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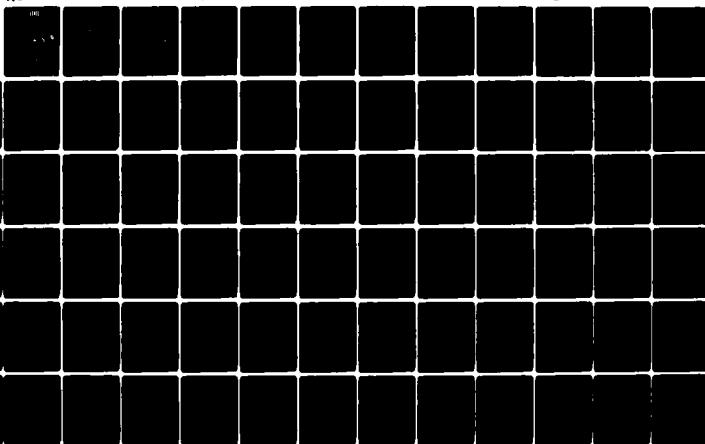
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**MOBILIZATION MANPOWER MODEL
FINAL REPORT**

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**Support Forces, Manpower and Logistics Branch
Systems Analysis Division
Office of the Chief of Naval Operations
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ASC R-127

Final Report

MOBILIZATION MANPOWER MODEL

May 1980

Fred J. Breaux
Henry L. Eskew
Beatrice M. Smith

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Prepared for
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by
Administrative Sciences Corporation
5205 Leesburg Pike - Suite 1313
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I. INTRODUCTION

Administrative Sciences Corporation (ASC), under Contract No. N00014-79-C-0527 with the Office of Naval Research, has completed development of an automated model which estimates time-phased Naval mobilization manpower supply and demand. Its purpose is to provide an improved capability for addressing mobilization issues which arise in connection with the CPAM process.

The model is programmed in SUPER FORTRAN, a superset of H-Level FORTRAN IV, for operation in a time-shared mode on a Xerox Data System 940. Documentation of the nine computer programs which make up the model is contained in an appendix to this report. The report's primary objective is to provide a non-technical description of the model and its capabilities.

Following this Introduction, Section II describes the accounting structure and presents a brief overview of the model. Section III describes the supply sector and Section IV the demand sector. Finally, Section V discusses a wide range of potential applications of the model.

II. ACCOUNTING STRUCTURE AND MODEL OVERVIEW

The model's basic measure of time is a ten-day increment. Events are initiated at Pre-M Day and proceed to M-Day, M+10, M+20, etc. Increments may be combined to accommodate scenarios prepared in, for example, thirty-day increments after M+90.

There is a supply sector and a demand sector. Within each is a trained and an untrained (trainee) component. Elements of trained supply, for officers and enlistees separately, are:

- . Initial Active Force
- . Selected Reserve
- . Other Inactives (Reserves and Retirees)
- . Training Output

Total supply, trained and untrained, consists of the above plus the trainee population.

Elements of trained demand, likewise for officers and enlistees, are:

- . Structure Billet Requirements
- . Non-structure Requirements (Transients and Students)
- . Casualty Replacement Demand

Total demand, trained and untrained, consists of the above plus the demand for trainees.

Outputs from the supply and demand sectors constitute inputs to a summary model which produces both tabular and graphic comparisons of aggregate supply and demand. Exhibit II-1 provides an example of the supply and demand summary tables

EXHIBIT II-1
EXAMPLE SUMMARY SUPPLY AND DEMAND TABLES

5/23/80 DEMORUN ENLISTED/OFFICERS

* CUMULATIVE-SUPPLY *

	PRE-M	M	M+10	M+20	M+30	M+40	M+50	M+60	M+70	M+80	M+90	M+120	M+150	M+180
TOTAL	536490	633890	662537	699554	755411	760011	765654	773811	780240	786769	793197	812583	832369	848169
TRAINED	511800	609548	636138	671028	725118	727308	730553	736818	739615	742666	745977	759745	776214	795691
INITIAL AF	511800	511800	511800	511800	511800	511800	511800	511800	511800	511800	511800	511800	511800	511800
SELECT RES	0	82200	82200	82200	82200	82200	82200	82200	82200	82200	82200	82200	82200	82200
OTHR INACT	0	13300	37800	70500	122500	122500	122500	125000	125000	125000	125000	125000	125000	125000
TRAIN OUTP	0	2248	4338	6528	8618	10808	14053	17818	20615	23666	26977	40745	57214	76691
TRAINEE	24690	24342	26399	28526	30293	32703	35101	36993	40625	44102	47220	52838	56155	52478

5/23/80 DEMORUN ENLISTED/OFFICERS

* CUMULATIVE-DEMAND *

	PRE-M	M	M+10	M+20	M+30	M+40	M+50	M+60	M+70	M+80	M+90	M+120	M+150	M+180
TOTAL	598310	807249	817111	860388	852892	830165	836036	829583	826545	825496	844582	841601	844991	839597
TRAINED	530589	725813	739812	790533	790356	776412	783058	778565	780086	781394	797363	788744	788836	787119
STRUCTURE	451189	642675	641648	681042	681026	664355	661190	650951	649340	647992	662540	657584	664591	661341
NON-STRUCT	79400	81475	94355	96570	83189	72668	72523	69140	64485	63942	63218	61062	58099	50545
CAS-REPLS	0	1663	3809	12921	26141	39389	49346	58474	66261	69459	71604	70117	71166	72632
TRAINEE	67720	81437	77299	69854	62536	53753	52978	51018	46460	44102	47220	52838	56155	52478

for officers and enlistees combined. Computations of manpower shortages and overages are illustrated in Exhibit II-2, and the same data are displayed in graphic form in Exhibit II-3. It should be emphasized that all model outputs appearing in the report are for illustrative purposes only; they should not be construed as representing any official estimates of wartime manpower supply and demand.

EXHIBIT II-2
EXAMPLE COMPUTATION OF SHORTAGES AND OVERAGES

5/23/80	DEMORUN	ENLISTED/OFFICERS												
* CUMULATIVE-SUMMARY *														
	PRE-M	M	M+10	M+20	M+30	M+40	M+50	M+60	M+70	M+80	M+90	M+120	M+150	M+180
SUPPLY	536490	633890	662537	699554	755411	760011	765654	773811	780240	786769	793197	812583	832369	848169
TRAINED	511800	609548	636138	671028	725118	727308	730553	736818	739615	742666	745977	759745	776214	795691
TRAINEE	24690	24342	26399	28526	30293	32703	35101	36993	40625	44102	47220	52838	56155	52478
DEMAND	598310	807249	817111	860388	852892	830165	836036	829583	826545	825496	844582	841601	844991	839597
TRAINED	530589	725813	739812	790533	790356	776412	783058	778565	780086	781394	797363	788764	788836	787119
TRAINEE	67720	81437	77299	69854	62536	53753	52978	51018	46460	44102	47220	52838	56155	52478
SHORT(OVER)														
TOTAL	-61820	-173359	-154574	-160833	-97481	-70154	-70382	-55771	-46305	-38727	-51385	-29019	-12622	8572
TRAINED	-18789	-116264	-103673	-119505	-65238	-49104	-52505	-41746	-40471	-38727	-51385	-29019	-12622	8572
TRAINEE	-43030	-57095	-50900	-41328	-32243	-21050	-17877	-14025	-5835	0	0	0	0	0

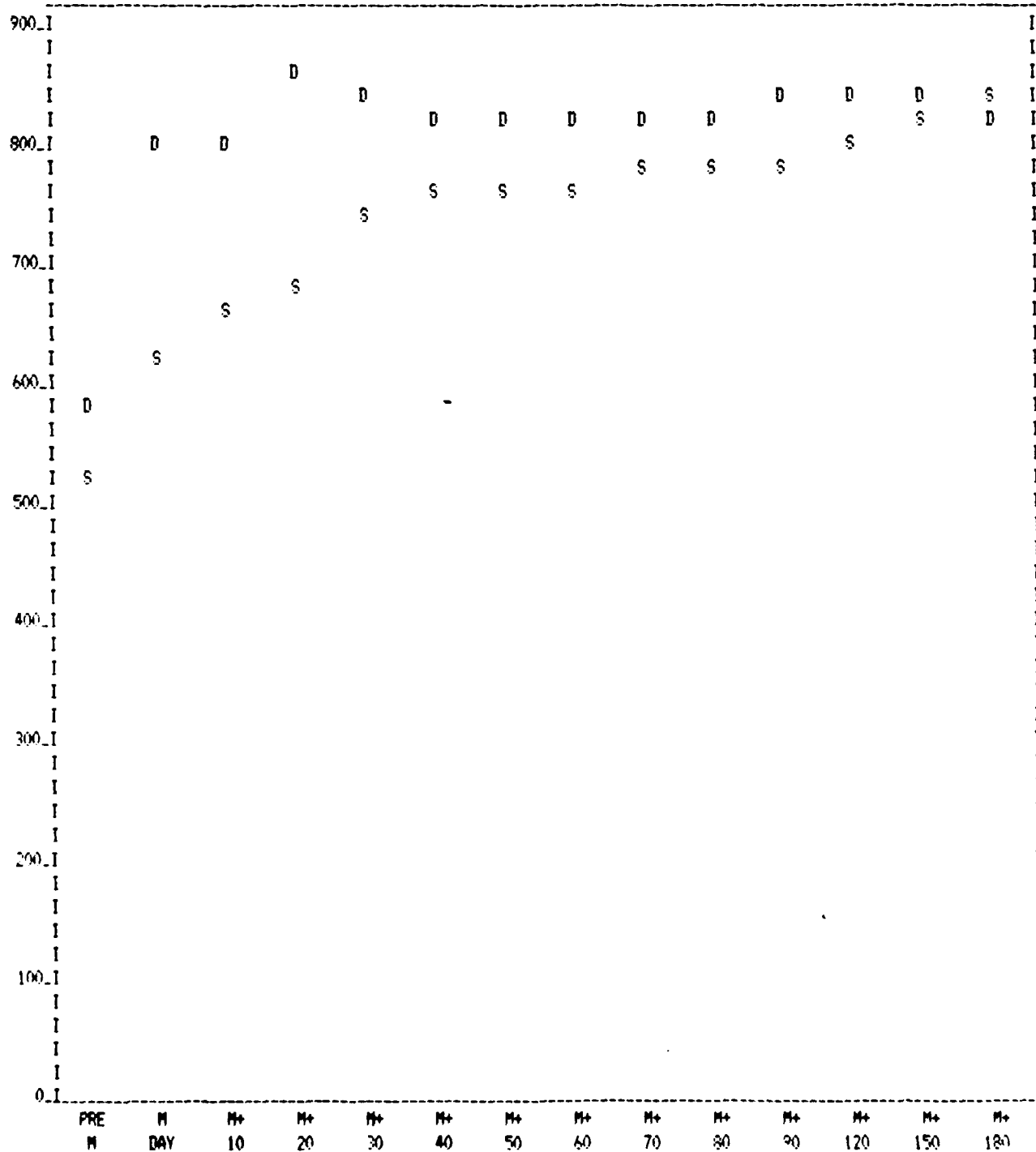
EXHIBIT II-3

EXAMPLE GRAPHIC COMPARISON OF AGGREGATE SUPPLY AND DEMAND

5/23/80 DEMORUN
ENLISTED/OFFICERS

CUMULATIVE DEMAND AND SUPPLY COMPARISONS

TOTAL

MANPOWER
(THOUS)

III. SUPPLY SECTOR

Exhibit III-1 is a flow chart which identifies and describes the order of computations that result in the supply sector output. These data are generated prior to initiating demand computations since they are required as input to the casualty replacement submodel, one of two major submodels in the demand sector.

