EFFECT OF AN IMMUNISATION CAMPAIGN

IN NATAL AND KWAZULU

ON VACCINATION COVERAGE RATES

1990 - 1991

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DECLARATION

This dissertation is the candidate's original work and has not been submitted in any form to another University.

The sources of data have been duly acknowledged in the text.

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1. SUMMARY

In 1990 the Department of National Health and Population Development of South Africa launched a nationwide immunisation coverage campaign targetted mainly at measles. In order to measure the effect of the campaign on vaccination coverage rates for children pre- and post-campaign vaccination coverage surveys were performed using a modified EPI technique, stratified for race and urban/rural residence.

The results in Natal/KwaZulu showed no significant changes in vaccination coverage rates as documented by Road-to-Health cards for any race, although the trend was towards a slight increase.

The results bring into question the effectiveness of immunisation campaigns as a strategy for raising vaccination coverage levels, and having a sustained impact on the incidence of measles. Alternative strategies, such as the strengthening and expansion of existing primary health care services, and changes to the immunisation schedule for measles, should be considered.

2. INTRODUCTION.

In 1990 the Department of National Health and Population Development of South Africa decided to launch a nationwide immunisation campaign, aimed primarily at measles, but also emphasizing the need to increase vaccination coverage rates against all the diseases of the Expanded Programme for Immunisation (EPI).

Despite the progress of the EPI, only 59% of children worldwide under one year of age were estimated to have received measles vaccine in 1988, and measles still causes an estimated 1.5 million deaths per year.[1] Measles vaccination coverage rates in South Africa prior to the campaign were estimated at between 50% and 68% for the black population, and around 80% for white and coloured children aged between 12 and 23 months.[2] In 1989, the year before the campaign, there were 18,123 cases of measles notified in South Africa.[3] This probably represents an under-estimate of the actual number of cases of measles, given the problems with notification systems[4], and hence the true incidence rate cannot be ascertained. However, using the notification data, estimates of annual incidence rates for Blacks for 1989 varied from 1.9/100,000 in Bophuthatswana and 3.8/100,000 in the Orange Free State, to 72.9 in the Eastern Cape and 86.9/100,000 in Lebowa. Case fatality rates varied from 0.9% to 8.0% in the different regions.[5] In most regions the incidence appeared to be declining.

Immunisation programmes aim to interrupt measles transmission by inducing herd immunity, but the high transmissibility of measles makes herd immunity difficult to achieve. Hope-Simpson estimated that 75.6% of household exposures of susceptibles lead to measles transmission, compared to 61% for varicella and only 31.1% for mumps.[6]

It has been estimated that around 95% immunisation coverage with a vaccine which is 100% effective must be achieved to eliminate measles from a stable population. However Choi found that a substantial probability (10-30 percent) of secondary transmission remains even when the proportion of immune persons in a population is as high as 96%.[7] In other words, even with complete coverage of small population, a vaccine failure rate as low as 4% in a fully vaccinated population may permit secondary transmission when measles is introduced.[8]

The UNICEF 'Universal Child Immunisation' (UCI) was adopted by the World Health Assembly in 1982.[9] Its objective is the immunisation of all children in the world against the six diseases covered by the EPI. The UCI programme is also meant to dynamize the basic health services, providing immediate protection against specific diseases and promoting the longer term involvement of whole societies in the wider cause of health promotion. It offers potential as a spearhead for the rapid expansion of other elements in primary health care at sustainable cost.[10]

In view of the low estimated measles vaccination coverage rate, large number of notified cases of measles in South Africa, and consequent high toll on childhood morbidity and mortality, the national immunisation campaign of May/June 1990 was launched. The objectives of the campaign were:

1. To obtain 95% immunisation coverage for children under 5 years of age;

2. To increase public awareness about immunisation;

3. To improve and strengthen immunisation services.

The intention was to reduce the incidence of measles and increase vaccination coverage rates through a high-profile

campaign, which would hopefully help to direct attention and resources to preventive health care and immunisation services, thereby producing effects which would be sustained after the campaign proper was over. The campaign was to spearhead a general improvement in immunisation services. As one measure of the effectiveness of the campaign in producing a sustained increase in vaccination coverage rates over the following year, it was deemed necessary to measure vaccination coverage rates in children both before and after it, and to compare the results to see if a significant increase in coverage rates had occurred. The pre-campaign survey was performed in 1990. The survey reported here is the post-campaign survey, which was performed to ascertain the level of vaccination coverage of children aged from 9 months to 21 months in Natal and KwaZulu subsequent to the Measles Immunisation Campaign of May/June 1990, and to compare the levels with those recorded in the pre-campaign survey of February 1990. The detailed results of this survey have been reported elsewhere.[11]

The investigation was designed so as to meet requirements specified by the Department of National Health and Population Development, along with the local requirements as agreed to by the Natal/KwaZulu Health Services Liaison Committee.

The National requirements included that information be gathered in respect of Urban Whites, Urban Asians, Urban Blacks, and Rural Blacks. The level of precision required was 5%.

The Regional requirements included information regarding the Coloured community, and that separate information be made available for Natal and KwaZulu. Information was also required for each of the eight Health Planning Sub-Regions of Natal/KwaZulu. (Annexure C). This information with

respect to Health Planning Sub-Regions has been reported separately and will not be included here.

3. PURPOSE

To identify the effect on vaccination coverage rates of immunisation services subsequent to an immunisation campaign held in Natal and KwaZulu in 1990.

4. OBJECTIVES

1. To obtain vaccination coverage rates for children in Natal and KwaZulu aged between 9 months and 21 months, according to racial group and urban/rural residence one year after an immunisation campaign.

2. To compare the results obtained in 1. (above) with those obtained in the pre-campaign vaccination coverage survey performed in 1990.

3. To ascertain whether a significant change in coverage rates occurred subsequent to the immunisation campaign.

4. To make recommendations regarding the use of campaigns as a method of increasing immunisation coverage.

5. METHOD.

5.1 Sampling Frame.

The sampling frame for the post-campaign survey consisted of children aged between nine months and one year nine months as of 1st June 1991 in Natal and KwaZulu, for each of the specified race groups. In 1990 (the pre-campaign survey) children aged between 12 and 24 months were selected. It was decided to change the age range for the post-campaign survey this year in order to select only those children who would have become eligible for measles vaccination during or subsequent to the Measles Immunisation Campaign of May/June 1990. Hence the children had to be a maximum of 1 year 9 months of age as of 1st June 1991.

5.2 **Sample Size.**

The detailed method was as described in the attached Protocol, Annexure B. Essentially the sample consisted of 114 clusters of seven children each from Whites, Asians, Rural Blacks and Urban Blacks, and 30 clusters of seven children from the Coloured community.

5.3 **Sampling Procedure.**

Cluster locations were selected using a multistage, sequential sampling technique, with the primary sampling units being the Magisterial districts, and the secondary sampling units being Enumerator Sub-Districts (ESDs). Seven starting points for finding children within each cluster were each randomly selected using 1:10,000 orthophoto maps of the relevant ESDs.

For the White community it was found necessary to deviate from this technique due to the scarcity of children in the required age range. In the previous survey - 1990 - it had been necessary for field workers to visit up to 30 houses around the randomly selected starting point before finding a child. Hence for the post-campaign survey it was decided to select children within the appropriate magisterial district using the registers of births kept at local and municipal clinics.

5.4 **General Comments on Sampling**

The method outlined above and described in detail in the attached protocol (Annexure B) is similar to the standard EPI technique,[12] but differs in one important detail. The seven households for each cluster are all randomly selected, in contrast to choosing seven households around one randomly selected point. Each cluster therefore represents with reasonable accuracy the ESD from which it was selected, and the clusters,

in correct combinations, represent with acceptable accuracy Natal and KwaZulu magisterial districts, Health Planning Sub-Regions, each race group in urban areas, and the Black race group in rural areas.

5.5 Questionnaire

Interviewers visited the points identified on the orthophoto maps and went to the nearest houses until a child of the correct age was found. Standard pre-coded questionnaires were administered for each identified child by Nurses who were fully trained regarding all aspects of the study. The Road-to-Health card was requested (RTHC) and details of vaccinations given were recorded. In the absence of a card a history of measles vaccination was requested, and a BCG scar looked for.

5.6 Data Analysis

Data was analysed on computer using SAS. The chi-squared test of significance was applied to compare the results of the 1990 survey with those of 1991.

6. LIMITATIONS OF THE STUDY

6.1 The 1985 census figures were used to determine the populations of the Magisterial and Enumerator Sub Districts. As Natal and KwaZulu have experienced major population movements over the last six years, this means that some areas - predominantly the peri-urban areas around Durban, Pietermaritzburg and Stanger (such as Inanda and Groutville) - will have been under-represented. The effect that this will have had on the results is uncertain.

6.2 Due to the unrest situation, it was not possible to gather information on some clusters. These included

mainly the KwaZulu black township of Kwa Mashu - where a Nursing Sister had her car stolen while gathering data - and Mpumulanga. Coincidentally these were the same areas which were omitted in 1990 - for similar reasons - hence this should not affect the validity of comparing the two years' results.

6.3 The age group selected this year differs slightly from that selected in 1990, when children from 12 to 24 months were chosen. In this age range all children should have received their measles vaccinations. However, in the age range selected this year - 9 to 21 months - the youngest children have only just become eligible for this vaccination, and may validly not have received it at the time of the survey. Hence the proportion of children aged 9 or 10 months may affect the coverage rates obtained for this vaccine, and tend to produce lower vaccination coverage rates in this survey than if the same age group were used as in 1990.

An attempt to allow for this has been made in the analysis by doing an additional analysis for the children aged over 12 months.

6.4 The sampling frame includes children who became eligible for vaccination during the campaign. This may have the effect of distorting any effect of routine immunisations subsequent to the campaign. The distinction between the effect on immunisation coverage rates due to the campaign proper, and the period subsequent to the campaign, is therefore somewhat blurred. In retrospect it may have been useful to perform sub-analyses of children aged 12 to 18 months for both the 1990 and 1991 surveys so that the effects of the campaign itself, and the routine services subsequent to the campaign, on immunisation

coverage rates could have been distinguished.

6.5 Details of vaccinations were taken from Road to Health Cards, as in 1990. This year, in the absence of such a card, detailed information was not collected. Evidence of a BCG scar was looked for, and a history of having had a measles vaccination was requested. It was felt in 1990 that more detailed information in respect of other vaccines had been difficult to elicit and very unreliable, and hence it was not sought this year. Therefore it is not possible to compare historical data with last year, except for Measles and BCG.

7. RESULTS.

OBJECTIVE 1 - POST-CAMPAIGN VACCINATION COVERAGE RATES IN NATAL/KWAZULU.

1. Sample size and response rate.

The composition of the sample by race and territory is as shown on Figure 1 and Table I. Response rate is shown on Figure 2 and Table II. Response rate was high for the White (97.5%), Coloured (102.8%) and Asian communities (96.4%), and acceptable for the Urban Black (72.9%) and Rural Black (86.8%) communities. The relatively low response rate for the Urban Black community was due to the high levels of violence in these areas, which prevented access by interviewers. The same black townships had to be abandoned both in 1990 and 1991 (mainly Kwa Mashu, Mpumulanga and Bruntville).

2. Vaccination Coverage Rates, Natal and Kwa Zulu 1991.

Tables III to IX show the vaccination coverage rates for all vaccines as found in the 1991 survey for all races, and for urban and rural Natal and Kwa Zulu. It may be seen that the coverage rates for measles (by card only) were for Asians - 93.1%, Coloureds - 89.8%, Whites - 83%, Rural Blacks - 65.2% and Urban Blacks 64.8%. The coverage rates for BCG and Polio/DPT 1-3 were for all races higher than those for measles.

If the results for Rural and Urban Blacks (by card alone) are broken down by territory (Tables VIII and IX), it can be seen that the coverage rates in Natal were markedly higher than in Kwa Zulu for all vaccines (except Polio 0 in the rural areas). In particular, the coverage rates for measles were 11.4% higher in rural Natal than rural Kwa Zulu, and 28.1% higher in urban Natal than urban Kwa Zulu.

