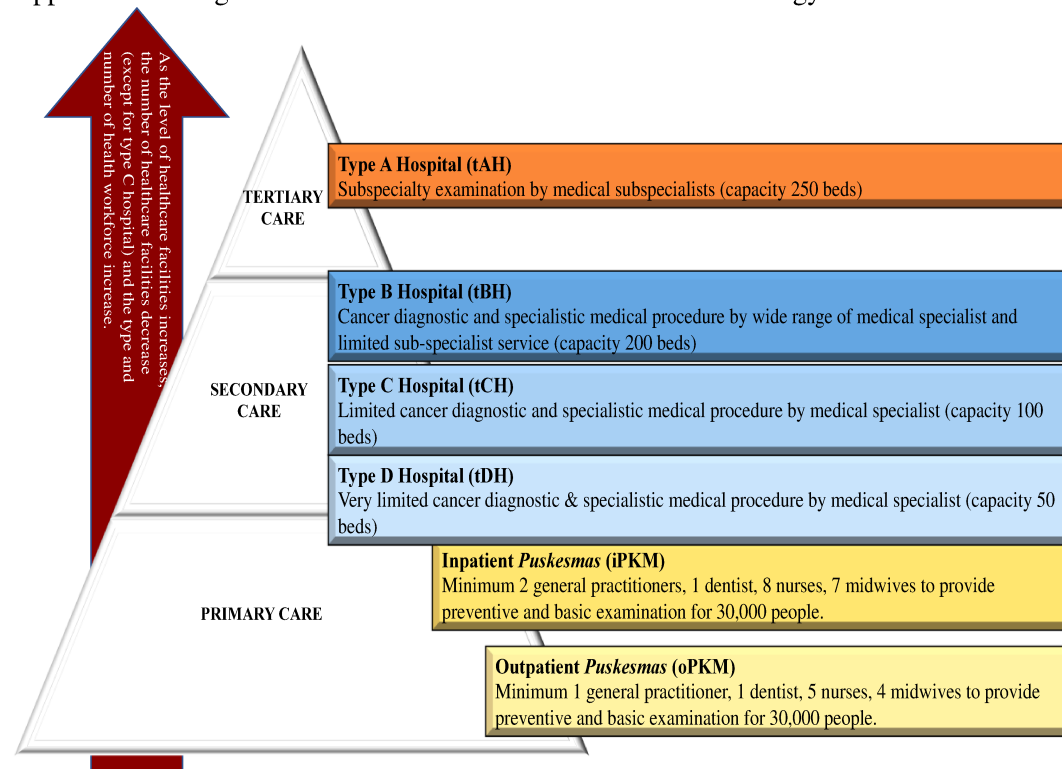


Appendix 1. Categorisation of Healthcare Facilities Related Oncology in Indonesia



Source: Adapted from NCCC (2015)

Appendix 2. Staffing Standard in Indonesia

STAFF	oPKM	iPKM	tDH	tCH	tBH	tAH	Source
General Practitioner	1	2	4	6	10	12	MoH, 2019
Nurse	5	8	33	67	200	250	MoH, 2019
Paediatrician	0	0	1	2	4	4	MoH, 2019
Obstetrician and Gynaecologist	0	0	1	2	4	4	MoH, 2019
Internist	0	0	1	2	4	4	MoH, 2019
General Surgeon	0	0	1	2	4	4	MoH, 2019
Pulmonologist	0	0	0	1	2	3	MoH, 2019
Radiologist	0	0	1	1	2	3	MoH, 2019
Clinical Pathologist	0	0	1	1	2	3	MoH, 2019
Anatomical Pathologist	0	0	1	1	1	2	MoH, 2019
Surgical Oncologist	0	0	0	0	1	2	NCCC, 2015
Medical Oncologist	0	0	0	0	1	1	NCCC, 2015
Paediatric Medical Oncologist	0	0	0	0	1	1	NCCC, 2015
Gynecologic Oncologist	0	0	0	0	1	2	NCCC, 2015
ENT Oncologist	0	0	0	0	1	1	NCCC, 2015
Urologic Oncologist	0	0	0	0	1	1	NCCC, 2015
Pulmonary Oncologist	0	0	0	0	1	1	NCCC, 2015
Radiation Oncologist	0	0	0	0	1	1	NCCC, 2015
Medical Physicist	0	0	0	0	1	1	NCCC, 2015
Radiation Therapy Technologist	0	0	0	0	1	1	NCCC, 2015

Appendix 3. Estimates of the required HRH were then the results of the calculated staffing levels and the total number of each type of healthcare facilities in a certain year as projected using the predictive model, using the following formula:

$$HRH_{r,xy} = \sum [(oPKM_{xy} * SSr_{oPKM}) + (iPKM_{xy} * SSr_{iPKM}) + (tDH_{xy} * SSr_{tDH}) + (tCH_{xy} * SSr_{tCH}) + (tBH_{xy} * SSr_{tBH}) + (tAH_{xy} * SSr_{tAH})]$$

Where:

HRH_{r,xy} represents the total HRH requirements for a particular type of staff **r**, in particular region **x**, in year **y**.

oPKM_{xy} represents total number of oPKM in region **x** in year **y**.

