POPULATION GROWTH ESTIMATION: STUDIES IN METHODOLOGY I
MATCHING OF VITAL EVENTS

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PREFACE

This is the first of a series of reports which the author is preparing on certain methodological and substantive aspects of the Population Growth Estimation (PGE) Project. This report is being circulated primarily to elicit comments for its improvement and to make available some important findings of PGE as early as possible. Eventually, this report will be incorporated as a chapter on matching operations, in the 1964-1965 PGE Report.

The author will like to acknowledge his gratitude to Mr. Naseem Iqbal Farooqui of the Central Statistical Office (formerly Chief, Matching Section of PGE), Mr. William Seltzer and Dr. Lee L. Bean for their help in the preparation of this report. Comments and suggestions for its improvement will be appreciated.

<div align="right">F. Y.</div>

4 April 1968

INTRODUCTION

1. A novel feature of the basic methodology of the Population Growth Estimation (PGE) Project $\underline{/1\underline{/}}$ was the use of Chandrasekaran-Deming $\underline{/2\underline{/}}$ technique to estimate, with a sufficient degree of reliability, the fertility and mortality levels in Pakistan. The technique involved collecting birth and death statistics through two "independent" systems of data collection, which in PGE terminology were designated as the longitudinal registration (LR) and the cross-sectional surveys (CS). Vital events' reports originating from these two sources were then compared, by using an elaborate matching procedure, so as to identify: (a) events reported by both the LR and CS systems (i.e. matched events), (b) events reported by LR but not the CS system (i.e. LR non matched events) and (c) events reported by CS but not the LR system (i.e. CS non matched events). From these three categories of events a fourth category namely events missed by both the LR and CS systems was estimated by using a simple probability model.[1] The sum of all the four categories of events (i.e. matched, non matched LR, non matched CS and those missed by both systems) was taken as the Chandrasekaran-Deming estimate.

2. It appears from the above description of PGE methodology that matching of vital events was one of the most crucial operations involved in the application of Chandrasekaran-Deming technique. The basic problem in matching was to decide about the matching criteria on the basis of which two reports of vital events could be declared either as matched or

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1. Assuming that the LR and CS systems were operating independently, the number of events missed by both systems was estimated by dividing the product of LR and CS non matched events by the number of matched events.

as non matched. We were aware of the fact that if our matching criteria
were too exacting, an event which had been caught by both systems might
sometimes be counted as two events because the entries about this event
as appearing on LR and CS documents may differ slightly. This would
result in inflated Chandrasekaran-Deming estimates. We also knew that
if our matching criteria were too loose, different events might be
considered as the same event, even if the entries on their respective
LR and CS documents would be substantially different. This would result
in deflated Chandrasekaran-Deming estimates $\sqrt{7}7$. In the absence of
an objective and precise theory of matching, a matching procedure was
developed which, on the basis of certain sample investigations, was
found to yield the maximum number of matched events.[2] The matching
criteria used were (hopefully) neither too exacting nor too loose.

3. As PGE has the distinction of being one of the first organizations
in Pakistan and other developing countries to undertake matching of
vital events' reports on a large scale,[3] we have presented in this report
the matching procedures and some analysis of the matching statistics for
the four years of PGE operations: 1962-1965.

4. The relevance of matching to demographic research may be illustrated
by the fact that matching is essential not only for the application of
Chandrasekaran-Deming technique but also to evaluate the efficiency of
one system of data collection on the basis of another system of data
collection and vice versa. Infact matching studies have been undertaken

2. Cf. footnote 7. For more details see pp.86-91 of reference $\sqrt{7}7$.

3. In Pakistan, the Medical Social Research Project of the John
Hopkins University (now called as the West Pakistan Research and
Evaluation Centre) had also tried the matching of vital events
reported in a small town near Lahore.

in many countries of the world for this purpose. For example, the efficiency of United States Census of 1960 was estimated by matching some of its data with corresponding statistics from the relevant Current Population Surveys $\underline{/}$9$\underline{/}$. Similar studies are being undertaken in many other countries (e.g. Thailand) to estimate the completeness of their official vital registration systems $\underline{/}$3, 4, 5, 8$\underline{/}$.

PREMATCHING OPERATIONS

5. As pointed out in para 1, PGE data were collected through two "independent" systems of data collection IR and CS. In the IR system, full time PGE registrars were stationed in each of the 20 IR sample areas, with instructions to register each birth and death occurring within the boundaries of their area. On the other hand, in the CS system specially trained interviewers of the Central Statistical Office (CSO) were sent on quarterly enumeration visits to each of the 20 CS sample areas.[4] During each enumeration visit, the interviewers were asked to collect, among other items, information about births and deaths occurring in their sample area during the twelve months prior to the interview. In both the IR and CS systems, information about vital events was collected on de facto basis except in 1965 when the CS system used de jure approach also. Further, although both the IR and CS systems were operating in 20 sample areas each, 16 of these areas were such that they were covered by both systems simultaneously.[5] The data presented in this report are for those

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4. During the 4 years of PGE operations, 17 CS quarterly enumeration visits were undertaken. The first visit was started in January 1962 and the last visit in January 1966.

5. The PGE sample consisted of 24 sample areas, 16 of which were common to both the IR and CS systems; of the remaining 8 areas, 4 were covered by the IR system only and 4 by the CS system only.

16 areas in which both systems were operating simultaneously.

6.   At the beginning of each month the registrars were supposed to send
copies of registration certificates, containing information about births
and deaths registered by them during the previous calendar month, to the
PGE headquarters. Similarly, after the completion of each enumeration
visit the enumerators sent all the information they had collected about
vital events and household composition etc. to the Field Services Division
of CSO, which transmitted it to the PGE headquarters. The LR and CS
vital events documents were scrutinized and coded by the Vital Events'
Section of PGE,[6] and the information was transferred to IBM punch cards
by the Data Processing Division (DPD) of CSO. The punched cards were
then arranged into LR and CS decks separately. The composition of the
LR and CS decks used for matching the 4 years' PGE data is shown in
Table 1. It can be seen from the table that for 1962 and 1963 the LR
decks contained 15 months'registration cards while the CS decks contained
the CS vital events' cards for the January visit of the following year.
However, in 1964, as matching was done on a half yearly rather than
annual basis, two decks of LR cards for nine months' registrations each
were compared with two decks of CS cards for the July 1964 and January
1965 enumeration visits. In 1965 we reverted to the annual matching
approach so that the LR deck for 1965 contained 13 months' registrations
(as the LR field operations were terminated by the end of January 1966)
and the CS deck consisted of enumeration cards for the January 1966 visit.
It may be pointed out that the reasoning behind using more than 12 months'

6.   For details of scrutiny and coding instructions see sections 3
     and 4 of reference [7].

registration cards was to give the late registrations a fair chance of being included in the matching operations.

TABLE 1   COMPOSITION OF LR AND CS DECKS OF VITAL
EVENTS' CARDS USED FOR MATCHING OF BIRTHS
AND DEATHS, PGE: 1962-1965

Year	LR deck consisting of vital events registered during the period	CS deck consisting of vital events reported in the enumeration visit starting in
1962	1 January 1962 to 31 March 1963	January 1963
1963	1 January 1963 to 31 March 1964	January 1964
1964(first half)	1 January 1964 to 30 September 1964	July 1964
1964(second half)	1 July 1964 to 31 March 1965 plus nonmatched LR events from the first half of 1964	January 1965
1965	1 January 1965 to 31 January 1966	January 1966

7.   The LR and CS decks of cards were then arranged in ascending order of dwelling numbers and were listed separately for each PGE area. These listings were verified by the Vital Events' Section from the relevant field documents. Errors if any were communicated to DPD for necessary corrections in the relevant cards. After the decks were corrected, a set of 4 prematching (PM) tabulations was run so as to establish control totals. These tabulations were:

PM1   PGE area by type of area by type of card by month and year of report by type of birth by sex

PM2   PGE area by type of area by type of card by month and year of death report by sex

PM3   PGE area by type of area by visit number by type of card by month and year of birth by type of birth by sex

PM4   PGE area by type of area by visit number by type of card by month and year of death by sex

These tabulations were sent by DPD to the Matching Section of PGE. It may be pointed out that PM tabulations were not prepared for 1964 and 1965 matchings because of lack of time.

MECHANICAL MATCHINGS

8. Table 2 lists the 15 common items of information available for matching the individual IR and CS vital events cards. On examining the PGE field and coding procedures we found that only 7 of these items (viz. item No.2, 3, 5, 6, 8, 11 and 12) were suitable for mechanical matching operations. Further, items 13, 14 and 15 were not relevant since matching was done for each PGE sample area separately. These items were then grouped into 10 sets of matching criteria which were tested on a sample basis.[7] The sample investigation showed that the following 8 matching criteria (4 each for births and deaths) yielded the maximum number of matches:

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7. Each of the following 10 matching criteria were used for mechanical matching of birth and death reports in two urban PGE sample areas in West Pakistan:

Match 1 -	3, 5, 11, 12	)
Match 2 -	5, 6, 8, 11, 12	)
Match 3 -	2, 5, 11, 12	) Note: The numbers
Match 4 -	1, 3, 5, 11	) refer to the
Match 5 -	3, 5, 6, 8	) item numbers
Match 6 -	2, 3, 5	) given in
Match 7 -	3, 5, 8, 12	) Table 2.
Match 8 -	3, 5, 6, 8, 12	)
Match 9 -	3, 5, 11	)
Match 10 -	2, 5, 11	)

On comparing the relevant field documents of mechanically matched events it was noted that matching criteria 10, 9, 8 and 2 produced the maximum number of confirmed mechanical matches. It may be pointed out that matching criteria 5, 6 and 7 yielded the largest number of false machine matches and were therefore discarded. The remaining 3 matching criteria were also not used since they were unnecessary elaborations of matching criteria 10, 9, 8 and 2.

TABLE 2   COMMON ITEMS OF INFORMATION ON
IR AND CS VITAL EVENTS' CARDS,
PGE: 1962-1965

Item No.	Items common on IR and CS	
	births cards	death cards
1.	Date of birth	Date of death
2.	Name of the baby	Name of the deceased
3.	Father's name	Father's name
4.	Grandfather's name	Husband's name [1]
5.	Sex of the baby	Sex of the deceased
6.	Caste	Caste
7.	Mother's name	Marital status
8.	Parity	Age at death
9.	Father's address	Address of the deceased
10.	Age of mother[2]	Occupation
11.	Dwelling no. where birth occurred	Dwelling no. where death occurred
12.	Relationship to the head of household	Relationship to the head of household
13.	Chunk	Chunk
14.	PGE area	PGE area
15.	Type of area	Type of area

1.   Available only in case of ever married females.

2.   Information about age of mother was not collected in 1962.

(a) FOR BIRTHS

Match 9 - Sex, father's name and dwelling number
where birth occurred

Match 10 - Sex, baby's name and dwelling number
where birth occurred

Match 8 - Sex, father's name, caste, parity and
relationship to the head of household

Match 2 - Sex, caste, parity, relationship to the
head of household and dwelling number
where birth occurred

(b) FOR DEATHS

Match 10 - Sex, deceased's name, dwelling number where
death occurred

Match 9 - Sex, father's name and dwelling number
where death occurred

Match 8 - Sex, father's name, caste, relationship
to the head of household and age at death

Match 2 - Sex, relationship to the head of household,
caste, age at death and dwelling number
where death occurred

9.   These matching criteria were used (in the order given above) by the
DPD in such a manner that each successive mechanical matching involved
only those cards which could not be matched in the previous matchings.
In other words, once a card was mechanically matched it was not subjected
to any further mechanical matching operations. After completing the
mechanical matchings, the DPD provided us with listings of LR and CS
vital events' cards which were matched by using any of the four matching
criteria (viz. matchings 10, 9, 8 or 2) and also the listings of those
residual LR and CS vital events cards which could not be matched by
using any of these matching criteria. The LR and CS matched events
were verified from the relevant field documents by the Matching Section.
This was thought necessary because the machine could match only on

the fields specified in the particular matching criteria. As none of these matching criteria provided conclusive evidence for matching, it was necessary to compare the relevant field documents on all items of information, other than those used for mechanical matching, so as to separate out:

 a. Confirmed mechanical matches,

 b. Mechanical matches of events which occurred outside the reference year,

 c. Mechanical matches of events which occurred outside the PGE sample area,

 d. Mechanical matches of still births,

 e. Mechanical matches which had no LR equivalent because more than one CS cards were matched with one LR card,

 f. Mechanical matches which had no CS equivalent because more than one LR cards were matched with one CS card, and

 g. Mechanical matches which were found to be false matches.

Mechanically matched events in categories b, c and d were excluded from further processing because they were spurious matches, while those in category a were kept separately as they were the confirmed matched events and were not subjected to any further matching operations. The mechanically matched events in categories e, f and g (i.e. false machine matches) were included with the non matched LR and CS cards and were subjected to common dwelling matching.[8]

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8. During the verification of mechanical matches the following three arbitrary rules were used. First, in case there was a conflict between LR and CS reports as to the year of occurrence of an event, the earlier year was taken as correct. Such conflicts would usually arise for events which occurred around the beginning or the end of a year. The second rule was that if a matched event was reported as live birth by one system and as still birth by the other, the live birth report was assumed to be correct. The third rule was that if an event was reported to have occurred outside the PGE sample area by one system and inside the PGE sample area by the other, it was assumed to have occurred outside the PGE area, see pp.79-80 of reference [7].

COMMON DWELLING AND CHARACTERISTIC SORT MATCHINGS

10. The common dwelling matching involved two main operations. First, from the card listings, those LR and CS non matched events were identified which were reported to have occurred in the same dwelling and second, the relevant LR and CS field documents for such non matched events were compared manually so as to identify:

(a) Confirmed common dwelling matches,

(b) Common dwelling matches of events which occurred outside the reference year,

(c) Common dwelling matches of events which occurred outside the sample area, and

(d) Common dwelling matches of still births.

Events in categories b, c and d were excluded from further analysis, while those in category a were included in the pack of matched cards.

11. The residual non matched events (i.e. after mechanical and common dwelling matchings) were subjected to the following characteristic sortings: ... used ... ...

FOR BIRTHS

    Characteristic sorting 1 –   Sex, parity and mother's name

    Characteristic sorting 2 –   Sex, parity and father's name

    Characteristic sorting 3 –   Month of event, grand father's name and father's name

FOR DEATHS

    Characteristic sorting 1 –   Sex, age at death and name of deceased

    Characteristic sorting 2 –   Sex, age at death and father's name

    Characteristic sorting 3 –   Month of event, name of deceased and father's name.