FIGURE 1

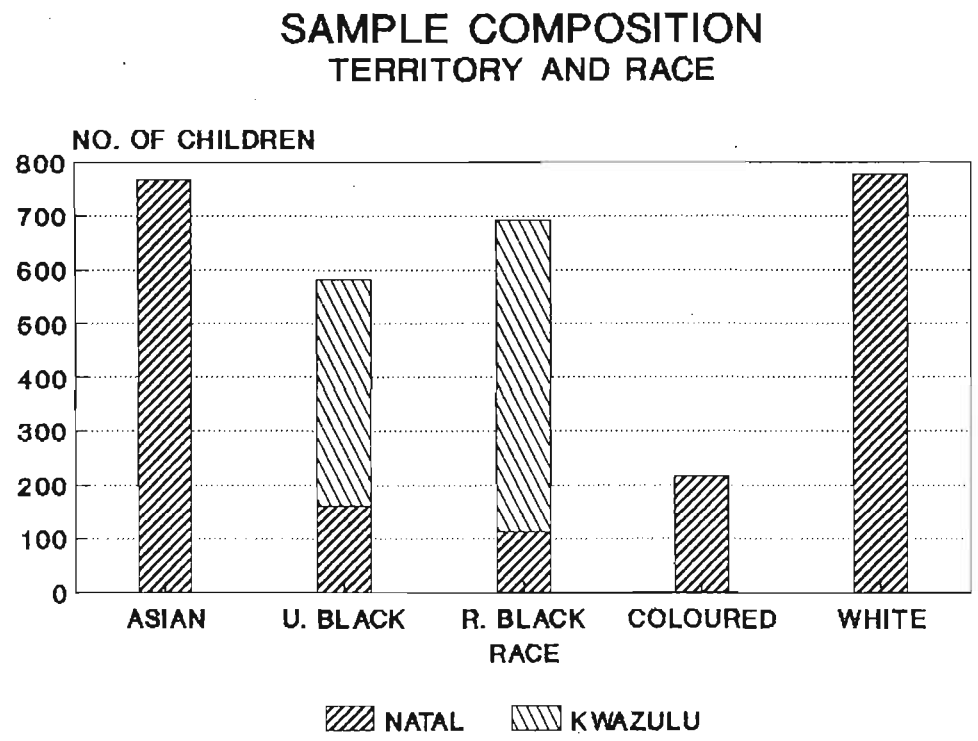
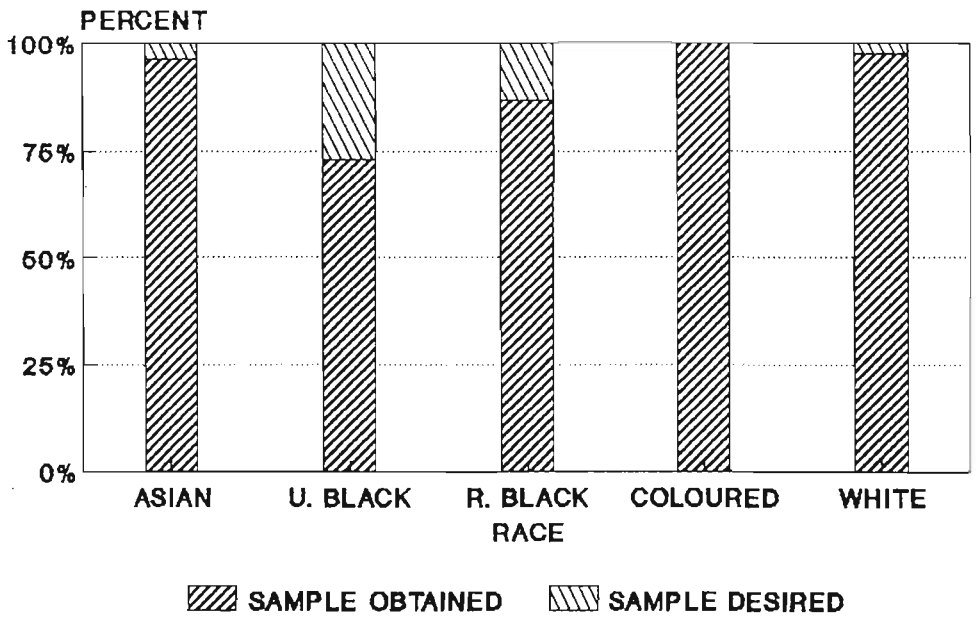


FIGURE 2



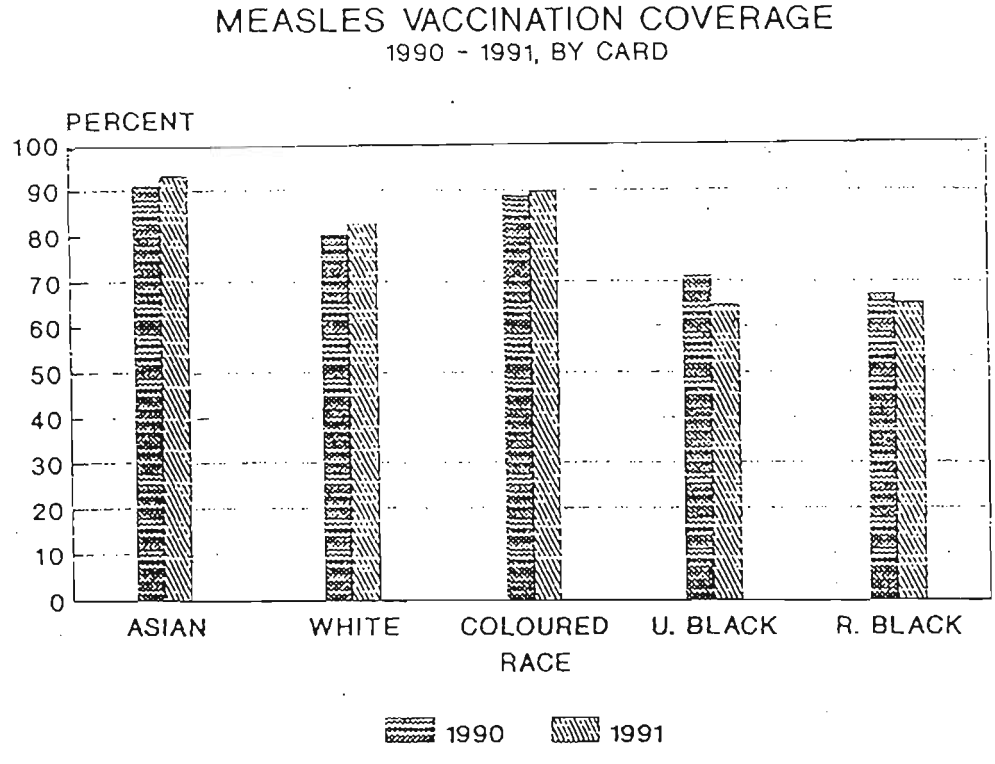
OBJECTIVES 2 AND 3 - CHANGE IN COVERAGE RATES SINCE 1990.

1. Natal and KwaZulu combined, all races, by card.

Figures 3 to 7 show the change in coverage rates by card for all races in Natal/KwaZulu (combined) from 1990 to 1991 for measles, BCG and DPT 1-3. These results are shown in more detail in Tables X - XIV along with statistical significance as indicated by $p<0.05$, chi-squared test.

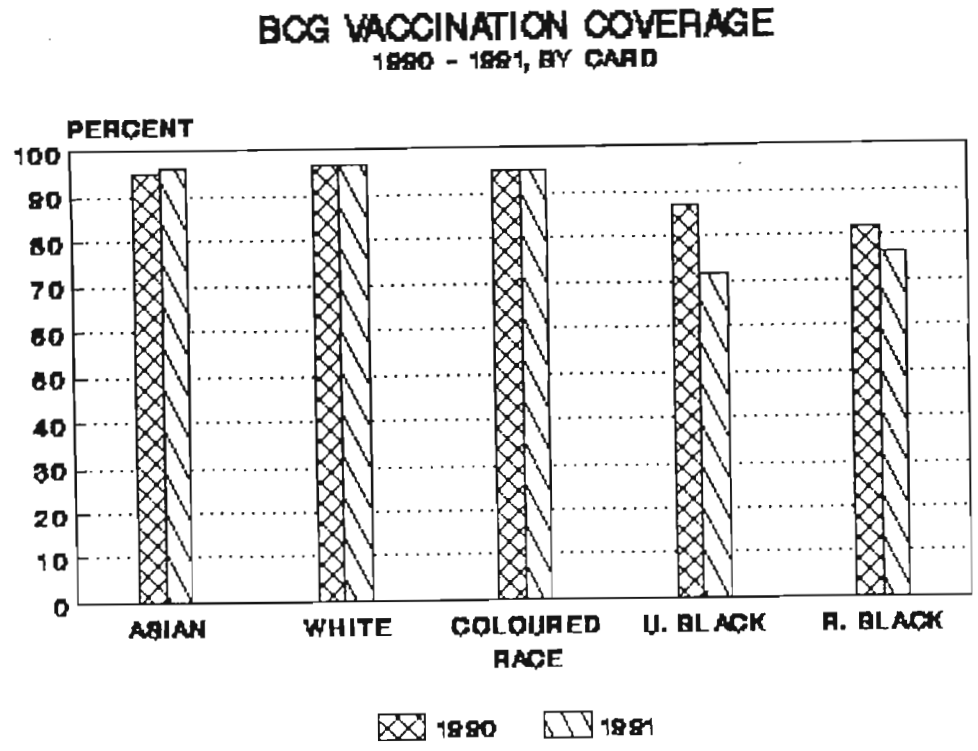
It can be seen that there was no significant increase in coverage rates for measles or BCG for any race. There was a significant increase in Polio 1 and DPT 1 for Whites ($p=0.045$). For Asians and Coloureds there were significant ($p<0.05$) increases in coverage for DPT and Polio 2 and 3, but for the Black community there was a significant decrease in coverage for BCG for both Urban and Rural Blacks, and a significant decrease in coverage for Measles and Polio 1 for Urban Blacks.

FIGURE 3



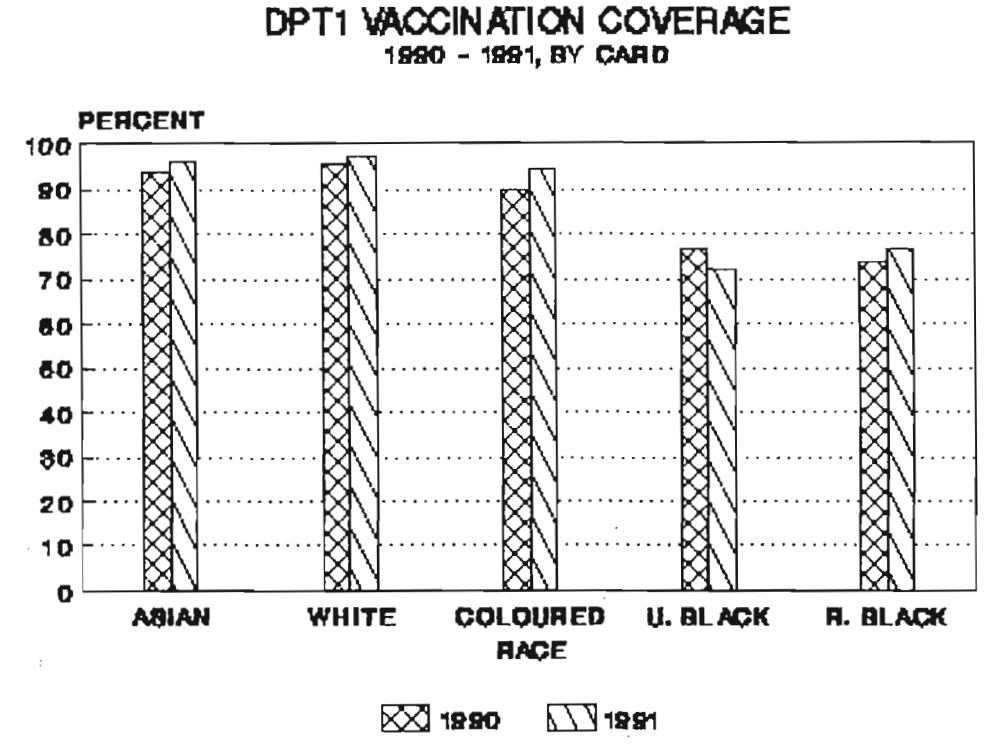
NATAL AND KWAZULU COMBINED.

FIGURE 4



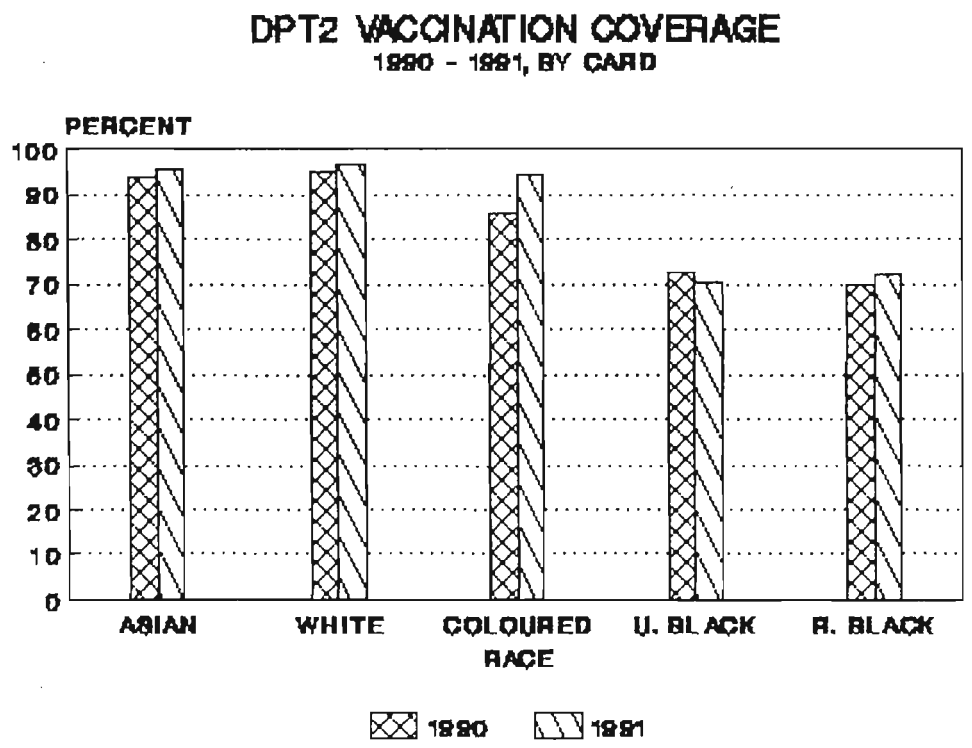
NATAL AND KWAZULU COMBINED.

