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# LAMPIRAN

## Lampiran 1. Data pengujian alat pada rumah sakit "A"

	kVp	Time (s)	Dose (mG)	Dose rate	HVL (mm)	Total Filtr	
Setting kv: 200 mA 0.1 s	50	49.85	0.103	0.382	3.721	2.00	Akurasi kv
	60	59.95	0.103	0.591	5.769	2.40	
	70	69.85	0.103	0.816	7.952	2.80	
	81	81.25	0.103	1.090	10.61	3.30	
	90	90.25	0.103	1.332	12.98	3.70	
	81.25	0.103	1.090	10.610	3.30	3.300	
	81.25	0.103	1.089	10.610	3.30	3.300	
Setting waktu: 70 kv 100 mA	0.05	69.75	0.052	0.204	3.977	2.80	Akurasi Waktu
	0.10	69.80	0.103	0.410	3.995	2.80	
	0.20	69.85	0.206	0.822	4.003	2.80	
	0.40	69.80	0.411	1.645	4.004	2.80	
	0.80	69.85	0.822	3.293	4.007	2.80	
	69.90	0.052	0.205	4.004	2.80	3.400	
	69.80	0.052	0.204	3.987	2.80	3.400	
70 kv 0.1 s	50	69.95	0.103	0.206	2.013	2.80	Linieritas fokus kecil
	100	69.90	0.103	0.410	3.995	2.80	
	125	69.90	0.103	0.512	4.987	2.80	
	160	69.85	0.103	0.652	6.358	2.80	
	200	69.90	0.103	0.814	7.927	2.80	
	200	69.85	0.103	0.816	7.952	2.80	fokus besar
	250	69.90	0.103	1.018	9.921	2.80	
	320	69.90	0.103	1.303	12.690	2.80	
	320	69.90	0.103	1.466	14.280	2.80	
	360	69.90	0.103	1.629	15.860	2.80	
70 kv 20 mAs	70	69.85	0.103	0.816	7.952	2.80	Repro
	69.85	0.103	0.816	7.951	2.80		
	69.85	0.103	0.815	7.945	2.80		
	69.95	0.103	0.815	7.949	2.80		
100 mA	70	69.80	0.103	0.410	3.995	2.80	HVL
	80	81.15	0.103	0.550	5.37	3.30	
	90	90.25	0.103	0.674	6.572	3.70	

Pengulangan error maks	69.8	0.103	0.41	3.995	2.8
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diinterpolasi ke	HVL
70	2.81
80	3.25
90	3.69

$m = 0.044$

$c = -0.2719$

## Lampiran 2. Data pengujian alat pada rumah sakit "B"

**DATA UJI TEKNIS**

**A. Kolimasi Berkas Sinar-X**

1. Bumihasi Alat Ukur

Titik ukur	Titik ukur	Titik ukur	Titik ukur	Titik ukur
Area 1	Area 2	Area 3	Area 4	Area 5
57%	57%	57%	57%	57%

2. Selah lapangan kolimasi dengan berkas sinar-X

Titik ukur	Titik ukur	Titik ukur	Titik ukur	Titik ukur
X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>
0.0	6.3	6.3	6.3	6.3

3. Ketegakkan berkas sinar-X

Ketegakkan	1.5
Ketegakkan Lolos?	Lolos

**B. Generator dan Tabung Sinar-X**

1. Uji akurasi tegangan (kVp) dan informasi data dosis keluaran radiasi

No	kVp-set	kVp-ukur	error (%)	Nilai lolos uji	uGy	uGy/mAs
1	50	49.39	-1.8%	431.212	21.56	
2	60	59.39	-1.8%	841.003	32.05	
3	70	69.64	-0.5%	892.952	44.65	
4	80	80.75	0.9%	1190.43	59.52	
5	90	89.16	-0.9%	1449.89	72.49	

Informasi dosis keluaran pada 50kVp: 23.37 uGy/mAs  
 Informasi dosis keluaran pada 60 kVp: 32.71 uGy/mAs  
 Informasi dosis keluaran pada 70 kVp: 45.11 uGy/mAs  
 Informasi dosis keluaran pada 80 kVp: 58.41 uGy/mAs

2. Uji akurasi waktu penyinaran

No	mAs-set	mAs-ukur	error (%)	Nilai lolos uji	uGy	uGy/mAs
1	50	50	0.0%	862.895	66.27	
2	100	100	0.0%	1727.18	66.36	
3	200	200	0.0%	3454.37	66.69	
4	300	300	0.0%	5181.55	66.69	
5	400	400	0.1%	6908.74	66.64	

