REFERENCES

Agrahari, R. S., Dangle, P. A., & Chandratre, K. V. (n.d.). Improvement Of Process Cycle Efficiency by Implementing A Lean Practice: A Case Study. *Mechanical Engineering*.

Aguwa, C., Olya, M. H., & Monplaisir, L. (2017). Modeling of fuzzy-based voice of customer for business decision analytics. *Knowledge-Based Systems*, *125*, 136–145. https://doi.org/10.1016/j.knosys.2017.03.019

Amoozad Mahdiraji, H., Hafeez, K., Kord, H., & Abbasi Kamardi, A. (2022). Analysing the voice of customers by a hybrid fuzzy decision-making approach in a developing country's automotive market. *Management Decision*, *60*(2), 399–425. https://doi.org/10.1108/MD-12-2019-1732

Azelya, I., & Thabrani, G. (2020). Analisis Pengurangan Non-Value Added Activities dengan Metode Lean Six Sigma. *Jurnal Kajian Manajemen dan Wirausaha*, *2*(2), 63. https://doi.org/10.24036/jkmw0284940

Batubara, H. (2013). *Penentuan Harga Pokok Produksi Berdasarkan Metode Full Costing Pada Pembuatan Etalase Kaca Dan Alumunium di UD. Istana Alumunium Manado*. 8.

Bhat, S., Antony, J., Gijo, E. V., & Cudney, E. A. (2019). Lean Six Sigma for the healthcare sector: A multiple case study analysis from the Indian context. *International Journal of Quality & Reliability Management*, *37*(1), 90–111. https://doi.org/10.1108/IJQRM-07-2018-0193

Chiarini, A., & Bracci, E. (2013). Implementing Lean Six Sigma in healthcare: Issues from Italy. *Public Money & Management*, *33*(5), 361–368. https://doi.org/10.1080/09540962.2013.817126

Endeshaw, B. (2020). Healthcare service quality-measurement models: A review. *Journal of Health Research*, *35*(2), 106–117. https://doi.org/10.1108/JHR-07-2019-0152

Ervannudin, A. N. (n.d.). *Fakultas Teknologi Dan Informatika Universitas Dinamika*. 49.

Improta, G., Balato, G., Ricciardi, C., Russo, M. A., Santalucia, I., Triassi, M., & Cesarelli, M. (2019). Lean Six Sigma in healthcare: Fast track surgery for patients undergoing prosthetic hip replacement surgery. *The TQM Journal*, *31*(4), 526–540. https://doi.org/10.1108/TQM-10-2018-0142

J. Liberatore, M. (2013). Six Sigma in healthcare delivery. *International Journal of Health Care Quality Assurance*, *26*(7), 601–626. https://doi.org/10.1108/IJHCQA-09-2011-0054

Kumar, S., Dhingra, A. K., & Singh, B. (2018). Process improvement through Lean-Kaizen using value stream map: A case study in India. *The International Journal of Advanced Manufacturing Technology*, *96*(5–8), 2687–2698. https://doi.org/10.1007/s00170-018-1684-8

McDermott, O., Antony, J., Bhat, S., Jayaraman, R., Rosa, A., Marolla, G., & Parida, R. (2022). Lean Six Sigma in Healthcare: A Systematic Literature Review on Motivations and Benefits. *Processes*, *10*(10), 1910. https://doi.org/10.3390/pr10101910

Menkes RI. 2020. Peraturan Menteri Kesehatan Republik Indonesia Nomor 24 tentang Pelayanan Radiologi Klinik.

Menkes RI. 2010. Peraturan Menteri Kesehatan Republik Indonesia Nomor 340/Menkes/Per/III/2010 tentang Klasifikasi Rumah Sakit.

Mu'tiyah, I., & Oktamianti, P. (2022). Meningkatkan Kinerja Ruang Operasi dengan Metode Lean Six Sigma: Literature Review. *Media Publikasi Promosi Kesehatan Indonesia (MPPKI)*, *5*(12), 1513-1519.

Paramita, P. D. (n.d.). *Penerapan Kaizen dalam Perusahaan*. 14.

RSUD Abdoel Wahab Sjahranie. (2022). Laporan Kegiatan Indikator Mutu Tahun 2022. Samarinda.

Sinsu, E. E., & Pangemanan, S. S. (2018). *Analysing The Bottlenecks In Laundry Service Operation Using Cause and Effect Diagram (Case Study On Fresh & Clean Coin Laundry In Manado)*.

