shown in **Figure 1**, a marked increase in the number of cases. The most outbreaks occurred in 2018, 2022, and 2023, making 2023 the greatest since record collection began in 1974, as shown in **Figure 2**: WHO recorded 40,130 suspected measles cases in 2023 (September 26). Even the surging in 1984 as WHO reported 39713 of cases but 2023 still the greatest ever compared to all the recorded years. Number of suspected vaccine-preventable measles and rubella cases in Yemen, 2019-2023 (Nov 30) as surveillance data, Ministry Of Public Health and Population, as shown in **Figure 3**.

METHODS

A systematic search across several databases, including PubMed and Scopus, using relevant keywords and search terms such as "Yemen", "conflict", "measles", "vaccine preventable diseases, and "immunization coverage," will be used. The inclusion criteria consist of peer- and non-peer-reviewed literature studies published between 2013 and 2023 from academic sources, multilateral organizations, donors, and governmental and non-governmental organizations, augmented by secondary data analysis.

Figure 3: Number Of Suspected Vaccine-Preventable Measles And Rubella Cases In Yemen, 2019-2023

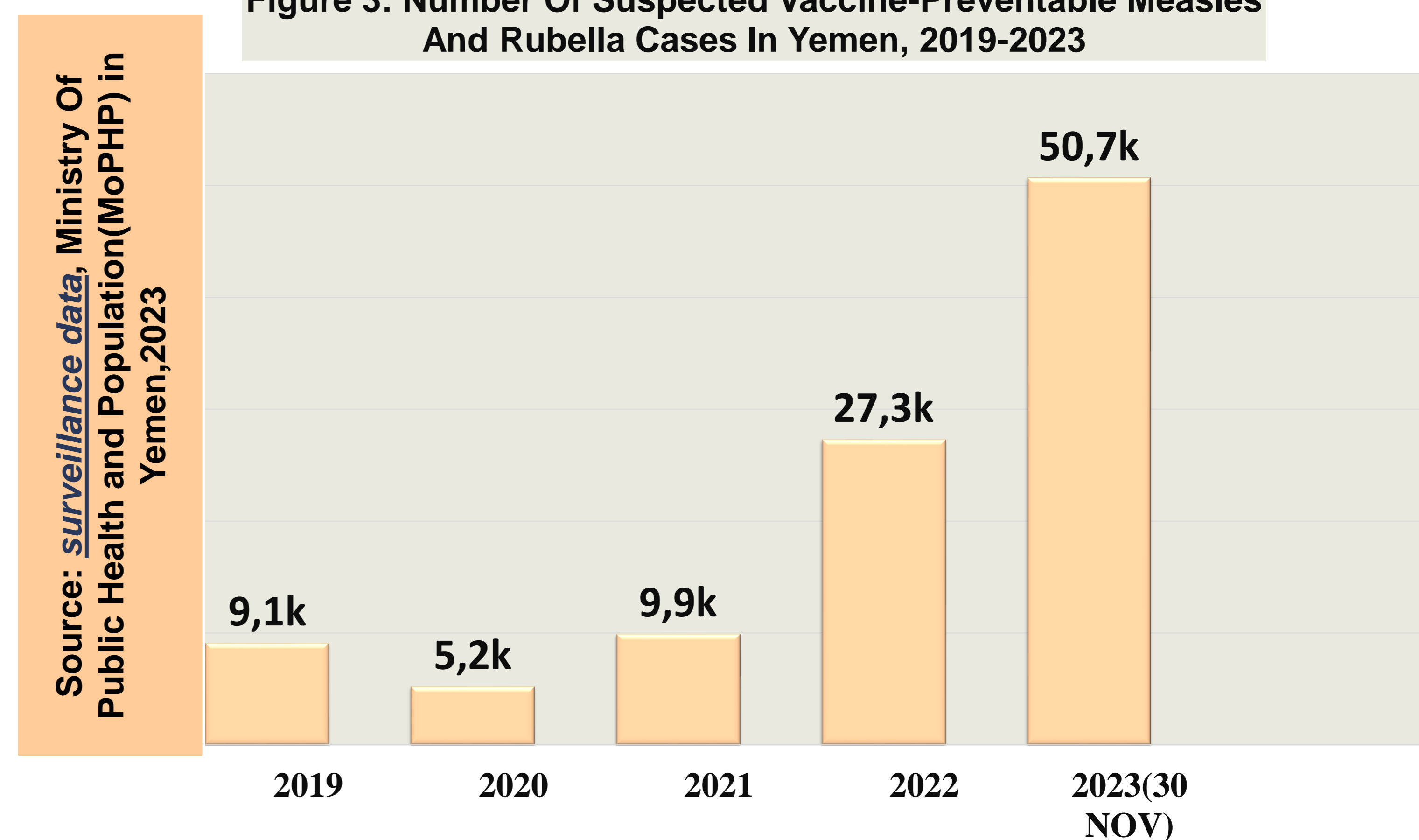


Figure 4: Measles-containing vaccine First-dose (MCV1) immunization coverage among 1 year old (%) & Measles-containing vaccine Second-dose (MCV2) immunization coverage by nationally recommended age (%)

