A Review of Two Systems for Reporting Cases of Hemorrhagic Fever

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OBJECTIVE: This study reviews two systems providing data to the Department of Virology on cases of Hemorrhagic Fever to search for information useful for future studies. Where possible. the results of the systems are co..pared.

BACKGROUND: Two methods of reporting cases of Hemorrhagic Fever (HF) in Thailand have been in use by the Department of Virology, SMRL, for several years. One system tabulates case reports provided by provincial health authorities to the Ministry of Health (MH). The other system reports the numbers of hospital admissions in the Bangkok—Thonburi area and is based on data collected by a Medical Research Technologist of the Department of Virology (DV)· Both reporting systems have been functioning for several years; the DV system has been in use since 1958.

The MH system is being supported by a serologic screening program of the Department of Microbiology, School of Public Health, Mahidol University.

DESCRIPTION: MH System:

For purposes of analysis, provinces were grouped into six case—reporting regions with geographic boundaries used by the government for census purposes (Fig 1). Population figures for mid—1973 were obtained from the Ministry of Health.

The numbers of cases and deaths for each province were tabulated each week and kept up—to—date by any additions or deletions reported later. Since reports were unavailable for January to May, this study only reviews the reports from June to December, 1973. Nevertheless it includes nearly all of the "epidemic" period. The data were used to determine disease specific incidence rates, case fatality ratios and the provinces reporting the most cases.

DV System:

A medical research technologist visited 18 hospitals in Metropolitan Bangkok at one or two month intervals. At each hospital she received data on every patient hospital admission with a *final diagnosis* of hemorrhagic fever. The information was provided by the head nurse of each pediatric service and included the number of cases and deaths per month and the age, sex and home town of each HF patient.

PROGRESS: Comparison of Reporting Systems:

The only areas from which both reporting systems received common data were Bangkok and Thonburi. Since the Ministry of Health undoubtedly had different sources of information than SMRL, the numbers of reported cases would not be expected to be equal. Nevertheless the case—fatality ratios should be similar. In fact, the CFR based on DV data was nearly four times higher than that of the MH system (Table 1). This difference may reflect MH underreporting, DV overreporting or both.

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Table 1. Comparison of Reports of Hemorrhagic Fever from Bangkok–Thonburi provided by two survey systems.

Month	Dept of Virology			Ministry of Health		
	Cases	Deaths	CFR*	Cases	Deaths	CFR
June	162	0		148	0	
July	189	0		120	0	
August	252	5		133	0	
September	168	2		146	2	
October	166	0		141	0	
November	123	2		115	0	
December	87	1		53	0	
7 month Totals	1147	10	0.87	856	2	0.23

* Case–fatality ratio.

MH System:

Cases and deaths due to HF were reported from all regions of the country in every weekly report. Variations in regional disease specific incidence rates (DSIR) suggested some areas were hit harder than others (Table 2); however, the variability of the case fatality ratio (CFR) suggested case reporting was not uniform. In fact, 17 provinces, representing 17% of the population of Thailand, reported less than 10 cases each throughout the 7 month reporting period. Nine of the low reporting provinces were in the South, but some were adjacent to areas reporting a high incidence of disease.

The 10 most populous provinces, representing 35% of the population, reported 49% of all cases and 43% of the deaths; however, the provinces reporting the most cases were not necessarily among the most populated (Table 3).

There were striking differences between regions in the patterns of weekly case reports (Fig 2). The South–Central region including Bangkok–Thonburi reported more than 25 cases per week from early June to December. The Southeast also reported more than 25 cases per week in early June, reached a peak by the end of July and declined by mid–September. The Northeast and North regions showed rising numbers of cases two and four weeks later than the Southeast, which peaked in late July and declined sharply by mid–October. The South region showed no distinct peak period of disease. With the exception of the Northeast region, the province reporting the most cases from each region closely represented all case reports from that region.

DV System:

An analysis of the characteristics of the patients in Metropolitan Bangkok showed an approximately equal sex distribution. There were 791 males with 10 deaths and 856 females with 16 deaths. The age of the patients ranged from less than 1 year to 16 years with a mode age of 7 years for both sexes.

There has been a change in the age distribution of reported cases during the past 10 years. A comparison of three reporting eras showed the median age of HF patients has shifted progressively from 3 years 10 months (1962–1965) to 5 years 7 months (1971–1973). The percentage over age 12 has changed very little (Fig 3). The apparent shift in age distribution correlates with a progressive decline in the total number of cases each year and loss of the formerly apparent every–other–year peak numbers of cases (1).