The non matched LR and CS cards (i.e. after mechanical and common dwelling matchings) were listed after each characteristic sorting. These listings were used by the Matching Section for the purpose of identifying those LR and CS events which matched on at least two of the characteristics on which the cards were sorted. Such provisionally matched events were verified from the relevant field documents so as to distinguish the:

(a) Confirmed characteristic sort matches,

(b) Characteristic sort matches of events which occurred outside the reference year,1

(c) Characteristic sort matches of events which occurred outside the sample area, and

(d) Characteristic sort matches of still births.

Events in categories b, c and d were excluded from further analysis, while those in category a were included in the pack of matched cards.

TREATMENT OF NON MATCHES

12. From the residual non matches (i.e. after mechanical, common dwelling and characteristic sort matchings), all cards for events which were either still births or which occurred outside the reference year or outside the PGE sample area, were excluded by the DPD. After these exclusions, they prepared a fresh set of listings for the non matched defacto events (excluding still births) which occurred during the reference year. These events were subjected to a process which in PGE terminology was known as the long table matching.9

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9. This method was called as long table matching because it required two long tables on which the registration and the enumeration documents could be spread and compared visually with each other.

13.   The long table matching operations involved the comparison of the

relevant field document for one LR non matched event with the field

documents of all the CS non matched events reported in that particular

area. This resulted in a small number of matches, which were included in

the pack of matched cards. During the long table matching operations

we came across some cases of double registrations and double enumerations

which were promtply excluded. Some more events were also excluded on

the detection of certain types of coding errors, for example, some still

births which were wrongly coded as live births had to be excluded.

14.   The remaining non matched events (i.e. after mechanical, common

dwelling, characteristic sort and long table matchings) were subjected to

supplementary office investigation which.involved the identification of

the following three categories of non matched events:

   (a)   LR and CS non matched events which occurred to
           persons other than usual residents of PGE sample
           areas,

   (b)   Non matched LR events which matched with one or
           more CS events enumerated in any of the 3 to 4
           visits which succeeded or preceeded the CS enumeration
           visit used for matching,10 and

   (c)   the LR and CS non matched events not included in
           categories a and b.

In the two categories a and b the   the results   for...

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10.   These events were considered as non matched because their
      equivalent CS events were reported in enumeration visits other
      than those used for matching. If we wanted to take them as
      matched, this would have involved: (1) the preparation of an
      unduplicated count of CS events reported in one or more CS
      enumeration visits and (2) the identification of CS equivalents
      of the LR events belonging to category b of para 14. This approach
      was tried by the author in 3 sample areas. He found that although
      the LR non matches decreased (since the LR non matches belonging
      to category b of para 14 were taken as matched), the CS non matches
      increased substantially and as a result the Chandrasekaran-
      Deming estimate was not affected significantly.

Events in categories a and b were taken as confirmed non matches,[11] while those in category c were sent for field investigation.

FIELD INVESTIGATIONS

15. The particulars of non matched LR and CS events belonging to category c (para 14) were sent to PGE Field Inspectors[12] with instructions to visit each dwelling where such events were reported to have occurred. They were also required to determine for each non matched event, whether it occurred inside the PGE sample area during the reference year. All events which occurred outside the reference year and/or occurred outside the   PGE sample areas were excluded. Of the remaining non matched events, some were matched in the field, while others were confirmed as non matched. As regards the confirmed non matches, the Field Inspectors were asked to determine the possible reason(s) because of which the registered events could not be enumerated and vice versa. The events matched in the field were combined with the mechanical, common dwelling, characteristic sort and long table matches, to get the total number of matched events. On the other hand, the events confirmed as non matched on the basis of field investigation were combined with non matched events in categories a and b (para 14) in case of LR and category a (para 14)in case of CS, to get the total number of non matched events.

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11. Events in category a were not sent for field investigation as they occurred to non usual residents of PGE areas and it was presumed that people would have forgotten about such events by the time the field investigation was undertaken. On the other hand, the fact that an LR event matched with a CS event enumerated in a visit other than that used for matching, was sufficient evidence for taking such LR events as confirmed non matches. Thus, there was no need to send for field investigation the events in categories a and b of para 14.

12. PGE Field Inspectors were usually graduates and were expected to supervise the work of 2 to 3 registrars. The particulars of non matched births were sent to them on forms NM7 and of non matched deaths on forms NM 8. For specimen copies of these forms see Annexure 1.

BIANNUAL MATCHINGS IN 1964

16.   On the recommendation of Mauldin, Sagen and Stephan $\boxed{6}$, matching
on a half yearly basis was attempted for the vital events of 1964. As
shown in Table 1, the LR deck for the first half of 1964 consisted of
vital events registered during the period 1 January 1964 to 30 September
1964, while the CS deck consisted of vital events enumerated in the
enumeration visit starting in July 1964. For matching these two decks
of cards, procedures outlined in paras 8 through 15 were used. Thus,
as a result of matching the events reported in the first half of 1964,
we got some confirmed matches, confirmed LR non matches and confirmed CS
non matches.

17.   For the matching of events reported in the second half of 1964, the
confirmed LR non matches (from the first half) were mixed with the LR
events registered between 1 July 1964 and 31 March 1965.[13]   The
corresponding deck of CS cards contained all events reported in the
enumeration visit starting in January 1965 (see Table 1). These two decks
were matched by using matching procedures outlined in paras 8 through 14.
It may be pointed out that the matching of 1965 events was given priority
over the matching of events reported in the second half of 1964.
Consequently, two years elapsed by the time the non matches for the second
half of 1964 were ready for field investigation; so it was decided not to
send them in the field. Thus, we got some confirmed matches, LR non
matches and CS non matches for the second half of 1964.

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13.   This was done so as to give the late enumerations a chance of
being matched with their corresponding LR events.

18. To get estimates for 1964 as a whole, the total number of matched events from the first and the second half of 1964 were combined together. Since LR non matches for the first half were subjected to matching operation in the second half also, the residual LR non matches for the second half, in fact, represented the LR non matches for the whole of 1964. On the other hand, the CS non matches for the first and second half had some common events, because of overlapping reference periods. These non matches were compared with each other to get an unduplicated count of CS non matches for the whole of 1964.

SPECIAL ADJUSTMENTS TO MATCHED AND NON MATCHED REPORTS

19. After completing the matching operations, three type of adjustments were made to the total number of matched and non matched reports originating from the LR and CS systems. The need for these adjustments was felt because: (a) the boundaries of half of the PGE sample areas were extended in July 1962, (b) the reference period for the CS system was not the same as used for matching purposes, and (c) the number of false non matches was presumed to be greater than the number of false matches.

20. On the basis of the first CS enumeration visit undertaken between January and March 1962, it was noted that the populations of 12 sample areas (6 in each province) were substantially smaller than the originally anticipated 5000 persons per area. In order to make up the deficiencies in the populations of these areas, their boundaries were extended in July 1962 to include some new areas. The events which occurred in the new areas from January to the end of June 1962 were obviously not registered by our registrars since these areas were not in the PGE sample during that period.

To compensate for the loss of such events, it was decided to inflate the
1962 LR events which occurred in the extended PGE sample areas by a
proportion equal to the contribution of the population of new areas to
the population of the extended areas.[14]   Thus, for example, if a PGE
sample area had a population of 4213 persons and after extension it had
5010 persons (i.e. an increase of about 25 per cent.), then according to
the first adjustment the 1962 LR matched and non matched events for
that area would be inflated by 25 per cent. This adjustment, however,
had no effect on the total number of CS events because for matching
purposes we used the January 1963 visit in which events occurring in the
extended sample areas during the 12 months' prior to the interview
were reported. Since the number of LR matches shall equal the number of
CS matches and the total number of CS events being unaffected by the
first adjustment, we had to transfer some of the CS events from the
category of non matched to matched so as to equalize the number of LR
and CS matches. Thus, as a result of the first adjustment the LR matches,
LR non matches and CS matches were increased by a proportion equal to the
increase in the population of the sample areas due to the extension of
their boundaries, while the CS non matches were decreased by an amount
equal to the increase in the number of CS matches.

21.   Another methodological problem encountered in PGE was that the
enumeration visits usually prolonged for a period of one to three months.
Thus, given an enumeration reference period of 12 months prior to the

14.   This adjustment was applicable only to events reported in 1962.

interview, an interviewer visiting a household (say) on 29 January 1963 was not expected to enumerate events which occurred between 1 January 1962 and 28 January 1962, while he was expected to report events which occurred between 1 January 1963 and 29 January 1963. This means that the CS system, due to no fault of the interviewer, missed certain events which should have been enumerated while it reported certain events which should not have been reported, had the reference period been one calendar year instead of 12 months' prior to the interview. This was further complicated because of the effects of recall lapse particularly in case of events occurring near the beginning of the reference period. To overcome these problems the second type of adjustments were used. According to these adjustments, 75 per cent of all defacto CS events which were excluded during the matching operations because they occurred outside the reference year, were added to the LR and CS matched events and 25 per cent to the CS non matched events.[15] As these adjustments did not affect the total number of LR events and since the number of LR matches had to be increased to make it equal to the number of CS matches, the LR non matches were decreased proportionately.

22. Despite the careful and exhaustive matching operations used in PGE, it was felt that the matching criteria used were somewhat exacting and therefore the number of false non matches was (presumably) greater than the number of false matches. In the absence of any other evidence the excess of false non matches over false matches was arbitrarily taken as 5 per cent.

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15. Assuming that 75 per cent of all CS events matched, this proportion was used to distribute the total number of assumed CS events among the matched and non matched categories. It is interesting to note from Tables 12A and 12B that this assumption about the ratio between CS matched and non matched events was quite correct.

Thus, according to the third type of adjustments, 5 per cent of the LR
or CS non matches (which ever were less) were transferred from the non
matched to the matched category of events. Thus, for example, if we
had 1020 matched, 321 LR non matched and 285 CS non matched events, we
transferred 5 per cent of 285, that is, 14 events from the non matched
to the matched category. This means that as a result of the third
type of adjustment the total matches were 1020+14 = 1034, the LR non
matches were 321-14 = 307 and the CS non matches were 285-14 = 271.

SOME RESULTS OF THE MATCHING ANALYSIS

23. After completing the matching operations, the results of matching
analysis for each of the 16 sample areas, in which both the LR and CS
systems were operating, were transcribed to forms AN20 (for specimen
copy see Annexure 2).[16]   These forms for the 8 sample areas in each
province were consolidated to get AN20s for East and West Pakistan for
each of the 4 years of PGE operations (viz. 1962-1965). The results
presented in this section are primarily derived from these consolidated
AN20s.

24. Tables 3A through 3D present the summary of processing operations
by the stage of matching for the LR and CS vital events reported during
the period 1962-1965 and Tables 4A through 4D present the same data in
percentage form. To facilitate the interpretation of these tables, the

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16. In 1964 two AN20s were completed for each area as matching
was done on half yearly basis.

results of matching analysis for births reported in East Pakistan during 1962 have been explained in this paragraph. It appears from Table 3A that the LR deck for 1962 consisted of 2283 cards and the CS deck consisted of 1823 cards. It may be recalled that the LR deck contained births registered during the 15 months' period (1 January 1962 to 31 January 1963) while the CS deck consisted of births enumerated during the CS enumeration visit starting in January 1963. From these two decks, 1020 LR cards were mechanically matched with 1006 CS cards (category # 2). On verification from the relevant field documents it was found that 181 LR and 167 CS mechanical matches (category # 3) had to be excluded for reasons specified in categories #b through g in para 9. So the total number of confirmed mechanical matches was 1020-181 = 839 LR and 1006-167= 839 CS. The residual non matches were 2283-1020 = 1263 LR and 1823-1006 = 817 CS. Since some of the excluded mechanical matches were false machine matches (for details of this type of events see category # e through g of para 9), they had to be included in the deck of non matched cards. The number of false machine matches was 125 in case of LR and 111 in case of CS.[17] Thus, the total number of non matched events available for further matching operations was 1263+125 = 1388 LR and 817+111 = 928 CS events (category # 5). Further, as a result of common dwelling and characteristic sort matchings, 461 more events were matched (category # 6). From these 461 matches, 28 were excluded (category # 7) because of reasons specified in categories # b through d of paras 10 and 11.

17. To get the number of false machine matches which were combined with the non matched cards, substract from category # 1 the sum of categories # 5 and 2.

Thus, we were left with 461-28 = 433 confirmed common dwelling and
characteristic sort matches (category # 8) and the residual non matches
were 1388-461 = 927 from the LR and 928-461 = 467 from the CS deck
(category # 9). From these residual non matches, all cards for events
which were either still births, or which occurred outside the reference year
(which in this case was 1 January 1962 to 31 December 1962) or which
occurred outside the PGE sample areas were excluded. From the LR non
matches 436 such events were excluded and the corresponding figure from
the CS non matches was 44 events only (category # 10). Thus, the residual
non matches were 927-436 = 491 LR and 467-44 = 423 CS (category # 11), which
were subjected to long table matchings. Out of these non matches, 31
events were matched (category # 12) and 23 LR and 1 CS events were excluded
on the basis of long table matchings. As a result we had 491-31-23 = 437
LR and 423-31-1 = 391 CS non matched events which were subjected to
supplementary office investigation. This involved confirming in the
office those LR non matches which matched with one or more CS events
which were reported in a visit other than that used for matching, and also
events which occurred to non usual residents of PGE sample areas. Such
LR non matches confirmed in the office were 237 (category # 14). Thus,
the remaining 437-237 = 200 LR and 391 CS non matches were sent for field
investigation (category # 15). Of these non matched events, 7 LR and
135 CS events were excluded on the basis of field investigation (category
16) and 10 events were matched in the field (category # 17). The
events confirmed as non matched in the field were 200-7-10 = 183 LR and
391-135-10 = 246 CS (category # 18). The total matched events were
839+433+31+10 = 1313 (i.e. sum of events in categories # 4, 8, 12 and 17)
while the total LR non matched events were 183+237 = 420 (i.e. sum of
events in categories # 14 and 18) and the total CS non matched events
were 246 (category # 18).

25. The following 10 major conclusions have been drawn from the PGE matching statistics presented in Tables 3 through 13. These conclusions are generally based on the 4 years' combined data unless specified otherwise.

