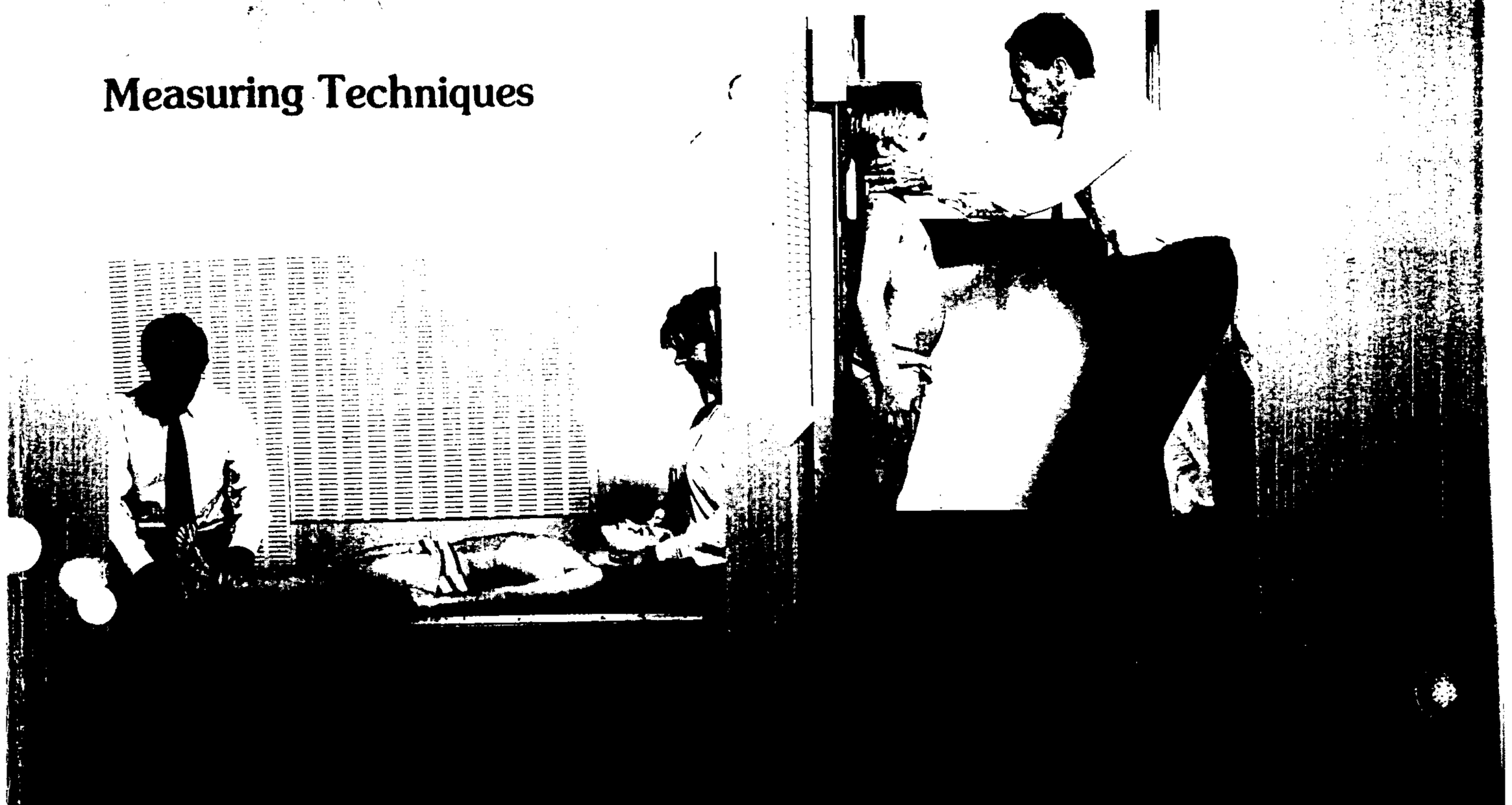
Measuring Techniques



Notes on the use of Height and Weight Standards Sheets

Height and weight attained charts (distance)
Heights and weights can most easily be charted by using a transparent ruler, especially if the measurements have been in inches and pounds. The lines marked 'longitudinal standards' represent the centiles for children followed at successive ages. The shaded areas marked 'limits' for single occasions (cross-sectional)' represent the 3rd and 97th centiles for cross-sectional data. On the first occasion a child is seen these wider limits apply; however on subsequent occasions a child initially falling within the shaded area should progress towards and into the longitudinal centiles.
The limits of normality taken must depend on the purpose for which the standards are being used. They also depend on the level of the average values obtained in a given clinic; regional variations may require a slight shifting of the scale from place to place. Some allowance for Registrar-General Occupational Category differences may also be made. As a rough guide, however, one might say that children outside the area of the tenth to ninetieth percentile range should be regarded with slight suspicion, and those outside the third to ninety-seventh range as unhealthy until proved otherwise.