DISCUSSION: Both systems are subject to over and under–reporting of cases and deaths. Nevertheless, the information provided by the DV system should be more consistent from year to year since it is gathered by one person and is based on final diagnoses.

Neither reporting system is adequate by itself for epidemiologic work in the absence of laboratory tests to confirm clinical diagnoses.

The relatively fewer children under 5 years of age who are now being hospitalized probably reflects the greater diagnostic skill of the physicians who must select those patients for admission who are most apt to develop hemorrhagic complications. It is also possible that as Metropolitan Bangkok has grown, children may go longer periods of time between consecutive dengue infections.

As in former years, Children's Hospital reported the largest number of cases (38.3%) and deaths (48.0%) from the greater Bangkok area (Table 4). These figures reflect the fact that Children's Hospital remains the primary referral center for severe cases of HF.

REFERENCE:

1. Udomsakdi, S.: Studies on Hemorrhagic Fever in Thailand. 1958–1971. A review. J. Med. Ass. Thailand 56:40, 1973.

Table 2. Reports of Hemorrhagic Fever in Thailand (June–Dec. 1973) provided by the Ministry of Health

Region	Population Mid 1973 (x 1,000)	Total Cases	Disease Specific Incidence Rate (per 100,000 pop.)	Total Deaths	Case Fatality Ratio (per 100 cases)
North	4502	771	17.1	14	1.82
North Central	3654	194	5.3	16	8.25
Northeast	13351	2584	19.4	149	5.77
South Central	9041	1527	16.9	18	1.18
Southeast	2196	840	38.3	7	0.83
South	4589	352	7.7	18	5.11
Thailand	37333	6268	16.8	222	3.54

Table 3. Provinces Reporting the Most Cases of Hemorrhagic Fever June–December 1973

Area	Rank by Population	No. Cases	Disease Specific Incidence Rate (per 100,000 pop.)	No. Deaths	Case Fatality Ratio (per 100 cases)
Bangkok–Thonburi	1	856	25.0	2	0.23
Khon Kaen	7	446	40.8	22	4.93
Chantaburi	57	438	188.8	3	0.68
Chiang Mai	6	390	35.1	4	1.03
Ubon Ratchatani	5	387	31.2	8	2.07
Nakhon Ratchasima	3	380	22.0	21	5.53
Udorn Thani	4	251	19.7	7	2.79
Nakhon Si Thamarat	8	241	25.2	10	4.15
Chaiyaphum	14	219	32.3	17	7.76
Roi Et	11	218	26.6	19	8.72

Table 4. Frequency of HF Cases by Hospital 1973.

Hospital	Cases	Deaths
Children's	624	12
Siriraj	341	3
Prapinklao	189	2
Chulalongkorn	138	3
Wachira	104	1
Bumrasnaradura	57	0
Ramathibodi	31	1
Bangkok Christian	31	1
Bhumipol	28	1
Lertsin	27	2
Phramongkutklao	21	0
Tobacco	16	0
Police	7	0
Mission	5	0
Bangkok General*	3	0
Central	3	0
Kwongsiew	3	0
Sahapayabarn	0	0
TOTAL	1630	25

* Reports from August to December only.