(i) About 47 to 59 per cent. of the LR events were matched, 20 to 30 per cent. were non matched and 16 to 21 per cent. were excluded because they were either still births or occurred outside the reference period or outside the PGE sample areas. The corresponding figures for the CS events were 62 to 69 per cent. matched, 13 to 20 per cent. non matched and an equal percentage of the CS events was excluded (Tables 3A-4D). Most of the exclusions in case of the LR events were due to the fact that 15 months' instead of 12 months' registrations were used for matching. On the other hand, the 13 to 20 per cent. exclusions from the CS decks, inspite of the fact that the CS reference period was of 12 months' duration, may partly reflect the lower efficiency of the CS system of data collection.

(ii) The mechanical matching criteria as such did not provide conclusive evidence about the matching status of vital events. Thus, it was necessary to check the mechanical matches by comparing the relevant field documents. In case we had not done this checking the total matched events would have contained a substantial number of false matches.[18]

8. The percentage contributions of false machine matches and other exclusions (including false machine matches) from the total mechanical matches as computed from the all years columns of Tables 3A through 3D are given below:

(iii) Match 9 and match 11 accounted for 80 to 90 percent. of the
total mechanical matches (Tables 5A and 5B). These matching criteria
had the following 4 common items: (1) dwelling number where the
event occurred, (2) sex of the baby/deceased, (3) name of the
baby/deceased and (4) father's name of the baby/deceased. It seems
that these were among the most powerful items on the basis of which
two events could be declared either as matched or non matched. It m
however be mentioned that our experience has shown that the coding
and matching of names is a very difficult task particularly when
one system reports the formal name and the other reports the nick
name or does not report the name at all $/ 10 /$. Further, as we
do not have the system of giving surnames in Pakistan, matching on
the basis of the name of the baby/deceased will more often result in
false matches unless the matching is done on father's name also.

(iv) The mechanical matches accounted for 72 to 78 per cent. of
all verified matches, while the contribution of common dwelling
matches was between 11 and 22 per cent. and the characteristic
sort, long table and field matches combined accounted for 6 to 12
per cent of all verified matches (Tables 6A and 6B). These figures
reveal the importance of combining the mechanical matchings with
manual and field matching operations.

.... footnote 18 continued from previous page.

		Percent of		
		false machine matches	all exclusions	total mech. matches
East Pak.(births)	LR	9.9	17.1.	100.0
	CS	9.6	16.8	100.0
West Pak.(births)	LR	7.4	14.0	100.0
	CS	7.5	14.1	100.0
East Pak.(deaths)	LR	6.3	12.2	100.0
	CS	6.4	12.3	100.0
West Pak.(deaths)	LR	6.3	11.2	100.0
	CS	5.6	10.5	100.0

(w). The proportion of CS events excluded on the basis of field
investigation was more than four times the corresponding proportion
for the LR events (Tables 7A-7D). This again supports our observation
about the lower quality of CS field operations.

(vi) Two of the most important reasons for exclusion of events
on the basis of field investigation were that: (1) mother had
temporarily left PGE area to have her baby outside the PGE sample
area and (2) death occurred outside the PGE area to a member of a
PGE household (Tables 8A-8D). The fact that such births and deaths
were reported at all shows that either the registrars and enumerators
did not bother to find out whether the event occurred inside the
PGE sample area or may be they did not understand the instructions
completely.[19] A comparison of the number of LR events excluded
with the corresponding number of CS exclusions has shown that
the enumerators were more likely to commit this mistake of
enumerating dejure events.[20] Another important reason for

19. The registrars were specifically instructed to register only
those events which occurred inside the PGE sample areas (i.e.
defacto events). On the other hand, from 1962 to 1964 the
enumerators were given the same instructions, but in 1965 the
enumerators were asked to collect information on both defacto
and dejure basis.

20. It is interesting to note that the CS exclusions were not
unusually high in 1965 when the enumerators were expected to
report events on defacto and dejure basis.

exclusion of vital events was that the information given to
our registrars and enumerators was sometimes incorrect.

(vii) Most of the LR events were missed by the enumerators because
of one or more of the following reasons: (1) baby died within a
month of birth, (2) event occurred inside the PGE area but to
a non usual resident of the area, and (3) event occurred to a
household which later moved out of the PGE area. Somewhat similar
reasons were given for the CS events missed by the registrars.
It is apparent from Tables 9A through 9D that the LR non matches,
which were confirmed on the basis of field investigation, were
substantially more than the confirmed CS non matches.   This
means that the enumerators were more likely to miss events than
the registrars. This is also confirmed by the LR and CS match
rates presented in Tables 12A and 12B.

(viii) The net result of special adjustments made to the matched
and non matched reports was to increase the number of matched
events and decrease the number of non matched events.[21]   As a
result of these adjustments the contribution of the fourth category,

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21.   The following table has been derived from data presented in
Tables 3A-3D and 10A-10D.

	Prior to adjustments			After adjustments		
	Matched	NM(LR)	NM(CS)	Matched	NM(LR)	NM(CS)
East Pak.(births)	1313	420	246	1462	354	195
West Pak.(births)	1198	510	302	1319	473	244
East Pak.(deaths)	385	201	69	428	184	56
West Pak.(deaths)	393	267	87	434	255	73

Note: NM stands for non matched events.

namely events missed by both the LR and CS systems, was decreased substantially (Tables 11A and 11B). On the other hand, the Chandrasekaran-Deming estimates of births and deaths did not change substantially. Infact the estimated natural increase for East and West Pakistan decreased as a result of the special adjustments (Table 13).

(ix) Tables 11A and 11B show the per cent. contribution of the four components of the Chandrasekaran-Deming estimates[22] at the following three cumulative stages involved in PGE matching operations: (a) mechanical, common dwelling and characteristic sort matchings, (b) operations in stage a plus long table and field matchings, and (c) operations in stage b plus special adjustments. It appears from these tables that the Chandrasekaran-Deming estimates of vital events decreased with each additional stage of matching. The proportional decrease in the Chandrasekaran-Deming estimates was of the order of 6 to 10 per cent between stage a and stage b but the decrement from stage b to stage c was negligible. These figures clearly indicate the importance of combining the field matching operations with the mechanical and office matchings.

(x) Three main points emerge from Tables 12A and 12B which show the match rates computed for the LR and CS vital events' reports for East and West Pakistan. First, the match rates were higher in East than

22. The four components of the Chandrasekaran-Deming estimates were: (a) matched events, (b) LR non matched events, (c) CS non matched events, and (d) events missed by both the LR and CS systems.

in West Pakistan. This may be taken as an indication of the better quality of our field work in East Pakistan. This is also consistent with our conclusions based on a study of digital preferences in age reporting in Pakistan $\underline{/}11\underline{/}$. Second, the match rates were higher for the CS events compared to the LR events. This shows that the CS system missed more events than the LR system.[23] Finally, the match rates for deaths were lower than for births. It indicates the reluctance of our respondents to give correct information about the deceased persons.

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23. The match rates (MR) for the LR and CS systems were:

$$ \text{MR for LR} = \frac{\text{matched LR events}}{\text{matched LR events} + \text{non matched LR events}} $$

$$ \text{MR for CS} = \frac{\text{matched CS events}}{\text{matched CS events} + \text{non matched CS events}} $$

Since the number of matched LR events must be equal to the number of matched CS events, the higher match rate for the CS system indicates that the number of CS non matches was less than the number of LR non matches, showing thereby the fact that the CS system caught less events than the LR system.

FY/k.a.

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TABLE 3A SUMMARY OF PROCESSING OPERATIONS BY STAGE OF MATCHING AND SOURCE OF BIRTH REPORTS FOR EAST PAKISTAN, PGE SAMPLE: 1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total birth reports	2283	2662	2350	1926	9221	1823	1924	2713	1750	8210
2. Mechanical matches	1020	1258	1419	1048	4745	1006	1245	1418	1056	4725
3. Exclusions from category # 2	181	211	280	141	813	167	198	279	149	793
4. Mechanical matches less exclusions	839	1047	1139	907	3932	839	1047	1139	907	3932
5. Non matched reports after mechanical matching including false machine matches	1388	1522	1032	1008	4950	928	784	1395	832	3939
6. Common dwelling and characteristic sort matches	461	436	342	207	1446	461	436	342	207	1446
7. Exclusions from category # 6	28	36	30	4	98	28	36	30	4	98
8. Common dwelling and characteristic sort matches less exclusions	433	400	312	203	1348	433	400	312	203	1348
9. Non matched reports after mechanical, common dwelling and characteristic sort matching	927	1086	690	801	3504	467	348	1053	625	2493
10. Exclusions from category # 9	436	503	342	116	1397	..44	42	713	123	922
11. Non matched reports subjected to office investigation	491	583	348	685	2107	423	306	340	502	1571
12. Matched in the office	31	31	23	56	141	31	31	23	56	141
13. Exclusions from category # 11	23	37	1	4	65	1	1	0	0	2
14. LR non matched reports confirmed in the office	237	218	++	256	711	**	**	**	**	**
15. Birth reports sent for field investigation	200	297	167*	369	1033	391	274	172*	446	1283
16. Exclusions on the basis of field investigation	7	23	13*	12	55	135	48	15*	111	309
17. Matched in the field	10	6	4*	10	30	10	6	4*	10	30
18. Residual non matched reports	183	268	++	347	798	246	220	298	325	1089
19. Total matched reports	1313	1484	1478	1176	5451	1313	1484	1478	1176	5451
20. Total non matched reports	420	486	307	603	1816	246	220	298	325	1089

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

++ The forms AN20 for 1964 (1st and 2nd half) had been prepared in such a manner that an unduplicated count of events in categories 14 and 18 was not possible.

* These figures are for the 1st half of 1964 only, as no field investigation was undertaken for the non matched events of the 2nd half of 1964.

** Not applicable.

FY/k.a.

TABLE 3B SUMMARY OF PROCESSING OPERATIONS BY STAGE OF MATCHING AND SOURCE OF BIRTH REPORTS FOR WEST PAKISTAN, PGE SAMPLE: 1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total birth reports	2065	2187	2268	1943	8463	1635	1675	2703	1920	7933
2. Mechanical matches	1031	1034	1313	1125	4503	1019	1022	1330	1137	4508
3. Exclusions from category # 2	119	135	241	135	630	107	123	258	147	635
4. Mechanical matches less exclusions	912	899	1072	990	3873	912	899	1072	990	3873
5. Non matched reports after mechanical matching including false machine matches	1102	1228	1032	931	4293	672	716	1467	908	3763
6. Common dwelling and characteristic sort matches	251	234	239	183	907	251	234	239	183	907
7. Exclusions from category # 6	10	12	32	3	57	10	12	32	3	57
8. Common dwelling and characteristic sort matches less exclusions	241	222	207	180	850	241	222	207	180	850
9. Not matched reports after mechanical, common dwelling and characteristic sort matching	851	994	793	748	3386	421	482	1228	725	2856
10. Exclusions from category # 9	263	382	298	113	1056	18	35	580	189	822
11. Non matched reports subjected to office investigation	588	612	495	635	2330	403	447	648	536	2034
12. Matched in the office	39	24	66	53	182	39	24	66	53	182
13. Exclusions from category # 11	18	27	1	10	56	1	0	1	1	3
14. LR non matched reports confirmed in the office	227	200	++	190	617	**	**	**	**	**
15. Birth reports sent for field investigation	304	361	205*	382	1252	363	423	290*	482	1558
16. Exclusions on the basis of field investigation	15	19	10*	15	59	55	85	30*	97	267
17. Matched in the field	6	2	4*	8	20	6	2	4*	8	20
18. Residual non matched reports	283	304	++	359	982	302	336	547	377	1562
19. Total matched reports	1198	1147	1349	1231	4925	1198	1147	1349	1231	4925
20. Total non matched reports	510	540	414	549	2013	302	336	547	377	1562

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

++ The forms AN20 for 1964 (1st and 2nd half) had been prepared in such a manner that an unduplicated count of events in categories 14 and 18 was not possible.

* These figures are for the 1st half of 1964 only, as no field investigation was undertaken for the non matched events of the 2nd half of 1964.

** Not applicable.

TABLE 3C SUMMARY OF PROCESSING OPERATIONS BY STAGE OF MATCHING AND SOURCE OF DEATH REPORTS FOR EAST PAKISTAN, PGE·SAMPLE:1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total death reports	714	849	898	694	3155	524	540	885	412	2361
2. Mechanical matches	278	374	517	242	1411	278	375	507	252	1412
3. Exclusions from category # 2	31	45	78	18	172	31	46	68	28	173
4. Mechanical matches less exclusions	247	329	439	224	1239	247	329	439	224	1239
5. Non matched reports after mechanical matching including false machine matches	453	501	412	467	1833	263	192	399	185	1039
6. Common dwelling and characteristic sort matches	130	110	97	42	379	130	110	97	42	379
7. Exclusions from category # 6	4	7	9	1	21	4	7	9	1	21
8. Common dwelling and characteristic sort matches less exclusions	126	103	88	41	358	126	103	88	41	358
9. Non matched reports after mechanical, common dwelling and characteristic sort matching	323	391	315	425	1454	133	82	302	143	660
10. Exclusions from category # 9	98	132	110	33	373	13	10	184	34	241
11. Non matched reports subjected to office investigation	225	259	205	392	1081	120	72	118	109	419
12. Matched in the office	11	2	8	2	23	11	2	8	2	23
13. Exclusions from category # 11	3	2	0	0	5	0	0	0	0	0
14. LR non matched reports confirmed in the office	87	76	++	178	341	**	**	**	**	**
15. Death reports sent for field investigation	124	179	106*	212	621	109	70	37*	107	323
16. Exclusions on the basis of field investigation	9	10	3*	5	27	39	15	1*	25	80
17. Matched in the field	1	2	0*	2	5	1	2	0*	2	5
18. Residual non matched reports	114	167	++	205	486	69	53	109	80	311
19. Total matched reports	385	436	535	269	1625	385	436	535	269	1625
20. Total non matched reports	201	243	194	383	1021	69	53	109	80	311

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

++ The forms AN20 for 1964 (1st and 2nd half) had been prepared in such a manner that an unduplicated count of events in categories 14 and 18 was not possible.

* These figures are for the 1st half of 1964 only, as no field investigation was undertaken for the non matched events of the 2nd half of 1964.

** Not applicable.

FY/k.a.

