

A STUDY OF THE GRADE SYSTEM (SISTEM NILAI)

A New Development in Child Growth
Monitoring Techniques

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EXECUTIVE SUMMARY (English)

Purpose of the Study

This report presents the findings of an evaluation of the growth monitoring Grade System developed by Catholic Relief Services/Indonesia (CRS) for use in its Title II/Child Survival Program. The main purpose of the study is to assess the system's strengths, weaknesses, and potential. This report represents both a step in CRS's continued replication of the Grade System in the Mother/Child Health Centers (run by CRS counterparts) and a means for identifying topics related to the system which need further experimentation by CRS and others.

The Grade System is an innovative and potentially valuable "add-on" component to the national Family Nutrition Improvement Program (UPGK). The system has been designed to address longstanding problems of intelligibility in the individualized Health Progress Card (KMS). The main change in growth monitoring procedures is the introduction of a simple conversion table referred to as the Master Chart. Age and weight data obtained monthly at local CRS Centers are converted using the chart into growth performance grades (nilai) similar to school performance grades. Designers of the Grade System maintain that growth data in the form of "grades" are far easier for parents and Center cadres to understand, recall, and use than the complex growth curves on the KMS cards.

Four basic issues were investigated: system intelligibility, increased parental demand for health services due to the system, accuracy of grade calculations by cadres, and uses of the Grade System in various types of monitoring. These investigations were conducted at ten CRS Centers run by two CRS counterparts (YSS and BSM), in Central Java (Pemalang) and on the island of Flores (Mauwere), respectively. Both quantitative and qualitative survey techniques were used. Extensive use was made both of in-depth interviews and of testing for parental comprehension and grade recall.

Major Findings

1. The Grade System is easily understood and used by cadres and mothers: Both in-depth interviews and test results on a range of variables support this conclusion. The system is thus a major breakthrough in efforts to address longstanding problems of intelligibility in the KMS.
2. A close parallel exists between the growth monitoring Grade System and the school performance grade system: There is a close correspondence in the two systems between grades which are acceptable (roughly down to 5) and those which indicate poor performance (below 6). This parallel is probably a key factor in

the ease with which parents learn to interpret the health implications of different grade levels.

3. Parents' recall of their children's current and past grades was remarkably accurate: 93% of respondents knew the child's current grade and roughly half still correctly and confidently recalled the child's grade from six months ago. Interim months showed a gradual attrition in memory, as would be expected.
4. Minimal association was found to exist between economic status and parent's ability to understand and recall their children's grades: Scores on two variables testing knowledge of the relationships between health status and grade level differed slightly according to economic status, but the differences were not statistically important. Moreover, on both variables, over three-quarters of the poorest respondents showed full comprehension.
5. Illiterate and minimally educated parents are at a slight disadvantage in comprehending the Grade System: Even given this disadvantage, however, roughly two-thirds of the illiterate mothers in the sample showed full system comprehension on the measures used. In recall of grades, parents with little or no education showed no disadvantage when compared to those with higher education.
6. Evidence was found to suggest that use of the Grade System may be resulting in greater demand for nutritional and health information by parents: Easy comprehension of the Grade System combined with concern over low grades, suggests that low grades may serve as a "symptom" of health problems to parents (similar to fever or diarrhea). This in turn would stimulate parental demand for health services or at least for information on how to increase the grade. Though unsystematic and anecdotal in nature, this evidence suggests that the introduction of the Grade System alone might spontaneously stimulate health service demand.
7. Using the Master Chart, cadres are able to determine grades with a degree of accuracy: Child weight and age data from CRS Center records and a computer program were used to recalculate grades for each child in earlier months. Cadre accuracy was not only high, but showed improvement over time.
8. An easily corrected source of error in cadre grade determinations was identified: Both recalculation of past grades and cadre test data indicated cadre confusion over which direction to round weights on the Master Chart (rounding should be up).
9. The Grade System is useful for certain types of monitoring tasks, but not for others: Grade data is an accurate and useful measure of growth performance for monitoring the progress of individual children. Grade data marked on the Master Charts and turned in

to CRS each month, also serves as a useful and effective procedure for monitoring program operations. However, grade data from Master Charts should not be used to monitor program impact on communities without prior establishment of adequate intra-village and inter-village control groups.

10. There is a major need for further experimentation with the use of grades in monitoring and educational activities: However, further modifications in the Master Chart itself and in grade determination procedures are probably unnecessary and could be counterproductive.

Recommendations to CRS

1. Based on the highly positive findings of this study it is recommended that CRS continue to replicate the Grade System in as many of its other counterpart Centers as is feasible.
2. It is strongly recommended that the close parallel between the growth monitoring grades and school performance grading be more extensively and creatively used in efforts to train cadres and consult with parents.
3. Given the problem of cadre uncertainty over how to round borderline weights on the Master Chart, it is recommended that an additional note be placed on the chart which indicates that rounding should be up, not down.
4. To reduce replication costs and widen the range of people who understand and can calculate growth grades, CRS should develop and test a simple training package, complete with all necessary written materials.
5. With the basic elements of the Grade System in place, it is recommended that investment in experimentation now shift to exploring ways to use grades more effectively in individual child monitoring and in parental education activities.

EXECUTIVE SUMMARY (Indonesian)

Tujuan Studi

Laporan ini menyampaikan penemuan-penemuan dari sebuah evaluasi Sistim Nilai. Sistim ini sedang dikembangkan oleh Catholic Relief Services (CRS)/Indonesia untuk digunakan dalam Title II/Child Survival Program. Tujuan pokok studi adalah untuk mengumpulkan informasi tentang kekuatan, kelemahan, serta potensi Sistim Nilai. Riset ini merupakan suatu langkah dalam replikasi Sistim Nilai di pos-pos CRS lain (yang dijalankan oleh counterpart CRS) dan sekaligus merupakan suatu alat untuk mengetahui hal-hal berhubungan dengan Sistim Nilai yang masih membutuhkan perkembangan lebih lanjut.

Sistim Nilai adalah suatu "komponen tambahan" inovatif yang mempunyai potensi yang sangat berarti dalam program UPGK (Usaha Perbaikan Gizi Keluarga). Sistim ini dibentuk justru untuk mengatasi kesulitan pengertian Kartu Menuju Sehat (KMS) bagi ibu-ibu Balita. Alat pokok dalam Sistim Nilai adalah suatu daftar konversi yang dinamakan Master Chart. Data umur dan berat badan (yang diperoleh tiap bulan di pos penumbuhan setempat) diubah menjadi nilai pertumbuhan (bilangan utuh antara 1 - 10). Para perancang sistim berpendapat bahwa data pertumbuhan anak dalam bentuk "nilai" jauh lebih mudah dimengerti, diingat, dan digunakan oleh orang tua maupun kader kesehatan dibandingkan kurve-kurve pertumbuhan KMS yang sangat rumit.

Lima masalah dasar berkenaan dengan Sistim Nilai diteliti dalam studi ini yaitu: 1) kemudahan sistim untuk dimengerti, 2) bertambahnya tuntutan akan pelayanan akibat adanya sistim itu, 3) ketepatan penghitungan nilai oleh kader, dan 4) kegunaan-kegunaan Sistim Nilai dalam monitoring.

Sepuluh pos yang dikembangkan oleh dua counterpart CRS (yaitu YSS dan BSM) dipelajari. Pos ini terletak di Jaya Tengah (Pemalang) dan di pulau Flores, NTT (Maumere). Dalam pengumpulan data digunakan baik teknik-teknik survey kualitatif maupun kuantitatif. Dua teknik pokok adalah wawancara yang mendalam dan pengujian orang tua secara formil tentang pemahaman dan kemampuan mengingat nilai anaknya.

Temuan-temuan utama

1. Sistim Nilai mudah dimengerti dan digunakan oleh para kader dan para ibu: Baik wawancara mendalam maupun hasil test menunjukkan dan mendukung kesimpulan ini. Sistim Nilai nampaknya merupakan suatu pemecahan masalah-masalah kesulitan pengertian KMS yang penting dan perlu diberikan perhatian lebih dalam.

2. Ditemukan persamaan yang dekat antara bilangan dalam Sistim Nilai dan bilangan dalam nilai prestasi sekolah: Nilai-nilai yang menunjukkan keadaan "baik" (6 ke atas) tidak berbeda dalam kedua sistim dan nilai-nilai yang menunjukkan keadaan "jelek" (dibawah 6) juga sama. Persamaan ini mungkin merupakan faktor kunci yang memudahkan orang tua untuk cepat mengerti implikasi-implikasi nilai dalam kesehatan anaknya.
3. Ingatan orang tua akan nilai-nilai anaknya pada bulan ujian dan pada bulan-bulan lampau tepat: 93% responden mengetahui dengan tepat nilai anaknya pada waktu tesnya dilakukan. Lebih mengherankan bahwa separuhnya masih mengingat nilai anaknya dari enam bulan yang lalu dengan betul dan yakin. Kesalahan dalam ingatan meningkat bulan demi bulan diantaranya sebagaimana diduga.
4. Detemukan hubungan yang sangat minimal antara status ekonomi dan kemampuan orang tua anak untuk memaham dan mengingat nilai anaknya: Dua variable menunjukkan pengaruh kecil dari status ekonomi terhadap kemampuan orang tua untuk memaham arti nilai, namun efek tersebut hampir tidak berarti secara statistik. Tambah lagi, hampir 3/4 dari responden yang paling miskin dapat memaham dan mengingat nilai anaknya dan memakai nilai anaknya secara penuh. Kesimpulannya orang miskin dapat mengerti dan memakai nilai.
5. Ibu-ibu yang buta huruf atau pendidikannya minimal mengalami kesulitan dalam memahami Sistim Nilai dibandingkan dengan ibu-ibu yang pendidikannya lebih tinggi: Namun demikian, kurang lebih 2/3 ibu yang buta hurufpun dapat memahami sistim secara penuh. Mengenai pengingatan nilai anaknya, orang tua yang tidak berpendidikan atau sedikit berpendidikan sama sekali tidak mengalami kesulitan dibandingkan dengan orang tua yang berpendidikan tinggi.
6. Ditemukan data yang menunjukkan kemungkinan bahwa penggunaan Sistim Nilai dapat meningkatkan tuntutan orang tua akan informasi gizi dan kesehatan: Pengertian dan keprihatinan orang tua atas nilai rendah menunjukkan bahwa nilai rendah atau nilai yang menurun dapat berfungsi sebagai "gejala" masalah kesehatan (mirip dengan demam atau diare) yang bisa merangsang orang tua untuk mencari informasi atau pelayanan kesehatan dari kader ataupun tenaga kesehatan profesional. Walaupun data tentang peningkatan tuntutan tersebut tidak sistimatis, namun data ini menunjuk kemungkinan bahwa penambahan Sistim Nilai dalam kegiatan UPGK dapat secara spontan merangsang tuntutan pelayanan kesehatan.
7. Penghitungan nilai-nilai oleh kader dengan memakai Master Chart pada umumnya dilakukan secara tepat: Data berat badan serta umur anak yang dicatat dalam Center Record Book pada bulan-bulan lalu digurakan dalam menghitung kembali nilai anak-anak. Ditemukan bahwa ketepatan penghitungan nilai oleh kader dulu cukup tinggi dan bertambah tepat selama enam bulan terakhir.