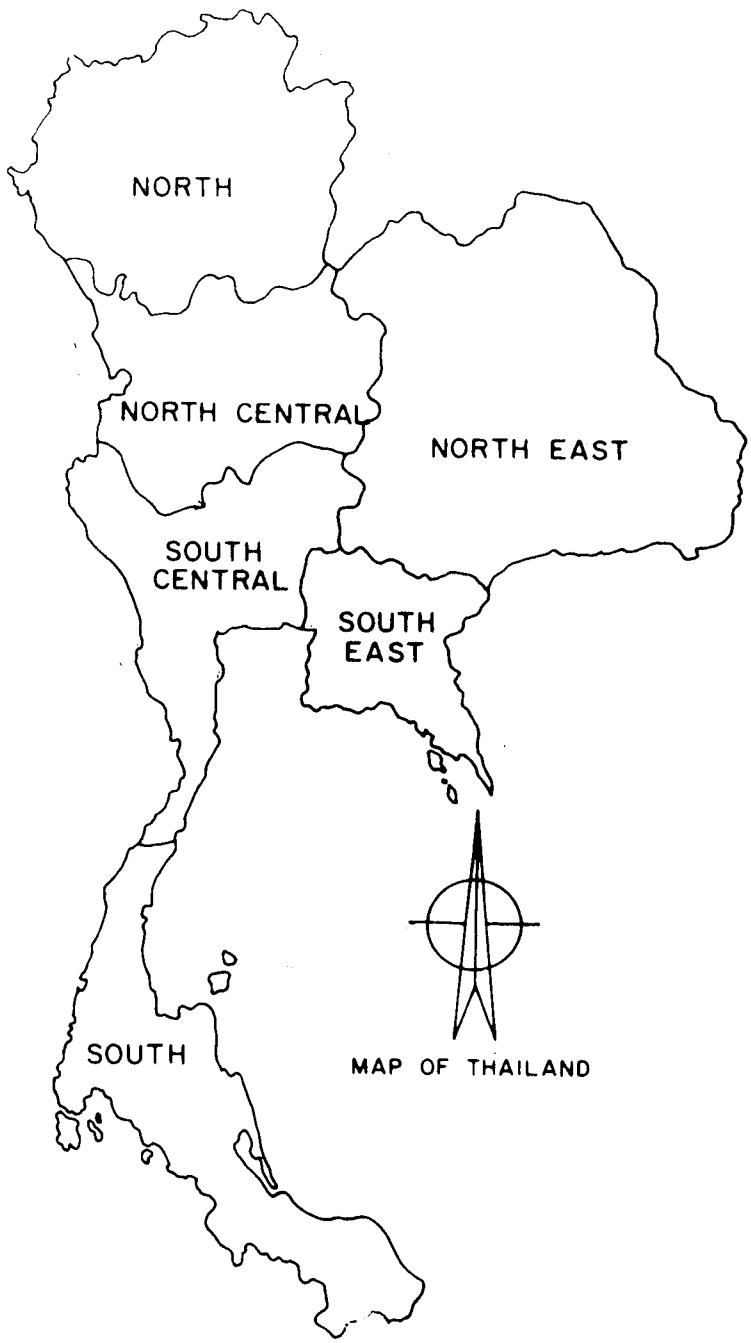


Figure 1. Geographic regions of Thailand reporting cases of Hemorrhagic Fever to the Ministry of Health.