FIGURE 5



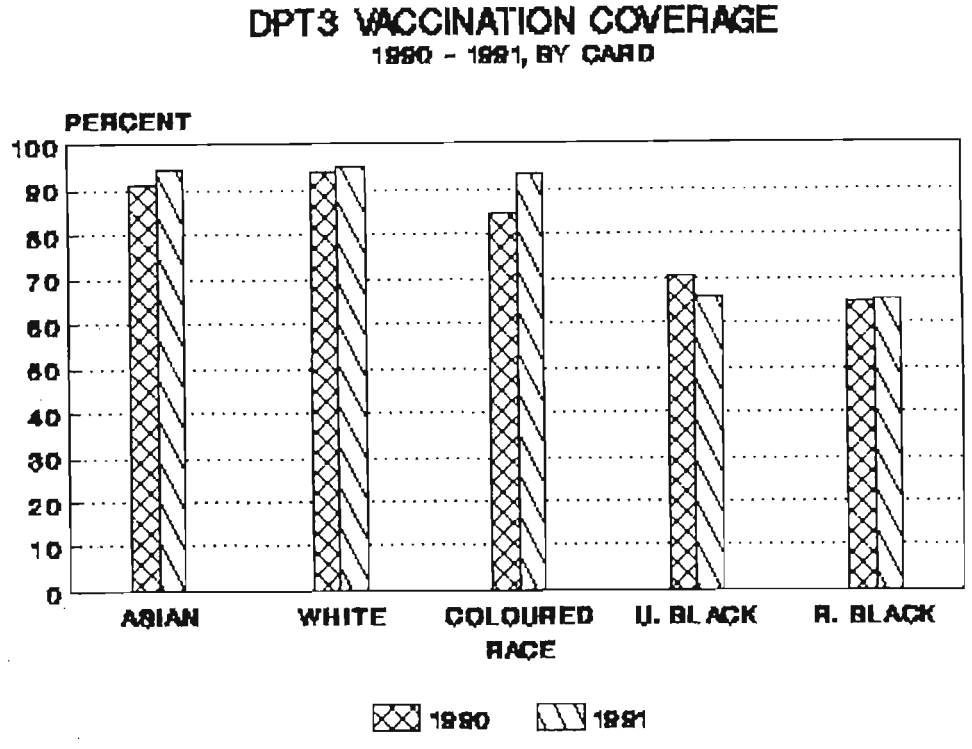
NATAL AND KWAZULU COMBINED.

FIGURE 6



NATAL AND KWAZULU COMBINED.

FIGURE 7



NATAL AND KWAZULU COMBINED.

2. Natal and KwaZulu combined, card and history - measles.

Table XV shows the change in measles immunisation coverage between 1990 and 1991 for all races, in Natal/KwaZulu combined. If the history of measles vaccination by the interviewee is to be believed, there was a significant increase in coverage rates for Asians (5.4%), Urban Blacks (7.8%) and Rural Blacks (7.0%). The increases for Whites and Coloureds were not statistically significant (3.0% and 0.8% respectively).

The sampling frame in the 1991 survey was children aged 9 to 21 months, as opposed to the 1990 survey which was 12 to 24 months. As the recommended age of vaccination was 9 months for black children, and in many Local Authority areas 12 months for white, coloured and asian children, this difference in age between the two samples may be a source of bias, tending to show lower coverage rates in the 1991 sample. Hence the results by card and history were also analysed excluding those children aged 9 to 12 months in the 1991 survey. These results are shown in Table XVI. As expected there is a higher rate of coverage in 1991 when children over 12 months only are included, and the increase in coverage rates for 1990 to 1991 is also greater for all races - Asians 5.9% (S), Whites 7.8% (S), Coloureds 2.1% (NS), Urban Blacks 8.1% (S), Rural Blacks 10.8% (S).

A second source of bias exists in those children aged 21 months who might have been immunised during the campaign, which might tend to raise coverage rates. Exclusion of those children aged 21 months would probably reduce these rates. Perhaps a comparison should be done between those children aged 12 to 20 months in each survey, but re-analysis of the original 1990 survey data is not possible.

3. Natal and KwaZulu separately, Urban and Rural Blacks.

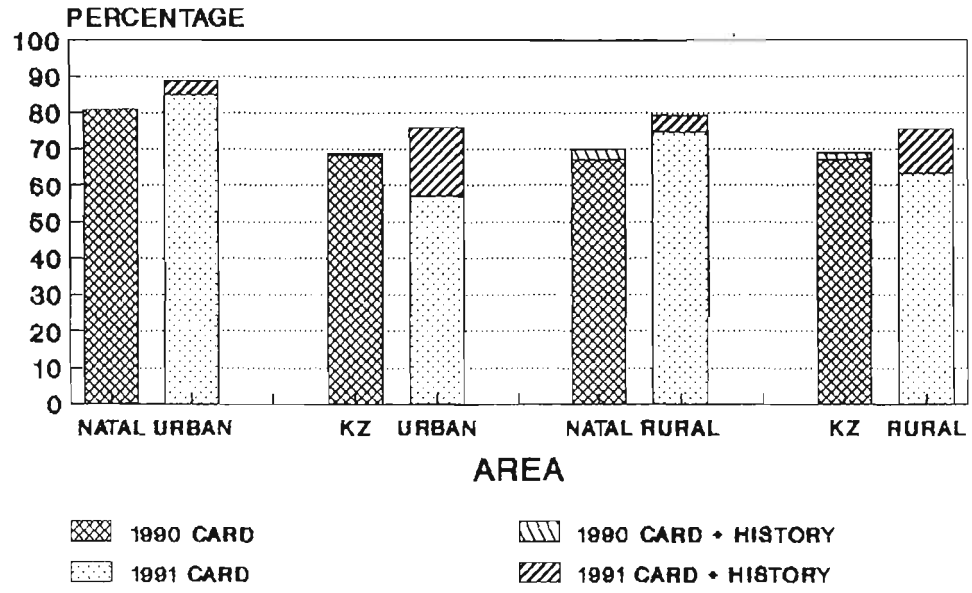
Figures 8 and 9 show the change in coverage for Natal and KwaZulu separately, for Urban and Rural Blacks, and by card

alone as compared with card and history for both measles and BCG. These results are shown in more detail in Tables XVII to XX. The results for the other vaccines are shown in Tables XXI to XXIV.

For measles immunisation the results show small increases in coverage for Natal by card, for both urban and rural blacks, which are larger when the history of measles vaccination is included (+7.8 and +9.3% respectively). These are not statistically significant. ($p>0.05$).

FIGURE 8

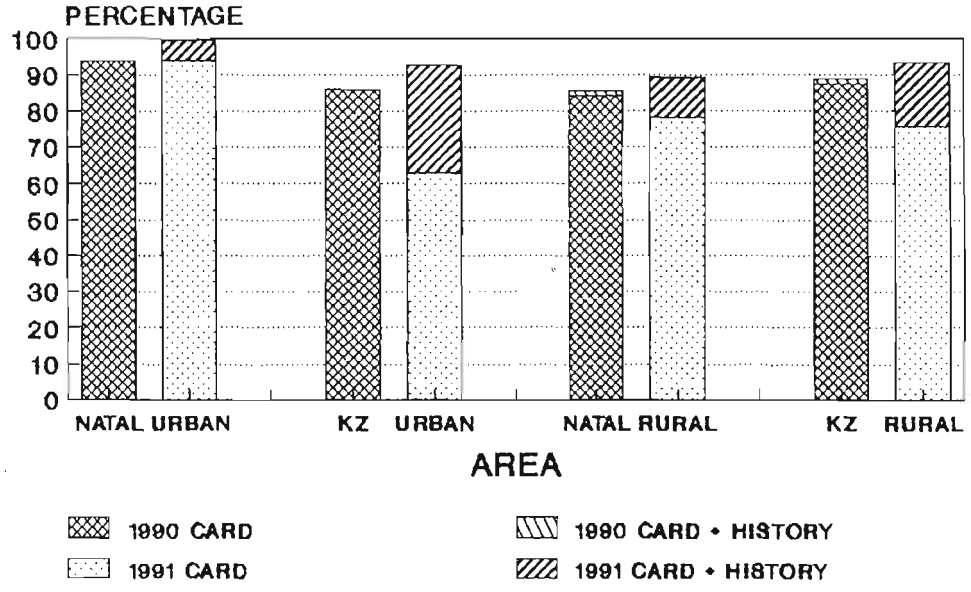
MEASLES VACCINATION COVERAGE
NATAL AND KWAZULU, RURAL AND URBAN
BLACKS, 1990 AND 1991.



KZ - KWA ZULU

FIGURE 9

BCG VACCINATION COVERAGE
NATAL AND KWAZULU, RURAL AND URBAN
BLACKS, 1990 AND 1991.



KZ - KWA ZULU

For KwaZulu, the results show **decreases** in coverage by card for both urban (-11.3%) and rural blacks (-3.9%), which are statistically significant for urban blacks (p=0.00009), but significant **increases** in coverage when a history of measles vaccination is included (urban +6.9% and rural +6.6%, p=0.028 and p=0.012 respectively).

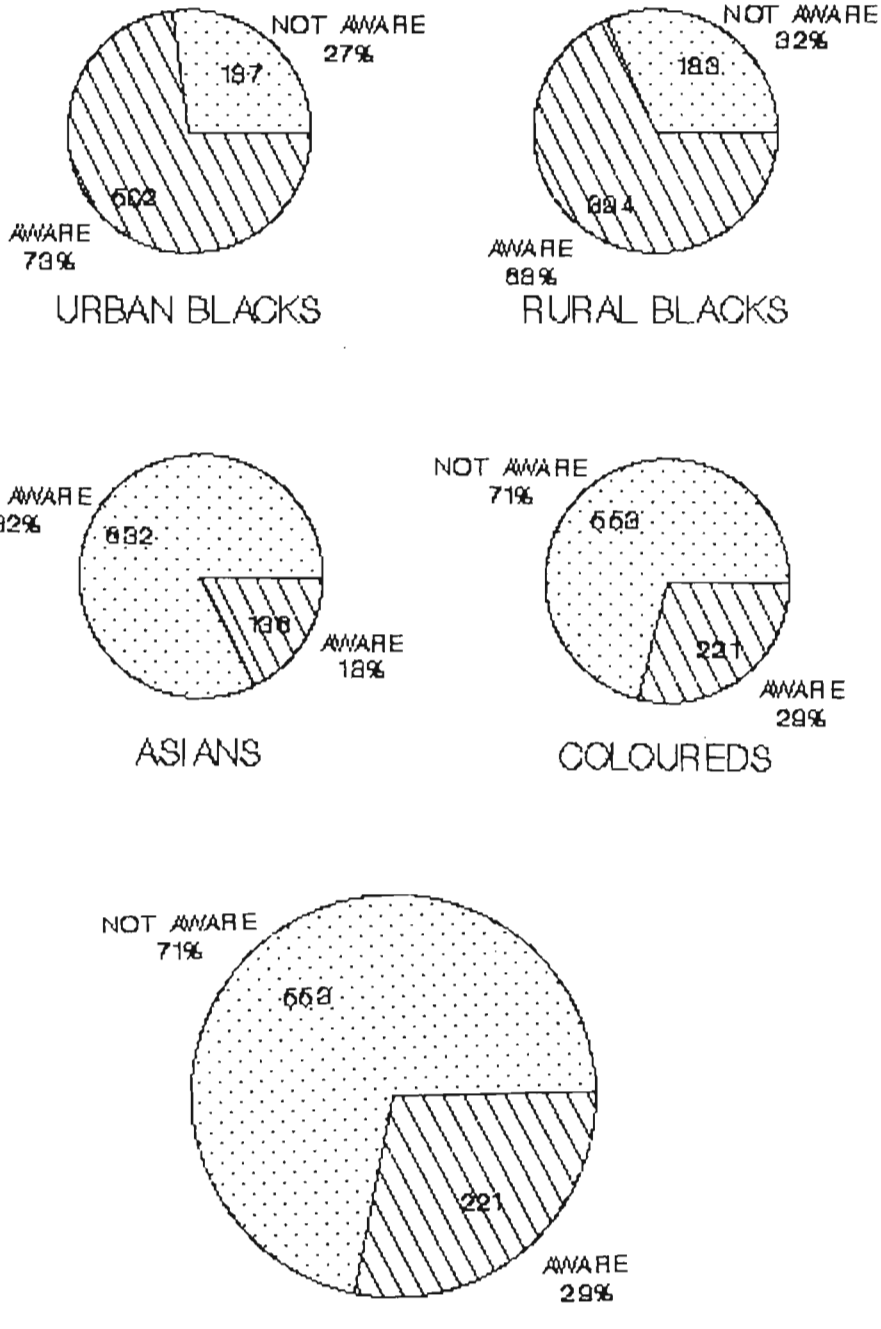
Similar trends are observed for BCG coverage, with significant decreases in coverage for KwaZulu urban and rural blacks (urban -23% and rural -11.9%, p<0.0000001 and p<0.000002 respectively) becoming increases when historical data - as evidenced in this case by a BCG scar - is included (urban +6.4% and rural +4.9%, p=0.0026 and p=0.003 respectively). As the history of BCG vaccination is confirmed by examination for a scar, it tends to suggest that a history of immunisation without the proof of an RTH card may be correct.

4. Awareness of Campaign - All Races.

Figure 10 and Table XXV show the awareness of the campaign of May/June 1990 of interviewees for each race.

FIGURE 10

AWARENESS OF MEASLES CAMPAIGN
NATAL AND KWAZULU



8. DISCUSSION.

8.1 DISCUSSION OF RESULTS

8.1.1 Sample Composition and Response Rate - Problems in the Field.

Tables I and II, along with Figures 1 and 2 show the numbers of children interviewed, and the proportion of the desired sample size attained. The response rate was very good for the Asian, White and Coloured communities, with 96.4% (769), 97.5% (778) and 102.8% (216) respectively.

For Rural Blacks 86.8% (693) of the sample was attained. Most of the shortfall in this group was due to problems in Region C (north-eastern Natal and KwaZulu) with manpower in respect of interviewers.

For Urban Blacks only 72.9% (582) was attained. This was due to the reasons mentioned in section 3.2 above (Limitations), with interviewing in Kwa Mashu (one of the largest black urban areas in KwaZulu) having to stop following the theft of a car from a Nursing Sister while on field work, and it being unsafe to enter certain areas of Mpumulanga and Bruntville. These areas were also omitted in 1990 - for the same reasons.

