National

Screening Report 2007

Deutsche Gesellschaft für Neugeborenenscreening

DGNS

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Abbreviations:

CAH	Congenital adrenal hyperplasia
CACT- Deficiency	Carnitin-Acylcarnitin-Translocase-Deficiency
CPTI- Deficiency	Carnitin- Palmitoyl-CoA-Transferase I-Deficiency
CPTII- Deficiency	Carnitin- Palmitoyl-CoA-Transferase II-Deficiency
GA I	Glutaric acidaemia type I
BW	Birth weight
HPA	Hyperphenylalaninaemia
IVA	Isovaleric acidaemia
LCHAD-Deficiency	Long-Chain-3-hydroxy-Acyl-CoA-Dehydrogenase-Deficiency
DoL	Day of life
GV 1 - 3	guide value 1 - 3
MCAD-Deficiency	Medium-Chain-Acyl-CoA-Dehydrogenase-Deficiency
MSUD	Maple syrup urine disease
NBS	New born screening
SP	secondary parameter
PKU	Phenylketonuria
PPV	positive predictive value
WoG	Week of gestation
VLCAD-Deficiency	Very-Long-Chain-Acyl-CoA-Dehydrogenase-Deficiency

1 Introduction

The newborn screening is a medical population based preventative measure with the aim of early and sufficient detection and high quality therapy of all newborns with treatable endocrine or metabolic diseases.

The guidelines of prevention of disease for children up to 6 years of age („Kinder-Richtlinien“) outline the details of newborn screening (NBS) since 1.7.2005.

The National Screening Report 2007 was composed by the “Deutschen Gesellschaft für Neugeborenenscreening (DGNS e.V.)” as well as the German screening laboratories. The statistical analysis of the screening data was according to the guidelines and their quality criteria of the NBS implementation. This report targets only the metabolic and endocrine diseases which are defined in these guidelines. It provides a wide statistical summary of disease related screening numbers, recall numbers at diagnoses for the year 2007. Additionally, data for process quality are presented.

Process quality describes the process flow and its evaluation through specialists according to defined indicators. These are the following for the newborn screening:

- Total Survey of the population
    - Collection method and rate
    - Blank card system
- Completeness of the control and the secondary testing
- Collection of test parameters and cut offs
- According to laboratory, age as well as gestational age, stratified rates of recall, positive predictive values and prevalence
- Specificity and sensitivity of diagnostic tests
- Process times (preanalytic and laboratory), age at blood collection, time within blood collections, time of arrival in the laboratory and time of result communication
- Screening values of newborns for which further testing is emphasized
- Diagnostic for confirmation
    - Type of diagnostic
    - Time of diagnostic
- Final diagnosis
- Start of therapy

In chapter 2, laboratories are listed which have undertaken the screening in 2007 for Germany. From chapter 3 the laboratories are listed scrambled. (see chapter 2 - laboratory number, numbers 12 and 13 relate to the same laboratory, ones with and without the co-operation of the Screening Centre, same for 14 and 15). Paragraphs in the text relate to the altered guidelines for children from 21/12/04 (1). Tables are numbered according to the chapters.

We thank all the laboratories for provision of their data. The data was checked for plausibility. Finally, the provided, and if necessary corrected, data was analysed. Remaining inconsistencies of data was analysed according to the reported data. (Inconsistency partly due to the system).

2 Screening Laboratories and Screening Centres

Screening Centers (laboratories) with different localities or laboratories which are connected to a screening centre are analysised stratified.

1) Neugeborenen Screeninglabor Berlin
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15) Medizinisches Versorgungszentrum für Laboratoriumsmedizin u. Mikrobiologie
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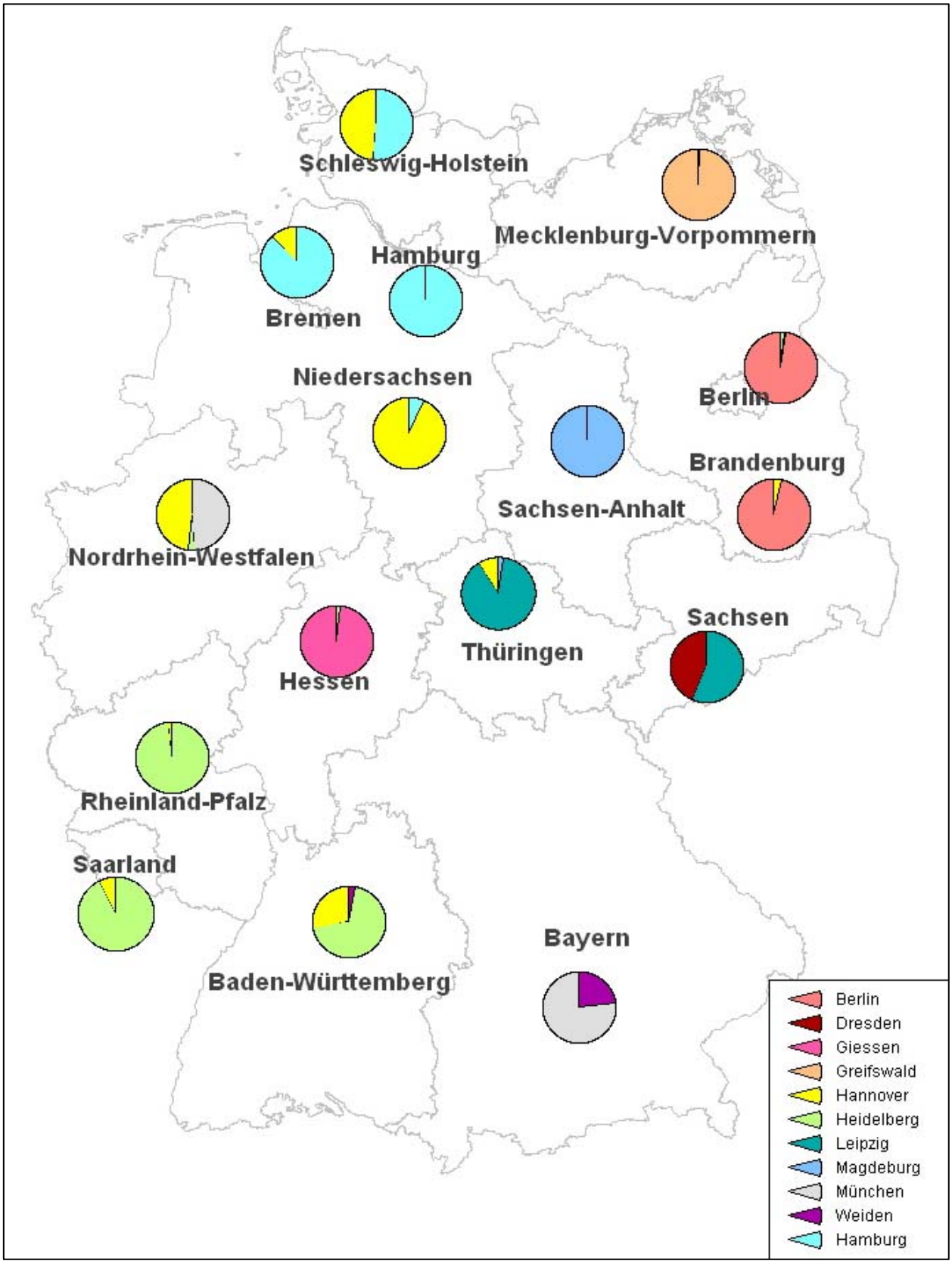
12) Labor Becker, Olgemöller & Kollegen
See 13
14) Medizinisches Versorgungszentrum für Laboratoriumsmedizin u. Mikrobiologie
See 15

The screening samples of the federal states are spread to the laboratories according to Figure1.

Figure 1: Distribution of analysis according to county and laboratory



3 Results 2007

In the year 2007, 684.862 children were born in Germany. The total recorded screening exceeds this number slightly at 686.064. The reason is because a second screening card is recorded as the first screening, as some cards are sent to a different laboratory than the original.

A secure statement about the rate of taking part in NGS can only be made by comparison of person related data or the population. By law this is only legal in the country of Bavaria. The screening rate for Germany is 100,3%.

Births:	684.862
First screening:	686.064
Final diagnosis (see Table 3):	465

In the German guidelines the targeted diseases are defined for the nationwide screening. Some laboratories will also screen for scientific purposes. These results will not be addressed in this report. Of 1.473 newborns one targeted disease according to the guidelines is found. Table 3 shows the prevalence of targeted diseases in the year 2007 in Germany.

Table 3. Absolute number of detected diseases found by screening

Disease	Confirmed cases	Prevalence
Hypothyroidism	163	1: 4.202
Congenital adrenal hyperplasia (CAH)	57	1: 12.015
Biotinidase Deficiency	17	1: 40.286
Galactosaemia (Classic)	9	1: 76.096
Phenylketonuria (PKU) n=56 / Hyperphenylalaninaemia (HPA)	120	1: 5.707
Maple syrup urine disease (MSUD)	2	1: 342.431
Medium-Chain-Acyl-CoA-Dehydrogenase (MCAD)-Deficiency	78	1: 8.780
Long-Chain-3-OH-Acyl-CoA-Dehydrogenase (LCHAD)-Deficiency	3	1: 228.287
(Very-)Long-Chain-Acyl-CoA-Dehydrogenase (VLCAD)-Deficiency	8	1: 85.608
Carnitin-Palmitoyl-CoA-Transferase I (CPTI)-Deficiency	0	
Carnitin-Palmitoyl-CoA-Transferase II (CPTII)-Deficiency	1	1: 684.862
Carnitin-Acylcarnitin-Translocase (CACT)-Deficiency	0	
Glutaric acidaemia Type I (GA I)	3	1: 228.287
Isovaleric acidaemia (IVA)	4	1: 171.216
Total	**465**	**1:** 1.473

3.1 Data of primary screening

According to the guidelines of children, every newborn should be screened before leaving the birth facility. A reliable screening can only be undertaken with blood sampling beyond the completed 32nd gestational week and 36th hour of life. A primary screening before the 36th hour of life or before the completed 32nd week of gestation should be followed by a repeat screening (Section 8 - paragraph 2.4). The following table shows the stratified results of the primary screening according to age and gestational age.