Syah, T. Y. R., Nurohim, A., & Hadi, D. S. (2019). *Lean Six Sigma Concept in The Health Service Process in The Universal Health Coverage of BPJS Healthcare (Healthcare and Social Security Agency)*.

Tanthowi, A. (n.d.). *Implementasi Sistem Informasi Pembayaran Berbasis SMS Gateway (Studi Kasus: SMK NEGERI 1 Bandar Lampung)*. *2*(2), 8.

Tjen, I. (2017). Improvement Waktu Pelayanan Pasien bagian Ultrasonografi dengan Metode Lean Di Rsup Prof Dr. R.D Kandou.

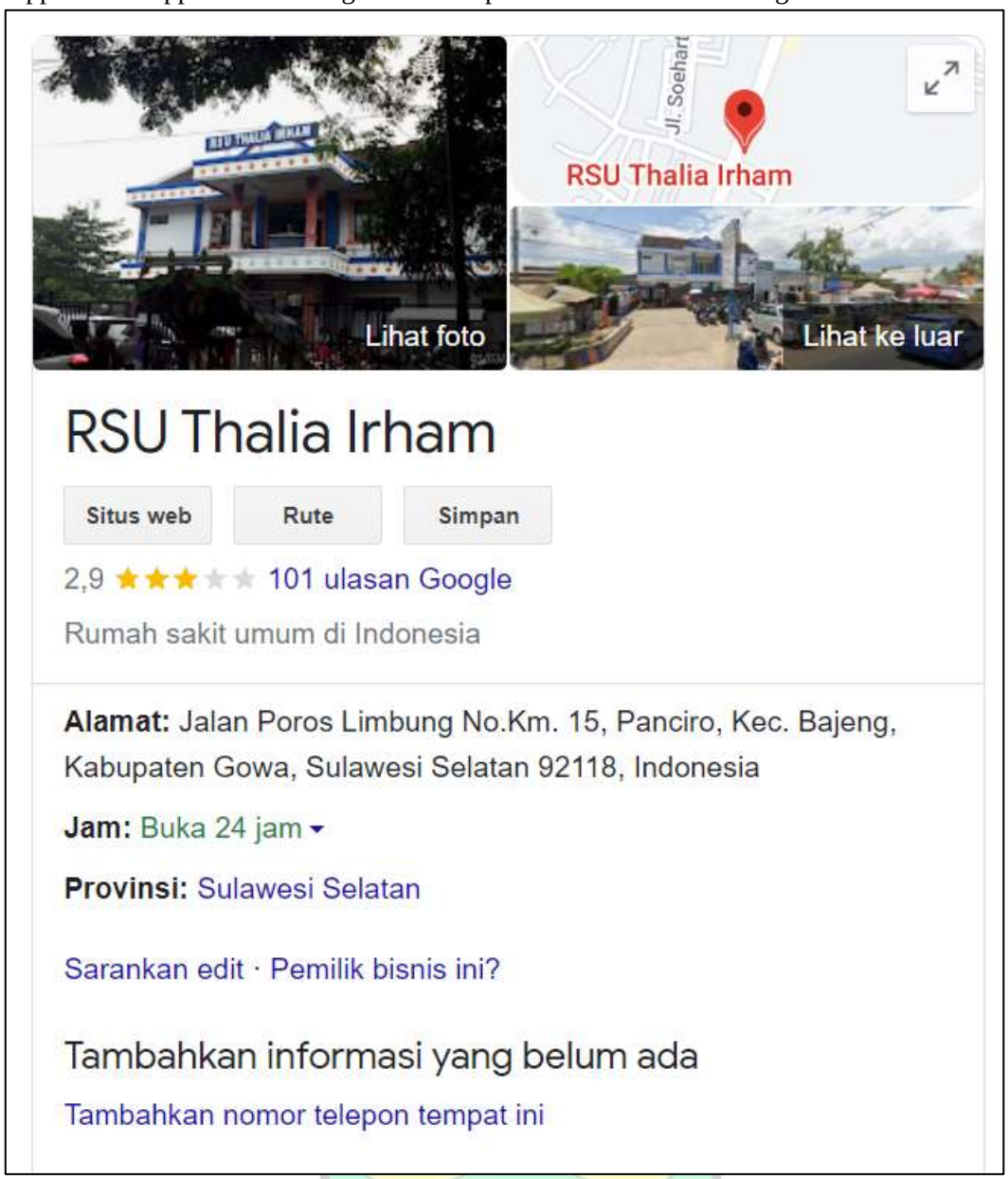
Tufail, M. M. B., Shakeel, M., Sheikh, F., Anjum, N., Department of Management Studies Bahria University Karachi Campus, Pakistan, Department of Business Studies Bahria University Karachi Campus, Pakistan, Pediatric Cardiology Department,