8. Satu sumber kesalah dalam penghitungan nilai oleh kader ditemukan tetapi masalah ini mudah diatasi: Hasil dari penghitungan kembali nilai terdahulu maupun hasil tes kader menunjukkan bahwa pada umumnya kader tidak jelas tentang cara membulatkan angka nilai kalau berat badan jatuh pada batasan diantara dua nilai di Master Chart. Seharusnya nilai yang lebih besar diambil.
9. Sistem Nilai berguna hanya dalam kegiatan monitoring tertentu: Data nilai adalah suatu alat ukur pertumbuhan yang akurat dan berguna dalam monitoring kemajuan anak-anak secara individu. Data nilai di Master Chart yang di serahkan tiap bulan kepada CRS nampaknya juga sangat berguna dalam monitoring kegiatan-kegiatan program (program operations). Tetapi data nilai yang dikumpulkan secara bulanan lewat Master Chart tidak cukup untuk memonitor dampak program di suatu wilayah kalau tidak disertai dengan data dari kelompok-kelompok "control" baik inter-desa maupun intra-desa.
10. Masih ada kebutuhan besar untuk percobaan lebih lanjut berhubungan dengan penggunaan nilai-nilai dalam kegiatan-kegiatan monitoring dan penyuluhan: Akan tetapi, bentuk Master Chart serta prosedur-prosedur yang dipakai dalam penghitungan nilai (yang telah diuji-coba oleh CRS) merupakan suatu hasil percobaan yang cukup lengkap dimana banyak faktor telah dipikirkan dan dipertimbangkan. Perubahan-perubahan lagi dapat menggangguimbangan antara faktor-faktor ini.

Saran-Saran Untuk CRS

1. Berdasarkan temuan-temuan yang sangat positif dari studi ini maka disarankan agar CRS melanjutkan penyebaran dan pengembangan Sistem Nilai di Center-Center lain.
2. Sangat disarankan agar persamaan yang dekat antara nilai pertumbuhan dengan penilaian prestasi sekolah digunakan secara kreatif dan eskstensif dalam pelatihan kader dan penyuluhan orang tua.
3. Dengan adanya masalah ketidak-jelasan kader dalam pembulatan nilai dalam Master Chart maka disarankan agar suatu catatan tambahan ditaruh pada Chart yang menunjukkan bahwa pembulatan harus ke atas, bukan ke bawah.
4. Untuk mengurangi biaya penggunaan Sistem Nilai di pos-pos lain dan meluaskan jumlah orang yang mengerti dan bisa menghitung nilai-nilai maka disarankan agar CRS/Jakarta mengembangkan dan menguji-coba suatu paket pelatihan Sistem Nilai yang sederhana dan lengkap dengan bahan-bahan yang diperlukan.

5. Dengan adanya Master Chart serta prosedur-prosedur untuk memakainya yang cukup lengkap maka disarankan agar kegiatan percobaan selanjutnya difokuskan pada pengembangan cara-cara menggunakan nilai baik dalam penjagaan (monitoring) kesehatan anak secara individu maupun dalam pelaksanaan penyuluhan yang lebih efektif.

1. INTRODUCTION

1.1 Purpose of this Study

For the past two years CRS/Indonesia has been experimenting with an "add-on" component to its version of the national Family Nutrition Improvement Program (UPGK).¹ This component is usually referred to as the Grade System (or in Indonesian, sistem nilai). Built on CRS work in several countries over the past ten years, the system is now being pilot-tested in Indonesia as part of the USAID-funded Title II/Child Survival Program.

The Grade System addresses problems of intelligibility in the individualized Health Progress Card, KMS, the key documentation instrument in UPGK (see Appendix A).² Using the Grade System, a child's monthly age and weight data are transformed with the aid of a Master Chart (see Appendix B) into a whole number or grade (nilai) ranging from one to ten.³ Each grade is a percentile range on the KMS growth curves, so that as in school performance marks, a child who remains at roughly the same percentile over time maintains the same grade. The derived grade is then entered directly onto the standard KMS as a record for future reference (see Appendix C for a detailed description of the Master Chart and system procedures).

Proponents of the system maintain that the transformation of age/weight data into grades makes interpretation far easier for parents, who should retain primary responsibility for monitoring child health. Given the natural concerns of parents for their young child's well being, the provision of a better measurement of current health status could encourage parents to take a more active role in the growth monitoring process. Over time, this would both improve program impact and reduce program costs.

If the Grade System is indeed being easily understood and utilized by minimally-educated village parents, and does not add major new burdens to already overworked health cadres, then the system could represent a major breakthrough in growth monitoring efforts.

This study was therefore carried out to assess the achievements, limitations, and potential of the Grade System as an "add-on" component in growth monitoring activities. The report focuses on four basic issues: system intelligibility, the effects of the system on parental demand for nutrition and health care services, accuracy of grade calculations by cadres, and monitoring activities based on the system.

1.2 Background

Role of KMS in UPGK

Over the past few years, national health policy decisions have been made to concentrate the provision of government health services at the sub-village level through the POSYANDU (Integrated Health Services Posts). The POSYANDU provides a number of services, but the UPGK weighing activity is the central monthly event around which other POSYANDU activities take place.⁴ UPGK has two primary objectives: a) singling out those children at greatest risk for special treatment and, b) educating mothers in improved child care and feeding practices. A key instrument in achieving both objectives is the individualized KMS (Health Progress Card).

The KMS is an Indonesian adaptation of a card first developed in Africa in the 1960s where it was used in clinical settings by health professionals.⁵ The KMS documents each child's growth progress through multi-dimensional graphic representations combining monthly age, weight, and growth percentile data. As used in the UPGK program, the KMS are usually kept by a child's family, and large investments have been made in production of multi-color, graphically interesting cards in the hopes that parents would come to treat the KMS as valued objects.⁶

A major assumption underlying the use of the KMS in the UPGK program has been that this document can serve as a simple, visual tool for cadres in discussing a child's progress with its mother. Unfortunately, field experience has shown that many, perhaps most, parents, especially poorer, less educated mothers, have difficulty in deciphering (what are for them) the card's complex graphic representations. The inability to interpret the growth/health data in the KMS effectively limits parents to a passive role in both educational activities and growth monitoring. The major responsibilities for both have therefore fallen on the health cadres, though even trained cadres sometimes have difficulty filling in, much less interpreting, the KMS. Because an accurate and usable documentation instrument is essential for achieving UPGK objectives, these difficulties with the KMS pose serious negative implications for program effectiveness.

CRS and Development of the Grade System

Among other activities, CRS/Indonesia carries out a food assistance program using PL 480/Title II commodities. These commodities are distributed through seven Indonesian non-governmental organizations (referred to as "counterparts") in six provinces.

Growth monitoring activities have been part of the CRS program since the 1970s. These activities were redesigned in 1984 as an expanded CRS mother and child welfare program. Under the redesign, CRS began to explore new approaches to UPGK growth monitoring activities. Testing was focused on 25 Pilot Centers around the country, with each counterpart responsible for several Centers. Each Center in turn is the focal point for several hamlet-level "weighing groups" (klompok), with each group consisting of 30-50 households with children under five years old.

Based on initial experiences with growth monitoring, CRS noted that both mothers and cadres were having major difficulties with the KMS. The card's graphic abstractions, even with color coding, were simply too complex for minimally educated parents and cadres to understand. Dr. Carlo Capone (CRS/HQ), who had been working on this problem for several years and in several countries, was called in to assist in addressing this pressing issue. In 1984, CRS received approval from the Department of Health to begin experimenting with the Grade System as an add-on component to the standard UPGK package of village nutrition and health services.

During the initial stages of implementation, several difficulties were identified and most were overcome. Responding to procedural problems arising from the initial layout of the Master Chart, Capone redesigned the chart.⁷ The new chart was introduced through training seminars for CRS counterparts in September 1985 and the current form of the Grade System began to be put into practice in late 1985. This version of the Master Chart is a careful compromise among several different requirements, including accuracy, legibility, ease of use, and cadre focus on mothers and children rather than on documentation.

CRS is now considering replicating the Grade System in all 260 of its Centers. In addition, the GOI, other PVOs, and donors are becoming increasingly interested in the system. For these reasons, it is important to assess the system's strengths and weaknesses, and to reflect on its potential for contributing to the emerging POSYANDU program before embarking on major replication efforts. This study was therefore carried out as a cooperative effort between CRS and USAID/Indonesia.

1.3 Methodology

Study Design

The preferred methodology for a study of this type would have been a comparison of weighing posts which differ only in the presence or absence of the Grade System. However, because the Grade System is being used only in CRS's Pilot Centers where several other program innovations are also being tested, it would be difficult to control for the effects of these other innovations. The findings from a comparative analysis of CRS Centers (with and without the system) under these conditions would not be conclusive, so a comparative methodology had to be rejected.

As an alternative, this evaluation focuses on the Grade System only in CRS Pilot Centers, and the emphasis is on those aspects of the Grade System which appear to most clearly address problems in the KMS. The result is an identification of key strengths and weaknesses of the system which can be used by CRS or others for future testing in a more rigorous comparative framework.

Given time and resource constraints, this study is limited to testing certain effects of using the Grade System, rather than evaluating actual procedures used by cadres during weighing and recording. Full

consideration of the latter would have required systematic data collection during weighing sessions. However, over the course of the past year, Dr. Capone and the CRS/Indonesia staff have identified several problem areas concerning weighing center procedures. These are drawn into this report (primarily as footnotes) for the benefit of non-CRS/Indonesia readers.

Data and Analyses

Data for addressing these questions were obtained through the following sources:

1. structured questionnaire surveys with parents and cadres,
2. short "tests" administered to all mothers and cadres, and
3. in-depth interviews with parents, cadres, and supervisors.

In exploring an issue as complex as the intelligibility of the Grade System, it is important to use concrete measures to the extent possible. Questionnaires and tests were thus designed to explore, step-by-step, a series of topics reflecting system intelligibility and use. To make statistical analysis easier and more meaningful, questions on these topics were structured so that answers could be unambiguously scored as "correct" or "incorrect" (i.e., as binary variables). Results were then analyzed using simple descriptive statistics, and the process was made considerably easier through the use of a computer.