Table 3.1 Age at primary screening

Laboratory	Total	≥36h and ≥32WOG		<36h and ≥32WOG		<32WOG	
		n	%	n	%	n	%
1	48219	46074	95,55	1541	3,20	604	1,25
3	15134	14588	96,39	391	2,58	155	1,02
5	50326	49308	97,98	426	0,85	592	1,18
6	12693	12189	96,03	331	2,61	173	1,36
7	44306	39851	89,94	3152	7,11	1303	2,94
8	171793	167742	97,64	1951	1,14	2100	1,22
9	108435	105734	97,51	1394	1,29	1307	1,21
10	34215	33331	97,42	529	1,55	355	1,04
11	17224	16506	95,83	513	2,98	205	1,19
12	82744	81441	98,43	897	1,08	406	,49
13	74498	73519	98,69	811	1,09	168	,23
14	23862	23277	97,55	359	1,50	226	,95
15	2615	2511	96,02	99	3,79	5	.
Total	**686064**	**666071**	**97,09**	**12394**	**1,81**	**7599**	**1,11**

3.2 Relation of requested to received repeat screenings

In table 3.2.1 the repeat screenings are listed stratified according to their base of request defined as:

„<32WoG“: all sample of newborns before 32 WoG, independent of age and result of primary screening

„<36h“: all sample of newborns beyond 32 WoG, but age less than 36h, independent of the result of primary screening

Recall: essential repeat testing due to suspicious primary screening at a gestational age > 32 WoG and age > 36h

Table 3.2.1 Requested and received repeat screenings

Laboratory[a]	Total[b] requested	Total[b] received	%[b]	**Recall** requested	Recall received	%
1	3019	2897	95,96	531	512	96,42
3	597	615	[d]	39	39	100
5	1551	1347	86,85	526	521	99,05
6	227	224	98,68	211	209	99,05
7[c]	5276			726		.
8	6037	4432	73,41	1633	1466	89,77
9	4483	2971	66,27	582	498	85,57
11	771	744	96,50	53	52	98,11
12	2471	2456	99,39	1168	1155	98,89
13	1837	1834	99,84	858	858	100
14	797	796	99,87	212	212	100
Total	**27066**	**18316**	**84,06**	**6539**	**5522**	**94,99**

Laboratory[a]	**<36h** requested	<36h received	%	**<32WOG** requested	<32WOG received	%
1	1541	1530	99,29	604	570	94,37
3	391	399	[d]	155	163	[d]
5	426	307	72,07	592	512	86,49
6	4	4	100.	12	11	91,67
7[c]	3247			1303		
8	1951	1124	57,61	2100	1640	78,10
9	1449	800	55,21	1840	1190	64,67
11	513	502	97,86	205	190	92,68
12	897	895	99,78	406	406	100
13	811	811	100,00	168	165	98,21
14	359	358	99,72	226	226	100
Total	**11589**	**6730**	**80,68**	**7611**	**5073**	**80,42**

Laboratory[a]	**Other** requested[e]	Other received	%
1	343	285	83,09
3	12	14	[c]
5	7	7	100
8	353	202	57,22
9	612	483	78,92

[a]Laboratory 10 and Laboratory 15 cannot give information
[b]Inclusive secondary screening due to blood transfusion, parenteral nutrition or medication
[c]Laboratory cannot differentiate secondary screening completely therefore it is not considered for percentage calculation but for calculation of absolute numbers
[d]n received > n requested, therefore no percentage calculation.
[e] secondary screening due to blood transfusion, parenteral nutrition or medication
Non listed laboratories have not given information

3.3 Tracking of completeness of screening

The newborn screening is a measure of public health and should be given to all in Germany born children. To guarantee that the screen is offered to all newborns the tracking of completeness is necessary. For children born in obstetric units, an alignment of the recorded birth number on the screening card along with the recorded birth number of the sending unit would be possible, or if legally allowed, by comparing with data from the birth register.

Currently both measures are not undertaken nationwide. To target the tracking of completeness the following rule was included into the "guidelines (§9.6): The obstetric unit should document on a blank test card refusal of screening or death of a neonate. This test card should then be sent to the screening centre.

In 2007 the number of received blank cards has risen markedly, as shown in table 3.3. Tracking of completeness cannot be ensured by this measure.

Table 3.3 Laboratory received blank cards/ requested and screened children

		Screening undertaken		
	Blank Cards Received*	Alignment Blank Cards	Alignment Recorded birth number**	alignment Birth Register **
Laboratory	n	n	n	n
1	3251	303		
3	407	402	35	
5	4010	104		
6	242		32	
7	283			
8	1071			
9	797			
10	1115		10	
11	364		5	
12	696	694		46
13	n.s.			
14	13	13		11
15	n.s.			
Total	**12249**	**1516**	**82**	**57**

*registration of blank cards was not differentiated according to reason, as some laboratories cannot differentiate or do not register a reason.
**only information for laboratories who record alignment.

3.4 Requirements to a repeat screening card due to bad sample quality

Lab	Primary Screening	Control requested	Control received	received/ requested (%)	Percentage of unprocessed screening cards/ Primary Screening (%)
1	48219	343	285	83,09	0,71
3	15134	15	15	100	0,10
5	50326	550	550	100	1,09
6	12693	10	10	100	0,08
7	44306	68	61	89,71	0,15
8	171793	723	635	87,83	0,42
9	108435	351	320	91,17	0,32
10	34215	166	158	95,18	0,49
11	17224	0	0		
12	82744	586	577	98,46	0,71
13	74498	432	407	94,21	0,58
14	23862	19	19	100,00	0,08
15	2615	n.s.	n.s.		
Total	**686.064**	**3263**	**3037**	**93,07**	**0,48**

4 Recall Rate, Prevalence, Positive predictive value specificity

The excellence of a test is measured by the sensitivity, the specificity as well as the positive predictive value. In screening, the sensitivity (true-test positives) but more so the specificity (true-test negatives), should be easy to find all diseased and to avoid unnecessary worries and costs. A measure for the specificity in newborn screening is the recall rate. The smaller the recall rate the higher the specificity. The positive predictive value estimates the risk of disease with a positive test result. It depends on the prevalence of the targeted disease. In Table 4 listed epidemiologic numbers concern all screened children independently of age and gestational age. The sensitivity cannot be calculated since the number of screened but undetected children is not recorded systematically. Recall is a necessary follow-up testing due a positive primary screening.

Table 4 Specificity, PPV related to the total number of primary screening tests independent of age and gestational age.

Disease	Primary Screening	Recall Total	Recall-rate (%)	Confirmed cases	PPV (%)	Specificity (%)	False negative
Hypothyroidism	686064	960	0,14	163	16,98	99,88	0
CAH	686064	5293	0,77	57	1,08	99,24	0
Biotinidase	686064	142	0,02	17	11,97	99,98	0
Classic Galactosaemia	686064	426	0,06	9	2,11	99,94	0
MS/MS	686064	958	0,14	219	22,86	99,89	0
Total*	**686064**	**7779**	**1,13**	**465**	**5,98**	**98,93**	**0**

Considering the analysis is only for screening which was taken from neonates older than 32 WOG and older than 36 hours of life the overall PPV is 7,4%, only about 7% of recalled children suffer from the targeted disease. For some diseases the PPV is very high, e.g. for HPA/PKU 56,9%, for MCAD-deficiency 44,6% and for hypothyroidism 26,5%.

The range of the PPV in between different laboratories is wide, e.g. hypothyroidism 11%-47%; MCAD-deficiency 12%-96%. More positive predictive values (of screening > 36 hours of life and >32 WoG) are listed in Table 4a which differ from Table 4.

Table 4a: Recall PPV with a screening > 36 hours of life and >32 WoG

Disease	Primary Screening	Recall	Recall-rate(%)	Confirmed cases	PPV(%)	Specificity ≥ 36h(%)
Hypothyroidism	666071	573	0,09	152	26,53	99,94
CAH	666071	3771	0,57	46	1,22	99,44
Biotinidase	666071	130	0,02	17	13,08	99,98
Classic Galactosaemia	666071	414	0,06	8	1,93	99,94
MS/MS*	666071	867	0,13	205	23,64	99,90
Total	**666071**	**5755**	**0,86**	**428**	**7,44**	**99,20**

***Only targeted diseases

4.1 Recall rate, prevalence stratified

Recall rates of the following tables as well as PPV are of newborns that were screened > 32 weeks gestational age and 36 hours age. The reference of > 36 hours automatically includes > 32 weeks gestational age.

The confirmed diagnosis, confirmed cases and their prevalence relate to the total screening tests, irrespective to age and gestational age. The validation of confirmed cases was tested for plausibility of metabolic diseases by Professor Andreas Schulze and Dr. Regina Ensenauer, for endocrine diseases by Dr. Oliver Blankenstein. Cases with implausible (n=17) or missing data (n=24) as well as cases which did not have the necessary data for validation (n=41) were excluded from analysis. All double cases were included only once.

Table 4.1 All targeted diseases

Disease	Primary Screening Total	Primary Screening ≥36h	Recall ≥36h	Recall-rate % [a]	Confirmed cases	PPV ≥36h (%)	Prevalence Total	False negative
Hypothyroidism	686064	666071	573	0,09	163	26,53	1: 4209	0
CAH	686064	666071	3771	0,57	57	1,22	1: 12036	0
Biotinidase-Deficiency	686064	666071	130	0,02	17	13,08	1: 40357	0
Classic Galactosaemia	686064	666071	414	0,06	9	1,93	1: 76229	0
PKU/HPA	686064	666071	195	0,03	120	56,92	1: 5717	0
MSUD	686064	666071	91	0,01	2	2,20	1: 343032	0
MCAD	686064	666071	168	0,03	78	44,64	1: 8796	0
LCHAD	686064	666071	48	0,01	3	2,08	1: 228688	0
VLCAD	686064	666071	152	0,02	8	5,26	1: 85758	0
CPT I-Deficiency	686064	666071	3		0			0
CPT II-Deficiency	686064	666071	3		1		1: 686064	0
CAT-Deficiency	686064	666071	0		0			0
GA I	686064	666071	121	0,02	3	2,48	1: 228688	0
IVA	686064	666071	86	0,01	4	4,65	1: 171516	0
Total	**686064**	**666071**	**5755**	**0,86**	**465**	**7,44**	**1: 1475**	**0**

[a] Recall rate recorded only if ≥ 0,01%

4.1.1 Hypothyroidism

Laboratory	Primary Screening Total	Primary Screening >=36h	Recall >=36h	Recall-rate(%)*	Confirmed cases	Prevalence	False negative
1	48219	46074	27	0,06	12	1: 4018	0
3	15134	14588	4	0,03	2	1: 7567	0
5	50326	49308	79	0,16	12	1: 4194	0
6	12693	12189	3	0,02	1	1: 12693	0
7	44306	39851	28	0,07	4	1: 11077	0
8	171793	167742	258	0,15	51	1: 3368	0
9	108435	105734	50	0,05	27	1: 4016	0
10	34215	33331	11	0,03	7	1: 4888	0
11	17224	16506	4	0,02	3	1: 5741	0
12	82744	81441	45	0,06	23	1: 3598	0
13	74498	73519	54	0,07	13	1: 5731	0
14	23862	23277	10	0,04	8	1: 2983	0
15	2615	2511	0		0		0
Total	**686064**	**666071**	**573**	**0,09**	**163**	**1: 4209**	**0**

*Recall rate recorded only if ≥ 0,01%

4.1.2 Congenital adrenal hyperplasia (CAH)

Laboratory	Primary Screening Total	Primary Screening >=36h	Recall >=36h	Recall-rate(%)*	Confirmed cases	Prevalence	False negative
1	48219	46074	154	0,33	4	1: 12055	0
3	15134	14588	7	0,05	1	1: 15134	0
5	50326	49308	295	0,60	3	1: 16775	0
6	12693	12189	171	1,40	3	1: 4231	0
7	44306	39851	46	0,12	3	1: 14769	0
8	171793	167742	753	0,45	19	1: 9042	0
9	108435	105734	261	0,25	8	1: 13554	0
10	34215	33331	58	0,17	2	1: 17108	0
11	17224	16506	22	0,13	1	1: 17224	0
12	82744	81441	1015	1,25	5	1: 16549	0
13	74498	73519	824	1,12	6	1: 12416	0
14	23862	23277	154	0,66	2	1: 11931	0
15	2615	2511	11	0,44	0		0
Total	**686064**	**666071**	**3771**	**0,57**	**57**	**1: 12036**	**0**

*Recall rate recorded only if ≥ 0,01%

4.1.3 Biotinidase Deficiency

Laboratory	Primary Screening Total	Primary Screening >=36h	Recall >=36h	Recall-rate(%)*	Confirmed cases	Prevalence	False negative
1	48219	46074	6	0,01	1	1: 48219	0
3	15134	14588	1	0,01	0		0
5	50326	49308	3	0,01	1	1: 50326	0
6	12693	12189	3	0,02	1	1: 12693	0
7	44306	39851	7	0,02	2	1: 22153	0
8	171793	167742	72	0,04	11	1: 15618	0
9	108435	105734	4		1	1: 108435	0
10	34215	33331	0		0		0
11	17224	16506	2	0,01	0		0
12	82744	81441	16	0,02	0		0
13	74498	73519	13	0,02	0		0
14	23862	23277	2	0,01	0		0
15	2615	2511	1	0,04	0		0
Total	**686064**	**666071**	**130**	**0,02**	**17**	**1: 40357**	**0**