Height and weight velocity charts
The standards are appropriate for velocity calculated over a whole year period, not less (since a smaller period requires wider limits). The yearly velocity should be plotted at the midpoint of the year. The 'longitudinal whole-year centiles' are appropriate to children who have their peak velocity at the average age for this event. The shaded areas include the velocity curves of all children who have their peak velocities up to two standard deviations of age before and after this average age. The arrows and diamonds mark the 3rd, 50th and 97th centiles of peak velocity when the peak takes place at these early and late limits. Corresponding points for peaks at other ages may be found by interpolation. Whether early or late the shape of the velocity curve should follow the general shape shown by the centile lines. The charts are published in J. M. Tanner & R. H. Whitehouse, *Archives of Disease in Childhood*, 1976, Vol. 51.

Stages of Puberty
Ages of attainment of successive stages of pubertal sexual development are given in the 'distance' charts. The stage Pubic Hair 2 + represents the state of a child who shows the pubic hair appearance stage 2 but not stage 3 (see below). The centiles for age at which this state is normally seen are given, the 97th centile being considered as the early limit, the 3rd centile as the late limit. The child's puberty stages may be plotted at successive ages. Testis sizes are judged by comparison with the Prader orchidometer (Zachmann, Prader, Kind, Haflinger & Budliger, *Helv. Paed. Acta*, 29, 61-72, 1974); only two sizes are given here out of a succession of 10.

Source of standards
[illegible] of the source data and of the construction of these standards are set [illegible] *Archives of Disease in* [illegible] 5½-15½ years) London County Council survey reported by Scott in 1959. Height attained and height velocity percentiles are calculated on the assumption of a Gaussian distribution at each age; weight attained and weight velocity percentiles were estimated directly from the frequency distributions. Smoothing was in general carried out graphically. The shape of the longitudinal standards are based on longitudinal data from the Harpenden Growth Study and the International Children's Centre, London Longitudinal Study of the Institute of Child Health, London.
Stages of development of the secondary sex characters may be recorded on the front page. The following standard ratings on a scale of 1 to 5 may be used. (Taken by kind permission of the publishers from the standard illustrations in *Growth at Adolescence* 2nd ed.; Oxford, Blackwell Sci. Pupl., 1962; see also Chapter 7 in *Textbook of Paediatrics* ed. J. Forfar and G. Arneill, Churchill-Livingstone 1973).

Genital (penis) development:
Stage 1. Pre-adolescent, testes, scrotum and penis are of about the same size and proportion as in early childhood.
Stage 2. Enlargement of scrotum and testes. Skin of scrotum reddens and changes in texture. Little or no enlargement of penis at this stage.
Stage 3. Enlargement of penis, which occurs at first mainly in length. Further growth of testes and scrotum.
Stage 4. Increased size of penis with growth in breadth and development of glans. Testes and scrotum larger; scrotal skin darkened.
Stage 5. Genitalia adult in size and shape.

Pubic hair
Stage 1. Pre-adolescent. The vellus over the pubes is not further developed than that over the abdominal wall, i.e. no pubic hair.
Stage 2. Sparse growth of long, slightly pigmented downy hair, straight or slightly curled, chiefly at the base of the penis.
Stage 3. Considerably darker, coarser and more curled. The hair spreads sparsely over the junction of the pubes.
Stage 4. Hair now adult in type, but area covered is still considerably smaller than in the adult. No spread to the medial surface of thighs.
Stage 5. Adult in quantity and type with distribution of the horizontal (or classically 'feminine') pattern. Spread to medial surface of thighs but not up linea alba or elsewhere above the base of the inverse triangle (spread up linea alba occurs late and is rated stage 6).

DECIMAL AGE
The system of decimal age has been used in all charts. Thus the year is divided into 10 not 12. Each date in the calendar is marked (from the table on front page) in terms of thousandths of the year. Thus January 7th 1962 is 62.016. The child's birth date is similarly recorded e.g. child born on June 23rd 1959 has [illegible] 59.474. Age at examination is then obtained by [illegible]