NICVD Karachi, Pakistan, & Medical Practitioner Karachi, Pakistan. (2021). Implementation of lean Six-Sigma project in enhancing health care service quality during COVID-19 pandemic. *AIMS Public Health*, *8*(4), 704–719. https://doi.org/10.3934/publichealth.2021056

Upadhyai, R., Jain, A. K., Roy, H., & Pant, V. (2019). A Review of Healthcare Service Quality Dimensions and their Measurement. *Journal of Health Management*, *21*(1), 102–127. https://doi.org/10.1177/0972063418822583

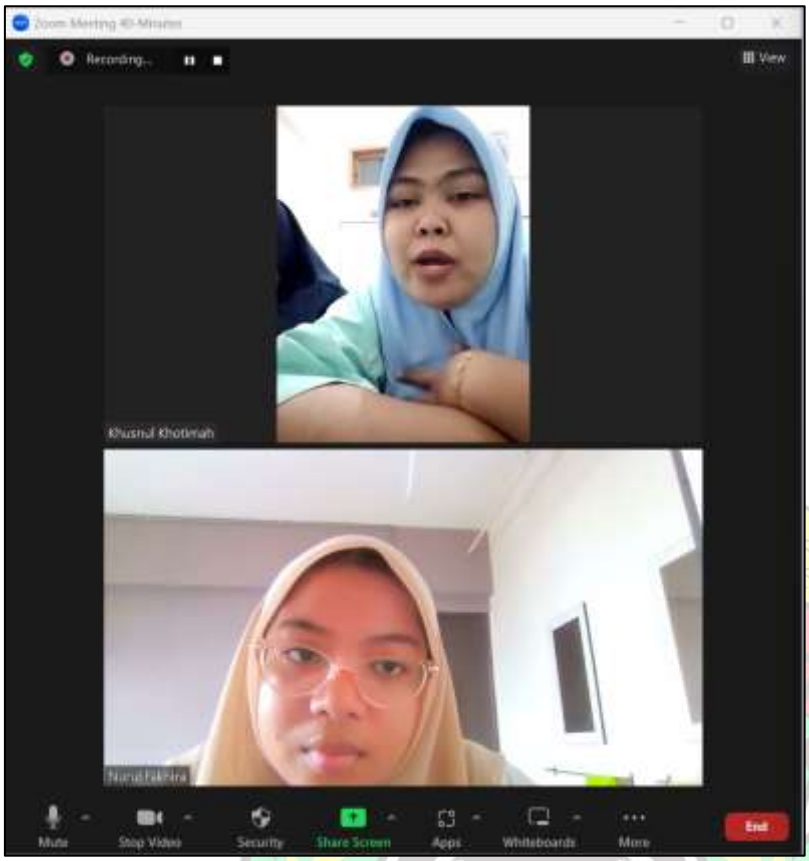
APPENDIX

Appendix 1 Appendix 1 Rating Public Hospital Thalia Irham on Google Reviews

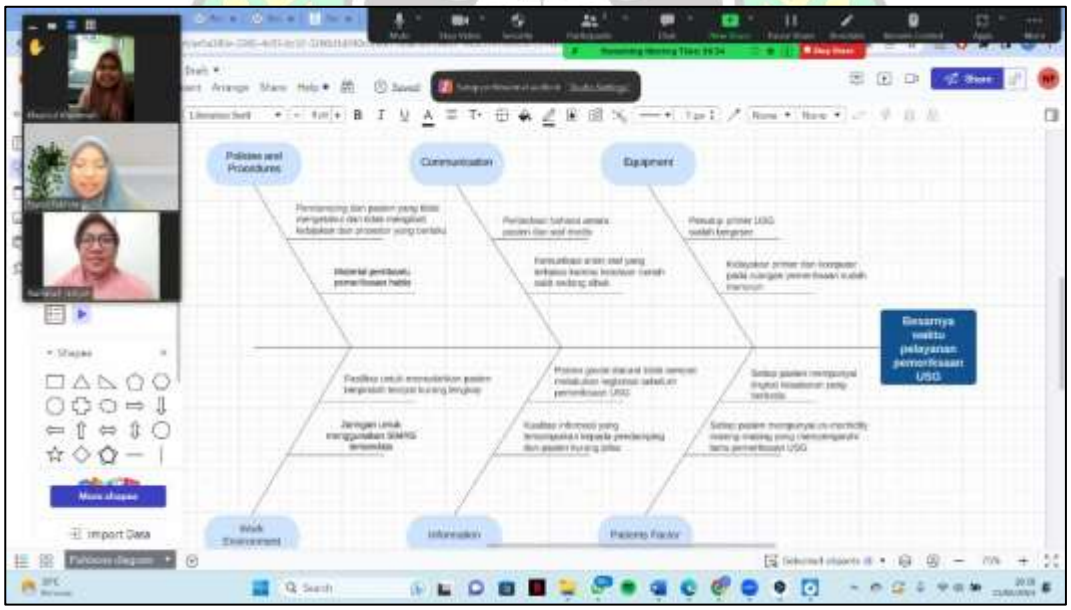


Appendix 2 Data collection process in the ultrasound check room

Appendix 3 Interview with Head of Radiology Unit of Public Hospital Thalia Irham



Appendix 4 Voting method and FGD with 1 doctor radiologist and 1 Head of Radiology Unit



Appendix 5 Data collection blank

	Nama :		
	Umur :		
	Asisten Dokter (Radiografer) :		
	Jenis Pemeriksaan USG :		
	Y1 : Waktu Pemeriksaan Pasien		
	Input data (s)	Atur posisi pasien (s)	Pemeriksaan USG (S)
Operator			
	Y2 : Waktu tunggu pasien untuk mendapatkan hasil diagnosa		
	Membersihkan/merapikan alat USG (s)	Mengetik Hasil diagnosa (s)	Pasien menunggu hasil (s)
Operator			
	Waste time		
	Kegiatan	Durasi (s)	ket

Appendix 6 RCA Tools - Contributing factors classification

Root Cause Analysis (RCA) TOOL 2

Contributing factors classification[1]

Government of South Australia
SA Health

The classification covers nine broad categories of patient assessment, staff factors, patient factors, equipment, work environment, information, communication, policies/procedures and coordination. The factors are listed below in order of frequency, from highest to lowest.

Patient assessment	