Training Output

As the exhibit indicates, supply computations begin with estimation of output from the training establishment. For officers, those numbers are developed outside the model and treated as "thruputs." For enlistees, there is a training submodel. Inputs to the submodel are:

- . Length of Pre-M boot camp (wks)
- . Pre-M boot input per week
- . Pre-M population in "A" schools
- . Pre-M population in boot camps
- . Recruit attrition rate (%)
- . Percent of Post-M boot output assigned to "A" schools
- . Length of Post-M boot camp (wks)
- . Length of Post-M "A" schools (wks)
- . Capacity of boot camps
- . Number of Post-M weeks to be processed
- . Post-M boot input for each week

Example output is displayed in Exhibit III-2. Note that the output is expressed in weeks rather than ten-day increments. The submodel contains an algorithm which converts those data into the required ten-day format for use

EXHIBIT III-1
SUPPLY SECTOR FLOW CHART

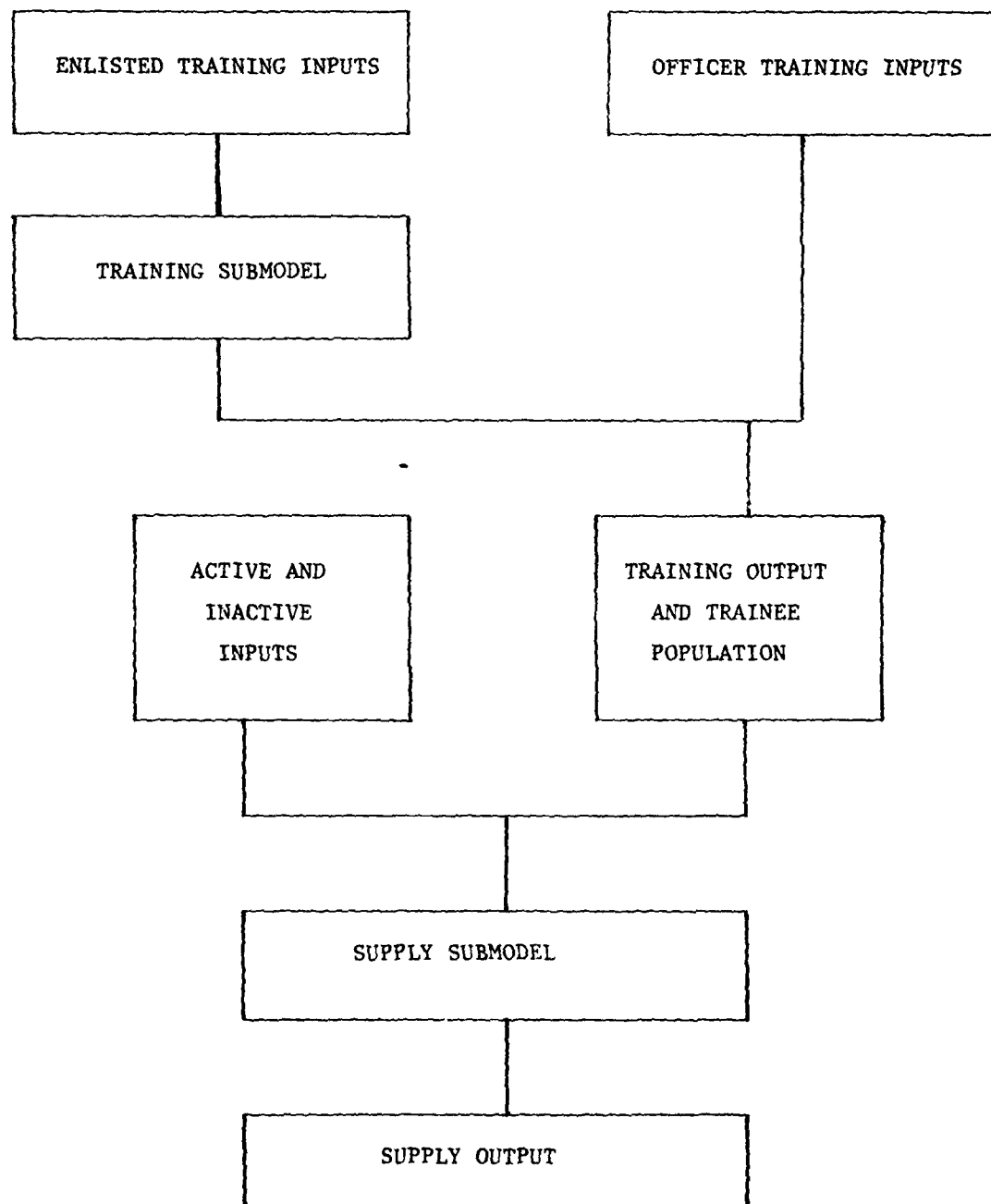


EXHIBIT III-2
EXAMPLE OUTPUT FROM ENLISTED TRAINING SUBMODEL

DEMO SUP					WORLD WIDE SUPPLY				ENLISTED			
TRAINING PROGRAM 30 WEEKS					5/23/80							
TIME (WKS)	BOOT INPT	BOOT ATT	BOOT OTPT	BOOT POP	TO FLT	TO A-SCH	A-SCH OTPT	A-SCH POP	TOT POP	TOT OTPT	CUM OTPT	
0	0	0	2926	13000	1170	1756	878	9642	22642	2048	2048	
1	2800	280	1463	14057	585	878	878	9642	23699	1463	3511	
2	3700	370	1463	15924	585	878	878	9642	25566	1463	4974	
3	3000	300	1463	17161	585	878	878	9642	26803	1463	6437	
4	3000	300	1463	18398	585	878	878	9642	28040	1463	7900	
5	3000	300	1463	19635	585	878	878	9642	29277	1463	9363	
6	4000	400	1463	21772	585	878	878	9642	31414	1463	10826	
7	4000	400	2520	22852	1008	1512	878	10276	33128	1886	12712	
8	4000	400	3330	23122	1332	1998	1756	10518	35640	3088	15800	
9	5000	500	2700	24922	1080	1620	878	11261	36183	1958	17757	
10	5000	500	2700	26722	1080	1620	878	12003	38725	1958	19715	
11	5000	500	2700	28522	1080	1620	878	12745	41267	1958	21673	
12	5000	500	3600	29422	1440	2160	878	14027	43449	2318	23991	
13	5000	500	3600	30322	1440	2160	878	15309	45631	2318	26309	
14	5000	500	3600	31222	1440	2160	878	16592	47814	2318	28626	
15	5000	500	4500	31222	1800	2700	1512	17780	49002	3312	31938	
16	5000	500	4500	31222	1800	2700	1998	18482	49704	3798	35736	
17	5000	500	4500	31222	1800	2700	1620	19562	50784	3420	39156	
18	5000	500	4500	31222	1800	2700	1620	20642	51864	3420	42576	
19	5000	500	4500	31222	1800	2700	1620	21722	52944	3420	45996	
20	5000	500	4500	31222	1800	2700	2160	22262	53484	3960	49956	
21	5000	500	4500	31222	1800	2700	2160	22802	54024	3960	53916	
22	5000	500	4500	31222	1800	2700	2160	23342	54564	3960	57876	
23	4000	400	4500	30322	1800	2700	2700	23342	53664	4500	62376	
24	4000	400	4500	29422	1800	2700	2700	23342	52764	4500	66876	
25	4000	400	4500	28522	1800	2700	2700	23342	51864	4500	71376	
26	3000	300	4500	26722	1800	2700	2700	23342	50064	4500	75876	
27	0	0	4500	22222	1800	2700	2700	23342	45564	4500	80376	
28	0	0	4500	17722	1800	2700	2700	23342	41064	4500	84876	
29	0	0	3600	14122	1440	2160	2700	22802	36924	4140	89016	
30	0	0	3600	10522	1440	2160	2700	22262	32784	4140	93156	

elsewhere in the model. Note also that the submodel computes the size of the trainee population at each time interval. This is the source of data for the untrained component of total supply.

Other Elements of Supply

The initial active force is a single number - actually two numbers, one for officers and the other for enlistees - taken from the FYDP for the time frame in question. The same is true of the Selected Reserve. Input data pertaining to other inactive personnel are based on estimates of the sizes of those populations and the time-phased yields likely to be produced by various management actions. Output from the full supply submodel is illustrated in Exhibit III-3.

EXHIBIT III-3

EXAMPLE OUTPUT FROM SUPPLY SUBMODEL

	5/23/80	DEMOSUP		ENLISTED		WORLD WIDE SUPPLY									
		PRE-M	M	M+10	M+20	M+30	M+40	M+50	M+60	M+70	M+80	M+90	M+120	M+150	M+180
SUPPLY	456690	531290	555737	588654	637211	641711	646854	652511	658940	665369	671797	691083	710369	725669	
TR POP	432000	508648	531238	562028	608818	610908	613653	617418	620215	623166	626477	640145	656114	675091	
ACT F	432000	432000	432000	432000	432000	432000	432000	432000	432000	432000	432000	432000	432000	432000	
SEL R	0	65600	65600	65600	65600	65600	65600	65600	65600	65600	65600	65600	65600	65600	
OTH I	0	9000	29500	58200	102900	102900	102900	102900	102900	102900	102900	102900	102900	102900	
T OUT	0	2048	4138	6228	8318	10408	13153	16918	19715	22666	25977	39645	55614	74591	
TRAINEE	24690	22642	24499	26626	28393	30803	33201	35093	38725	42202	45320	50938	54255	50578	

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IV. DEMAND SECTOR

Overview

Exhibit IV-1 identifies and describes the order of computations which ultimately result in the detailed demand sector output. The first set comprises those computations associated with casualty estimation. Outputs from the casualty submodel become inputs to a second submodel which estimates requirements for physicians, nurses and hospital corpsmen both within and outside theaters of operations. Outputs from this submodel are combined with the casualty output and with externally generated estimates of non-theater demand to serve as inputs to the overall demand submodel. The following paragraphs provide amplification of the principal components of the demand sector.

Theater Structure, Casualty Replacement and Medical Staff Demand

As Exhibit IV-1 indicates, one of the inputs to the casualty submodel is the size of exposed populations (officers and enlistees) for each theater of operations being examined. On the assumption that all theater structure billets can be and are filled from available supply (shortages being absorbed out-of-theater), theater exposed populations and theater structure demand are identical. Determination of those requirements is a very complicated and time-consuming process which involves the following general steps:

- (1) Defining the size, shape, readiness condition and deployment posture of the Navy and Marine Corps at the time immediately prior to beginning of the scenario
- (2) Organizing ships and aircraft into notional task forces in accordance with availability times, locations and scenario applications

EXHIBIT IV-1
DEMAND SECTOR FLOW CHART

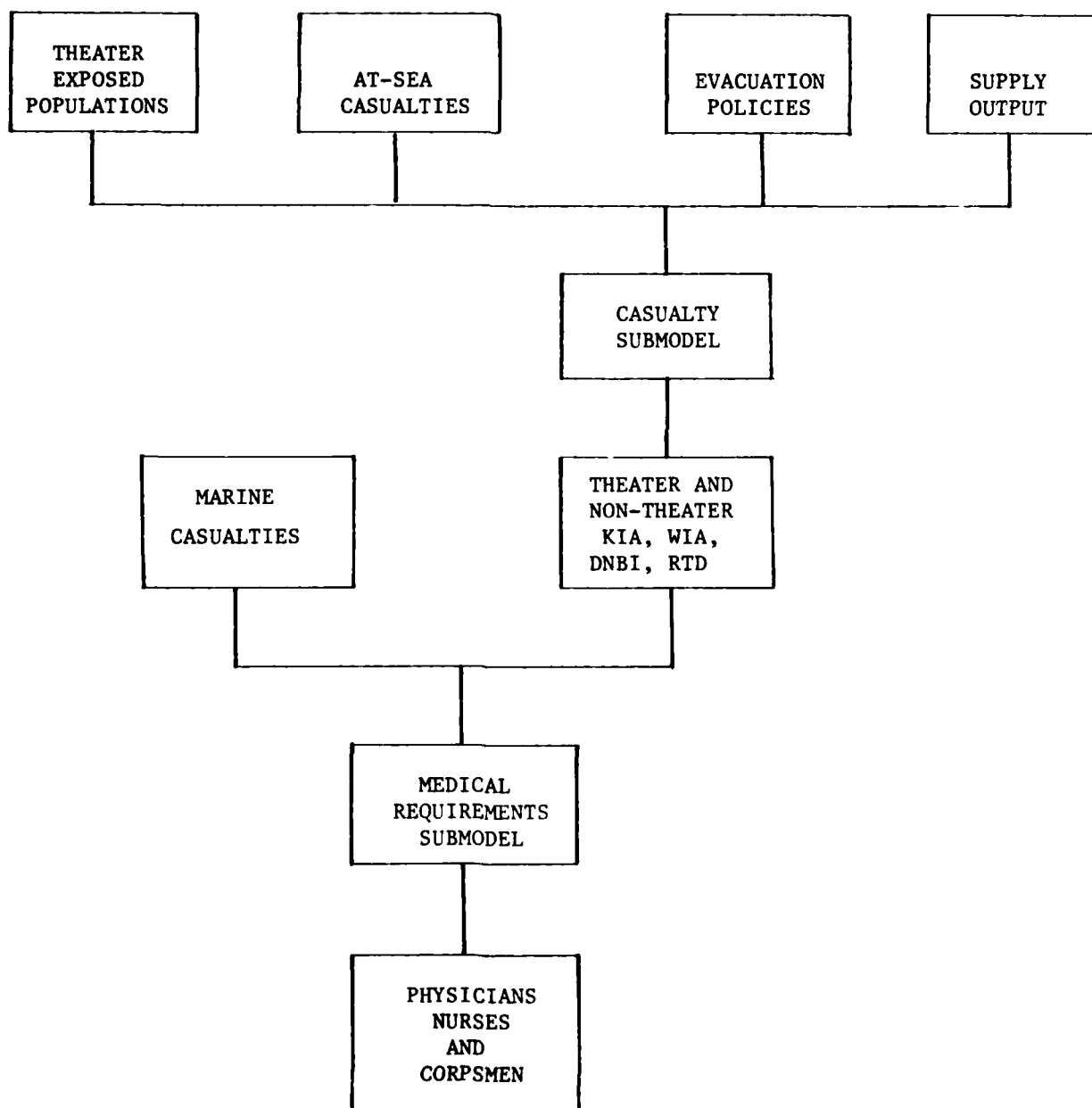
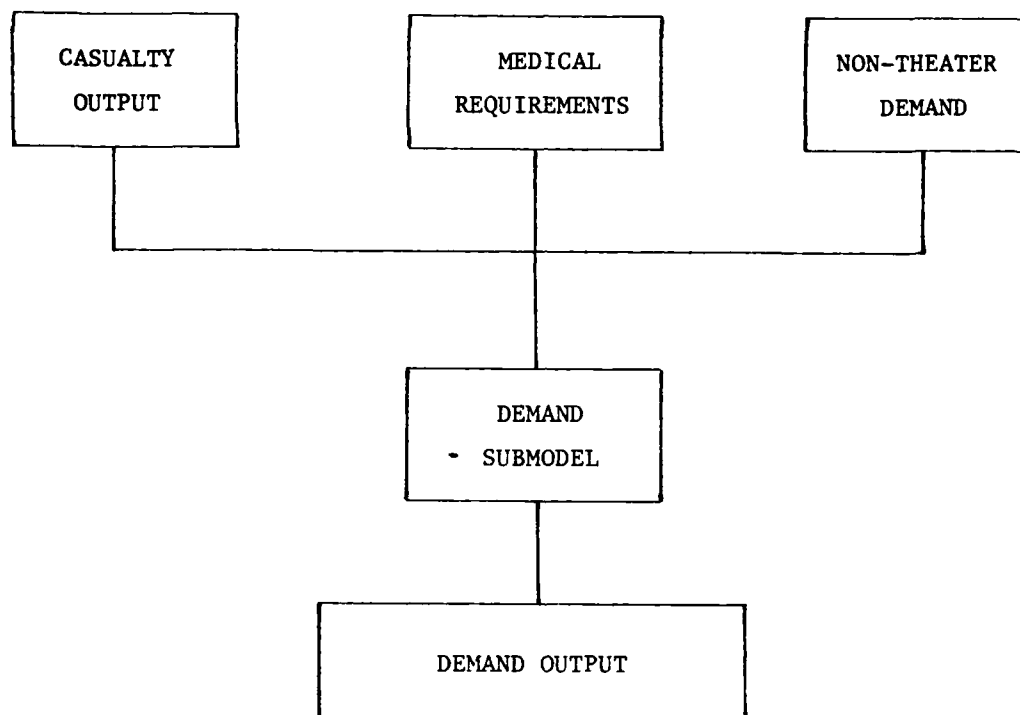


EXHIBIT IV-1 (cont'd.)