* Recall rate Recorded only if ≥ 0,01%

4.1.4 Galactosaemia incl. Variants / Classic

Lab [a]	Primary Screening Total	Primary Screening >=36h	Recall >=36h	Recall-rate(%)[c]	Confirmed cases	Prevalence	False negative
1	48219	46074	62	0,13	14	1: 3444	0
3	15134	14588	2	0,01	1	1: 15134	0
5	50326	49308	48	0,10	0		0
6	12693	12189	6	0,05	0		0
7 [b]	44306	39851	21	0,05	1	1: 44306	0
8	171793	167742	175	0,10	1	1: 171793	0
9	108435	105734	9	0,01	2	1: 54218	0
10	34215	33331	6	0,02	4	1: 8554	0
11	17224	16506	11	0,07	0		0
12	82744	81441	20	0,02	2	1: 41372	0
13	74498	73519	24	0,03	1	1: 74498	0
14	23862	23277	28	0,12	0		0
15	2615	2511	2	0,08	0		0
Total	**686064**	**666071**	**414**	**0,06**	**26**	**1: 26387**	**0**
Classic					**9**	**1: 76229**	**0**

* Recall rate Recorded only if ≥ 0,01%

4.1.5 MS/MS

MS/MS only targeted diseases

Laboratory	Primary Screening Total	Primary Screening >=36h	Recall >=36h	Recall-rate(%)*	Confirmed cases	Prevalence	False negative
1	48219	46074	218	0,47	23	1: 2096	0
3	15134	14588	27	0,19	5	1: 3027	0
5	50326	49308	105	0,21	16	1: 3145	0
6	12693	12189	24	0,20	3	1: 4231	0
7	44306	39851	103	0,26	19	1: 2332	0
8	171793	167742	56	0,03	54	1: 3181	0
9	108435	105734	181	0,17	30	1: 3615	0
10	34215	33331	17	0,05	2	1: 17108	0
11	17224	16506	14	0,08	6	1: 2871	0
12	82744	81441	52	0,06	24	1: 3448	0
13	74498	73519	52	0,07	26	1: 3725	0
14	23862	23277	17	0,07	11	1: 2169	0
15	2615	2511	1	0,04	0		0
Total	**686064**	**666071**	**867**	**0,13**	**219**	**1: 3133**	**0**

* Recall rate recorded only if ≥ 0,01%

4.1.5.1 PKU / HPA

Lab	Primary Screening Total	Primary Screening >=36h	Recall >=36h	Recall-rate(%)*	Confirmed cases	Prevalence	False negative
1	48219	46074	33	0,07	17	1: 2836	0
3	15134	14588	4	0,03	2	1: 7567	0
5	50326	49308	16	0,03	11	1: 4575	0
6	12693	12189	2	0,02	3	1: 4231	0
7	44306	39851	29	0,07	8	1: 5538	0
8	171793	167742	26	0,02	26	1: 6607	0
9	108435	105734	32	0,03	15	1: 7229	0
10	34215	33331	10	0,03	1	1: 34215	0
11	17224	16506	4	0,02	4	1: 4306	0
12	82744	81441	17	0,02	14	1: 5910	0
13	74498	73519	14	0,02	13	1: 5731	0
14	23862	23277	8	0,03	6	1: 3977	0
15	2615	2511	0		0		0
Total	**686064**	**666071**	**195**	**0,03**	**120**	**1: 5717**	**0**
Only PKU					**56**	**1: 12251**	

* Recall rate recorded only if ≥ 0,01%

4.1.5.2 MSUD

Laboratory	Primary Screening Total	Primary Screening >=36h	Recall >=36h	Recall-rate(%)*	Confirmed cases	Prevalence	False negative
1	48219	46074	18	0,04	0		0
3	15134	14588	2	0,01	0		0
5	50326	49308	8	0,02	0		0
6	12693	12189	5	0,04	0		0
7	44306	39851	12	0,03	0		0
8	171793	167742	1		1	1: 171793	0
9	108435	105734	38	0,04	0		0
10	34215	33331	1		0		0
11	17224	16506	2	0,01	0		0
12	82744	81441	1		0		0
13	74498	73519	1		1	1: 74498	0
14	23862	23277	2	0,01	0		0
15	2615	2511	0		0		0
Total	**686064**	**666071**	**91**	**0,01**	**2**	**1: 343032**	**0**

* Recall rate recorded only if ≥ 0,01%

4.1.5.3 MCAD-Deficiency

Laboratory	Primary Screening Total	Primary Screening >=36h	Recall >=36h	Recall-rate(%)*	Confirmed cases	Prevalence	False negative
1	48219	46074	39	0,08	5	1: 9644	0
3	15134	14588	9	0,06	2	1: 7567	0
5	50326	49308	33	0,07	4	1: 12582	0
6	12693	12189	7	0,06	0		0
7	44306	39851	13	0,03	10	1: 4431	0
8	171793	167742	23	0,01	22	1: 7809	0
9	108435	105734	14	0,01	11	1: 9858	0
10	34215	33331	3	0,01	1	1: 34215	0
11	17224	16506	2	0,01	2	1: 8612	0
12	82744	81441	9	0,01	7	1: 11821	0
13	74498	73519	8	0,01	9	1: 18625	0
14	23862	23277	7	0,03	5	1: 4772	0
15	2615	2511	1	0,04	0		0
Total	**686064**	**666071**	**168**	**0,03**	**78**	**1: 8796**	**0**

* Recall rate recorded only if ≥ 0,01%

4.1.5.4 LCHAD-Deficiency

Laboratory	Primary Screening Total	Primary Screening >=36h	Recall >=36h	Recall-rate(%)*	Confirmed cases	Prevalence	False negative
1	48219	46074	20	0,04	0		0
3	15134	14588	0		0		0
5	50326	49308	0		0		0
6	12693	12189	2	0,02	0		0
7	44306	39851	0		0		0
8	171793	167742	2		2	1: 85897	0
9	108435	105734	6	0,01	1	1: 108435	0
10	34215	33331	0		0		0
11	17224	16506	0		0		0
12	82744	81441	6	0,01	0		0
13	74498	73519	12	0,02	0		0
14	23862	23277	0		0		0
15	2615	2511	0		0		0
Total	**686064**	**666071**	**48**	**0,01**	**3**	**1: 228688**	**0**

* Recall rate recorded only if ≥ 0,01%

4.1.5.5 VLCAD-Deficiency

Laboratory	Primary Screening Total	Primary Screening >=36h	Recall >=36h	Recall-rate(%)*	Confirmed cases	Prevalence	False negative
1	48219	46074	34	0,07	1	1: 48219	0
3	15134	14588	5	0,03	1	1: 15134	0
5	50326	49308	8	0,02	0		0
6	12693	12189	1	0,01	0		0
7	44306	39851	35	0,09	0		0
8	171793	167742	2		2	1: 85897	0
9	108435	105734	57	0,05	2	1: 54218	0
10	34215	33331	0		0		0
11	17224	16506	0		0		0
12	82744	81441	10	0,01	1	1: 82744	0
13	74498	73519	0		0		0
14	23862	23277	0		0		0
15	2615	2511	0		0		0
Total	**686064**	**666071**	**152**	**0,02**	**8**	**1: 85758**	**0**

* Recall rate recorded only if ≥ 0,01%

4.1.5.6 No confirmed cases of CPTI-Deficiency and for CACT-Deficiency

4.1.5.7 CPT II-Deficiency

Laboratory	Primary Screening Total	Primary Screening >=36h	Recall >=36h	Recall-rate(%)*	Confirmed cases	Prevalence	False negative
1	48219	46074	2		0		0
3	15134	14588	0		0		0
5	50326	49308	1		1	1: 50326	0
6	12693	12189	0		0		0
7	44306	39851	0		0		0
8	171793	167742	0		0		0
9	108435	105734	0		0		0
10	34215	33331	0		0		0
11	17224	16506	0		0		0
12	82744	81441	0		0		0
13	74498	73519	0		0		0
14	23862	23277	0		0		0
15	2615	2511	0		0		0
Total	686064	666071	3	0,0005	1	1: 686064	0

* Recall rate recorded only if ≥ 0,01%

4.1.5.8 Glutaric acidaemia Type I

Laboratory	Primary Screening Total	Primary Screening >=36h	Recall >=36h	Recall-rate(%)*	Confirmed cases	Prevalence	False negative
1	48219	46074	47	0,10	0		0
3	15134	14588	0		0		0
5	50326	49308	24	0,05	0		0
6	12693	12189	5	0,04	0		0
7	44306	39851	9	0,02	1	1: 44306	0
8	171793	167742	1		1	1: 171793	0
9	108435	105734	32	0,03	0		0
10	34215	33331	1		0		0
11	17224	16506	0		0		0
12	82744	81441	2		1	1: 82744	0
13	74498	73519	0		0		0
14	23862	23277	0		0		0
15	2615	2511	0		0		0
Total	**686064**	**666071**	**121**	**0,02**	**3**	**1: 228688**	**0**

* Recall rate recorded only if ≥ 0,01%

4.1.5.9 Isovaleric acidaemia

Laboratory	Primary Screening Total	Primary Screening >=36h	Recall >=36h	Recall-rate(%)*	Confirmed cases	Prevalence	False negative
1	48219	46074	25	0,05	0		0
3	15134	14588	7	0,05	0		0
5	50326	49308	15	0,03	0		0
6	12693	12189	2	0,02	0		0
7	44306	39851	4	0,01	0		0
8	171793	167742	1		0		0
9	108435	105734	1		1	1: 108435	0
10	34215	33331	1		0		0
11	17224	16506	6	0,04	0		0
12	82744	81441	7	0,01	1	1: 82744	0
13	74498	73519	17	0,02	2	1: 37249	0
14	23862	23277	0		0		0
15	2615	2511	0		0		0
Total	**686064**	**666071**	**86**	**0,01**	**4**	**1: 171516**	**0**

* Recall rate recorded only if ≥ 0,01%

4.2 Recall rate stratified according to age of primary screening

The number of positives, especially false positive screening results and therefore the recall rate depends on age and gestational age. Earlier testing than the 36th hour of life and a gestational age of <32 weeks increase the risk of false negative and false positive results. Since this is different for the individual diseases we show the recall rate stratified to targeted disease and age / gestational age. Recall rate is recorded only if it exceeds 0,01%.