Physical Behavioural Observation	This category covers initial assessment and ongoing monitoring of the patient's physical and mental state for evaluation of patient risk. Behavioural assessment is particularly relevant in the case of patients who may be at risk of harming themselves.
Staff factors training	
Knowledge/skills/competency Supervision Staff allocation/ scheduling/ availability Other (eg: recruitment/appraisal)	This category covers factors of a human resource nature, including inadequacies in knowledge or skills to undertake required duties or to deal with a situation that might be expected to arise. It includes training and continuing education (including training for tasks specific to the unit or procedure being performed).
Patient factors	
Co-morbidity Non-compliance Aggressive behaviour	This set of factors covers situations where the patient's clinical condition or their action or inaction impacts on the risk of adverse outcomes. Pre-existing morbidities may cause the patient to be of high risk of an adverse outcome.
Equipment	
Failure Availability Incompatibility Appropriateness	All contributing factors that relate to hospital equipment are covered under this heading, including design or operating faults, maintenance or calibration deficiencies or suitability for the purpose for which it is provided.
Work environment	
Physical environment Design/safety Security Facilities management Work culture	This category includes factors arising from any aspect of the environment in which the hospital service is provided, including design and security. It includes management of external factors such as contracted services (eg pathology, maintenance or information technology).

continued

1 Australian Institute of Health and Welfare and Australian Commission on Safety and Quality in Health Care, *Sentinel events in Australian public hospitals 2004-05*, July 2007