SSr_{oPKM} represents the staffing standard for staff type **r** at oPKM level.

Similar notations were applied to other type of healthcare facilities.

Appendix 4. Forecast of Healthcare Facilities and HRH-related Oncology in the Sumatera Region

REGION 1 - SUMATERA ISLAND												
Projected Population	58,560,200	59,337,100	60,093,700	60,828,500	61,541,100	62,231,100	62,898,600	63,545,500	64,173,300	64,781,300	65,369,500	65,938,300
HEALTH FACILITY/YEAR	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Outpatient Puskesmas	997	916	845	783	728	680	637	600	567	538	513	491
Inpatient Puskesmas	1651	1948	2226	2487	2732	2963	3181	3388	3583	3768	3945	4112
Type D Hospital	210	268	318	362	401	436	468	497	524	549	572	594
Type C Hospital	419	524	644	779	925	1082	1248	1422	1603	1791	1985	2184
Type B Hospital	82	88	94	101	110	119	129	140	153	167	182	198
Type A Hospital	10	11	13	14	15	17	18	20	22	24	26	29
Total Health Facilities	3370	3755	4141	4526	4911	5296	5682	6067	6452	6837	7223	7608
Overall Health facilities per 100,000 population	5.755	6.329	6.890	7.440	7.980	8.511	9.033	9.547	10.054	10.554	11.049	11.538
Primary care (Puskesmas) per 30,000 populati	1.357	1.448	1.533	1.613	1.687	1.756	1.821	1.883	1.940	1.994	2.046	2.094
Secondary care per 100,000 population	1.215	1.482	1.758	2.042	2.333	2.630	2.933	3.240	3.553	3.869	4.190	4.514
Type D hospital per 100,000 population	0.359	0.452	0.530	0.595	0.652	0.701	0.744	0.782	0.816	0.847	0.875	0.901
Type C hospital per 100,000 population	0.716	0.882	1.072	1.280	1.503	1.738	1.984	2.237	2.498	2.765	3.037	3.313
Type B hospital per 100,000 population	0.141	0.148	0.157	0.167	0.178	0.191	0.205	0.221	0.238	0.257	0.278	0.300
Tertiary care per 100,000 population	0.018	0.019	0.021	0.023	0.025	0.027	0.029	0.031	0.034	0.037	0.040	0.043

REGION 1 - SUMATERA ISLAND												
STAFF TYPE	Year 2019	Year 2020	Year 2021	Year 2022	Year 2023	Year 2024	Year 2025	Year 2026	Year 2027	Year 2028	Year 2029	Year 2030
General Practitioner	8602	10042	11528	13057	14624	16228	17866	19537	21238	22970	24730	26518
Nurse	72254	84522	97685	111669	126415	141878	158020	174811	192226	210244	228847	248020
Paediatrician	1419	1712	2034	2380	2750	3141	3552	3982	4429	4893	5373	5868
Obstetrician and Gynaecologist	1419	1712	2034	2380	2750	3141	3552	3982	4429	4893	5373	5868
Internist	1419	1712	2034	2380	2750	3141	3552	3982	4429	4893	5373	5868
General Surgeon	1419	1712	2034	2380	2750	3141	3552	3982	4429	4893	5373	5868
Anesthesiologist	928	1112	1308	1514	1731	1957	2194	2439	2695	2959	3232	3515
Radiologist	825	1002	1189	1385	1591	1805	2028	2259	2498	2745	2999	3260
Clinical Pathologist	825	1002	1189	1385	1591	1805	2028	2259	2498	2745	2999	3260
Anatomical Pathologist	732	902	1082	1270	1466	1670	1881	2099	2324	2554	2791	3033
Surgical Oncologist	103	111	119	129	140	152	165	180	196	214	234	255
Medical Oncologist	93	99	107	115	125	135	147	160	175	190	208	226
Paediatric Medical Oncologist	93	99	107	115	125	135	147	160	175	190	208	226
Gynecologic Oncologist	103	111	119	129	140	152	165	180	196	214	234	255
ENT Oncologist	93	99	107	115	125	135	147	160	175	190	208	226
Urologic Oncologist	93	99	107	115	125	135	147	160	175	190	208	226
Pulmonologic Oncologist	93	99	107	115	125	135	147	160	175	190	208	226
Radiation Oncologist	93	99	107	115	125	135	147	160	175	190	208	226
Medical Physicist	93	99	107	115	125	135	147	160	175	190	208	226
Radiation Therapy Technologist	93	99	107	115	125	135	147	160	175	190	208	226
TOTAL	90788	106448	123209	140982	159696	179294	199732	220973	242984	265741	289220	313401

Appendix 5. Forecast of Healthcare Facilities and HRH-related Oncology in the Java Region

