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Policy Implications of a Project to Investigate Misclassification Errors in Growth Monitoring

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by

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by Marian Zeitlin, Ph.D., Alexa Beiser, Ph.D., and Leisa Weld, Ph.D.

1. Introduction

The purpose of this paper is to discuss the policy implications of a set of simulations conducted in Boston in 1986 to investigate the sensitivity and specificity of growth monitoring. For a more technical presentation, readers are referred the statistical report produced by the project which is entitled, "Misclassification Errors in Growth Monitoring: Comparisons Among Types of Growth Charts" (Beiser, et al, 1986).

The purpose of this small project, for the AID Bureau of Program and Policy Coordination, was to gain insight into the levels of accuracy in detecting growth failure that can be achieved by growth monitoring and to explore the implications of these accuracy levels for policy and program design. The project used growth data from a well-nourished reference population to construct a computerized simulation model that may in future be applied to developing country data. It compared the accuracy of growth monitoring using:

- o Charts with few bands, as in the "road to health" chart versus many bands, as in the Indonesian "rainbow" chart.
- o Monthly weighing versus weighing at three-monthly or six-monthly intervals.

2. Methods

It is important to make it clear to the reader that this project used data from the well-nourished United States reference population for the simulation. It reports findings that are broadly generalizable to data from malnourished developing country populations. Nevertheless, this generalizability should be confirmed and actual figures for sensitivity and specificity should be derived by re-running the simulation program using data from developing countries. Data from the Fells longitudinal growth study (NCHS, Ross) were used to simulate the errors that would occur in monitoring the growth of 1,000 girls between birth and three years. The simluation used an estimate taken from Martorell and coworkers (1975) for measurement error caused by short term changes in weight due mainly to intake of liquids and foods and to excretion.

The insufficient weight gain, or loss, that could be detected by the use of a particular type of chart was given the name identified insufficient growth (IIG). The degree of insufficient gain, or loss, that should be of true clinical concern was called clinically insufficient growth (CIG). (These two terms were refered to as declared loss and biologically significant loss in the technical paper.) As shown in Table 1, sensitivity and specificity were defined in terms of the extent to which IIG was capable of detecting CIG. This corresponds to the degree to which a health worker reading the chart would be capable of detecting clinically significant growth failure.

Table 1

Clinically Insufficient Growth

		Insufficient	Sufficient	
Identified Insufficient Growth	Insufficient	a	b	a+b
	Sufficient	c	d	c+d
		a+c	b+d	N

Prevalence (clinically insufficient)	=(a+c)/N
Prevalence (identified insufficient)	=(a+b)/N
Sensitivity	=a/(a+c)
Specificity	=d/(b+d)

2.1 Clinically Insufficient Growth

A biological significant failure to grow adequately from one time point to the next would be a growth rate that lead ultimately to negative functional consequences, illness, or death. Clinically insufficient growth can be defined as a rate of growth that has a fairly high probability of being biologically significant. Unfortunately, data on which to base such probability estimates are almost non-existent. Morley (1973) noted that failure to gain at least 0.5 kg per month in the first trimester, or at least 0.25 kg per month in the second trimester was associated with subsequent malnutrition in Nigerian village infants. Yet many clinicians would wish to detect milder growth deficits than this for the purpose of counseling the mother. The upper limit of CIG is defined here as the upper limit of poor growth--the fastest rate that we define as unacceptable--with the understanding that any actual weight loss

or growth below the upper limit must immediately be considered to be significant.

In the absence of good data, the project defined a loss of 2 SD in Z-score of weight-for-age over several months of as carrying a risk of biological significance for infants whose weight was initially within the normal or mildly malnourished ranges. For infants whose weights fell initially into the moderately to severely malnourished categories, any failure to grow at or above the reference rate entails a functional risk.

2.2 The Types of Charts Investigated

The project compared charts with 0,4,6,8,10, and an infinite number of bands. Zero or "no bands" refered to the case where weights are recorded in notebooks and growth failure is detected only if there has been no gain at all from one weighing to the next. This level of detection also occurs using charts without any bands to indicate how the child should grow, such as the charts used by Belgian nuns in MCH programs in Kinshasa, Zaire.

An infinite number of bands refers to the use of the simple road to health chart to estimate whether the child is growing parallel to the lines. Wherever the line for the individual child falls, the worker may be encouraged to visualize an imaginary line parallel to the reference line through the child's curve and to compare the child's growth to that imaginary line. Because an infinite number of such imaginary lines would have to be visualized to assess the growth of all children, assessment by

this method is equivalent to using an infinite number of bands. In practice these charts have two lines drawn in to aid in creating the reference line. If these lines are used to define bands, this chart corresponds to a chart with three bands.

Two ten-band charts were simulated. One of these corresponded approximately to the Indonesian "rainbow" chart, which has ten color bands, each with a width of five percentage points of weight for age using the Harvard standard (Stewart and Stevenson, 1959). Using the similar NCHS standard, our 10 bands chart had band widths of 0.5 SD, which is approximately 5.5% of weight for age. The ten bands were considered to be defined by differences in shading or color, since many growth curve lines on charts that already displayed horizontal and vertical lines would be visually confusing.

The other charts had from 4 to 10 bands ranging in width from three standard deviations to 0.5 standard deviations. Most of the charts with fewer than ten bands can be discarded from policy consideration because they have inadequate sensitivity, no matter how the bands are placed. Therefore, most of these charts will not be described in detail.

Standard deviation units of the reference population, rather than percentiles, were chosen for defining the distances between bands on the charts used in the simulations. There were several reasons for this choice: in part because the Indonesian "rainbow" chart uses uniform band-widths comparable to half standard deviations; in part because the concept of biologically significant loss was defined in terms of standard deviations; in

part because the use of standard deviations versus percentiles had little effect on the comparisons between numbers of bands. The main reason standard deviations were used was in order to make it easier to generalize the simulation model and the results to developing country populations. Standard deviation units were more appropriate for this purpose because:

- o Standard deviation units measure actual deficits, whereas percentiles measure relative position only. In dealing with moderately to severely malnourished children and populations, clinicians and policy makers need to know actual growth deficits in comparison to the reference standard, which reflects the children's genetic potential.
- o Percentiles of the reference standard cannot be used for plotting weights of malnourished children in developing countries because the majority will fall off the bottom of the chart, below the 1st percentile. By contrast, bands measuring standard deviations can be extended downwards into the malnourished zone. If percentiles of a local reference standard, based on a malnourished population, are used, the comparison to genetic potential is lost.
- o Standard deviations of weight of preschool children taken from the reference population happen to be similar to the standard deviations of weight found in malnourished populations, in which the overall growth curve is lower. This similarity has been noted by Zeitlin (but not published) in the analysis of data from Indonesia, Philippines, Bangladesh, Ghana, Zaire, Burkina Faso, Guatemala, and Mexico. Therefore, standard deviation bands based on the reference standard also are useful in measuring dispersion from the mean of malnourished child populations.

3. Results

We will first look at the frequency of evaluation and then at the sensitivity and specificity of the charts.

3.1 Frequency of Evaluation

The rate at which the child is growing had to be taken into

account in defining CIG. Rate of growth slows down continuously over the first three years of life. Expected growth from birth to one month is 800 grams, whereas expected growth per month in the third year of life is between 100 and 200 grams. Growth in proportion to the child's size slows down even more. From birth to one month, the child is supposed to gain 20% of its expected weight at one month; from 8-9 months, expected gain is 5% of the 9 month weight; from 17-18 months, it is 2% of the 18 month weight, and from 35-36 months, only 1% of the 36 month figure. Thus a child who gains only half of the expected amount in the first month of life will experience a 10% short-fall, whereas one who gains half the expected amount from 17-18 months will only be 1% off target. The first rate of short-fall will be clinically significant in that it would rapidly lead to a cumulative loss in Z-score of two SD (about 22%). The second rate would not.