By asking several parallel questions exploring each test point and scoring a respondent "correct" only if all responses were correct, it was possible to construct verified, logically interrelated composite variables, each measuring a particular aspect of system intelligibility. The findings reported below are therefore conservative--the system could be even more effective than suggested here.

In-depth interviews were recorded and later analyzed through content analysis. Data from these interviews served to identify potential problems not yet anticipated when the questionnaire was prepared, as well as to provide verification and contextual data for interpreting the quantitative results.

Given the "testing" nature of the interviews, it was important to reduce inter-respondent communication as much as possible. For this reason, mothers in each post were gathered together at the outset and special educational materials which had been brought by the team were used to keep them busy. Each respondent was then interviewed in isolation in a separate room without the benefit of Center cadres, village leaders, counterparts, or other health workers who might influence their responses. After each interview, respondents were sent directly home. In this way, pre-interview knowledge of what was to be asked was kept to a minimum.⁸

Study Sample

For statistical purposes, the sample of parents interviewed needed to consist of at least ten weighing groups (klompok) representing ten different Centers. The family member accompanying the child to the post was in almost every case the mother, and all mothers and cadres in each group were interviewed, yielding a total sample of 251 parents and 62 cadres. Because size variations were not great between weighing groups, these groups were not weighted for statistical analyses.

To reduce logistical difficulties, the ten weighing groups used in the study were drawn from Centers assisted by only two of CRS's seven counterparts. These two reflected the best and worst local conditions under which the Grade System is currently being tested. The first counterpart (YSS) is working in the Pemalang district of Central Java; the second (BSM) is working in the Maumere district on the island of Flores (NTT province). The Java Centers, while in poor areas, represent far better local conditions with more advanced physical infrastructure (roads, electricity, etc.) and higher education levels than the Flores Centers. The Central Java counterpart had also been working with CRS for several years, while Flores entered the program only in 1983. Within these two selected areas, only Centers which had been using the Grade System for at least one year were used in the study and the most active weighing group was the one included in the survey.

Study Team

The study was carried out by a team consisting of a program evaluation specialist (USAID/Indonesia), a field data collection specialist (CRS consultant), and CRS staff members. Data were collected in August and September; data analyses and draft report preparation were completed in November 1986.

2. SYSTEM INTELLIGIBILITY

The principal purpose of the Grade System is to address problems of intelligibility inherent in the current KMS system. The first step in this investigation was therefore to determine the extent to which parents actually understand the Grade System. Two basic questions were explored:

- Do mothers comprehend the basic relationships between grade (or change in grade) and actual condition of the child?
- Can mothers recall the current and past grades of their children when they do not have immediate access to data on the KMS?

Answers to these questions were then followed up with a third which focused on the effects of socio-economic factors:

- Do mothers at the lowest economic and educational levels have more difficulty in either comprehension or recall of grades, as would be expected with the complicated KMS card alone?

Specific survey questions were asked of all respondents to test the hypotheses that some portion of them might not fully understand the system. These questions were then explored further through in-depth interviews.

2.1 Knowledge of Relationship of Grades to Child Health

In exploring the ability of mothers to correctly perceive the relationship of a child's health and his/her current grade, we proceeded in a step-by-step fashion. Three "levels" of potential error in comprehension were anticipated.⁹

Grade Directionality

First, it was suspected that some mothers might not understand that higher grade numbers indicate better health conditions (i.e., some mothers might incorrectly believe that the closer to [1], the better the child's condition). Three similar questions were posed in which the respondent was given two grades and asked to choose the one meaning better health condition. A composite variable was then constructed in which the respondent scored "correct" only if she had responded correctly to all three examples given. Results showed that essentially all mothers (97%) correctly understand the system on this basic point.

Grade Ranges for "Healthy" and "Unhealthy" Condition

Second, a mother clearly cannot interpret the meaning of her child's monthly grade by herself unless she knows the grade range at which potential health or growth problems might be indicated. In the Grade System, the transition from the 80th to the 81st percentile (green to

yellow on the KMS) occurs between grades 5 and 6.¹⁰ Parents are informed by cadres that when the child's grade falls around or below these points, they should become concerned.

Data from in-depth interviews showed that most mothers know that beginning roughly at the range of grades 5-6, that their children should be considered "unhealthy" or "undernourished", and hence are at greater risk of falling ill.

To test more precisely mothers' knowledge of this range, two logically interrelated survey questions were asked to identify: a) the lowest grade which was still within the "healthy" range (dianggap sehat) and b) the grade at which a child enters nutritional risk (dianggap kurang gizi). Table 1 shows the range of responses on these two variables.

TABLE 1
RANGE OF MOTHERS' RESPONSES ON QUESTIONS LOCATING
PERCEIVED TRANSITION FROM "HEALTHY" TO "AT RISK"

Grade	Lowest Grade Still within Healthy Range		Beginning of Nutritional Risk		
	number	percent	number	percent	
[12]	1	-	-	-	
10	6	3%	-	-	
9	2	1%	-	-	
8	18	8%	1	-	
7	29	13%	4	2%	
6	153	67%	17	7%	} 93%
5	12	5%	154	68%	
4	8	3%	42	18%	
3	1	-	9	4%	
2	-	-	-	1%	
1	-	-	-	-	
[0]	-	-	2	1%	
	230	100%	230	100%	

[note: bracketed responses were outside the meaningful range]

A composite variable was also constructed in which a mother's responses had to fall within acceptable ranges on both variables (i.e., 5-6-7 and 4-5-6, respectively) to be scored "correct" on the composite. Fully 77% of mothers scored correctly on this composite variable.

These results show that given only the monthly grades of their children, most respondents in the study Centers can correctly interpret the basic growth status of their child by themselves without any further assistance from weighing post personnel.

Information from in-depth interviews suggested that widespread understanding of these transitional ranges in grade is at least partially due to a fortuitous parallel between the growth grade system and the Indonesian school (performance) grading system. Performance in each subject is reported as a number between 1 and 9. Parents of rural children usually consider grades of 7 and above to be good, 6 to be marginal, and 5 and below to be poor. Grades 6 and above are written in blue ink on the report card and grades 5 and below are written in red.

Children's school performance is important to parents because diplomas are a major factor in getting a government job after graduation. More immediately, children must compete for positions in the national (negri) schools which are much cheaper and better than the private (swasta) schools. For these reasons, most rural parents probably consider a school grade drop below 6 (into the red) to be serious.

The parallel between the meaning of specific levels in the two systems is fortunate and almost surely facilitates spontaneous "transfer" of understanding of the meaning of school grades to growth monitoring.

Association of Change in Condition with Change in Grade

A third level of potential difficulty for mothers is the meaning of grade change over time. It was suspected that mothers might not fully understand that a reasonably healthy child (i.e., between grades 6 and 10) need not necessarily increase in grade over time. During in-depth interviews, some confusion was found on this point.

To determine the extent of the problem, two logically inter-related questions concerning changes in health and grade were asked of mothers. First, "what happens to the grade of a child who was healthy (or "plump", gemuk) but becomes unhealthy ("skinny", kurus)?" 93% of mothers responded correctly that the child's grade would decrease with deterioration in health/weight.

The second question was "what happens to the grade of a child who remains healthy over time?" The correct response is that grade should remain unchanged or possibly go up, but only 45% of mothers responded in this way. A full 46% incorrectly thought that if a child remains healthy over time, then the grade must also be increasing.¹¹

Data from in-depth interviews suggest that the confusion is between "weight" and "grade". The heavy UPGK emphasis on the message that "a healthy child always gains weight" is probably leading to the false

expectation that grade should also continually rise as long as a child remains healthy. Both mothers and many cadres were confused about the weight vs. grade distinction (though oddly, this did not interfere with their understanding of other aspects of the system). One reason for cadre confusion could be CRS's emphasis on raising all children (below 10) to higher grades, regardless of their current grades. Confusion was also noted on this question at higher supervisory levels at CRS/ Jakarta. This suggests that the problem at lower levels might be dealt with by simply correcting misinformation at the top. Greater use of the parallel noted earlier between school marks and growth grades in explaining the Grade System would also reduce the general confusion on this point.

In any case, less than complete understanding on this point may not be that important as it in no way interferes with the basic program messages: 1) a child's grade should remain above 5, and 2) the grade should not be decreasing. In this regard, what this test item did show was that at least 91% of all respondents clearly understood that if a child remains healthy, then his grade should not be decreasing.

2.2 Mother's Ability to Recall her Child's Grade

Another aspect of intelligibility of the Grade System is the ease with which parents can recall the current and past grades of their children. Easy and correct recall frees the parent from the immediate need for the KMS when discussing the past performance of a child, thus increasing the utility of the growth information in day-to-day decisions. We therefore needed to test the ability of mothers to "spontaneously recall" grades, that is, without immediate access to written data on their child's KMS.

This was done through a test of each mother's recall. All cards were collected when the interviewers first entered a Center. Each child's actual grades for the current month (August) and the previous six months were transferred from the KMS to the questionnaire. During the interviews mothers were asked to recall the child's grade for each of these seven months, beginning with the most recent. The data were later analyzed per month by subtracting the mother's recalled grade from the KMS recorded grade. A response of "cannot recall" was scored as an "inaccurate" response. (Respondents were, of course, only included in the analyses if they were in the program by the month indicated.) The results are shown in Table 2.

TABLE 2

ABILITY OF MOTHERS TO ACCURATELY RECALL THEIR CHILD'S
GRADES FOR THE PREVIOUS SIX MONTHS

MONTH -----	Percent with Accurate Recall -----	Percent Accurate or Missed by Only 1 Grade -----	N ---
August	93 %	96 %	246
July	83 %	91 %	245
June	74 %	86 %	239
May	67 %	79 %	236
April	66 %	75 %	229
March	51 %	61 %	170
February	45 %	56 %	153

[note: "no answer/do not know" was scored as an inaccurate response]

Given the simplicity of the system, it is not surprising that nearly all mothers (93%) correctly recalled their child's grade for the most recent weighing (August). More striking, however, was evidence that most mothers are correctly recalling their child's grades over a period of several months. The table shows (as would be expected) that a gradual attrition in memory occurs over time, yet fully half the mothers could still correctly recall their child's grade from six months ago (March).

The high degree of accuracy in recall suggests that parents are easily internalizing growth/health information when presented as grades. This means that they then have immediate access to this information in everyday settings, such as in casual conversations within families or among friends about a given child's health condition.

2.3 Effects of Education and Economic Status

An important measure of the usefulness of the Grade System is the extent to which parents' ability to comprehend and recall grades is tied to levels of education and to economic status. These variables are particularly important because they have consistently been shown to be the socio-economic factors most closely related to differences in mothers' health and nutrition knowledge, attitudes, and practice, and to nutrition "impact" variables (e.g., anthropometric measures). For this reason it is important to know whether the Grade System shows evidence of being more accessible to persons with lower education and economic status than would be expected using the difficult KMS system alone.