REGION 2 - JAVA ISLAND												
Projected Population	151,061,800	152,449,900	153,797,800	155,101,700	156,361,000	157,573,300	158,738,000	159,852,700	160,912,700	161,917,500	162,864,900	163,754,800
HEALTH FACILITY/YEAR	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Outpatient Puskesmas	1371	1222	1090	973	869	776	694	621	556	498	447	402
Inpatient Puskesmas	2226	2604	2950	3265	3555	3820	4063	4287	4493	4683	4858	5020
Type D Hospital	408	531	639	736	822	900	969	1032	1089	1141	1188	1231
Type C Hospital	718	892	1090	1310	1545	1795	2055	2325	2601	2882	3167	3454
Type B Hospital	271	313	362	418	481	551	630	717	812	917	1031	1154
Type A Hospital	41	44	45	45	45	46	46	47	47	48	48	49
Total Health Facilities	5035	5606	6176	6747	7317	7888	8458	9029	9599	10170	10740	11311
Overall Health facilities per 100,000 population	3.333	3.677	4.016	4.350	4.680	5.006	5.328	5.648	5.965	6.281	6.594	6.907
Primary care (Puskesmas) per 30,000 populati	0.714	0.753	0.788	0.820	0.849	0.875	0.899	0.921	0.941	0.960	0.977	0.993
Secondary care per 100,000 population	0.925	1.138	1.360	1.588	1.822	2.060	2.302	2.549	2.798	3.051	3.307	3.566
Type D hospital per 100,000 population	0.270	0.348	0.416	0.475	0.526	0.571	0.611	0.646	0.677	0.705	0.730	0.752
Type C Hospital per 100,000 population	0.475	0.585	0.709	0.844	0.988	1.139	1.295	1.454	1.616	1.780	1.944	2.109
Type B hospital per 100,000 population	0.180	0.205	0.235	0.269	0.307	0.350	0.397	0.448	0.505	0.567	0.633	0.705
Tertiary care per 100,000 population	0.027	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.030	0.030

REGION 2 - JAVA ISLAND												
STAFF TYPE	Year 2019	Year 2020	Year 2021	Year 2022	Year 2023	Year 2024	Year 2025	Year 2026	Year 2027	Year 2028	Year 2029	Year 2030
General Practitioner	14969	17558	20242	23021	25890	28845	31883	35001	38196	41466	44807	48219
Nurse	150798	177743	206714	237783	270909	306055	343182	382253	423231	466080	510763	557243
Paediatrician	3094	3741	4446	5205	6017	6877	7784	8736	9730	10765	11839	12951
Obstetrician and Gynaecologist	3094	3741	4446	5205	6017	6877	7784	8736	9730	10765	11839	12951
Internist	3094	3741	4446	5205	6017	6877	7784	8736	9730	10765	11839	12951
General Surgeon	3094	3741	4446	5205	6017	6877	7784	8736	9730	10765	11839	12951
Anesthesiologist	2146	2581	3038	3523	4036	4577	5145	5741	6364	7013	7689	8391
Radiologist	1792	2180	2587	3016	3465	3934	4423	4931	5457	6001	6562	7140
Clinical Pathologist	1792	2180	2587	3016	3465	3934	4423	4931	5457	6001	6562	7140
Anatomical Pathologist	1479	1823	2181	2553	2939	3337	3747	4167	4597	5036	5483	5937
Surgical Oncologist	354	401	451	508	571	643	722	810	907	1013	1127	1252
Medical Oncologist	313	357	406	463	526	597	676	763	860	965	1079	1203
Paediatric Medical Oncologist	313	357	406	463	526	597	676	763	860	965	1079	1203
Gynecologic Oncologist	354	401	451	508	571	643	722	810	907	1013	1127	1252
ENT Oncologist	313	357	406	463	526	597	676	763	860	965	1079	1203
Urologic Oncologist	313	357	406	463	526	597	676	763	860	965	1079	1203
Pulmonologic Oncologist	313	357	406	463	526	597	676	763	860	965	1079	1203
Radiation Oncologist	313	357	406	463	526	597	676	763	860	965	1079	1203
Medical Physicist	313	357	406	463	526	597	676	763	860	965	1079	1203
Radiation Therapy Technologist	313	357	406	463	526	597	676	763	860	965	1079	1203
TOTAL	188560	222682	259286	298449	340120	384251	430791	479694	530913	584401	640112	698000

Appendix 6. Forecast of Healthcare Facilities and HRH-related Oncology in the Bali and the Nusa Tenggara Region