Violence was also encountered during field work in the Natal Midlands, when Nurses were fired upon with a shotgun by a farm owner when searching for Rural Black children on a Natal farm. Information on White children in some areas had to be arranged by telephone, due to the hazards posed to field workers by guard dogs around houses.

Violence and theft are serious problems in South Africa today, and pose very real threats to health workers performing field work for community-based research. Before

undertaking further similar types of research serious consideration must be given to whether the benefits to be derived from the results justify the risks to life and property faced by the field workers, as evidenced by the incidents outlined above.

It is felt that the response rates obtained were sufficent. The effect of omitting the children from some of the black townships on the results is uncertain.

8.1.2 Vaccination Coverage Rates by Road-To-Health Card.

8.1.2.1 Different Races, Natal/KwaZulu combined.

As can be seen from Tables 2.1 to 2.6 the vaccination coverage rates are generally very good for the White, Coloured and Asian populations. The results for all vaccinations except measles show the coverage rates tending to be slightly higher in the white group, followed by the Asians and then the Coloured communities. However these differences are not significant, and the coverage is between 93.1 and 97.9% for all race groups and all vaccines except measles.

The results for Measles show a slightly lower coverage for Coloureds and Whites, although the coverage for Coloureds increases to over 92% when data from histories is included. It is suggested that the coverage for the white population is relatively low because many of the white mothers may wait for the child to have the M.M.R. vaccine at 15 months. Information on this vaccine was not collected in this survey.

The vaccination coverage rates for the Black groups are all some 17 to 30% lower than those for the Asian,

White and Coloured groups. The rates for the Rural and Urban Black sections in Natal/KwaZulu combined are very similar for all vaccines. The results range from 64.4 to 77.5%.

However, if Tables VI and VII are examined, it can be seen that a large percentage of the Black population - both Urban and Rural - may have had vaccinations without them being recorded, as 23% of Urban Blacks and 16.9% of Rural Blacks had BCG scars as proof of vaccination, but no documentary evidence of the same. Similarly with measles vaccination, 14.8% of Urban Blacks and 11.0% of Rural Blacks gave a history of vaccination, but had no documentary proof. While it might be suggested that these histories are not reliable, and that these vaccines have not all been given, this is not necessarily the case.

During the Measles Immunisation Campaign of 1990 health workers were exhorted to give measles vaccine at any and every opportunity. Many of these vaccines were given when the mother did not have a Road-To-Health card available and hence were not recorded. It may therefore also be the case that the mothers were unaware that it was in fact measles vaccine that was being given. Hence the historical data may actually be an under-estimate of the vaccinations received by the children.

It could therefore be that the true vaccination coverage rates for the Black populations are as much as 10 - 20% higher than those reflected by the Road-To-Health cards. This would bring the overall levels for Natal/KwaZulu up to a more acceptable 75 - 90%. However, this is only speculation, and the results as

determined by analysis of the RTH cards show that the present documented levels of vaccination remain unsatisfactory.

8.1.2.2 Urban and Rural Blacks, Natal and KwaZulu

Division of the Urban and Rural Black population groups shows how misleading overall figures can be. (Table IX). While the coverage figures for Natal/KwaZulu combined, as reflected by Road-To-Health cards, show no significant differences in coverage between Urban and Rural groups, analysis of the results by different territory - Natal versus KwaZulu - gives a dramatically different picture.

The Rural results continue to show no significant differences between Natal and KwaZulu apart from Measles vaccination coverage, which is significantly higher ($p < 0.05$) in Natal than KwaZulu (74.8% versus 63.4%). However, the results for the Urban population show a dramatic and significant difference for all vaccines ($p < 0.05$), with the coverage in Natal being 20 - 30% higher for all vaccines. The same trend was observed in 1990 between Natal and KwaZulu, with similar coverage in the Rural areas, but much greater coverage in the Urban areas of Natal then KwaZulu. However, the differences then were of the order of 10 - 20%. This gap has apparently widened.

Within Natal the coverage is significantly greater in the Urban areas than the Rural - with differences of the order of 10 - 15% for all vaccines. Within KwaZulu the reverse is true, with the coverage being 5 - 13% higher in the Rural areas than the Urban. The same trend was observed last year for Natal, but in KwaZulu the coverages rates were very similar between the Urban and Rural areas.

8.1.3 **Vaccination Coverage Rates by Card and History.**

From further analysis of the results, however, and for the reasons discussed above, it appears that consideration must be given to the historical data regarding measles vaccination. Tables XVII and XVIII show the Pre- and Post-Campaign results for both coverage by Card and coverage by History for measles vaccination in Blacks. If one considers just the post-campaign results in each Table, increases in coverage produced for Natal when historical data is considered in addition to data from the RTH cards for both Urban (85.1 to 88.8%) and Rural (74.8 to 79.3%) Blacks, are not significant. However the increases produced in KwaZulu are very large in both Rural (63.4 to 75.6%) and Urban (57.0 to 76.0%) Blacks. These results suggest that there is a lack of documentation of vaccinations, especially in KwaZulu areas.

When the results for BCG are looked at, (Tables XIX and XX) it can again be seen that there is a marked increase in the coverage rates for Natal, both Rural (78.4 to 89.2%) and Urban (93.8% to 99.4%), and a dramatic increase in the coverage rates for KwaZulu in both Rural (75.6 to 93.6%) and Urban (62.9 to 92.6%) when the data from histories/scars is considered in addition to that from the RTH cards. BCG scars serve as objective evidence of vaccination corroborating the histories, and suggest that historical data for measles immunisation may also be correct, although it has been found elsewhere that parents significantly over-estimate the immunisation status of children.[13]

This would tend to confirm the above suggestion that the actual vaccination coverage, at least for BCG and probably also for measles, is much higher than that implied by analysis of RTH card data only - particularly in KwaZulu. It suggests that for many children RTH cards are possibly being lost, stolen, kept outside the home, or are not being

issued. It may also reflect a lack of recording of immunisations given during the campaign itself by health workers, which would manifest itself in an excess of unrecorded vaccinations in the older children who may have been immunised in the campaign.

8.1.4 Change in Vaccination Coverage since 1990.

8.1.4.1 Measles - All races

The changes in coverage for Measles vaccination since before the 1990 Campaign are shown on Tables XV to XVIII.

Table XV shows the results for the five major groups. An increase in coverage can be seen for all race groups, although for the white and coloured populations these increases are not statistically significant.

As mentioned above under Limitations (Section 6) the age range of the sample this year was slightly different from that of 1990. This may have had an effect on the results for the measles vaccination coverage, as this was previously not given till nine months of age. If many children in our sample were aged nine months, it may have made the coverage rates appear slightly lower than last year, as they may have been interviewed shortly before having the vaccination. In order to check this, further analysis was performed on the results for 1991 excluding those children aged below 12 months, in order to make the age range comparable to 1990. The results of this are shown on Table XVI. This causes an increase in the coverage rates for 1991 of approximately 4% for Blacks and Whites, and less than 1% for Coloureds and Asians.

Having performed the above analysis, it shows that the

increase in coverage rates for the White population is significant for the over 12 month age group - from 81.0% to 88.8%.

8.1.4.2 Measles - Blacks.

Tables XVII and XVIII show the changes in measles vaccination coverage that have occurred within the Black population group since the Campaign, broken down by Area and Territory.

Table XVII shows the results of the survey looking at the data from the RTH cards only. This shows small, but not significant, increases in Natal - both Rural and Urban areas. There is a small, but again not significant, fall in coverage in Rural KwaZulu, and a large (11.3%) fall in coverage in Urban KwaZulu. This is an apparently very disturbing result. However, when the results of the historical data are included, there is a dramatic shift in the picture in KwaZulu. From there having been an apparent fall in coverage, there is now an apparent significant increase in coverage in both Rural and Urban areas of 6.6% and 6.9% respectively.

8.1.4.3 BCG - Blacks.

Tables XIX and XX give the results for the Black population for BCG by card, and by card and history. This shows the same trend as the measles results discussed in 8.4.2 - significant apparent falls in coverage in KwaZulu become significant increases when the historical data is included. Small falls in coverage in Natal become small increases. As the historical data collection included confirmation by looking for a scar, it is likely that these results give an accurate reflection of the situation.

8.1.4.4 All vaccines.

Tables X to XIV and XXI to XXIV show the results for all the vaccines, and all race groups. Slight increases can be observed for all vaccines for the White community (Table XII). These are statistically significant for Polio and DPT 1.

For Asians, (Table X), there were small increases in all vaccines, significantly so for Polio 2, Polio 3 and DPT 3.

For the Coloured population (Table XI), significant increases in coverage were found for Polio and DPT 2 and 3.

When the Rural Black community as a whole was considered (Table XIII) the only significant change was a fall in BCG coverage. The Urban Black community as a whole showed small falls in coverage in all vaccines when the results of the RTH card analysis only were considered (Table XIV).

When Natal was considered separately the changes were small but not significant increases, except for a small fall in coverage in BCG in both Rural and Urban areas. (Tables XXI and XXII)

KwaZulu showed a fall in coverage for BCG in Rural areas, and large, significant falls in coverage for all vaccines in Urban areas. However, as discussed in sections 8.4.2 and 8.4.3 above, it appears likely that in fact it is only the *documented* coverage which has fallen, but the *actual* coverage - as evidenced by the historical data and BCG scars - has probably increased.

8.1.5 Awareness of the Measles Immunisation Campaign.

Table XXV and Figures 10 to 14 shows the number and percentage of respondants who were aware of the Measles Immunisation Campaign of May/June 1990. It can be seen that the vast majority of Asians, Coloureds and Whites (82.3%, 76.3% and 71.4% respectively) were *unaware* of the Measles campaign. However, the majority of both Urban and Rural Blacks (72.9% and 68.3% respectively) were aware of it. As the Campaign was targetted mainly at the Black population, it is not surprising that more of them were aware of it than the other races.

8.2 DISCUSSION OF IMPLICATIONS AND LITERATURE REVIEW

8.2.1 Value of Vaccination Campaigns.

These results bring into question the value of vaccination campaigns as a strategy in the fight to control infectious diseases through raising immunisation coverage rates. While the inclusion of historical data did show significant increases in coverage rates, and the number of notified measles cases in South Africa subsequent to the campaign did fall (from 18,123 in 1989[3] to 9,959 in 1990[14] and 3,847 in 1991[15]) the number of cases notified for 1992 has shown an increase. In the eight month period January to August 5,239 cases were notified,[16] which suggests that the total number for 1992 will at least approximate that of 1990, the campaign year. This implies that the campaign produced neither an increase in documented measles vaccination coverage rates, nor a sustainable reduction in the incidence of measles. A rapid drop in measles incidence occurred for the months immediately subsequent to the campaign proper, perhaps due to a short-term increase in the number of immune children, which may indicate the usefulness of campaigns as a form of crisis intervention.

However the effects of the campaign in terms of a measurable strengthening of routine immunisation services were disappointing.

The use of campaigns has been questioned since 1971[17] on account of their cost, their inefficiency,[18] and the elaborate operational structures they involve. Following the evaluation of an immunisation campaign in Senegal, Unger came to the conclusion that the management characteristics of intensive campaigns (centralisation, short time scales, lack of administrative integration and extension by activity) lead to low sustainability and interference with other activities of the services. As was found in Senegal, increases in coverage rates are usually short-lived, and may even stabilise at levels lower than before the campaign. He also makes the point that quite a high proportion of measles immunisations will be performed on children over 9 months of age during a campaign, and that therefore - compared to immunisations performed by well functioning fixed clinics on an on-going basis - no intensive campaign can ever result in an average earlier age at vaccination.[19]

Deficiencies in the quality of care have also been found during intensive campaigns. In Nigeria quality of care indicators were compared in a mass immunisation setting with routine services. Important differences were noticed, each of them to the detriment of the intensive campaign: checked immunisation records (70 vs 95%); assessed child's general health (5 vs 50%); informed mother of return date (35 vs 62%).[20] The finding in this post-campaign survey of a large percentage of children whose mothers claimed they were vaccinated against measles, yet could not produce a completed Road-To-Health card, suggests that a decrease in the quality of care could have occurred in the Natal/KwaZulu campaign, with immunisations not being recorded as zealously as normal.

Given these shortcomings of immunisation campaigns, what alternative strategies can be proposed as a means of decreasing measles morbidity and mortality? Cutts suggests that attention in developing countries should be focussed on underserved urban slums and settlements, because these areas account for 30-50% of urban populations, usually provide low access to health services, carry a large burden of disease mortality, and act as sources of infection for the city and surrounding rural areas.[21] This may well apply in South Africa, where the peri-urban informal settlements are characterised by overcrowded living conditions, and high migration rates between urban and rural areas. The high population density may mean earlier exposure of susceptible children to measles, with a consequent higher case-fatality rate.

8.2.2 Reducing missed opportunities

Factors affecting usage of immunisation services have been found to include employment of mothers outside the home and long waiting times at health centres.[22] Mothers who had been turned away from vaccination sessions or asked to return on another day were also less likely to complete the immunisation series. In Mozambique a KAP survey in Inhambane showed that children whose nearest health centre vaccinated only once per week had a relative risk of 8.5 for incomplete vaccination compared with children whose nearest health centre vaccinated on three or more days per week.[23] Numerous studies have shown the importance of identifying these and other causes of missed opportunities for immunisation at health facilities.[24]

For South Africa innovative ways must be found to increase the availability and accessibility of immunisation services, by designing the services around the needs of the mothers rather than those of the staff and employers. This would include the provision of services at weekends and outside of normal working hours, so that working women need

no longer to have the loss of a day's pay as the price of immunising their child. The introduction of "flexi-time" for health workers would facilitate the opening of health services on Saturdays, which may go a long way towards increasing their accessibility. Methods of providing services in less-densely populated areas other than the monthly "mobile clinic" should be explored, for example the giving of immunisations by unqualified (i.e. non-nursing) people - trained specifically in that task - at the local store. Perhaps now is the time for health Authorities and Professional Bodies to think laterally.