4.2.1 Hypothyroidism

Laboratory	Primary Screening ≥ 36h			Primary Screening < 36h			Primary Screening < 32WOG		
	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate
1	27	46074	0,06	10	1541	0,65	0	604	
3	4	14588	0,03	0	391		0	155	
5	79	49308	0,16	4	426	0,94	2	592	0,34
6	3	12189	0,02	0	331		0	173	
7	28	39851	0,07	0	3152		3	1303	0,23
8	258	167742	0,15	201	1951	10,30	12	2100	0,57
9	50	105734	0,05	15	1394	1,08	0	1307	
10	11	33331	0,03	17	529	3,21	0	355	
11	4	16506	0,02	67	513	13,06	2	205	0,98
12	45	81441	0,06	41	897	4,57	6	406	1,48
13*	54	73519	0,07		811			168	
14	10	23277	0,04	7	359	1,95	0	226	
15	0	2511		0	99		0	5	
Total	**573**	**666071**	**0,09**	**362**	**12394**	**3,12**	**19**	**7025**	**0,27**

* Laboratory 13 cannot differentiate recall rate according to age, therefore we counted all recalls as ≥ 36h

4.2.2 Congenital adrenal hyperplasia (CAH)

Laboratory	Primary Screening ≥ 36h			Primary Screening < 36h			Primary Screening < 32WOG		
	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate
1	154	46074	0,33	26	1541	1,69	12	604	1,99
3	7	14588	0,05	0	391		0	155	
5	295	49308	0,60	5	426	1,17	21	592	3,55
6	171	12189	1,40	3	331	0,91	5	173	2,89
7	46	39851	0,12	2	3152	0,06	505	1303	38,76
8	753	167742	0,45	233	1951	11,94	322	2100	15,33
9	261	105734	0,25	23	1394	1,65	4	1307	0,31
10	58	33331	0,17	12	529	2,27	4	355	1,13
11	22	16506	0,13	17	513	3,31	3	205	1,46
12	1015	81441	1,25	46	897	5,13			
13*	824	73519	1,12		811				
14	154	23277	0,66	10	359	2,79	27	226	11,95
15	11	2511	0,44	1	99	1,01	1	5	20,00
Total	**3771**	**666071**	**0,57**	**378**	**12394**	**3,26**	**904**	**7025**	**12,67**

* Laboratory 13 cannot differentiate recall rate according to age, therefore we counted all recalls as ≥ 36h

4.2.3 Biotinidase Deficiency

Laboratory	Primary Screening ≥ 36h			Primary Screening < 36h			Primary Screening < 32WOG		
	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate
1	6	46074	0,01	1	1541	0,06	2	604	0,33
3	1	14588	0,01	0	391		0	155	
5	3	49308	0,01	0	426		0	592	
6	3	12189	0,02	0	331		0	173	
7	7	39851	0,02	0	3152		0	1303	
8	72	167742	0,04	3	1951	0,15	5	2100	0,24
9	4	105734		0	1394		0	1307	
10	0	33331		0	529		0	355	
11	2	16506	0,01	0	513		0	205	
12	16	81441	0,02	0	897				
13	13	73519	0,02		811				
14	2	23277	0,01	0	359		0	226	
15	1	2511	0,04	0	99		0	5	
Total	**130**	**666071**	**0,02**	**4**	**12394**	**0,03**	**7**	**7025**	**0,1**

* Laboratory 13 cannot differentiate recall rate according to age, therefore we counted all recalls as ≥ 36h

4.2.4 Galactosaemia

Lab	Primary Screening ≥ 36h			Primary Screening < 36h			Primary Screening < 32WOG		
	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate
1	62	46074	0,13	1	1541	0,06	0	604	
3	2	14588	0,01	0	391		0	155	
5	48	49308	0,10	0	426		2	592	0,34
6	6	12189	0,05	0	331		0	173	
7	21	39851	0,05	0	3152		0	1303	
8	175	167742	0,10	3	1951	0,15	1	2100	0,05
9	9	105734	0,01	0	1394		0	1307	
10	6	33331	0,02	0	529		0	355	
11	11	16506	0,07	0	513		0	205	
12	20	81441	0,02	0	897				
13*	24	73519	0,03		811				
14	28	23277	0,12	1	359	0,28	2	226	0,88
15	2	2511	0,08	0	99		0	5	
Total	**414**	**666071**	**0,06**	**5**	**12394**	**0,04**	**5**	**7025**	**0,07**

* Laboratory 13 cannot differentiate recall rate according to age, therefore we counted all recalls as ≥ 36h

4.2.5 MS/MS Total

Laboratory	Primary Screening ≥ 36h			Primary Screening < 36h			Primary Screening < 32WOG		
	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate
1	218	46074	0,47	13	1541	0,84	18	604	2,98
3	27	14588	0,19	0	391		1	155	0,65
5	105	49308	0,21	1	426	0,23	15	592	2,53
6	24	12189	0,20	1	331	0,30	7	173	4,05
7	103	39851	0,26	3	3152	0,10	13	1303	1,00
8	56	167742	0,03	0	1951		2	2100	0,10
9	181	105734	0,17	3	1394	0,22	6	1307	0,46
10	17	33331	0,05	0	529		3	355	0,85
11	14	16506	0,08	1	513	0,19	0	205	
12	52	81441	0,06	1	897	0,11			
13*	52	73519	0,07		811				
14	17	23277	0,07	2	359	0,56	1	226	0,44
15	1	2511	0,04	0	99		0	5	
Total	**867**	**666071**	**0,13**	**25**	**12394**	**0,22**	**66**	**7025**	**0,93**

* Laboratory 13 cannot differentiate recall rate according to age, therefore we counted all recalls as ≥ 36h

4.2.5.1 PKU/HPA

Laboratory	Primary Screening ≥ 36h			Primary Screening < 36h			Primary Screening < 32WOG		
	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate
1	33	46074	0,07	9	1541	0,58	7	604	1,16
3	4	14588	0,03	0	391		1	155	0,65
5	16	49308	0,03	1	426	0,23	2	592	0,34
6	2	12189	0,02	0	331		1	173	0,58
7	29	39851	0,07	3	3152	0,10	12	1303	0,92
8	26	167742	0,02	0	1951		0	2100	
9	32	105734	0,03	1	1394	0,07	4	1307	0,31
10	10	33331	0,03	0	529		3	355	0,85
11	4	16506	0,02	0	513		0	205	
12	17	81441	0,02	1	897	0,11			
13*	14	73519	0,02		811				
14	8	23277	0,03	0	359		0	226	
15	0	2511		0	99		0	5	
Total	**195**	**666071**	**0,03**	**15**	**12394**	**0,13**	**30**	**7025**	**0,43**

* Laboratory 13 cannot differentiate recall rate according to age, therefore we counted all recalls as ≥ 36h

4.2.5.2 MSUD

Laboratory	Primary Screening ≥ 36h			Primary Screening < 36h			Primary Screening < 32WOG		
	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate
1	18	46074	0,04	0	1541		1	604	0,17
3	2	14588	0,01	0	391		0	155	
5	8	49308	0,02	0	426		0	592	
6	5	12189	0,04	0	331		2	173	1,16
7	12	39851	0,03	0	3152		1	1303	0,08
8	1	167742	0,00	0	1951		1	2100	0,05
9	38	105734	0,04	0	1394		0	1307	
10	1	33331	0,00	0	529		0	355	
11	2	16506	0,01	0	513		0	205	
12	1	81441	0,00	0	897				
13*	1	73519	0,00		811				
14	2	23277	0,01	0	359		0	226	
15	0	2511	0,00	0	99		0	5	
Total	**91**	**666071**	**0,01**	**0**	**12394**		**5**	**7025**	**0,07**

* Laboratory 13 cannot differentiate recall rate according to age, therefore we counted all recalls as ≥ 36h

4.2.5.3 MCAD-Deficiency

Laboratory	Primary Screening ≥ 36h			Primary Screening < 36h			Primary Screening < 32WOG		
	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate
1	39	46074	0,08	0	1541		0	604	
3	9	14588	0,06	0	391		0	155	
5	33	49308	0,07	0	426		0	592	
6	7	12189	0,06	1	331	0,30	0	173	
7	13	39851	0,03	0	3152		0	1303	
8	23	167742	0,01	0	1951		0	2100	
9	14	105734	0,01	2	1394	0,14	0	1307	
10	3	33331	0,01	0	529		0	355	
11	2	16506	0,01	0	513		0	205	
12	9	81441	0,01	0	897				
13*	8	73519	0,01		811				
14	7	23277	0,03	0	359		0	226	
14	1	2511	0,04	0	99		0	5	
Total	**168**	**666071**	**0,03**	**3**	**12394**	**0,02**	**0**	**7025**	

* Laboratory 13 cannot differentiate recall rate according to age, therefore we counted all recalls as ≥ 36h

4.2.5.4 LCHAD-Deficiency

Laboratory	Primary Screening ≥ 36h			Primary Screening < 36h			Primary Screening < 32WOG		
	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate
1	20	46074	0,04	0	1541		0	604	
3	0	14588		0	391		0	155	
5	0	49308		0	426		0	592	
6	2	12189	0,02	0	331		0	173	
7	0	39851		0	3152		0	1303	
8	2	167742		0	1951		1	2100	0,05
9	6	105734	0,01	0	1394		0	1307	
10	0	33331		0	529		0	355	
11	0	16506		0	513		0	205	
12	6	81441	0,01	0	897				
13*	12	73519	0,02		811				
14	0	23277		1	359	0,28	0	226	
15	0	2511		0	99		0	5	
Total	**48**	**666071**	**0,01**	**1**	**12394**	**0,01**	**1**	**7025**	**0,01**

* Laboratory 13 cannot differentiate recall rate according to age, therefore we counted all recalls as ≥ 36h

4.2.5.5 VLCAD-Deficiency

Laboratory	Primary Screening ≥ 36h			Primary Screening < 36h			Primary Screening < 32WOG		
	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate
1	34	46074	0,07	0	1541		3	604	0,50
3	5	14588	0,03	0	391		0	155	
5	8	49308	0,02	0	426		1	592	0,17
6	1	12189	0,01	0	331		0	173	
7	35	39851	0,09	0	3152		0	1303	
8	2	167742		0	1951		0	2100	
9	57	105734	0,05	0	1394		0	1307	
10	0	33331		0	529		0	355	
11	0	16506		1	513	0,19	0	205	
12	10	81441	0,01	0	897				
13*	0	73519			811				
14	0	23277		1	359	0,28	0	226	
15	0	2511		0	99		0	5	
Total	**152**	**666071**	**0,02**	**2**	**12394**	**0,02**	**4**	**7025**	**0,07**

* Laboratory 13 cannot differentiate recall rate according to age, therefore we counted all recalls as ≥ 36h

4.2.5.6 CPTI-Deficiency

Laboratory	Primary Screening ≥ 36h			Primary Screening < 36h			Primary Screening < 32WOG		
	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate
1	0	46074		1	1541	0,06	0	604	
3	0	14588		0	391		0	155	
5	0	49308		0	426		3	592	0,51
6	0	12189		0	331		0	173	
7	1	39851		0	3152		0	1303	
8	0	167742		0	1951		0	2100	
9	1	105734		0	1394		0	1307	
10	1	33331		0	529		0	355	
11	0	16506		0	513		0	205	
12	0	81441		0	897				
13*	0	73519			811				
14	0	23277		0	359		0	226	
15	0	2511		0	99		0	5	
Total	**3**	**666071**	**0,0002**	**1**	**12394**	**0,01**	**3**	**7025**	**0,04**

* Laboratory 13 cannot differentiate recall rate according to age, therefore we counted all recalls as ≥ 36h

4.2.5.7 CPTII-Deficiency

Laboratory	Primary Screening ≥ 36h			Primary Screening < 36h			Primary Screening < 32WOG		
	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate
1	2	46074		0	1541		0	604	
3	0	14588		0	391		0	155	
5	1	49308		0	426		0	592	
6	0	12189		0	331		0	173	
7	0	39851		0	3152		0	1303	
8	0	167742		0	1951		0	2100	
9	0	105734		0	1394		0	1307	
10	0	33331		0	529		0	355	
11	0	16506		0	513		0	205	
12	0	81441		0	897				
13*	0	73519			811				
14	0	23277		0	359		0	226	
15	0	2511		0	99		0	5	
Total	**3**	**666071**	**0,0002**	**0**	**12394**		**0**	**7025**	

* Laboratory 13 cannot differentiate recall rate according to age, therefore we counted all recalls as ≥ 36h

4.2.5.8 Glutaric acidaemia Type I

Laboratory	Primary Screening ≥ 36h			Primary Screening < 36h			Primary Screening < 32WOG		
	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate
1	47	46074	0,10	3	1541	0,19	4	604	0,66
3	0	14588		0	391		0	155	
5	24	49308	0,05	0	426		3	592	0,51
6	5	12189	0,04	0	331		0	173	
7	9	39851	0,02	0	3152		0	1303	
8	1	167742		0	1951		0	2100	
9	32	105734	0,03	0	1394		2	1307	0,15
10	1	33331		0	529		0	355	
11	0	16506		0	513		0	205	
12	2	81441		0	897				
13*	0	73519			811				
14	0	23277		0	359		0	226	
15	0	2511		0	99		0	5	
Total	**121**	**666071**	**0,02**	**3**	**12394**	**0,02**	**9**	**7025**	**0,12**