In order to take this slowing of growth rate into account, the time window over which minimal satisfactory weight gain is evaluated has to be lengthened as the child grows older. As shown in Appendix 2 of the technical paper, monthly evaluations from birth to six months correspond in their ability to detect minimal growth insufficiency to 2-monthly evaluations from 6-12 months, 3-monthly evaluations from 12-18 months, and 6-monthly evaluations from 18-36. Such a lengthening time window for well baby check-ups is common practice in the United States, where the prevalence of malnutrition is very low.

For normal and mild to moderately malnourished children, the upper limit for CIG was defined as growth of half the expected

amount per evaluation period, where the evaluation period lengthens with the child's age as described in the previous paragraph. With this definition, growth at the CIG level would lead to a cumulative short-fall of -2 SD in weight occuring at some point between 4-8 evaluation periods.

This definition dovetails conveniently with the Indonesian style rainbow chart with band widths of 0.5 standard deviations. Visually, it is equivalent to stating that the child's true weight drops by one band from the beginning to the end of the evaluation period.

A drop in Z-score of 0.5 SD from one month to the next also would be significant in an older child, and would be roughly equivalent to crossing a band in a month on the Indonesian chart. While such extremely poor growth is not prevalent in the reference population it may be so in developing country children with high rates of infection. If the child did not rebound over the next couple of months, such a drop would be picked up in the longer evaluation period, but it might not be identified soon enough for timely intervention.

Another definition of the upperlimit for CIG is any decrease from original Z-score over the evaluation period. This definition is appropriate for severely malnourished children.

3.2 Sensitivity and Specificity of Different Charts

For purposes of general comparison, true prevalence, observed prevalence, sensitivity, and specificity were computed for monthly, three-monthly, and six-monthly evaluation periods

for all age groups, and for CIG cut-off levels of 1/2 SD and 0 SD. These computations are shown for the 4-band, 10-band Indonesian style, and infinite band charts in tables in the Appendix, as well as tables displaying the same figures for charts with no bands.

In each of these charts, the loss of sensitivity with age simply reflects the fact noted in Section 3.1 that the time window for evaluation must increase with age for detection of a growth rate equal to half the expected rate. Thus it is easy to confirm that after about 6 months, monthly evaluation of minimal levels of insufficient gain have very poor sensitivity, but that 3-monthly evaluation remains adequate, and similarly that a switch to 6-monthly evaluation is appropriate by about 18 months.

Sensitivity increases consistently with increasing number of bands, while specificity falls but much less severely. Therefore, more bands definitely give greater accuracy of detection, provided that the method used for detection can be easily specified and learned by health workers. Tables 2 and 3 make it evident that the four band chart, shown as Figure 1, is of unsatisfactory sensitivity. The infinite band "road to health chart" when used as a three band chart, as shown in Figure 2, has even less sensitivity.

If the "road to health" chart is interpreted using the infinite band method, as shown in Figure 3, where the invisible band that the health worker is supposed to visualize has been drawn in, sensitivity and specificity rise to excellent levels. The project team, however, doubt the feasibility of training

Figure 1
Examples of Growth Charts with 4,6,8 and 10 Bands

(a) 4 Bands

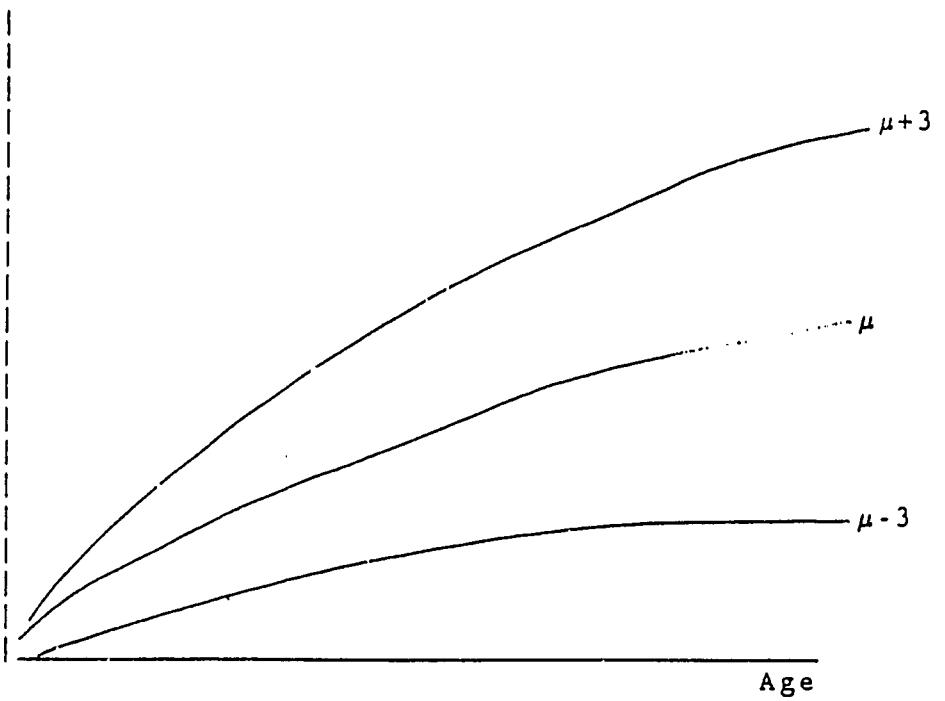
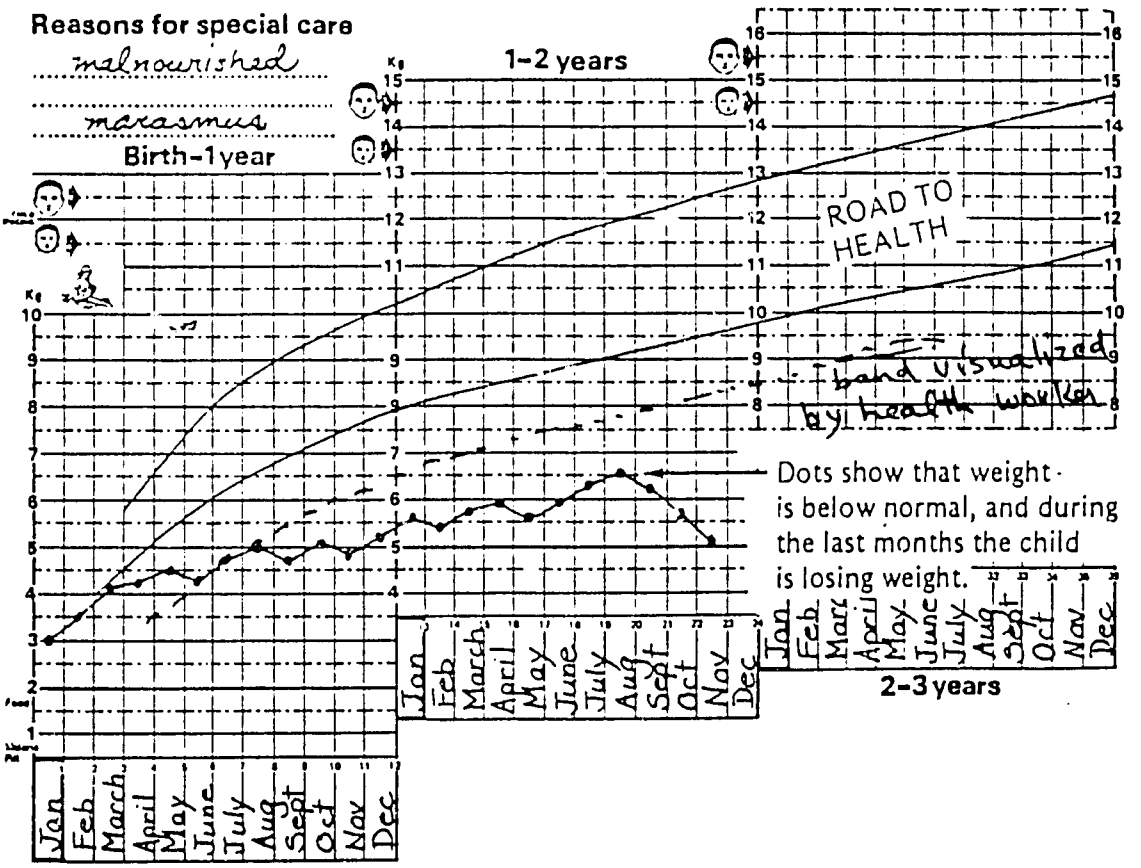
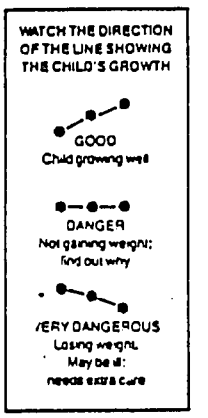


