From: Chief, Smallpox Eradication

To: Smallpox Staff

Subject: Progress Report 31 - Target Zero 11 July 1975

1.0 Introduction

The dramatic news this past week was the deletion from the list of the last infected village in India - and, for the first time in history, India's listing as a smallpox-free country! For all of us, it is difficult to comprehend that the country which as recently as May of last year reported more than 40 000 cases is now smallpox-free. The achievement is a remarkable one!

The historical dates for the last cases are:

Pakistan - 12 October 1974
Nepal - 6 April 1975
India - 24 May 1975

Bangladesh - ?
Ethiopia - ?

Only two more to go! But when?

In Bangladesh, pending outbreaks since week 21 have decreased at a rate of 16% weekly, increasing to 19% between weeks 26 and 27. At this rate of decline (19%), totals of infected villages by week would be as follows:

	July		August		September	
week 28	313 316	week 32	135 98	week 36	58 34	
29	253 255	33	109 72	37	47 25	
30	205 180	34	88 60	38	38	
31	166 135	35	72 47	39	31	

The last case thus might be detected toward the end of October, only marginally before seasonal transmission rates normally increase. Obviously, there is no place for complacency from these projections. Moreover, yet another cloud has appeared on the horizon - the monsoon rains this year are greatly delayed and the possibility of famine with all which that implies looms large again. Obviously, none can begin to relax until a true '0' is achieved.

The situation in Ethiopia now is of even greater concern. The total of infected villages is 144 (week 27) and is still increasing. While earlier in the year, the numbers of cases detected were up to 50 percent below the figures of a year ago, the June data are ominous - 436 cases reported compared to 326 cases recorded during June 1974. The increased mobility of staff and better surveillance made possible this year by use of helicopters (now 3) is counter-balanced by difficulties in approaching some infected areas and shortages of petrol which are limiting mobility.

Gojjam Province which accounted for 56% of all cases during June and now records 75 of the 144 infected villages has always been exceptionally difficult because of resistance of the population to vaccination. What effect the summer rains will have this year in an area with a scattered population with a substantially greater immunity remains to be seen. A full review of the situation by national and international staff will be held beginning 13 July.

2.0 Visit by Dr Mahler to Bangladesh and India

It is a pleasure to report that in mid-August Dr Mahler will undertake a special trip to India and to Bangladesh in support of the programme. He will attend special national meetings of smallpox staff and, in Bangladesh, will make special field visits. A visit later this autumn to Ethiopia is under consideration.

3.0 Special reports

3.1 India - surveillance assessment -

Search operations have steadily improved in India, in major part because of independant assessment by special epidemiologists and district teams who visit a sample of villages in each block and in each district to appraise the quality of search.

Summary results of the May 1975 assessment are set forth below to indicate the magnitude and type of this effort.

State	Total no. of Villages	No. assessed	% assessed	% of sample which was actually searched
Bihar	82 000	11 154	13	92
Uttar Pradesh	143 000	1 724	1	85
West Bengal	48 000	2 300	5	90
Assam	20 500	4 277	21	88
Meghalaya	5 000	300	6	94
Tripura	5 300	500	9	96

All villages are scheduled to be searched by health workers who usually report that all had been properly searched. Independant check here shows that the percent actually searched varied between 85 and 96 percent. While not 100% (and I doubt that 100% is ever achieved in a district), the effort is a good one.

Individuals in each village were queried as to (1) Did they know that a search had been conducted in May (2) Had they ever seen the smallpox recognition card (3) Did they know about the 100 Rupee reward for reporting a case and (4) Did they know where to report a suspected case. The results were as follows:

State	No. of persons interviewed	Knew about May Search (%)	Had seen Recognition Card (%)	Knew About Reward (%)	Knew where to report a case (%)
Bihar	279 157	66	53	60	51
Uttar Pradesh	51 390	46	36	44	30
West Bengal	63 000	48	53	59	50
Tripura	13 017	82	65	66	57

While not all individuals knew of the search, reward, etc., the number who did know is, to me, surprisingly large. The data suggest that it would be difficult indeed for smallpox to persist for very many generations before being detected by someone who knew about the reward and where to report.

One additional item of data comes from Bihar where the number of rumours of cases (entered in "rumour registries") during a four week period in April was tabulated. Data were available from 24 of 31 districts. A total of 14 713 rumours were recorded and investigated (average of 613 per district with a range of 88 to 2850). Not surprisingly, the highest totals were from districts which had had the most recent problems (Patna - 2850 , Gaya - 913, Madhubani 1 021). With the reward for reporting a case now increased to 1 000 rupees, one must anticipate that the number of rumours will increase.