* Laboratory 13 cannot differentiate recall rate according to age, therefore we counted all recalls as ≥ 36h

4.2.5.9 Isovaleric acidaemia

Laboratory	Primary Screening ≥ 36h			Primary Screening < 36h			Primary Screening < 32WOG		
	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate	Recall	Primary Screening	Recall-rate
1	25	46074	0,05	0	1541		3	604	0,50
3	7	14588	0,05	0	391		0	155	
5	15	49308	0,03	0	426		6	592	1,01
6	2	12189	0,02	0	331		4	173	2,31
7	4	39851	0,01	0	3152		0	1303	
8	1	167742		0	1951		0	2100	
9	1	105734		0	1394		0	1307	
10	1	33331		0	529		0	355	
11	6	16506	0,04	0	513		0	205	
12	7	81441	0,01	0	897				
13*	17	73519	0,02		811				
14	0	23277		0	359		1	226	0,44
15	0	2511		0	99		0	5	
Total	**86**	**666071**	**0,01**	**0**	**12394**		**14**	**7025**	**0,2**

* Laboratory 13 cannot differentiate recall rate according to age, therefore we counted all recalls as ≥ 36h

5 Process Periods

5.1 Age at blood collection

According to the guidelines (Kinderrichtlinien, section 8, paragraph 1) the sampling should be performed between the 36th and 72nd hour of life. In 82,87% of cases, with specification of collection time, the collection was according to the guidelines, in 15,47% (5,81-25,41%) beyond the 72nd hour of life, in 1,66% (0,9-4,36%) before the 36th hour of life (see Table 5.1, figure 2).

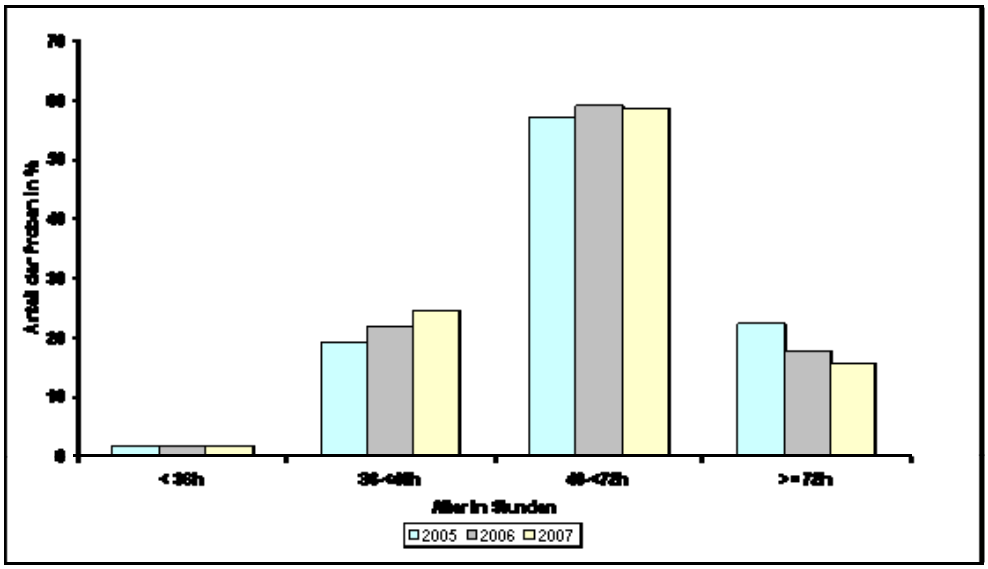
The number of cards with recorded times is less than the total number of first screening cards due to missing information on some cards (marked [b] in table 5.1). Although compared with the additional secondary screening cards, the numbers are higher. The 15.5% of samples taken beyond the 72nd hour of life are mainly first samples of children where the first screening was rejected.

Table 5.1 Age at blood collection, primary screening

Lab[a]	Total	<36h		36h-<48h		48h-<72h		≥72h	
	n	n	%	n	%	n	%	n	%
1[b]	48108	1654	3,44	6077	12,63	30177	62,73	10200	21,20
3[b]	15061	391	2,60	1816	12,06	11979	79,54	875	5,81
5[c]	50874	460	0,90	25299	49,73	20698	40,68	4417	8,68
6	12693	345	2,72	1922	15,14	7870	62,00	2556	20,14
8[b]	154198	2230	1,45	50924	33,03	81040	52,56	20004	12,97
9	108435	1510	1,39	14319	13,21	65051	59,99	27555	25,41
10	34215	558	1,63	6793	19,85	22028	64,38	4836	14,13
11[b]	17220	534	3,10	2912	16,91	11905	69,13	1869	10,85
12[b]	80269	1012	1,26	23663	29,48	44977	56,03	10617	13,23
13[b]	74496	811	1,09	10333	13,87	53837	72,27	9515	12,77
14	23862	693	2,90	6711	28,12	13318	55,81	3140	13,16
15	2615	114	4,36	603	23,06	1276	48,80	622	23,79
Total	**622046**	**10312**	**1,66**	**151372**	**24,33**	**364156**	**58,54**	**96206**	**15,47**

[a] Laboratory 7 could not differentiate times and is therefore not listed. [b] and [c] see text

Figure 2: Comparison: Age at blood collection 2005 to 2007



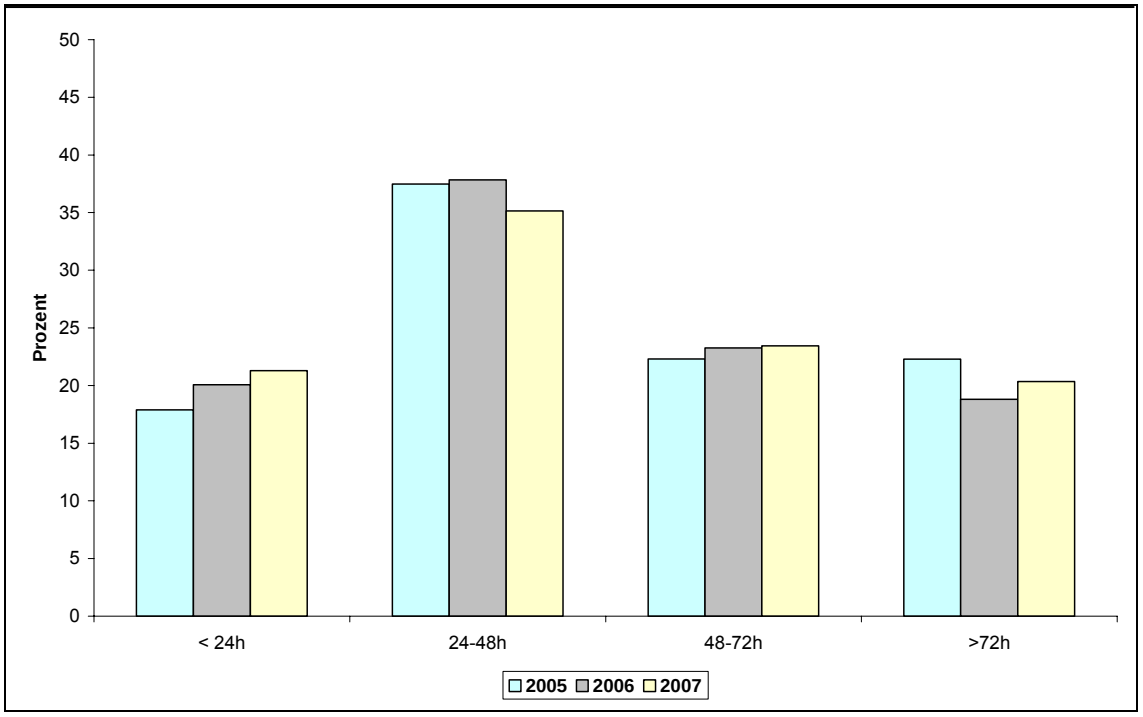
5.2 Period from sampling to laboratory receipt

The time span between sampling and conveyance of suspect results should not exceed 72 hours (section 6, paragraph 3). In 20,35% (3,51-31,72%) of cases with statement of the delivery time the probe was received after 72 hours of sampling. In further 23,45% (9,87-31,69%) of the cases in a period between 48 and 72 hours. Shorter periods of delivery times are desirable, especially on the weekends. (Table 5.2)

Table 5.2: Period between sampling and laboratory receipt

Lab	Total	≤24h		>24h-48h		>48h-72h		>72h	
	n	n	%	n	%	n	%	n	%
1[a]	48101	12970	26,96	18377	38,21	9702	20,17	7052	14,66
3[a]	15068	9287	61,63	3591	23,83	1661	11,02	529	3,51
5[b]	50788	2929	5,77	22793	44,88	16097	31,69	8969	17,66
6[a]	11079	1729	15,61	4420	39,90	3149	28,42	1781	16,08
7	44306	10154	22,92	12761	28,80	7339	16,56	14052	31,72
8[a]	158142	21422	13,55	55701	35,22	41668	26,35	39351	24,88
9[a]	108435	8690	8,01	36656	33,80	29976	27,64	33113	30,54
10	34215	3859	11,28	13152	38,44	9578	27,99	7626	22,29
11	17224	1866	10,83	7868	45,68	4870	28,27	2620	15,21
12[a]	80544	28627	35,54	27611	34,28	15360	19,07	8946	11,11
13	74498	23646	31,74	25479	34,20	14675	19,70	10698	14,36
14	23862	14667	61,47	5936	24,88	2354	9,87	905	3,79
15	2615	845	32,31	825	31,55	446	17,06	499	19,08
Total	**668877**	**140691**	**21,03**	**235170**	**35,16**	**156875**	**23,45**	**136141**	**20,35**

Figure 3: Period between sampling and laboratory receipt: Comparison 2005 to 2007



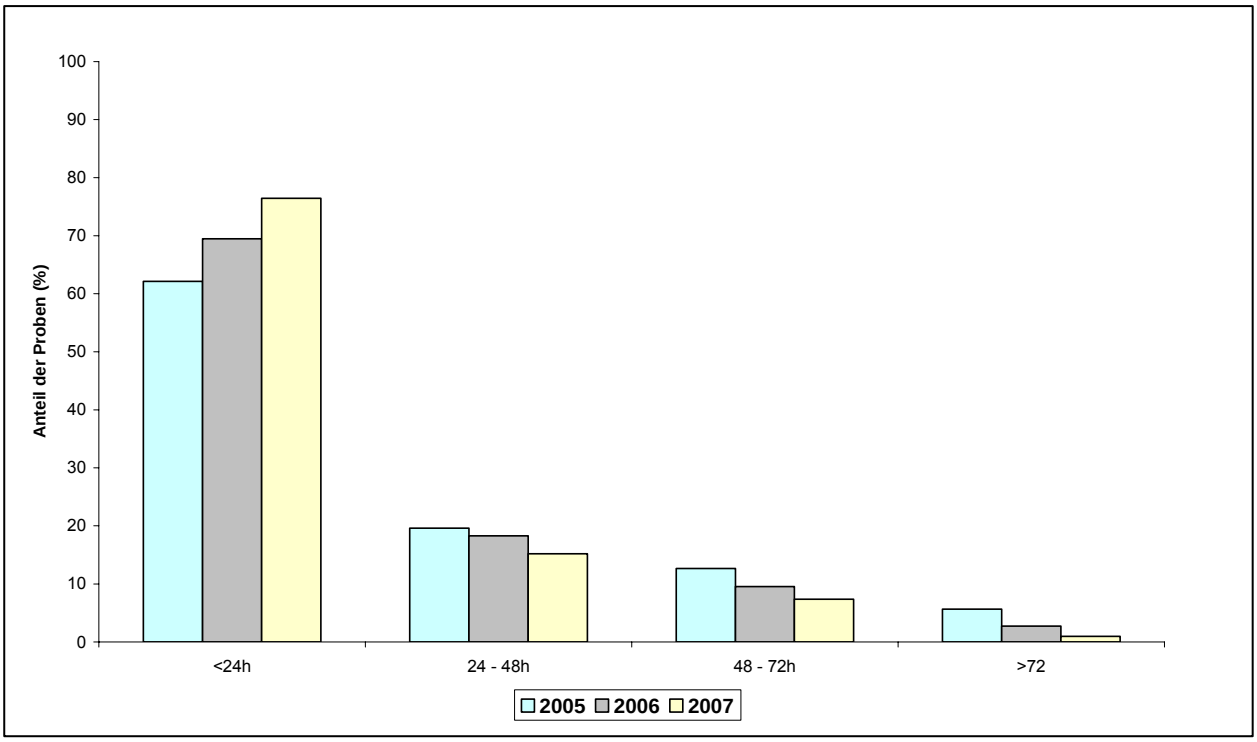
5.3 Period between laboratory receipt and conveyance

Analysis of screening cards has to be done the same day of receipt. Pathological results then have to be reported promptly (§14.3). Usually, this reporting is done via Telephone or Fax. This directive can only be achieved in 3 quarters of cases.