Effects of Mothers' Economic Status

To measure the effects of mothers' economic status, an accurate but simple economic indicator was needed. The most obvious measure, income, is almost impossible to assess accurately for villagers with multiple and changing income sources. Similarly, data on productive resources (such as land or livestock) as a proxy for income tends to misclassify households with high-wage government or skilled craftsman jobs but few capital resources. Both problems were avoided by focusing on expenditures using a household items index.

In constructing an index of this type, it is important that it reflect only the household's disposable income without interference from extraneous factors. It was therefore important to include only "prestige" items which all households at a given income tend to buy. Items that have different prestige value for different ethnic groups (e.g., wall clocks) were rejected. Items were also rejected which are used by some households as capital rather than as prestige goods (e.g., sewing machines). In order to gain tighter control over exactly what was being measured, the list was shortened to only a few key items meeting these criteria--radio/tape players, guest table/ chair sets, TVs, and motorbikes. (Note that both electronic items are often run on batteries and so are not tied to the availability of electricity.) Based on cost ranges, these items were used to form a three-level economic status scale as follows:

<u>Economic Status</u>	<u>Prestige Item(s) Owned</u>	<u>Item Cost</u>	<u>% All Sample Respondents</u>
High	TV and/or motorbike	above Rp 100,000	10.8%
Mid	Guest furniture set and/or radio-tape player (but neither high status item)	roughly Rp 15,000 to Rp 40,000	52.0%
Low	None of the four items		37.2%

We approached the question of whether lower economic status women were at a disadvantage in understanding the Grade System by looking for evidence that more of these mothers would perform poorly on the variables presented in the above sections. The results of this analysis are shown in Table 3 (following page).

Results showed no major differences in comprehension and recall among women of different economic status. Slight differences were noted in comprehension of poorer and wealthier women for the two variables related to relationship between health condition and grade levels (B and C), but the differences were of minimal statistical importance. On the whole, these data suggest that poorer women are not at a relative disadvantage in comprehending and using the grades.

TABLE 3

EFFECTS OF ECONOMIC STATUS ON MOTHERS'
COMPREHENSION AND GRADE RECALLA. Grade Directionality [2.1]

Economic Status	Answered Correctly (%)	N (Total)
high	96 %	27
mid	98 %	130
low	97 %	93
overall	97 %	250

B. Grade Ranges "Healthy" and "At Risk" [2.1]

Economic Status	Answered Correctly (%)	N (Total)
high	85 %	27
mid	78 %	130
low	72 %	93
overall	77 %	250

C. Association of Change in Condition with Change in Grade [2.1]

Economic Status	Answered Correctly (%)	N (Total)
high	89 %	27
mid	89 %	130
low	80 %	94
overall	85 %	251

D. Ability to Recall Child's Grade from Latest Weighing [2.2]

Economic Status	Answered Correctly (%)	N (Total)
high	93 %	27
mid	94 %	125
low	92 %	91
overall	93 %	243

[note: numbers in brackets indicate the corresponding section of the text; composite variables used in items A-C]

Effects of Mothers' Education Level

The second key socioeconomic variable tested in relation to comprehension and grade recall was mother's education level. Data were collected on the final grade level attained by the respondents. Since it was assumed that education level was meaningful primarily in relation to a mother's level of literacy, respondents were categorized in these terms rather than in the more standard blocks of "no school", "primary school", "junior high", etc. The following three categories were used:

<u>Years in School</u>	<u>Presumed Level of Literacy</u>	<u>Rationale</u>	<u>% All Sample Respondents</u>
0-2 yrs	functionally illiterate	little reinforcement of literacy skills gained in first or second grades	11.6 %
3-6 yrs	minimally literate	some ability to read printed materials such as the KMS	74.9 %
7+ yrs	fully literate	relatively familiar with communication through printed sources such as the KMS	13.5 %

As with economic status, the possible disadvantage of less educated mothers was explored by looking for evidence that they would perform more poorly on the comprehension and recall variables discussed above. The results of this analysis are shown in Table 4.

This table shows some disadvantage for less educated mothers for knowledge of grade directionality (A), in correct grade ranges (B), and association of grade and health change (C). However, it is also important to note that for all three variables, the overwhelming majority of even the "illiterate" demonstrated full comprehension (72%, 59%, and 85% respectively).¹² Concerning ability to recall past grades (D), no disadvantage was found for less educated mothers.

TABLE 4

EFFECTS OF EDUCATION LEVEL ON MOTHERS'
COMPREHENSION AND GRADE RECALLA. Grade Directionality [2.1]

Years of Schooling	Answered Correctly (%)	N (Total)
0-2 yrs	72 %	29
3-6 yrs	100 %	188
7+ yrs	100 %	34
overall	97 %	251

B. Grade Ranges "Healthy" and "At Risk" [2.1]

Years of Schooling	Answered Correctly (%)	N (Total)
0-2 yrs	59 %	29
3-6 yrs	76 %	188
7+ yrs	100 %	34
overall	77 %	251

C. Association of Change in Condition with Change in Grade [2.1]

Years of Schooling	Answered Correctly (%)	N (Total)
0-2 yrs	90 %	29
3-6 yrs	85 %	187
7+ yrs	83 %	35
overall	85 %	251

D. Ability to Recall Child's Grade from Latest Weighing [2.2]

Years of Schooling	Answered Correctly (%)	N (Total)
0-2 yrs	92 %	27
3-6 yrs	94 %	182
7+ yrs	91 %	34
overall	93 %	243

[note: composite variables used in items A-C]

3. GRADE SYSTEM EFFECTS ON PARENTAL DEMAND FOR HEALTH SERVICES

A fundamental assumption underlying UPGK educational efforts has been that parents can take a more active, informed role in improving child nutrition and health care. Consequently, UPGK activities are designed to provide parents both with important information on nutrition and child care topics and with a means for knowing when special attention to a child's condition is needed. The KMS, as the primary record of each child's progress, is expected to be a key element in this process. Problems with intelligibility of the card, however, have undermined the overall effectiveness of efforts to upgrade parental roles.

Earlier sections of this report have shown that the Grade System can make basic child growth/health data more understandable and more available to parents and cadres. Does this then lead to a more active, informed role by parents? Specifically, does it lead to greater parental demand for child nutrition and health care information and, when necessary, to greater parental demand for professional health care services?

Developing solid evidence that the introduction of the Grade System increases demand for services is difficult. Perhaps the best approach would have been a series of detailed case studies focusing on a limited sample of families over time. Under the circumstances, we were limited to examining certain indicators that demands for educational and health care services might be increasing. Specifically, we focused on two questions:

1. Are mothers closely associating changes in their children's grade level with specific health-related causes?
2. Is there evidence of parental concern over low or decreasing grade which might lead parents to seek out means for increasing grades?

3.1 Ability to Relate Past Grade Changes to Specific Illness-Related Causes

The ability of mothers to relate changes in their children's grades to health-related causes was tested by focusing on specific episodes of grade drop in the recent past for each child. Interviewers examined each child's card and selected the most recent episode in which the child had dropped at least two grade levels in three months or less. These drops represent drastic cases of health status change, but are salient, clearly definable instances of grade movement about which mothers could be queried.

Of a total of 251 cases reviewed, 29% (74) had at least one incidence of a major drop in grade (as defined above). For these cases, 92% (68) of the respondent mothers were able to identify a specific health-related cause. Many simply explained these grade drops as due to "child would not eat"; others focused on symptoms, the most common being

"fever" and "diarrhea". A few, however, actually pointed to the effects of specific nutrition or health-related practices such as "weaning to solid foods" or "too little protein". These results were further substantiated through in-depth interviews in which mothers were asked about the meaning of grade and about the potential causes of grade changes.

Based on these findings, it is clear that mothers can easily perceive causal links between grade change and health-related events or behaviors. We do not yet know to what extent they spontaneously make use of such perceived linkages in changing their own child care practices or in seeking health services.

3.2 Parental Response to Low or Decreasing Grades

Parental awareness that a child has a low or decreasing grade would only effect parental behavior (and demand for services) if parents are concerned over deteriorating grade conditions. Parental attitudes toward such conditions were therefore explored through in-depth interviews.

During the interviews, respondents were asked about what their reactions had been or would be if their child's grade should drop below 6. Most parents responded with relatively emotionally negative phrases such as "worried" (kuatir), "frightened" (takut), "bad feeling" (jelek rasanya), and so forth. Whether these negative associations with low grade resulted from cadre educational activities, specific associations between low grade and illness in the past, or some other cause was not clear. Whatever the source, however, these responses suggest that parents faced with deterioration in their child's grade would likely seek out further information on the child's condition or professional medical attention.

Numerous cases were uncovered during interviews in which parents had sought professional health services when their child's grade dropped. It is, of course, difficult to determine after the fact whether grade drop or some other symptom (fever, diarrhea, etc.) was most influential in each specific decision. Nonetheless, these cases provide at least anecdotal evidence that use of the Grade System may in itself be effectively increasing demand for information and curative services among these parents.

3.3 Defacto "Household-based" Monitoring System

An increase in parental demand for information and health services at critical times (due to low or decreasing grade) represents the emergence of a defacto "household-based" (vs. government-based) growth/health monitoring system. The implications for cost and effectiveness of UPGK activities are major. For example, parents are no longer entirely dependent on cadres for referral to the PUSKESMAS, but can make such decisions on their own initiative, based on weighing data

which they now understand. In educational activities, the role of cadres can shift from initiating nutrition-related "guidance" (penyuluhan) of little immediate interest or relevance to parents, to one of responding to specific parental demands for information to explain low or dropping grade.

4. ACCURACY OF GRADE CALCULATION BY CADRES

The effective use of the Grade System by cadres and parents requires accurate grade determinations for each child each month. There are several points in the process of data collection, calculation, and recording at which errors can be made. These points are illustrated in Section I of Appendix D for growth monitoring with the KMS alone, and Section 2 of Appendix D for the KMS system plus the Grade System. Most of the points of likely error exist with or without the addition of the Grade System.¹³ However, introduction of the system does add potential error at one point: in the calculation of a child's grade from age and weight data. The accuracy with which cadres are calculating grades was therefore checked using two different methods.

4.1 Recalculation of Past Grades from Center Records

The first method was aimed at determining the magnitude of any miscalculation that might be occurring. For this purpose, grades were recalculated on data recorded each month in the Center Register Books. (Center Registers actually serve CRS as an auditing device, and only inadvertently served our testing purposes.)

Register Book data include age, weight, and calculated grade for each child attending the Center each month. Drawing on recorded age and weight data from a random sample of 30 children per Center per month (or as many as appeared at the Center), we recalculated grades using a simple computer program. This was done for the most recent weighing (August) and for six months earlier (February). The differences between computer and cadre calculations were derived for each case. Assuming that the computer calculation was accurate, the cadre's calculation was then classified as correct or off by one or more grades.