Urban programmes in other African countries are increasingly adopting a house-to-house approach to increasing community motivation and immunisation coverage, with systems of registration and follow-up tracing of defaulters, for example Addis Ababa[25] and Khartoum[26]. These home visits may also be used to identify and refer defaulters from other services, such as tuberculosis, family planning and sexually transmitted diseases.

8.2.3 Changes to Vaccination Schedule

Unfortunately the attainment of high immunisation coverage rates is not in itself the complete answer. In spite of coverage rates as high as 83% - one of the highest in sub-Saharan Africa - measles outbreaks continue to occur regularly in Harare, Zimbabwe.[27] The 1988 outbreak exhibited a bimodal age distribution, with peaks for children aged less than 2 years, and among 5-7 year olds, with a general upward shift in the age of the children affected. The upward shift in the age-specific incidence of measles with increasing vaccination coverage has been observed elsewhere[28] and the accumulation of nonimmunised children and vaccination failures may lead to a pool of susceptible older children large enough to result in an outbreak of measles.

53% of all cases of measles aged 9 months to 10 years in the Harare study were immunised. They estimated that the vaccine efficiency rate among 9-24 month-olds was 73%. There was no evidence of improper vaccine storage or cold-chain failure. The ideal age for immunisation with the standard Schwarz vaccine is 15 months.[29] Administration of this vaccine at the recommended age of nine months (as is currently the schedule for the Black areas of South Africa) in developing countries with high childhood measles morbidity and mortality is a compromise between the presence of interfering persistent maternal antibodies and the intensity of measles transmission in the community. The cost of this is lower vaccine efficacy. Perhaps the time has come to reconsider the immunisation schedule.

Loening and Coovadia reported that 20-45% of their urban and 6-12% of their rural patients with measles were less than 8 months of age.[30] The introduction of high potency Edmonston-Zagreb (EZ) vaccine administered to 4-6 month olds held the prospect of effective early measles immunisation. However a randomised vaccine trial in Senegal found that childhood mortality was significantly higher in a group which received high-titre EZ vaccine at 5 months than for those who received standard low-titre Schwarz vaccine at 10 months. Mortality was also significantly higher in a third group who received high-titre Schwarz vaccine at 5 months of age.[31]

Another option may be the use of low-titre Schwarz vaccine at 6 or 9 months, followed by another dose at 15-18 months to minimize the number of vaccination failures in order to prevent transmission in older children. A cost-benefit study of a second measles inoculation in Israel (with the second dose being given at age 6) found that there would be a benefit to cost ratio of 4.53/1[32]. Because of the relatively higher incidence rates in South Africa the benefit to cost ratio of a second vaccine dose may be even

greater here. Perhaps the time is overdue for the reintroduction of a two-dose schedule in this country.

8.2.4 Monitoring and Surveillance

This study raised serious questions about the use of EPI style vaccination coverage surveys for monitoring the effectiveness of immunisation campaigns, and other health interventions. The absence of adequate funding for the surveys compelled the use of clinic and hospital nurses normally involved in delivery of primary health care services, and thus interrupted and detracted from the routine immunisation services. The present situation of violence and unrest extending throughout many of the black residential areas meant the existence of serious and very real threats to the interviewers.

Using routine data on immunisation activities is difficult in the South African situation, where denominator populations are not available for the catchment areas of different health centres, and there is much cross-boundary flow. The use of the Lot Quality Assurance Sample method has been suggested as a method of identifying pockets of low coverage, with a zone which has more than 4 out of 14 randomly selected children unvaccinated being classified as having a low coverage.[33]

Additional methods of monitoring vaccination coverage rates, along with the surveillance of cases and outbreaks of measles, need to be investigated. The current disease notification system in South Africa, while giving an indication of trends, is insufficiently comprehensive to give a reliable picture of measles incidence.

9. CONCLUSION

In conclusion, it can be seen from the above results that the battle to control infectious diseases in Natal and KwaZulu through attainment of high immunisation coverage rates is far from won. While coverage is at a high level for the White, Asian and Coloured communities, the rates for the Black population, both Urban and Rural, remain unacceptably low. Indeed it appears that the documented coverage in the KwaZulu Urban areas is in fact worsening. The actual coverage, however, as suggested by histories and BCG scars has probably increased.

The reduction in documented evidence of vaccination in Urban KwaZulu areas may be a reflection of drift towards urban areas, unrest, - with cards being stolen or destroyed, - or else perhaps reflects the issuing of cards by KwaZulu health services. It may be a confirmation of the reduction of quality of care found in vaccination campaigns in other countries in Africa.

It has been widely found that immunisation campaigns do not produce enduring increases in vaccination coverage. Perhaps the time has come in South Africa for the implementation of different approaches to the problem, including increasing the accessibility of immunisation services, and changes to the vaccination schedule.

The unrest also presented a major threat to the safety of Nurses and other field workers in all areas, with several very serious incidents being reported. The threat posed by this prevailing climate of violence must be taken into consideration before further investigations of this nature are planned. Alternative measures of the effects of campaigns and other health interventions should be explored.

10. RECOMMENDATIONS

1. Health workers should be reminded of the need to issue documentary evidence of vaccination to mothers - preferably in the form of a Road-To-Health Card - when a vaccine is given.

2. Strengthening of primary health care services should take preference over further intermittent campaigns.

3. Attempts should be made to increase the accessibility of primary health care services through increasing the hours of operation, and the use of less qualified personnel for simple tasks such as vaccine administration.

4. A two-dose measles vaccination schedule should be reintroduced with the first dose at either 6 or 9 months, and the second dose at 15-18 months.

5. Investigations to evaluate health interventions should take cognisance of the current level of violence in South Africa, and use methods which do not expose health workers or interviewers to personal danger.

6. Attempts should be made to identify and reduce missed opportunities for immunisation occurring during contacts with health services.

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TABLE I

VACCINATION COVERAGE SURVEY - NATAL AND KWA ZULU 1991

RESPONSE RATE BY RACE - NUMBER AND PERCENT.

	RACE					TOTAL
	ASIAN	URBAN BLACK	RURAL BLACK	COLOURED	WHITE	
ıMPLE ɹMBER ɜTAINED	769	582	693	216	778	3038
ıMPLE ɹMBER ɛSIRED ɛLUSTERS)	798 (114x7)	798 (114x7)	798 (114x7)	210 (30x7)	798 (114x7)	3402
ɛSPONSE ıTE	96.4%	72.9%	86.8%	102.8%	97.5%	89.3%

TABLE II

VACCINATION COVERAGE SURVEY - NATAL AND KWA ZULU 1991

AMPLE COMPOSITION BY RACE AND TERRITORY - NUMBER AND PERCENT (%)

ERRITORY	RACE					TOTAL
	ASIAN	URBAN BLACK	RURAL BLACK	COLOURED	WHITE	
NATAL	769	161	111	216	778	2035
	(100)	(27.7)	(16.0)	(100)	(100)	(67)
KWA ZULU	0	421	582	0	0	1003
	(0.0)	(72.3)	(84.0)	(0.0)	(0.0)	(33)
TOTAL	769	582	693	216	778	3038
	(100)	(100)	(100)	(100)	(100)	(100)

TABLE III

VACCINATION COVERAGE SURVEY - NATAL AND KWA ZULU 1991

ASIANS - NUMBER AND PERCENT

VACCINE	VACCINATION STATUS			TOTAL
	CARD	SCAR / HISTORY	NOT VACCINATED	
BCG	739 (96.1)	30 (3.9)	0 (0)	769 (100)
POLIO - BIRTH	718 (93.4)	*	51 (6.6)	769 (100)
POLIO - 1	739 (96.1)	*	30 (3.9)	769 (100)
POLIO - 2	734 (95.4)	*	35 (4.6)	769 (100)
POLIO - 3	724 (94.1)	*	45 (5.9)	769 (100)
MEASLES	716 (93.1)	27 (3.5)	26 (3.4)	769 (100)
DWT - 1	739 (96.1)	*	30 (3.9)	769 (100)
DWT - 2	736 (95.7)	*	33 (4.3)	769 (100)
DWT - 3	726 (94.4)	*	43 (4.6)	769 (100)

TABLE IV

VACCINATION COVERAGE SURVEY - NATAL AND KWA ZULU 1991

COLOUREDS - NUMBER AND PERCENT

VACCINE	VACCINATION STATUS			TOTAL
	CARD	SCAR / HISTORY	NOT VACCINATED	
BCG	205 (94.9)	11 (5.1)	0 (0)	216 (100)
POLIO - BIRTH	202 (93.5)	*	14 (6.5)	216 (100)
POLIO - 1	204 (94.4)	*	12 (5.6)	216 (100)
POLIO - 2	204 (94.4)	*	12 (5.6)	216 (100)
POLIO - 3	201 (93.1)	*	15 (6.9)	216 (100)
MEASLES	194 (89.8)	5 (2.3)	17 (7.9)	216 (100)
DWT - 1	204 (94.4)	*	12 (5.6)	216 (100)
DWT - 2	204 (94.4)	*	12 (5.6)	216 (100)
DWT - 3	201 (93.1)	*	15 (6.9)	216 (100)

TABLE V

VACCINATION COVERAGE SURVEY - NATAL AND KWA ZULU 1991

WHITES - NUMBER AND PERCENT

VACCINE	VACCINATION STATUS			TOTAL
	CARD	SCAR / HISTORY	NOT VACCINATED	
BCG	752 (96.7)	12 (1.5)	14 (1.8)	778 (100)
POLIO - BIRTH	739 (95.0)	*	39 (5.0)	778 (100)
POLIO - 1	762 (97.9)	*	16 (2.1)	778 (100)
POLIO - 2	757 (97.3)	*	21 (2.7)	778 (100)
POLIO - 3	745 (95.8)	*	33 (4.2)	778 (100)
MEASLES	646 (83.0)	8 (1.0)	124(16.0)	778 (100)
DWT - 1	759 (97.6)	*	19 (2.4)	778 (100)
DWT - 2	753 (96.8)	*	25 (3.2)	778 (100)
DWT - 3	741 (95.2)	*	37 (4.8)	778 (100)

TABLE VI

VACCINATION COVERAGE SURVEY - NATAL AND KWA ZULU 1991

RURAL BLACKS - NUMBER AND PERCENT

VACCINE	VACCINATION STATUS			TOTAL
	CARD	SCAR / HISTORY	NOT VACCINATED	
BCG	527 (76.0)	117 (16.9)	49 (7.1)	693 (100)
POLIO - BIRTH	446 (64.4)	*	247 (35.6)	693 (100)
POLIO - 1	537 (77.5)	*	156 (22.5)	693 (100)
POLIO - 2	505 (72.9)	*	188 (27.1)	693 (100)
POLIO - 3	458 (66.1)	*	235 (33.9)	693 (100)
MEASLES	452 (65.2)	76 (11.0)	165 (23.8)	693 (100)
DWT - 1	531 (76.6)	*	162 (23.4)	693 (100)
DWT - 2	500 (72.2)	*	193 (27.8)	693 (100)
DWT - 3	452 (65.2)	*	241 (34.8)	693 (100)

TABLE VII

VACCINATION COVERAGE SURVEY - NATAL AND KWA ZULU 1991

URBAN BLACKS - NUMBER AND PERCENT

VACCINE	VACCINATION STATUS			TOTAL
	CARD	SCAR / HISTORY	NOT VACCINATED	
BCG	416 (71.5)	134 (23.0)	32 (5.5)	582 (100)
POLIO - BIRTH	388 (66.7)	*	194 (33.3)	582 (100)
POLIO - 1	424 (72.9)	*	158 (27.1)	582 (100)
POLIO - 2	408 (70.1)	*	174 (29.9)	582 (100)
POLIO - 3	384 (66.0)	*	198 (34.0)	582 (100)
MEASLES	377 (64.8)	86 (14.8)	119 (20.4)	582 (100)
DWT - 1	420 (72.2)	*	162 (27.8)	582 (100)
DWT - 2	410 (70.4)	*	172 (29.6)	582 (100)
DWT - 3	382 (65.6)	*	200 (34.4)	582 (100)

TABLE VIII

VACCINATION COVERAGE SURVEY - NATAL AND KWA ZULU 1991

PERCENTAGE COVERAGE BY ROAD-TO-HEALTH CARD - ALL RACES

VACCINE	RACE				
	ASIANS (n=769)	URBAN BLACK (n=582)	RURAL BLACK (n=693)	COLOURED (n=216)	WHITE (n=778)
BCG	96.1	71.5	76.0	94.9	96.7
POLIO - BIRTH	93.4	66.7	64.4	93.5	95.0
POLIO - 1	96.1	72.9	77.5	94.4	97.9
POLIO - 2	95.4	70.1	72.9	94.4	97.3
POLIO - 3	94.1	66.0	66.1	93.1	95.8
MEASLES	93.1	64.8	65.2	89.8	83.0
DWT - 1	96.1	72.2	76.6	94.4	97.6
DWT - 2	95.7	70.4	72.2	94.4	96.8
DWT - 3	94.4	65.6	65.2	93.1	95.2

TABLE IX

VACCINATION COVERAGE SURVEY 1991

PERCENTAGE COVERAGE BY ROAD-TO-HEALTH CARD - NATAL AND KWA ZULU, URBAN AND RURAL BLACK - NUMBER AND PERCENT

VACCINE	VACCINATION STATUS BY CARD - BLACKS			
	NATAL RURAL n=111	KWA ZULU RURAL n=582	NATAL URBAN n=161	KWA ZULU URBANn=421
BCG	87 (78.4)	440 (75.6)	151 (93.8)	265 (62.9)
POLIO - BIRTH	60 (54.1)	386 (66.3)	143 (88.8)	245 (58.2)
POLIO - 1	89 (80.2)	448 (77.0)	146 (90.7)	278 (66.0)
POLIO - 2	82 (73.9)	423 (72.7)	139 (86.3)	269 (63.9)
POLIO - 3	79 (71.2)	379 (65.1)	131 (81.4)	253 (60.1)
MEASLES	83 (74.8)	369 (63.4)	137 (85.1)	240 (57.0)
DWT - 1	88 (79.3)	443 (76.1)	145 (90.1)	275 (65.3)
DWT - 2	81 (73.0)	419 (72.0)	143 (88.8)	267 (63.4)
DWT - 3	78 (70.3)	374 (64.3)	134 (83.2)	248 (58.9)

TABLE X

VACCINATION COVERAGE SURVEY - NATAL AND KWA ZULU

POST-CAMPAIGN VERSUS PRE-CAMPAIGN RESULTS FOR

THE ASIAN COMMUNITY.