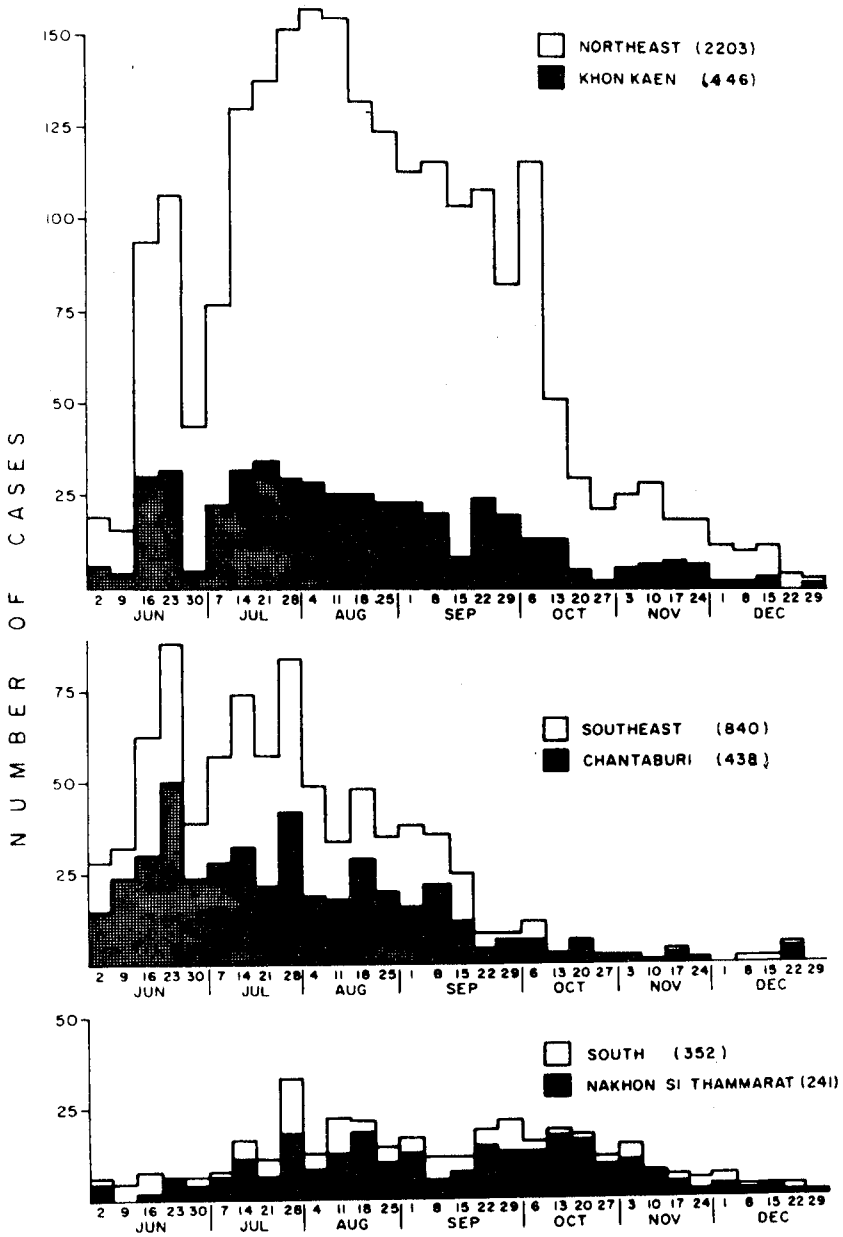
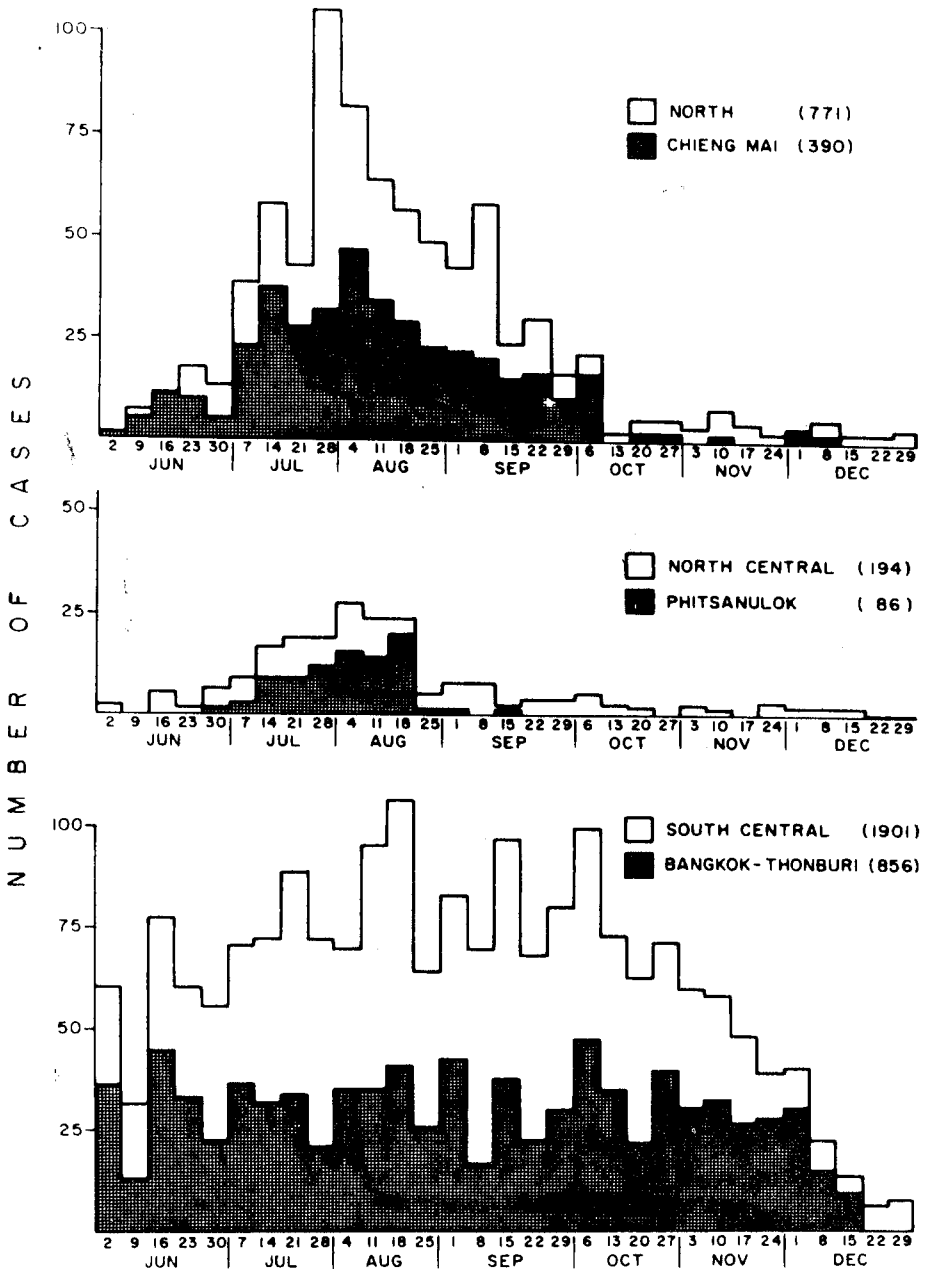


Figure 2. Cases of Hemorrhagic Fever reported to the Ministry of Health each week for seven months of 1973. White bars represent all cases reported from the region. Black bars represent the provinces reporting the most cases for each region.