- (3) Meshing all force units, their ancillary attachments and direct support units into a "time line" and into geographic locations for a period beginning with pre-event status and running beyond expiration of scenario time
- (4) Determining indirect support requirements necessary to support the scenario, and determining the political or policy billets that would exist either for national purposes or in connection with internal DOD policies

Since much of the above is judgmental in nature and does not lend itself to automation, both theater and non-theater structure demand are computed outside the model and thruput. Since those requirements are developed twice a year (by OP-11) in connection with the OSD-directed Wartime Manpower Program System (WARMAPS), a source for "base case" inputs is readily available.

Casualties estimated to occur at sea in connection with aircraft losses, ship sinkings and major battle damage are likewise treated as thruputs. Output from the supply submodel is required as an input to the casualty submodel since non-theater exposed populations are determined by subtracting theater structure demand (the same as theater exposed populations) from total supply. Appendix A provides a detailed discussion of the casualty submodel. Exhibit IV-2 provides an example of its output applicable to theater casualties and replacement demand, and Exhibit IV-3 illustrates non-theater demand.

In connection with any mobilization manpower analysis, considerable interest centers on the magnitude and location of medical staff requirements - physicians, nurses and corpsmen. Because of that, and because computation of those requirements is ideally suited for automation, a medical requirements submodel was developed as part of the demand sector.

EXHIBIT IV-2
EXAMPLE CASUALTY SUBMODEL OUTPUT, THEATERS

5/23/80	DENORUN	TOTAL THEATER										OFF&ENL			
	PRE-M	M	M+10	M+20	M+30	M+40	M+50	M+60	M+70	M+80	M+90	M+100	M+110	M+120	
POP	122360	142499	218752	293248	299963	315968	366946	375878	378420	382096	387817	387817	390245	398728	
ADJ-POP	122360	142499	218752	293248	299963	315968	366946	375878	378420	382096	387817	387817	390245	398728	
BTL CAS	0	0	0	9265	5474	4302	8484	3543	4399	5447	0	0	1299	0	
KIA	0	0	0	3803	2737	2151	3550	1771	2199	2248	0	0	456	0	
MIA	0	0	0	5462	2737	2151	4934	1772	2200	3099	0	0	843	0	
KIA	0	0	3	3810	2744	2158	3557	1841	2335	2433	85	85	541	85	
MIA	0	0	11	5485	2760	2174	4957	2030	2704	3444	345	345	1188	345	
EVAC	0	0	3	2279	3421	2047	2587	2376	1610	1677	834	152	337	337	
HOSP	0	0	9	3206	-662	126	2369	-345	1095	1767	-488	193	851	8	
DWBI	0	1368	1987	2816	3263	3388	3756	4086	4149	4183	4235	4266	4279	4339	
EVAC	0	66	161	630	1155	1264	1019	784	823	616	404	408	410	414	
HOSP	0	1302	1826	2186	2108	2124	2737	3301	3325	3567	3830	3858	3869	3926	
DOW	0	0	0	28	14	11	48	19	26	58	6	6	20	6	
PTD	0	101	1058	2404	2947	2527	2083	3509	4372	3801	3860	4608	4385	4171	
FATS	0	1201	1978	4938	3423	3135	6111	5539	5561	7037	6513	5951	5766	5523	
REPL3	0	1267	944	9707	5819	5192	10187	4447	4817	6260	805	89	1124	600	
CUM-REP	0	1267	2211	11917	17736	22928	33115	37563	42379	48640	49445	49534	50658	51257	

EXHIBIT IV-3

EXAMPLE CASUALTY SUBMODEL OUTPUT. NON-THEATERS

5/23/80	DEMORUM		TOTAL NON-THEATER							ENL/OFF					
	PRE-M	M	M+10	M+20	M+30	M+40	M+50	M+60	M+70	M+80	M+90	M+120	M+150	M+180	
POP	168464	196032	196032	196032	221098	221098	221098	223829	223829	223829	234740	234740	234740	237439	
ADJ-POP	503015	759439	630482	525443	573171	546212	452127	444723	445621	446465	441650	439593	461202	466995	
DNBI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

WIA-TR	0	0	6	4558	6842	4094	5174	4752	3220	3354	1668	1652	1480	1260	
DNBI	0	5947	7967	7618	8352	8685	7529	6501	6543	6138	5693	17186	17392	17892	
TR	0	132	322	1260	2310	2528	2038	1568	1646	1232	808	2464	2522	2538	
OTHR	0	5815	7645	6358	6042	6157	5491	4933	4897	4906	4885	14722	14870	15354	
DOW-DIS	0	2	5	602	909	560	692	631	436	447	225	246	225	197	
RTD	0	1551	4933	7206	6565	6109	6093	5848	6234	7088	7808	27786	23952	22881	
PATS	1100	5495	8529	12896	20616	26725	32643	37417	40509	42466	41793	32599	27294	23368	

REPLS	0	4265	2711	-849	-523	47	-602	-916	-1338	-2182	-2924	-13065	-9082	-7527	
CLM-REP	0	4265	6976	6127	5604	5652	5049	4134	2796	614	-2310	-15374	-24456	-31984	

This submodel basically operates off outputs from the casualty submodel and a set of medical care factors supplied by BUMED. The factors are expressed in terms of number of physicians, nurses and corpsmen required for each day of a patient's hospitalization; for example, 1.196 physicians for day 1; 0.107 for days 2 through 6; etc. There are separate factors for theater and non-theater, and for WIA/NBI and diseased. Appendix B contains a complete list of the factors.

The computations involved are straightforward conceptually, although by no means trivial from a programming point of view (reference the description in Appendix C of the program labeled "MMMHOSPRG"). Requirements for each type of staff resource are computed separately for each day in the scenario. The following is an example of the computation of physician requirements for day 3.

<u>Day</u>	<u>Number</u>	<u>Number</u>	<u>Care</u>	
<u>Hospitalized</u>	<u>Hospitalized</u>	<u>Remaining</u>	<u>Factor</u>	<u>Requirement</u>
3	50	50	1.196	59.8
2	50	45	0.107	4.8
1	50	40	0.107	<u>4.3</u>
TOTAL REQ'T FOR DAY:				68.9

Differences between numbers hospitalized and numbers remaining are attributable to returns-to-duty, evacuations, discharges and died-of-wounds - information on which is obtained from the casualty submodel. After performing these calculations, the medical requirements submodel scans each ten-day time increment for its maximum requirement, and records that value as the increment's requirement. Example outputs from the submodel appear in Exhibits IV-4 and IV-5.

EXHIBIT IV-4

EXAMPLE MEDICAL REQUIREMENTS SUBMODEL OUTPUT, THEATERS

5/26/80	DEMORUN	TOTAL THEATER				WIA\NBI
	ADMISSIONS	PATIENTS	DOCTORS	NURSES	CORPSMEN	
M	274	213	50	86	136	
M+10	409	468	83	175	267	
M+20	6048	3566	1011	1547	2514	
M+30	3412	3407	702	1341	2062	
M+40	2851	1963	504	824	1316	
M+50	5708	3740	977	1576	2531	
M+60	2848	3586	644	1359	2049	
M+70	3534	2893	630	1148	1801	
M+80	4281	3928	802	1531	2374	
M+90	1192	3767	446	1299	1858	
M+100	1199	3235	355	1095	1575	
M+110	2044	2881	429	1035	1547	
M+120	1213	2575	335	901	1312	
M+130	1223	2420	310	843	1232	
M+140	1869	2287	377	840	1269	
M+150	1223	2468	326	866	1265	
M+160	1223	2342	305	819	1199	
M+170	1622	2221	343	804	1205	
M+180	1234	2295	312	809	1188	
M+190	1234	2223	300	782	1150	
M+200	1234	2129	294	753	1110	
M+210	1235	2025	288	720	1066	
M+220	1235	2025	288	721	1066	
M+230	1236	2026	288	721	1066	
M+240	0	1903	141	609	834	
M+250	0	1000	60	312	426	

EXAMPLE IV-5
EXAMPLE MEDICAL REQUIREMENTS SUBMODEL OUTPUT, WORLDWIDE

5/26/80	DEMORUN	WORLD WIDE				WIA&DIS		
	ADMISSIONS	PATIENTS PEAK	DOCTORS	NURSES	CORPSMEN	OFFICERS	ENLISTED	TOTAL
M	5286	5092	341	1569	2072	1910	2072	3983
M+10	6862	10820	590	2921	3759	3511	3759	7270
M+20	15089	17143	1758	5542	7708	7300	7708	15008
M+30	14234	22991	1714	6980	9350	8695	9350	18044
M+40	12553	27098	1662	7641	10018	9303	10018	19321
M+50	15646	36079	2329	9654	12663	11983	12663	24646
M+60	12309	42698	2176	10901	13956	13078	13956	27034
M+70	12280	46999	2208	11554	14669	13762	14669	28431
M+80	12887	50082	2330	12112	15357	14442	15357	29799
M+90	8804	51578	1953	12139	15123	14092	15123	29215
M+100	8187	51250	1757	11686	14434	13443	14434	27877
M+110	9218	51057	1746	11422	14083	13168	14083	27251
M+120	8381	48282	1564	10772	13235	12337	13235	25572
M+130	8204	44460	1416	9928	12211	11344	12211	23555
M+140	9008	43325	1440	9672	11929	11112	11929	23041
M+150	8375	43627	1398	9756	12006	11155	12006	23160
M+160	8234	43071	1366	9603	11812	10969	11812	22782
M+170	8722	42989	1400	9545	11752	10945	11752	22697
M+180	8347	44294	1395	9800	12032	11195	12032	23228
M+190	8270	47134	1424	10340	12653	11764	12653	24417
M+200	8271	48744	1438	10626	12972	12064	12972	25036
M+210	8271	49409	1443	10749	13109	12192	13109	25301
M+220	8271	50137	1450	10893	13276	12343	13276	25619
M+230	8270	50673	1455	10998	13398	12453	13398	25851
M+240	0	49831	1184	10669	12878	11853	12878	24731
M+250	0	41466	833	8452	10003	9286	10003	19289

Non-Structure Billet Requirements

The demand submodel has the capability of estimating non-structure billet requirements, which consist of transients and students and are associated only with the non-theater, as a (variable) percentage of structure requirements. It can also accept them as thruputs. The demand submodel's full output is illustrated in Exhibits IV-6 and IV-7.

Demand for Trainees

Certain mobilization manpower analyses - notably OSD's WARMAPS - simply set trainee demand equal to trainee supply. However, for the purposes of this model it was considered useful to allow the relationship between trainee demand and supply to reflect potential manpower shortages. Thus, on the assumption that it would take ninety days to train for and fill an empty billet once it is perceived, and assuming further a ten percent trainee attrition rate, the model takes successive ninety-day "looks" out into scenario time, records any shortages that exist, adjusts for attrition, and adds the result to trainee supply to compute trainee demand for each period. Since those computations require all other demand and supply computations to have been completed, they are done in the summary model and reflected in the output illustrated in Section II. Output shown in this section is limited to the demand for trained manpower.