Figure 2

Road to Health Chart Used As
Infinite Band Chart



Source: Werner, 1977.

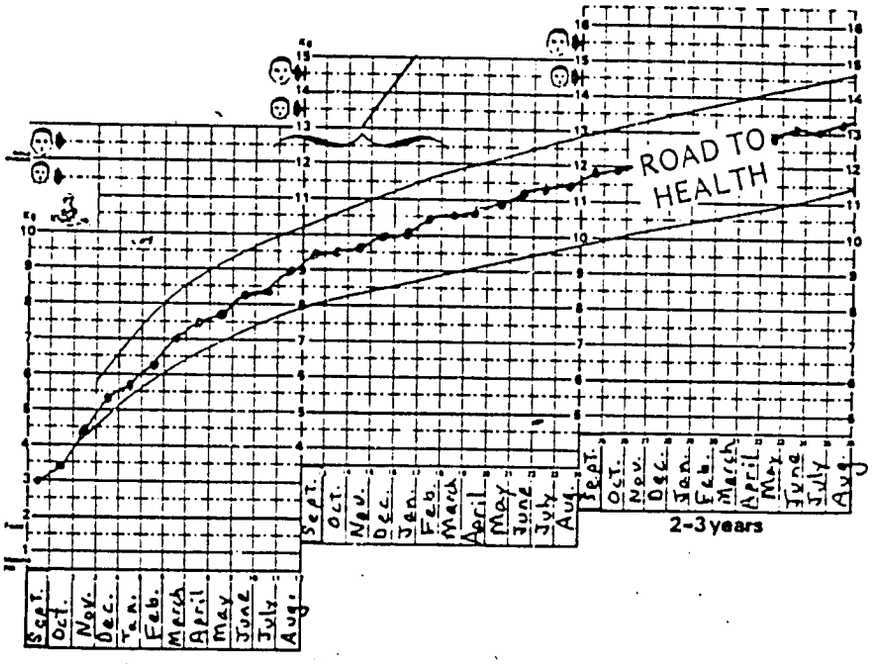


Source: current Morley chart

Figure 3

Road to Health Chart as
Three Band Chart (see caption)

In the healthy, well-nourished child, the weight rises steadily. The dots usually lie inside the lines that mark the Road to Health.



Source: Werner, 1977.

lower level health workers to "eye-ball" the charts in this manner accurately and consistently. The drawing on the chart that is provided as a guideline for interpretation shows only three trends: up, down, and completely flat. How workers are trained to deal with lines that bounce between these levels is not clear. Anecdotal information suggests that many health workers do consider all children to be healthy so long as they do not leave "the road." If true, this is a three band method of growth monitoring and is unsatisfactory.

The ten band Indonesian-style chart comes out well by comparison to a three or four band chart and to an infinite interpretation method which is difficult to standardize. In fact, the infinite band interpretation method can also be applied to the Indonesian chart, if the clinician worries that a malnourished child is not growing parallel to the growth curve.

From 12 months onward, the no-band scenario, with monthly weighings recorded in notebooks, where any loss in absolute weight is an identified insufficient gain, has sensitivities and specificities that are better than monthly evaluations and almost as good as quarterly evaluations using the Indonesian style chart. The problem with this method is that it is extremely inadequate between birth and six months and moderately poor up to 12 months. It also is inadequate for evaluating older children who don't attend every month.

4. Problems in Generalizing to Malnourished Populations

The fact that more bands yield better sensitivity, hence

greater accuracy in detecting growth failure holds true for both well-nourished and poorly nourished populations. The "rainbow" chart simulation using the reference population is expected to correspond quite closely to the same simulation results using data from South East Asia, although this correspondence should be tested. Our expectation is that the entire growth curve will be moved downwards but that the distributions as displayed on the 0.5 SD bands will be similar. The largest expected difference should occur between about 4-10 months, when the prevalence of CIG should be much higher in the South East Asian population. This higher prevalence should significantly increase sensitivity.

The claim that children in the reference population who exhibit CIG, as defined by half of expected gain, are truly malnourished probably is exagerated. Yet this definition has been adopted because we expect it to apply to developing country populations where the likelihood that children will develop true malnutrition is much greater. Much of what appears to be CIG in the reference population probably reflects patterns of individual growth in spurts, which are leveled off in the reference standard. Thus a child that has just taken a rapid spurt may exceed the average growth rate in one interval and grow more slowly in the next.

Because children in the reference population are well-nourished and relatively healthy, the frequency of baby weighing can decrease rapidly as the infant grows older. Such decreased frequency of weighing probably is inappropriate in malnourished populations.

In rerunning the simulation it may also be appropriate to experiment with other definitions of CIG, as for example, any cumulative loss in 0.5 SD body weight over, 1,2,3, and 6 month periods, rather than using a fixed rate of half of expected rate of growth as was done in the present model.

5. Policy Recommendations

With respect to type of chart, the project recommends that the "rainbow" style chart be used with band widths of 0.5 SD of the NCHS reference population, adopted for international use by WHO. For ease of cross comparison, the bands should radiate down (and up if necessary) from the median value of the reference population as published by WHO (Lavoipierre, et al. 1983). For simplicity, the combined values for boys and girls could probably be used. Whether bands should be displayed above the median and the number of bands to be displayed below the median should depend on the degree of malnutrition in the population(s) to be monitored.

Children should come for weighing every month at least during the first year, since about 12 contacts are desirable during the first year for immunizations, etc. and since a rapid drop in nutritional status commonly occurs between about 5-12 months. Monthly weighing probably should continue during the second year, where malnutrition and/or infection are highly prevalent. The decision to change to a two-monthly or quarterly schedule in the second year and/or a quarterly or six-monthly schedule in the third to fifth years should be based on

assessment of true sensitivities and specificities and on illness prevalence using data that are representative of the country or geographical region.

Such actual data also should be used to calculate observed prevalence of CIG and predictive value of growth monitoring, so that the costs of various educational and other interventions can be estimated.

Health workers should be trained to identify CIG as a cummulative drop of one band over 2 repeated monthly weighings between 6-12 months, over repeated monthly weighings from 12-24 months, and over a 6-month interval thereafter. Any drop of two bands in a single measurement period should flag the need for intervention. The point at which referral to the health services should be recommended must depend on the practical value of such referral in each country setting.

The issue of timing of introduction of supplements to purely breast-fed babies on the basis of growth faultering detected by growth monitoring is important and requires further study in two respects. First, reference curves for growth based on the growth of well-nourished, purely breast-fed babies should be used in simulating the sensitivity and specificity of growth monitoring in detecting true growth faultering. Second, growth data from developing countries must be entered into such a simulation in order to estimate whether both the sensitivity and the specificity of detection are high enough to support the decision to introduce supplements in contaminated environments.