3.2 Bangladesh - active cases of smallpox

In just nine weeks (week 18 to week 27), the number of infected villages has decreased by 70% from 1 280 to 385 but an even more dramatic decline has occurred in the number of "active cases". A case is termed "active" from time of discovery until separation of the last scab. In week 18, 1 780 active cases were registered but in week 27, only 229 - a decrease of 87%. As Bangladesh is the first programme in which such data have been systematically collected, these data for the past 10 weeks are of interest:

Week	No. of Infected Villages	No. of Active Cases	Ratio Cases/Outbreaks
16	1 202	1 858	1.55
17	1 241	1 844	1.49
18	1 280	1 780	1.39
19	1 250	1 720	1.38
20	1 157	1 464	1.27
21	1 099	1 213	1.10
22	939	966	1.03
23	855	853	1.00
24	699	666	0.95
25	521	399	0.77
26	476	281	0.59
27	386	229	0.59

Some years ago, it was observed that initially we had plotted progress on a country and provincial basis, subsequently on a District basis and then by blocks/thanas. In now monitoring the numbers of individuals capable of transmitting infection, I believe we've reached a final stage. The declining case to outbreak ratio reflects the fact that outbreaks now are small in size and that a substantial number are in the late stages, i.e. fifth or sixth week, and so will soon be removed from the list. In week 27, only 32 new outbreaks and a total of 86 cases were discovered.

Data concerning present efficiency of outbreak detection show that of 602 outbreaks detected during May, 368 (61%) were found within 15 days after onset of the first case. Three Districts exceeded the target of 80% - Mymensingh: 43 of 52 outbreaks (83%) found within 15 days; Faridpur: 28 of 34 (82%); and Tangail: 6 of 7. For outbreaks concluded during May, containment in the affected villages was generally excellent - in only 79 of 896 outbreaks did cases occur more than 21 days after discovery. Most of the failures were in Sylhet where 41 of 99 outbreaks (42%) at that time persisted beyond 21 days. Sylhet, not surprisingly, is the most infected District, but with massive strengthening of operations, now seems to be coming under control. The containment figures, however, are somewhat misleading for it was found that many satellite outbreaks had been developing within a one to two mile radius in adjacent villages, simply because of lethargic containment around the index outbreak. Thus, measures have been taken to try to complete the full containment vaccination within three days.

The last village search (28 May-3 June) was the most successful so far executed, although still lagging significantly behind the efficiency of the searches in India. A total of 50 547 villages were reported to have been searched and 101 new outbreaks were detected in 16 Districts. Surprisingly, few old outbreaks were discovered. A tabulation of the interval between first case and detection shows as follows:

Days between onset and detection	No. of Villages	Percent	Cumulative Percent
Under 7	38	38	38
8 - 14	26	26	63
15 - 21	9	9	72
22 - 28	11	11	83
29 - 35	9	9	92
35 - 42	4	4	96
Over 42	4	4	100

3.3 Variolation

Concern has been frequently expressed that a variolator with preserved material might utilise the material after many years, thereby reintroducing

smallpox into an area where human to human transmission had been interrupted. Only in Pakistan and Afghanistan is material normally preserved for long periods and utilized by traditional variolators. These areas, therefore, have been of special concern to us. WHO staff in both areas have endeavoured to identify variolators, to collect material and to learn from them what their experience has been in regard to long-term preservation of scabs or pustular material. As the practice of variolation is known by the public to be officially frowned upon, this has been a difficult task but, to date, 10 specimens have been collected for study.

Serial No.	Country	Type of Specimen	Date of Testing	Age of Specimen	RESULTS		
					EM	Virus Isolation	Titre of Virus*
1	Afghanistan	Fluid	March 1969	?	ND	+	2500/mm3
2	"	Scabs	May 1969	9 months	ND	+	10000/mm^3
3	"	Scabs	Sept. 1969	4 months	ND	+	30/mm^3
4	"	Scabs	April 1970	?	ND	+	14/mm^3
5	"	Scabs	Jan. 1972	?	-	-	
6	Ethiopia	Fluid in honey	March 1974	4 months	ND	-	
7	Pakistan	Scabs	April 1975	12 months	ND	-	
8	"	Scabs	April 1975	?	+	-	
9	"	Scabs	June 1975	?	+	-	
10	"	Scabs	June 1975	?	Herpes	-	

* For vaccinia virus, a titre of 300/mm^3 induces 50% takes in unvaccinated persons.

It is notable that no isolations have been obtained from material tested since April 1970. Since smallpox was endemic in Afghanistan during 1969 and 1970, isolations of variola virus in high titre from specimens collected during this period is not surprising. Identification of variola virus by electron microscopy was possible in two recent Pakistan specimens but it is assumed that the virus was not viable as no isolate could be obtained despite repeated attempts at isolation. Notably the last specimen contained herpes virus, suggesting that the variolator was either desperate for material or a poor diagnostician.

Although these studies will continue as the opportunities present, these data plus information from the variolators themselves that collected material loses potency in 3 to 12 months suggest that variolation poses no serious threat to eradication.