TABLE 3D SUMMARY OF PROCESSING OPERATIONS BY STAGE OF MATCHING AND SOURCE OF DEATH REPORTS FOR WEST PAKISTAN, PGE SAMPLE: 1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total death reports	781	778	720	561	2840	520	426	649	419	2014
2. Mechanical matches	316	259	358	229	1162	318	249	360	226	1153
3. Exclusions from category # 2	24	39	38	29	130	26	29	40	26	121
4. Mechanical matches less exclusions	292	220	320	200	1032	292	220	320	200	1032
5. Non matched reports after mechanical matching including false machine matches	476	541	375	359	1751	215	189	304	217	925
6. Common dwelling and characteristic sort matches	85	82	62	34	263	85	82	62	34	263
7. Exclusions from category # 6	1	6	5	0	12	1	6	5	0	12
8. Common dwelling and characteristic sort matches less exclusions	84	76	57	34	251	84	76	57	34	251
9. Non matched reports after mechanical, common dwelling and characteristic sort matching	391	459	313	325	1488	130	107	242	183	662
10. Exclusions from category # 9	95	142	81	27	345	13	4	84	45	146
11. Non matched reports subjected to office investigation	296	317	232	298	1143	117	103	158	138	516
12. Matched in the office	12	9	14	18	53	12	9	14	18	53
13. Exclusions from category # 11	6	5	1	4	16	0	0	4	0	4
14. LR non matched reports confirmed in the office	109	103	++	90	302	**	**	**	**	**
15. Death reports sent for field investigation	169	200	129*	186	684	105	94	64*	120	383
16. Exclusions on the basis of field investigation	6	10	3*	6	25	13	14	10*	14	51
17. Matched in the field	5	1	1*	4	11	5	1	1*	4	11
18. Residual non matched reports	158	189	++	176	523	87	79	129	102	397
19. Total matched reports	393	306	392	256	1347	393	306	392	256	1347
20. Total non matched reports	267	292	213	266	1038	87	79	129	102	397

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

++ The forms AN20 for 1964 (1st and 2nd half) had been prepared in such a manner that an unduplicated count of events in categories 14 and 18 was not possible.

* These figures are for the 1st half of 1964 only, as no field investigation was undertaken for the non matched events of the 2nd half of 1964.

FY/k.a.   ** Not applicable.

TABLE 4A PERCENT SUMMARY OF PROCESSING OPERATIONS BY STAGE OF MATCHING AND SOURCE OF BIRTH REPORTS FOR EAST PAKISTAN, PGE SAMPLE: 1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total birth reports	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2. Mechanical matches	44.7	47.3	60.4	54.4	51.5	55.2	64.7	52.3	60.3	57.4
3. Exclusions from category # 2	7.9	7.9	11.9	7.3	8.8	9.2	10.3	10.3	8.5	9.7
4. Mechanical matches less exclusions	36.7	39.3	48.5	47.1	42.6	46.0	54.4	42.0	51.8	47.9
5. Non matched reports after mechanical matching including false machine matches	60.8	57.2	43.9	52.3	53.7	50.9	40.7	51.4	47.5	48.0
6. Common dwelling and characteristic sort matches	20.2	16.4	14.6	10.7	15.7	25.3	22.7	12.6	11.8	17.6
7. Exclusions from category # 6	1.2	1.4	1.3	0.2	1.1	1.5	1.9	1.1	0.2	1.2
8. Common dwelling and characteristic sort matches less exclusions	19.0	15.0	13.3	10.5	14.6	23.8	20.8	11.5	11.6	16.4
9. Non matched reports after mechanical, common dwelling and characteristic sort matching	40.6	40.8	29.4	41.6	38.0	25.6	18.1	38.8	35.7	30.4
10. Exclusions from category # 9	19.1	18.9	14.6	6.0	15.1	2.4	2.2	26.3	7.0	11.2
11. Non matched reports subjected to office investigation	21.5	21.9	14.8	35.6	22.8	23.2	15.9	12.5	28.7	19.1
12. Matched in the office	1.4	1.2	1.0	2.9	1.5	1.7	1.6	0.8	3.2	1.7
13. Exclusions from category # 11	1.0	1.4	0.0	0.2	0.7	0.1	0.1	0.0	0.0	0.0
14. IR non matched reports confirmed in the office	10.4	8.2	++	13.3	7.7	**	**	**	**	**
15. Birth reports sent for field investigation	8.8	11.2	7.1*	19.2	11.2	21.4	14.2	6.3*	25.5	15.6
16. Exclusions on the basis of field investigation	0.3	0.9	0.6*	0.6	0.6	7.4	2.5	0.6*	6.3	3.8
17. Matched in the field	0.4	0.2	0.2*	0.5	0.3	0.5	0.3	0.1*	0.6	0.4
18. Residual non matched reports	8.0	10.11	++	18.0	8.7	13.5	11.4	11.0	18.6	13.3
19. Total matched reports	57.5	55.7	62.9	61.1	59.1	72.0	77.1	54.5	67.2	66.4
20. Total non matched reports	18.4	18.3	13.1	31.3	19.7	13.5	11.4	11.0	18.6	13.3

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

++ The forms AN20 for 1964 (1st and 2nd half) had been prepared in such a manner that an unduplicated count of events in categories 14 and 18 was not possible.

* These figures are for the 1st half of 1964 only, as no field investigation was undertaken for the non matched events of the 2nd half of 1964.

** Not applicable.

FY/k.a.

TABLE 4B PCERCENT SUMMARY OF PROCESSING OPERATIONS BY STAGE OF MATCHING AND SOURCE OF BIRTH REPORTS FOR WEST PAKISTAN, PGE SAMPLE:1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total birth reports	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2. Mechanical matches	49.9	47.3	57.9	57.9	53.2	62.3	61.0	49.2	59.2	56.8
3. Exclusions from category # 2	5.8	6.2	10.6	6.9	7.4	6.5	7.3	9.5	7.7	8.0
4. Mechanical matches less exclusions	44.2	41.1	47.3	51.0	45.8	55.8	53.7	39.7	51.6	48.8
5. Non matched reports after mechanical matching including false machine matches	53.4	56.1	45.5	47.9	50.7	41.1	42.7	54.3	47.3	47.4
6. Common dwelling and characteristic sort matches	12.2	10.7	10.5	9.4	10.7	15.4	14.0	8.8	9.5	11.4
7. Exclusions from category # 6	0.5	0.5	1.4	0.2	0.7	0.6	0.7	1.2	0.2	0.7
8. Common dwelling and characteristic sort matches less exclusions	11.7	10.2	9.1	9.3	10.0	14.7	13.3	7.7	9.4	10.7
9. Non matched reports after mechanical, common dwelling and characteristic sort matching	41.2	45.4	35.0	38.5	40.0	25.7	28.8	45.4	37.8	36.0
10. Exclusions from category # 9	12.7	17.5	13.1	5.8	12.5	1.1	2.1	21.5	9.8	10.4
11. Non matched reports subjected to office investigation	28.5	28.0	21.8	32.7	27.5	24.6	26.7	24.0	27.9	25.6
12. Matched in the office	1.9	1.1	2.9	2.7	2.2	2.4	1.4	2.4	2.8	2.3
13. Exclusions from category # 11	0.9	1.2	0.0	0.5	0.7	0.1	0.0	0.0	0.1	0.0
14. LR non matched reports confirmed in the office	11.0	9.1	++	9.8	7.3	**	**	**	**	**
15. Birth reports sent for field investigation	14.7	16.5	9.0*	19.7	14.8	22.2	25.3	10.7*	25.1	19.6
16. Exclusions on the basis of field investigation	0.7	0.9	0.4*	0.8	0.7	3.4	5.1	1.1*	5.1	3.4
17. Matched in the field	0.3	0.1	0.2*	0.4	0.2	0.4	0.1	0.1*	0.4	0.3
18. Residual non matched reports	13.7	15.5	++	18.5	11.6	18.5	20.1	20.2	19.6	19.7
19. Total matched reports	58.0	52.4	59.5	63.4	58.2	73.3	68.5	49.9	64.1	62.1
20. Total non matched reports	24.7	24.7	18.3	28.3	23.8	18.5	20.1	20.2	19.6	19.7

FY/k.a.

TABLE 4C   PERCENT SUMMARY OF PROCESSING OPERATIONS BY STAGE OF MATCHING AND SOURCE OF DEATH REPORTS FOR EAST PAKISTAN, PGE SAMPLE:1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total death reports	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2. Mechanical matches	38.9	44.1	57.6	34.9	44.7	53.1	69.4	57.3	61.2	59.8
3. Exclusions from category # 2	4.3	5.3	8.7	2.6	5.5	5.9	8.5	7.7	6.8	7.3
4. Mechanical matches less exclusions	34.6	38.8	48.9	32.3	39.3	47.1	60.9	49.6	54.4	52.5
5. Non matched reports after mechanical matching including false machine matches	63.4	59.0	45.9	67.3	58.1	50.2	35.6	45.1	44.9	44.0
6. Common dwelling and characteristic sort matches	18.2	13.0	10.8	6.1	12.0	24.8	20.4	11.0	10.2	16.1
7. Exclusions from category # 6	0.6	0.8	1.0	0.1	0.7	0.8	1.3	1.0	0.2	0.9
8. Common dwelling and characteristic sort matches less exclusions	17.6	12.1	9.8	5.9	11.3	24.0	19.1	9.9	10.0	15.2
9. Non matched reports after mechanical, common dwelling and characteristic sort matching	45.2	46.1	35.1	61.2	46.1	25.4	15.2	34.1	34.7	28.0
10. Exclusions from category # 9	13.7	15.5	12.2	4.8	11.8	2.5	1.9	20.8	8.3	10.2
11. Non matched reports subjected to office investigation	31.5	30.5	22.8	56.5	34.3	22.9	13.3	13.3	26.5	17.7
12. Matched in the office	1.5	0.2	0.9	0.3	0.7	2.1	0.4	0.9	0.5	1.0
13. Exclusions from category # 11	0.4	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
14. LR non matched reports confirmed in the office	12.2	9.0	++	25.6	10.8	**	**	**	**	**
15. Death reports sent for field investigation	17.4	21.1	11.8*	30.5	19.7	20.8	13.0	4.2*	26.0	13.7
16. Exclusions on the basis of field investigation	1.3	1.2	0.3*	0.7	0.9	7.4	2.8	0.1*	6.1	3.4
17. Matched in the field	0.1	0.2	0.0*	0.3	0.2	0.2	0.4	0.0*	0.5	0.2
18. Residual non matched reports	16.0	19.7	++	29.5	15.4	13.2	9.8	12.3	19.4	13.2
19. Total matched reports	53.9	51.3	59.6	38.8	51.5	73.5	80.7	60.5	65.3	68.8
20. Total non matched reports	28.2	28.6	21.6	55.2	32.4	13.2	9.8	12.3	19.4	13.2

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

++ The forms AN20 for 1964 (1st and 2nd half) had been prepared in such a manner that an unduplicated count of events in categories 14 and 18 was not possible.

* These figures are for the 1st half of 1964 only, as no field investigation was undertaken for the non matched events of the 2nd half of 1964.

** Not applicable.

FY/k.a.

TABLE 4D   PERCENT SUMMARY OF PROCESSING OPERATIONS BY STAGE OF MATCHING AND SOURCE OF DEATH REPORTS FOR WEST PAKISTAN, PGE SAMPLE:1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total death reports	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2. Mechanical matches	40.5	33.3	49.7	40.8	40.9	61.2	58.5	55.5	53.9	57.2
3. Exclusions from category # 2	3.1	5.0	5.3	5.2	4.6	5.0	6.8	6.2	6.2	6.0
4. Mechanical matches less exclusions	37.4	28.3	44.4	35.7	36.3	56.2	51.6	49.3	47.7	51.2
5. Non matched reports after mechanical matching including false machine matches	60.9	69.5	52.1	64.0	61.7	41.3	44.4	46.8	51.8	45.9
6. Common dwelling and characteristic sort matches	10.9	10.5	8.6	6.1	9.3	16.3	19.2	9.6	8.1	13.1
7. Exclusions from category # 6	0.1	0.8	0.7	0.0	0.4	0.2	1.4	0.8	0.0	0.6
8. Common dwelling and characteristic sort matches less exclusions	10.8	9.8	7.9	6.1	8.8	16.2	17.8	8.8	8.1	12.5
9. Non matched reports after mechanical, common dwelling and characteristic sort matching	50.1	59.0	43.5	57.9	52.4	25.0	25.1	37.3	43.7	32.9
10. Exclusions from category # 9	12.2	18.3	11.2	4.8	12.1	2.5	0.9	12.9	10.7	7.2
11. Non matched reports subjected to office investigation	37.9	40.7	32.2	53.1	40.2	22.5	24.2	24.3	32.9	25.6
12. Matched in the office	1.5	1.2	1.9	3.2	1.9	2.3	2.1	2.2	4.3	2.6
13. Exclusions from category # 11	0.8	0.6	0.1	0.7	0.6	0.0	0.0	0.6	0.0	0.2
14. LR non matched reports confirmed in the office	14.0	13.2	++	16.0	10.6	**	**	**	**	**
15. Death reports sent for field investigation	21.6	25.7	17.9*	33.2	24.1	20.2	22.1	9.9*	28.6	19.0
16. Exclusions on the basis of field investigation	0.8	1.3	0.4*	1.1	0.9	2.5	3.3	1.5*	3.3	2.5
17. Matched in the field	0.6	0.1	0.1*	0.7	0.4	1.0	0.2	0.1*	1.0	0.5
18. Residual non matched reports	20.2	24.3	++	31.4	18.4	16.7	18.5	19.9	24.3	19.7
19. Total matched reports	50.3	39.3	54.4	45.6	47.4	75.6	71.8	60.4	61.1	66.9
20. Total non matched reports	34.2	37.5	29.6	47.4	36.5	16.7	18.5	19.9	24.3	19.7

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

++   The forms AN20 for 1964 (1st and 2nd half) had been prepared in such a manner that an unduplicated count of events in categories 14 and 18 was not possible.

*   These figures are for the 1st half of 1964 only, as no field investigation was undertaken for the non matched events of the 2nd half of 1964.

**   Not applicable.

FY/K.a.