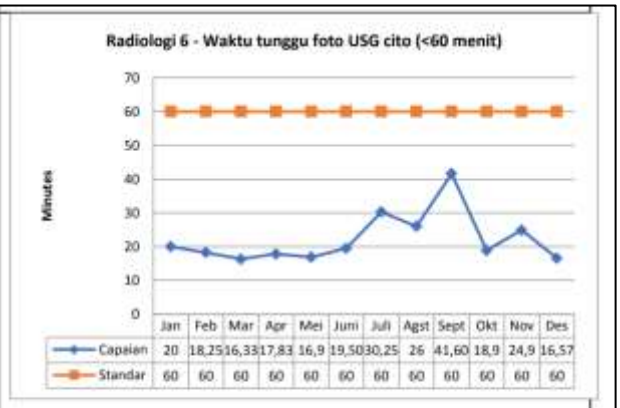
Contributing factors classification

Information	
Availability of information Clarity of information Quality of information Completeness of information	This heading covers all factors related to documentation of information relating to a patient's care. It includes missing medical records and ambiguous or illegible documentation relating to the patient.
Communication	
Staff – staff Staff – patient Staff – family/carer/advocate Patient consent issues Cultural diversity issues	This category includes issues arising from lack of effective communication between staff, including across disciplines, units or hospitals, and between staff and patients or their family/carer/advocate. Staff- patient communication issues include medical or technical language problems, difficulties for non- English speaking patients and other culturally influenced impediments to understanding. It covers all forms of communication.
Policies and procedures	
Availability of or clarity of procedures/guidelines Failure to follow procedures/ guidelines Patient identification Site identification	This category includes any situation in which policies or procedures were not understood, not followed or not available.
Coordination	
Coordination of care Inter-hospital issues Transportation issues	This category deals with factors associated with coordination of patient care arrangements, whether immediate (eg: transportation between sites) or longer term (eg: a coordinated care plan involving community- based services).

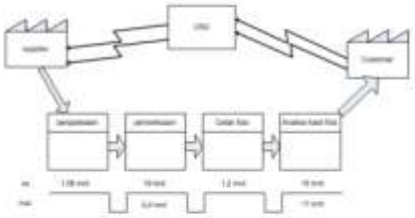
For more information

SA Health
Safety and Quality Unit
Telephone: 08 8226 6539
www.sahealth.sa.gov.au/safetyandquality

Appendix 7 Time of Ultrasound Check-up Service at Abdoel Wahab Sjahranie Hospital.

PMKP Radiologi 6	Waktu tunggu foto USG Cito	 Jan Feb Mar Apr Mei Juni Juli Agst Sept Okt Nov Des Capaian 20 18,25 16,33 17,83 16,9 19,50 30,25 26 41,60 18,9 24,9 16,57 Standar 60 60 60 60 60 60 60 60 60 60 60 60 **Analisa :** Capaian indikator pada Triwulan IV adalah sebesar 20,52 menit Ini artinya bahwa waktu tunggu usg cito yang dicapai sudah sesuai target yang ditetapkan (≤ 1 jam / 60 menit), namun capaian ini harus dipertahankan dan lebih ditingkatkan lagi.

Appendix 8 Time of Ultrasound Check-up Service at Prof. R.D Kandou Hospital.



Gambar 2. Current State Map proses USG

118

Tjen dkk/ Widya Teknik

Berdasarkan tabel hasil simulasi montecarlo pada tabel.1, beserta hasil perhitungan maka jumlah pasien yang sering muncul per hari yaitu 8 orang, nilai ini sama dengan nilai pada perhitungan manual dan dapat disimpulkan jumlah pasien minimum per hari yang sering ditangani bagian USG yaitu 8 orang pasien

- **Current State Map**

Proses pelayanan ultrasonografi berada pada bagian radiologi rumah sakit. Awal dari proses usg yaitu proses penjadwalan, pasien yang datang melakukan pendaftaran untuk dan diatur jadwal USG. Proses penjadwalan ini memiliki waktu rata-rata yaitu 1,08 menit dan dilakukan oleh administrasi bagian USG. Setelah dibuat jadwal usg pasien datang sesuai waktu yang telah dilakukan, proses pemeriksaan dimulai dengan cara pasien yang mendapat giliran masuk ke ruangan untuk proses USG, waktu rata-rata proses ini yaitu 23,4 menit dan membutuhkan waktu 4,4 menit untuk persiapan pasien diantaranya masuk ke ruangan, berbaring ke tempat tidur dan ada sedikit pembicaraan dengan dokter.

Setelah proses USG selesai pasien dipersilahkan keluar ruangan untuk menunggu hasil USG, dalam proses ini dokter akan mencetak hasil foto yang memerlukan waktu rata-rata 1,2 menit. Selanjutnya dokter akan menganalisa dan mencatat hasil USG yang memerlukan waktu rata-rata 10 menit, setelah selesai pembuatan hasil, hasil tersebut diambil oleh administrasi untuk selanjutnya diserahkan ke pasien, waktu rata-rata proses ini yaitu 11 menit.