AS - ROYAL

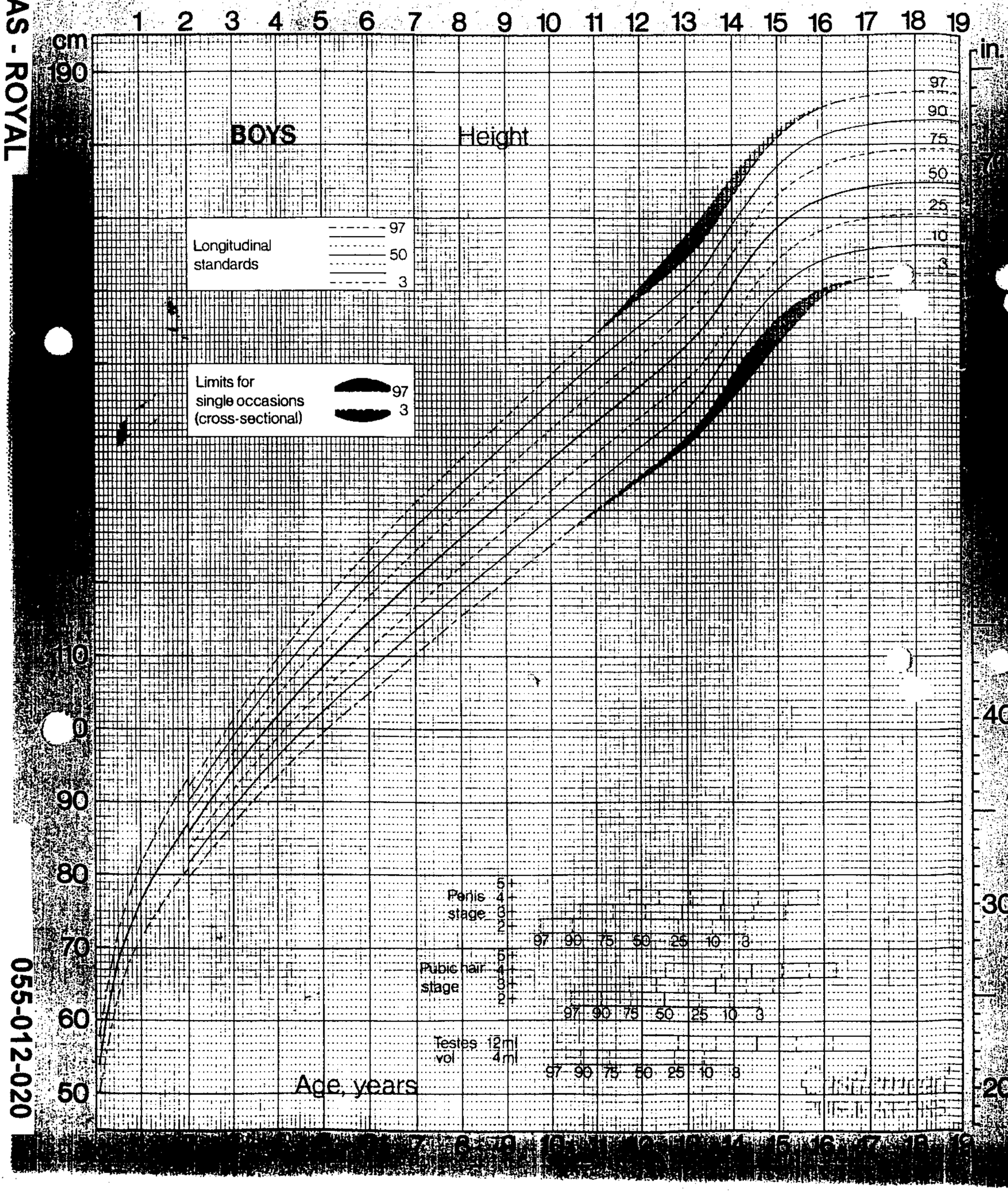
Reg. No.