Area/Year	All verified mechanical matches of birth reports		Percent contribution of			
	Number	Percent	Match 9	Match 11	Match 8	Match 2
EAST PAKISTAN						
1962	839	100.0	66.7	11.4	2.9	19.0
1963	1047	100.0	72.8	4.9	3.5	18.8
1964	1139	100.0	73.3	14.4	2.5	9.7
1965	907	100.0	72.4	14.6	2.3	10.7
All years	3932	100.0	71.6	11.3	2.8	14.3
WEST PAKISTAN						
1962	912	100.0	73.8	16.2	3.2	6.8
1963	899	100.0	78.0	12.7	4.2	5.1
1964	1072	100.0	77.1	15.8	3.2	4.0
1965	990	100.0	81.0	13.7	2.4	2.8
All years	3873	100.0	77.6	14.6	3.2	4.6

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

[1] The following matching criteria were employed successively on reports not matched in previous matching operations:
Match 9: Dwelling number, father's name, sex
Match 11: Dwelling number, own name, sex
Match 8: Sex, father's name, caste, parity, relationship to head of household
Match 2: Dwelling number, caste, parity, relationship to head of household, sex

FY/_a.

TABLE 5B PERCENT DISTRIBUTION OF VERIFIED MECHANICAL MATCHES OF DEATH REPORTS BY TYPE OF MATCH $/$ 1 $/$ FOR EAST AND WEST PAKISTAN, PGE SAMPLE: 1962-1965

Area/Year	All verified mechanical matches of death reports		Percent contribution of			
	Number	Percent	Match 11	Match 9	Match 8	Match 2
EAST PAKISTAN						
1962	247	100.0	51.0	31.2	2.8	15.0
1963	329	100.0	40.4	42.2	4.9	12.5
1964	439	100.0	55.8	32.3	2.0	9.8
1965	224	100.0	64.3	23.2	3.1	9.4
All years	1239	100.0	52.3	33.1	3.1	11.5
WEST PAKISTAN						
1962	292	100.0	56.8	32.5	3.1	7.5
1963	220	100.0	52.7	30.5	12.3	4.5
1964	320	100.0	61.9	30.0	5.3	2.8
1965	200	100.0	66.5	26.5	3.0	4.0
All years	1032	100.0	59.4	30.2	5.7	4.7

SOURCE: Consolidated forms *N20 for the 16 sample areas in which both the registration and survey systems were operating.

$/$ 1 $/$ The following matching criteria were employed successively on reports not matched in previous matching operations:
Match 11: Dwelling number, own name, sex
Match 9: Dwelling number, father's name, sex
Match 8: Father's name, caste, sex, age at death, relationship to head of household
Match 2: Caste, sex, relationship to head of household, dwelling number

FY/k.a.

TABLE 6A PERCENT DISTRIBUTION OF ALL VERIFIED MATCHES OF BIRTH REPORTS BY TYPE OF MATCH/‾1_7FOR EAST AND WEST PAKISTAN, PGE SAMPLE: 1962-1965

Area/Year	All verified matches of birth reports		Percent contribution of				
	Number	Percent	Mechanical matches	Common dwelling matches	Characteristic sort matches	Long table matches	Field matches
EAST PAKISTAN							
1962	1313	100.0	63.9	29.4	3.6	2.4	0.8
1963	1484	100.0	70.6	22.9	4.0	2.1	0.4
1964	1478	100.0	77.1	18.5	2.6	1.6	0.3
1965	1176	100.0	77.1	15.2	2.0	4.8	0.8
All years	5451	100.0	72.1	21.6	3.1	2.6	0.6
WEST PAKISTAN							
1962	1198	100.0	76.1	15.9	4.3	3.3	0.5
1963	1147	100.0	78.4	13.1	6.3	2.1	0.2
1964	1349	100.0	79.5	9.6	5.8	4.9	0.3
1965	1231	100.0	80.4	10.2	4.4	4.3	0.6
All years	4925	100.0	78.6	12.1	5.2	3.7	0.4

SOURCE: Consolidated forms AN20 for the 16 sampl. ....s i.. which both the registration and survey systems were operating.

/‾1_7 The following matching criteria were used successively on reports not matched in previous matching operations:
a. Mechanical matches - for details see footnote # 1 of Table
b. Common dwelling matches - for details see para # of the text.
c. Characteristic sort matches - for details see para # . of the text.
d. Long table matches - for details see para # of the text.
e. Field matches - for details see para # . of the text.

FY/k.a.

TABLE 6B PERCENT DISTRIBUTION OF ALL VERIFIED MATCHES OF DEATH REPORTS BY TYPE OF MATCH $\underline{/1\underline{7}}$ FOR EAST AND WEST PAKISTAN, PGE SAMPLE:1962-1965

Area/Year	All verified matches of death reports		Percent contribution of				
	Number	Percent	Mechanical matches	Common dwelling matches	Characteristic sort matches	Long table matches	Field matches
EAST PAKISTAN							
1962	385	100.0	64.2	28.3	4.5	2.9	0.3
1963	436	100.0	75.5	18.3	5.3	0.5	0.5
1964	535	100.0	82.1	13.6	2.9	1.5	0.0
1965	269	100.0	83.3	9.7	5.5	0.7	0.7
All years	1625	100.0	76.2	17.7	4.3	1.5	0.3
WEST PAKISTAN							
1962	393	100.0	74.3	15.5	5.9	3.1	1.3
1963	306	100.0	71.9	17.3	7.5	2.9	0.3
1964	392	100.0	81.6	6.9	7.6	3.6	0.3
1965	256	100.0	78.1	5.1	8.2	7.0	1.6
All years	1347	100.0	76.6	11.5	7.2	3.9	0.8

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration
and survey sytems were operating.

$\underline{/1\underline{7}}$ The following matching criteria were used successively on reports not matched in previous matching operations:

a. Mechanical matches - for details see footnote   .1 of Table

b. Common dwelling matches - for details see para   of the text.

c. Characteristic sort matches - for details see para   of the text.

d. Long table matches - for details see para   of the text.

e. Field matches - for details see para   of the text.

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TABLE 7A   PERCENT DISTRIBUTION OF EAST PAKISTAN REGISTRATION AND SURVEY BIRTH REPORTS SENT FOR FIELD INVESTIGATION BY OUTCOME, PGE SAMPLE:
1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total birth reports sent for field investigation	200	297	167[*]	369	1033	391	274	172[**]	446	1283
2. Percent total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
3. Birth reports matched in the field	5.0	2.0	2.4	2.7	2.9	2.6	2.2	2.3	2.2	2.3
4. Birth reports excluded on the basis of field investigation	3.5	7.4	7.8	3.3	5.2	34.5	17.5	8.7	24.9	24.1
5. Birth reports which could not be investigated in the field	26.0	7.4	1.8	5.4	9.4	10.7	5.1	4.7	3.1	6.1
6. Birth reports confirmed as non matched on the basis of field investigation, reasons for being non matched specified	23.0	56.6	29.9	15.2	31.0	34.3	60.2	71.5	15.5	38.3
7. Birth reports confirmed as non matched on the basis of field investigation, reasons for being non matched undetermined	42.5	26.6	58.1	73.4	51.5	17.9	15.0	12.8	54.3	29.2

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

[*]   These were the registration reports for the 1st half of 1964 sent for field investigation. No field investigation was carried out for the events reported during the 2nd half of 1964.

[**]   These were the enumeration reports for the 1st half of 1964 sent for field investigation. No field investigation was carried out for the events reported during the 2nd half of 1964.

FY/k.a.

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TABLE 7B PERCENT DISTRIBUTION OF WEST PAKISTAN REGISTRATION AND SURVEY BIRTH REPORTS SENT FOR FIELD INVESTIGATION BY OUTCOME, PGE SAMPLE:1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total birth reports sent for field investigation	304	361	205*	382	1252	363	423	290**	482	1558
2. Percent total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
3. Birth reports matched in the field	2.0	0.5	2.0	2.2	1.6	1.6	0.4	1.4	1.7	1.3
4. Birth reports excluded on the basis of field investigation	4.9	5.3	4.9	3.9	4.7	15.2	20.1	10.3	20.0	17.1
5. Birth reports which could not be investigated in the field	7.6	5.0	7.3	7.3	6.7	8.8	5.0	4.1	4.6	5.6
6. Birth reports confirmed as non matched on the basis of field investigation, reasons for being non matched specified	41.8	58.7	43.9	33.2	44.4	42.7	62.9	60.7	38.8	50.3
7. Birth reports confirmed as non matched on the basis of field investigation, reasons for being non matched undetermined	43.7	30.5	41.9	53.4	42.6	31.7	11.6	23.5	34.9	25.7

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

* These were the registration reports for the 1st half of 1964 sent for field investigation. No field investigation was carried out for the events reported during the 2nd half of 1964.

** These were the enumeration reports for the 1st half of 1964 sent for field investigation. No field investigation was carried out for the events reported during the 2nd half of 1964.

FY/k.a.

TABLE 7C PERCENT DISTRIBUTION OF EAST PAKISTAN REGISTRATION AND SURVEY DEATH REPORTS SENT FOR FIELD INVESTIGATION BY OUTCOME,PGE SAMPLE:1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total death reports sent for field investigation	124	179	106*	212	621	109	70	37**	107	323
2. Percent total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
3. Death reports matched in the field	0.8	1.1	0.0	0.9	0.8	0.9	2.9	0.0	1.9	1.6
4. Death reports excluded on the basis of field investigation	7.3	5.6	2.8	2.4	4.3	35.8	21.4	2.7	23.4	24.8
5. Death reports which could not be investigated in the field	16.1	3.4	3.8	4.2	6.3	8.3	0.0	5.4	3.7	4.6
6. Death reports confirmed as non matched on the basis of field investigation, reasons for being non matched specified	29.0	51.4	38.7	17.5	33.2	26.6	41.4	59.5	7.5	27.2
7. Death reports confirmed as non matched on the basis of field investigation, reasons for being non matched undetermined	46.8	38.5	54.7	75.0	55.4	28.4	34.3	32.4	63.5	41.8

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

* These were the registration reports for the 1st half of 1964 sent for field investigation. No field investigation was carried out for the events reported during the 2nd half of 1964.

** These were the enumeration reports for the 1st half of 1964 sent for field investigation. No field investigation was carried out for the events reported during the 2nd half of 1964.

FY/k.a.

TABLE 7D PERCENT DISTRIBUTION OF WEST PAKISTAN REGISTRATION AND SURVEY DEATH REPORTS SENT FOR FIELD INVESTIGATION BY OUTCOME, PGE SAMPLE: 1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total death reports sent for field investigation	169	200	129*	186	684	105	94	64**	120	383
2. Percent total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
3. Death reports matched in the field	3.0	0.5	0.7	2.2	1.6	4.8	1.1	1.6	3.3	2.9
4. Death reports excluded on the basis of field investigation	3.5	5.0	2.3	3.2	3.7	12.4	14.9	15.6	11.7	13.3
5. Death reports which could not be investigated in the field	13.0	6.0	1.6	7.0	7.2	4.8	9.6	3.1	20.0	10.4
6. Death reports confirmed as non matched on the basis of field investigation, reasons for being non matched specified	30.8	53.0	45.0	39.2	42.2	39.0	63.8	51.6	25.8	43.1
7. Death reports confirmed as non matched on the basis of field investigation, reasons for being non matched undetermined	49.7	35.5	50.4	48.4	45.3	39.0	10.6	28.1	39.2	30.3

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

* These were the registration reports for the 1st half of 1964 sent for field investigation. No field investigation was carried out for the events reported during the 2nd half of 1964.

** These were the enumeration reports for the 1st half of 1964 sent for field investigation. No field investigation was carried out for the events reported during the 2nd half of 1964.

FY/k.a.

TABLE 8A DISTRIBUTION OF EAST PAKISTAN BIRTH REPORTS EXCLUDED ON THE BASIS OF FIELD INVESTIGATION, BY THE REASON FOR EXCLUSION AND SOURCE
OR REPORT, PGE SAMPLE: 1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total birth reports excluded on the basis of field investigation	7	22	13*	12	54	135	48	15**	111	309
2. Live birth truned out to be a still birth	2	1	0	1	4	0	0	0	3	3
3. Mother had temporarily left PGE area to have her baby outside the area	4	15	9	8	36	117	44	11	90	262
4. Live birth had occurred outside PGE area to a household which later moved in the area	1	4	3	0	8	6	3	4	5	18
5. Live birth wrongly reported due to faulty information	0	2	1	3	6	12	1	0	13	26

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were
operating.

* These were the registration reports for the 1st half of 1964 which were excluded on the basis of field
investigation. No field investigation was carried out for the events reported during the 2nd half of 1964.

** These were the enumeration reports for the 1st half of 1964 which were excluded on the basis of field
investigation. No field investigation was carried out for the events reported during the 2nd half of
1964.

FY/k.a.

TABLE 8B   DISTRIBUTION OF WEST PAKISTAN BIRTH REPORTS EXCLUDED ON THE BASIS OF FIELD INVESTIGATION, BY THE REASON FOR EXCLUSION AND SOURCE OF REPORT, PGE SAMPLE: 1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total birth reports excluded on the basis of field investigation	15	19	10*	15	59	55	85	30**	97	267
2. Live birth turned out to be a still birth	3	0	1	1	5	2	1	2	0	5
3. Mother had temporarily left PGE area to have her baby outside the area	4	4	5	4	17	35	69	22	64	190
4. Live birth had occurred outside PGE area to a household which later moved in the area	0	0	2	3	5	9	5	3	14	31
5. Live birth wrongly reported due to faulty information	8	15	2	7	32	9	10	3	19	41

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

*   These were the registration reports for the 1st half of 1964 which were excluded on the basis of field investigation.   No field investigation was carried out for the events reported during the 2nd half of 1964.

**   These were the enumeration reports for the 1st half of 1964 which were excluded on the basis of field investigation.   No field investigation was carried out for the events reported during the 2nd half of 1964.

FY/k.a.

TABLE 8C DISTRIBUTION OF EAST PAKISTAN DEATH REPORTS EXCLUDED ON THE BASIS OF FIELD INVESTIGATION, BY THE REASON FOR EXCLUSION AND SOURCE OF REPORT, PGE SAMPLE: 1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total death reports excluded on the basis of field investigation	9	10	3*	5	27	39	15	1**	25	80
2. Death turned out to be a still birth	3	1	0	1	5	1	1	0	2	4
3. Death occurred outside PGE area to a member of a PGE household	4	6	2	3	15	28	10	1	9	48
4. Death occurred outside PGE area to a member of household which latter moved into the PGE area	0	2	1	●	3	3	2	0	2	7
5. Death wrongly reported due to faulty information	2	1	0	1	4	7	2	0	12	21

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

*   These were the registration reports for the 1st half of 1964 which were excluded on the basis of field investigation. No field investigation was carried out for the events reported during the 2nd half of 1964.