EXHIBIT IV-6
EXAMPLE DEMAND SUBMODEL OUTPUT, THEATERS

5/23/80	DEMORUN	ENLISTED		TOTAL THEATER											
		PRE-M	M	M+10	M+20	M+30	M+40	M+50	M+60	M+70	M+80	M+90	M+120	M+150	M+180
DEMAND	111014	129923	199638	275071	285698	305204	358476	371428	377803	386815	392303	403402	405979	412438	
TRAINED	111014	129923	199638	275071	285698	305204	358476	371428	377803	386815	392303	403402	405979	412438	
STRUCTURE	111014	128774	197640	264065	269318	284096	328003	336872	338861	342140	346930	356426	356698	361104	
THEATER	111014	128374	196948	270098	283515	304934	356042	370251	370848	373356	378556	388547	389438	394311	
NON-THET	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
MEDICAL	0	400	692	3034	2513	1790	3163	2782	2547	3210	2800	2356	2334	2266	
BIL LOS	0	0	0	-9067	-16710	-22628	-31202	-36161	-34534	-34426	-34426	-34477	-35074	-35473	
NON-STRUC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
CAS-REPLS	0	1149	1998	11006	16380	21108	30473	34556	38942	44675	45373	46976	49281	51334	
KIA	0	0	3	3546	6099	8076	11367	13080	15228	17478	17552	18199	18736	19152	
WIA	0	0	9	5110	7676	9667	14252	16128	18596	21754	22055	23747	25251	26524	
DNBI	0	1241	3036	5575	8509	11553	14919	18576	22293	26038	28828	41351	53115	64952	
RTDS	0	-92	-1051	-3226	-5904	-8188	-10064	-13228	-17175	-20596	-24062	-36321	-47822	-59294	

EXHIBIT IV-7
EXAMPLE DEMAND SUBMODEL OUTPUT, NON-THEATERS

5/23/80	DEMORUN	ENLISTED				TOTAL NON-THEATER									
		PRE-M	M	M+10	M+20	M+30	M+40	M+50	M+60	M+70	M+80	M+90	M+120	M+150	M+180
DEMAND		162976	174810	176598	178485	202423	205749	208785	212359	214049	215249	224600	219875	217266	217634
TRAINED		162976	174810	176598	178485	202423	205749	208785	212359	214049	215249	224600	219875	217266	217634
STRUCTURE		135813	155219	155219	155219	173308	173308	173308	174369	174369	174369	183101	183101	183101	185245
THEATER		0	0	0	0	0	0	0	0	0	0	0	0	0	0
NON-THEAT		135813	153546	152151	150545	166472	165080	163809	163196	162247	162222	170777	172222	173430	175478
MEDICAL		0	1673	3068	4674	6836	8228	9499	11173	12122	12147	12324	10879	9671	9767
BIL LOS		0	0	0	0	0	0	0	0	0	0	0	0	0	0
NON-STRUC		27163	15522	15522	15522	17331	17331	17331	17437	17437	17437	18310	18310	18310	18525
CAS-REPLS		0	4070	5857	7744	11785	15110	18146	20553	22243	23443	23189	18464	15855	13865
KIA		0	0	0	0	0	0	0	0	0	0	0	0	0	0
WIA		0	0	3	2282	5703	7750	10337	12713	14323	16000	16834	17660	18400	19030
DNBI		0	5597	11990	17600	23399	29390	34505	38843	43177	47320	51237	63104	75171	87719
RTDS		0	-1527	-6136	-12138	-17317	-22029	-26695	-31003	-35257	-39877	-44882	-62300	-77715	-92885

V. MODEL APPLICATIONS

Potential applications of the model, both within the CPAM process and in other contexts, fall into four general categories. Each is discussed below.

Base Case Updates

At any one time, the model will be "loaded" with a set of base case inputs to which there will correspond a unique set of outputs. These will reflect the size and composition of the fleet, scenarios and other policy guidance, and supply data applicable to a given time frame. Each of the above can change without a change in time frame, and in general they will all change with a change in time frame. Thus one application of the model is to simply maintain currency; i.e., to update the inputs and execute the full model whenever there is a change in the basic (and official) determinants of mobilization manpower supply and demand.

Training Excursions

In Section III, eleven different inputs to the enlisted training submodel were listed. Each of these is either a policy variable or a magnitude about which there is some uncertainty. Changes in one or more of them could have a significant impact on output from the training establishment during a mobilization period. Thus the model can be used to examine the sensitivity of training output to proposed policy changes, or to certain inputs - such as yields from the draft - characterized by uncertainty.

Casualty, Medical Requirements and Evacuation Policy Analysis

Applications of the model in this area are virtually limitless. First, it is an area where the input factors are subject to extreme uncertainty. A

wide range of sensitivity analyses is suggested. And, as with the training submodel, policy variables - especially those pertaining to evacuation - play a critical role.

There is a great deal of interdependence between casualties, medical staff requirements and evacuation policy which the model can be used to analyze. For example, casualty estimates and evacuation policies in combination determine theater requirements for physicians, nurses and hospital corpsmen. However, a particular set of those requirements might be considered infeasible. Thus evacuation policies would have to be modified to result in theater medical requirements which are feasible. This, in turn, would have an effect on return-to-duty rates, which would be reflected in a modified casualty replacement demand, and ultimately in the "bottom line" - manpower shortages and overages. While no doubt requiring iterative use of the model, this type of application is quite legitimate and potentially quite useful.

A final application in this area is to use the model's output as a basis for examining logistic support requirements. For example, implicit in the evacuation and returns-to-duty data are a set of transportation requirements. Analysis of those requirements might reveal them to be substantially greater than what can be met by programmed resources. Thus, as in the immediately preceding example, this would require a change in evacuation policy, setting in motion the same chain which ends with a new relationship between aggregate manpower supply and demand.

Qualitative Manpower Analysis

While it is important for planners to have data on the balance or imbalance between total manpower supply and demand, it may be even more

important to have those same types of insights with respect to particular categories of manpower. The model can be used to examine time-phased requirements for, and availability of, machinist's mates, electronics technicians, etc. It is especially well suited for applications of this sort in that, rather than using Navy-wide averages as inputs, more precise data can be employed. Naturally, much of the relevant data gathering and analysis would have to be done outside the model, but as a vehicle for processing and displaying those results, and for performing many of the requisite calculations, the model is quite valuable.

APPENDICES

APPENDIX A
CASUALTY REPLACEMENT SUBMODEL

Background

Integral to any mobilization/wartime manpower analysis are the issues of casualties and returns-to-duty. Obtaining realistic estimates of those magnitudes is a difficult task because of: (1) the large number of interacting variables - size and composition of exposed forces, scenario events and duration, areas of deployment, evacuation policies in effect, etc.; (2) the correspondingly large number of calculations required; and (3) the limited amount of empirical data available. All of this suggests the need for algorithms which "simulate" the casualty, treatment and discharge cycles in any given conflict. One such model, known as MEDCON II, was developed at the Bureau of Medicine and Surgery (BUMED). A considerable amount of the content of that model has been incorporated into this submodel, and the final product has been fully coordinated with BUMED.

Basic Features

Provision is made for the following types of casualties to occur within theaters:

- . Killed/Missing in Action (KIA)
- . Wounded in Action (WIA)
- . Disease and Non-Battle Injuries (DNBI)

Casualty replacement may be either with or without delay. The number of casualties, by type, is computed by multiplying a set of population inputs by casualty-rate factors, also inputs. In addition, provision is made for direct

"thruput" of special-case casualty data associated with losses and damage to ships and aircraft. A fraction of theater WIA and DNBI are hospitalized and the balance are evacuated to CONUS, with provision made for evacuation delays. Sizes of the fractions depend on what evacuation policies are in effect at any period. The model will accommodate essentially any number of theaters, all of whose evacuees are accumulated in CONUS. Only DNBI originate within CONUS. Provision is made for Died-of-Wounds (DOW) within theaters, and DOW and disability discharges within CONUS.

Returns-to-Duty (RTD) are computed on the basis of mean time to discharge plus pipeline time for each time of hospitalization and evacuation policy. Theater replacement demand is defined as total casualties less the sum of RTD's for each period.

Analytics and Algorithms

It will be convenient to begin this section with a word on notation. Each ten-day time period will be denoted by a subscript 't.' Thus $t=1$ is the period Pre-M to M-Day; $t=2$ is M-Day to M+10; $t=3$ is M+10 to M+20; etc. The subscript $t=0$ is a special case, reserved for Pre-M population and patient inventories.

This model, like most discrete-time formulations, involves two types of variables; stocks and flows. They are best defined by example. PAT_t denotes the size of a specific patient pool at the end of period 't.' It is a stock measure. WIA_t denotes the number of Wounded in Action during period 't.' It is a flow measure. Generally speaking, the summation of

flows produces stocks. As a simple example, assuming all WIA and DNBI are hospitalized and survive, and ignoring any initial patient pool, we have:

$$PAT_t = \Sigma WIA_t + \Sigma DNBI_t - \Sigma RTD_t,$$

where the summations are taken from $t=1$ through the period in question.

The first analytic complication arises when a delay in casualty replacement is specified. The population inputs which would normally be multiplied by casualty-rate factors cannot be used directly because the replacement delay causes the actual populations to fall short of the original objectives. Casualties must therefore be computed from adjusted populations, but those populations are in turn dependent on contemporaneous casualties. What emerges is the need for a simultaneous equation system. The basic relationships are:

$$TCAS_t = ICAS_t + k(ADJ_{t-1} + ADJ_t)/2 \quad (1)$$

$$ADJ_t = ADJ_{t-1} + (INT_t - INT_{t-1}) - TCAS_t + TCAS_{t-x} \quad (2)$$

where

TCAS = total casualties (KIA + WIA + DNBI)

ICAS = input casualties

k = combined casualty-rate factor (for 10-day period)

ADJ = adjusted population

INT = initial population

t = time period

x = length of casualty replacement delay (in periods)

Equation (1) states that total casualties are the sum of input and computed casualties. The latter are determined by multiplying an average of beginning and ending adjusted populations by a combined casualty-rate factor.* Once the adjusted populations are computed from the simultaneous system, individual casualty-rate factors are applied to determine WIA, KIA and DNBI.

Equation (2) states that the ending adjusted population, ADJ_t , is determined by first adding to its beginning value the amount of the target increase, $(INT_t - INT_{t-1})$, then subtracting the current period's casualties, and finally adding in delayed casualty replacement.

Substituting Eq. (1) into Eq. (2) and simplifying, the following expression emerges for computing adjusted populations:

$$ADJ_t = \left[(1-k/2) ADJ_{t-1} + (INT_t - INT_{t-1}) - ICAS_t + \right. \\ \left. k(ADJ_{t-x-1} + ADJ_{t-x})/2 + ICAS_{t-x} \right] / (1+k/2)$$

The adjusted populations are thereby consistent with the simultaneously-determined losses for the same period.

As mentioned earlier, a portion of theater WIA and DNBI are evacuated to CONUS and the remainder are assigned to theater hospitals. These allocations are determined by a set of input percentages which reflect different evacuation policies for various phases of the scenario. Provision for evacuation delays is also provided through inputs. Once the numbers of

*The averaging procedure applies to all periods except $t=1$. There it is assumed that the Pre-M population remains constant for the nine days preceding M-Day. A weighted average is therefore computed, with the weights being .9 and .1.

casualties assigned to theater and CONUS hospitals are known, and after allowances for DOW and disability discharges have been made, the next analytic problem is that of computing returns-to-duty for each time period.

Fortunately, the RTD problem is easily treated within a general Markovian framework. To elaborate, assume that a scenario consists of only three periods, and consider the following matrix:

		Hospitalizations		
Returns	$t \backslash t$	1	2	3
	1	p_{11}	0	0
	2	p_{21}	p_{22}	0
	3	p_{31}	p_{32}	p_{33}

Each non-zero element represents the probability of, or fraction, being returned in the period denoted by the first subscript, given that hospitalization occurred in the period denoted by the second. For example, p_{32} is the fraction of those returned in period 3 who entered in period 2. Note that all elements to the right of the diagonal are definitionally equal to zero since returns cannot occur prior to admissions. Now let N_1^h, N_2^h, N_3^h represent the number who are hospitalized (and who also survived) in period 1, 2, and 3. The number returned in each period, N_t^r , is then computed as:

$$N_1^r = p_{11}N_1^h$$

$$N_2^r = p_{21}N_1^h + p_{22}N_2^h$$

$$N_3^r = p_{31}N_1^h + p_{32}N_2^h + p_{33}N_3^h$$

These sums obey the rules of matrix algebra; i.e., in this case, post-multiplication of a matrix (the p_{ij}) by a conforming vector (N^h). Since the elements of the vector, hospitalizations, have been computed by the model, the remaining analytic problem is to quantify the p_{ij} , the so-called "transition" matrix.

Determining values for the p_{ij} requires that certain assumptions be made. First, the flow of hospitalizations is assumed to be uniformly distributed over any given ten-day period. In other words, $N_t^h/10$ arrive on each day in a ten-day period. Since input data are provided on mean times to discharge plus pipeline times, one approach would be to assume that, given for example a mean time to discharge of 25 days and a pipeline time of 5 days, all persons hospitalized on day one would be returned on day 31; those admitted on day 2 would be returned on 32; etc. While greatly simplifying the problem, this approach does not seem very realistic. It assumes there is no variability around the mean discharge times. A better approach is to make an explicit assumption about the variance, and about the probability distribution, of returns-to-duty. This model assumes returns to be normally distributed with variance equal to the mean discharge time. The assumption of equivalence between mean and variance is frequently used in reliability and maintainability work when data is available only for such parameters as mean-time-between-failures, mean-time-to-repair, etc. And, results of the joint assumptions of normality and equivalence of mean and variance are intuitively reasonable in the present context. For example, using the same data hypothesized above, approximately two-thirds of hospitalizations on day 1 would be returned between the 25th and 35th days, and 95% between the 20th and 40th days.

Once a statistical distribution of returns has been computed for each day in the 10-day admissions period, they must be combined into a single distribution (also normal) applicable to the full period. Then, that distribution is divided into its ten-day increments, and the individual probabilities in each increment are summed to finally produce the required P_{ij} . All of these computations are performed, with the aid of the IBM Scientific Subroutine Package, as part of a separate pre-processor. They are then written into files in transition matrix format and are accessed directly by the model.

An example of the model's output appears in Section IV of the report. By way of summary, initial populations and at-sea casualties are provided as inputs. Other KIA and WIA, and all DNBI, result from multiplying input factors by adjusted populations, and in turn are multiplied by other input percentages to compute evacuations and DOW. Procedures used for computing adjusted populations, RTD, and patients have been described above, with the exception that the patients computation also adds in the initial patient pool. Finally, net replacement demand for each period is total casualties less RTD's. The summation of those results is total casualty replacement demand. Exhibit A-1 displays a set of casualty-rate factors, evacuation percentages and policies, discharge/pipeline times, delays and other data which were provided by BUMED and are presently being used in the submodel.