4. Uji linearitas keluaran radiasi  
a. Jika mA dan s dapat diatur

kVp-set		mA-set		s-set		SID (cm)		Alat Ukur	
70		200		0,1		100		RaySafe	
fokus		fokus		fokus		fokus		fokus	
besar		besar		besar		besar		besar	
mA-accan	No	mA	kVp-ukur	uGy	uGy/mAs	CL	Nilai lolos uji	Grafik Output vs mA	
100	1	200	70,42	1328,89	66,4345	0,04	CL ≤ 0,1		
200	2	200	69,95	1648,49	82,4245				
300	3	200	69,59	2076,63	103,8315				
400	4	200	68,68	2480,62	124,0310				
kVp-set		mA-set		s-set		SID (cm)		Alat Ukur	
70		100		0,1		100		RaySafe	
mA-accan	No	mA	kVp-ukur	uGy	uGy/mAs	CL	Nilai lolos uji	Grafik Output vs mA	
50	1	100	69,15	260,224	52,0448	0,05	CL ≤ 0,1		
100	2	100	70,04	566,331	56,6331				
150	3	125	70,08	724,238	57,93904				
200	4	150	69,94	921,647	57,802938				
CL max			0,4%			Linearitas Lolos?		Lolos	

5. Uji reproduksibilitas tegangan puncak (kVp), waktu penyrinaran (s), dan dosis (mGy)

kVp-set		mA-set		s-set		SID (cm)	
70		200		0,10		100	
fokus		fokus		fokus		fokus	
besar		besar		besar		besar	
No	kV	s	uGy	Repro kV lolos?	Repro waktu lolos?	Repro dosis lolos?	
1	69,64	0,0997778	892,952	Lolos	Lolos	Lolos	
2	69,45	0,0997778	891,388	Lolos	Lolos	Lolos	
3	69,55	0,0998889	892,622	Lolos	Lolos	Lolos	
4	69,42	0,0998889	903,752	Lolos	Lolos	Lolos	
5	69,46	0,0997778	903,823	Lolos	Lolos	Lolos	
Rerata	69,50632	0,09982224	896,9074				
Std	0,088209223	6,0852E-05	6,3076876				
CV	0,001	0,001	0,007				
Nilai lolos uji	CV ≤ 0,05						

6. Uji kualitas berkas sinar-X

No	Setting	Filter tambahan (mm Al)	Hasil ukur (mm Al)	Nilai lolos uji (mm Al)
1	70	20	0	≥ 2,1
2	80	20	(dikapas)	≥ 2,3
1	70	20	2,85	≥ 2,1
2	80	20	(permanen)	≥ 2,3

Kesimpulan:

Hasil Kalibrasi ini mengacu pada PERKA Bapeten no 2 tahun 2018  
Sesuai dengan Pedoman Pengujian Dan Kalibrasi Alat Kesehatan PERMENKES No. 54 Tahun 2015,  
maka peralatan ini dinyatakan :

Baik dan laik untuk digunakan

Lampiran 3. Data pengujian alat pada rumah sakit "C"

DATA UJI										
<b>A. Kalimetri Berkas Sinar-X</b>										
<b>1. Huminari</b>										
Alat Ukur: RaySafe, SID (cm): 100										
Lapangan: 25 cm x 25 cm										
(+)		(-)		Titik ukur	Pengukuran (µA)	Rerata (µA)	Cakupan (µA)	PK	Hasil Uji (µA)	Nilai lolos uji
1 2 3		4 5 6		Area 1	188,546	188,1	30,1	0,02	161	≥ 100 µA
2 3 4		5 6 7		Area 2	190,533					
3 4 5		6 7 8		Area 3	190,342					
4 5 6		7 8 9		Area 4	182,934					
Huminari Lolos? Lolos										
<b>2. Selidik lapangan kalimetri dengan berkas sinar-X</b>										
Alat Ukur: 58 mArrot, mA-rot: 10, SID (cm): 100										
Lap. (cm): 25x25										
Konsentrasi		Titik ukur	Titik ukur	Titik ukur	Titik ukur	Titik ukur	Titik ukur	Titik ukur	Titik ukur	Titik ukur
(+)		(-)		N1	N2	N3	N4	N5	N6	N7
1 2 3		4 5 6		1	2	3	4	5	6	7
4 5 6		7 8 9		1	2	3	4	5	6	7
7 8 9		10 11 12		1	2	3	4	5	6	7
Kalimetri Lolos? Lolos										
<b>3. Koteqakluran Berkas sinar-X</b>										
Koteqakluran: 1,5										
Koteqakluran Lolos? Lolos										
<b>B. Generator dan Tabung Sinar-X</b>										
<b>1. Uji akurasi tegangan (kVp) dan informasi data daris keluaran radiasi</b>										
fokus		fokus		fokus		fokus		fokus		
besar		besar		besar		besar		besar		
25 cm x 25 cm		25 cm x 25 cm		25 cm x 25 cm		25 cm x 25 cm		25 cm x 25 cm		
Alat Ukur		Alat Ukur		Alat Ukur		Alat Ukur		Alat Ukur		
RaySafe		RaySafe		RaySafe		RaySafe		RaySafe		
201,12		20 mAr		SID (cm)		100		100		
0,10		0,10		0,10		0,10		0,10		
kVp-accan	No	kVp-set	kVp-ukur	error (%)	Nilai lolos uji	uGy	uGy/mAs	Grafik Output vs kVp		
50	1	50	49,13	1,7%		426,068	21,30			
60	2	60	58,69	2,2%		641,632	32,08			
70	3	70	68,63	2,0%		918,116	45,91			
80	4	80	78,02	1,2%		1196,15	59,81			
90	5	90	88,96	1,2%	e max ≤ 10%	1500,61	75,03			
6	6									
7	7									
8	8									
e max				2,2%	Akurasi kV Lolos?	Lolos				
informari daris keluaran pada 50 kVp				22,58	uGy/mAr					
informari daris keluaran pada 60 kVp				34,58	uGy/mAr					
informari daris keluaran pada 70 kVp				47,76	uGy/mAr					
informari daris keluaran pada 80 kVp				61,30	uGy/mAr					