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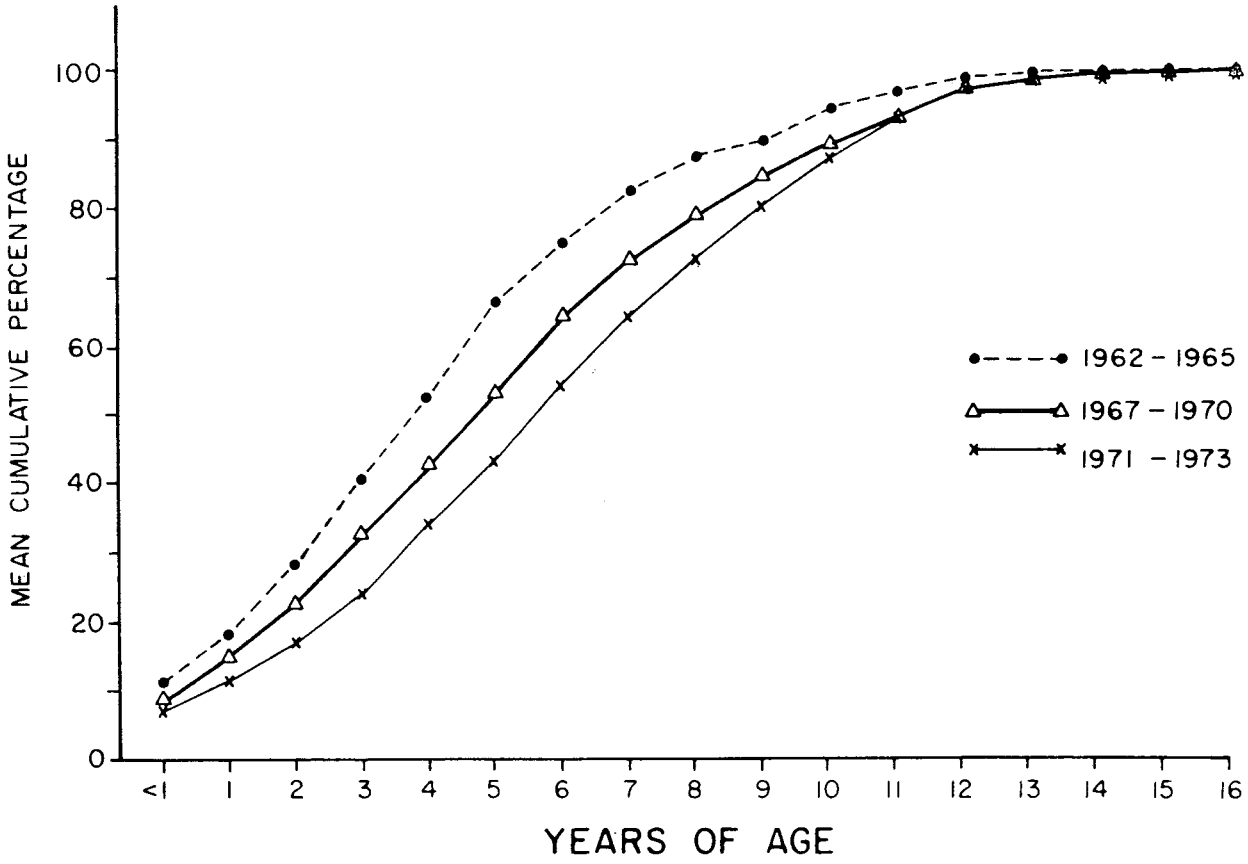

FIGURE 3. CHANGES IN THE AGE DISTRIBUTION OF PATIENTS HOSPITALIZED WITH HEMORRHAGIC FEVER IN BANGKOK-THONBURI FOR THREE TIME PERIODS. THE NUMBER OF CASES FOR EACH TIME PERIOD IS 1962-1965, 13,278; 1967-1970, 7093, AND 1971-1973, 5095. IN RECENT YEARS RELATIVELY FEW CHILDREN UNDER 5 YEARS OF AGE WERE ADMITTED TO A HOSPITAL.