REGION 3 - BALI AND THE NUSA TENGGARA ISLANDS												
Projected Population	14,863,500	15,047,800	15,229,900	15,409,700	15,586,600	15,760,900	15,932,400	16,101,200	16,267,600	16,431,700	16,592,900	16,751,400
HEALTH FACILITY/YEAR	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Outpatient Puskesmas	327	319	312	305	298	292	286	280	275	270	265	261
Inpatient Puskesmas	364	402	439	475	511	545	579	611	643	675	705	735
Type D Hospital	51	58	63	68	72	76	79	82	84	87	89	91
Type C Hospital	87	108	131	154	178	203	228	253	278	303	328	353
Type B Hospital	16	20	23	28	33	39	45	51	59	67	75	84
Type A Hospital	3	3	3	3	3	3	3	3	3	3	3	3
Total Health Facilities	848	910	972	1033	1095	1157	1219	1280	1342	1404	1466	1527
Overall Health facilities per 100,000 population	5.705	6.046	6.379	6.705	7.025	7.339	7.648	7.951	8.250	8.543	8.832	9.117
Primary care (Puskesmas) per 30,000 populati	1.395	1.438	1.479	1.518	1.556	1.592	1.627	1.661	1.693	1.724	1.754	1.783
Secondary care per 100,000 population	1.036	1.233	1.430	1.625	1.819	2.012	2.205	2.396	2.587	2.778	2.967	3.156
Type D hospital per 100,000 population	0.346	0.385	0.416	0.441	0.462	0.479	0.494	0.507	0.518	0.528	0.537	0.545
Type C Hospital per 100,000 population	0.582	0.719	0.859	1.002	1.145	1.288	1.430	1.570	1.708	1.844	1.978	2.110
Type B hospital per 100,000 population	0.108	0.130	0.154	0.182	0.212	0.245	0.281	0.320	0.361	0.406	0.452	0.502
Tertiary care per 100,000 population	0.020	0.020	0.020	0.019	0.019	0.019	0.019	0.019	0.018	0.018	0.018	0.018

REGION 3 - BALI AND THE NUSA TENGGARA ISLANDS												
STAFF TYPE	Year 2019	Year 2020	Year 2021	Year 2022	Year 2023	Year 2024	Year 2025	Year 2026	Year 2027	Year 2028	Year 2029	Year 2030
General Practitioner	1976	2235	2500	2769	3044	3324	3608	3897	4189	4486	4787	5093
Nurse	15999	18624	21380	24261	27264	30384	33618	36965	40422	43988	47660	51438
Paediatrician	301	364	431	501	573	648	725	805	887	971	1058	1146
Obstetrician and Gynaecologist	301	364	431	501	573	648	725	805	887	971	1058	1146
Internist	301	364	431	501	573	648	725	805	887	971	1058	1146
General Surgeon	301	364	431	501	573	648	725	805	887	971	1058	1146
Anesthesiologist	201	240	280	321	365	409	456	504	553	605	657	712
Radiologist	179	214	250	287	326	365	405	446	489	532	576	622
Clinical Pathologist	179	214	250	287	326	365	405	446	489	532	576	622
Anatomical Pathologist	160	192	224	256	290	323	357	392	427	462	498	535
Surgical Oncologist	22	26	29	34	39	45	51	57	65	73	81	90
Medical Oncologist	19	23	26	31	36	42	48	54	62	70	78	87
Paediatric Medical Oncologist	19	23	26	31	36	42	48	54	62	70	78	87
Gynecologic Oncologist	22	26	29	34	39	45	51	57	65	73	81	90
ENT Oncologist	19	23	26	31	36	42	48	54	62	70	78	87
Urologic Oncologist	19	23	26	31	36	42	48	54	62	70	78	87
Pulmonologic Oncologist	19	23	26	31	36	42	48	54	62	70	78	87
Radiation Oncologist	19	23	26	31	36	42	48	54	62	70	78	87
Medical Physicist	19	23	26	31	36	42	48	54	62	70	78	87
Radiation Therapy Technologist	19	23	26	31	36	42	48	54	62	70	78	87
TOTAL	20093	23407	26879	30502	34272	38183	42234	46421	50741	55193	59774	64483

Appendix 7. Forecast of Healthcare Facilities and HRH-related Oncology in the Kalimantan Region

REGION 4 - KALIMANTAN ISLAND												
Projected Population	16,491,700	16,769,700	17,042,800	17,311,000	17,573,800	17,831,100	18,082,600	18,328,700	18,570,200	18,806,500	19,037,900	19,264,000
HEALTH FACILITY/YEAR	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Outpatient Puskesmas	392	367	345	324	305	288	272	258	245	233	223	213
Inpatient Puskesmas	533	612	688	760	830	896	960	1021	1080	1136	1191	1243
Type D Hospital	53	64	72	80	86	92	97	101	106	109	113	117
Type C Hospital	110	138	169	203	238	275	314	353	394	435	477	520
Type B Hospital	22	25	27	31	34	38	43	48	53	59	66	73
Type A Hospital	3	3	3	3	3	3	3	4	4	4	4	4
Total Health Facilities	1113	1209	1305	1401	1497	1593	1689	1785	1881	1977	2073	2169
Overall Health facilities per 100,000 population	6.749	7.209	7.657	8.093	8.518	8.934	9.340	9.739	10.129	10.512	10.889	11.259
Primary care (Puskesmas) per 30,000 population	1.683	1.752	1.818	1.879	1.937	1.992	2.044	2.093	2.140	2.185	2.227	2.268
Secondary care per 100,000 population	1.122	1.349	1.579	1.810	2.042	2.274	2.508	2.741	2.976	3.211	3.446	3.681
Type D hospital per 100,000 population	0.319	0.379	0.425	0.461	0.490	0.515	0.535	0.553	0.568	0.582	0.594	0.606
Type C Hospital per 100,000 population	0.668	0.824	0.993	1.172	1.356	1.544	1.735	1.927	2.120	2.313	2.506	2.698
Type B hospital per 100,000 population	0.135	0.146	0.161	0.177	0.195	0.215	0.237	0.261	0.287	0.315	0.346	0.378
Tertiary care per 100,000 population	0.018	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019