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SENSITIVITY AND SPECIFICITY FOR GIRLS FROM BIRTH TO 35 MONTHS

MEASURMENT ERROR = .3
CIG CUTOFF=0
MONTHLY GROWTH STATUS EVALUATIONS
NO BANDS

MONTHS	TRUE PREVALENCE	OBSERVED PREVALENCE	SENSITIVITY	SPECIFICITY
0	0.66	0.11	0.16	0.99
1	0.60	0.12	0.19	0.98
2	0.62	0.13	0.19	0.96
3	0.57	0.14	0.22	0.95
4	0.73	0.14	0.18	0.97
5	0.48	0.15	0.24	0.94
6	0.58	0.19	0.29	0.94
7	0.58	0.17	0.25	0.94
8	0.48	0.22	0.36	0.92
9	0.35	0.21	0.38	0.88
10	0.40	0.22	0.36	0.87
11	0.46	0.24	0.38	0.88
12	0.49	0.25	0.37	0.87
13	0.36	0.26	0.43	0.83
14	0.42	0.29	0.43	0.81
15	0.44	0.30	0.41	0.79
16	0.46	0.33	0.48	0.79
17	0.45	0.31	0.43	0.79
18	0.49	0.31	0.43	0.81
19	0.49	0.31	0.42	0.79
20	0.45	0.32	0.45	0.78
21	0.30	0.33	0.55	0.76
22	0.52	0.30	0.40	0.81
23	0.50	0.33	0.46	0.81
24	0.51	0.35	0.47	0.78
25	0.53	0.34	0.46	0.79
26	0.34	0.36	0.48	0.71
27	0.55	0.38	0.49	0.76
28	0.59	0.34	0.42	0.78
29	0.34	0.35	0.54	0.75
30	0.54	0.34	0.46	0.80
31	0.55	0.36	0.48	0.77
32	0.36	0.36	0.51	0.73
33	0.57	0.35	0.44	0.76
34	0.55	0.33	0.44	0.80
35	0.36	0.33	0.44	0.73

SENSITIVITY AND SPECIFICITY FOR GIRLS FROM BIRTH TO 35 MONTHS

MEASURMENT ERROR - .3
CIG-1/2 EXPECTED WEIGHT GAIN OVER EVALUATION PERIOD
MONTHLY GROWTH STATUS EVALUATIONS
NO BANDS

MONTHS	TRUE PREVALENCE	OBSERVED PREVALENCE	SENSITIVITY	SPECIFICITY
0	0.14	0.11	0.30	0.93
1	0.16	0.12	0.37	0.93
2	0.15	0.13	0.40	0.92
3	0.17	0.14	0.36	0.90
4	0.16	0.14	0.38	0.91
5	0.17	0.15	0.38	0.90
6	0.20	0.19	0.47	0.88
7	0.22	0.17	0.44	0.91
8	0.22	0.22	0.44	0.85
9	0.22	0.21	0.45	0.86
10	0.22	0.22	0.48	0.85
11	0.22	0.24	0.48	0.83
12	0.24	0.25	0.51	0.83
13	0.26	0.26	0.52	0.83
14	0.29	0.29	0.48	0.79
15	0.28	0.30	0.46	0.77
16	0.28	0.33	0.55	0.75
17	0.28	0.31	0.47	0.75
18	0.31	0.31	0.48	0.77
19	0.31	0.31	0.48	0.76
20	0.28	0.32	0.49	0.74
21	0.30	0.33	0.55	0.76
22	0.33	0.30	0.47	0.78
23	0.31	0.33	0.55	0.77
24	0.32	0.35	0.53	0.74
25	0.32	0.34	0.50	0.73
26	0.32	0.36	0.51	0.72
27	0.31	0.38	0.53	0.69
28	0.36	0.34	0.46	0.73
29	0.31	0.35	0.56	0.75
30	0.32	0.34	0.53	0.75
31	0.32	0.36	0.51	0.70
32	0.32	0.36	0.53	0.73
33	0.34	0.35	0.51	0.73
34	0.33	0.33	0.51	0.75
35	0.33	0.33	0.49	0.74

SENSITIVITY AND SPECIFICITY FOR GIRLS FROM BIRTH TO 35 MONTHS

MEASURMENT ERROR = .3
CIG-1/2 EXPECTED WEIGHT GAIN OVER EVALUATION PERIOD
BIANNUAL GROWTH STATUS EVALUATIONS
10 BANDS AS IN THE INDONESIAN CHARTS

MONTHS	TRUE PREVALENCE	OBSERVED PREVALENCE	SENSITIVITY	SPECIFICITY
0	0.01	0.41	1.00	0.59
1	0.01	0.36	1.00	0.65
2	0.01	0.33	1.00	0.68
3	0.01	0.30	1.00	0.71
4	0.01	0.22	0.93	0.79
5	0.01	0.17	0.82	0.83
6	0.01	0.16	1.00	0.84
7	0.02	0.13	0.95	0.88
8	0.02	0.11	0.78	0.90
9	0.03	0.09	0.79	0.93
10	0.02	0.10	0.87	0.92
11	0.04	0.11	0.70	0.91
12	0.04	0.13	0.72	0.89
13	0.05	0.15	0.73	0.88
14	0.07	0.18	0.65	0.86
15	0.09	0.23	0.83	0.82
16	0.09	0.24	0.76	0.82
17	0.08	0.21	0.74	0.84
18	0.09	0.22	0.75	0.83
19	0.09	0.24	0.70	0.81
20	0.08	0.22	0.71	0.82
21	0.10	0.19	0.61	0.86
22	0.10	0.21	0.66	0.84
23	0.12	0.25	0.78	0.82
24	0.11	0.23	0.64	0.81
25	0.11	0.25	0.78	0.81
26	0.14	0.28	0.75	0.80
27	0.14	0.28	0.73	0.79
28	0.15	0.29	0.69	0.78
29	0.15	0.28	0.68	0.79
30	0.15	0.27	0.72	0.81

SENSITIVITY AND SPECIFICITY FOR GIRLS FROM BIRTH TO 35 MONTHS

MEASURMENT ERROR = .3
GIG =1/2 EXPECTED WEIGHT GAIN OVER EVALUATION PERIOD
BIANNUAL GROWTH STATUS EVALUATIONS
INFINITE BANDS

MONTHS	TRUE PREVALENCE	OBSERVED PREVALENCE	SENSITIVITY	SPECIFICITY
0	0.01	0.49	1.00	0.51
1	0.01	0.46	1.00	0.54
2	0.01	0.44	1.00	0.56
3	0.01	0.42	1.00	0.59
4	0.01	0.33	1.00	0.68
5	0.01	0.26	1.00	0.75
6	0.01	0.25	1.00	0.76
7	0.02	0.21	1.00	0.80
8	0.02	0.19	0.91	0.83
9	0.03	0.16	0.91	0.86
10	0.02	0.18	0.96	0.84
11	0.04	0.20	0.92	0.83
12	0.04	0.23	0.87	0.79
13	0.05	0.25	0.88	0.79
14	0.07	0.31	0.86	0.73
15	0.09	0.40	0.95	0.65
16	0.09	0.38	0.97	0.68
17	0.08	0.37	0.87	0.67
18	0.09	0.38	0.89	0.67
19	0.09	0.39	0.87	0.66
20	0.08	0.38	0.93	0.67
21	0.10	0.35	0.83	0.71
22	0.10	0.42	0.89	0.64
23	0.12	0.45	0.94	0.62
24	0.11	0.41	0.92	0.65
25	0.11	0.46	0.93	0.60
26	0.14	0.47	0.91	0.60
27	0.14	0.51	0.95	0.56
28	0.15	0.51	0.93	0.56
29	0.15	0.50	0.93	0.58
30	0.15	0.50	0.93	0.58