Table 5.3 Period between laboratory receipt and conveyance

Lab[a]	Total	≤24h		>24h-48h		>48h-72h		>72h	
	n	n	%	n	%	n	%	n	%
1[b]	48196	23136	48,00	20429	42,39	3011	6,25	1620	3,36
3[b]	15068	12198	80,95	2395	15,89	381	2,53	94	0,62
5	50839	31928	62,80	14814	29,14	3215	6,32	882	1,73
8	171793	141044	82,10	4406	2,56	24733	14,40	1610	0,94
9[b]	108335	100609	92,87	6498	6,00	1190	1,10	38	0,04
10	34215	23612	69,01	9995	29,21	573	1,67	35	0,10
11	17224	11036	64,07	5787	33,60	256	1,49	145	0,84
12[b]	81369	61641	75,75	13509	16,60	6002	7,38	217	0,27
13	74498	54961	73,78	12471	16,74	5900	7,92	1166	1,57
14	23862	17768	74,46	4738	19,86	1060	4,44	296	1,24
15	2616	2052	78,44	505	19,30	45	1,72	14	0,54
Total	**628015**	**479985**	**76,43**	**95547**	**15,21**	**46366**	**7,38**	**6117**	**0,97**

Figure 4: Period from laboratory receipt to conveyance, comparison of 2005 to 2007



6 Time of screening in the confirmed cases.

6.1 Primary screening

Crucial for successful screening are the reliability of results and the promptness of further diagnostic evaluation and therapy in suspect cases. The optimal sampling time is the 48th to the 72nd hour of life (§6.1). The probe should not be sampled before the 36th and not after the 72nd hour of life.

The age of primary screening is shown for the targeted disease in Table 6.1. For clarity reasons the description >72 hours of age is reported in days.

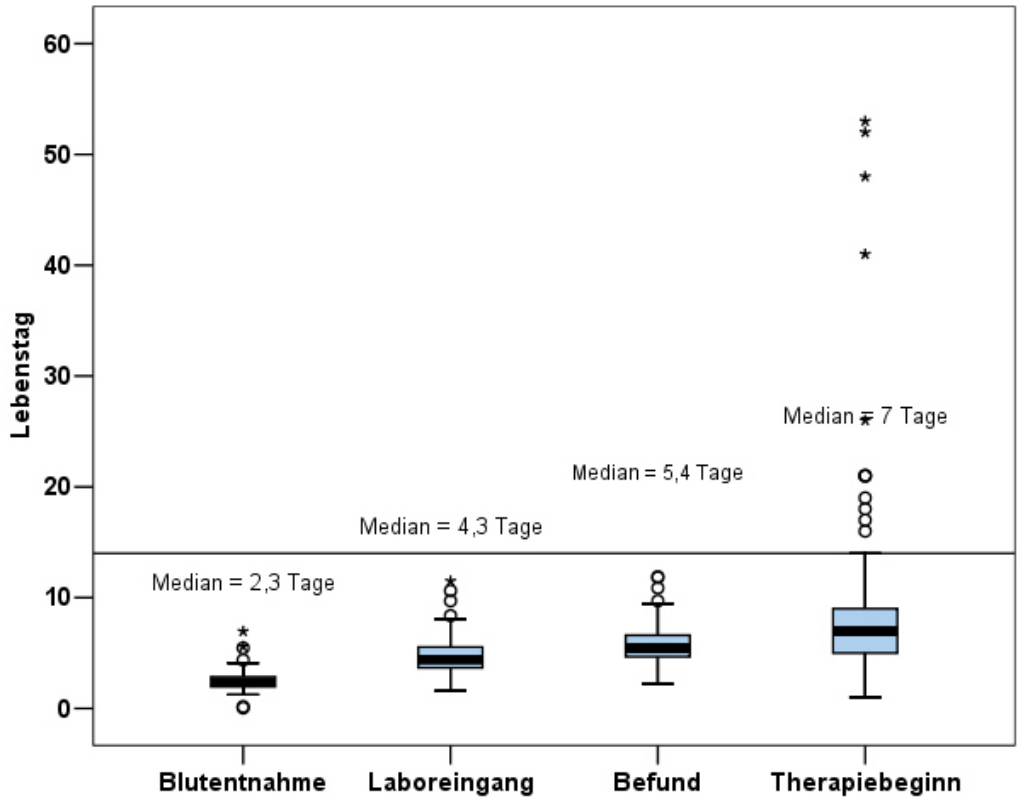
Exemplary the age of the children and the time of sampling, laboratory receipt, reporting and start of therapy are shown for children with hypothyroidism, CAH and PKU in figure 5, 6 and 7.

Table 6.1 Time of primary screening in confirmed cases

Disease	36-72h	4-7d	>7d	<36h	<32WOG	≥36h, n.s. Time *	No information**	Total
Hypothyroidism	126	24	0	3	6	2	2	**163**
CAH	38	6	1	8	2	1	1	**57**
Biotinidase	13	2				2		**17**
Classic Galactosaemia	8			1				**9**
PKU/HPA	94	12	2	6	2	3	1	**120**
MSUD	2							**2**
MCAD	63	8	1	2		3	1	**78**
LCHAD	1			1	1			**3**
VLCAD	7	1						**8**
CPT II	1							**1**
GA I	2	1						**3**
IVA	2	2						**4**
Total	**357**	**56**	**4**	**21**	**11**	**11**	**5**	**465**

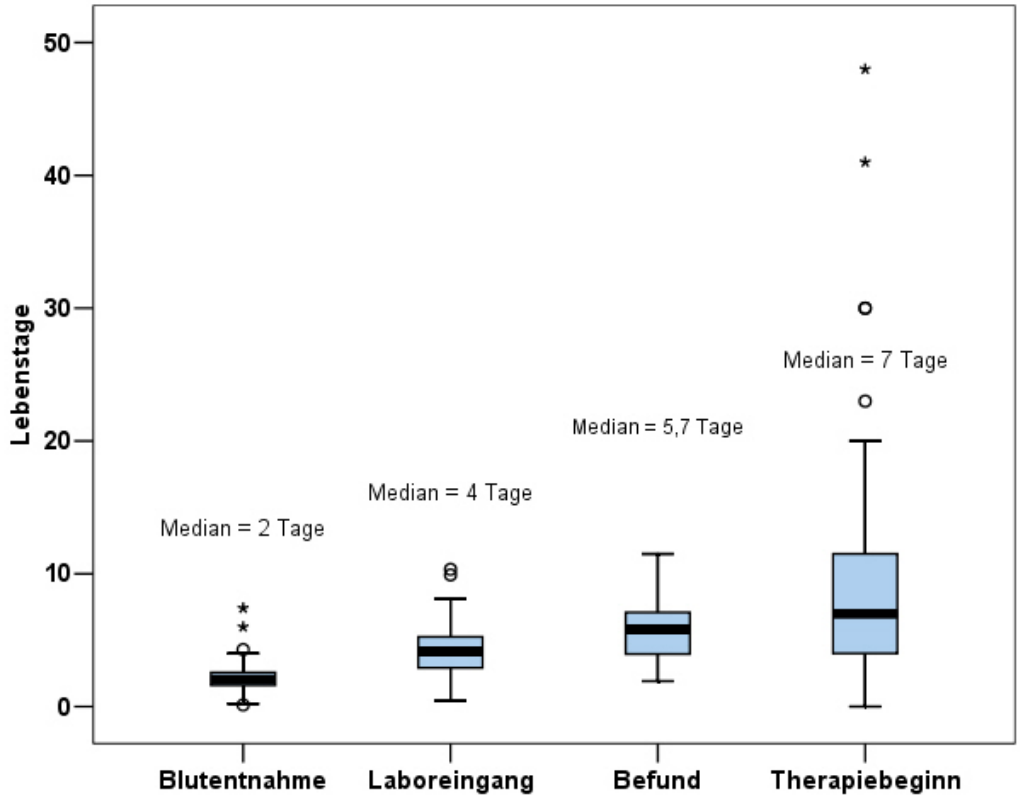
*≥ 36h n.s. does not include repeat testing with early sampling or preterm birth, but exact age of sampling time not stated.
** No information, neither WOG nor age at sampling.

Figure 5: Time elapsed from initiation of therapy in children with hypothyroidism (n=129)



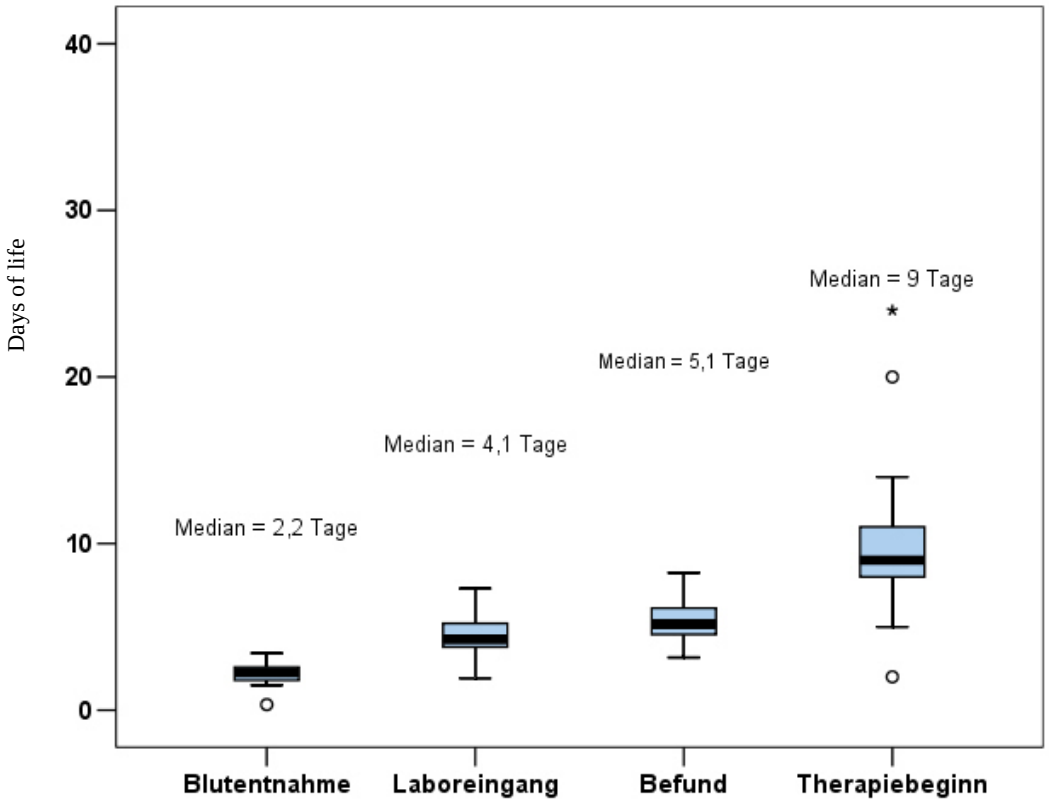
Children whose treatment was initiated very late (with low TSH on primary screening), suffered from trisomy 21, were born <32 WOG or had sampling after blood transfusion.