Appendix 9 Patient time data of ultrasound check-up

No. of patients	Age	Types of Check-up	Y1 (s)	Y2 (s)	Y3 (s)	Y4 (s)	Y5 (s)	waiting time (s)
1	41	Thyroid	23,90	18,55	304,37	18,89	105,62	60,00
2	42	Abdomen	5,00	24,47	141,18	23,86	2,00	120,00
3	18	Abdomen	23,80	16,87	156,72	4,42	60,00	60,00
4	49	Abdomen	23,79	43,06	457,09	23,99	88,54	180,00
5	3	Abdomen	45,33	10,25	203,94	12,86	19,32	120,00
6	14	Abdomen	11,60	8,29	430,52	21,74	95,34	120,00
7	45	Abdomen	2,00	3,00	273,23	21,85	12,35	120,00
8	15	Thyroid	17,98	35,44	633,14	42,58	95,54	480,00
9	65	Abdomen	19,60	21,25	511,62	13,34	125,90	180,00
10	56	Abdomen	23,78	17,60	322,33	21,52	20,13	60,00
11	65	Abdomen	54,86	13,48	326,85	35,73	2,00	60,00
12	51	Abdomen	36,14	8,42	262,80	39,89	114,51	60,00
13	45	Abdomen	11,79	7,89	314,76	20,03	134,77	120,00
14	60	Abdomen	33,00	16,73	172,51	4,16	76,25	60,00
15	51	Abdomen	20,71	21,56	218,12	8,05	88,05	60,00
16	50	Abdomen	35,92	38,55	238,13	12,73	33,87	120,00
17	69	Abdomen	28,70	24,11	199,82	16,38	24,53	120,00
18	45	Abdomen	52,21	71,80	318,96	40,63	122,93	240,00
19	40	Abdomen	19,00	22,36	383,28	11,32	43,87	180,00
20	14	Abdomen	12,92	12,45	504,17	10,00	503,17	60,00
21	41	Abdomen	50,13	15,93	349,91	16,21	70,49	120,00
22	8	Abdomen	18,93	30,85	541,67	33,19	96,36	60,00
23	27	Abdomen	31,90	19,30	189,60	25,31	2,00	240,00
24	24	Abdomen	33,00	14,06	174,35	23,96	20,32	180,00
25	57	Abdomen	18,56	73,31	161,56	17,12	2,00	60,00
26	63	Abdomen	24,50	7,52	503,88	50,22	2,00	60,00
27	42	Ginekologi	21,40	14,01	273,94	10,20	370,63	420,00

28	32	Abdomen	14,20	1,38	373,84	16,57	2,00	120,00
29	30	Abdomen	31,09	18,74	343,23	22,95	2,00	60,00
30	46	Abdomen	22,05	36,63	253,08	15,33	61,07	120,00
31	34	Abdomen	25,10	37,50	217,09	31,95	19,23	660,00
32	30	Abdomen	15,66	10,78	304,85	15,81	39,11	240,00
33	50	Abdomen	22,50	14,23	367,48	13,82	2,00	60,00
34	67	Abdomen	24,49	62,50	292,67	10,42	39,17	120,00
35	79	Abdomen	14,35	46,37	280,68	32,06	19,85	60,00
36	42	Abdomen	22,43	20,93	287,50	16,44	35,13	120,00
37	54	Abdomen	33,23	46,75	340,46	17,99	41,22	180,00
38	48	Abdomen	46,70	4,10	216,64	10,35	34,87	120,00
39	51	Abdomen	15,51	6,55	181,85	19,67	26,30	120,00
40	17	Abdomen	21,3	27,68	267,34	16,69	41,25	180,00
41	50	Abdomen	26,40	5,85	279,99	11,41	88,59	540,00
42	61	Abdomen	29,73	11,00	255,30	7,65	186,57	120,00
43	60	Abdomen	45,23	37,20	278,09	11,46	144,83	60,00
44	3	Thyroid	21,55	45,05	378,72	6,85	91,23	240,00
45	50	Abdomen	15,75	14,05	358,70	18,71	151,44	760,00
46	42	Abdomen	26,33	40,43	236,45	20,45	50,05	120,00
47	52	Abdomen	12,95	36,13	338,42	23,46	36,55	60,00
48	52	Abdomen	35,78	23,36	301,44	31,33	15,80	60,00
49	44	Abdomen	22,36	19,43	227,56	52,53	52,58	240,00
50	45	Abdomen	33,12	8,53	299,61	12,67	27,67	60,00
51	50	Abdomen	31,80	39,46	365,62	16,71	54,65	240,00
52	48	Abdomen	42,90	13,06	314,42	30,83	60,29	180,00
53	21	Abdomen	27,71	25,85	183,28	10,65	104,25	1320,00
54	24	Abdomen	13,41	29,93	272,80	18,77	182,09	540,00
55	17	Abdomen	68,05	20,71	328,40	5,43	180,81	1200,00
56	45	Abdomen	8,08	10,15	229,03	8,62	102,35	780,00
57	41	Abdomen	17,77	25,88	183,26	16,50	34,65	60,00
58	42	Abdomen	28,23	14,98	258,30	11,34	27,98	180,00
59	52	Abdomen	22,93	26,51	241,88	9,11	28,66	240,00
60	41	Abdomen	21,60	9,00	276,35	4,97	129,99	360,00