**4. Uji linieritas keluaran radiasi**

a. Jika mA dapat diatur

mA	Na	mAs	kVp/peker	αG	αGq/mAs	CL	Nilai t <sub>uji</sub>	Gratik Output mAs
100	1	20	68.79	928.454	46.42	0.02	CL: 0,1	
200	2	40	68.66	1128.14	45.53			
300	3	60	67.79	1442.12	45.07			
400	4	80	67.66	1778.36	44.46			
500	5	100						

b. Jika mA tidak dapat diatur

mA	Na	mAs	kVp/peker	αG	αGq/mAs	CL	Nilai t <sub>uji</sub>	Gratik Output mAs
50	1	5	68.61	245.881	49.12	0.03	CL: 0,1	
100	2	10	68.54	487.741	48.77			
150	3	15	68.66	582.288	46.58			
200	4	20	68.88	749.317	46.83			

**5. Uji reproduktibilitas tegangan puncak (kVp), waktu penyinaran (s), dan dosis**

Na	kV	s	αG
1	68.63	0.833	318.413
2	68.75	0.188	324.851
3	68.73	0.188	328.454
4	68.74	0.188	325.845
5	68.55	0.833	329.653

**6. Uji kualitas berkas sinar-X**

Na	kV	Filter	Penyinaran (mAs)	Nilai t <sub>uji</sub>	Nilai t <sub>tabel</sub>
1	78	...	...	2,1	≥ 2,1
2	88	...	...	2,3	≥ 2,3
1	78	...	...	2,71	≥ 2,1
2	88	...	...	2,78	≥ 2,3

Lampiran 4. Data pengujian alat pada rumah sakit "D"

Setting kV:	50	60.00	0.10	0.372	223.400	2.02
200 mA	60	60.30	0.10	0.589	353.400	2.47
0.1 s	70	69.80	0.10	0.831	498.000	2.86
	80	80.40	0.10	1.112	666.300	3.28
	90	91.20	0.10	1.429	866.700	3.72
Setting waktu:	0.05	70.20	0.0507	0.188	236.300	2.84
70 kV	0.10	70.00	0.100	0.401	240.400	2.85
	0.20	69.80	0.200	0.815	244.400	2.86
	0.40	69.90	0.400	1.641	246.100	2.85
	0.80	69.80	0.800	3.291	248.800	2.86
100 mA	20	69.80	0.100	0.401	240.400	2.85
	50	69.60	0.100	0.401	121.700	2.88
	100	70.00	0.100	0.401	240.400	2.85
70 kV	160	69.90	0.100	0.661	396.700	2.86
	200	69.80	0.100	0.831	498.000	2.86
	250	69.70	0.100	1.038	622.200	2.86
	320	69.90	0.100	1.337	801.300	2.85
	400	69.80	0.100	1.680	1000.000	2.85
mAs	70	69.80	0.100	0.831	498.000	2.86
	20	69.80	0.100	0.831	498.000	2.86
	69.90	0.100	0.829	497.200	2.86	
	69.70	0.100	0.830	497.600	2.86	
69.90	0.100	0.829	497.600	2.85		
10 mAs	70	70.00	0.100	0.401	240.400	2.85
	80	80.60	0.100	0.539	322.900	3.26
	90	91.50	0.100	0.691	413.900	3.72
Thorax	47.90	0.080	0.127	95.23	132	
	48	49.10	0.080	0.127	95.46	132
	8	47.90	0.080	0.127	95.39	134
Abdomen	69.80	0.100	0.831	498.000	2.86	
	70	69.80	0.100	0.831	498.000	2.86
20	69.90	0.100	0.829	497.200	2.86	
Thorax AEC dg phantom	kV					
	mAs					
	kV	100	0.000			
	mAs	40		mAs = #DIV/0!		
mAs						
s			mAs' = mAs = 0			

perlu diedit  
diisi untuk keperluan laporan  
diisi sebagai data pelengkap  
sudah merupakan rumus