Figure 6: Time elapsed from initiation of therapy in children with CAH (n=44)



Children that started late with therapy had 17 OHP values < 100nmol/l on screening

Figure 7: Time elapsed from initiation of therapy in children with PKU (n=50)



6.2 Indication for request of repeat testing in the confirmed cases.

An indication for a second screening could be early sampling before the 32nd week of pregnancy or before the 36th hour of life, even in children with confirmed diagnosis. In Table 6.2 the indications for repeat testing are shown

Table 6.2 : Indication for request of repeat testing in the confirmed cases

	Indication for repeat screening				
Disease	Recall	< 36.h	<32WOG	No information	Total
Hypothyroidism	152	3	6*	2	**163**
CAH	46	8	2	1	**57**
Biotinidase	17				**17**
Classic Galactosaemia	8	1			**9**
PKU/HPA	111	6	2	1	**120**
MSUD	2				**2**
MCAD	75	2		1	**78**
LCHAD	1	1	1		**3**
VLCAD	8				**8**
CPTI	1				**1**
GA I	3				**3**
IVA	4				**4**
Total	**428**	**21**	**11**	**5**	**465**

*5 of 6 cases: TSH primary screening <20 mU/l; with n=1 suspicion of central hypothyroidism and n=1 after transfusion

7 Confirmation of pathological results

The following chapter outlines the diagnostic measures for confirmation of the suspected diagnosis as known to the laboratories. This information is used for quality control by the individual laboratories; unfortunately feedback by the Clinicians is not always warranted. For the year 2007 in 40 out of 465 confirmed cases no detailed information about the confirmation diagnostics is available, in a further 25 cases only limited information is given, that confirmation can not be accepted and we therefore do not list it in our analysis.

7.1.1 Hypothyroidism

Laboratory	Confirmed cases	TSH	T3	fT3	T4	fT4	ultrasound	Thyroid antibodies
1	12	12	7	3	8	10	10	7
3	2	1	n.s.	n.s.	n.s.	1	n.s.	n.s.
5	12	12	2	8	2	10	10	9
6	1	1	1	n.s.	n.s.	1	1	n.s.
7	4	2	n.s.	1	n.s.	n.s.	4	n.s.
8	51	48	6	29	4	43	42	34
9	27	26	12	15	10	24	10	5
10	7	6	n.s.	3	1	5	5	3
11	3	3	n.s.	2	n.s.	3	3	2
12	23	23	2	17	1	22	16	5
13	13	9	n.s.	n.s.	n.s.	8	2	9
14	8	8	1	6	1	7	7	3
Total	**163***	**151**	**31**	**84**	**27**	**134**	**110**	**71**

*including n=8 cases without proper confirmation

7.1.2 Congenital adrenal hyperplasia (CAH)

Laboratory	Confirmed cases	17-OHP (Serum)	Serum-steroids	Urinary steroids	Molecular genetic testing
1	4	4	4	n.s.	4
3	1	1	n.s.	n.s.	n.s.
5	3	3	2	2	3
6	3	3	2	n.s.	2
7	3	n.s.	n.s.	n.s.	3
8	19	7	13	6	8
9	8	8	7	n.s.	5
10	2	2	2	1	2
11	1	1	1	n.s.	1
12	5	2	3	1	5
13	6	1	n.s.	1	4
14	2	2	n.s.	n.s.	2
Total	**57***	**34**	**34**	**11**	**39**

*including n=4 cases without proper confirmation

7.1.3 Biotinidase deficiency

Laboratory	Confirmed cases	Serum Biotinidase	Molecular genetic testing
1	1	1	n.s.
5	1	1	n.s.
6	1	n.s.	n.s.
7	2	2	2
8	11	11	n.s.
9	1	1	n.s.
Total	**17***	**16**	**2**

*including n=1 cases without proper confirmation

7.1.4 Galactosaemia

Classic

Laboratory	Confirmed cases	Red cell GALT	Molecular genetic testing
1	3	3	1
7	1	1	1
8	1	1	n.s.
9	1	n.s.	n.s.
10	1	1	1
12	1	1	n.s.
13	1	1	n.s.
Total	**9***	**8**	**3**

*including n=1 cases without proper confirmation

Galactosaemia inc. Variants

Laboratory	Confirmed cases	Red cell GALT	Molecular genetic testing
1	14	13	4
3	1	n.s.	1
7	1	1	1
8	1	1	n.s.
9	2	n.s.	n.s.
10	4	3	4
12	2	1	n.s.
13	1	1	n.s.
Total	**26***	**20**	**10**

*including n=4 cases without proper confirmation

7.1.5 PKU / HPA

Lab	Confirmed cases	Phe (Serum)	Phe/Tyr	BH4-Test	BH4 sensitive	Molecular genetic testing	Pterine in Urine	DHPR in dried blood
1	17	17	n.s.	9	1	17	17	17
3	2	2	2	1	n.s.	n.s.	n.s.	n.s.
5	11	9	11	7	2	n.s.	6	5
6	3	1	2	3	1	n.s.	1	1
7	8	5	7	6	2	n.s.	6	6
8	26	21	12	15	6	4	16	15
9	15	4	13	8	1	7	9	8
10	1	1	n.s.	1	n.s.	n.s.	1	1
11	4	3	3	3	1	1	3	3
12	14	14	6	14	5	1	13	12
13	13	2	1	1	n.s.	n.s.	n.s.	1
14	6	6	3	6	5	1	6	6
Total	**120***	**85**	**60**	**74**	**24**	**31**	**78**	**75**

*including n=14 cases without proper confirmation

7.1.6 MSUD

Laboratory	Confirmed cases	Confirmation Serum	Urinary organic acids	Enzyme activity	Molecular genetic testing
8	1	1	1	n.s.	n.s.
13	1	n.s.	n.s.	n.s.	n.s.
Total	2*	1	1	n.s.	n.s.

*including n=9 cases without proper confirmation

7.1.7 MCAD-Deficiency

Laboratory	Confirmed cases	Confirmation Serum	Urinary organic acids	Enzyme activity	Molecular genetic testing
1	5	n.s.	5	n.s.	5
3	2	n.s.	n.s.	n.s.	n.s.
5	4	4	1	n.s.	4
7	10	9	9	n.s.	9
8	22	8	15	n.s.	18
9	11	8	9	n.s.	6
10	1	1	1	n.s.	1
11	2	n.s.	2	n.s.	2
12	7	1	n.s.	n.s.	7
13	9	n.s.	n.s.	1	5
14	5	1	n.s.	n.s.	5
Total	**78***	**32**	**42**	**1**	**62**

*including n=9 cases without proper confirmation

7.1.8 LCHAD-Deficiency

Laboratory	Confirmed cases	Confirmation Serum	Urinary organic acids	Enzyme activity	Molecular genetic testing
8	2	1	1	n.s.	2
9	1	1	n.s.	n.s.	n.s.
Total	**3**	**2**	**1**	**n.s.**	**2**

7.1.9 VLCAD-Deficiency

Laboratory	Confirmed cases	Confirmation Serum	Urinary organic acids	Enzyme activity	Molecular genetic testing
1	1	n.s.	1	1	1
3	1	n.s.	n.s.	1	1
8	2	2	1	2	2
9	2	2	2	2	1
12	1	1	1	1	n.s.
13	1	n.s.	n.s.	1	n.s.
Total	**8**	**5**	**5**	**8**	**5**

7.1.10 CPT II-Deficiency

Laboratory	Confirmed cases	Confirmation Serum	Enzyme activity	Molecular genetic testing
5	1	n.s.	n.s.	1

7.1.11 Glutaric acidaemia Type I

Laboratory	Confirmed cases	Confirmation Serum	Urinary organic acids	Enzyme activity	Molecular genetic testing
7	1	1	1	1	1
8	1	1	1	n.s.	1
12	1	n.s.	1	1	n.s.
Total	**3**	**2**	**3**	**2**	**2**

7.1.12 Isovaleric acidaemia

Laboratory	Confirmed cases	Confirmation Serum	Urinary organic acids	Enzyme activity	Molecular genetic testing
9	1	1	1	n.s.	n.s.
12	1	1	n.s.	n.s.	n.s.
13	2	n.s.	n.s.	n.s.	n.s.
Total	**4***	**2**	**1**	**n.s.**	**n.s.**

*including n=2 cases without proper confirmation

8 Laboratory Organisation

8.1 Acquisition of completeness

Laboratory	Comparison with birth records	Name based Comparison with birth registry
1	Yes	
3	Yes	
5	Yes	
6	Yes	
7		
8		
9		
10	Yes	
11	Yes	
12		Yes
13		
14		Yes
15		
Total	**6**	**2**

8.2 Tracking

When necessary laboratories or regional screening centres do tracking in the listed situations.

Laboratory	Suspicious Primary Screening	Primary Screening < 36.Std.	Primary Screening < 32 WOG	Empty cards	Bad sample quality	Confirmation	Therapy
1	Yes	Yes		Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	Yes			Yes	Yes	Yes	Yes
8	Yes			Yes	Yes	Yes	Yes
9	Yes	Yes			Yes	Yes	
10	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	Yes	Yes	Yes	Yes	Yes	Yes	Yes
15	Yes	Yes	Yes		Yes	Yes	Yes

9 Methods and cut offs in screening

9.1 Filter paper for sampling

Laboratory	Filter paper
1	WS 903
3	WS 903
5	WS 903
6	WS 903
7	WS 2992
8	WS 903
9	WS 903
10	WS 903
11	WS 903
12	Macherey and Nagel 918
13	Macherey and Nagel 918
14	WS 903
15	WS 903

9.2 Hypothyroidism

Laboratory	Parameter	Cutoff [mU/l]	Method
1	TSH	15	AutoDELFIA
3	TSH	15	AutoDELFIA
5	TSH	n.s.	AutoDELFIA
6	TSH	15	DELFIA
7	TSH	15	AutoDELFIA
8	TSH	> 15	DELFIA
9	TSH	15	AutoDELFIA
10	TSH	15	AutoDELFIA
11	TSH	15	DELFIA
12	TSH	>20	AutoDELFIA
13	TSH	>20	AutoDELFIA
14	TSH	> 20	AutoDELFIA
15	TSH	> 20	AutoDELFIA

9.3 Biotinidase Deficiency

Laboratory	Parameter	Cutoff	Method
1	Biotinidase	30% board mean	Colorimetrie qualitative
3	Biotinidase	30 % day mean	Colorimetrie qualitative
5	Biotinidase	n.s.	Colorimetrie quantitative
6	Biotinidase	30% day mean	Colorimetrie quantitative
7	Biotinidase	2,7 U/g Hb	Colorimetrie quantitative
8	Biotinidase	< 30% day mean	Colorimetrie quantitative
9	Biotinidase	0,2	Colorimetrie qualitative
10	Biotinidase	< 30%	Colorimetrie qualitative
11	Biotinidase	n.s.	Colorimetrie qualitative
12	Biotinidase	< 30%	Fluorometrie quantitative
13	Biotinidase	< 30%	Fluorometrie quantitative
14	Biotinidase	< 30 %	Colorimetrie quantitative
15	Biotinidase	< 30 %	Colorimetrie quantitative