**   These were the enumeration reports for the 1st half of 1964 which were excluded on the basis of field investigation. No field investigation was carried out for the events reported during the 2nd half of 1964.

FY/k.a.

TABLE 8D DISTRIBUTION OF WEST PAKISTAN DEATH REPORTS EXCLUDED ON THE BASIS OF FIELD INVESTIGATION, BY THE REASON FOR EXCLUSION AND SOURCE OF REPORT, PGE SAMPLE: 1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total death reports excluded on the basis of field investigation	6	10	3*	6	25	13	14	10**	14	51
2. Death turned out to be a still birth	2	0	1	1	4	2	1	3	0	6
3. Death occurred outside PGE area to a member of a PGE household	1	3	2	3	9	8	11	4	7	30
4. Death occurred outside PGE area to a member of household which later moved into the PGE area	0	0	0	0	0	0	1	0	1	2
5. Death wrongly reported due to faulty information	3	7	0	2	12	3	1	3	6	13

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

* These were the registration reports for the 1st half of 1964 which were excluded on the basis of field investigation. No field investigation was carried out for the events reported during the 2nd half of 1964.

** These were the enumeration reports for the 1st half of 1964 which were excluded on the basis of field investigation. No field investigation was carried out for the events repored during the 2nd half of 1964.

FY/k.a.

TABLE 9A DISTRIBUTION OF EAST PAKISTAN BIRTH REPORTS CONFIRMED AS NON MATCHED ON THE BASIS OF FIELD INVESTIGATION, BY THE KNOWN REASON
FOR BEING NON MATCHED AND SOURCE OF REPORT, PGE SAMPLE: 1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total birth reports confirmed as non matched on the basis of field investigation, reason for being non matched specified	85	79	97*	271	532	70	41	22**	242	375
2. Baby died within a month of her birth	28	37	17	47	129	10	17	3	26	56
3. Multiple birth	0	0	2	5	7	0	0	0	2	2
4. Live birth occurred inside PGE area but not at the usual residence of the mother	4	5	0	5	14	9	2	1	4	16
5. Live birth occurred inside PGE area but mother was not a usual resident of the area	13	17	7	41	78	14	7	2	12	35
6. Birth occurred in a household which latter moved out of the PGE area	23	9	12	36	80	8	3	0	13	24
7. Birth occurred in a dwelling near the PGE boundary and it was not certain whether the dwelling was inside the PGE area or not	14	10	9	9	42	28	12	4	7	51
8. Other reasons	3	1	50	128	182	1	0	12	178	191

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

* These were the registration reports for the 1st half of 1964 which were excluded on the basis of field investigation. No field investigation was carried out for the events reported during the 2nd half of 1964.

** These were the enumeration reports for the 1st half of 1964 which were excluded on the basis of field investigation. No field investigation was carried out for the events reported during the 2nd half of 1964.

FY/k.a.

TABLE 9B DISTRIBUTION OF WEST PAKISTAN BIRTH REPORTS CONFIRMED AS NON MATCHED ON THE BASIS OF FIELD INEVESTIGATION, BY THE KNOWN REASON FOR BEING NON MATCHED AND SOURCE OF REPORT, PGE SAMPLE:1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total birth reports confirmed as non matched on the basis of field investigation, reason for being non matched specified	133	110	86*	204	533	115	49	68**	168	400
2. Baby died within a month of her birth	39	55	24	33	151	20	17	16	15	68
3. Multiple birth	1	1	2	1	5	1	3	4	0	8
4. Live birth occurred inside PGE area but not at the usual residence of the mother	14	7	0	7	28	16	3	1	0	20
5. Live birth occurred inside PGE area but mother was not a usual resident of the area	14	7	13	46	80	10	9	4	10	33
6. Birth occurred in a household which latter moved out of the PGE area	56	33	23	56	168	39	15	14	34	102
7. Birth occurred in a dwelling near the PGE boundary and it was not certain whether the dwelling was inside the PGE area or not	3	1	0	1	5	14	2	1	0	17
8. Other reasons	6	6	24	60	96	15	0	28	109	152

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

* These were the registration reports for the 1st half of 1964 which were excluded on the basis of field investigation. No field investigation was carried out for the events reported during the 2nd half of 1964.

** These were the enumeration reports for the 1st half of 1964 which were excluded on the basis of field investigation. No field investigation was carried out for the events reported during the 2nd half of 1964.

FY/k.a.

TABLE 9C DISTRIBUTION OF EAST PAKISTAN DEATH REPORTS CONFIRMED AS NON MATCHED ON THE BASIS OF FIELD INVESTION, BY THE KNOWN REASON FOR BEING NON MATCHED AND SOURCE OF REPORT, PGE SAMPLE: 1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total death reports confirmed as non matched on the basis of field investigation, reason for being non matched specified	58	69	58*	159	344	31	24	12**	68	135
2. Death occurred within a month of birth	29	51	19	46	145	12	17	3	29	61
3. Infant death	0	0	0	0	0	0	0	0	0	0
4. Death occurred inside PGE area to a PGE household member, but not at his usual residence	1	4	0	2	7	1	2	1	2	6
5. Death occurred inside PGE area to a person who was not a usual member of any household in that area	9	5	3	20	37	5	0	0	0	5
6. Death occurred inside PGE area to the usual member of a household which latter moved out of the PGE area	11	3	0	18	32	3	0	0	6	9
7. Death occurred inside a dwelling near the PGE boundary and it was not certain whether the dwelling was inside the area or not	6	6	9	0	21	10	5	2	0	17
8. Other reasons	2	0	27	73	102	0	0	6	31	37

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

* These were the registration reports for the 1st half of 1964 which were excluded on the basis of field investigation. No field investigation was carried out for the events reported during the 2nd half of 1964.

** These were the enumeration reports for the 1st half of 1964 which were excluded on the basis of field investigation. No field investigation was carried out for the events reported during the 2nd half of 1964.

FY/k.a.

TABLE 9D DISTRIBUTION OF WEST PAKISTAN DEATH REPORTS CONFIRMED AS NON MATCHED ON THE BASIS OF FIELD INVESTIGATION, BY THE KNOWN REASON FOR BEING NON MATCHED AND SOURCE OF REPORT, PGE SAMPLE: 1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total death reports confirmed as non matched on the basis of field investigation, reason for being non matched specified	84	71	65*	90	310	41	10	18**	47	116
2. Death occurred within a month of birth	39	52	32	36	159	29	8	9	17	63
3. Infant death	0	0	0	0	0	0	0	0	0	0
4. Death occurred inside PGE area to a PGE household member, but not at his usual residence	3	2	0	1	6	2	0	0	1	3
5. Death occurred inside PGE area to a person who was not a usual member of any household in that area	10	3	3	13	29	3	0	0	4	7
6. Death occurred inside PGE area to the usual member of a household which latter moved out of the PGE area	26	12	11	13	62	5	2	3	5	15
7. Death occurred inside a dwelling near the PGE boundary and it was not certain whether the dwelling was inside the area or not	0	0	0	0	0	2	0	0	0	2
8. Other reasons	6	2	19	27	54	0	0	6	20	26

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

* These were the registration reports for the 1st half of 1964 which were excluded on the basis of field investigation. No field investigation was carried out for the events reported during the 2nd half of 1964.

** These were the enumeration reports for the 1st half of 1964 which were excluded on the basis of field investigation. No field investigation was carried out for the events reported during the 2nd half of 1964.

FY/k.a.

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TABLE 10A   DETAILS OF SOME SPECIAL ADJUSTMENTS MADE TO EAST PAKISTAN BIRTH REPORTS, PGE SAMPLE: 1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Net adjustment to total reports	83	*	*	*	83	98	156	*	82	336
a. Estimate of births not enumerated because time reference of survey did not correspond exactly to a calendar year	*	*	*	*	*	98	156	*	82	336
b. Estimate of births not registered during the first half of 1962 in that portion of the sample that was first covered in July 1962	83	*	*	*	83	*	*	*	*	*
2. Net adjustment to matched reports	149	128	7	78	362	149	128	7	78	362
a. Assumed matches due to time reference adjustment	74	117	*	62	253	74	117	*	62	253
b. Assumed matches due to July 1962 sample expansion	63	*	*	*	63	63	*	*	*	63
c. Assumed matches to compensate for presumed excess of false non matches over false matches	12	11	7	16	46	12	11	7	16	46
3. Net adjustment to non matched reports	-66	-128	-7	-78	-279	-51	28	-7	4	-26
a. Assumed non matches due to time reference adjustment	-74	-117	*	-62	-253	24	39	*	20	83
b. Assumed non matches due to July 1962 sample expansion	20	*	*	*	20	-63	*	*	*	-63
c. Assumed non matches to compensate for excess of false non matches over false matches	-12	-11	-7	-16	-46	-12	-11	-7	-16	-46
4. Total adjusted birth reports	1816	1970	1785	1779	7350	1657	1860	1776	1583	6876
5. Total adjusted matched birth reports	1462	1612	1485	1254	5813	1462	1612	1485	1254	5813
6. Total adjusted non matched birth reports	354	350	300	525	1537	195	248	291	329	1063

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

*   Not applicable.

FY/k.a.

TABLE 10B DETAILS OF SOME SPECIAL ADJUSTMENTS MADE TO WEST PAKISTAN BIRTH REPORTS, PGE SAMPLE: 1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Net adjustment to total reports	84	*	*	*	84	63	95	*	76	234
a. Estimate of births not enumerated because time reference of survey did not correspond exactly to a calendar year	*	*	*	*	*	63	95	*	76	234
b. Estimate of births not registered during the first half of 1962 in that portion of the sample that was first covered in July 1962	84	*	*	*	84	*	*	*	*	*
2. Net adjustment to matched reports	121	88	14	76	299	121	88	14	76	299
a. Assumed matches due to time reference adjustment	47	71	*	57	175	47	71	*	57	175
b. Assumed matches due to July 1962 sample expansion	59	*	*	*	59	59	*	*	*	59
c. Assumed matches to compensate for presumed excess of false non matches over false matches	15	17	14	19	65	15	17	14	19	65
3. Net adjustment to non matched reports	-37	-88	-14	-76	-215	-58	7	-14	0	-65
a. Assumed non matches due to time reference adjustment	-47	-71	*	-57	-175	16	24	*	19	59
b. Assumed non matches due to July 1962 sample expansion	+25	*	*	*	25	-59	*	*	*	-59
c. Assumed non matches to compensate for excess of false non matches over false matches.	-15	-17	-14	-19	-65	-15	-17	-14	-19	-65
4. Total adjusted birth reports	1792	1687	1763	1780	7022	1563	1578	1896	1684	6721
5. Total adjusted matched birth reports	1319	1235	1363	1307	5224	1319	1235	1363	1307	5224
6. Total adjusted non matched birth reports	473	452	400	473	1798	244	343	533	377	1497

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

*   Not applicable.

TABLE 10C   DETAILS OF SOME SPECIAL ADJUSTMENTS MADE TO EAST PAKISTAN DEATH REPORTS, PGE SAMPLE: 1962-1965

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Net adjustment to total reports	26	*	*	*	26	30	36	*	29	95
a. Estimate of deaths not enumerated because time reference of survey did not correspond exactly to a calendar year	*	*	*	*	*	30	36	*	29	95
b. Estimate of deaths not registered during the first half of 1962 in that portion of the sample that was first covered in July 1962	26	*	*	*	26	*	*	*	*	*
2. Net adjustment to matched reports	43	30	3	26	102	43	30	3	26	102
a. Assumed matches due to time reference adjustment	23	27	*	22	72	23	27	*	22	72
b. Assumed matches due to July 1962 sample expansion	17	*	*	*	17	17	*	*	*	17
c. Assumed matches to compensate for presumed excess of false non matches over false matches	3	3	3	4	13	3	3	3	4	13
3. Net adjustment to non matched reports	-17	-30	-3	-26	-76	-13	6	-3	3	-7
a. Assumed non matches due to time reference adjustment	-23	?7	*	-22	-72	7	9	*	7	23
b. Assumed non matches due to July 1962 sample expansion	9	*	*	*	9	-17	*	*	*	-17
c. Assumed non matches to compensate for excess of false non matches over false matches.	-3	-3	-3	-4	-13	-3	-3	-3	-4	-13
4. Total adjusted death reports	612	679	729	652	2672	484	525	644	378	2031
5. Total adjusted matched death reports	428	466	538	295	1727	428	466	538	295	1727
6. Total adjusted non matched death reports	184	213	191	357	945	56	59	106	83	304

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

*   Not applicable.

Category	Registration					Survey				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Net adjustment to total reports	29	*	*	*	29	27	27	*	28	82
a. Estimate of deaths not enumerated because time reference of survey did not correspond exactly to a calendar year	*	*	*	*	*	27	27	*	28	82
b. Estimate of deaths not registered during the first half of 1962 in that portion of the sample that was first covered in July 1962	29	*	*	*	29	*	*	*	*	*
2. Net adjustment to matched reports	41	24	4	26	95	41	24	4	26	95
a. Assumed matches due to time reference adjustment	20	20	*	21	61	20	20	*	21	61
b. Assumed matches due to July 1962 sample expansion	17	*	*	*	17	17	*	*	*	17
c. Assumed matches to compensate for presumed excess of false non matches over false matches	4	4	4	5	17	4	4	4	5	17
3. Net adjustment to non matched reports	-12	-24	-4	-26	-66	-14	3	-4	2	-13
a. Assumed non matches due to time reference adjustment	-20	-20	*	-21	-61	7	7	*	7	21
b. Assumed non matches due to July 1962 sample expansion	12	*	*	*	12	-17	*	*	*	-17
c. Assumed non matches to compensate for excess of false non matches over false matches	-4	-4	-4	-5	-17	-4	-4	-4	-5	-17
4. Total adjusted death reports	689	598	605	522	2414	507	412	521	386	1826
5. Total adjusted matched death reports	434	330	396	282	1442	434	330	396	282	1442
6. Total adjusted non matched death reports	255	268	209	240	972	73	82	125	104	384

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

* Not applicable.

FY/k.a.