## Lampiran 5. Data pengujian alat pada rumah sakit “E”

Akurasi kV, Repro, HVL						
<b>Tested equipment</b>						
<b>Generator</b>						
Name:	X Ray Generator	Model:	Multix Fusion	Type:	HF/DC	
Serial nun	40130	Manufacturer:	Siemens			
<b>Tube</b>						
Name:	Rad Tube	Insert type:	03345233	Serial nun	8.112E+09	
Manufact	Siemens					
<b>Measurements</b>						
<b>Set mAs(n SSD(cm))</b>						
	10	100				

Set kV(kV)	e voltage	posure time(n)	Exposure(μGy)	ure rate(nrVL/mm Al	SSD(cm)	mAs	
40	39.6079	33.133694	81.04985477	2.44617	1.48234	100	10
50	49.7863	25.5864906	158.771779	6.2053	2.05208	100	10
60	59.7819	30.0985203	248.976598	8.27205	2.45437	100	10
70	69.8517	35.155201	348.352337	9.90898	2.83	100	10
70	69.9575	35.1454506	349.2213591	9.93646	2.80862	100	10
70	69.9123	35.1458702	348.9718492	9.92924	2.81858	100	10
70	69.9405	35.1170502	348.4999254	9.92378	2.82572	100	10
70	69.8661	35.1174812	349.238109	9.94485	2.82137	100	10
81	80.5021	40.6425285	466.58037	11.4801	3.26563	100	10
85	84.7763	42.1718292	516.9776027	12.2588	3.45233	100	10
90	90.5542	44.1321907	584.7999111	13.2511	3.66539	100	10
102	101.845	50.2010689	743.9060194	14.8185	4.22934	100	10

### Linearitas mA

#### Tested equipment

##### Generator

Name: X Ray Generator Model: Multix Fusion Type: HF/DC  
Serial nun 40130 Manufacturer: Siemens

##### Tube

Name: Rad Tube Insert type: 03345233 Serial nun 8112111556  
Manufact Siemens

#### Measurements

##### Set kV(kV SSD(cm))

10 100

mAs	e voltage	posure time(n)	Exposure(μGy)	ure rate(nrVL/mm Al	SSD(cm)	Set kV(kV)	
10	70.04956	34.63893127	349.4416152	10.08812	2.809609	100	70
20	69.95974	69.73181915	699.3234753	10.02876	2.82076	100	70
32	70.05425	113.4061966	1118.770937	9.865165	2.829549	100	70
40	70.0262	144.0426025	1397.302412	9.70062	2.829915	100	70
50	70.0855	144.7523987	1744.290351	12.10872	2.828993	100	70

#### HVL Manual

#### Tested equipment

##### Generator

Name: X Ray Generator Model: Multix Fusion Type: HF/DC  
Serial nun 40130 Manufacturer: Siemens

##### Tube

Name: Rad Tube Insert type: 03345233 Serial nun 8112111556  
Manufact Siemens

#### Measurements

##### Set kV(kV SSD(cm)) set mAs

81 100 10

Set kV(kV)	e voltage	posure time(n)	Exposure(mGy)	ure rate(nrVL/mm Alded filtr.(n	SSD(cm)	mAs		
81	80.41742	40.16440964	0.466791466	11.62202	3.274511	0	100	10
81	80.4223	40.13602066	0.360385484	8.979103	3.76522	1	100	10
81	80.36419	40.1355896	0.292237672	7.281262	4.211441	2	100	10
81	80.31132	40.13602066	0.244449813	6.090534	4.587132	3	100	10
81	80.17092	40.64677048	0.208668968	5.138637	4.877307	4	100	10

Illuminasi				
<b>Tested equipment</b>				
<b>Generator</b>				
Name:	X Ray Generator	Model:	Multix Fusion	Type:
Serial nun	40130	Manufacturer:	Siemens	HF/DC
<b>Tube</b>				
Name:	Rad Tube	Insert type:	03345233	Serial nun
Manufact	Siemens			8112111556
<b>Measurements</b>				
Light(lx)	Text			
91.768	BG I			
65.79949	BG II			
66.92454	BG III			
89.28758	BG IV			
218.1887	I			
197.0723	II			
166.7365	III			
165.129	IV			

Linearitas mA				
<b>Tested equipment</b>				
<b>Generator</b>				
Name:	X Ray Generator	Model:	Multix Fusion	Type:
Serial nun	40130	Manufacturer:	Siemens	HF/DC
<b>Tube</b>				
Name:	Rad Tube	Insert type:	03345233	Serial nun
Manufact	Siemens			8112111556
<b>Measurements</b>				
Set kv(kv SDD(cm))	set mAs			
90	100	40		
set kv(kv)	mAs	Exposure(µGy)	posure rate(mGy/l)	Posisi
90	40	0.138666512	0.131617229	Kanan
90	40	0.164705336	0.056093612	Depan
90	40	0.15582905	0.019019089	Kiri
90	40	0.254069386	0.086556863	Atas
90	40	0.116859932	0.039755417	Belakang
90	40	0.023551581	0.008013317	Jatar

Lampiran 6. Logbook rumah sakit “A”