Several possible errors during data transfer and computer recalculation of grades might have lead us to misinterpret a given cadre calculation as incorrect, so the results obtained, at worst, err on the conservative side.¹⁴ To reduce the probability of such errors, the five cases in which cadre-calculated grades were off by more than two grades are not included in the analysis. The results are shown in Table 5.

TABLE 5

ACCURACY OF GRADE CALCULATION BY CADRES FOR THE
MONTHS OF FEBRUARY AND AUGUST 1986

Cadre's Calculation	February [N=239]	August [N=250]	
too high {	+2	.0 %	.8 %
	+1	5.9 %	6.8 %
exactly correct	83.7 %	88.8 %	
too low {	-1	9.2 %	2.8 %
	-2	.8 %	.8 %

These results show that most cadre calculations are correct most of the time. While there is room for improvement, it is encouraging that when cadres have miscalculated, they have rarely missed by more than one grade. Also encouraging is the fact that calculation accuracy appears to have improved over time (from 83.3 to 88.8 % in six months).

Improvement over time is primarily related to reduction in cadre tendency to underestimate grade by one (i.e., [-1] in Table 5). These errors dropped from 9.2% down to 2.8% in six months. Close examination of Center Records showed that in 54% of such cases, the error was due to an incorrect "rounding" of borderline weights. When the weight of the child fell exactly on the line between two grades, the cadre often incorrectly rounded down to the lower grade. One source of the problem is the construction of the Master Chart which does not make it clear that borderline cases should be rounded up (see Annex 3).

4.2 Testing Cadres

A second method used was aimed at identifying where specific problems might exist in grade calculation procedures. For this purpose, a simple test was administered to all cadres interviewed.

The test was designed to parallel the standard procedures used by cadres for calculating grades using the Master Chart. Each cadre tested was provided with one Master Chart and three KMS cards. The cards contained growth data for three hypothetical children and were filled in up to the most recent weighing (August). The weight of the child for the next weighing (September) was given on a small slip of paper stapled to the corner of the card.

In the test, cadres had three tasks: to find the current (September) age for each child on the KMS, to find and mark the child's grade on the Master Chart using the current weight and age, and then to transfer the calculated grade back to the proper position on the KMS card. Analysis focused on these three steps. A cadre had to be correct for all three children to be scored "correct" on a step. Thus, if she missed on any child for a given step, she was scored as unable to carry out that step accurately.

1. Transferring Age from the KMS: 89 % of the cadres correctly transferred the child's age from the KMS to the Master Chart for all three children.
2. Determining Grade from the Master Chart: 73% of the cadres marked the correct grade on the chart based on the weight given and age transferred for all three children.
3. Transferring Grade Back to the KMS: 85% of the cadres correctly transferred whatever grade they had calculated back to the appropriate column (September) on the KMS.

The fact that some 27% of the cadres overall were incorrectly determining grade (step 2 above) is not in itself important, since the tendency in nearly all posts is for one or two cadres to specialize in this task. However, the test does provide an opportunity to see where errors are being made.

One source of error was in extracting and transferring the child's age from the KMS. 11% of the cadres were unable to do this consistently (item 1). This was paralleled by the inability of 15% of cadres to correctly transfer grades, once determined, back to the KMS (item 3). Error in the latter case would be hidden until subsequent months. This again flags the general difficulty being experienced in interpreting the KMS graphics, a problem which merely resurfaced in this test. Nonetheless, accurate transfer of age is an essential prerequisite for accurate grade calculation, and further attention to this problem is needed.

The major source of calculation error confirmed through the test was the failure to consistently round borderline weights up to the next higher grade. The September weight for one of the three children in the test was specifically chosen to fall exactly on the borderline between grades 6 and 7. 15% of the cadres incorrectly rounded this weight down to grade 6.

5. MONITORING ACTIVITIES BASED ON THE GRADE SYSTEM

CRS Center data based on the Grade System are well suited to certain types of monitoring efforts. Three distinct monitoring functions are discussed in this section: individual child progress, program operations, and program impact.

In addition to marking individual KMS cards with grades each month, each Center sends a copy of its completed Master Chart to CRS (and elsewhere) for further processing. CRS has developed software (based on DBase III) for use in storing and analyzing these collective data. Computer input data consist of row and column totals from the Master Chart. Outputs include automatic calculations of the percentages of attending children at different grade levels, and summations of percentages of children of different age ranges attending each month.

5.1 Grade System Data for Monitoring Individual Child Progress

Aside from addressing difficulties of deciphering card coloring and graphics, the Grade System appears to offer greater accuracy for the following reasons:

1. The basic growth indicator used in the UPGK program is weight for age. Weights in kilograms, when marked on the KMS, then become percentile points. Card users do not typically focus on these points per se, but rather on one of three color bands (green, yellow, or below the red) where points fall. These color bands represent very broad percentile ranges which are not nearly as sensitive to changes in an individual child's growth progress as grades, each of which represents a 2-3 percentile range.
2. The core UPGK message is that a child's weight should increase each month; if not, the child's condition is deteriorating. However, there are conditions under which this indicator could be misleading. For example, a child's weight might increase slightly each month over several months, while the child's condition is actually deteriorating. The problem would probably not be noted until the growth line enters a new color range. The only direct indicator that a child's growth status is not deteriorating is that it remains at about the same percentile (or increases) over time. For this purpose, grade (being based on a narrow percentile range) is a better indicator for monitoring of child growth over time than weight.
3. There are numerous potential sources of error in determining a given child's monthly growth status. Among these are inaccurate weighing scales, inaccuracies in weighing technique, and mistakes in marking down weight or determining current age. Since parents clearly understand and recall grades, they can play a corrective role where a clearly inaccurate grade is being reported by a cadre. For example, a sharp drop of more than one grade is obviously

inaccurate when a child has remained healthy and thriving over the past month. CRS staff have noted several cases in which such inaccuracies have been challenged by mothers worried about apparant negative changes in their child's status.

These points suggest that use of the grade levels as a rendering of relative growth status is acceptably accurate for individual child growth monitoring purposes.

5.2 Grade System Data as a Center Operations Monitoring Device

Grade-based Center weighing data are currently being processed and utilized by CRS in Jakarta, primarily for monitoring CRS-Mother/Child Welfare program "operations". The Master chart does appear to be quite effective for this purpose. Two different operations monitoring tasks are served:

1. Determining that weighing sessions took place and estimating attendance rates: Clusters of marks in the 600 cells on the Master Chart tend to be distinctive for each Center, with limited change month to month. This stability reflects chance clusters of births and general nutrition and health conditions in each community. Under these circumstances, falsification of or tampering with the Charts to increase the apparent number of participants can be detected by a trained observer. Visual checking of Master Charts and rough inspection of computer-generated statistics are adequate techniques for this purpose.
2. Determining age groups being targeted by the program: Age group data from the Master Chart provide a useful indicator to program supervisors on whether or not the youngest children are attending, a main objective in the CRS program. While the sampling problem noted above makes precise age targeting analysis impossible, the Master Chart does yield enough data to flag those Centers where the youngest children may not be attending. This can then be followed up by supervisors.

5.3 Grade System Data in Program Impact Monitoring

CRS has correctly recognized that the Grade System provides no means in itself for monitoring the impact of the CRS Child Survival Program on the nutrition and health status of local communities. The ten grade levels of the Grade System do yield more precise aggregated data than the standard three levels of the UPGK monitoring system for those children who attend Centers. However, the system does not alter the basic sampling deficiencies inherent in the use of weighing post data alone.

These sampling deficiencies are related to the following two problems:

1. Attending children are only a sample of the whole population of children under five years old in a given village. Because Center

data tell us nothing of the condition of those who are not attending, we cannot possibly determine (based on Center data alone) whether those who are in the program are improving relative to those who are not or whether attenders were on the whole much better or worse off to begin with.

2. Because the Master Chart does not specifically identify individuals, it is impossible to tell whether those being weighed in different months represent the same sample or constantly-changing samples from the overall village under-five population.

In assessing program impact, it is important not to underestimate the extent to which the above two sampling problems might confound impact-related findings. For example, it would be possible for a weighing post to show increasingly higher percentages of children at low grade levels (an apparent failure in impact), when in fact, the program might be getting better at picking up undernourished children from more distant, poorer families than in the earlier months (an obvious impact success). Use of Center weighing data alone for impact monitoring is therefore not only inadequate, but could also lead to dangerously false conclusions.

6. CONCLUSIONS

The results of this study show that the Grade System as an "add-on" component to UPGK (growth monitoring) activities is easily understood and used by both parents and cadres. The system appears to be a major breakthrough in efforts to address longstanding problems of intelligibility in the KMS. The specific conclusions of this study are presented below.

6.1 System Comprehension

1. Individual child growth status, when presented as "grades", is easily and correctly understood by parents and cadres alike. Interview data indicate that the Grade System reduces the difficulties inherent in teaching the complex graphic representations of growth in the KMS. Both cadres and parents strongly indicated a desire to continue using the grade system.
2. Both in-depth interviews and test data showed that most mothers clearly understand what the grade of a healthy, well-nourished child should be, and what point on the descending scale grades begin to indicate increased nutrition/health risk.
3. A fortuitous parallel exists between the growth monitoring Grade System and the school performance grade system: There is close correspondence between grades which are acceptable (roughly over 6) and those which indicate poor performance (below 6). This parallel is probably a key factor in the ease with which parents learn to interpret the health implications of different grade levels.
4. A common misconception was found concerning grade level change over time. Many cadres and about half of the sample of parents incorrectly thought that, if a child remains healthy and growing steadily, his/her grade must eventually increase. Surprisingly, this misconception did not appear to interfere with the generally sound understanding of other aspects of the system. It is likely that the problem arises from a confusion between grade and weight, the necessity for consistent increase in weight being an off-repeated UPGK message. Whatever the source, this misconception is only a minor problem since it does not contradict the basic messages of the program: that a child's grade should be above 6 and should not be decreasing.

6.2 Grade Recall

1. Tests of parents' recall of their child's current and past grades (without access to KMS data) were remarkably accurate. 93% of respondents knew in the child's current grade and roughly half still correctly and confidently recalled the child's grade from six months ago. (Interim months showed a gradual attrition, as would be expected.)

2. Widespread and accurate parental recall of children's past grades means that mothers are easily internalizing growth/health data in grade form. They thus have direct access to these data for use in everyday settings (e.g., casual conversations within families or among friends). This is not true of the KMS system alone, which requires both physical presence of the cards and ability to interpret the graphics in order to make use of growth data depicted.