SENSITIVITY AND SPECIFICITY FOR GIRLS FROM BIRTH TO 35 MONTHS

MEASURMENT ERROR = .3
GIG -1/2 EXPECTED WEIGHT GAIN OVER EVALUATION PERIOD
BIANNUAL GROWTH STATUS EVALUATIONS
4 BANDS

MONTHS	TRUE PREVALENCE	OBSERVED PREVALENCE	SENSITIVITY	SPECIFICITY
0	0.01	0.16	0.67	0.84
1	0.01	0.14	0.78	0.86
2	0.01	0.11	0.50	0.89
3	0.01	0.11	0.60	0.89
4	0.01	0.07	0.50	0.94
5	0.01	0.05	0.27	0.96
6	0.01	0.05	0.38	0.96
7	0.02	0.04	0.25	0.96
8	0.02	0.03	0.22	0.97
9	0.03	0.03	0.36	0.99
10	0.02	0.03	0.30	0.98
11	0.04	0.03	0.14	0.98
12	0.04	0.04	0.23	0.97
13	0.05	0.03	0.22	0.98
14	0.07	0.05	0.24	0.96
15	0.09	0.05	0.25	0.97
16	0.09	0.05	0.20	0.96
17	0.08	0.04	0.11	0.97
18	0.09	0.06	0.23	0.95
19	0.09	0.05	0.17	0.96
20	0.08	0.07	0.27	0.95
21	0.10	0.04	0.16	0.97
22	0.10	0.05	0.15	0.96
23	0.12	0.06	0.21	0.96
24	0.11	0.06	0.20	0.96
25	0.11	0.05	0.13	0.96
26	0.14	0.08	0.24	0.95
27	0.14	0.07	0.22	0.95
28	0.15	0.08	0.26	0.95
29	0.15	0.08	0.21	0.95
30	0.15	0.06	0.20	0.96

SENSITIVITY AND SPECIFICITY FOR GIRLS FROM BIRTH TO 35 MONTHS

MEASURMENT ERROR = .3
CIG CUTOFF=0
BIANNUAL GROWTH STATUS EVALUATIONS
10 BANDS AS IN THE INDONESIAN CHARTS

MONTHS	TRUE PREVALENCE	OBSERVED PREVALENCE	SENSITIVITY	SPECIFICITY
0	0.52	0.41	0.73	0.93
1	0.45	0.36	0.72	0.94
2	0.43	0.33	0.68	0.93
3	0.39	0.30	0.65	0.92
4	0.32	0.22	0.57	0.95
5	0.22	0.17	0.61	0.95
6	0.20	0.16	0.60	0.95
7	0.19	0.13	0.56	0.97
8	0.14	0.11	0.52	0.96
9	0.13	0.09	0.48	0.96
10	0.13	0.10	0.46	0.95
11	0.14	0.11	0.51	0.96
12	0.18	0.13	0.54	0.96
13	0.21	0.15	0.50	0.95
14	0.28	0.18	0.47	0.93
15	0.38	0.23	0.51	0.93
16	0.32	0.24	0.56	0.92
17	0.33	0.21	0.49	0.93
18	0.36	0.22	0.49	0.93
19	0.37	0.24	0.48	0.90
20	0.34	0.22	0.49	0.92
21	0.32	0.19	0.48	0.94
22	0.42	0.21	0.42	0.94
23	0.43	0.25	0.50	0.94
24	0.40	0.23	0.45	0.91
25	0.43	0.25	0.48	0.92
26	0.46	0.28	0.49	0.90
27	0.49	0.28	0.48	0.91
28	0.53	0.29	0.47	0.91
29	0.50	0.28	0.50	0.93
30	0.48	0.27	0.50	0.94

SENSITIVITY AND SPECIFICITY FOR GIRLS FROM BIRTH TO 35 MONTHS

MEASURMENT ERROR = .3
CIG CUTOFF=0
BIANNUAL GROWTH STATUS EVALUATIONS
4 BANDS

MONTHS	TRUE PREVALENCE	OBSERVED PREVALENCE	SENSITIVITY	SPECIFICITY
0	0.52	0.16	0.29	0.98
1	0.45	0.14	0.30	0.98
2	0.43	0.11	0.25	0.99
3	0.39	0.11	0.26	0.98
4	0.32	0.07	0.19	0.99
5	0.22	0.05	0.17	0.99
6	0.20	0.05	0.18	0.99
7	0.19	0.04	0.18	0.99
8	0.14	0.03	0.17	0.99
9	0.13	0.03	0.15	0.99
10	0.13	0.03	0.12	0.99
11	0.14	0.03	0.15	0.99
12	0.18	0.04	0.14	0.99
13	0.21	0.03	0.12	0.99
14	0.28	0.05	0.14	0.98
15	0.38	0.05	0.11	0.98
16	0.32	0.05	0.13	0.98
17	0.33	0.04	0.09	0.99
18	0.36	0.06	0.14	0.98
19	0.37	0.05	0.11	0.98
20	0.34	0.07	0.16	0.98
21	0.32	0.04	0.11	0.99
22	0.42	0.05	0.11	0.99
23	0.43	0.06	0.13	0.99
24	0.40	0.06	0.12	0.98
25	0.43	0.05	0.09	0.98
26	0.46	0.08	0.15	0.98
27	0.49	0.07	0.13	0.98
28	0.53	0.08	0.13	0.97
29	0.50	0.08	0.14	0.99
30	0.48	0.06	0.12	0.99

SENSITIVITY AND SPECIFICITY FOR GIRLS FROM BIRTH TO 35 MONTHS

MEASURMENT ERROR = .3
CIG CUTOFF=0
BIANNUAL GROWTH STATUS EVALUATIONS
INFINITE BANDS

MONTHS	TRUE PREVALENCE	OBSERVED PREVALENCE	SENSITIVITY	SPECIFICITY
0	0.52	0.49	0.83	0.88
1	0.45	0.46	0.85	0.85
2	0.43	0.44	0.83	0.85
3	0.39	0.42	0.82	0.84
4	0.32	0.33	0.76	0.87
5	0.22	0.26	0.79	0.90
6	0.20	0.25	0.79	0.88
7	0.19	0.21	0.76	0.92
8	0.14	0.19	0.74	0.90
9	0.13	0.16	0.70	0.91
10	0.13	0.18	0.71	0.90
11	0.14	0.20	0.76	0.89
12	0.18	0.23	0.80	0.89
13	0.21	0.25	0.73	0.88
14	0.28	0.31	0.68	0.84
15	0.38	0.40	0.75	0.81
16	0.32	0.38	0.78	0.81
17	0.33	0.37	0.77	0.82
18	0.36	0.38	0.73	0.81
19	0.37	0.39	0.72	0.80
20	0.34	0.38	0.73	0.80
21	0.32	0.35	0.75	0.84
22	0.42	0.42	0.72	0.80
23	0.43	0.45	0.78	0.80
24	0.40	0.41	0.72	0.80
25	0.43	0.46	0.77	0.78
26	0.46	0.47	0.74	0.76
27	0.49	0.51	0.76	0.74
28	0.53	0.51	0.77	0.77
29	0.50	0.50	0.77	0.78
30	0.48	0.50	0.80	0.78