Posisi	Proyeksi	Gender (L/P)	Umar (tahun)	Berat badan (Kg)	Tinggi Badan (cm)	Tinggi Badan (m)	Indeks Massa Tubuh (standar Deviasi)	Status Gizi	Tebal thorax	FFD	FSD	kV	mAs	Tube Output	INAK	ESAK(mGy)	Keterangan
Erect	PA	L	9	18.5	125	1.25	11.94	KURUS	6	150	144	64.3	11	0.03337	0.0398356	0.054	
Erect	PA	L	8	17.7	110	1.1	14.60	KURUS	11	150	139	64.3	12	0.03337	0.0466397	0.063	
Erect	PA	P	8	24.6	120	1.2	17.08	KURUS	12	150	138	64.5	14	0.0336	0.055563	0.075	
Erect	PA	L	5	16.4	116	1.16	12.19	KURUS	8	150	142	64.5	11	0.0336	0.042357	0.056	
Erect	PA	P	7	23.5	111	1.11	19.07	NORMAL	12	150	138	68	11	0.03757	0.0488262	0.066	
Erect	PA	L	13	30.3	145	1.45	14.70	KURUS	16	150	134	66	11	0.03527	0.0486147	0.066	
Erect	PA	P	5	17	102	1.02	16.34	KURUS	13	150	137	63	11	0.03196	0.0421468	0.057	
Erect	PA	L	10	15.7	105	1.05	14.24	KURUS	25	150	125	64.3	11	0.03337	0.0528660	0.071	
Erect	PA	L	12	26	116	1.16	19.32	NORMAL	13	150	137	64.3	11	0.03337	0.0440104	0.059	
Erect	PA	P	12	43	130	1.3	25.44	at Badan L	16	150	134	64.5	12	0.0336	0.050560	0.068	
Erect	PA	P	12	37.3	131	1.31	21.74	NORMAL	27	150	123	64.5	12	0.0336	0.0593554	0.081	
Erect	PA	P	5	19.6	110	1.1	16.20	KURUS	14	150	136	61.5	16	0.03037	0.0591195	0.080	
Erect	PA	L	6	14	107	1.07	12.23	KURUS	13	150	137	60	11	0.02883	0.0380444	0.051	
Erect	PA	P	11	25.5	137	1.37	13.59	KURUS	15.5	150	134.5	64.5	14	0.0336	0.0584990	0.079	
Erect	PA	P	7	14.7	107	1.07	12.84	KURUS	15	150	135	60	11	0.02883	0.039191	0.053	
Erect	PA	L	10	24	110	1.1	19.83	NORMAL	16	150	134	63	11	0.03196	0.0440572	0.059	
Erect	PA	P	6	20	123	1.23	13.22	KURUS	14.5	150	135.5	60	125	0.02883	0.0441593	0.060	
Erect	PA	P	5	14.6	105	1.05	13.24	KURUS	11	150	139	60	11	0.02883	0.0363924	0.050	
Erect	PA	L	5	20	110	1.1	16.53	KURUS	14	150	136	60	11	0.02883	0.0387755	0.052	
Erect	PA	L	9	16	106	1.06	16.02	KURUS	17	150	133	63	125	0.03196	0.0508207	0.063	
Erect	PA	L	5	26	107	1.07	22.71	NORMAL	14	150	136	60	125	0.02883	0.0439356	0.053	
Erect	PA	P	8	16	110	1.1	13.22	KURUS	13	150	137	60	125	0.02883	0.0441982	0.058	
Erect	PA	L	6	19.1	104	1.04	17.65	KURUS	11	150	139	64.5	12	0.0336	0.0463472	0.063	
Erect	PA	P	5	13.5	105	1.05	12.24	KURUS	14	150	136	60	11	0.02883	0.0385755	0.052	
Erect	PA	P	8	39.7	131	1.31	23.13	NORMAL	16	150	134	63	16	0.03196	0.0640832	0.087	
Erect	PA	L	12	37	135	1.35	20.30	NORMAL	18	150	132	63	14	0.03196	0.0577848	0.078	
Erect	PA	L	14	46	140	1.4	23.47	NORMAL	15	150	135	63	16	0.03196	0.0631373	0.085	
Erect	PA	P	13	30	135	1.35	16.46	KURUS	12	150	138	63	16	0.03196	0.0604221	0.082	
Erect	PA	P	13	27.3	135	1.35	15.31	KURUS	12	150	138	85	2.8	0.06024	0.1928278	0.263	
Erect	PA	P	12	57	150	1.5	25.33	at Badan L	17	150	133	64.5	12	0.0336	0.0592785	0.063	
Erect	PA	L	14	35	140	1.4	17.86	KURUS	16	150	134	66	16	0.03527	0.0701283	0.095	
Erect	PA	P	13	28	141	1.41	14.08	KURUS	14	150	136	64.5	12	0.0336	0.0490412	0.066	
Erect	PA	L	9	25	125	1.25	16.00	KURUS	11	150	139	63	125	0.03196	0.0465280	0.063	
Erect	PA	L	7	22	127	1.27	13.64	KURUS	13	150	137	61.5	16	0.03037	0.0582596	0.073	