61	17	Abdomen	15,36	28,66	244,32	12,59	185,76	120,00
62	47	Abdomen	18,00	10,43	245,05	10,07	99,99	300,00
63	57	Abdomen	16,25	15,93	337,14	6,48	170,31	180,00
64	48	Abdomen	14,98	42,36	251,75	7,36	121,45	180,00
65	55	Abdomen	22,80		235,26	16,74	10,09	120,00
66	50	Abdomen	8,78	8,73	202,21	7,82	23,56	180,00
67	29	Abdomen	14,33	23,56	250,16	5,68	90,72	120,00
68	27	Abdomen	28,55	18,18	258,97	7,37	121,60	180,00
69	49	Abdomen	3,78	10,54	151,32	8,38	80,59	180,00
70	29	Ginekologi	59,52	17,16	264,64	10,36	26,01	120,00
71	63	Abdomen	34,60	25,36	200,84	13,28	73,65	120,00
72	42	Abdomen	28,55	18,18	258,97	17,28	111,66	240,00
73	14	Abdomen	28,60	20,28	420,55	19,33	114,30	300,00
74	34	Abdomen	18,38	30,68	442,68	23,54	47,81	180,00
75	26	Mammae	19,55	35,34	670,23	22,41	138,19	2880,00
76	46	Ginekologi	29,31	19,16	248,25	22,85	106,52	240,00
77	71	Abdomen	27,87	15,36	391,98	33,59	109,78	120,00
78	36	Thyroid	24,18	35,48	508,58	44,90	240,73	300,00
79	29	Abdomen	26,54	9,43	202,42	12,13	25,30	60,00
80	35	Abdomen	29,99	10,20	211,10	24,03	91,93	180,00
81	26	Abdomen	13,65	25,28	249,12	13,91	111,45	1980,00
82	45	Mammae	19,45	23,32	588,31	27,40	128,16	240,00
83	55	Abdomen	11,95	24,97	292,20	28,79	83,53	120,00
84	20	Abdomen	29,86	26,38	161,24	9,70	119,41	360,00
85	42	Abdomen	23,11	12,90	276,20	15,98	64,24	60,00
86	79	Abdomen	21,80	13,16	264,37	9,52	90,52	120,00
87	27	Abdomen	23,53	22,10	394,72	14,70	195,56	180,00
88	22	Abdomen	16,53	12,65	213,26	15,99	22,53	60,00
89	52	Abdomen	16,15	18,46	166,99	11,73	57,41	120,00
90	28	Abdomen	9,86	11,69	260,27	6,58	31,28	120,00

91	66	Abdomen	27,30	10,36	177,95	14,32	44,78	120,00
92	30	Abdomen	30,05	16,68	279,41	10,24	88,63	240,00
93	44	Thyroid	35,32	18,06	421,10	7,11	70,60	120,00
94	23	Mammae	27,96	19,88	563,24	14,65	41,92	60,00
95	50	Thyroid	26,19	10,65	295,19	9,79	398,46	360,00
96	30	Abdomen	19,53	9,81	332,88	12,64	52,23	180,00
97	60	Abdomen	12,51	27,90	269,22	7,44	27,90	180,00
98	54	Abdomen	38,58	16,48	459,03	15,70	189,21	120,00
99	70	Abdomen	29,00	12,50	380,06	5,52	64,24	120,00
100	30	Abdomen	27,46	15,23	248,67	7,16	12,33	60,00