6.3 Effects of Economic and Educational Status

1. Tests showed only minimal association between household economic status and parents' ability to understand the system and to recall their children's grades. The only variable showing effects of economic status was knowledge of grade ranges for the transition from "healthy" to "at risk". But even on this variable, nearly three-fourths of the poorest respondents showed full comprehension.
2. Test data showed that illiterate and minimally educated parents are at a slight, but definite disadvantage in comprehending the grade system. Even given this disadvantage, however, roughly two thirds of the illiterate mothers sampled showed full comprehension on two of the three variables used. In terms of recall of grades, parents with little or no education showed no disadvantage in comparison to those with higher education.
3. Minimal problems in system comprehension and grade recall for poorer, less educated parents is of major significance, since it suggests that adding the Grade System to the standard UPGK procedures will increase the potential for serving lower socio-economic status households, the most difficult targets to reach.

6.4 Grade System and Parental Demand for Health Services

Limited evidence was found suggesting that the use of the Grade System may be resulting in greater demand for nutritional and health information by parents. Most of the mothers interviewed stated concern over children with low or decreasing grades. Easy comprehension of the grade system, combined with concern over low grades, suggests that children's grades might be serving as "symptoms" of health problems (similar to fever or diarrhea). This in turn may be stimulating parental demand for health services or at least for information on how to increase their child's grade. Though unsystematic and anecdotal in nature, this evidence suggests that the introduction of the Grade System could alone spontaneously stimulate health service demand.

6.5 Accuracy of Cadre Calculation of Grades

1. The accuracy with which cadres have been using the Master Chart to calculate grades was tested using Center Records and a computer

program. The results showed a reasonable degree of accuracy and improvement over time.

2. A special test was administered to cadres to assess their ability to use the KMS and the Master Chart to determine grades. Findings from this test (paralleled by results from the grade recalculation above) showed that the major source of errors which do occur is cadre confusion over whether to round borderline weights up or down in selecting a grade (rounding should be up).
3. A second source of grade calculation error results from cadre difficulties in reading and interpreting age on the KMS and in correctly placing grades (once determined) in the proper month column on the KMS. This problem derives from the general difficulties cadres are facing in understanding and using the KMS. Nonetheless, proper calculation of grades over time requires that this problem be overcome, or that appropriate modifications in the KMS be made.

6.6 Monitoring Efforts Using the Grade System

1. Grade level is a rendering of relative growth status which is accurate enough for monitoring individual child growth, and for singling out children at high risk. Though not as precise as the percentile point usually used on the KMS, grade is still a relatively narrow percentile range (2-3 percentiles) which is at least as accurate as the scale calibration. It is clearly more useful for indicating change in growth status to parents than either the gross classification of three (color) levels on the KMS or the potentially misleading indicator of weight gain alone (condition may be deteriorating even with weight gain).
2. CRS's routine computer input and processing of Master Chart data for each Center appear to be a useful and effective instrument for monitoring program operations.
3. CRS has correctly recognized that growth data generated from the Centers alone, even when based on and derived from the Master Chart, are inadequate for purposes of monitoring program impact within communities.

6.7 Need for Further Experimentation

1. The Master Chart layout and the procedures used to calculate grade have undergone a long and careful period of experimentation. The current chart and procedures represent what appear to be the best compromises among a range of competing factors, including ease of use, intelligibility, and insistence that cadres focus on parents and children rather than on data gathering. To avoid counterproductive repetition of earlier efforts, any further modifications of the chart or procedures should be preceded by full

consideration of likely side effects and careful small-scale testing before implementation.

2. There is clearly a major need for experimentation focused on how growth grades can be used more effectively in both individual child monitoring and educational efforts with parents.

7. RECOMMENDATIONS TO CRS

1. Based on the highly positive findings of this study, it is recommended that CRS favorably consider replicating of the Grade System in as many of its other counterpart Centers as is feasible.
2. It is strongly recommended that the close parallel between the growth monitoring grades and school performance grading be more extensively and creatively used in efforts to train cadres and consult with parents. For example, defining transition grades from "acceptable" to "at risk" would be easier using school grades as a parallel example (e.g., growth grades 5 and below could be written or circled in red like school grades).
3. Given the problem of cadre uncertainty over how to round borderline weights on the Master Chart, it is recommended that an additional note be placed on the chart which indicates that rounding should be up, not down. The following note would be adequate: Jika berat bayi jatuh tepat pada batasan antara dua nilai maka nilai yang lebih rendah dipakai. Alteration of chart lines to solve the rounding problem is not recommended.
4. To reduce replication costs and widen the range of persons who understand and can calculate growth grades, CRS/Jakarta should develop and test a simple training package, complete with all necessary written materials. This package would not only be useful to CRS in improving cadre ability to determine grades, but would assist other PVOs and perhaps the GOI in implementing the Grade System. It would also be useful to expand training efforts with these materials to local PUSKBSMAS and health professionals.
5. Given the long and careful period of experimentation on the Grade System and the major effects that minor alterations could have on calculation accuracy, etc., it is recommended that future modifications in either the Chart layout or calculation procedure be made only after careful consideration of likely side effects and small-scale experimentation.
6. With the basic elements of the Grade System now in place, it is recommended that investment in experimentation shift to exploring ways to use grades more effectively in both individual child monitoring and parental educational activities. Some promising areas that might be investigated include:
 - Developing ways to better teach the meaning of grade levels and grade drops to illiterate parents and young children. For example, one possibility would be to teach a simple child's song (always popular in Indonesia) which makes rhymes or witty word plays on the meaning of each grade level from 10 to 1. Another would be to develop use of grade information in poster form.
 - Exploring means for expanding knowledge of the meaning of grades beyond the circle of persons attending the weighing sessions

(e.g., to other family members and local health professionals). For example, this could be done through development of short films using popular, nationally known comedians. These films could be shown in a festive atmosphere in villages.

- Exploring the utility and possibility of teaching local health professionals (bidan, doctors, etc.) the meaning of grades. These professionals could be encouraged to query parents during curative sessions on the recent grade history of their child, thereby encouraging spontaneous association by parent of grade change and specific behaviors or illnesses.
- Developing use of the mass media (particularly radio and TV) in introducing grade-related health information. This might be most successful if locally-produced.

NOTES

1. With the recognition that malnutrition and undernutrition contribute substantially to high infant and child mortality rates in Indonesia, the Family Nutrition Improvement Program or UPGK (Usaha Perbaikan Gizi Keluarga) was established in the mid-1970s. The program is multi-sectoral but is implemented at the village level by local health cadres, primarily under the guidance of the Ministry of Health and the National Family Planning Coordinating Board (BKKBN). The program has expanded rapidly and now covers some 40,000 villages, over half of all the villages in Indonesia. The goal of UPGK is to improve the health and nutritional status of children under five years of age (Balita), as well as that of pregnant and lactating women, through growth (weight for age) monitoring and educational activities.

In 1979, BKKBN began testing ways to integrate UPGK activities into its village-level family planning promotion efforts. The resulting Family Planning-Nutrition (KB-Gizi) program has become the model for the nation-wide Integrated Health Services Posts (POSYANDU) working out of district-level Community Health Centers (PUSKESMAS). In addition to UPGK and family planning activities, the POSYANDU includes oral rehydration, immunization, and mother/child education activities. Child weighing activities provide the central monthly event around which other POSYANDU activities are organized.
2. KMS is an acronym for Kartu Menuju Sehat (Health Progress Card).
3. The term nilai means "value", "level", or "grade". Because school performance grades and growth monitoring grades are called nilai, the association is an easy one for parents to make.
4. See note 1.
5. The growth monitoring card was an outgrowth of work done by Morely in West Africa in the early 1960s. The initial purposes of the card were to get mothers to return regularly to health clinics which were usually staffed by Western-trained professionals and to provide some record of a child's past health status. During the 1960s, CRS was instrumental in the early dissemination and use of the growth card in Africa. In the early 1970s, OXFAM became committed to the dissemination of the use of the card outside of Africa. Later, UNICEF became the major donor supporting the development of growth monitoring activities worldwide and the card was a key element in UNICEF's efforts. The Indonesian version, the KMS, was designed by the GOI with UNICEF assistance in the late 1970s. The KMS was originally prepared for use in nutrition-related activities as part of the UPGK, but it has since become the core documentation instrument for the Integrated Health Services Posts (POSYANDU).
6. A recent evaluation of the KB-Gizi program in East Java and Bali found that roughly 60% of mothers did not have their child's card, due to either loss or damage. Thus, the observation that villagers treat government-supplied documents with great care probably does not

extend to documents that they do not consider to be of particular importance. But without the card (and regular attendance) no effective growth monitoring can take place. Recognizing this problem, cadres in some areas have resorted to collecting and storing cards centrally, thus removing any potential for spontaneous educational use of the cards in the home setting.

7. The most serious of these was that the Master Chart layout followed the layout of the KMS curved graphics. Grade ranges for younger children on this chart were narrower and therefore even harder to read than the color bands on the KMS itself. As a result, the cadres tended to reverse the grade calculation procedure: The child was weighed and the KMS card marked as in the old system. Then, from the position of the mark on the KMS color (percentile) "rainbow", a grade was estimated and marked on the Master Chart. This method increased errors due to imprecision on the Master chart. This problem was solved with the introduction of the new Master Chart.
8. This procedure was vital, as the data had to reflect the level of comprehension of each mother individually. By keeping cadres busy with the waiting mothers, coaching of those interviewed was kept to a minimum.

In-depth interviews were carried out with a subset of the survey respondents, the main criterion for selection being the mother's openness and willingness to talk about both positive and negative aspects of the program and the Grade System during the survey interview.

9. In fact, the most basic level of understanding of the Grade System concerns system "structure", that is, an interval scale of ten whole numbers. As would be expected, no problems were detected in mothers' understanding at this simplest level.
10. A percentile is the score below which a given percentage of cases fall. For example, the 100th percentile is the score (in this case, a weight per age) below which 100% of cases will fall, 80% of the cases fall below the 80th percentile, 60% fall below the 60% percentile, and so on.

The higher the age, the higher the weight for a given percentile. Since growth is faster in the earlier months each percentile line forms a curved line on the KMS card. On the KMS card, the intervals between certain percentile lines appear as color bands, hence the "rainbow" effect.

11. A third question which could have been asked to better clarify the extent of the problem was: "What is the likely health condition of a child whose grade is 7 and remains at 7 for a whole year?"; with coded responses for:

1. health condition is deteriorating
2. health remains constant and/or acceptable
3. health condition is improving
4. unable to respond/no answer

The only correct response would be #2.