## Lampiran 10. Logbook rumah sakit “E”

Posisi	Proyeksi	Gender (L/P)	Umur (tahun)	Berat badan (Kg)	Tinggi Badan (cm)	Tinggi Badan (m)	Indeks Massa Tubuh (BMI) (kg/m <sup>2</sup> )	Status Gizi	Tabal thorax	FFD	FSD	Kv	ms	z	mAr	Tuba Opert	RIAK (mGy)	ESAK(mGy)	Kotiragen
Erect	PA	L	12	34	145	1.45	16.11	KURUS	21	150	123	60				5.6	24.28040	0.18337651	0.24837
Erect	PA	P	12	45	157	1.57	18.26	KURUS	18	150	132	63				6	27.05042	0.20958488	0.28294
Erect	PA	L	5	30	120	1.2	20.83	NORMAL	16	150	134	58				7	31.59000	0.26966074	0.37690
Erect	PA	L	5	17.8	102	1.02	14.39	KURUS	13	150	137	63				4.5	27.05042	0.14552441	0.19700
Erect	PA	P	7	25	124	1.24	16.26	KURUS	16	150	134	60				6.3	24.28040	0.1918595	0.25895
Erect	PA	P	6	23.5	126	1.26	14.80	KURUS	8	150	142	57.5				5	22.16894	0.12345125	0.16866
Erect	PA	L	6	25	131	1.31	14.57	KURUS	13	150	137	57.5				5.2	22.16894	0.137838	0.18621
Erect	PA	L	5	30	135	1.35	16.46	KURUS	18	150	132	58				5.6	22.55224	0.16308434	0.22016
Erect	PA	L	7	18	110	1.10	13.65	KURUS	10	150	140	58				5.4	22.55224	0.18388084	0.18573
Erect	PA	L	5	16	124	1.24	11.71	KURUS	11	150	133	55				5	20.65398	0.16803366	0.15773
Erect	PA	P	9	16	115	1.15	13.61	KURUS	12	150	138	63				6	27.05042	0.1917563	0.25897
Erect	PA	P	7	20	100	1	20.00	NORMAL	10	150	140	70				10	34.10440	0.3195056	0.52853
Erect	PA	L	14	70	150	1.5	31.11	Obesitas	20	150	130	70				10	34.10440	0.4440532	0.61297
Erect	PA	P	5	15	121	1.21	10.25	KURUS	18	150	132	60				5	24.28040	0.16688301	0.21779
Erect	PA	P	14	40	142	1.42	19.84	NORMAL	17	150	133	63				5	27.05042	0.17203797	0.23225
Erect	PA	P	7	30	125	1.25	19.20	NORMAL	15	150	135	60				6.3	24.28040	0.18388416	0.25513
Erect	PA	P	14	30	150	1.5	17.75	KURUS	18	150	132	63				8	27.05042	0.23444591	0.37725
Erect	PA	P	6	30	122	1.22	20.16	NORMAL	16	150	134	58				5.6	22.55224	0.1925244	0.21594
Erect	PA	L	9	48	138	1.38	25.20	Berat Badan Lebih	23	150	127	58.5				5.6	22.98205	0.1935602	0.24237
Erect	PA	L	5	13.5	103	1.03	11.36	KURUS	12	150	138	58.5				5.6	22.98205	0.1920595	0.20527
Erect	PA	P	6	15	110	1.10	10.77	KURUS	14	150	136	57				6	21.70587	0.19342856	0.21388
Erect	PA	P	3	32	156	1.56	13.15	KURUS	15	150	135	66				6.3	23.96460	0.2330558	0.31463
Erect	PA	P	6	14.5	109	1.09	12.20	KURUS	17	150	133	55				4	20.65398	0.16809395	0.13763
Erect	PA	P	13	63	156	1.56	37.21	Obesitas	21	150	123	70				10	34.10440	0.44161018	0.62251
Erect	PA	P	5	35	128	1.28	21.56	NORMAL	17	150	133	60				11	24.28040	0.33371201	0.45898
Erect	PA	L	9	37	127	1.27	22.34	NORMAL	16	150	134	63				8	27.05042	0.20337531	0.27456
Erect	PA	L	12	34	134	1.34	18.34	NORMAL	15	150	135	63				8	27.05042	0.2078467	0.36067
Erect	PA	L	9	40	136	1.36	21.63	NORMAL	13	150	131	63				8	27.05042	0.20372315	0.38303
Erect	PA	P	3	45	134	1.34	25.06	Berat Badan Lebih	20	150	130	55				5	20.65398	0.13357143	0.18033
Erect	PA	L	11	50	137	1.37	16.88	KURUS	17	150	133	63				8	27.05042	0.27526011	0.37180
Erect	PA	P	5	11	103	1.03	13.21	KURUS	14	150	136	56				6	20.37162	0.1623398	0.20571
Erect	PA	L	14	50	166	1.66	18.34	KURUS	17	150	133	66				6.3	23.96460	0.2401936	0.32416
Erect	PA	L	5	17	105	1.05	15.42	KURUS	10	150	140	55				5.6	20.65398	0.1688937	0.17434