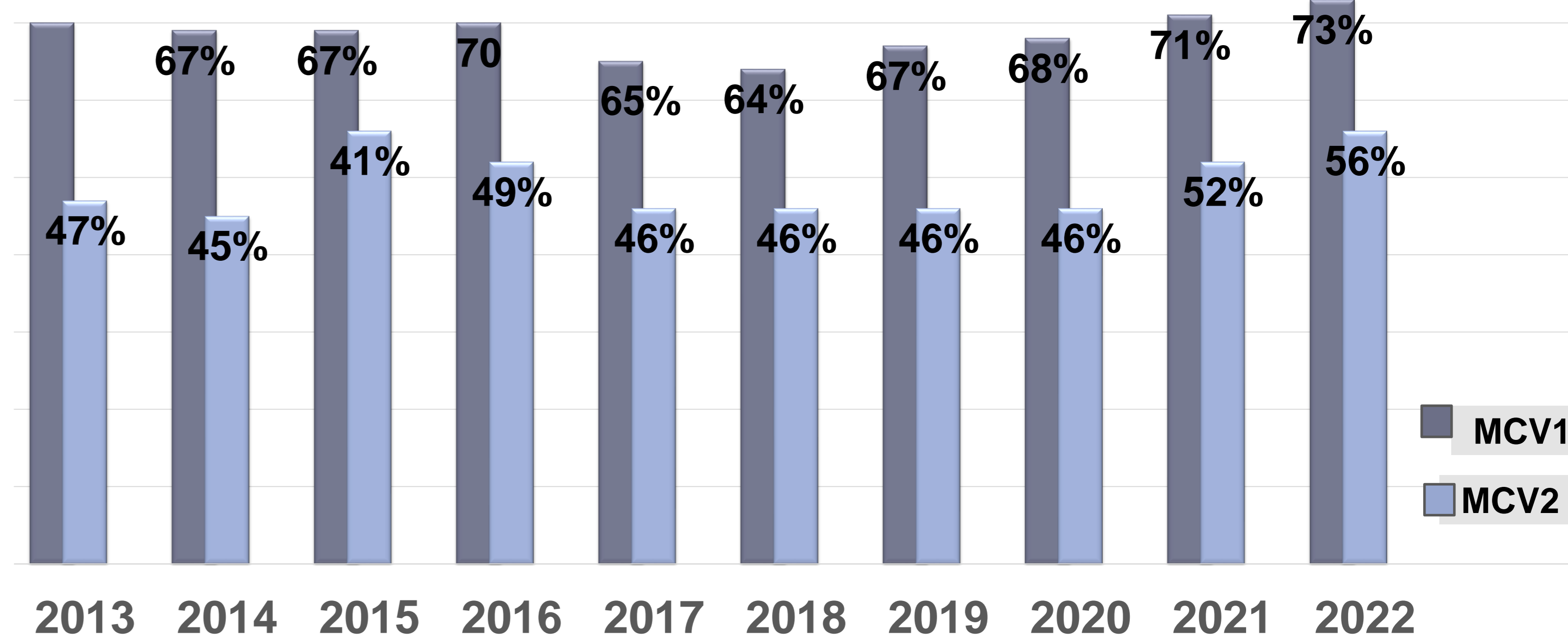


Figure 1: Measles Number Of Reported Cases In Yemen, 2003-2023, WHO

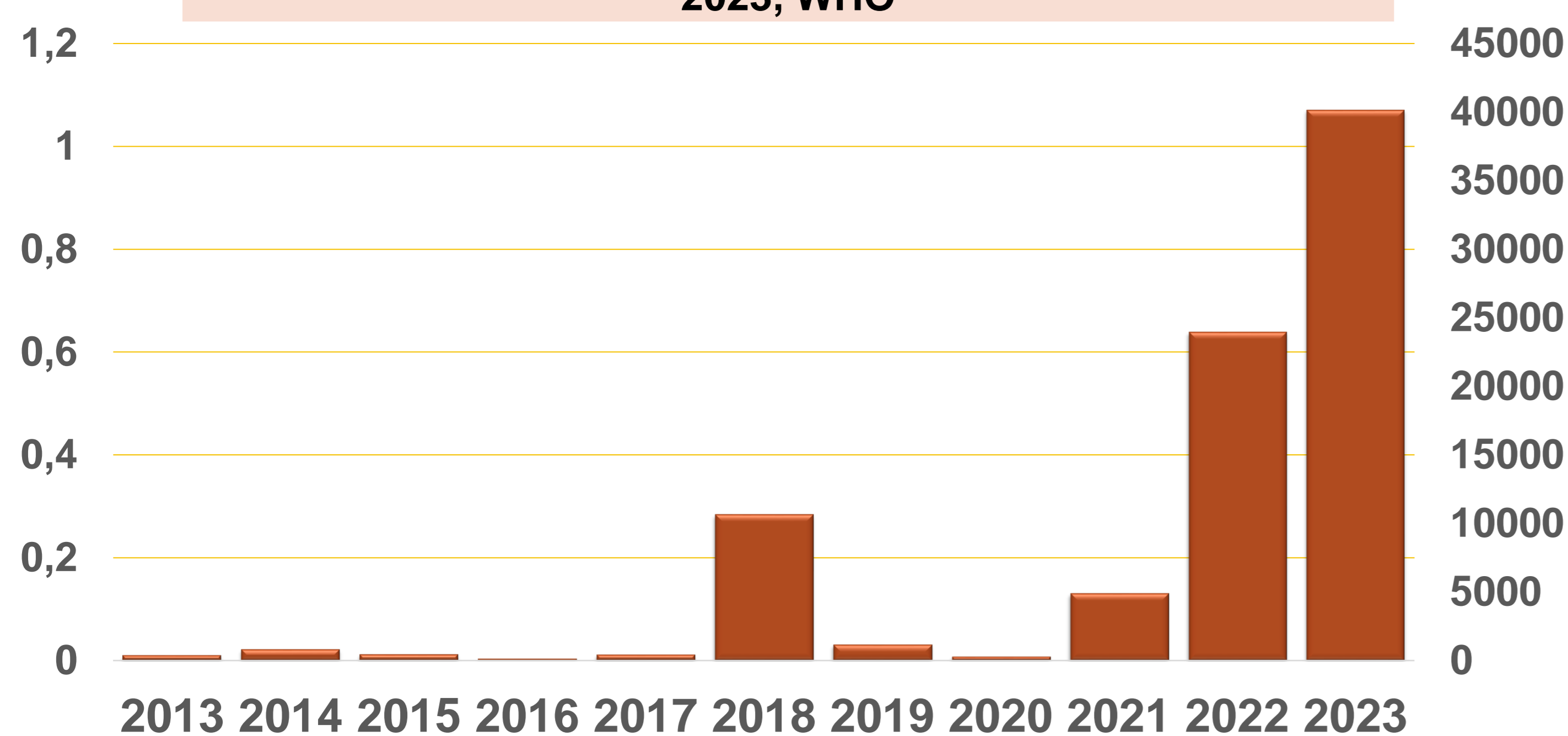
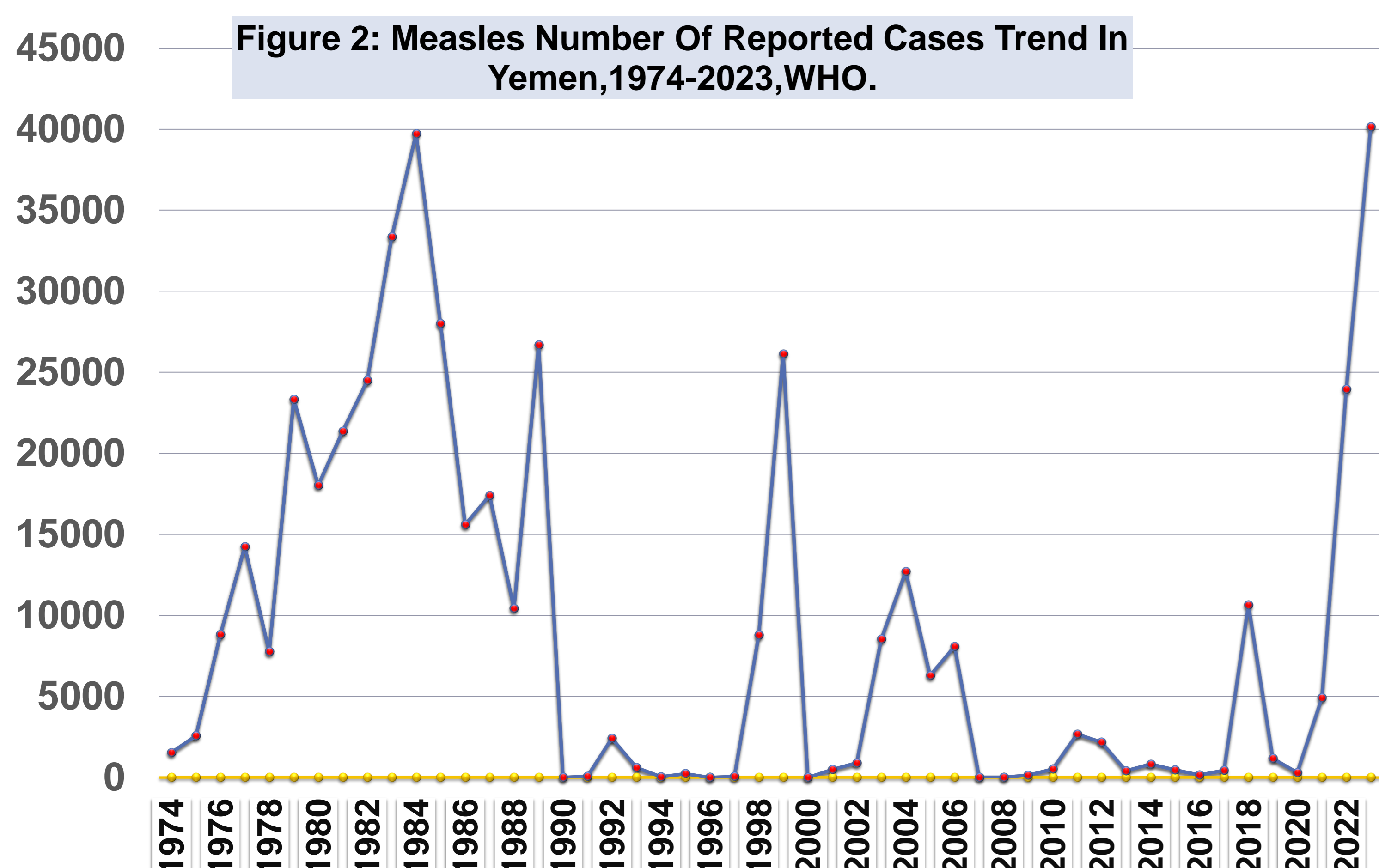


Figure 2: Measles Number Of Reported Cases Trend In Yemen, 1974-2023, WHO.



DISCUSSION

The destruction of hospitals, clinics, and vaccination centers due to airstrikes, ground warfare, and neglect has significantly impacted healthcare services. Additionally, population displacement, economic and political instability, and fragmentation of healthcare systems further complicate the process of vaccinating susceptible populations, leading to lower vaccination rates and resurging outbreaks. In 2023 the measles vaccination coverage has dropped 10% compared to same period in 2022. Although the measles vaccine coverage rate is increasing as shown in **Figure 4**, it has not reached to the national target of 95%. Despite this waves of epidemic have occurred in recent years. This may make us ask many questions, including about the effectiveness of the vaccine, which is affected by transportation and storage, or the reliability of the statistics collected, and this requires studies and research focusing on this aspect. Addressing these social determinants is crucial for improving vaccination coverage and mitigating the risks of measles outbreaks in conflict settings, such as by improving healthcare infrastructure, ensuring easy healthcare service access, and raising public awareness about immunization's importance.

ETHICS STATEMENT

This study has been reviewed and approved by the Institutional Review Board (IRB) or Ethics Review Board (ERB) of my institution and has local ethics approval or permission in the study country, in accordance with local requirements.