12. Responses of "do not know" for any given item were scored as "incorrect" on those items. There appeared to a disproportionate number of "do not know" responses among the less educated. The apparent disadvantage indicated for some less educated women could then conceivably be due to a corresponding unwillingness of these women to assert themselves with the interviewers who were urban and well-educated, rather than showing a true disadvantage related to education level.
13. The introduction of the Grade System might reduce the overall potential for error by introducing quality control by mothers themselves. That is, if mothers better understand and follow their own child's grades and grades are important to them, then they should spot a change (or lack of change) which "does not make sense". CRS staff have observed cases in which derived grades have been questioned by mothers. In such cases, mothers could ask for a recalculation of the grade or even a re-weighting, especially if encouraged to do so.
14. For example, errors would include cadre inaccuracies in recording the age or weight used for the original calculation, inaccuracies in recording the grade which was originally calculated, inaccurate data transfer from the Center Record Books to the forms used for this study, and inaccurate data input for computer analysis.

Master Chart

Untuk Memonitor Pertumbuhan Berat Badan
(Berat dalam Kg/Umur dalam Bulan)

POS :	TGL										BULAN										TAHUN																			
NILAI	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
BANYAKNYA ANAK																																								

Umur dalam Bulan	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59																																									
10	3.4	4.3	5.0	5.7	6.3	6.9	7.4	8.0	8.4	8.9	9.3	9.6	9.9	10.2	10.4	10.6	10.8	11.0	11.3	11.5	11.7	11.9	12.0	12.2	12.4	12.6	12.7	12.9	13.1	13.3	13.5	13.7	13.8	14.0	14.2	14.4	14.5	14.7	14.8	15.0	15.2	15.3	15.5	15.7	15.8	16.0	16.2	16.3	16.5	16.6	16.8	16.9	17.1	17.2	17.4	17.6	17.7	17.9	18.0	18.2																																								
9	3.2	4.0	4.7	5.4	6.0	6.5	7.0	7.5	8.0	8.4	8.8	9.1	9.4	9.6	9.8	10.0	10.2	10.4	10.7	10.9	11.1	11.3	11.5	11.8	12.0	12.1	12.3	12.5	12.7	12.8	13.0	13.1	13.3	13.5	13.6	13.8	13.9	14.1	14.2	14.4	14.5	14.7	14.8	15.0	15.2	15.4	15.5	15.6	15.8	16.0	16.1	16.2	16.4	16.5	16.7	16.8	17.0	17.1	17.3																																									
8	3.0	3.7	4.4	5.1	5.7	6.2	6.7	7.1	7.6	8.0	8.4	8.7	8.9	9.1	9.3	9.5	9.7	9.9	10.1	10.3	10.5	10.7	10.9	11.1	11.2	11.4	11.6	11.8	12.0	12.1	12.2	12.4	12.5	12.6	12.8	12.9	13.1	13.2	13.4	13.5	13.6	13.7	13.9	14.0	14.2	14.4	14.6	14.7	14.8	15.0	15.2	15.3	15.4	15.6	15.7	15.8	16.0	16.1	16.3	16.4																																								
7	2.8	3.5	4.2	4.7	5.3	5.8	6.3	6.7	7.2	7.5	7.9	8.2	8.4	8.6	8.8	9.0	9.2	9.4	9.5	9.7	9.9	10.1	10.3	10.4	10.5	10.7	10.9	11.1	11.3	11.4	11.5	11.7	11.8	11.9	12.0	12.2	12.3	12.5	12.6	12.7	12.9	13.0	13.1	13.3	13.5	13.6	13.8	13.9	14.0	14.1	14.3	14.4	14.6	14.7	14.8	15.0	15.1	15.2	15.4	15.5																																								
6	2.7	3.4	4.0	4.5	5.0	5.5	6.3	6.7	7.1	7.4	7.7	7.9	8.1	8.3	8.5	8.7	8.9	9.0	9.2	9.4	9.6	9.7	9.8	9.9	10.1	10.3	10.5	10.6	10.7	10.8	11.0	11.1	11.2	11.3	11.5	11.6	11.8	11.9	12.0	12.2	12.3	12.4	12.6	12.7	12.9	13.0	13.1	13.2	13.3	13.5	13.6	13.8	13.9	14.1	14.3	14.4	14.6	14.7	14.8	15.0	15.1	15.2	15.4	15.5																																				
5	2.5	3.2	3.7	4.3	4.7	5.2	5.5	5.9	6.3	6.6	6.9	7.3	7.4	7.6	7.8	7.9	8.1	8.3	8.4	8.6	8.8	8.9	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.0	10.1	10.3	10.4	10.5	10.6	10.8	10.9	11.0	11.1	11.2	11.4	11.5	11.6	11.7	11.8	12.0	12.1	12.2	12.3	12.4	12.6	12.7	12.9	13.0	13.1	13.3	13.4	13.5	13.6	13.8	13.9	14.1	14.3	14.4	14.6	14.7	14.8	15.0	15.1	15.2	15.4	15.5																												
4	2.4	2.9	3.4	4.0	4.5	4.9	5.2	5.5	5.9	6.2	6.5	6.7	6.9	7.1	7.3	7.4	7.6	7.8	7.9	8.1	8.2	8.3	8.4	8.6	8.7	8.9	9.0	9.2	9.3	9.4	9.5	9.7	9.8	9.9	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	11.0	11.2	11.3	11.4	11.5	11.6	11.7	11.9	12.0	12.1	12.2	12.3	12.4	12.6	12.7	12.9	13.0	13.1	13.3	13.4	13.5	13.6	13.8	13.9	14.1	14.3	14.4	14.6	14.7	14.8	15.0	15.1	15.2	15.4	15.5																					
3	2.2	2.7	3.2	3.7	4.1	4.5	4.8	5.2	5.5	5.7	6.0	6.2	6.4	6.6	6.8	6.9	7.1	7.2	7.3	7.5	7.6	7.7	7.8	8.0	8.1	8.2	8.3	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	10.0	10.1	10.2	10.4	10.5	10.6	10.7	10.8	10.9	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.9	12.0	12.1	12.2	12.3	12.4	12.6	12.7	12.9	13.0	13.1	13.3	13.4	13.5	13.6	13.8	13.9	14.1	14.3	14.4	14.6	14.7	14.8	15.0	15.1	15.2	15.4	15.5													
2	2.0	2.5	2.9	3.4	3.8	4.2	4.5	4.9	5.1	5.3	5.5	5.8	6.0	6.2	6.3	6.4	6.6	6.7	6.8	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.9	12.0	12.1	12.2	12.3	12.4	12.6	12.7	12.9	13.0	13.1	13.3	13.4	13.5	13.6	13.8	13.9	14.1	14.3	14.4	14.6	14.7	14.8	15.0	15.1	15.2	15.4	15.5					
1	1.8	2.2	2.6	3.0	3.4	3.8	4.1	4.4	4.7	4.9	5.1	5.3	5.5	5.7	5.8	5.9	6.1	6.2	6.3	6.5	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.9	12.0	12.1	12.2	12.3	12.4	12.6	12.7	12.9	13.0	13.1	13.3	13.4	13.5	13.6	13.8	13.9	14.1	14.3	14.4	14.6	14.7	14.8	15.0	15.1	15.2	15.4	15.5

APPENDIX B : Master Chart

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APPENDIX C

DETAILED DESCRIPTION OF GRADE DETERMINATION PROCEDURES

Standard Procedure Using the KMS

The primary document for recording individual child growth progress (as weight for age) is the KMS. This card is a two-dimensional graph with weight in kg as the vertical axis and age in months as the horizontal axis (see Appendix A). Percentile ranges of growth appear as a series of bands rising steeply at the right side in the early months but flattening to the left as age increases. Percentile ranges are color coded in the KMS, 100-81 as shades of green and 80-61 as shades of yellow. The critical 60th percentile is a red line.

Monthly age/weight data are entered as discrete marks (usually dots made with pen or pencil) at the point where the weight coordinate meets the age coordinate. The position of the mark in reference to the colored percentile bands indicates the adequacy of the body weight attained at a given age.

Monthly growth entries are joined by lines to produce a rough curve. This curve, which is specific for each child, demonstrates the child's actual growth history in relation to the expected growth portrayed by the colored reference bands.

Meaning of Grade on the Master Chart

Dr. Carlo Capone (CRS/New York), working closely with CRS/ Indonesia staff and the CRS counterpart PVOs, has developed a simple numerical method for presenting growth status. This consists of converting monthly age and weight data into discrete whole numbers between 1 and 10. Each number, or "grade", represents a percentile range of a few points. Grade determination makes use of a Master Chart which serves as a conversion table. This chart (see Appendix B) is a two-dimensional grid with grade numbers (percentile bands) as the vertical axis and age in months as the horizontal axis. In a sense, the Master Chart is like a large KMS card with the percentile curves flattened out horizontally. The curved lines of the KMS graph are replaced on the Master Chart by rows of reference weights, each weight representing the percentile line at a given age.

Each horizontal band or grade on the Master Chart is delimited by rows of weights at the upper and lower extremes. Specific grades (weight ranges) for each month of age were selected based on the Harvard Standard. The uppermost row of weights (between grades 10 and 9) represents 100% on the Harvard Standard. Weights for any given month which fall above this line receive a grade of 10. The darker, middle row of grades (between 5 and 6) represents 80% of the Standard for any given age. The lowest row of weights (between 2 and 1) represents 60% of the Standard, so that weights falling below this line and receiving a grade of 1 are below 60% of the Standard. Levels 2 to 4 and 7 to 9 are spread out between these three basic reference lines.

Based on the Harvard Standard, specific grades clearly fall into three basic categories: well-nourished (6-10), under-nourished (5-2), and severely under-nourished (1).