SENSITIVITY AND SPECIFICITY FOR GIRLS FROM BIRTH TO 35 MONTHS

MEASURMENT ERROR - .3
CIG CUTOFF-0
QUARTERLY GROWTH STATUS EVALUATIONS
4 BANDS

MONTHS	TRUE PREVALENCE	OBSERVED PREVALENCE	SENSITIVITY	SPECIFICITY
0	0.63	0.18	0.28	0.98
1	0.57	0.17	0.26	0.95
2	0.63	0.17	0.25	0.97
3	0.58	0.15	0.24	0.97
4	0.58	0.13	0.21	0.98
5	0.47	0.10	0.19	0.98
6	0.49	0.11	0.19	0.97
7	0.38	0.08	0.16	0.98
8	0.31	0.07	0.16	0.98
9	0.26	0.06	0.15	0.98
10	0.33	0.05	0.11	0.98
11	0.32	0.05	0.12	0.98
12	0.29	0.05	0.12	0.97
13	0.28	0.04	0.11	0.99
14	0.35	0.06	0.13	0.98
15	0.41	0.05	0.09	0.97
16	0.42	0.06	0.11	0.98
17	0.43	0.05	0.08	0.98
18	0.45	0.08	0.15	0.98
19	0.36	0.04	0.08	0.98
20	0.33	0.06	0.13	0.98
21	0.37	0.05	0.10	0.98
22	0.52	0.06	0.10	0.99
23	0.50	0.07	0.11	0.97
24	0.42	0.06	0.11	0.97
25	0.44	0.05	0.08	0.98
26	0.48	0.06	0.11	0.98
27	0.49	0.07	0.11	0.97
28	0.53	0.07	0.10	0.96
29	0.49	0.07	0.11	0.98
30	0.47	0.06	0.11	0.98
31	0.49	0.06	0.09	0.97
32	0.49	0.05	0.10	0.99
33	0.50	0.07	0.11	0.98

SENSITIVITY AND SPECIFICITY FOR GIRLS FROM BIRTH TO 35 MONTHS

MEASURMENT ERROR - .3
CIG-1/2 EXPECTED WEIGHT GAIN OVER EVALUATION PERIOD
QUARTERLY GROWTH STATUS EVALUATIONS
4 BANDS

MONTHS	TRUE PREVALENCE	OBSERVED PREVALENCE	SENSITIVITY	SPECIFICITY
0	0.03	0.18	0.56	0.83
1	0.04	0.17	0.57	0.85
2	0.04	0.17	0.48	0.84
3	0.04	0.15	0.47	0.87
4	0.05	0.13	0.48	0.88
5	0.05	0.10	0.29	0.91
6	0.05	0.11	0.36	0.91
7	0.07	0.08	0.35	0.95
8	0.09	0.07	0.24	0.95
9	0.09	0.06	0.26	0.97
10	0.09	0.05	0.15	0.96
11	0.11	0.05	0.18	0.96
12	0.11	0.05	0.18	0.96
13	0.13	0.04	0.17	0.98
14	0.16	0.06	0.17	0.96
15	0.15	0.05	0.16	0.97
16	0.18	0.06	0.15	0.96
17	0.16	0.05	0.11	0.96
18	0.17	0.08	0.18	0.94
19	0.18	0.04	0.10	0.97
20	0.15	0.06	0.14	0.96
21	0.19	0.05	0.13	0.97
22	0.19	0.06	0.11	0.96
23	0.22	0.07	0.14	0.95
24	0.21	0.06	0.15	0.96
25	0.19	0.05	0.09	0.96
26	0.20	0.06	0.18	0.96
27	0.23	0.07	0.14	0.96
28	0.24	0.07	0.15	0.96
29	0.23	0.07	0.16	0.96
30	0.22	0.06	0.16	0.97
31	0.23	0.06	0.12	0.96
32	0.20	0.05	0.11	0.96
33	0.24	0.07	0.16	0.96

SENSITIVITY AND SPECIFICITY FOR GIRLS FROM BIRTH TO 35 MONTHS

MEASURMENT ERROR = .3
CIG CUTOFF=0
QUARTERLY GROWTH STATUS EVALUATIONS
INFINITE BANDS

MONTHS	TRUE PREVALENCE	OBSERVED PREVALENCE	SENSITIVITY	SPECIFICITY
0	0.63	0.60	0.84	0.81
1	0.57	0.55	0.81	0.79
2	0.63	0.60	0.82	0.78
3	0.58	0.56	0.79	0.76
4	0.58	0.55	0.77	0.77
5	0.47	0.48	0.76	0.78
6	0.49	0.49	0.79	0.80
7	0.38	0.40	0.74	0.80
8	0.31	0.37	0.74	0.80
9	0.26	0.31	0.67	0.82
10	0.33	0.38	0.72	0.79
11	0.32	0.38	0.72	0.78
12	0.29	0.34	0.70	0.80
13	0.28	0.33	0.69	0.82
14	0.35	0.38	0.65	0.77
15	0.41	0.45	0.71	0.73
16	0.42	0.47	0.76	0.74
17	0.43	0.46	0.73	0.73
18	0.45	0.46	0.69	0.73
19	0.36	0.39	0.65	0.76
20	0.33	0.39	0.68	0.75
21	0.37	0.41	0.72	0.77
22	0.52	0.48	0.68	0.74
23	0.50	0.52	0.76	0.72
24	0.42	0.45	0.69	0.73
25	0.44	0.47	0.72	0.73
26	0.48	0.49	0.71	0.71
27	0.49	0.51	0.71	0.68
28	0.53	0.51	0.70	0.71
29	0.49	0.50	0.72	0.72
30	0.47	0.49	0.73	0.72
31	0.49	0.52	0.73	0.68
32	0.49	0.50	0.74	0.72
33	0.50	0.49	0.70	0.72

SENSITIVITY AND SPECIFICITY FOR GIRLS FROM BIRTH TO 35 MONTHS

MEASURMENT ERROR = .3
CIG CUTOFF=0
QUARTERLY GROWTH STATUS EVALUATIONS
10 BANDS AS IN INDONESIAN CHARTS

MONTHS	TRUE PREVALENCE	OBSERVED PREVALENCE	SENSITIVITY	SPECIFICITY
0	0.63	0.48	0.70	0.91
1	0.57	0.44	0.67	0.87
2	0.63	0.47	0.67	0.89
3	0.58	0.41	0.62	0.87
4	0.58	0.39	0.58	0.88
5	0.47	0.34	0.59	0.88
6	0.49	0.35	0.61	0.89
7	0.38	0.25	0.53	0.91
8	0.31	0.22	0.49	0.89
9	0.26	0.19	0.45	0.91
10	0.33	0.23	0.50	0.90
11	0.32	0.22	0.45	0.89
12	0.29	0.21	0.49	0.91
13	0.28	0.19	0.46	0.92
14	0.35	0.23	0.43	0.88
15	0.41	0.24	0.44	0.90
16	0.42	0.28	0.51	0.88
17	0.43	0.27	0.46	0.87
18	0.45	0.26	0.45	0.89
19	0.36	0.23	0.42	0.87
20	0.33	0.21	0.42	0.90
21	0.37	0.21	0.41	0.91
22	0.52	0.25	0.38	0.89
23	0.50	0.28	0.45	0.89
24	0.42	0.24	0.41	0.88
25	0.44	0.25	0.42	0.89
26	0.48	0.26	0.42	0.88
27	0.49	0.26	0.42	0.89
28	0.53	0.26	0.38	0.87
29	0.49	0.27	0.44	0.89
30	0.47	0.25	0.42	0.91
31	0.49	0.26	0.39	0.87
32	0.49	0.25	0.41	0.90
33	0.50	0.24	0.39	0.91

SENSITIVITY AND SPECIFICITY FOR GIRLS FROM BIRTH TO 35 MONTHS

MEASURMENT ERROR = .3
CIG-1/2 EXPECTED WEIGHT GAIN OVER EVALUATION PERIOD
QUARTERLY GROWTH STATUS EVALUATIONS
INFINITE BANDS