EXHIBIT A-1
SELECTED INPUTS AND PARAMETER VALUES *

Casualty-Rate Factors

KIA: Navy with Marines
 Amphibious assault:
 Forward 3.0/1000/Day
 Support 0.4/1000/Day
 High Intensity Sustaining:
 Forward 1.3/1000/Day
 Support 0.2/1000/Day

WIA: Navy with Marines
 Amphibious assault:
 Forward 10.7/1000/Day
 Support 1.3/1000/Day
 High Intensity Sustaining:
 Forward 4.5/1000/Day
 Support 1.1/1000/Day

All other KIA & WIA: 0 (thruput)

DNBI: 1/1000/Day

Evacuation Policies

Pre-M to M+10:	60-day
M+11 to M+40:	15-day
M+41 to M+70:	30-day
M+71 to M+190:	60-day

Evacuation Rates

	<u>15-day Policy</u>	<u>30-day Policy</u>	<u>60-day Policy</u>
WIA:	.83	.68	.44
DNBI:	.38	.20	.096

EXHIBIT A-1 (cont'd.)

Mean Discharge and Pipeline Times (in days)

	<u>15-day Policy</u>	<u>30-day Policy</u>	<u>60-day Policy</u>
Non-Evacuees			
WIA - Discharge:	8	15	25
Pipeline:	1	1	1
DNBI - Discharge:	5	8	10
Pipeline:	1	1	1
Evacuees			
WIA - Discharge:	64	85	145
Pipeline:	15	15	15
DNBI - Discharge:	33	57	99
Pipeline:	15	15	15
Within CONUS			
DNBI - Discharge:	10	10	10
Pipeline:	1	1	1

Evacuation Delays

WIA: 5 days

DNBI: 5 days

Other Losses from Hospitalizations

Non-Evacuees

DOW: 3%

Evacuees

DOW: 0

Disab. Discharge:

WIA: 8.95%

DNBI: 0.92%

*Source: Bureau of Medicine and Surgery

APPENDIX B
MEDICAL CARE REQUIREMENTS BY LENGTH-OF-STAY*

<u>Theater</u>	<u>Day</u>	<u>Doctors</u>	<u>Nurses</u>	<u>Corpsmen</u>
WIA/NBI	1	1.196	.908	1.89
	2	.107	.363	.503
	3	.107	.338	.465
	4	.107	.338	.465
	5	.107	.334	.458
	6	.107	.312	.426
	7+ (see note 1)		.312	.426
Disease	1	.114	.242	.321
	2	.040	.242	.321
	3	.040	.229	.301
	4	.040	.229	.301
	5	.040	.209	.272
	6	.040	.186	.236
	7+ (see note 1)		.186	.236
<u>Non-Theater</u>				
WIA/NBI	1	.33	.595	.827
	2-10	.074	.496	.693
	11-50 (see note 2)		.242	.302
	51+	.015	.202	.236
Disease	1	.210	.302	.386
	2-10	.038	.280	.354
	11-15	.038	.204	.241
	16-50	.016	.204	.241
	51+	.016	.195	.227

*Source: Bureau of Medicine and Surgery

APPENDIX B (cont'd.)

Notes:

- (1) Requirements for physician care of patients retained in theater beyond the sixth day vary with the evacuation policy.

	<u>15-day Policy</u>	<u>30-day Policy</u>	<u>60-day Policy</u>
WIA/NBI	.04	.05	.06
Disease	.017	.022	.022

- (2) Requirements for physician care of WIA/NBI patients in the reconstruction period vary with the evacuation policy.

	<u>15-day Policy</u>	<u>30-day Policy</u>	<u>60-day Policy</u>
	.056	.059	.061

APPENDIX C

COMPUTER PROGRAM DOCUMENTATION

The nine separate computer programs which make up the model are documented in this appendix. Documentation consists of a brief narrative description of each program's functions, inputs, outputs, uses and options. Following each narrative is a program listing.

In terms of computer processing, each of the programs operates independently. Input and output for each are stored in files. All inter-program communication is accomplished via these files. An advantage of this type of modular processing is that it minimizes the effects of any execution interrupt. If the interrupt is caused by machine malfunction, the amount of re-running is very small. User interruptions cause no problem at all since individual execution times are short and easily adaptable to scheduling. Flexibility is maintained by allowing the user to specify which files are to be used and to be generated at each program execution.

Each program is identified by a mnemonic label. The order in which they appear, and the sections of the overall model to which they relate, are as follows:

Supply:	MMMSUPPRG
Evacuation Policy & Casualty-Related Data:	NUPOLPRG
Casualty Estimation:	WMPREPROC
	MMMCASPRG
	MMMPRNPRG
Medical Requirements:	MMMHOSPRG
	MEDPRGM
Demand:	MMMDENPRG
Comparisons and Graphs:	MMDSMODL

MMMSUPPRG

Function

This program creates supply tables.

Input

- . Table ID, TITLE, TYPE (OFFICER or ENLISTED)
- . The initial active force
- . Selective Reserve personnel by time period, if any
- . Other inactive personnel by time period, if any
- . Trainee data (enlisted supply tables only)
 - . Length of PRE-M boot camp (wks)
 - . PRE-M boot input/wk
 - . PRE-M population in "A" schools
 - . PRE-M population in boot camps
 - . Recruit attrition rate (%)
 - . POST-M-day % to "A" school (%)
 - . Length of POST-M boot camp (wks)
 - . Length of POST-M "A" schools (wks)
 - . Capacity of boot camps
 - . Number of POST-M weeks to be processed
 - . POST-M boot input for each week

Output

- . A file containing the supply tables created
- . Detailed displays of the supply tables created
- . A detailed display of trainee output and populations covering the number of weeks specified

Use

- . The supply file is an input for the demand-supply comparison program (MMDSMODL)
- . Supply totals may be used by the casualty program (MMCASPRG) to compute the non-theater exposed populations on which casualties are based

Options

Displays are optional.

```

C:  MMMSUPPRG      TRAINING/SUPPLY PROGRAM
C:
C:  STRING      DAY(27)(6), THETR(36), ENOF(8), THID(12), DATE(9)
C:  STRING      NAM(7)(7), IFN(15), FILID(15), NYN(3)
C:
C:  DIMENSION  SOUT(27,7), ACF(27), SLR(27), OTN(27), TRF(27), TRN(27)
C:  DIMENSION  NDYS(27), NFAC(27), NDX(27)
C:  DIMENSION  BINP(40), BAT(40), BOTP(40), AINP(40), TPOP(40), COTP(40)
C:  EQUIVALENCE (ACF,SOUT(1,3)), (SLR,SOUT(1,4)), (OTN,SOUT(1,5))
C:  EQUIVALENCE (TRF,SOUT(1,6)), (TRN,SOUT(1,7))
C:
C:  DATA  DAY//PRE-M'
C:          , 'M', 'M+10', 'M+20', 'M+30', 'M+40', 'M+50', 'M+60', 'M+70', 'M+80'
C:          , 'M+90', 'M+100', 'M+110', 'M+120', 'M+130', 'M+140', 'M+150', 'M+160'
C:          , 'M+170', 'M+180', 'M+190'//
C:  DATA  NAM//SUPPLY', 'TR POP', 'ACT F', 'SEL R', 'OTH I', 'T OUT', 'TRAINEE'//
C:  DATA  ISW/5/, ILM/27/, NBZZ/13/
C:
C:  1  FORMAT(//)
C:  2  FORMAT(6X,15('-----'))//
C: 12  FORMAT(/15,2X,S36,2X,S8,2X,S12,A6)
C: 18  FORMAT(/8X,S12,3X,S36,5X,S8)
C: 20  FORMAT(/10X,'TRAINING PROGRAM',I4,' WEEKS',14X,A9//)
C: 21  FORMAT(' TIME  BOOT BOOT  BOOT  BOOT  TO  TO  A-SCH  A-SCH  TOT'
C:          , ' TOT  CUM'// (WKS)  INPT  ATT  OTPT  POP  FLT  A-SCH'
C:          , ' OTPT  POP  POP  OTPT  OTPT'//)
C: 22  FORMAT(I4,I8,I5,I6,I7,I6,4I7,I6,I7)
C: 30  FORMAT(/4X,S9,5X,S12,4X,S8,2X,S36/)
C: 32  FORMAT(/15X,14(2X,A6))
C: 34  FORMAT(/4X,S7,4X,14I8)
C: 35  FORMAT(/6X,S7,2X,14I8)
C: 36  FORMAT(/8X,S7,14I8)
C:
C:  WRITE (1,1)
C:  ACCEPT " RUN DATE = ", DATE, " ID = ", FILID: NWRT = 0
C:  ACCEPT " SUPPLY OUTPUT ? ", NYN: IF (NYN.EQ.'N') GO TO 120
C:  ACCEPT " OUTPUT FILE = ", IFN: NWRT = 1
C:  OPEN (4,IFN,OUTPUT,BINARY): WRITE (4) FILID, DATE: WRITE (1,2)
C: 120  NWRT2 = 0: ACCEPT " SUPPLY TOTALS OUTPUT ? ", NYN
C:  IF (NYN.EQ.'N') GO TO 140
C:  ACCEPT " FILE = ", IFN: OPEN (3,IFN,OUTPUT): NWRT2 = 1
C: 140  NDX(1) = 1: NFAC(1) = 1
C:  ACCEPT " SUPPLY DATA FILE = ", IFN: OPEN (7,IFN)
C:
C: 150  DO 152  I=1,ILM
C:  DO 152  J=1,7
C: 152  SOUT(I,J) = 0
C:  READ (7,END=500) THID, THETR, ENOF, NPD: IF (NPD.EQ.0) GO TO 180
C:  READ (7,END=500) (NDYS(N), N=2,NPD+1), ACF(1)
C:  NFIL = NFIL + 1: NPD = NPD + 1
C:  DO 158  N=2,NPD
C:  NDX(N) = 2 + NDYS(N)/10
C: 158  NFAC(N) = NDX(N) - NDX(N-1)
C:  ITP = NDX(NPD) - 1: KPD = ILM - NPD
C:  WRITE (1,12) NFIL, THETR, ENOF, THID, DAY(ITP+1)
C:
C:  READ (7) NV: IF (NV.GT.0) READ (7) (SLR(K), K=KPD+2,ILM)

```

```

READ (7) NV;      IF (NV.GT.0) READ (7) (OTN(K), K=KPD+2, ILM)
READ (7) NV;      IF (NV.GT.0) READ (7) (TRP(K), K=KPD+2, ILM)
READ (7) NV;      IF (NV.GT.0) READ (7) (TRN(K), K=KPD+2, ILM)
  NN = 0
DO 162 KK=KPD+3, ILM
  K = ILM - NN;    NN = NN + 1
162  TRN(K) = TRN(K) - TRN(K-1)
  CALL PSPRD (KPD,NPD,NDX,NFAC,SLR)
  CALL PSPRD (KPD,NPD,NDX,NFAC,OTN)
  CALL PSPRD (KPD,NPD,NDX,NFAC,TRP)
  CALL PSPRD (KPD,NPD,NDX,NFAC,TRN)
DO 168 I=2, ITP+1
  ACF(I) = ACF(1);      SLR(I) = SLR(1) + SLR(I-1)
  TRP(I) = TRP(1) + TRP(I-1);  TRN(I) = TRN(1) + TRN(I-1)
168  OTN(I) = OTN(1) + OTN(I-1)
  IF (ENOF.EQ.'OFFICERS') GO TO 350
C:
180 READ (7) INTR;      IF (INTR.EQ.0) GO TO 350
  READ (7) LP, BINP(1), APOP, BPOP, COTP(1), ATT, APCT
    ,LB, LA, POPMAX, LF1, LF2, NWK, (BINP(N), N=3,NWK+2)
  ATT = ATT/100;      APCT = APCT/100;      FPCT = 1-APCT;      BFRN = 0
C:
  ACCEPT " COMPUTE TRAINING OUTPUT ? ", NYN
  IF (NYN.EQ.'N') GO TO 350
  ACCEPT " PRINT DETAILED TRAINING OUTPUT ? ", NYN
  IF (NYN.EQ.'N') GO TO 250
  ACCEPT " ", NYN;      BFRN = 1;      WRITE (1,18) THID, THETR, ENOF
  WRITE (1,20) NWK, DATE;  WRITE (1,21)
C:
250  LF = LF1
  IF (POPMAX.EQ.0) POPMAX = 1E10
  IF (BINP(1).EQ.0) BINP(1) = BPOP/(LP*(1-ATT))
  BAT(1) = ROUND (ATT*BINP(1));      BOTP(1) = BINP(1) - BAT(1)
  AINP(1) = APCT*BOTP(1);      TPOP(1) = APOP + BPOP
DO 268 N=2,NWK+2
  BAT(N) = ROUND (ATT*BINP(N))
  BOTP(N) = BINP(MAX(N-LB,1)) - BAT(MAX(N-LB,1))
  IF (N.EQ.2) BOTP(N) = (LF-LB) * (BINP(1)-BAT(1))
  IF (N-LB.EQ.2) BOTP(N) = BINP(1) - BAT(1)
  BPOP = BPOP + BINP(N) - BOTP(N) - BAT(N)
  IF (BPOP.LE.POPMAX) GO TO 264
  BINP(N) = BINP(N) - (BPOP-POPMAX)/(1-ATT)
  BAT(N) = ATT*BINP(N);      BPOP = POPMAX
264 IF (N.GT.3) LF = LF2
  FLT = FPCT*BOTP(MAX(N-LF,1));      AINP(N) = APCT*BOTP(N)
  AOPT = AINP(MAX(N-LA,1))
  APOP = APOP + AINP(N) - AOPT;      TPOP(N) = APOP + BPOP
  TOTP = AOPT + FLT;      COTP(N) = COTP(N-1) + TOTP
  IF (BFRN.GT.0) WRITE (1,22) N-2, BINP(N), BAT(N), BOTP(N)
    ,BPOP, FLT, AINP(N), AOPT, APOP, TPOP(N), TOTP, COTP(N)
268 CONTINUE
  WRITE (1,1);      ACCEPT " ", NYN
  TRP(1) = COTP(1);      TRN(1) = TPOP(1)
  CALL XTRP (NWK,COTP,TRP);      CALL XTRP (NWK,TPOP,TRN)
  GO TO 350
C:
300 READ (7) NV;      IF (NV.GT.0) READ (7) (SLR(K), K=KPD+2, ILM)
  READ (7) NV;      IF (NV.GT.0) READ (7) (OTN(K), K=KPD+2, ILM)
  CALL PSPRD (KPD,NPD,NDX,NFAC,SLR)
  CALL PSPRD (KPD,NPD,NDX,NFAC,OTN)
DO 328 I=2, ITP+1