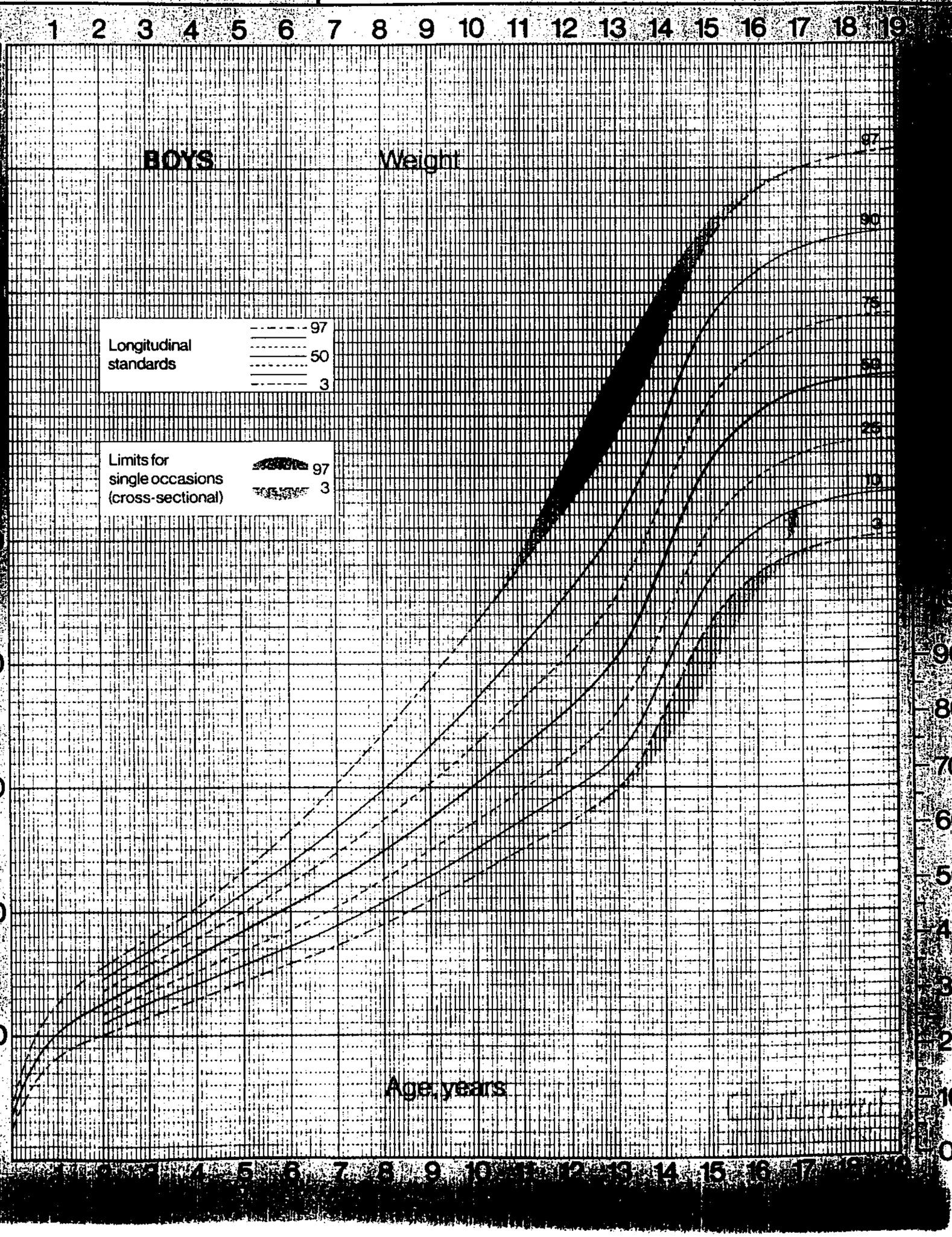
Surname

Forename

Date of Birth / / Decimal Yr.

Notes/Treatment





055-012-020

Hospital/Clinic Name

Reg. No.

Surname

Forename

Date of Birth / / Decimal Yr.

Growth and Development Record

Boys: Birth-19 years Height and Weight

TANNER-WHITEHOUSE (1975)

Ref. 11A INTEGRATED SERIES

Date of Examination												
Age												
Height cm/in												
Weight												
Bone Maturity Score												
Skeletal Age												
Puberty Ratings	Genitalia											
	Pubic Hair											
	Axillary Hair											

TABLE OF DECIMALS OF YEAR

	1 JAN.	2 FEB.	3 MAR.	4 APR.	5 MAY	6 JUNE	7 JULY	8 AUG.	9 SEPT.	10 OCT.	11 NOV.	12 DEC.
1	000	085	162	247	329	414	496	581	666	748	833	915
2	003	088	164	249	332	416	499	584	668	751	836	918
3	005	090	167	252	334	419	501	586	671	753	838	921
4	008	093	170	255	337	422	504	589	674	756	841	923
5	011	096	173	258	340	425	507	592	677	759	844	926
6	014	099	175	260	342	427	510	595	679	762	847	929
7	016	101	178	263	345	430	512	597	682	764	849	932
8	019	104	181	266	348	433	515	600	685	767	852	934
9	022	107	184	268	351	436	518	603	688	770	855	937
10	025	110	186	271	353	438	521	605	690	773	858	940
11	027	112	189	274	356	441	523	608	693	775	860	942
12	030	115	192	277	359	444	526	611	696	778	863	945
13	033	118	195	279	362	447	529	614	699	781	866	948
14	036	121	197	282	364	449	532	616	701	784	868	951
15	038	123	200	285	367	452	534	619	704	786	871	953
16	041	126	203	288	370	455	537	622	707	789	874	956
17	044	129	205	290	373	458	540	625	710	792	877	959
18	047	132	208	293	375	460	542	627	712	795	879	962
19	049	134	211	296	378	463	545	630	715	797	882	964
20	052	137	214	299	381	466	548	633	718	800	885	967
21	055	140	216	301	384	468	551	636	721	803	888	970
22	058	142	219	304	386	471	553	638	723	805	890	973
23	060	145	222	307	389	474	556	641	726	808	893	975
24	063	148	225	310	392	477	559	644	729	811	896	978
25	066	151	227	312	396	479	562	647	731	814	899	981

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