0 Last year and this

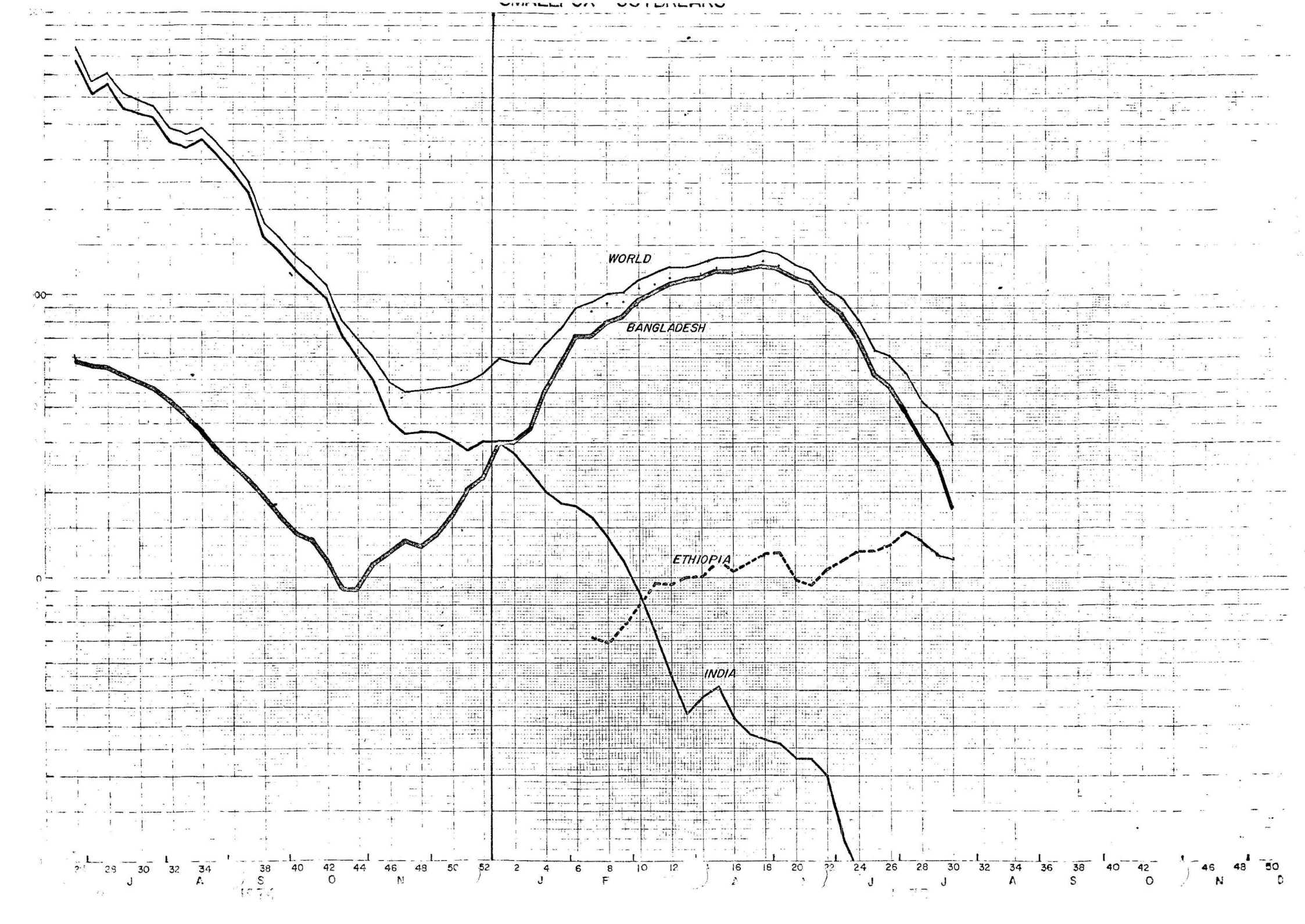
For those who like to recall the "good old bad old days", a list of the worst infected districts (provinces - Ethiopia) as of week 28, 1974 (week 27 data were incomplete) and week 27, 1975 is presented below:

World's Most Infected Districts/Provinces (Ethiopia)

1974 (week 28)				1975 (week 27)		
1.	Bihar	Purnea	386	Bangladesh	Sylhet	120
2.	Bihar	Singhbum	350	Bangladesh	Dacca	87
3.	Bihar	Katihar	279	Ethiopia	Gojjam	75
4.	Bihar	Dhanbad	270	Bangladesh	Comilla	40
5.	Bangladesh	Mymensingh	254	Bangladesh	Barisal	23
6.	Bihar	Dumka	248	Ethiopia	Shoa	21
7.	Bihar	Bhagalpur	224	Ethiopia	Wollo	19
8.	Bihar	Gaya	160	Bangladesh	Mymensingh	18
9.	Bihar	Saharsa	156	Bangladesh	Faridpur	18
10.	Bihar	Monghyr	151	Bangladesh	Bogra	15
11.	Bihar	Ranchi	150	Ethiopia	Begemdir	15

The total of all outbreaks in this year's list (451) adds up to only 65 more villages than were known in week 28 in the single District of Purnea (and Purnea only four weeks before had recorded 521!). Notably, the only district on both lists is Mymensingh.

The situation overall does look brighter but there's still a long way to go!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