```

```

      ACF(I) = ACF(I);          SLR(I) = SLR(I) + SLR(I-1)
328   OTN(I) = OTN(I) + OTN(I-1)
C:
350 DO 358 I=1,ITP+1
      DO 352 J=3,6
352   SOUT(I,2) = SOUT(I,2) + SOUT(I,J)
358   SOUT(I,1) = SOUT(I,2) + SOUT(I,7)
C:
400 CONTINUE
      IF (NWRT2.EQ.1) WRITE (3,40) DATE, THETR, ENOF, (SOUT(I,1), I=1,27)
40  FORMAT(1X,"",A9,"",1X,"",S36,"",1X,"",S8,"",I12/(8X,7I10/))
      IF (NWRT.EQ.1) WRITE (4) ISW, DATE, THID, THETR, ENOF, ITP, SOUT
C:
      NPD = 14
      DO 402 N=1,NPD
      IF (N.LT.12) NDX(N) = N
      IF (N.GT.11) NDX(N) = N + 2*(N-11)
402 CONTINUE
      ACCEPT " PRINT SUPPLY DETAIL ? ", NYN; IF (NYN.EQ.'N') GO TO 150
      ACCEPT " STANDARD PRINT ? ", NYN; IF (NYN.EQ.'Y') GO TO 410
C:
      ACCEPT " # OF PERIODS TO PRINT = ", NPD; NPD = NPD + 1
      ACCEPT " LIST PERIOD(S): ", (NDYS(N), N=2,NPD); NDX(1) = 1
      DO 408 N=2,NPD
408   NDX(N) = 2 + NDYS(N)/10
C:
410 WRITE (1,2); ACCEPT ".", NYN
      NT = 0; WRITE (1,1)
420 NB = NT + 1; NT = MIN (NB+NBZZ,NPD)
      WRITE (1,30) DATE, THID, ENOF, THETR
      WRITE (1,32) (DAY(NDX(N)), N=NB,NT)
      DO 428 J=1,7
      GO TO (424,425,426,426,426,426,425), J
424 WRITE (1,34) NAM(J), (SOUT(NDX(N),J), N=NB,NT); GO TO 428
425 WRITE (1,35) NAM(J), (SOUT(NDX(N),J), N=NB,NT); GO TO 428
426 WRITE (1,36) NAM(J), (SOUT(NDX(N),J), N=NB,NT)
428 CONTINUE
      WRITE (1,2); IF (NT.LT.NPD) GO TO 420
      GO TO 150
C:
500 CLOSE (7); CLOSE (4); CLOSE(3); DISPLAY NFIL, " RECORD(S) PROCESSED"
      END

```

```

SUBROUTINE XTRP (NWK,WK,PD)
  DIMENSION WK(*), PD(*)
  PD(2) = WK(2); I = 10
  DO 198 N=2,NWK+2
    K = 7 * (N-2) + 1
    IF (K+6-I) 198,150,110
110 IF (K-I) 150,150,180
150 BAS = WK(N); TOP = WK(N+1); FAC = (TOP-BAS)/7
    PD(2+I/10) = TOP - (K+6-I)*FAC
180 I = I + 10
198 CONTINUE
  END
SUBROUTINE PSEPD (KPD,NPD,NDX,NFAC,FINE)
  DIMENSION NDX(*), NFAC(*), FINE(*)
  M = 1

```

MMMSUPPRG

DO 198 N=2,NPD 45
FNUM = FINP(KPD+N)
120 M = M + 1; IF (M.EQ.NDX(N)) GO TO 190
FINP(M) = FINP(KPD+N)/NFAC(N); FNUM = FNUM - FINP(M); GO TO 120
190 FINP(M) = FNUM
198 CONTINUE
RETURN
END

NUPOLPRG

Function

This program creates a file containing all the data associated with the policies utilized during a scenario's time frame.

Input

- . The policy to be used in each time period
- . The WIA & DNBI evacuation rates for each policy
- . The WIA & DNBI mean RTD's for each policy

Output

A binary file containing:

- . Time phased lists of policy identifiers and evacuation rates
- . WIA & DNBI matrices of percentage RTD's for each time period
- . Lists of daily percentage RTD's for each policy

Use

- . Input to the casualty program (MMMCASPRG)
- . Input to the hospital program (MMMHOSPRG)

Separate policy files are generated for theaters and non-theaters

```

STRING  IFN(15), MFN(15), NFN(15), LFN(15), NYN(3)
DIMENSION  RM(27,27), IN(27), SD(27), PROB(27)
DIMENSION  MPLA(27), MPOL(26)
DIMENSION  RWFV(3), RDEV(3), IRTD(3,2), RTDM(2,10)
EQUIVALENCE (MPOL,MPLA(2))

C:
DATA  ILM/27/, CN/.1/

C:
1 FORMAT(//)
6 FORMAT(2I3/26I3/6F7.3,4X,12I3)

C:
WRITE (1,1)
ACCEPT " POLICY INPUT = ", IFN;      OPEN (3,IFN)
READ (3)  NTH, RWFV, RDEV, JNUM, (RTDM(1,J),RTDM(2,J), J=1,JNUM)

C:
READ (3)  NV;      NT = 0
DO 168  N=1,NV
  NN = NT + 1
  READ (3)  NTO, IMPL;      NT = 2 + NTO/10
  DO 168  M=NN,NT
    MPLA(M) = IMPL
168 CONTINUE
  READ (3)  IRTD;      CLOSE (3)

C:
ACCEPT " POLICY FILE = ", MFN;      OPEN (4,MFN,OUTPUT,BINARY)
C:C  ACCEPT " POLICY FILE = ", MFN;      OPEN (4,MFN,OUTPUT)
  JNM = MIN (JNUM,6)
  WRITE (4)  NTH, JNM, MPOL, RWFV, RDEV, IRTD
C:C  WRITE (4,6)  NTH, JNM, MPOL, RWFV, RDEV, IRTD
C:
DO 188  J=1,JNM
  M = RTDM(1,J);      S = RTDM(2,J);      CALL POLICY (1,1,M,S,PROB)
188 CONTINUE

C:
DO 248  K=1,2
  IF (MPLA(1).EQ.0)  GO TO 220
  M = RTDM(1,IRTD(MPLA(1),K));      S = RTDM(2,IRTD(MPLA(1),K))
  CALL POLICY (2,0,M,S,PROB)
DO 208  J=2,ILM
208  RM(1,J) = PROB(J-1)

C:
220  M = 0
DO 238  I=2,ILM
  ML = M
  IF (MPLA(I).EQ.0)  GO TO 238
  M = RTDM(1,IRTD(MPLA(I),K));      S = RTDM(2,IRTD(MPLA(I),K))
  IF (M.NE.ML)  CALL POLICY (2,1,M,S,PROB)
DO 238  J=I,ILM
  RM(I,J) = PROB(J+1-I)
238 CONTINUE
CALL PUTRMB (RM,ILM)
248 CONTINUE

C:
IF (JNM.EQ.JNUM)  GO TO 298
  M = RTDM(1,JNM+1);      S = RTDM(2,JNM+1);      IF (M.EQ.0)  GO TO 270
  CALL POLICY (2,0,M,S,PROB)
DO 258  J=2,ILM
258  RM(1,J) = PROB(J-1)

C:

```



```

270  M = RTDM(1,UNM+2);      S = RTDM(2,UNM+2);      IF (M.EQ.0) GO TO 280
      CALL POLICY (2,1,M,S,PROB)
      DO 272 I=2,ILM
      DO 272 J=I,ILM
272  RM(I,J) = PROB(J+1-I)
280  CALL PUTRMB (RM,ILM)
298  CLOSE (4)
      END
      SUBROUTINE PUTRMB (RM,ILM)
      DIMENSION RM(*,*), RMAT(378)

```

```

C: 10 FORMAT(I3,9F7.4,17X,9F7.4,17X,9F7.4)
C:

```

```

      DO 298 I=1,ILM
      DO 298 J=1,I
298  RMAT(I*(I-1)/2 + J) = RM(J,I)
      WRITE (4) RMAT
      RETURN
      END

```

```

C: SUBROUTINE POLICY (LSW,ISW,MM,S,PROB)
      DIMENSION PR(270), P(270), PROB(*)
      M = MM + 1
      IDL = MIN(M-1,4*S) + 1;      IB = M-IDL;      PTOT = 0;      PTOT2 = 0
      DO 205 I=1,IDL
      P(I) = PFN((IDL-I+.5)/S) - PFN((IDL-I-.5)/S)
      IF (I.LT.IDL) P(2*IDL-I) = P(I)
205  PTOT = PTOT + 2*P(I)
      PTOT = PTOT - P(IDL)
      IF (LSW.EQ.2) GO TO 220
      CALL DISPL (M,IDL,IB,P);      RETURN

```

```

C: 220 IF (ISW.EQ.1) GO TO 230
      IB = 0;      LT = 2*(IDL-1)
      DO 228 J=1,2*(IDL-1)
      PR(J) = 0
      DO 226 K=J+1,2*IDL-1
226  PR(J) = PR(J) + P(K)
228  PTOT2 = PTOT2 + PR(J)
      GO TO 250

```

```

C: 230 DO 238 J=1,2*IDL+8
      JB = MAX (1,J-9);      PR(IB+J) = 0;      JT = MIN(J,IDL+4)
      IF (J.GT.IDL+4) GO TO 234
      DO 232 K=JB,JT
232  PR(IB+J) = PR(IB+J) + P(K)
      GO TO 238
234  PR(IB+J) = PR(IB+2*IDL+9-J)
238  PTOT2 = PTOT2 + PR(IB+J)
      LT = IB + 2*IDL + 8

```

```

C: 250 PTOT = 0

```

```

C: DISPLAY PTOT2, IB+1, (PR(IB+J), J=1,2*IDL+8);      DISPLAY /
      DO 258 L=1,LT,10
      LR = 1+L/10;      PROB(LR) = 0
      IF (L+9.LE.IB) GO TO 258
      KT = MIN (L+9,LT);      KB = MAX (L,IB+1)
      DO 252 K=KB,KT
252  PROB(LR) = PROB(LR) + PR(K)
      PROB(LR) = PROB(LR) / PTOT2
      PTOT = PTOT + PROB(LR)

```

```

258 CONTINUE
DO 262 L=LR+1,27
262 PROB(L) = 0
C: DISPLAY / /, PTOT; DISPLAY / /
RETURN
END
FUNCTION PFN (X)
  AX=ABS(X)
  T=1.0/(1.0+.2316419*AX)
  D=0.3989423*EXP(-X*X/2.0)
  P=1.0-D*T*(((1.330274*T-1.821256)*T+1.781478)*T-0.3565638)*T+0.319315)
  PFN = P; IF (X.LT.0) PFN = 1.0-P
RETURN
END
SUBROUTINE DISPL (M,IDL,IB,PR)
  DIMENSION PR(*), P(270)
10 FORMAT(4I6/)
20 FORMAT(10F8.4)
  JT = 2*(IDL-1)
  P(1) = PR(1)
DO 112 J=2,JT
112 P(J) = PR(J) + P(J-1)
  WRITE (4) IB+1, JT+2, 0.0, (P(J), J=1,JT), 1.0
C:C WRITE (4,10) IB+1, JT+2
C:C WRITE (4,20) 0.0, (P(J), J=1,JT), 1.0
RETURN
END
SUBROUTINE PUTRM (RM,ILM)
  DIMENSION RM(*,*)
C:
10 FORMAT(I3,9F7.4,17X,9F7.4,17X,9F7.4)
C:
DO 298 I=2,ILM
  NN = -1
DO 278 J=1,J
  IF (RM(J,I).EQ.0) GO TO 278
  IF (NN.LT.0) NN = J - 1
  NT = J
278 CONTINUE
  ZN = J + CN
  IF (NN.GE.0) GO TO 290
  NN = I - 1; NT = I
290 WRITE (4,10) NN, (RM(J,I), J=NN+1,I)
298 CONTINUE
DO 302 I=1,ILM
DO 302 J=1,ILM
302 RM(I,J) = 0.0
  CN = CN + .1
END

```

WMPREPROC

Function

This program creates a file containing a data set for each theater described.