Category	EAST PAKISTAN					WEST PAKISTAN				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total births after mechanical, common dwelling and characteristic sort matching but prior to long table and field matching	2349	2459	2221	2607	9585	2350	2424	2673	2632	10090
a. Percent total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
b. Percent matched	54.2	58.8	65.3	42.6	55.1	49.1	46.2	47.9	44.4	46.8
c. Percent non matched (registration)	20.9	23.7	15.7	26.3	22.0	25.0	25.3	18.5	24.1	23.1
d. Percent non matched (survey)	18.0	12.4	15.3	19.2	16.4	17.1	18.4	24.2	20.4	20.2
e. Percent missed by both registration and survey systems [1]	6.9	5.0	3.7	11.9	6.5	8.8	10.1	9.4	11.1	9.9
2. Total births after long table and field matching but prior to special adjustments	2058	2262	2145	2270	8719	2139	2181	2478	2325	9138
a. Percent total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
b. Percent matched	63.8	65.6	68.9	51.8	62.5	56.0	52.6	54.4	53.0	53.9
c. Percent non matched (registration)	20.4	21.5	14.3	26.6	20.8	23.9	24.8	16.7	23.6	22.0
d. Percent non matched (survey)	12.0	9.7	13.9	14.3	12.5	14.1	15.4	22.1	16.2	17.1
e. Percent missed by both registration and survey systems [1]	3.8	3.2	2.9	7.3	4.2	6.0	7.2	6.8	7.2	7.0
3. Total births after special adjustments	2058	2273	2135	2246	8694	2123	2156	2452	2293	9034
a. Percent total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
b. Percent matched	71.0	70.9	69.6	55.8	66.9	62.1	57.3	55.6	57.0	57.8
c. Percent non matched (registration)	17.2	15.8	14.0	23.4	17.7	22.3	21.0	16.3	20.6	19.9
d. Percent non matched (survey)	9.5	10.9	13.6	14.7	12.2	11.5	15.9	21.7	16.5	16.6
e. Percent missed by both registration and survey systems [1]	2.3	2.4	2.8	6.1	3.2	4.1	5.8	6.4	5.9	5.7

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

[1] Following the procedure suggested by Chandrasekaran and Deming, this category of events was calculated by dividing the product of non matched registration and survey reports by the number of matched reports.

FY/k.a.

TABLE 11B PERCENT DISTRIBUTION OF ALTERNATE ESTIMATES OF DEATHS BY SOURCE OF REPORT FOR EAST AND WEST PAKISTAN, PGE SAMPLE:1962-1965

Category	EAST PAKISTAN					WEST PAKISTAN				
	1962	1963	1964	1965	All years	1962	1963	1964	1965	All years
1. Total deaths after mechanical, common dwelling and characteristic sort matching but prior to long table and field matching	790	806	896	927	3381	881	826	864	846	3402
a. Percent total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
b. Percent matched	47.2	53.6	58.8	28.6	47.2	42.7	35.8	43.6	27.7	37.7
c. Percent non matched (registration)	28.5	32.1	22.9	42.3	32.0	33.6	38.4	26.9	35.2	33.6
d. Percent non matched (survey)	15.2	8.9	13.2	11.7	12.4	13.3	12.5	18.3	16.3	15.2
e. Percent missed by both registration and survey systems /1_/	9.1	5.4	5.1	17.4	8.4	10.4	13.3	11.2	20.8	13.5
2. Total deaths after long table and field matching but prior to special adjustments	691	762	878	846	3152	806	752	804	730	3088
a. Percent total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
b. Percent matched	55.7	57.2	60.9	31.8	51.5	48.8	40.7	48.8	35.1	43.6
c. Percent non matched (registration)	29.1	31.9	22.1	45.3	32.4	33.1	38.8	26.5	36.4	33.6
d. Percent non matched (survey)	10.0	7.0	12.4	9.4	9.9	10.8	10.5	16.0	14.0	12.9
e. Percent missed by both registration and survey systems /1_/	5.2	3.9	4.6	13.5	6.2	7.3	10.0	8.7	14.5	9.9
3. Total deaths after special adjustments	692	765	873	835	3142	805	747	796	715	3057
a. Percent total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
b. Percent matched	61.8	60.9	61.6	35.3	54.9	53.9	44.2	49.7	39.5	47.2
c. Percent non matched (registration)	26.6	27.9	21.9	42.8	30.1	31.7	35.9	26.3	33.6	31.8
d. Percent non matched (survey)	8.1	7.7	12.1	9.9	9.7	9.1	11.0	15.7	14.5	12.5
e. Percent missed by both registration and survey systems /1_/	3.5	3.5	4.4	12.0	5.3	5.3	8.9	8.3	12.4	8.5

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

/1_/ Following the procedure suggested by Chandrasekaran and Deming, this category of events was calculated by dividing the product of non matched registration and survey reports by the number of matched reports.

FY/k.a.

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TABLE 12A ALTERNATE MATCH RATES/‾1‾7 FOR REGISTRATION AND SURVEY REPORTS OF BIRTHS IN EAST AND WEST PAKISTAN, PGE SAMPLE: 1962-1965

Area/Year	Match rates for registration reports of births			Match rates for survey reports of births		
	Prior to long table and field matching	Prior to special adjust-ments	After special adjust-ments	Prior to long table and field matching	Prior to special adjust-ments	After special adjust-ments
EAST PAKISTAN						
1962	72.1	75.8	80.5	75.0	84.2	88.2
1963	71.3	75.3	81.8	82.5	87.1	86.7
1964	80.7	82.8	83.2	81.0	83.2	83.6
1965	61.8	66.1	70.5	68.9	78.3	79.2
All years	71.5	75.0	79.1	77.1	83.3	84.5
WEST PAKISTAN						
1962	66.2	70.1	73.6	74.1	79.9	84.4
1963	64.7	68.0	73.2	71.5	77.3	78.3
1964	72.1	76.5	77.3	66.4	71.1	71.9
1965	64.8	69.2	73.1	68.6	76.6	77.3
All years	67.0	71.0	74.3	69.9	75.9	77.6

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

/‾1‾7 Match rate for registration reports = $\dfrac{\text{Number of matched registration reports}}{\text{Number of matched registration reports + number of non matched registration reports}}$

Match rate for survey reports = $\dfrac{\text{Number of matched survey reports}}{\text{Number of matched survey reports + number of non matched survey reports}}$

FY/k.a.

TABLE 12B   ALTERNATE MATCH RATES /¯1_7 FOR REGISTRATION AND SURVEY REPORTS OF DEATHS IN EAST AND WEST PAKISTAN, PGE SAMPLE:1962-1965

Area/Year	Match rates for registration reports of deaths			Match rates for survey reports of deaths		
	Prior to long table and field matching	Prior to special adjust- ments	After special adjust- ments	Prior to long table and field matching	Prior to special adjust- ments	After special adjust- ments
EAST PAKISTAN						
1962	62.4	65.7	69.9	75.7	84.8	88.4
1963	62.5	64.2	68.6	85.7	89.2	88.8
1964	72.0	73.4	73.8	81.7	83.1	83.5
1965	40.3	41.3	45.2	70.9	77.1	78.0
All years	59.6	61.4	64.6	79.2	83.9	85.0
WEST PAKISTAN						
1962	56.0	59.5	63.0	76.3	81.9	85.6
1963	48.3	51.2	55.2	74.2	79.5	80.1
1964	61.9	64.8	65.5	70.5	75.2	76.0
1965	44.0	49.0	54.0	62.9	71.5	73.1
All years	52.9	56.5	59.7	71.3	77.2	79.0

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

/¯1_7   Match rate for registration reports = $\dfrac{\text{Number of matched registration reports}}{\text{Number of matched registration reports + number of non matched registration reports}}$

Match rate for survey reports = $\dfrac{\text{Number of matched survey reports}}{\text{Number of matched survey reports + number of non matched survey reports}}$

FY/k.a.

TABLE 13   ALTERNATE ESTIMATES OF BIRTHS, DEATHS AND NATURAL INCREASE IN EAST AND WEST PAKISTAN, PGE SAMPLE: 1962-1965

Area/Year	Estimated number of births			Estimated number of deaths			Estimated natural increase		
	Prior to long table and field matching	Prior to special adjust-ments	After special adjust-ments	Prior to long table and field matching	Prior to special adjust-ments	After special adjust-ments	Prior to long table and field matching	Prior to special adjust-ments	After special adjust-ments
EAST PAKISTAN									
1962	2349	2058	2058	790	691	692	1559	1367	1366
1963	2459	2262	2273	806	762	765	1653	1500	1508
1964	2221	2145	2135	896	878	873	1325	1267	1262
1965	2607	2270	2246	927	846	835	1680	1424	1411
All years	9585	8719	8694	3381	3152	3142	6204	5567	5552
WEST PAKISTAN									
1962	2350	2139	2123	881	806	805	1469	1333	1318
1963	2424	2181	2156	826	752	747	1598	1429	1409
1964	2673	2478	2452	864	804	796	1809	1674	1656
1965	2632	2325	2293	846	730	715	1786	1595	1578
All years	10090	9138	9034	3402	3088	3057	6688	6050	5977

SOURCE: Consolidated forms AN20 for the 16 sample areas in which both the registration and survey systems were operating.

FY/k.a.

ANNEXURE 2

FORM NM 7

FIELD INVESTIGATION
OF BIRTHS

1.	PGE	Name	
2.	area	Code	
3.	Serial no.		
4.	Reported dw. of birth		
5.	Other dw. to visit		

6. <u>Child</u>

| Own name | Father's name | Grandfather's name |

Sex   Date of birth   Assumed present age

Mother's name   Parity

Name of head of household   Relationship of child to head

Midwife   Names of other persons to contact

Items below to be filled in by Field Inspector:

7. _____
Names of present respondent(s)

8. _____
Relationship of each respondent to family in which birth occurred

9. Is the child now alive?

No ☐   Yes ☐ → _____ Where? _____   Yes ☐   No ☐
Did you see it?
☐ Yes

10. WHERE WAS THE CHILD BORN? Inside PGE area
☐ No   _____ Where?

11. WHEN WAS THE CHILD BORN? _____
Day   Month   Year

12. Correct below any inconsistencies found in item 6.

13. If the child is dead, can you refer the birth described on this form to an infant death described on a form NM8?

Yes ☐ → Serial no. of form NM8 _____

No ☐ | Your reasons for assuming this fact:

Not ☐ |
applicable
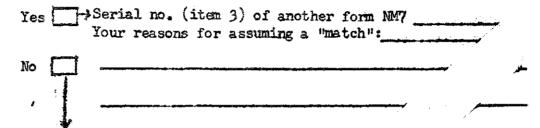
FORM NM 7

Serial No._____

14. Can you match the birth described on this form with that described on another form NM 7?

    Yes ☐→Serial no. (item 3) of another form NM7 _____
           Your reasons for assuming a "match":_____

    No ☐   _____

              _____

15. Possible reasons why this birth was omitted:
(Encircle the code for each reason which could be applicable in this case).

Reason	Code
Still birth	1
Death within a month of birth	2
Multiple birth (twins)	3
Birth occurred inside PGE area, but not at own home	4
Birth occurred inside PGE area, but mother was not normally a resident of the PGE area.	5
Birth occurred inside PGE area, but to a household which later moved away (specify when).......	6
Mother had temporarily left PGE area to have her baby outside	7
Birth had occurred outside PGE area to a household which later moved into the area	8
Birth occurred in a dwelling near the PGE boundary, and it was not certain whether the dwelling was inside the PGE area or not	9
Birth was not reported for reasons undetermined........	10
Other reasons (specify in item 16)	11

16. If the circumstances surrounding this birth are other than the possibilities (codes 1 - 9) listed in item 15 above, recount the details below:

17. _____ 18. _____ 19. _____
     Date   Place   Field Inspector's signature

FORM NM 8

FIELD INVESTIGATION
OF DEATHS

1.	PGE	Name
2.	area	Code
3.	Serial no.	
4.	Reported dw. of death	
5.	Other dw. to visit	

6. Deceased

Own name	Father's name	Husband's name
		ago.
	Age Date of death	How long since?
	Sex Marital status	Occupation

Name of head of household   Relationship of deceased to head
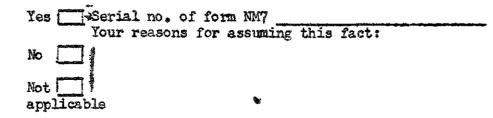
Names of other persons to contact

Items below to be filled in by Field Inspector

7. _____
   (Name (s) of present respondent(s)

8. _____
   Relationship of each respondent to family in which death occurred

9. _____   Yes ☐   No ☐
   Cause of death   Where is grave?   Did you see it?

10. WHERE DID DEATH OCCUR?   ☐ Yes
        Inside PGE area?
                                  ☐ No   _____
                                            Where?

11. WHEN DID DEATH OCCUR? _____
                          Day   Month   Year

12. Correct below any inconsistencies found in item 6.

13. If this is an infant death, can you refer the death described on this form to
   a birth described on a form NM7?

        Yes ☐ Serial no. of form NM7 _____
                 Your reasons for assuming this fact:
        No ☐
        Not ☐
        applicable

FORM NM8

Serial no:_____

14. Can you match the death described on this form with that
described on another form NM8?

    Yes ☐ → Serial no.(item 3) of other form NM8 _____
           Your reasons for assuming a "match": _____

    No ☐   ————————————————————————

              ————————————————————————
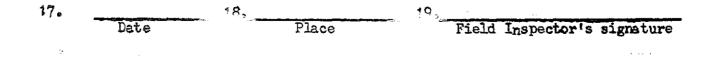
15. Possible reasons why this death was omitted:
(Encircle the code for each reason which could be applicable in
this case.)

Reason		Code
Infant death	Still birth	1
	Death within a month of birth	2
Death occurred inside PGE area, to a PGE household member, but no at home		4
Death occurred inside PGE area, but to a migrant, not a PGE household member		5
Death occurred inside PGE area, but to a household which later moved away (specify when)		6
Death occurred outside PGE area, to a member of a PGE household		7
Death occurred outside PGE area to a member of a household which later moved into the PGE area		8
Death occurred in a dwelling near the PGE boundary, and it was uncertain whether the dwelling was inside the area or not		9
Death was not reported for reasons undetermined		10
Other reasons (specify in item 16)		11

16. If the circumstances surrounding this death are other than
the possibilities (codes 1 - 9) listed in item 15 above,
recount the details below:

17. _____ 18. _____ 19. _____
     Date   Place   Field Inspector's signature

ANNEXURE 2

FORM AN20

0.1	PGE	Name		
0.2	area	Code		
0.3	Date form made out			
0.4	Form made out by			
0.5	Form checked by			

MATCHING IN
ONE PGE AREA

0.0 Vital rates for the year 196..

0.6 Registration cards used for matching:

0.7 Enumeration cards used for matching:

0.8 Registration cards did not include:

0.9 Enumeration cards did not include:

0.10 This PGE area was/was not subject to an extension with effect from
1st July, 1962. Base population

in old area: ....(B)

in NEW AREA: ....(b) or .... % of
whole PGE area
in whole PGE area:................(B')

0.11 General comments, like quality of registration and enumeration:

0.12 Items dealing for the time being with assumed figures are to be
asterisked, but items depending in turn of such asterisked items
arithmetically are not to be so marked.