REGION 4 - KALIMANTAN ISLAND												
STAFF TYPE	Year 2019	Year 2020	Year 2021	Year 2022	Year 2023	Year 2024	Year 2025	Year 2026	Year 2027	Year 2028	Year 2029	Year 2030
General Practitioner	2588	2960	3340	3728	4123	4524	4932	5346	5765	6190	6621	7056
Nurse	20540	23816	27271	30899	34687	38626	42709	46932	51290	55781	60403	65153
Paediatrician	374	451	534	622	714	810	910	1014	1121	1231	1345	1462
Obstetrician and Gynaecologist	374	451	534	622	714	810	910	1014	1121	1231	1345	1462
Internist	374	451	534	622	714	810	910	1014	1121	1231	1345	1462
General Surgeon	374	451	534	622	714	810	910	1014	1121	1231	1345	1462
Anesthesiologist	245	292	341	391	444	500	557	616	677	740	806	873
Radiologist	216	261	306	354	403	454	507	561	617	674	733	793
Clinical Pathologist	216	261	306	354	403	454	507	561	617	674	733	793
Anatomical Pathologist	191	233	276	320	366	412	460	510	560	611	663	717
Surgical Oncologist	28	31	34	37	41	45	50	55	61	67	73	80
Medical Oncologist	25	28	31	34	38	42	46	51	57	63	69	76
Paediatric Medical Oncologist	25	28	31	34	38	42	46	51	57	63	69	76
Gynecologic Oncologist	28	31	34	37	41	45	50	55	61	67	73	80
ENT Oncologist	25	28	31	34	38	42	46	51	57	63	69	76
Urologic Oncologist	25	28	31	34	38	42	46	51	57	63	69	76
Pulmonologic Oncologist	25	28	31	34	38	42	46	51	57	63	69	76
Radiation Oncologist	25	28	31	34	38	42	46	51	57	63	69	76
Medical Physicist	25	28	31	34	38	42	46	51	57	63	69	76
Radiation Therapy Technologist	25	28	31	34	38	42	46	51	57	63	69	76
TOTAL	25750	29910	34289	38879	43665	48635	53782	59101	64585	70232	76040	82004

Appendix 8. Forecast of Healthcare Facilities and HRH-related Oncology in the Sulawesi Region

REGION 5 - SULAWESI ISLAND												
Projected Population	19,699,800	19,934,000	20,163,100	20,386,500	20,603,900	20,815,000	21,019,800	21,218,300	21,411,200	21,598,100	21,779,100	21,953,500
HEALTH FACILITY/YEAR	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Outpatient Puskesmas	680	668	657	646	635	625	615	606	597	588	580	572
Inpatient Puskesmas	658	711	762	813	861	909	955	1000	1044	1086	1128	1168
Type D Hospital	75	87	96	102	107	111	115	118	121	123	126	128
Type C Hospital	144	188	235	285	337	390	444	499	554	609	665	721
Type B Hospital	36	39	43	47	52	57	63	70	77	85	94	104
Type A Hospital	3	3	3	3	3	3	4	4	4	4	4	4
Total Health Facilities	1593	1693	1793	1893	1993	2093	2192	2292	2392	2492	2592	2692
Overall Health facilities per 100,000 population	8.086	8.491	8.890	9.283	9.671	10.053	10.431	10.804	11.174	11.540	11.903	12.264
Primary care (Puskesmas) per 30,000 populati	2.038	2.075	2.112	2.146	2.179	2.211	2.241	2.270	2.299	2.326	2.352	2.378
Secondary care per 100,000 population	1.294	1.573	1.852	2.130	2.408	2.684	2.961	3.236	3.512	3.787	4.063	4.338
Type D hospital per 100,000 population	0.378	0.436	0.474	0.501	0.521	0.535	0.547	0.556	0.564	0.571	0.578	0.584
Type C Hospital per 100,000 population	0.733	0.942	1.166	1.399	1.636	1.874	2.113	2.350	2.586	2.820	3.053	3.283
Type B hospital per 100,000 population	0.183	0.195	0.211	0.230	0.251	0.275	0.301	0.330	0.362	0.396	0.432	0.471
Tertiary care per 100,000 population	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017