ACCINE	PERCENT VACCINATION COVERAGE BY CARD			STATISTICAL SIGNIFICANCE # (p)
	PRE-CAMPAIGN 1990 (n=717)	POST-CAMPAIGN 1991 (n=769)	CHANGE IN COVERAGE %	
CG	95.3	96.1	+ 0.8	N.S. (p=0.42)
OLIO - BIRTH	not assessed	93.4		
OLIO - 1	93.8	96.1	+ 2.3	N.S. (p=0.062)
OLIO - 2	92.7	95.4	+ 2.7	S. (p=0.026)
OLIO - 3	90.2	94.1	+ 3.9	S. (p=0.0048)
EASLES	90.9	93.1	+ 2.2	N.S. (p=0.12)
WT - 1	93.9	96.1	+ 2.2	N.S. (p=0.06)
WT - 2	93.7	95.7	+ 2.0	N.S. (p=0.86)
WT - 3	91.2	94.4	+ 3.2	S. (p=0.016)

- Chi squared test.

= Significant

= Not Significant

TABLE XI

VACCINATION COVERAGE SURVEY - NATAL AND KWA ZULU

POST-CAMPAIGN VERSUS PRE-CAMPAIGN RESULTS FOR

THE COLOURED COMMUNITY.

ACCINE	PERCENT VACCINATION COVERAGE BY CARD			STATISTICAL SIGNIFICANCE # (p)
	PRE-CAMPAIGN 1990 (n=160)	POST-CAMPAIGN 1991 (n=216)	CHANGE IN COVERAGE %	
CG	95.0	94.9	- 0.1	N.S. (p=0.05)
OLIO - BIRTH	not assessed	93.5		
OLIO - 1	92.5	94.4	+ 1.9	N.S. (p=0.44)
OLIO - 2	86.9	94.4	+ 7.5	S. (p=0.01)
OLIO - 3	84.9	93.1	+ 8.2	S. (p=0.01)
EASLES	88.8	89.8	+ 1.0	N.S. (p=0.74)
WT - 1	90.0	94.4	+ 4.4	N.S. (p=0.10)
WT - 2	86.2	94.4	+ 8.2	S. (p=0.006)
WT - 3	85.0	93.1	+ 8.0	S. (p=0.028)

- Chi Squared test.

TABLE XII

VACCINATION COVERAGE SURVEY - NATAL AND KWA ZULU

POST-CAMPAIGN VERSUS PRE-CAMPAIGN RESULTS FOR

THE WHITE COMMUNITY.

ACCINE	PERCENT VACCINATION COVERAGE BY CARD			STATISTICAL SIGNIFICANCE # (p)	
	PRE-CAMPAIGN 1990 (n=744)	POST-CAMPAIGN 1991 (n=778)	CHANGE IN COVERAGE %		
CG	96.8	96.7	- 0.1	N.S.	(p=0.89)
OLIO - BIRTH	not assessed	95.0			
OLIO - 1	96.1	97.9	+ 1.8	N.S.	(p=0.045)
OLIO - 2	95.6	97.3	+ 1.7	N.S.	(p=0.067)
OLIO - 3	94.7	95.8	+ 1.1	N.S.	(p=0.35)
EASLES	80.3	83.0	+ 2.7	N.S.	(p=0.16)
PT - 1	95.6	97.6	+ 2.0	N.S.	(p=0.045)
PT - 2	95.3	96.8	+ 1.5	N.S.	(p=0.13)
PT - 3	93.9	95.2	+ 1.3	N.S.	(p=0.26)

- Chi Squared test

TABLE XIII

VACCINATION COVERAGE SURVEY - NATAL AND KWA ZULU

POST-CAMPAIGN VERSUS PRE-CAMPAIGN RESULTS FOR

THE RURAL BLACK COMMUNITY.

ACCINE	PERCENT VACCINATION COVERAGE BY CARD			STATISTICAL SIGNIFICANCE # (p)
	PRE-CAMPAIGN 1990 (n=725)	POST-CAMPAIGN 1991 (n=693)	CHANGE IN COVERAGE %	
CG	81.8	76.0	- 5.8	S. (p=0.008)
OLIO - BIRTH	not assessed	64.4		
OLIO - 1	75.5	77.5	+ 2.0	N.S. (p=0.36)
OLIO - 2	71.1	72.9	+ 1.8	N.S. (p=0.46)
OLIO - 3	66.7	66.1	- 0.6	N.S. (p=0.78)
EASLES	67.3	65.2	- 2.1	N.S. (p=0.41)
NT - 1	73.8	76.6	+ 2.8	N.S. (p=0.21)
NT - 2	69.9	72.2	+ 2.3	N.S. (p=0.35)
NT - 3	65.0	65.2	+ 0.2	N.S. (p=0.91)

- Chi Squared test

TABLE XIV

VACCINATION COVERAGE SURVEY - NATAL AND KWA ZULU

POST-CAMPAIGN VERSUS PRE-CAMPAIGN RESULTS FOR

THE URBAN BLACK COMMUNITY.

ACCINE	PERCENT VACCINATION COVERAGE BY CARD			STATISTICAL SIGNIFICANCE # (p)
	PRE-CAMPAIGN 1990 (n=498)	POST-CAMPAIGN 1991 (n=582)	CHANGE IN COVERAGE %	
CG	87.3	71.5	- 15.8	S. (p<0.000001)
OLIO - BIRTH	not assessed	66.7		
OLIO - 1	80.2	72.9	- 7.3	S. (p=0.02)
OLIO - 2	74.5	70.1	- 4.4	N.S. (p=0.10)
OLIO - 3	71.3	66.0	- 5.3	N.S. (p=0.061)
EASLES	71.2	64.8	- 6.4	S. (p=0.022)
WT - 1	76.7	72.2	- 4.5	N.S. (p=0.088)
WT - 2	72.9	70.4	- 2.5	N.S. (p=0.37)
WT - 3	70.5	65.6	- 4.9	N.S. (p=0.089)

- Chi Squared test

TABLE XV

VACCINATION COVERAGE SURVEY - NATAL AND KWA ZULU

POST-CAMPAIGN VERSUS PRE-CAMPAIGN RESULTS FOR

MEASLES VACCINATION BY CARD AND HISTORY

RACE	PERCENT COVERAGE BY CARD AND HISTORY		CHANGE IN	STATISTICAL SIGNIFICANCE #
	PRE-CAMPAIGN 1990	POST-CAMPAIGN 1991	COVERAGE %	(p)
SIANS	91.2	96.6	+ 5.4	S. (p=0.01)
HITES	81.0	84.0	+ 3.0	N.S. (p=0.12)
OLOUREDS	91.3	92.1	+ 0.8	N.S. (p=0.75)
RBAN LACKS	71.8	79.6	+ 7.8	S. (p=0.003)
URAL LACKS	69.2	76.2	+ 7.0	S. (p=0.0034)

- Chi Squared test

TABLE XVI

VACCINATION COVERAGE SURVEY - NATAL AND KWA ZULU

PRE-CAMPAIGN VERSUS POST-CAMPAIGN MEASLES RESULTS

CHILDREN OVER 12 MONTHS ONLY.

ACE	PERCENT COVERAGE BY CARD AND HISTORY		CHANGE IN	STATISTICAL SIGNIFICANCE #
	PRE-CAMPAIGN 1990	POST-CAMPAIGN 1991 CHILDREN > 12 MTHS	COVERAGE %	(p)
IANS	91.2	97.1 (n=651)	+ 5.9	S. (p=0.00005)
ITES	81.0	88.8 (n=644)	+ 7.8	S. (p=0.00006)
LOUREDS	91.3	92.4 (n=172)	+ 2.1	N.S. (p=0.69)
RBAN LACKS	71.8	83.9 (n=465)	+ 8.1	S. (p=0.000008)
URAL LACKS	69.2	80.0 (n=591)	+10.8	S. (p=0.000008)

- Chi Squared test

TABLE XVII

VACCINATION COVERAGE SURVEY - NATAL AND KWA ZULU

POST-CAMPAIGN VERSUS PRE-CAMPAIGN RESULTS FOR

MEASLES VACCINATION BY CARD - URBAN AND RURAL BLACKS

AREA AND TERRITORY	PERCENT COVERAGE BY CARD		CHANGE IN COVERAGE %	STATISTICAL SIGNIFICANCE # (p)
	PRE-CAMPAIGN 1990	POST-CAMPAIGN 1991		
NATAL, URBAN	81.0 (n=116)	85.1 (n=161)	+ 4.1	N.S. (p=0.37)
KWAZULU, URBAN	68.3 (n=382)	57.0 (n=421)	-11.3	S. (p=0.0009)
NATAL, RURAL	67.3 (n=147)	74.8 (n=111)	+ 7.5	N.S. (p=0.19)
KWAZULU RURAL	67.3 (n=578)	63.4 (n=582)	- 3.9	N.S. (p=0.16)

- chi squared test

TABLE XVIII

VACCINATION COVERAGE SURVEY - NATAL AND KWA ZULU

POST-CAMPAIGN VERSUS PRE-CAMPAIGN RESULTS FOR

MEASLES VACCINATION BY CARD AND HISTORY - URBAN AND RURAL BLACKS

AREA AND TERRITORY	PERCENT COVERAGE BY CARD AND HISTORY		CHANGE IN COVERAGE	STATISTICAL SIGNIFICANCE # (p)
	PRE-CAMPAIGN 1990	POST-CAMPAIGN 1991		
NATAL, URBAN	81.0 (n=116)	88.8 (n=161)	+ 7.8	N.S. (p=0.068)
KWAZULU, URBAN	69.1 (n=382)	76.0 (n=421)	+ 6.9	S. (p=0.028)
NATAL, RURAL	70.0 (n=147)	79.3 (n=111)	+ 9.3	N.S. (p=0.094)
KWAZULU RURAL	69.0 (n=578)	75.6 (n=582)	+ 6.6	S. (p=0.012)

TABLE XIX

VACCINATION COVERAGE SURVEY - NATAL AND KWA ZULU

POST-CAMPAIGN VERSUS PRE-CAMPAIGN RESULTS FOR

BCG VACCINATION BY CARD - URBAN AND RURAL BLACKS

AREA AND TERRITORY	PERCENT COVERAGE BY CARD		CHANGE IN COVERAGE %	STATISTICAL SIGNIFICANCE # (p)
	PRE-CAMPAIGN 1990	POST-CAMPAIGN 1991		
NATAL, URBAN	94.0 (n=116)	93.8 (n=161)	- 0.2	N.S. (p=0.95)
KWAZULU, URBAN	85.9 (n=382)	62.9 (n=421)	-23.0	S. (p<0.000001)
NATAL, RURAL	84.4 (n=147)	78.4 (n=111)	- 6.0	N.S. (p=0.21)
KWAZULU RURAL	87.5 (n=578)	75.6 (n=582)	-11.9	S. (p<0.000002)

- chi squared test

TABLE XX

VACCINATION COVERAGE SURVEY - NATAL AND KWA ZULU

POST-CAMPAIGN VERSUS PRE-CAMPAIGN RESULTS FOR

BCG VACCINATION BY CARD AND HISTORY - URBAN AND RURAL BLACKS

AREA AND TERRITORY	PERCENT COVERAGE BY CARD AND HISTORY		CHANGE IN COVERAGE %	STATISTICAL SIGNIFICANCE # (p)
	PRE-CAMPAIGN 1990	POST-CAMPAIGN 1991		
NATAL, URBAN	94.0 (n=116)	99.4 (n=161)	+ 5.4	S. (p=0.007)
KWAZULU, URBAN	86.2 (n=382)	92.6 (n=421)	+ 6.4	S. (p=0.0026)
NATAL, RURAL	85.8 (n=147)	89.2 (n=111)	+ 3.4	N.S. (p=0.40)
KWAZULU RURAL	88.7 (n=578)	93.6 (n=582)	+ 4.9	S. (p=0.003)

TABLE XXI

VACCINATION COVERAGE SURVEY - NATAL

POST-CAMPAIGN VERSUS PRE-CAMPAIGN RESULTS FOR

THE RURAL BLACK COMMUNITY.

ACCINE	PERCENT VACCINATION COVERAGE BY CARD			STATISTICAL SIGNIFICANCE # (p)
	PRE-CAMPAIGN 1990 (n=147)	POST-CAMPAIGN 1991 (n=111)	CHANGE IN COVERAGE %	
CG	84.4	78.4	- 6.0	N.S. (p=0.21)
OLIO - BIRTH	not assessed	54.1		
OLIO - 1	74.8	80.2	+ 5.4	N.S. (p=0.31)
OLIO - 2	71.4	73.9	+ 2.5	N.S. (p=0.66)
OLIO - 3	65.3	71.2	+ 5.9	N.S. (p=0.08)
EASLES	67.3	74.8	+ 7.5	N.S. (p=0.19)
WT - 1	75.5	79.3	+ 3.8	N.S. (p=0.47)
WT - 2	72.7	73.0	+ 0.3	N.S. (p=0.97)
WT - 3	65.3	70.3	+ 5.0	N.S. (p=0.39)

- chi squared test

TABLE XXII

VACCINATION COVERAGE SURVEY - NATAL

POST-CAMPAIGN VERSUS PRE-CAMPAIGN RESULTS FOR

THE URBAN BLACK COMMUNITY.