## Lampiran 11. hasil uji tanda Rumah sakit “C”

```
{r}
library(nonpar)
signtest(data[data$rs=="RSBM"], ]$esak, m=0.588, conf.level=0.95, exact=FALSE)

Large Sample Approximation for the Sign Test

H0: The population median is = 0.588
HA: The population median is not equal to 0.588

B = 20

Significance Level = 0.05
The p-value is 0.617075077451974
There is not enough evidence to conclude that the population median is different
than 0.588 at a significance level of 0.05

The 95 % confidence interval is [ 0.547683356344206 , 0.61725607023798 ].
```

## Lampiran 12. Hasil uji tanda Rumah sakit “D”

```
{r}
library(nonpar)
signtest(data[data$rs=="RSHJ"], ]$esak, m=0.588, conf.level=0.95, exact=FALSE)

Large Sample Approximation for the Sign Test

H0: The population median is = 0.588
HA: The population median is not equal to 0.588

B = 19

Significance Level = 0.05
The p-value is 0.871131491597158
There is not enough evidence to conclude that the population median is different
than 0.588 at a significance level of 0.05

The 95 % confidence interval is [ 0.393504045833438 , 0.945458227594348 ].
```

### Lampiran 13. Hasil uji Tanda Rumah sakit “E”

```
{r}
library(nonpar)
signtest(data[data$rs=="RSPM", ]$esak, m=0.588, conf.level=0.95, exact=FALSE)
```

Large Sample Approximation for the Sign Test

H0: The population median is = 0.588  
HA: The population median is not equal to 0.588

B = 31

Significance Level = 0.05  
The p-value is 1.09264451695555e-06  
There is enough evidence to conclude that the population median is different than 0.588 at a significance level of 0.05

The 95 % confidence interval is [ 0.205712736613262 , 0.282939593180655 ].

### Lampiran 14. Hasil uji tanda Rumah sakit “A”

```
{r}
library(nonpar)
signtest(data[data$rs=="RSCM", ]$esak, m=0.588, conf.level=0.95, exact=FALSE)
```

Large Sample Approximation for the Sign Test

H0: The population median is = 0.588  
HA: The population median is not equal to 0.588

B = 34

Significance Level = 0.05  
The p-value is 1.51855955235201e-08  
There is enough evidence to conclude that the population median is different than 0.588 at a significance level of 0.05

The 95 % confidence interval is [ 0.0594140251636821 , 0.0692260161756286 ].

### Lampiran 15. Hasil uji tanda Rumah sakit “B”

```
{r}
library(nonpar)
signtest(data[data$rs=="RSK", ]$esak, m=0.588, conf.level=0.95, exact=FALSE)
```

Large Sample Approximation for the Sign Test

H0: The population median is = 0.588  
HA: The population median is not equal to 0.588

B = 46

Significance Level = 0.05  
The p-value is 3.24748964833769e-11  
There is enough evidence to conclude that the population median is different than 0.588 at a significance level of 0.05

The 95 % confidence interval is [ 0.00623984745658122 , 0.00944934939828396 ].

## Lampiran 16. Estimasi Parameter Regresi

```
{r}
model_rs <- lm(log(esak) ~ dummy_jk + log(umur) + log(IMT) + log(tebal_thorax) +
              dummy_rscm + dummy_rsbm + dummy_rsk + dummy_rshj, data=data)
summary(model_rs)
```

Call:  
lm(formula = log(esak) ~ dummy\_jk + log(umur) + log(IMT) + log(tebal\_thorax) +  
dummy\_rscm + dummy\_rsbm + dummy\_rsk + dummy\_rshj, data = data)

Residuals:

Min	1Q	Median	3Q	Max
-1.70396	-0.23444	0.01518	0.27080	1.21852

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-3.46063	0.41294	-8.380	1.55e-14 ***
dummy_jk	-0.13020	0.06061	-2.148	0.033045 *
log(umur)	0.33813	0.10069	3.358	0.000959 ***
log(IMT)	0.15221	0.12197	1.248	0.213709
log(tebal_thorax)	0.39377	0.16660	2.364	0.019181 *
dummy_rscm	-1.33184	0.10137	-13.138	< 2e-16 ***
dummy_rsbm	0.59503	0.09939	5.987	1.15e-08 ***
dummy_rsk	-3.58703	0.09389	-38.206	< 2e-16 ***
dummy_rshj	0.72343	0.09865	7.333	7.61e-12 ***

---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.4052 on 178 degrees of freedom  
Multiple R-squared: 0.9506, Adjusted R-squared: 0.9484  
F-statistic: 428 on 8 and 178 DF, p-value: < 2.2e-16