MONTHS	TRUE PREVALENCE	OBSERVED PREVALENCE	SENSITIVITY	SPECIFICITY
0	0.03	0.60	1.00	0.41
1	0.04	0.55	1.00	0.47
2	0.04	0.60	1.00	0.42
3	0.04	0.56	1.00	0.47
4	0.05	0.55	0.98	0.48
5	0.05	0.48	0.96	0.55
6	0.05	0.49	0.96	0.53
7	0.07	0.40	0.96	0.64
8	0.09	0.37	0.90	0.68
9	0.09	0.31	0.80	0.74
10	0.09	0.38	0.83	0.67
11	0.11	0.38	0.91	0.68
12	0.11	0.34	0.83	0.72
13	0.13	0.33	0.77	0.74
14	0.16	0.38	0.73	0.69
15	0.15	0.45	0.86	0.62
16	0.18	0.47	0.88	0.62
17	0.16	0.46	0.85	0.61
18	0.17	0.46	0.83	0.61
19	0.18	0.39	0.76	0.69
20	0.15	0.39	0.74	0.67
21	0.19	0.41	0.79	0.68
22	0.19	0.48	0.83	0.60
23	0.22	0.52	0.90	0.59
24	0.21	0.45	0.83	0.65
25	0.19	0.47	0.81	0.61
26	0.20	0.49	0.82	0.59
27	0.23	0.51	0.83	0.58
28	0.24	0.51	0.83	0.59
29	0.23	0.50	0.84	0.60
30	0.22	0.49	0.87	0.61
31	0.23	0.52	0.84	0.57
32	0.20	0.50	0.80	0.57
33	0.24	0.49	0.84	0.62

SENSITIVITY AND SPECIFICITY FOR GIRLS FROM BIRTH TO 35 MONTHS

MEASURMENT ERROR = .3
CIG-1/2 EXPECTED WEIGHT GAIN OVER EVALUATION PERIOD
QUARTERLY GROWTH STATUS EVALUATIONS
10 BANDS AS IN THE INDONESIAN CHARTS

MONTHS	TRUE PREVALENCE	OBSERVED PREVALENCE	SENSITIVITY	SPECIFICITY
0	0.03	0.48	0.96	0.54
1	0.04	0.44	1.00	0.59
2	0.04	0.47	0.93	0.56
3	0.04	0.41	0.91	0.61
4	0.05	0.39	0.98	0.64
5	0.05	0.34	0.90	0.68
6	0.05	0.35	0.85	0.68
7	0.07	0.25	0.84	0.79
8	0.09	0.22	0.73	0.83
9	0.09	0.19	0.65	0.86
10	0.09	0.23	0.72	0.82
11	0.11	0.22	0.66	0.84
12	0.11	0.21	0.63	0.85
13	0.13	0.19	0.61	0.87
14	0.16	0.23	0.54	0.83
15	0.15	0.24	0.58	0.82
16	0.18	0.28	0.63	0.79
17	0.16	0.27	0.64	0.80
18	0.17	0.26	0.59	0.80
19	0.18	0.23	0.52	0.83
20	0.15	0.21	0.49	0.84
21	0.19	0.21	0.53	0.86
22	0.19	0.25	0.56	0.82
23	0.22	0.28	0.63	0.81
24	0.21	0.24	0.54	0.84
25	0.19	0.25	0.55	0.83
26	0.20	0.26	0.56	0.81
27	0.23	0.26	0.57	0.83
28	0.24	0.26	0.49	0.81
29	0.23	0.27	0.55	0.81
30	0.22	0.25	0.54	0.83
31	0.23	0.26	0.53	0.82
32	0.20	0.25	0.53	0.82
33	0.24	0.24	0.53	0.85

SENSITIVITY AND SPECIFICITY FOR GIRLS FROM BIRTH TO 35 MONTHS

MEASURMENT ERROR = .3
CHG CUTOFF=0
MONTHLY GROWTH STATUS EVALUATIONS
INFINITE BANDS

MONTHS	TRUE PREVALENCE	OBSERVED PREVALENCE	SENSITIVITY	SPECIFICITY
0	0.66	0.59	0.72	0.67
1	0.60	0.55	0.72	0.71
2	0.62	0.56	0.72	0.70
3	0.57	0.54	0.69	0.66
4	0.73	0.63	0.73	0.63
5	0.48	0.49	0.69	0.69
6	0.58	0.54	0.72	0.70
7	0.58	0.55	0.69	0.65
8	0.48	0.50	0.73	0.71
9	0.35	0.41	0.63	0.71
10	0.40	0.46	0.66	0.68
11	0.46	0.46	0.65	0.69
12	0.49	0.48	0.64	0.68
13	0.36	0.42	0.66	0.71
14	0.42	0.43	0.59	0.68
15	0.44	0.48	0.61	0.61
16	0.46	0.50	0.67	0.65
17	0.45	0.50	0.68	0.65
18	0.49	0.49	0.62	0.64
19	0.49	0.48	0.60	0.64
20	0.45	0.49	0.63	0.62
21	0.30	0.42	0.63	0.68
22	0.52	0.46	0.59	0.68
23	0.50	0.51	0.68	0.65
24	0.51	0.51	0.63	0.62
25	0.53	0.51	0.64	0.65
26	0.34	0.43	0.61	0.66
27	0.55	0.55	0.65	0.58
28	0.59	0.53	0.63	0.62
29	0.34	0.42	0.61	0.68
30	0.54	0.52	0.67	0.66
31	0.55	0.54	0.65	0.60
32	0.36	0.45	0.63	0.65
33	0.57	0.51	0.61	0.61
34	0.55	0.50	0.61	0.63
35	0.36	0.42	0.59	0.68

SENSITIVITY AND SPECIFICITY FOR GIRLS FROM BIRTH TO 35 MONTHS

MEASURMENT ERROR = .3
CIG CUTOFF=0
MONTHLY GROWTH STATUS EVALUATIONS
10 BANDS AS IN THE INDONESIAN CHARTS

MONTHS	TRUE PREVALENCE	OBSERVED PREVALENCE	SENSITIVITY	SPECIFICITY
0	0.66	0.46	0.60	0.81
1	0.60	0.41	0.58	0.83
2	0.62	0.41	0.56	0.82
3	0.57	0.37	0.49	0.79
4	0.73	0.43	0.52	0.82
5	0.48	0.33	0.51	0.83
6	0.58	0.36	0.51	0.84
7	0.58	0.33	0.46	0.84
8	0.48	0.31	0.48	0.85
9	0.35	0.24	0.40	0.85
10	0.40	0.25	0.40	0.85
11	0.46	0.28	0.41	0.83
12	0.49	0.29	0.41	0.84
13	0.36	0.23	0.40	0.86
14	0.42	0.25	0.37	0.84
15	0.44	0.25	0.34	0.82
16	0.46	0.28	0.42	0.84
17	0.45	0.26	0.39	0.84
18	0.49	0.25	0.36	0.86
19	0.49	0.26	0.35	0.83
20	0.45	0.26	0.40	0.86
21	0.30	0.21	0.36	0.86
22	0.52	0.24	0.32	0.85
23	0.50	0.25	0.36	0.86
24	0.51	0.25	0.34	0.84
25	0.53	0.25	0.35	0.86
26	0.34	0.21	0.33	0.86
27	0.55	0.26	0.34	0.83
28	0.59	0.26	0.32	0.81
29	0.34	0.21	0.36	0.87
30	0.54	0.25	0.35	0.86
31	0.55	0.26	0.34	0.84
32	0.36	0.19	0.33	0.88
33	0.57	0.23	0.29	0.85
34	0.55	0.23	0.31	0.87
35	0.36	0.17	0.25	0.88