ACCINE	PERCENT VACCINATION COVERAGE BY CARD			STATISTICAL SIGNIFICANCE # (p)
	PRE-CAMPAIGN 1990 (n=116)	POST-CAMPAIGN 1991 (n=161)	CHANGE IN COVERAGE %	
CG	94.0	93.8	- 0.2	N.S. (p=0.95)
OLIO - BIRTH	not assessed	88.8		
OLIO - 1	89.6	90.7	+ 1.1	N.S. (p=0.77)
OLIO - 2	86.2	86.3	+ 0.1	N.S. (p=0.97)
OLIO - 3	84.4	81.4	- 3.0	N.S. (p=0.49)
EASLES	81.0	85.1	+ 4.1	N.S. (p=0.37)
WT - 1	88.0	90.1	+ 2.1	N.S. (p=0.57)
WT - 2	84.5	88.8	+ 4.3	N.S. (p=0.28)
WT - 3	83.6	83.2	- 0.4	N.S. (p=0.93)

- chi squared test

TABLE XXIII

VACCINATION COVERAGE SURVEY - KWA ZULU

POST-CAMPAIGN VERSUS PRE-CAMPAIGN RESULTS FOR

THE RURAL BLACK COMMUNITY.

ACCINE	PERCENT VACCINATION COVERAGE BY CARD			STATISTICAL SIGNIFICANCE # (p)
	PRE-CAMPAIGN 1990 (n=578)	POST-CAMPAIGN 1991 (n=582)	CHANGE IN COVERAGE %	
CG	87.5	75.6	-11.9	S. (p<0.0000002)
OLIO - BIRTH	not assessed	66.3		
OLIO - 1	75.8	77.0	+ 2.0	N.S. (p=0.63)
OLIO - 2	71.0	72.7	+ 1.7	N.S. (p=0.50)
OLIO - 3	67.1	65.1	- 2.0	N.S. (p=0.47)
EASLES	67.3	63.4	- 3.9	N.S. (p=0.16)
WT - 1	73.4	76.1	+ 2.7	N.S. (p=0.27)
WT - 2	69.2	72.0	+ 2.8	N.S. (p=0.29)
WT - 3	64.9	64.3	- 0.6	N.S. (p=0.82)

- chi squared test

TABLE XXIV

VACCINATION COVERAGE SURVEY - KWA ZULU

POST-CAMPAIGN VERSUS PRE-CAMPAIGN RESULTS FOR

THE URBAN BLACK COMMUNITY.

CCINE	PERCENT VACCINATION COVERAGE BY CARD			STATISTICAL SIGNIFICANCE # (p)
	PRE-CAMPAIGN 1990 (n=382)	POST-CAMPAIGN 1991 (n=421)	CHANGE IN COVERAGE %	
G	85.9	62.9	-23.0	S. (p<0.0000001)
LIO - BIRTH	not assessed	58.2		
LIO - 1	77.2	66.0	-11.2	S. (p=0.00045)
LIO - 2	70.9	63.9	- 7.0	S. (p=0.033)
LIO - 3	67.3	60.1	- 7.2	S. (p=0.034)
ASLES	68.3	57.0	-11.3	S. (p=0.00094)
T - 1	73.3	65.3	- 8.0	S. (p=0.014)
T - 2	69.4	63.4	- 6.0	N.S. (p=0.074)
T - 3	66.5	58.9	- 7.6	S. (p=0.026)

- chi squared test

TABLE XXV

VACCINATION COVERAGE SURVEY - NATAL AND KWA ZULU

AWARENESS OF MEASLES CAMPAIGN

NUMBER AND PERCENT (%)

ACE	AWARE OF CAMPAIGN		TOTAL
	NO	YES	
IANS	632 (82.3)	136 (17.7)	768 (100)
ITES	553 (71.4)	221 (28.6)	774 (100)
LOUREDS	164 (76.3)	51 (23.7)	215 (100)
BAN ACKS	187 (27.1)	502 (72.9)	689 (100)
RAL ACKS	183 (31.7)	394 (68.3)	577 (100)

Annexure A

VACCINATION CAMPAIGN

IN

NATAL AND KWAZULU:

PROTOCOL FOR THE EVALUATION, 1991.

VACCINATION CAMPAIGN
IN
NATAL AND KWAZULU

EVALUATION

1. INTRODUCTION

The "measles immunization campaign" implemented throughout the RSA in 1990, following recommendation by the Health Matters Advisory Committee (HMAC), is to be evaluated in 1991. As was the case in 1990, the Department of National Health and Population Development (DNHPD) will assume responsibility for overall co-ordination of this evaluation campaign and will provide necessary financial support. At the regional level the campaign will be co-ordinated by the Department of National Health & Population Development through its Regional offices.

In order to assess the effectiveness of the 1990 campaign it has been agreed that vaccination status will now be evaluated. For each province the respective Department of Community Health will be responsible for the evaluation in that area.

In the case of Natal and KwaZulu the evaluation procedure will be conducted through the facilities of the St John Community Health Resource Centre.

It is expected that all Health Authorities will be active participants in the evaluation process.

It may be stated that the purpose of the evaluation process is to evaluate vaccination levels in Natal and KwaZulu after the implementation of the National immunization campaign in 1990 in these territories.

The following is a summarized account of the proposed evaluation process.

2. OBJECTIVES

The objectives are as follows the:

i) identification of National and Regional requirement in respect of evaluation

ii) development of a sampling strategy which will meet the levels of requirement for evaluation

iii) formulation of a practical procedure for conducting the evaluation

iv) analysis of the collected data and the preparation of a report which meets both national and regional needs.

3. DEFINITIONS

It is necessary, to avoid variation in interpretation which may affect the validity of the evaluation, to describe the following terms:

i) National Requirements: The requirements for the evaluation of vaccination coverage as specified by the Department of National Health and Population

Development (DNHPD) in association with Departments of Community Health.

ii) Local Requirements: The requirements for the evaluation of vaccination agreed to by the Natal/KwaZulu Health Services Liaison Committee.

iii) Vaccination: The process of administering immunizing agents against pathogenic micro-organisms. In the present context this will be limited to tuberculosis, poliomyelitis, diphtheria, pertussis, tetanus, and measles.

iv) Evaluation: The assessment of vaccination rates according to geographical area, population group and community type.

vi) Health Region: The 8 regions defined by the Natal/KwaZulu Health Services Liaison Committee which consist of contiguous and intact magisterial districts, irrespective of the identity of the administering authority.

4. NATIONAL AND REGIONAL REQUIREMENTS

i) National: The Division of Epidemiology of DNHPD has indicated that, for Natal, information in respect of Urban Whites, Urban Asian, Urban Black and Rural Black populations is required. The number of Coloureds and Rural Whites and Rural Asians living in Natal is so small that sampling for National purposes is unwarranted. The level of precision required at the National level is ± 5%, not ± 10% as is normally recommended by WHO. Statistics are required therefore

at the specified level of precision in respect of 4 distinct community types: Urban Asian, Urban Black, Urban Coloureds and Urban Whites and Rural Blacks.

ii) Regional: The fragmentation of the area previously known as Natal to form KwaZulu is such that the exclusion of KwaZulu would considerably reduce the value of any assessment. It is important therefore that KwaZulu has agreed to participate in this survey. For reasons of clarity the combined areas of Natal/KwaZulu are referred to below as the 'territory'.

For evaluation to be useful at the territorial level in Natal/ KwaZulu it is important that comparison is made between the various race groups and between geographical areas. In respect of intra-regional (geographical) comparison, Natal/KwaZulu is fortunate that a relevant structure exists - the 8 Health Regions created by the Natal/KwaZulu Health Services Liaison Committee.

In the case of the Asian, Coloured and White population groups more than 95% live in Urban areas while for Blacks a substantial proportion live in rural areas. It is therefore considered appropriate that all 4 urban populations and the Rural Black population should be sampled. It is also necessary for subsequent intervention that statistics should be provided separately for the Natal/KwaZulu territories.

The level of precision required within the Natal/KwaZulu region is ± 10%. Sampling should therefore be effected to obtain the required level of precision in respect of each: territory (Natal and

KwaZulu), Health Regions (8), Race (Asian, Black, Coloured and White) and, in the case of Blacks, Community Type (urban and rural).

5. SAMPLING STRATEGY

i) Sample Size: The sample size proposed for the present survey meets both National and Regional requirements. It includes 114 clusters (N=798) of children each from Urban Whites, Urban Asians, Urban Blacks and Rural Blacks. In addition, the sample includes 30 clusters (N=210) of Urban Coloured children.

All subjects will contribute to the measurement of vaccination coverage ie. all subjects will have their road-to-health cards checked. In instances where a road-to-health card is not available a vaccination history will be taken from the closest available relative or guardian.

ii) Sampling Frame: The sample has to be representative of children aged between 12 and 23 months (i.e. have had their first birthday but not their second birthday) who live in Natal or KwaZulu. This vast area is divided into 8 Health Regions (HR) which are divided into magisterial districts which are, in turn, further divided up into enumerator sub-districts (ESD).

The number of people of each race group living in each HR, magisterial district and ESD will be obtained from the 1985 census data. The number of people of each race group living in each ESD is designated n_{ijk} where i represents the population group, j the ESD and k the

magisterial district. The sum of all n_{ijk} for each value of i and k provides the population size of each race group in each magisterial district (Table 1-3, column 3). Summing n_{ijk} where i equals Blacks and over values of j which are designated firstly, Urban ESD and secondly, rural ESD provides the total number of urban and rural Blacks, respectively for each magisterial district (Table, Column 4 & 5).

iii) Sampling Procedure:

a) Allocation of Clusters: A multistage sampling technique will be used. In order to select the rural Black and the urban Black, Coloured, Asian and White subjects in each HR the following hierarchy of sampling units will be used:

- primary : magisterial districts
- secondary: Enumerator Sub-Districts (ESD)
- tertiary : Local Enumerator Areas (LEA)

Sequential sampling will be used to select the primary sampling units. This technique is self-weighting as more clusters are selected from the more populous magisterial districts. Using COSASP, the number of clusters from each magisterial district is obtained for Asians (Table 1, column 4) Whites (Table 2, column 4), Coloureds (Table 3, column 4) and urban and rural Blacks (Table 4, columns 6 & 7).

Secondary sampling units, the ESD's, are also selected using sequential sampling. Maps (1:50 000) will be obtained for each ESD

selected.

Identification of the tertiary sampling units (LEA) will only be necessary if more than one cluster is selected in a particular ESD. When two or more clusters are to be selected in one ESD, that ESD will be divided into conveniently sized LEAs on a 1:50 000 map (eg. suburbs, sections of suburbs or farms, etc.). LEAs will then be numbered and, using simple random selection, each cluster will be allocated to a selected LEA.

b) Selection of the Seven Children for each cluster: In each selected ESD and LEA (where relevant) 7 random points will be selected on a 1:50 000 map. These 7 points will identify the 1:10 000 orthophotographs (for rural areas) and town planning maps (for urban areas) which will be required to select specific houses. Following selection of the orthophotographs and maps a random point will be selected on each and the house nearest that point will represent the house to be visited. The random points on the map will be obtained by placing a grid with lines 2mm apart on the map and plotting the intersection of x and y axis co-ordinates. Co-ordinates will be selected using a random number table.

If there are no children in the target age group in the selected house, then the next nearest house will be visited. This process will continue until one subject is obtained.

If there is more than one child in the stipulated

age group in a house, all children living in the house will be included in the study.

In the case of the White population, the 7 children will be identified by Birth Registers due to the difficulty of obtaining the required number of children for the sample utilising the above methodology.

iv) General Comments on Sampling:

Using the sampling procedure outlined above each cluster can be interpreted either singly or in any combination that would provide useful information. For some combinations of clusters, appropriate weighting techniques (using population proportion as the weight) should be applied.

The methods described above are similar, in principle, to the standard EPI techniques. An important difference is that the seven households are not selected because of their proximity to one randomly selected point, instead they are from seven randomly selected points. Each cluster therefore represents with reasonable accuracy (notwithstanding the small sample size) the ESD or LEA from which it was selected. Therefore the clusters, in correct combinations, represent with acceptable accuracy Natal and KwaZulu magisterial districts, HRs, and each race group in urban areas and, in the case of Blacks, rural areas also.

6. ORGANIZATION

i) The overall co-ordination of the evaluation project will be effected by the Regional Office (Durban) of the DNHPD. The evaluation of the current vaccination status will be carried out by the Department of Community Health (DCH).

ii) All aspects of evaluation will be co-ordinated by the DCH. A registrar from the DCH will be allocated to each Health Region (HR) and will be responsible for ensuring that the day to day functions relevant to the evaluation are carried out.

iii) A list of cluster and precise sample points will be provided for each HR by the DCH. Each sample point will either be indicated on a map orthophotograph or explained in an address list.

iv) The houses represented by sample points will be visited by Health Immunization Teams (HIT) and collected data will be entered onto a purpose-designed questionnaire/checklist.

v) A Team Control Person (TCP) will be designated by the DNHPD for each HR. The TCP will be responsible for arranging the staffing of the appropriate number of HITs.

vi) These teams comprising 2 health workers (eg. Enrolled nurse and a nursing assistant) will be trained by members of the DCH on how to conduct the survey.

vii) A Transport Organizer (TO) will be designated by the DNHPD for each HR. The TO will be responsible for the arranging of transport for each HIT.

viii) Registrars will ensure that all arrangements concerning HIT staffing, transport and provision are timeously effected.

ix) The channels for communication will be from the persons indicated in (v), (vi) and (vii) above for the registrar indicated in (viii) above. In the case of difficulty or in respect of matters external to their allocated HRs registrars will communicate in the first instance with the Responsible Specialist designated by the DCH. The Responsible Specialist will be responsible for the management of difficulties which may occur and the co-ordination of the project at the territorial level.

xi) The Responsible Specialist will, where necessary communicate with the Head of the DCH who will be responsible for the management of matters referred by the Responsible Specialist and for overall management of the project and for communication external to Health Regions.