REGION 5 - SULAWESI ISLAND												
STAFF TYPE	Year 2019	Year 2020	Year 2021	Year 2022	Year 2023	Year 2024	Year 2025	Year 2026	Year 2027	Year 2028	Year 2029	Year 2030
General Practitioner	3558	3994	4442	4901	5368	5843	6324	6813	7307	7807	8313	8824
Nurse	28772	33108	37675	42448	47403	52524	57800	63226	68795	74505	80353	86338
Paediatrician	520	632	750	874	1002	1134	1270	1410	1552	1698	1847	1998
Obstetrician and Gynaecologist	520	632	750	874	1002	1134	1270	1410	1552	1698	1847	1998
Internist	520	632	750	874	1002	1134	1270	1410	1552	1698	1847	1998
General Surgeon	520	632	750	874	1002	1134	1270	1410	1552	1698	1847	1998
Anesthesiologist	342	408	476	545	617	691	766	844	925	1007	1091	1178
Radiologist	300	363	426	491	558	626	696	767	840	914	990	1067
Clinical Pathologist	300	363	426	491	558	626	696	767	840	914	990	1067
Anatomical Pathologist	261	320	380	441	503	566	629	694	759	825	892	960
Surgical Oncologist	42	46	49	54	59	64	70	77	85	93	101	111
Medical Oncologist	39	42	46	50	55	61	67	74	81	89	98	107
Paediatric Medical Oncologist	39	42	46	50	55	61	67	74	81	89	98	107
Gynecologic Oncologist	42	46	49	54	59	64	70	77	85	93	101	111
ENT Oncologist	39	42	46	50	55	61	67	74	81	89	98	107
Urologic Oncologist	39	42	46	50	55	61	67	74	81	89	98	107
Pulmonologic Oncologist	39	42	46	50	55	61	67	74	81	89	98	107
Radiation Oncologist	39	42	46	50	55	61	67	74	81	89	98	107
Medical Physicist	39	42	46	50	55	61	67	74	81	89	98	107
Radiation Therapy Technologist	39	42	46	50	55	61	67	74	81	89	98	107
TOTAL	36009	41512	47294	53324	59575	66027	72670	79493	86492	93662	101000	108505

Appendix 9. Forecast of Healthcare Facilities and HRH-related Oncology in the Maluku Region

REGION 6 - MALUKU ISLAND												
Projected Population	3,058,700	3,110,700	3,162,300	3,213,500	3,264,200	3,314,200	3,363,700	3,412,600	3,461,100	3,509,200	3,556,600	3,603,600
HEALTH FACILITY/YEAR	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Outpatient Puskesmas	122	111	102	94	87	82	77	73	69	66	64	62
Inpatient Puskesmas	234	284	330	373	414	453	489	524	557	588	618	646
Type D Hospital	33	43	54	66	79	93	107	122	138	154	170	187
Type C Hospital	13	15	18	21	24	28	32	37	43	48	55	61
Type B Hospital	5	6	7	7	8	9	10	11	12	14	15	17
Type A Hospital	0	0	0	0	0	0	0	0	0	0	0	0
Total Health Facilities	407	459	510	562	613	665	716	768	819	871	922	974
Overall Health facilities per 100,000 population	13.306	14.739	16.128	17.473	18.779	20.050	21.286	22.490	23.663	24.806	25.924	27.015
Primary care (Puskesmas) per 30,000 populati	3.492	3.807	4.097	4.364	4.611	4.840	5.051	5.247	5.428	5.596	5.752	5.896
Secondary care per 100,000 population	1.667	2.050	2.471	2.926	3.409	3.918	4.450	5.001	5.570	6.154	6.751	7.361
Type D hospital per 100,000 population	1.066	1.368	1.697	2.048	2.416	2.797	3.187	3.583	3.982	4.383	4.784	5.182
Type C Hospital per 100,000 population	0.427	0.492	0.566	0.650	0.744	0.849	0.965	1.091	1.229	1.377	1.535	1.703
Type B hospital per 100,000 population	0.173	0.190	0.208	0.227	0.249	0.272	0.298	0.327	0.359	0.394	0.432	0.475
Tertiary care per 100,000 population	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