SENSITIVITY AND SPECIFICITY FOR GIRLS FROM BIRTH TO 35 MONTHS

MEASURMENT ERROR = .3
GHG CUTOFF=0
MONTHLY GROWTH STATUS EVALUATIONS
4 BANDS

MONTHS	TRUE PREVALENCE	OBSERVED PREVALENCE	SENSITIVITY	SPECIFICITY
0	0.66	0.15	0.21	0.96
1	0.60	0.14	0.19	0.95
2	0.62	0.13	0.18	0.95
3	0.57	0.11	0.17	0.96
4	0.73	0.14	0.17	0.96
5	0.48	0.08	0.14	0.97
6	0.58	0.10	0.14	0.96
7	0.58	0.09	0.14	0.96
8	0.48	0.08	0.13	0.97
9	0.35	0.06	0.12	0.97
10	0.40	0.06	0.10	0.96
11	0.46	0.06	0.09	0.96
12	0.49	0.07	0.10	0.96
13	0.36	0.05	0.09	0.97
14	0.42	0.06	0.11	0.97
15	0.44	0.05	0.07	0.97
16	0.46	0.06	0.09	0.97
17	0.45	0.05	0.06	0.96
18	0.49	0.07	0.11	0.97
19	0.49	0.05	0.06	0.97
20	0.45	0.08	0.12	0.96
21	0.30	0.05	0.08	0.97
22	0.52	0.05	0.08	0.99
23	0.50	0.06	0.09	0.96
24	0.51	0.06	0.08	0.96
25	0.53	0.05	0.07	0.97
26	0.34	0.05	0.10	0.97
27	0.55	0.06	0.08	0.96
28	0.59	0.07	0.07	0.94
29	0.34	0.05	0.09	0.97
30	0.54	0.05	0.08	0.98
31	0.55	0.06	0.08	0.97
32	0.36	0.04	0.06	0.98
33	0.57	0.06	0.08	0.97
34	0.55	0.05	0.07	0.98
35	0.36	0.04	0.06	0.97

SENSITIVITY AND SPECIFICITY FOR GIRLS FROM BIRTH TO 35 MONTHS

MEASURMENT ERROR = .3
CIG=1/2 EXPECTED WEIGHT GAIN OVER EVALUATION PERIOD
MONTHLY GROWTH STATUS EVALUATIONS
INFINITE BANDS

MONTHS	TRUE PREVALENCE	OBSERVED PREVALENCE	SENSITIVITY	SPECIFICITY
0	0.14	0.59	0.88	0.46
1	0.16	0.55	0.85	0.51
2	0.15	0.56	0.88	0.50
3	0.17	0.54	0.84	0.52
4	0.16	0.63	0.90	0.42
5	0.17	0.49	0.84	0.58
6	0.20	0.54	0.87	0.54
7	0.22	0.55	0.83	0.53
8	0.22	0.50	0.81	0.58
9	0.22	0.41	0.68	0.67
10	0.22	0.46	0.74	0.63
11	0.22	0.46	0.75	0.62
12	0.24	0.48	0.75	0.61
13	0.26	0.42	0.70	0.68
14	0.29	0.43	0.61	0.64
15	0.28	0.48	0.67	0.59
16	0.28	0.50	0.73	0.59
17	0.28	0.50	0.70	0.58
18	0.31	0.49	0.66	0.59
19	0.31	0.48	0.64	0.59
20	0.28	0.49	0.65	0.57
21	0.30	0.42	0.63	0.68
22	0.33	0.46	0.63	0.63
23	0.31	0.51	0.73	0.58
24	0.32	0.51	0.71	0.59
25	0.32	0.51	0.69	0.58
26	0.32	0.43	0.59	0.64
27	0.31	0.55	0.70	0.53
28	0.36	0.53	0.66	0.55
29	0.31	0.42	0.63	0.67
30	0.32	0.52	0.75	0.59
31	0.32	0.54	0.69	0.53
32	0.32	0.45	0.63	0.64
33	0.34	0.51	0.67	0.57
34	0.33	0.50	0.68	0.59
35	0.33	0.42	0.58	0.66

SENSITIVITY AND SPECIFICITY FOR GIRLS FROM BIRTH TO 35 MONTHS

MEASURMENT ERROR = .3
CIG =1/2 EXPECTED WEIGHT GAIN OVER EVALUATION PERIOD
MONTHLY GROWTH STATUS EVALUATIONS
10 BANDS AS IN THE INDONESIAN CHARTS

MONTHS	TRUE PREVALENCE	OBSERVED PREVALENCE	SENSITIVITY	SPECIFICITY
0	0.14	0.46	0.81	0.60
1	0.16	0.41	0.74	0.65
2	0.15	0.41	0.76	0.64
3	0.17	0.37	0.70	0.70
4	0.16	0.43	0.77	0.63
5	0.17	0.33	0.65	0.74
6	0.20	0.36	0.68	0.73
7	0.22	0.33	0.62	0.75
8	0.22	0.31	0.55	0.76
9	0.22	0.24	0.48	0.83
10	0.22	0.25	0.50	0.82
11	0.22	0.28	0.51	0.79
12	0.24	0.29	0.54	0.79
13	0.26	0.23	0.44	0.85
14	0.29	0.25	0.41	0.82
15	0.28	0.25	0.38	0.80
16	0.28	0.28	0.48	0.79
17	0.28	0.26	0.38	0.79
18	0.31	0.25	0.38	0.81
19	0.31	0.26	0.42	0.81
20	0.28	0.26	0.43	0.81
21	0.30	0.21	0.36	0.86
22	0.33	0.24	0.37	0.83
23	0.31	0.25	0.43	0.83
24	0.32	0.25	0.38	0.81
25	0.32	0.25	0.39	0.81
26	0.32	0.21	0.30	0.84
27	0.31	0.26	0.39	0.80
28	0.36	0.26	0.35	0.78
29	0.31	0.21	0.38	0.87
30	0.32	0.25	0.39	0.81
31	0.32	0.26	0.39	0.80
32	0.32	0.19	0.34	0.87
33	0.34	0.23	0.34	0.83
34	0.33	0.23	0.36	0.83
35	0.33	0.17	0.25	0.87

Sens x True prev obs prev.

APPENDIX

SENSITIVITY AND SPECIFICITY FOR GIRLS FROM BIRTH TO 35 MONTHS

MEASURMENT ERROR = .3
CIG-1/2 EXPECTED WEIGHT GAIN OVER EVALUATION PERIOD
MONTHLY GROWTH STATUS EVALUATIONS
4 BANDS

MONTHS	TRUE PREVALENCE	OBSERVED PREVALENCE	SENSITIVITY	SPECIFICITY
0	0.14	0.15	0.34	0.88
1	0.16	0.14	0.25	0.89
2	0.15	0.13	0.24	0.89
3	0.17	0.11	0.26	0.92
4	0.16	0.14	0.25	0.89
5	0.17	0.08	0.19	0.94
6	0.20	0.10	0.21	0.93
7	0.22	0.09	0.20	0.94
8	0.22	0.08	0.19	0.95
9	0.22	0.06	0.15	0.96
10	0.22	0.06	0.12	0.96
11	0.22	0.06	0.15	0.96
12	0.24	0.07	0.14	0.95
13	0.26	0.05	0.10	0.97
14	0.29	0.06	0.12	0.96
15	0.28	0.05	0.08	0.97
16	0.28	0.06	0.11	0.96
17	0.28	0.05	0.07	0.96
18	0.31	0.07	0.11	0.95
19	0.31	0.05	0.07	0.97
20	0.28	0.08	0.12	0.94
21	0.30	0.05	0.08	0.97
22	0.33	0.05	0.09	0.97
23	0.31	0.06	0.10	0.96
24	0.32	0.06	0.08	0.95
25	0.32	0.05	0.09	0.96
26	0.32	0.05	0.10	0.97
27	0.31	0.06	0.10	0.95
28	0.36	0.07	0.09	0.94
29	0.31	0.05	0.10	0.98
30	0.32	0.05	0.09	0.97
31	0.32	0.06	0.09	0.95
32	0.32	0.04	0.06	0.98
33	0.34	0.06	0.11	0.96
34	0.33	0.05	0.07	0.96
35	0.33	0.04	0.06	0.97