7. METHOD OF DATA COLLECTION

i) Each HIT which has been previously briefed and trained by the relevant registrar will visit each specified sample point and identify the house to which it refers.

ii) Permission to include this household in the study will be sought from the Head of the household or other responsible person, after informing of its purpose.

iii) In the event of permission being refused the next nearest household will be visited and (ii) above repeated.

iv) When permission is granted the details on Page 1 of Annexure A will be completed for the household and it will be established whether any children born in the year 30.08.89 - 01.09.90 are normally resident in that household. (This will include children of ages 9 months to 1 year and 9 months).

v) In the event of there being no such child the next nearest household will be visited and steps (ii) and if appropriate, (iii) will be repeated.

vi) A child who is absent from the home, but whose RTH card is available will be included in the sample.

vii) Where a child born in the above year is preesnt and qualifies by the inclusion criteria the information on Page 2 of Annexure A will be collected in respect of that child and entered there on.

viii) At the end of each day all questionnaires/ checklists will be checked and in the case of incomplete or obviously erroneous data having been entered HIT teams will revisit the relevant

household the following day to correct the deficiencies.

ix) All questionnaires/checklists will be collected and retained by registrars and submitted, on completion of the data collection, to the DCH.

x) In the case of Urban White populations the required sample will be randomly selected from the Birth Registe

8. SCHEDULE

Confirmation of Procedure	22.03.91
Final calculation of cluster numbers	22.03.91
Identification of situation of clusters	30.04.91
Identification of household sample points	30.04.91
Communication of sample points to Chairman	- .05.91
Training of Field Staff	- .05.91
Commencement of data collection	01.06.91
Completion of data collection	14.06.91
Submission of data to Dept of Community Health	21.06.91
Feedback of preliminary results	31.08.91
Completion of report by Dept of Community Health	30.11.91

Table 1

THE NUMBER OF CLUSTERS TO BE SELECTED

FOR

INDIANS FROM EACH MAGISTERIAL DISTRICT

[Total population (1985 Census) = 693 195]

ODE	MAGISTERIAL DISTRICT	POPULATION	CLUSTERS
A4	NEWCASTLE	9 740	2
A7	DANHAUSER	2 421	1
D4	KLIP RIVER	8 741	1
D5	ESTCOURT	5 782	1
F7	UMFOLOZI	2 256	1
F11	LOWER TUGELA	35 907	6
G5	KRANSKOP	192	1
G7	PIETERMARITZBURG	35 907	10
G12	LIONS RIVER	3 323	1
H5	DURBAN	131 029	21
H6	PINETOWN	18 184	3
H7	INANDA	173 741	27
H8	CHATSWORTH	190 489	31
I6	PORT SHEPSTONE	10 805	2
I7	UMZINTO	19 113	3

Table 2

THE NUMBER OF CLUSTERS TO BE SELECTED

FOR

WHITES FROM EACH MAGISTERIAL DISTRICT

[Total population (1985 Census) = 606 925]

CODE	MAGISTERIAL DISTRICT	POPULATION	CLUSTERS
A3	DUNDEE	5 807	2
A4	NEWCASTLE	26 916	5
A6	UTRECHT	2 909	1
B2	VRYHEID	15 392	3
C2	UBOMBO	956	1
C8	HLABISA	3 672	1
D4	KLIP RIVER	13 765	2
D5	ESTCOURT	7 233	2
F7	UMFOLOZI	24 579	5
F8	UMTUNZINI	5 608	1
F9	ESHOWE	3 928	1
F11	LOWER TUGELA	8 837	2
G5	KRANSKOP	605	1
G7	PIETERMARITZBURG	64 733	12
G8	CAMPERDOWN	8 581	2
G10	IXOPO	8 581	1
G12	LIONS RIVER	10 511	2
H5	DURBAN	231 710	43
H6	PINETOWN	82 735	14
H7	INANDA	16 613	3
I4	MOUNT CURRIE	5 020	1
I5	ALFRED	898	1
I6	PORT SHEPSTONE	26 193	4
I7	UMZINTO	10 433	2

Table 3

THE NUMBER OF CLUSTERS TO BE SELECTED

FOR

COLOUREDS FROM EACH MAGISTERIAL DISTRICT

[Total population (1985 Census) = 100 154]

DE	MAGISTERIAL DISTRICT	POPULATION	CLUSTERS
3	DUNDEE	1 011	1
8	HLABISA	344	1
7	UMFOLOZI	144	1
11	LOWER TUGELA	1 429	1
37	PIETERMARITZBURG	13 908	4
310	IXOPO	1 506	1
H5	DURBAN	40 146	12
H6	PINETOWN	4 166	2
H7	INANDA	15 579	4
H8	CHATSWORTH	632	1
I4	MOUNT CURRIE	4 882	1
I5	ALFRED	1 419	1

Table 4

THE NUMBER OF CLUSTERS TO BE SELECTED

FOR

URBAN AND RURAL BLACKS FROM EACH HEALTH PLANNING SUB-REGION

Col 1 MD	Col 2 POPULATION	Col 3 %Urbn	Col 4 RURAL (%)	Col 5 URBAN (%)	Col 6 No. OF CLUSTERS		
					RURAL	URBAN	TOTAL
A1	113 628	0.5	113 060 (3)	568 (0)	3	0	3
A2	262 934	54.0	120 950 (3)	141 984 (11)	4	12	16
A3	22 300	45.0	12 265 (0)	10 035 (1)	0	1	1
A4	17 124	15.0	14 555 (0)	2 569 (0)	0	1	1
A5	10 680	42.0	6 194 (0)	4 486 (0)	0	1	1
A6	29 809	0.0	29 809 (1)	0 (0)	1	0	1
A7	13 004	55.0	5 852 (0)	7 152 (1)	0	1	1
TOTAL FOR HEALTH REGION A					8	16	24
B1	181 500	18.0	148 830 (4)	32 670 (3)	4	3	7
B2	63 680	15.0	54 128 (1)	9 552 (1)	1	1	2
B3	18 141	20.0	14 513 (0)	3 828 (0)	0	1	1
TOTAL FOR HEALTH REGION B					5	5	10
C1	111 086	0.6	110 419 (3)	667 (0)	3	0	3
C2	86 061	0.3	85 803 (2)	258 (0)	2	0	2
C3	141 460	1.0	140 045 (3)	1 415 (0)	4	0	4
C4	101 220	4.0	97 171 (2)	4 049 (0)	3	0	3
C5	139 708	1.0	138 311 (3)	1 397 (0)	4	0	4
C7	26 895	5.0	25 550 (1)	1 345 (0)	1	0	1
TOTAL FOR HEALTH REGION C					17	0	17

	POPULATION	%Urbn	RURAL (%)	URBAN (%)	No. OF CLUSTERS		
					RURAL	URBAN	TOTAL
.	166 587	11.0	148 262 (4)	18 325 (1)	4	2	6
2	149 851	9.0	136 364 (3)	13 487 (1)	4	1	5
3	23 420	0.0	23 420 (1)	0 (0)	1	0	1
4	41 109	14.0	35 354 (1)	5 755 (0)	1	0	1
5	30 863	9.0	28 085 (1)	2 778 (0)	1	0	1
7	20 029	28.0	14 421 (0)	5 608 (0)	0	1	1
OTAL FOR HEALTH REGION D					11	4	15
F1	129 974	14.0	111 778 (3)	18 196 (1)	3	2	5
F2	149 211	10.0	134 290 (3)	14 921 (1)	4	1	5
F3	116 626	1.0	115 460 (3)	1 166 (0)	3	0	3
F4	111 995	7.0	104 155 (2)	7 840 (1)	3	1	4
F5	202 597	7.0	188 415 (4)	14 182 (1)	5	1	6
F6	176 533	0.0	176 533 (4)	0 (0)	5	0	5
F7	37 185	10.0	33 467 (1)	3 719 (0)	1	0	1
F11	86 725	40.0	52 035 (1)	34 690 (3)	1	3	4
TOTAL FOR HEALTH REGION F					25	8	33
G1	137 312	3.0	133 193 (3)	4 119 (0)	4	0	4
G2	222 328	30.0	155 630 (4)	66 698 (5)	4	6	10
G3	228 220	25.0	171 165 (4)	57 055 (4)	5	5	10
G4	33 401	15.0	28 391 (1)	5 010 (0)	1	0	1
G6	32 952	0.0	32 952 (1)	0 (0)	1	0	1
G7	73 774	67.0	24 345 (1)	49 429 (4)	1	4	5
G8	23 435	0.0	23 435 (1)	0 (0)	1	0	1
G9	20 257	0.0	20 257 (0)	0 (0)	1	0	1
G10	26 800	0.0	26 800 (1)	0 (0)	1	0	1
TOTAL FOR HEALTH REGION G					19	15	34

MD	POPULATION	%Urbn	RURAL (%)	URBAN (%)	No. OF CLUSTERS		
					RURAL	URBAN	TOTAL
H1	246 095	95.0	12 305 (0)	233 790 (18)	0	21	21
H2	394 747	71.0	114 477 (3)	280 270 (22)	3	25	28
H3	277 359	33.0	185 831 (4)	91 528 (7)	5	8	13
H4	159 686	0.0	159 686 (4)	0 (0)	4	0	4
H5	79 423	100.0	0 (0)	79 423 (6)	0	7	7
H7	22 506	21.0	17 780 (0)	4 726 (0)	0	1	1
H8	41 273	95.0	2 064 (0)	39 209 (3)	0	4	4
TOTAL FOR HEALTH REGION H					12	66	78
I1	107 618	0.0	107 618 (3)	0 (0)	3	0	3
I2	192 559	0.0	192 559 (5)	0 (0)	5	0	5
I3	193 767	2.0	189 892 (5)	3 875 (0)	5	0	5
I4	30 669	21.0	24 229 (1)	6 440 (0)	1	0	1
I6	20 891	0	20 891 (0)	0 (0)	1	0	1
I7	22 641	1	22 415 (1)	226 (0)	1	0	1
TOTAL FOR HEALTH REGION I					16	0	16
TOTAL	5 499 850	23.6	4 202 995 (100)	1 296 855 (100)	114	114	228

C. IF THE CHILD DOES HAVE A ROAD TO HEALTH CARD, COMPLETE THE FOLLOWING:

	BCG	POLIO BIRTH	POLIO 1	POLIO 2	POLIO 3
DATE (D/M/Y)					

	MEASLES	DWT 1	DWT 2	DWT 3
DATE (D/M/Y)				

NUTRITIONAL STATUS: TO OBTAIN THE RECORDED WEIGHT AT 3 POINTS IN THE FIRST YEAR OF LIFE FROM THE ROAD TO HEALTH CARD.

AGE IN MONTHS			
WEIGHT IN GRAMS			

D. IF THE CHILD DOES NOT HAVE A ROAD TO HEALTH CARD COMPLETE THE FOLLOWING:

DOES THE CHILD HAVE A BCG SCAR? | YES | NO |

HAS THE CHILD EVER RECEIVED POLIO DROPS? | YES | NO | DONT KNOW |

HAS THE CHILD EVER RECEIVED MEASLES VACCINE? | YES | NO | DONT KNOW |

E. DIARRHOEA / ORAL REHYDRATION

HAS THIS CHILD HAD DIARRHOEA IN THE LAST TWO WEEKS? (MORE THAN 3 LOOSE STOOLS PER DAY) | YES | NO |

HAVE YOU HEARD OF ORAL REHYDRATION /SUGAR SALT SOLUTION TO TREAT DIARRHOEA? | YES | NO |

WHERE WILL YOU GET YOUR WATER FROM TODAY?

TAP	RAINWATER TANK	RIVER
SPRING	BOREHOLE	OTHER

HOW DO YOU DISPOSE OF YOUR REFUSE?

BIN	PIT	RECYCLE
MUNICIPAL COLLECTION		OTHER

IS THE HOUSE BUILT OF.... | BRICK | BLOCKS | WOOD | MUD | OTHER |

INTERVIEWER: _____

A. DEMOGRAPHIC

TERRITORY:	NATAL	KWAZULU

AREA TYPE:	RURAL	URBAN	PERIURBAN

RACE:	ASIAN	BLACK	COLOURED	WHITE

MAGISTERIAL DISTRICT CODE:	ESD:	CLUSTER:	POINT:

ADDRESS OF FIRST HOUSE VISITED:	

ADDRESS OF FINAL HOUSE VISITED:	

TOTAL NUMBER OF HOUSES VISITED: [ ]

B. QUESTIONS RELATING TO THE CHILD.

1. WHAT IS THE CHILD'S DATE OF BIRTH?

DAY	MONTH	YEAR

IF NOT KNOWN, ESTIMATE AGE IN MONTHS: [ ]

2. WHO USUALLY CARES FOR THE CHILD?

MOTHER	FATHER	GRANDMOTHER	AUNT
SISTER	DOMESTIC	OTHER:	

3. WERE YOU AWARE OF THE MEASLES CAMPAIGN IN 1990?

YES	NO

4. HAS THE CHILD HAD MEASLES?

YES	NO	DON'T KNOW

IF YES, AT WHAT AGE DID THE CHILD HAVE MEASLES? (AGE IN MONTHS) [ ]

5. DOES THE CHILD HAVE A ROAD TO HEALTH CARD?

YES	NO

HEALTH PLANNING SUB-REGIONS