9.4 Galactosaemia

Laboratory	Parameter	Cutoff	Method
1	GALT Galactose	3,5 U/gHb 15 mg/dl	Fluorometrie(PE) BIORAD Quantase
3	GALT Galactose	2,3 Ug/Hb 15 mg/dl	BIORAD Quantase
5	GALT Galactose	 n.s.	Fluorometrie quantitative Colorimetrie quantitative
6	GALT	3,5 U/g Hb	Fluorometrie quantitative
7	GALT	3,5 U/g Hb	Fluorometrie quantitative
8	GALT Galactose	<20 % Tagesmittel >18 mg/dl (ab 30.06.07 >30mg/dl)	Fluoro quant non kit Colorimetrie non Kit
9	GALT Galactose	<2,3U/gHb 20 mg/dl	BIORAD Quantase BIORAD Quantase
10	GALT Galactose	2,3U/gHb 1111µmol/l	BIORAD Quantase BIORAD Quantase
11	GALT	3,5 U/gHb	Fluorometrie quantitative
12	GALT Galactose	< 30% 15 mg/dl	Fluoro. quant.(non-kit) Colorimetrie non Kit
13	GALT Galactose	< 30% 15 mg/dl	Fluoro. quant.(non-kit) Colorimetrie non Kit
14	GALT Galactose	<2,3 U/g Hb >15mg/dl	BIORAD Quantase BIORAD Quantase
15	GALT Galactose	<2,3 U/g Hb >15mg/dl	BIORAD Quantase BIORAD Quantase

9.5 MS/MS

Laboratory	Method
1	derivative non Kit
3	non derivat.PE Kit
5	non derivat.non Kit
6	non derivat.PE Kit
7	derivative PE Kit
8	derivative non Kit
9	derivative non Kit
10	derivative non Kit
11	non derivat.non Kit
12	derivative non Kit
13	derivative non Kit
14	derivative non Kit
15	derivative non Kit

9.6 Congenital adrenal hyperplasia (CAH)

Term babies

Laboratory	Parameter	Method	Dependent on age	Dependent on WOG	Dependent on BW	Formula	Constant value
1	17 OHP	AutoDELFIA	Yes			ln(OHP)=2,90798-0,40653ln(age)	
3	17 OHP	AutoDELFIA	Yes			Stopsack 2005	
5	17 OHP	AutoDELFIA		Yes		value * 0,75 (17OHP test B015112)	40
6	17 OHP	DELFIA		Yes			40
7	17 OHP	AutoDELFIA					40
8	17 OHP	DELFIA					60
9	17 OHP	AutoDELFIA		Yes			50
10	17 OHP	AutoDELFIA	Yes				
11	17 OHP	DELFIA	Yes				
12	17 OHP	AutoDELFIA	Yes				
13	17 OHP	AutoDELFIA	Yes		Yes		
14	17 OHP	AutoDELFIA	Yes		Yes		40
15	17 OHP	AutoDELFIA	Yes		Yes		40

Preterm babies

Laboratory	Parameter	Method	Dependent on age	Dependent on WOG	Dependent on BW	Formula	Constant value
1	17 OHP	AutoDELFIA	Yes	Yes		ln(OHP)=3,470-0,121ln(age)	
3	17 OHP	AutoDELFIA	Yes	Yes		Stopsack 2005	
5	17 OHP	AutoDELFIA		Yes		Before discharge, analog 36-38 WOG	40
6	17 OHP	DELFIA		Yes			
7	17 OHP	AutoDELFIA			Yes		
8*	17 OHP	DELFIA		Yes	Yes		
9	17 OHP	AutoDELFIA		Yes			
10	17 OHP	AutoDELFIA	Yes	Yes			
11	17 OHP	DELFIA	Yes	Yes			
12	17 OHP	AutoDELFIA	Yes		Yes		
13	17 OHP	AutoDELFIA	Yes		Yes		
14	17 OHP	AutoDELFIA	Yes		Yes		
15	17 OHP	AutoDELFIA	Yes		Yes		

*Laboratory 8: with raised Delfia 17OHP TMS steroidprofile with 17-OHP, 21-desoxycortisol, 11-desoxycortisol, cortisol and androstendion.

9.7 MS/MS Parameter

Guide (GV) and secondary (SP) parameters are listed. If the laboratory has given the cut off value for their guide value, it is taken as a guide value.

Remarks to testing for parameters in MS/MS

Laboratory	Comments
3	Quarterly actualisation of cutoff values dependent on kitcharge and mashinestatus on the base of all results > 32. WOG and > 36 hours of life
5	z-value based on > 10 000 primary sampling test cards
6	All cutoffs calculated from percentiles and are therefore dynamic

9.7.1 PKU

Parameter /Cut off	1	3	5	6	7	8	9	10	11	12	14
Phe	120	LW	150	148	139	150	123	150	126	120	129
Tyr								NW		NW	
Phe/Tyr	NW	NW	NW	NW	2,5	2,5	2,0	NW	2,0	2,0	NW

9.7.2 MSUD

Parameter / Cut off	1	3	5	6	7	8	9	10	11	12	14
Ala								NW		LW	
Val	NW	NW	NW	NW	280	NW	NW	NW	186	LW	NW
Leu/Ile	263	LW	z >= 3,5	345	300	400	299	314	294	LW	350
Fischer-Q	NW	NW		NW					3,0	LW	LW
Leu/Ile:Phe	NW		z >= 3,5			10		NW		LW	NW
Val/Phe			NW					NW		LW	NW
Leulle/Ala	NW	NW	z >= 3,5	NW			>3	NW	NW	LW	

9.7.3 MCAD-Deficiency

Parameter / Cut off	1	3	5	6	7	8	9	10	11	12	14
C0								NW			
C6	NW	NW	NW		0,18	NW	NW	NW	NW	LW	NW
C8	0,28	LW	z >= 3,5	0,23	0,4	0,3	0,28	0,3	0,30	LW	0,34
C8/C10	NW	LW	NW	NW		5,0	NW	NW	2,32	LW	NW
C8/C12	NW		NW	NW			NW		NW	LW	
C8/C16					NW			NW		LW	
C10	NW	NW	NW	NW		NW	NW	NW	NW	LW	NW
C10:1	NW	NW	NW	NW	0,15	NW	NW	NW	NW	LW	NW
C8/C2	NW			NW		0,02	NW				NW
C8/C6			NW				NW			LW	

9.7.4 LCHAD-Deficiency

Parameter / Cut off	1	3	5*	6	7	8	9	10	11	12	14
C0								NW			
C14:1			NW	NW		NW		NW	NW	NW	
C14OH			NW	0,041			NW	NW	NW	LW	
C16OH	0,08	LW	z >= 3,5	0,07	0,11	0,1	0,1	0,15	0,053	LW	0,60
C16:1OH			NW	NW			NW	NW		LW	NW
C18OH	0,04	NW		0,035	0,1	NW	0,07	NW	0,034	LW	NW
C18:1OH	0,05	NW	z >= 3,5	NW	0,1	0,1	0,11	NW	0,046	LW	NW
C18:2OH						NW		NW			NW
C16OH/C16		NW	NW					NW	0,018		

* Recall, when also C16:1OH/C16OH <1

9.7.5 VLCAD-Deficiency

Parameter / Cut off	1	3	5	6	7	8	9	10	11	12	14
C0								NW			
C12			NW							LW	
C14	NW	NW	NW	NW	0,65	NW	NW	NW	0,46	LW	NW
C14:1	0,43	LW	z >= 3,5	0,245	0,4	0,3	0,43	0,36	0,33	LW	0,25
C16:1							NW	NW			
C14:2	NW	NW		NW	NW	NW			0,068	LW	NW
C14:1/C16	NW	LW	NW	NW					0,155		LW
C14/C4								NW			NW
C14:1/C4			NW				NW	NW		LW	NW
C14:1/C12			NW								
C14:1/C12:1			NW			NW					

9.7.6 CPT I-Deficiency

Parameter / Cut off	1	3	5	6	7	8	9	10	11	12	14
C0	NW	LW	NW	54,06	70	80	65,49	50	NW	NW	NW
C8											
C16	0,94	LW	NW	8,228	<0,6		LW	0,56	0,56	LW	<1
C18	0,24	NW	NW	2,249	<0,3		LW	0,21	0,152	LW	NW
C18:1	0,43			3,604				NW	0,244	LW	
C16/C2											
(C16+C18:1)/C2				NW							
C0/(C16+C18)	NW	NW	>= 70	NW		40	LW		18,3	LW	NW

9.7.7 CPT II-Deficiency

Parameter / Cut off	1	3	5	6	7	8	9	10	11	12	14
AC ges								NW			
C0	NW	NW		5,0	<10			NW	4,9	NW	NW
C16	7,84	LW	NW	8,228	8,0	8	7,65	8,83	8,1	LW	>6
C16:1					0,6		0,67	NW		LW	NW
C18	2,27			2,249	2,6		2,34	3,65	2,12	LW	>2,5
C18:1	3	LW	NW	3,604	3,5	3,4	1,92	NW	3,54	LW	NW
(C16+C18:1)/C2	NW	NW	z >= 3,5			0,3	NW	20,3	NW		
C18:2								NW		LW	
C16/C2			NW								
C0/(C16+C18)			NW	NW			NW	NW			

9.7.8 CACT-Deficiency

Parameter / Cut off	1	3	5	6	7	8	9	10	11	12	14
AC ges							NW	NW			
C0	NW	NW		NW	<10	< 25	NW	NW	4,9	LW	NW
C16	7,84	LW	NW	8,228	8,0	8,0	7,65	8,83	8,1	LW	>6
C16:1							0,67	NW		LW	NW
C18	2,27			2,249	2,6	2,5	2,34	2,65	2,12	LW	NW
C18:1	3	LW	NW	3,604	3,5			3,9	3,54	LW	NW
(C16+C18:1)/C2	NW	NW	z >= 3,5					NW	NW		NW
C18:2										LW	
C0/AC ges								NW			
C16/C2			NW								
C0/(C16+C18)			NW	NW			NW	NW			
C0/(C16+C18:1)							NW	NW			

9.7.9 Glutaric acidaemia Type I

Parameter / Cut off	1	3	5	6	7	8	9	10	11	12	14
C5DC (Glut)	0,12	LW	z >= 0,13	0,666	0,33	0,20	0,17	0,25	0,57	LW	<0,15
C5DC/C0	NW		NW	NW		NW					
C5DC/C2	NW									LW	
C5DC/C4	NW			NW				NW		LW	
C5DC/C8	NW	NW		NW	5,9		NW	NW			NW
C5DC/C12	NW	NW							NW	LW	
C5DC/C16			NW	NW			NW	NW	NW	LW	NW
C5DC/(C8+C10)		NW	NW								

9.7.10 Isovaleric acidaemia

Parameter / Cut off	1	3	5	6	7	8	9	10	11	12	14
C0								NW			
C5	0,38	LW	z >= 3,5	0,53	1	0,5	0,63	0,6	1,0	LW	0,6
C5/C2			NW	NW		0,02	NW				
C5/C3								NW			NW
C5/C8	NW	NW	NW	NW	NW			NW	NW	LW	
C5/C4	NW	NW	NW	NW				NW	NW	LW	

10 Literature

1 Beschluss über eine Änderung der Richtlinien des Bundesausschusses der Ärzte und Krankenkassen über die Früherkennung von Krankheiten bei Kindern bis zur Vollendung des 6. Lebensjahres (Kinder-Richtlinien) zur Einführung des erweiterten Neugeborenen-Screenings vom 21. Dezember 2004; Dt. Ärzteblatt 2005, 102: A1158-63

2 Statistisches Jahrbuch 2008 Herausgeber: Statistisches Bundesamt, Wiesbaden www.destatis.de