0.13 "This year" refers to the year shown in # 0.0

0.14 "Last year" refers to the year preceeding that shown in # 0.0

0.15 "Next year" refers to the year following that shown in # 0.0

1.1 Symbols used (see Krotki's Ottawa paper):

1.2 C = vital events both registered and enumerated

1.3 N_r = vital events registered, but not enumerated

1.4 N_e = vital events enumerated, but not registered

1.5 $\dfrac{N_r N_e}{C}$ = vital events neither registered, nor enumerated

1.6 $N = C + N_e + N_r + \dfrac{N_r N_e}{C}$ = estimates of total vital events

1.7 The index f denotes final figures (obtained after office and
field investigation.)

2.0	BIRTHS (LR)	a 9	b 11	c 8	d 2	e Total
2.1	Totals on M listings	.....	.....	.....	.....	.....
2.2	Minus 196_ (last year) both sides	−.....	−.....	−.....	−.....	−.....
2.3	Minus 196_ (next year) both sides	−.....	−.....	−.....	−.....	−.....
2.4	No CS equivalents	−.....	−.....	−.....	−.....	−.....
2.5	No MM *	−.....	−.....	−.....	−.....	−.....
2.6	Minus SB both sides	−.....	−.....	−.....	−.....	−.....
2.7	Verified mech. matches	.....	.....	.....	.....	.....

3.0	DEATHS (LR)	11	9	8	2	Total
3.1	Totals on M listings	.....	.....	.....	.....	.....
3.2	Minus 196_ (last year) both sides	−.....	−.....	−.....	−.....	−.....
3.3	Minus 196_ (next year) both sides	−.....	−.....	−.....	−.....	−.....
3.4	No CS equivalents	−.....	−.....	−.....	−.....	−.....
3.5	No MM *	−.....	−.....	−.....	−.....	−.....
3.6	Verified mech. matches	.....	.....	.....	.....	.....

		BIRTHS	DEATHS
4.1	Registrations on check listings	.....	.....
4.2	Minus total on M listings (# 2.1 or #3.1 col.e)	−.....	−.....
4.3	Registrations on last non-matched listing	.....	.....
4.4	Add no CS equivalents (# 2.4 and #3.4 col.e)	+.....	+.....
4.5	Add no MM (# 2.5 and #3.5 col.e)	+.....	+.....
4.6	Non matched registrations after mech. matches	.....	.....

		BIRTHS		DEATHS	
5.0	Common dw. no matches				
5.1	# 4.6	.....		.....	
5.2	196_ (this year) form AN23 live births/deaths	.....	.....	.....	
5.3	196_ (last year) (crossed out on last non-matched listing)	+.....		+.....	
5.4	196_ (next year)	+.....		+.....	
5.5	SB both sides in 196_	+.....			
5.6	Common dw. no. matches	.....	−.....	.....	−.....
5.7	Available for ch. sortings	.....		.....	

* Matching with asterisks had all matches checked manually.

|		Births	Deaths
6.0	**Characteristic sorting matches**		
6.1	# 5.7	.....	.....
6.2	No.1 196_(this year) live births/ deaths	+.....	+.....
6.3	No.2 196_(this year)live births/ deaths	+.....	+.....
6.4	No.3 196_(this year)live births/ deaths	+.....	+.....
6.5	196_(last year) ch. sorting matches (crossed out on last non-matched listings)	+.....	+.....
	196_(next year) ch. sorting matches (crossed out on last non-matched listings)	+.....	+.....
6.6	SB both sides in 196_	+.....	
6.7	All ch. sorting matches	..... -.....	..... -.....
6.8	196_(last year), 196_(this year) and 196_(next year) non-matched registrations	.....	.....
6.9	196_(last year) non-matches	+.....	+.....
6.10	196_(next year) non-matches	+.....	+.....
6.11	All non-matches out of time reference	..... -.....	..... -.....
6.12	196_(this year) non-matched registrations after mech. and man. matches	.....	.....
6.13	Verified mech. matches (# 2.7 and # 3.6)	+.....	+.....
6.14	196_(this year) common dw. no. matches (# 5.2)	+.....	+.....
6.15	196_(this year) ch. sorting matches (# 6.2 + # 6.3 + # 6.4)	+.....	+.....
6.16	Registrations for year shown in # 0.0 including unmatched still births	.....	.....
7.1	6.16	.....	.....
7.2	Deduct remaining still births for year shown in # 0.0	-.....	
7.3	Live births/deaths registered for year shown in # 0.0	.....	.....
7.4	If in # 0.6 only 12 months registrations were used make here an allowance for late registrations (1/3 of # 7.3)	+.....	+.....
7.5	Registrations omitted because NEW AREA did not start registrations until mid-1962; half of the %-age (x) in # 0.10, figures in # 7.3 being equal for 100%-x/2%; registrations in respect of new areas and in respect of period prior to July 1962 have been deleted from all the listings (1962 only)	+.....	+.....
7.6	All relevant registrations		
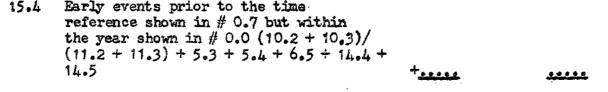
		Births		Deaths

8.0	Assumed matches Unavoidables:				
8.1	Early 196_(this year) non-enumerated (3/4 of # 15.4)	.....	. ..	.....	
8.2	(1962 only) Registrations from NEW AREAS which may have matched if registered (#14.7 x #7.5 / #7.3)	+.....		+.....	
8.3	All unavoidables	.....	.....	.....	.....
8.4	Safeguards: Standard (1/10 of #6.12 with a min. of 1)	.....		.....	
8.5	Wild (possible but unverified matches)	+.....		+.....	
8.6	All safeguards	.....	+.....	.....	+.....
8.7	All assumed matches		.....		.....

9.1	# 7.6		.....		.....
9.2	Mech. matches (# 6.13)	.....		.....	
9.3	Manual matches (#6.14 + #6.15)	+.....		+.....	
9.4	Assumed matches (#8.7)	+.....		+.....	
9.5	All matches (C)	.....	-.....	.....	-.....
9.6	Non matched registrations (N_r)		.....		.....

		a	b	c	d	e
10.0	BIRTHS (CS)	9	11	8	2	Total
10.1	Total on M listings	.....	.....	.....	.....	.....
10.2	196_(last year) both sides	.....	-.....	-.....	-.....	-.....
10.3	196_(next year) both sides	.....	-.....	-.....	-.....	-.....
10.4	No LR equivalents	-.....	-.....	-.....	-.....	-.....
10.5	No MM *	-.....	-.....	-.....	-.....	-.....
10.6	Minus SB both sides	-.....	-.....	-.....	-.....	-.....
10.7	Verified mech. matches	.....	.....	.....	.....	.....

		a	b	c	d	e
11.0	DEATHS (CS)	11	9	8	2	Total
11.1	Total on M listings	.....	.....	.....	.....	.....
11.2	196_(last year) both sides	-.....	-.....	-.....	-.....	-.....
11.3	196_(next year) both sides	-.....	-.....	-.....	-.....	-.....
11.4	No LR equivalents	-.....	-.....	-.....	-.....	-.....
11.5	No MM*	-.....	-.....	-.....	-.....	-.....
11.6	Verified mech. matches	.....	.....	.....	.....	.....

* Matchings with asterisks and all matches checked manually.

		Births	Deaths
12.1	Enumerations on check listing	.....	.....
12.2	Minus total on M listings (# 10.1 or # 11.1 col.e)	−.....	−.....
12.3	Enumerations on last non-matched listing.	.....	.....
12.4	Add no IR equivalents (# 10.4 and # 11.4 col.e)	+.....	+.....
12.5	Add no MM (#10.5 and #11.5 col.e)	+.....	+.....
12.6	Non-matched enumerations after mech. matches	.....	.....

13.0 Common dw. no. matches

		Births	Deaths
13.1	# 12.6	.....	.....
13.2	Common dw. no. matches (# 5.6)	−.....	−.....
13.3	Available for ch. sortings	.....	.....

14.0 Characteristic sorting matches

		Births	Deaths
14.1	# 13.3	.....	.....
14.2	All ch. sorting matches (# 6.7)	−.....	−.....
14.3	196_(last year), 196_(this year) and 196_(next year) non-matched enumerations	.....	.....
14.4	196_(last year) non-matches	−.....	−.....
14.5	196_(next year) non-matches	−.....	−.....
14.6	196_(this year) non-matched enumerations after mech. and man. matches	.....	.....
14.7	All mech. and man. matches (#6.13 + #6.14 + #6.15)	+.....	.....
14.8	Enumerations for the year shown in # 0.0 including unmatched still births	.....	.....

		Births	Deaths
15.1	# 14.8	.....	.....
15.2	Deduct remaining still births for year shown in # 0.0	−.....	−.....
15.3	Live births/deaths enumerated for year shown in # 0.0	.....	.....
15.4	Early events prior to the time reference shown in # 0.7 but within the year shown in # 0.0 (10.2 + 10.3)/ (11.2 + 11.3) + 5.3 + 5.4 + 6.5 + 14.4 + 14.5	+.....	.....
15.5	All relevant enumerations	.....	.....

		Births	Deaths
16.1	# 15.5	.....	.....
16.2	All matches (C) (# 9.5)	-.....	-.....
16.3	Non matched enumerations (N_e)	.....	.....

17.1	C (#.9.5)	.....	.....
17.2	N_r (# 9.6)	+.....	+.....
17.3	N_e (# 16.3)	+.....	+.....
17.4	$\dfrac{N_r \, N_e}{C} = \underline{\quad\quad} = \underline{\quad\quad};\quad \underline{\quad\quad} = \underline{\quad\quad};$	+.....	+.....
17.5	N	.....	.....

18.1	All registrations (# 17.1 + # 17.2)	.....	.....
18.2	All enumerations (# 17.1 +#17.3)	.....	.....

19.0	**Office and field investigations**		
19.1	All matches excl. of assumptions, before investigation (# 9.2 + # 9.3)	.....	.....
19.2	Matches found during office investigation (this visit only)	+.....	+.....
19.3	Matches after office investigation	.....	.....
19.4	Matches found during field investigation (this visit only)	+.....	+.....
19.5	All matches, excl. of assumptions, revised	.....	.....

		Births			Deaths	
20.0	**Confirmation of non-matched events**				. .	
20.1	Non-matched enumerations (rubber stamp)	.....			.....	
20.2	Additional matches (# 19.2 + # 19.4)	–.....			–.....	
20.3	Remaining non-matched enumerations	.....			......,	
20.4	Unmatched events confirmed in the office	.....		.....		
20.5	Unmatched events confirmed in the field	+.....		+.....		
20.6	Total confirmed unmatched enumerations	.–...	–.....	.....	–.....	
20.7	Erroneous enumerations	.. .	.....		.....	
20.8	Non-matched registrations (rubber stamp)		.....		.....	
20.9	Additional matches (#19.2 + #19.4)		–.....		–.....	
20.10	Remaining non-matched registrations	.....	.....	.....	.....	
20.11	Unmatched events confirmed in the office	.....		.....		
20.12	Unmatched events confirmed in the field	+.....	..	+.....		
20.13	Total confirmed unmatched registrations	.....	–.....	......	–.....	
20.14	Erroneous registrations	.....		.....		

	21.0	**Total registrations**				
	21.1	Live births/deaths registered for year shown in #0.0 (#7.3)	.....	.....	......	.....
	21.2	Erroneous registrations (#20.14)	.....		.....	
	21.3	SB/IB/D confusion discovered in fields	+.....		+.....	
21.3.1		Total adjustments	.....	–.....	.....	–.....
	21.4	Total confirmed registrations	.....		.....	
	21.5	If in # 0.6 only 12 months' registrations were used, make here an allowance for late registrations (1/30 of # 21.4) +	+.....		+.....	
	21.6	Registrations omitted because NEW AREA did not start registrations until mid-'62 (#21.4 x $\frac{B'-B}{B'+B}$ from # 0.10) 1962 only	+.....		+.....	
	21.7	All relevant registrations, revised	.....		.....	

		Births	Deaths
22.0	**Total enumerations**		
22.1	Live births/deaths enumerated for year shown in # 0.0 (# 5.3)	.....	.....
22.2	Erroneous enumerations (# 20.7)	.....	.....
22.3	SB/LB/D confusion discovered in field	+.....	+.....
22.3.1	Total adjustments	..... -.....	..... -.....
22.4	Total confirmed enumerations	.....	.....
22.5	Early events prior to the time reference shown in #0.7 but within the year shown in #0.0 (#15.4)	... +.....	+.....
22.6	All relevant enumerations, revised	......	.....

		Births	Deaths
23.0	**Matches**		
	Assumed matches:		
23.1	Early 196_ (this year) non-enumeration (# 8.1)	.....	.....
23.2	(1962 only) registration from NEW AREA which may have matched if registered (# 19.5 x $\frac{21.6}{21.4}$)	+.....	+.....
23.3	Justified assumed matches	.....	.....
23.4	Safeguards (1/20 of #20.6 or #20.13, whichever is less)	+.....	+.....
23.5	All assumed matches	.....	.....
23.6	All real matches (#19.5)	+.....	+.....
23.7	C_f	.....	.....

		Births	Deaths
24.0	**Non-matched registrations**		
24.1	All relevant registrations (#21.7)	.....	.....
24.2	All matches (C_f) (#23.7)	-.....	-.....
24.3	N_{rf}	.....	.....

		Births	Deaths
25.0	**Non matched enumerations**		
25.1	All relevant enumerations (# 22.6)	.....	.....
25.2	All matches (C_f) (#23.7)	-.....	-.....
25.3	N_{ef}	.....	.....