REGION 6 - MALUKU ISLAND												
STAFF TYPE	Year 2019	Year 2020	Year 2021	Year 2022	Year 2023	Year 2024	Year 2025	Year 2026	Year 2027	Year 2028	Year 2029	Year 2030
General Practitioner	852	1000	1150	1303	1458	1617	1780	1945	2114	2286	2462	2641
Nurse	5495	6436	7434	8490	9606	10781	12018	13319	14683	16114	17611	19177
Paediatrician	80	97	116	137	160	185	212	241	273	306	341	378
Obstetrician and Gynaecologist	80	97	116	137	160	185	212	241	273	306	341	378
Internist	80	97	116	137	160	185	212	241	273	306	341	378
General Surgeon	80	97	116	137	160	185	212	241	273	306	341	378
Anesthesiologist	62	76	91	109	128	148	170	193	218	244	271	299
Radiologist	56	70	85	101	119	139	160	182	205	230	255	282
Clinical Pathologist	56	70	85	101	119	139	160	182	205	230	255	282
Anatomical Pathologist	51	64	78	94	111	130	150	171	193	216	240	265
Surgical Oncologist	5	6	7	7	8	9	10	11	12	14	15	17
Medical Oncologist	5	6	7	7	8	9	10	11	12	14	15	17
Paediatric Medical Oncologist	5	6	7	7	8	9	10	11	12	14	15	17
Gynecologic Oncologist	5	6	7	7	8	9	10	11	12	14	15	17
ENT Oncologist	5	6	7	7	8	9	10	11	12	14	15	17
Urologic Oncologist	5	6	7	7	8	9	10	11	12	14	15	17
Pulmonologic Oncologist	5	6	7	7	8	9	10	11	12	14	15	17
Radiation Oncologist	5	6	7	7	8	9	10	11	12	14	15	17
Medical Physicist	5	6	7	7	8	9	10	11	12	14	15	17
Radiation Therapy Technologist	5	6	7	7	8	9	10	11	12	14	15	17
TOTAL	6946	8161	9452	10819	12263	13785	15386	17068	18832	20680	22612	24630

Appendix 10. Forecast of Healthcare Facilities and HRH-related Oncology in the Papua Region

REGION 7 - PAPUA ISLAND													
Projected Population	4,338,900	4,407,200	4,494,800	4,571,400	4,646,800	4,721,000	4,793,900	4,865,500	4,936,000	5,005,200	5,073,100	5,139,500	
HEALTH FACILITY/YEAR	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Outpatient Puskesmas	159	140	125	112	102	93	86	80	75	70	67	64	
Inpatient Puskesmas	420	504	582	655	722	785	843	898	950	999	1045	1089	
Type D Hospital	38	59	81	105	130	155	180	206	231	257	282	307	
Type C Hospital	23	28	34	43	54	66	81	98	118	139	163	189	
Type B Hospital	2	2	2	2	2	2	2	2	2	2	2	2	
Type A Hospital	0	0	0	0	0	0	0	0	0	0	0	0	
Total Health Facilities	642	734	826	917	1009	1101	1193	1284	1376	1468	1560	1651	
Overall Health facilities per 100,000 population	14.796	16.649	18.366	20.065	21.714	23.316	24.875	26.395	27.877	29.325	30.741	32.129	
Primary care (Puskesmas) per 30,000 populati	4.003	4.390	4.722	5.033	5.317	5.576	5.812	6.029	6.227	6.410	6.577	6.731	
Secondary care per 100,000 population	1.452	2.015	2.625	3.287	3.991	4.731	5.501	6.298	7.119	7.959	8.818	9.693	
Type D hospital per 100,000 population	0.870	1.334	1.810	2.299	2.790	3.277	3.758	4.228	4.685	5.128	5.555	5.966	
Type C Hospital per 100,000 population	0.528	0.629	0.763	0.938	1.152	1.404	1.695	2.023	2.387	2.785	3.218	3.682	
Type B hospital per 100,000 population	0.053	0.053	0.052	0.051	0.050	0.049	0.048	0.048	0.047	0.046	0.046	0.045	
Tertiary care per 100,000 population	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

REGION 7 - PAPUA ISLAND												
STAFF TYPE	Year 2019	Year 2020	Year 2021	Year 2022	Year 2023	Year 2024	Year 2025	Year 2026	Year 2027	Year 2028	Year 2029	Year 2030
General Practitioner	1311	1574	1844	2122	2408	2702	3003	3313	3630	3955	4287	4627
Nurse	7400	8997	10732	12603	14610	16752	19025	21429	23961	26617	29396	32293
Paediatrician	93	123	159	200	246	297	352	412	476	545	618	694
Obstetrician and Gynaecologist	93	123	159	200	246	297	352	412	476	545	618	694
Internist	93	123	159	200	246	297	352	412	476	545	618	694
General Surgeon	93	123	159	200	246	297	352	412	476	545	618	694
Anesthesiologist	68	93	123	155	190	228	268	311	356	403	452	503
Radiologist	65	91	120	153	188	226	266	309	354	401	450	500
Clinical Pathologist	65	91	120	153	188	226	266	309	354	401	450	500
Anatomical Pathologist	63	89	118	150	185	223	264	306	351	398	447	498
Surgical Oncologist	2	2	2	2	2	2	2	2	2	2	2	2
Medical Oncologist	2	2	2	2	2	2	2	2	2	2	2	2
Paediatric Medical Oncologist	2	2	2	2	2	2	2	2	2	2	2	2
Gynecologic Oncologist	2	2	2	2	2	2	2	2	2	2	2	2
ENT Oncologist	2	2	2	2	2	2	2	2	2	2	2	2
Urologic Oncologist	2	2	2	2	2	2	2	2	2	2	2	2
Pulmonologic Oncologist	2	2	2	2	2	2	2	2	2	2	2	2
Radiation Oncologist	2	2	2	2	2	2	2	2	2	2	2	2
Medical Physicist	2	2	2	2	2	2	2	2	2	2	2	2
Radiation Therapy Technologist	2	2	2	2	2	2	2	2	2	2	2	2
TOTAL	9366	11453	13717	16159	18776	21565	24524	27647	30933	34377	37975	41722