Steps for Using the Master Chart in Conjunction with the KMS

The steps used for determining grade and marking the Master Chart are as follows:

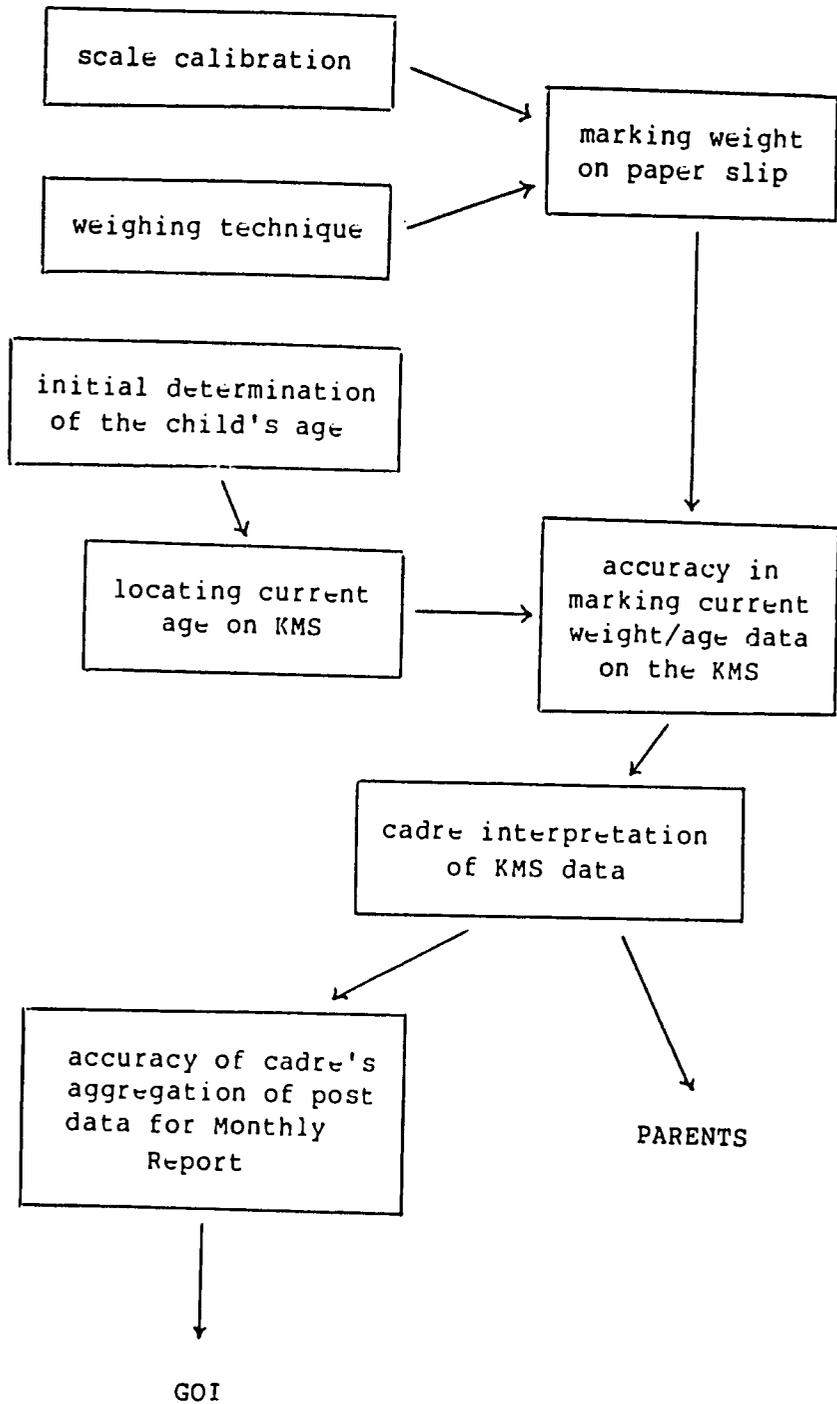
1. Weighing procedure: The child is weighed according to standard UPGK procedures.
2. Current age from the KMS: The current age of a child is obtained from the KMS card. Months beginning with the child's birth month are hand-written horizontally across the bottom of the KMS. Current age in months appears as a red number above the current month.
3. Finding the grade on the Master Chart: A child's grade is determined using the Master Chart (one chart used for each Center each month). First, the current age column is selected (between 1 and 59 months). Moving up this column, one looks for the two weights between which the child's weight falls. An "x" is placed in this space, and the corresponding grade is read from one of the four vertical columns marked nilai (grade) at the bottom. (Example: use the Master Chart in Appendix B to find that a child aged 36 months with a weight of 11.9 kg will have a grade of 6). If the current weight falls exactly on one of the (vertical column) weights for a given age, then the higher grade value is taken (i.e., weight is rounded up) and an [x] is placed in the area above the weight. (Example: a child aged 13 months with a weight of 7.6 kg has a grade of 5)
4. Noting new participants: If the child is appearing at the Center for the first time, a special mark (usually an "**") is used instead of an "x". This allows supervisors to note the age at which children are first registering in the program.
5. Filling in grade on the KMS: The grade just determined is marked on the child's KMS card on the vertical line representing his current age and roughly at the horizontal line representing his current weight (where a dot would usually go). The grade number is then circled and connected with a line to the last grade obtained. The current weight in kg to the first decimal is often then written at the bottom of the KMS graph exactly above the age/current month box. One recommendation made in this report is to circle numbers of 5 and below in red ink or pencil as is done for low school grades.
6. Totaling grades on the Chart: At the end of the weighing session, the marks on the Master Chart serve as a precise record of ages, weights, grades, and total number of children in each category who participated. The total number of new participants and the numbers of children at each grade are filled in the box at the upper right hand corner because these data are useful for the cadres themselves.

A major objective of the Grade System is to keep cadre attention and efforts focused on mothers and children, so no further (strictly administrative) calculations are asked of them. Instead, the chart is mailed to CRS for computer processing.

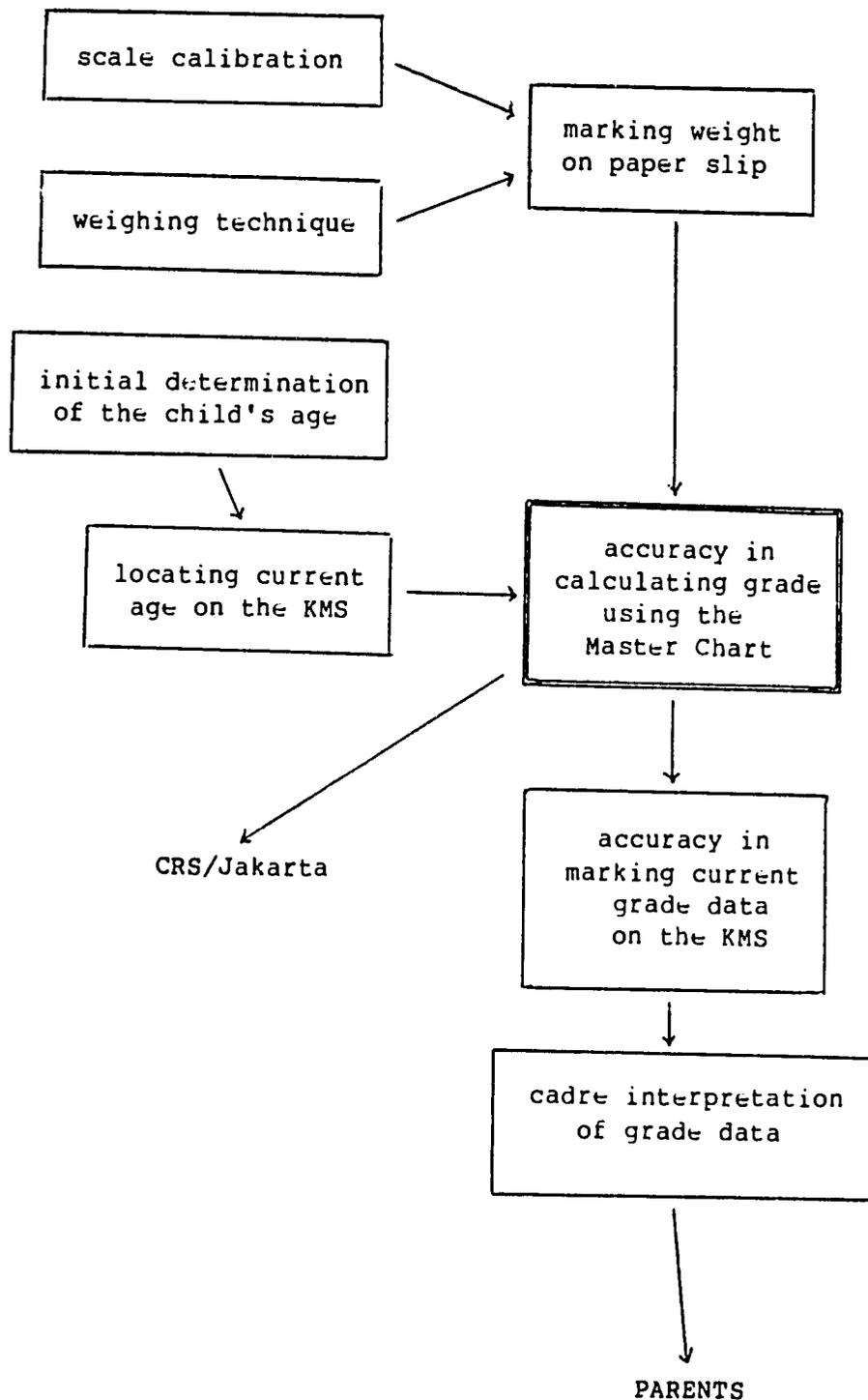
APPENDIX D

SOURCES OF ERROR IN GROWTH MONITORING PROCEDURES

1. Standard UPGK Procedures [KMS alone]



2. CRS Center Procedures [KMS with Grade System]



APPENDIX E

GLOSSARY

CRS	Catholic Relief Services
klompok	"group"; in this context, weighing post group
KMS	Health Progress Card (<u>Kartu Menuju Sehat</u>)
Master Chart	conversion table used to transform age and weight data into growth grades and simultaneously to record each weighed child's current age and weight
PUSKESMAS	Public Health Centers (Pusat Kesehatan Masyarakat)
POSYANDU	newly developed integrated health family planning services delivery posts in sub-village neighborhoods or hamlets
UPGK	national nutrition and growth monitoring program called the Family Nutrition Improvement Program (<u>Usaha Perbaikan Gizi Keluarga</u>)
USAID	United States Agency for International Development

PUBLICATIONS OF GENERAL INTEREST
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1. A Preliminary View of Indonesia's Employment Problem and Some Options for Solving It, by Robert L. Rucker, October 1985.
2. Demographic Background and Births Averted: Indonesian Family Planning, 1980-1984, by John A. Ross, Terry Hull, Lulu D. Cost, and David L. Piet, October 1985.
3. Public Expenditure Impact: Education and Health, Indonesian Family Planning, by Dennis N.W. Chao, John A. Ross, and David L. Piet, October 1985.
4. A Survey of Private Sector Training in Indonesia, by Grant Cox, November 1985.
5. An Epidemiological Approach to Health Planning and Problem Solving: A Case Study from Aceh Province, Indonesia, by Steven L. Solter, Ali Azir Hasibuan, and Burhanuddin Yusuf, February 1986.
6. Developing Manpower for Indonesia's National Family Planning Program: BKKBN's Experience with Overseas Graduate Training 1983-1985, by Santoso S. Hamijoyo, Thomas R. D'Agnes, and Slamet Sudarman, April 1986.
7. The High Performance Sederhana Irrigation Systems Project, by David M. Robinson, May 1986.
8. The Sederhana Assessment Study for West Java, West Sumatra, North Sumatra and South Sulawesi Provinces, Indonesia, by P.T. EXSA International Co. Ltd., May 1986.
9. Model Farm Program Benefits: The Citanduy Watershed, by Bungaran Saragih, Paul C. Huszar and Harold C. Cochrane, June 1986.
10. A Study of the System (Sistim Nilai): A New Development in Child Growth Monitoring Techniques, by William S. Cole, John E. Hull, Bambang Samekto, and Linawati Nesrif, December 1986.