## Lampiran 17. Hasil uji F

```
{r}
library(Stat2Data)
library(rms)
data("NFLStandings2016")

anova(rms::ols(log(esak) ~ dummy_jk + log(umur) + log(IMT) +
              log(tebal_thorax) +
              dummy_rscm + dummy_rsbm + dummy_rsk +
              dummy_rshj, data=data))
```

Analysis of Variance

Response: log(esak)

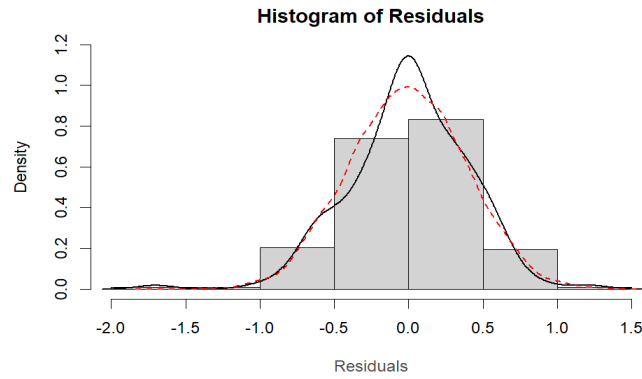
Factor	d.f.	Partial SS	MS	F	P
dummy_jk	1	0.7575873	0.7575873	4.62	0.0330
umur	1	1.8513053	1.8513053	11.28	0.0010
IMT	1	0.2556307	0.2556307	1.56	0.2137
tebal_thorax	1	0.9170045	0.9170045	5.59	0.0192
dummy_rscm	1	28.3352860	28.3352860	172.61	<.0001
dummy_rsbm	1	5.8840938	5.8840938	35.84	<.0001
dummy_rsk	1	239.6215063	239.6215063	1459.71	<.0001
dummy_rshj	1	8.8282056	8.8282056	53.78	<.0001
REGRESSION	8	562.0565340	70.2570668	427.99	<.0001
ERROR	178	29.2198380	0.1641564		

## Lampiran 18. Hasil Perhitungan Vif Setiap Variabel Bebas

```
{r}
library(car)
vif(model_rs)
```

	dummy_jk	log(umur)	log(IMT)	log(tebal_thorax)
dummy_rscm	1.030250	1.525082	1.342326	1.628282
dummy_rsbm	1.741426	1.749160	1.862432	
dummy_rsk				
dummy_rshj				1.794920

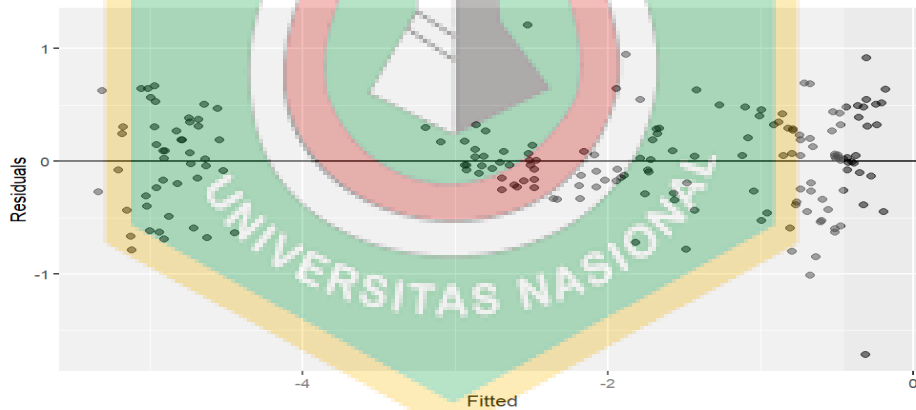
**Lampiran 19. Hasil uji normalitas “Histogram Residual”**



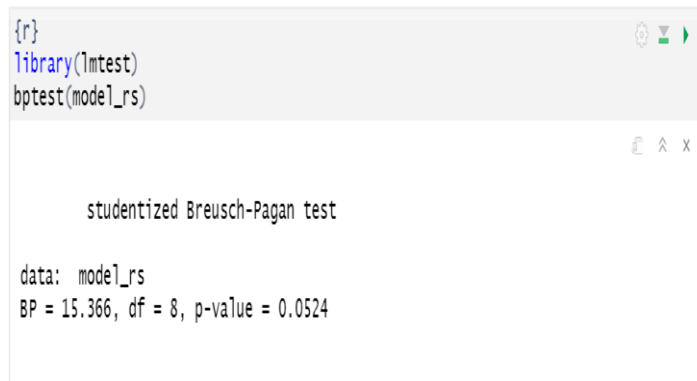
**Lampiran 20. Hasil Uji Normalitas Error Kolmogorov-Smirnov**



**Lampiran 21. Residual vs Fitted Plot**



**Lampiran 22. Hasil Uji Homoskedastisitas Breusch-Pagan**



**Lampiran 23. Logbook pasien**

Nama pasien	Posisi	Proyeksi	Gender	Umur	Berat badan	Tinggi Badan	Indeks Massa Tubuh	Tebal Thorax	FFD	FSD	kV	mA	s	mAs	INAK	ESAK