Appendix 11. Annual Incremental Costs Estimation 2020 - 2030

STAFF TYPE	Current Expenditure (2019)	Expenditure for Projected HRH Requirement (2019)	Expenditure Gap (2019)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
General Practitioner	£549.03	£406.74	£142.30	£113.46	£134.65	£159.10	£187.19	£219.44	£256.43	£298.79	£347.27	£402.69	£465.96	£538.13
Nurse	£1,521.56	£1,369.48	£152.08	£396.91	£482.72	£583.48	£700.83	£837.31	£995.77	£1,179.45	£1,392.01	£1,637.60	£1,920.91	£2,247.26
Paediatrician	£65.95	£114.55	£48.60	£38.05	£47.06	£57.55	£69.72	£83.85	£100.23	£119.17	£141.06	£166.31	£195.38	£228.82
Obstetrician and gynaecologist	£148.95	£217.65	£68.69	£72.29	£89.42	£109.34	£132.47	£159.32	£190.43	£226.43	£268.01	£315.98	£371.22	£434.76
Internist	£82.35	£114.55	£32.20	£38.05	£47.06	£57.55	£69.72	£83.85	£100.23	£119.17	£141.06	£166.31	£195.38	£228.82
General Surgeon	£88.36	£217.65	£129.29	£72.29	£89.42	£109.34	£132.47	£159.32	£190.43	£226.43	£268.01	£315.98	£371.22	£434.76
Anesthesiologist	£91.10	£165.88	£74.78	£53.64	£64.91	£78.40	£94.18	£112.58	£134.00	£158.87	£187.69	£221.02	£259.51	£303.88
Radiologist	£47.21	£111.51	£64.29	£37.78	£45.73	£55.11	£66.01	£78.65	£93.29	£110.21	£129.72	£152.18	£178.01	£207.66
Clinical Pathologist	£30.77	£86.97	£56.20	£29.47	£35.67	£42.98	£51.49	£61.35	£72.77	£85.96	£101.18	£118.70	£138.85	£161.98
Anatomical Pathologist	£11.90	£74.41	£62.50	£26.52	£32.02	£38.46	£45.88	£54.44	£64.27	£75.56	£88.49	£103.30	£120.22	£139.55
Surgical Oncologist	£6.86	£18.81	£11.96	£4.29	£5.18	£6.39	£7.87	£9.67	£11.85	£14.47	£17.59	£21.31	£25.72	£30.93
Medical Oncologist	£1.04	£5.32	£4.28	£1.25	£1.54	£1.92	£2.37	£2.92	£3.60	£4.40	£5.37	£6.52	£7.88	£9.49
Paediatric Medical Oncologist	£1.19	£11.76	£10.58	£2.76	£3.42	£4.24	£5.24	£6.47	£7.95	£9.74	£11.87	£14.41	£17.43	£20.99
Gynecologic Oncologist	£3.85	£20.62	£16.77	£4.71	£5.68	£7.00	£8.63	£10.60	£12.99	£15.86	£19.29	£23.36	£28.20	£33.91
ENT Oncologist	£1.69	£18.69	£17.00	£4.38	£5.43	£6.73	£8.33	£10.28	£12.64	£15.47	£18.87	£22.90	£27.70	£33.36
Urologic Oncologist	£0.48	£18.37	£17.89	£4.31	£5.34	£6.62	£8.19	£10.10	£12.42	£15.21	£18.54	£22.51	£27.22	£32.78
Pulmonary Oncologist	£0.86	£14.18	£13.32	£3.32	£4.12	£5.11	£6.32	£7.80	£9.59	£11.74	£14.31	£17.38	£21.01	£25.31
Radiation Oncologist	£5.35	£27.07	£21.73	£6.35	£7.86	£9.75	£12.07	£14.89	£18.31	£22.41	£27.32	£33.17	£40.11	£48.31
Medical Physicist	£3.29	£3.71	£0.41	£0.87	£1.08	£1.33	£1.65	£2.04	£2.51	£3.07	£3.74	£4.54	£5.49	£6.61
Radiation Therapy Technologist	£1.86	£3.05	£1.19	£0.71	£0.88	£1.10	£1.36	£1.68	£2.06	£2.52	£3.07	£3.73	£4.51	£5.43
TOTAL	£2,663.66	£3,020.95	£357.29	£911.41	£1,109.21	£1,341.47	£1,612.00	£1,926.58	£2,291.75	£2,714.93	£3,204.48	£3,769.90	£4,421.93	£5,172.72