Input

- . Theater ID, TITLE, TYPE (OFFICER or ENLISTED)
- . PRE-M population and patient pool
- . Population by time period
- . Personnel killed in action, and/or wounded in action and billet losses for each time period in which they occur
- . WIA & DNBI evacuation delays
- . Casualty replacement delay
- . KIA, WIA, DNBI, DOW, DISCHARGE rates for specified time periods

Output

A data set for each set of inputs

Use

Input to the casualty program (MMMCASPRG)

WMPREPROC

```

C:  WMPREPROC  PROCESSES RAW INPUT DATA FOR CASUALTY MODEL
C:
STRING      DAY(27)(6), IFN(15), MFN(15), PFN(15)
STRING      THETR(36), ENOF(8), THID(12), DATE(9), FILID(15)
DIMENSION   NDX(27), NFAC(26), NDYS(27)
DIMENSION   POUT(26,6), POP(26), PINC(26), TL1(26), TL2(26), BIL(26)
DIMENSION   RPP(26,3), ROW(26,3), DIS(3), DIE(3)

C:  EQUIVALENCE (PINC,POUT), (TL1,POUT(1,2)), (TL2,POUT(1,3))
EQUIVALENCE (BIL,POUT(1,4)), (ROW,POUT(1,4))
DATA  DAY//PRE-M'
      , 'M', 'M+10', 'M+20', 'M+30', 'M+40', 'M+50', 'M+60', 'M+70', 'M+80'
      , 'M+90', 'M+100', 'M+110', 'M+120', 'M+130', 'M+140', 'M+150', 'M+160'
      , 'M+170', 'M+180', 'M+190', 'M+200', 'M+210', 'M+220', 'M+230', 'M+240'//
DATA  DAY(27)//M+250//
DATA  NFAC/26*1/, ILM/27/

C:
2  FORMAT(/12X,7('-----'))
10  FORMAT(///3X,'RECORD #',20X,'THEATER',28X,'ID',2X,'LAST DAY'//)
12  FORMAT(I8,1X,S36,1X,S8,2X,A12,4X,A6)
18  FORMAT(//3X,S15,'/',1X,S15,I4,' RECORDS',2X,S9///)
40  FORMAT(2I2,S9,S12,S42,I4/2X,2I8,S14,F4.1)
42  FORMAT(4(2X,9I8/2X,9I8/10X,8I8))
44  FORMAT(6(2X,9F8.5/2X,9F8.5/10X,8F8.5))

C:
WRITE (1,2)
ACCEPT " PRE-PROCESS RUNDATE = ", DATE
ACCEPT " OUTPUT DATA FILE = ", MFN, " ID = ", FILID
OPEN (4,MFN,OUTPUT,BINARY);      WRITE (4) FILID, DATE
ACCEPT " INPUT DATA FILE = ", IFN;  OPEN (7,IFN)

C:
WRITE (1,10)
100  DO 102 I=1,ILM-1
      POP(I) = 0
      DO 102 N=1,6
102  POUT(I,N) = 0

C:
      K = 0;  READ (7,END=900) ISW, THID, THETR, ENOF, NPD, (NDYS(N), N=1,NPD)
DO 138 N=1,NPD
      NDX(N) = 1 + NDYS(N)/10;      NFAC(N) = NDX(N) - K
138  K = NDX(N)
      ITP = NDX(NPD);      KPD = ILM - NPD
      READ (7) MDW, MDD, IDL, PATO, PREM, AV
      READ (7) NV;      IF (NV.GT.0) READ (7) (POP(K), K=KPD,ILM-1)
      READ (7) NV;      IF (NV.GT.0) READ (7) (TL1(K), K=KPD,ILM-1)
      IF (ISW.EQ.1) GO TO 150
      READ (7) NV;      IF (NV.GT.0) READ (7) (TL2(K), K=KPD,ILM-1)
      READ (7) NV;      IF (NV.GT.0) READ (7) (BIL(K), K=KPD,ILM-1)

C:
150  PINC(KPD) = POP(KPD) - PREM
DO 158 K=KPD+1,ILM-1
      PINC(K) = POP(K) - POP(K-1)
158  POP(K-1) = 0
      KPD = KPD - 1
      CALL PSPRD (KPD,NPD,NDX,NFAC,PINC)

```

WMPREPROC

52

```

CALL PSPRD (KPD,NPD,NDX,NFAC,TL1)
IF (ISW.EQ.1) GO TO 190
CALL PSPRD (KPD,NPD,NDX,NFAC,TL2)
CALL PSPRD (KPD,NPD,NDX,NFAC,BIL)

```

```

C:
  READ (7) NV;      NT = 0
  DO 188 N=1,NV
    NN = NT + 1
    READ (7) NTO, RPK, RPW, RPD, EDW
    NT = 1 + NTO/10
    DO 188 M=NN,NT
      RPP(M,1) = RPK;   RPP(M,2) = RPW;   RPP(M,3) = RPD
188   RDW(M,3) = EDW
      GO TO 400

C:
190 READ (7) NV;      NT = 0
  DO 198 N=1,NV
    NN = NT + 1;   READ (7) NTO, RPD, DIE, DIS;   NT = 1 + NTO/10
    DO 198 M=NN,NT
      TL2(M) = RPD
    DO 198 K=1,3
      RDW(M,K) = DIE(K)
198   RPP(M,K) = DIS(K)

C:
400 IF (ITP.GE.ILM-1) GO TO 410
  DO 408 J=1,6
  DO 408 I=ITP+1,ILM-1
408   POUT(I,J) = 0
410   NFIL = NFIL + 1
  WRITE (1,12) NFIL, THETR, ENOF, THID, DAY(ITP+1)
  WRITE (4) ISW, IZER, DATE, THID, THETR, ENOF, ITP, PATO, PREM
    ,MDW, MOD, IDLY, AV
  WRITE (4) POUT, RPP
  GO TO 100
900 WRITE (1,18) MFN, FILID, NFIL, DATE;   CLOSE(7);   CLOSE (4)
  WRITE (1,2)
  END
  SUBROUTINE PSPRD (KPD,NPD,NDX,NFAC,FIMP)
  DIMENSION NDX(*), NFAC(*), FIMP(*)
  M = 0
  DO 198 N=1,NPD
    FNUM = FIMP(KPD+N)
120   M = M + 1;   IF (M.EQ.NDX(N)) GO TO 190
    FIMP(M) = FIMP(KPD+N)/NFAC(N);   FNUM = FNUM - FIMP(M);   GO TO 120
190   FIMP(M) = FNUM
198 CONTINUE
  RETURN
  END

```

MMMCASPRG

Function

Computes time phased casualty and replacement data for each theater and non-theater data set.

Input

- . Pre-processed data set files
- . Policy file(s) - applicable to each data set
- . Supply file (non-theater only) - optional

Output

A file containing casualty tables for each data set selected.

Use

- . Input to the printing/aggregating program (MMMPRNPRG)
- . Input to the demand program (MMDEMPRG)

Options

- . Selection of specific data sets from the input file - used for specifying which theaters contribute their evacuees to a particular non-theater

MMMCASPRG

```

C:      MMMCASPRG      MMM CASUALTY MODEL
C:
C:      STRING      DAY(27)(6), THETR(36), ENOF(8), THID(12), FILID(15)
C:      STRING      DATE(9), RUNDATE(9), MFN(15), LFN(15), PFN(15)
C:      STRING      THSUP(36), ENSUP(8), INID(15), INDATE(9)
C:
C:      DIMENSION    MPOL(26), PINC(26), TLOS(40), POUT(27,17)
C:      DIMENSION    POP(26), GPP(27), TLP(26), TL1(26), TL2(26), BIL(26)
C:      DIMENSION    WKA(26), WIA(26), DNB(26), DOW(26), RTD(26), PAT(26)
C:      DIMENSION    WEV(26), WHP(26), DEV(26), DHP(26)
C:
C:      DIMENSION    CWIA(26,3), CDIS(26,3), HSP(27,3), RPD(26), CDOW(3)
C:      DIMENSION    HS1(27), HS2(27), HS3(27), RP1(26), RP2(26), RP3(26)
C:      DIMENSION    RM(1134), RM1(378), RM2(378), RM3(378)
C:      DIMENSION    RDW1(26,3), RDW2(26,3), RDW(26), RWEV(3), RDEV(3), IDUM(6)
C:      DIMENSION    MDLY(3), FDLY(3), INLST(12), IDO(12), FRT(200)
C:
C:      EQUIVALENCE (POP,POUT(2,1)), (GPP,POUT(1,2)), (TLP,POUT(2,3))
C:      , (TL1,POUT(2,4)), (TL2,POUT(2,5)), (BIL,POUT(2,6))
C:      , (WKA,POUT(2,7)), (WIA,POUT(2,8)), (WEV,POUT(2,9))
C:      EQUIVALENCE (WHP,POUT(2,10)), (DNB,POUT(2,11)), (DEV,POUT(2,12))
C:      , (DHP,POUT(2,13)), (DOW,POUT(2,14)), (RTD,POUT(2,15))
C:      , (PAT,POUT(2,16)), (TLOS,POUT(2,17))
C:      EQUIVALENCE (HS1,HSP), (HS2,HSP(1,2)), (HS3,HSP(1,3))
C:      EQUIVALENCE (RDW,RDW1), (RPD,BIL)
C:      EQUIVALENCE (RP1,RDW2), (RP2,RDW2(1,2)), (RP3,RDW2(1,3))
C:      EQUIVALENCE (PREM,POUT), (PATO,POUT(1,16)), (FRT,RM)
C:      EQUIVALENCE (RM1,RM), (RM2,RM(379)), (RM3,RM(757))
C:
C:      DATA      DAY/'PRE-M'
C:      , 'M', 'M+10', 'M+20', 'M+30', 'M+40', 'M+50', 'M+60', 'M+70', 'M+80'
C:      , 'M+90', 'M+100', 'M+110', 'M+120', 'M+130', 'M+140', 'M+150', 'M+160'
C:      , 'M+170', 'M+180', 'M+190'
C:      DATA      ILM/27, ISW/-1/
C:
C:      2 FORMAT(/14X,8(/-----/))
C:      4 FORMAT(14X,8(/-----/))
C:      6 FORMAT(///)
C:      7 FORMAT(15X,S12,2X,S9/)
C:      12 FORMAT(/18,1X,S36,1X,S8,2X,S12,2X,A9)
C:      18 FORMAT(/10X,S15,/:/,1X,S15,I4, RECORDS/,2X,S9///)
C:
C:      WRITE (1,6)
C:      ACCEPT " CASUALTY RUN DATE = ", RUNDATE
C:      ACCEPT " CASUALTY FILE(OUTPUT) = ", LFN, " ID = ", FILID
C:      OPEN (4,LFN,OUTPUT,BINARY); WRITE (4) FILID, RUNDATE; DISPLAY " "
C:      ACCEPT " INPUT FILE = ", MFN; OPEN (7,MFN,INPUT,BINARY)
C:      READ (7) INID, DATE; WRITE (1,7) INID, DATE; WRITE (1,2)
C:      ACCEPT " # OF RECORDS TO PROCESS = ", NUMR
C:      ACCEPT " REC'D #S = ", (INLST(N), N=1,NUMR)
C:      DO 108 N=1,NUMR
C:      108 IDO(INLST(N)) = 1
C:
C:      150 LSW = ISW
C:      160 READ (7,END=900) ISW,LTP,DATE,THID,THETR,ENOF,ITP,PATO,FREM
C:      ,MDW,MDD,IDLY,AV
C:      NREC = NREC + 1

```

```

IF (ISW.EQ.0) READ (7) PINC, TL1, TL2, BIL, RDW, RDW, RDW2
IF (ISW.EQ.1) READ (7) PINC, TLP, RPD, RDW1, RDW2
IF (IDO(NREC).EQ.0) GO TO 160
  KREC = KREC + 1
WRITE (1,12) NREC, THETR, ENOF, THID, DATE
IF (ISW.EQ.LSW) GO TO (300,500), ISW+1
170 ACCEPT " POLICY FILE = ", PFN; OPEN (3,PFN,INPUT,BINARY)
READ (3) JSW, JNUM; IF (JSW.EQ.ISW) GO TO 172
DISPLAY " WRONG POLICY FILE"; GO TO 170
172 READ (3) MPOL, RWEV, RDEV, IDUM
DO 176 J=1,JNUM
176 READ (3) KB, KT, (FRT(K), K=1,KT)
READ (3) RM1, RM2; IF (JSW.EQ.1) READ (3) RM3
CLOSE (3); GO TO (300,500), ISW+1

C:
C: COMPUTE THEATER
300 MDLY(1) = TRUNC(MDW/10.0); FDLY(1) = FRACT(MDW/10.0)
  MDLY(2) = TRUNC(MDD/10.0); FDLY(2) = FRACT(MDD/10.0)
  HS2(1) = PAT0; POP(1) = PREM + PINC(1); GPP(1) = PREM
DO 358 I=1,ITP
  RPF = 5 * (RP1(I)+RP2(I)+RP3(I))
  TLP(I) = TL1(I) + TL2(I)
  IF (I.GT.1) POP(I) = POP(I-1) + PINC(I)
  GPP(I+1) = POP(I); IF (IDLY.EQ.0) GO TO 320
  GPP(I+1) = (1.-RPF)*GPP(I) + PINC(I) - TLP(I)
  IF (I.GT.IDLY) GPP(I+1) = GPP(I+1) + RTD(I-IDLY) + TLOS(I-IDLY)
  GPP(I+1) = GPP(I+1)/(1.+RPF)
320 TMP = 10*(1.-AV)*GPP(I) + 10*AV*GPP(I+1)
  IF (I.EQ.1) TMP = POP(I) + 9*GPP(I)
  WKA(I) = RP1(I)*TMP + TL1(I)
  WIA(I) = RP2(I)*TMP + TL2(I); DNB(I) = RP3(I)*TMP
  IF (I+MDLY(1)-ITP) 322,324,330
322 WEV(I+1+MDLY(1)) = WEV(I+1+MDLY(1)) + RWEV(MPOL(I))*WIA(I)*FDLY(1)
324 WEV(I+MDLY(1)) = WEV(I+MDLY(1)) + RWEV(MPOL(I))*WIA(I)*(1.-FDLY(1))
330 IF (I+MDLY(2)-ITP) 332,334,340
332 DEV(I+1+MDLY(2)) = DEV(I+1+MDLY(2)) + RDEV(MPOL(I))*DNB(I)*FDLY(2)
334 DEV(I+MDLY(2)) = DEV(I+MDLY(2)) + RDEV(MPOL(I))*DNB(I)*(1.-FDLY(2))
340 WHP(I) = WIA(I) - WEV(I); DHP(I) = DNB(I) - DEV(I)
  CDW = RDW(I) * (1.-RWEV(MPOL(I))) * WIA(I)
  HS1(I+1) = (1.-RWEV(MPOL(I)))*WIA(I) - CDW
  DOW(I) = CDW
C: CDW = RDW(I) * (1.-RDEV(MPOL(I))) * DNB(I)
  HS2(I+1) = (1.-RDEV(MPOL(I)))*DNB(I)
C: DOW(I) = DOW(I) + CDW
C:
C: PUT EVACS IN CONUS
  CWIA(I,1) = CWIA(I,1) + WEV(I); CWIA(I,2) = CWIA(I,2) + DEV(I)
  CWIA(I,3) = CWIA(I,3) + POP(I)
C:
DO 352 J=1,I+1
  IX = I*(I+1)/2 + J
352 RTD(I) = RTD(I) + HS1(J)*RM1(IX) + HS2(J)*RM2(IX)
  PAT(I) = WHP(I) + DHP(I) - DOW(I) - RTD(I)
  PAT(I) = PAT(I) + POUT(I,16)
  TLOS(I) = WKA(I) + WIA(I) + DNB(I) - RTD(I)
C: IF (I.EQ.1.AND.IDLY.NE.0) GPP(I+1) = POP(I)-WKA(I)-WIA(I)-DNB(I)
358 CONTINUE
  TPREM = TPREM + PREM
C:
400 WRITE (4) ISW, DATE, THID, THETR, ENOF, ITP, MDW, MDD, IDLY, POUT
C:

```



```

DO 462 I=1,ILM
DO 462 J=1,17
462  POUT(I,J) = 0
    IF (KREC.LT.NUMR) GO TO 150
    GO TO 900

C:
500 ACCEPT "    EVACUEE FILE = ", PFN;    IF (PFN.EQ.'N') GO TO 510
    OPEN (3,PFN);    LL = 0;    GO TO 504
502 CLOSE (3);    GO TO 500
504 READ (3,END=502) INDATE, THSUP, ENSUP, TPREM, CWIA;    LL = LL + 1
    WRITE (1,12) LL, THSUP, ENSUP, INDATE;    IF (ENSUP.NE.ENOF) GO TO 504
    CLOSE (3)
510 ACCEPT "    SUPPLY FILE = ", PFN;    IF (PFN.EQ.'N') GO TO 530
    OPEN (3,PFN);    LL = 0;    GO TO 514
512 CLOSE (3);    GO TO 510
514 READ (3,END=512) INDATE, THSUP, ENSUP, PSUP, TL2;    LL = LL + 1
    WRITE (1,12) LL, THSUP, ENSUP, INDATE;    IF (ENSUP.NE.ENOF) GO TO 514
    CLOSE (3)
    POUT(1,4) = PREM;    TL1(1) = PREM+PINC(1)
    PREM = PSUP - TPREM;    PINC(1) = TL2(1) - CWIA(1,3) - PREM
    DO 518 I=2,ILM-1
        TL1(I) = PINC(I) + TL1(I-1)
518  PINC(I) = (TL2(I)-CWIA(I,3)) - (TL2(I-1)-CWIA(I-1,3))

C:
C:    COMPUTE CONUS
530  MDLY(1) = TRUNC(MDW/10.0);    FDLY(1) = FRACT(MDW/10.0)
    MDLY(2) = TRUNC(MDD/10.0);    FDLY(2) = FRACT(MDD/10.0)
    MDLY(3) = TRUNC(IDLY/10.0);    FDLY(3) = FRACT(IDLY/10.0)
    HS2(1) = 0;    HS3(1) = PAT0;    POP(1) = PREM + PINC(1)
    GPP(1) = MAX (PREM,0)
    DO 558 I=1,ITP
        IF (I.GT.1) POP(I) = POP(I-1) + PINC(I)
        GPP(I+1) = MAX (POP(I),0)
        TMP = 10*(1.-AV)*GPP(I) + 10*AV*GPP(I+1)
        IF (I.EQ.1) TMP = POP(I) + 9*GPP(I)
        CWIA(I,3) = RPD(I)*TMP + TLP(I)
    DO 548 J=1,3
        TMP = RDW2(I,J) * CWIA(I,J)
        IF (I+MDLY(J)-ITP) 542,544,546
542  CDIS(I+1+MDLY(J),J) = CDIS(I+1+MDLY(J),J) + TMP*FDLY(J)
544  CDIS(I+MDLY(J),J) = CDIS(I+MDLY(J),J) + TMP*(1.-FDLY(J))
546  CDOW(J) = RDW1(I,J) * CWIA(I,J)
        HSP(I+1,J) = CWIA(I,J) - CDOW(J) - CDIS(I,J)
548  DOW(I) = DOW(I) + CDOW(J) + CDIS(I,J)
        WIA(I) = CWIA(I,1);    DEV(I) = CWIA(I,2)
        DHP(I) = CWIA(I,3);    DNB(I) = DEV(I) + DHP(I)
    DO 552 J=1,I+1
        IX = I*(I+1)/2 + J;    RTD(I) = RTD(I) + HS1(J)*RM1(IX)
552  RTD(I) = RTD(I) + HS2(J)*RM2(IX) + HS3(J)*RM3(IX)
        PAT(I) = HS1(I+1) + HS2(I+1) + HS3(I+1) - RTD(I)
        PAT(I) = PAT(I) + POUT(I,16)
        TLOS(I) = CWIA(I,3) - RTD(I)
558 CONTINUE
    GO TO 400

C:
900 CLOSE (7);    CLOSE (4)
    WRITE (1,18) LFN, FILID, KREC, RUNDAT;    WRITE (1,2)
    END

```

MMMPRNPRG

Functions

- . Print casualty tables
- . Print and store aggregates of casualty tables
- . Create and print hospital data files

Input

- . Casualty files created by MMPCASPRG
- . Casualty files previously created by this program
- . Hospital files previously created by this program

Output

All output is optional.

- . Casualty tables printed for any designated time periods
- . Specified aggregates of casualty tables:
 - . Printed for any designated time periods
 - . Stored as files
- . Hospital data printed for any designated time periods
- . Specified aggregates of hospital data sets:
 - . Printed for any designated time periods
- . Hospital data file

Use

Casualty tables can be aggregated to the level of detail desired for the demand program (MMDEMPRG), thus reducing storage requirements.

Hospital data files are input for the medical requirements program (MMMHOSPRG).

MMMPRNPRG

```

C:  MMMPRNPRG      PRINTS/SUMS THEATER/NON-THEATER CASUALTY OUTPUT
C:
COMMON  NDX(27), NDYS(27), IDO(12,2)
COMMON  NPD, MDW, MDD, IDLY, DAY, THETR, ENOF, THID, DATE, NYN
COMMON  NCON, NFIL, RUNDATE, RNID
C:
STRING  DAY(27)(6), THETR(36), ENOF(8), THID(12), DATE(9), NYN(3)
STRING  MFN(15), FILID(15), FILDATE(9), RUNDATE(9), RNID(12)
STRING  ENOF1(8), ENOF2(8), NCON(3,12)(3)
DIMENSION PINP(27,17), POUT(27,17), CWIA(27,3), INLST(12)
DIMENSION CWIN(27,3)
C:
DATA    DAY//PRE-M'
        , 'M', 'M+10', 'M+20', 'M+30', 'M+40', 'M+50', 'M+60', 'M+70', 'M+80'
        , 'M+90', 'M+100', 'M+110', 'M+120', 'M+130', 'M+140', 'M+150', 'M+160'
        , 'M+170', 'M+180', 'M+190', 'M+200', 'M+210', 'M+220', 'M+230', 'M+240'//
DATA    DAY(27)//M+250//
DATA    ILM/27/, ENOF1// //, ENOF2// //
C:
1  FORMAT(///)
2  FORMAT(/12X,8(/-----/))
3  FORMAT(/12X,8(/-----/),&)
7  FORMAT(15X,S12,2X,A9)
12  FORMAT(/16,1X,S36,1X,S8,2X,S12,2X,A6,&)
40  FORMAT(1X,'"',A9,'"',1X,'"',S36,'"',1X,'"',S8,'"',I12/(8X,7I10/))
C:
WRITE (1,1):      ACCEPT " RUN DATE = ", RUNDATE, "      ID = ", RNID
WRITE (1,2):      NOHSP = 0;      LSW = -1
ACCEPT "      SAVE HOSP DATA ? ", NYN;      IF (NYN.EQ.'N')      GO TO 120
ACCEPT "      HOSP FILE = ", MFN;      OPEN (4,MFN,OUTPUT,BINARY)
        NOHSP = 1
120  FILID = ' ';      FILDATE = ' ';      ISUM = 0;      IHSP = 0
ACCEPT "      INPUT FILE = ", MFN;      OPEN (7,MFN,INPUT,BINARY)
ACCEPT "      CASUALTY FILE ? ", NYN
IF (NYN.EQ.'Y')      READ (7)      FILID, FILDATE
WRITE (1,7)      FILID, FILDATE;      DISPLAY " "
DO 122  N=1,12
122  IDO(N,1) = 0
ACCEPT "      # OF RECORDS TO PROCESS = ", NUMR
IF (NUMR.GT.0)      GO TO 126
        NUMR = -NUMR;      ACCEPT "      (TP,HP,SP) ", (NCON(I,1), I=1,3)
        IDO(1,1) = 1;      IDO(1,2) = 1
DO 124  N=2,NUMR
DO 124  I=1,3
        NCON(I,N) = NCON(I,1)
        IDO(N,1) = 1
124  IDO(N,2) = 1
GO TO 130
126  ACCEPT "      LIST(#,TP,HP,SP): ", (INLST(N), (NCON(I,N), I=1,3), N=1,NUMR)
DO 128  N=1,NUMR
        IDO(INLST(N),2) = N
128  IDO(INLST(N),1) = 1
130  DISPLAY " ";      MSUM = 0;      MEVC = 0
ACCEPT "      SUM TABLES ? ", NYN;      IF (NYN.EQ.'Y')      MSUM = 1
ACCEPT "      SUM WOUNDED ? ", NYN;      IF (NYN.EQ.'Y')      MEVC = 1
WRITE (1,2):      NFIL = 0;      NREC = 0;      ACCEPT " ", NYN

```

C:

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150 READ (7,END=300) ISW,DATE,THID,THETR,ENOF,ITP,MDW,MDD,IDLY
    IF (ISW.LT.4) READ (7) PINP
    IF (ISW.GT.3) READ (7) CWIN
        NFIL = NFIL + 1; IF (IDO(NFIL,1).EQ.0) GO TO 150
    WRITE (1,12) NFIL, THETR, ENOF, THID, DAY(ITP+1); NREC = NREC + 1
    IF (ISW.EQ.2.OR.ISW.EQ.3) ISUM = ISUM + MDD - 1
    IF (ISW.GT.3) IHSP = IHSP + MDD - 1
    IF (ISW.GT.3) IHSP1 = MDD
    IF (ENOF1.EQ.1) ENOF1 = ENOF
    IF (ENOF.EQ.ENOF1) GO TO 152
    IF (ENOF2.EQ.1) ENOF2 = ENOF
152 IF (LSW.LT.0) LSW = ISW
    IF (ISW.GT.3) GO TO 180
    DO 154 I=1,ILM
        CWIN(I,1) = PINP(I,8); CWIN(I,2) = PINP(I,11)
154 CWIN(I,3) = PINP(I,14)
        IHSP1 = 1
        IF (MSUM.EQ.0) GO TO 170
        IF (MOD(ISW,2).NE.MOD(LSW,2)) GO TO 170
C:
        DO 168 J=1,17
        DO 168 I=1,ITP+1
168 POUT(I,J) = POUT(I,J) + PINP(I,J)
        ISUM = ISUM + 1; ISMAX = MAX (ISMAX,ITP)
170 IF (NCON(1,IDO(NFIL,2)).EQ.'Y') CALL SQRNT (ISW,DATE,PINP)
C:
180 IF (MEVC.EQ.0) GO TO 190
    IF (MOD(ISW,2).NE.MOD(LSW,2)) GO TO 190
    DO 182 I=1,ITP+1
    DO 182 J=1,3
182 CWIA(I,J) = CWIA(I,J) + CWIN(I,J)
        IHSP = IHSP + IHSP1; IHMAX = MAX (IHMAX,ITP)
190 IF (NOHSP.EQ.0) GO TO 192
    WRITE (4) ISW+4, DATE, THID, THETR, ENOF, ITP, 0, IHSP1, NFIL, CWIN
192 IF (NCON(2,IDO(NFIL,2)).EQ.'Y') CALL SQRNT (MOD(ISW,2)+4,DATE,CWIN)
    IF (NREC.LT.NUMR) GO TO 150
300 CLOSE (7)
    ACCEPT " ANOTHER INPUT FILE ? ", NYN; IF (NYN.EQ.'Y') GO TO 120
C:
    LSW = MOD(LSW,2)
    NFIL = 0; IF (ENOF2.NE.1) ENOF = LEFT(ENOF1,3) + "&" + LEFT(ENOF2,3)
    WRITE (1,1): IF (ISUM.EQ.0) GO TO 350
    ACCEPT " TABLE SUMMARY THEATER = ", THETR, " ID = ", THID
    IF (LSW.EQ.1) GO TO 310
    ACCEPT " SAVE EVAC DATA ? ", NYN; IF (NYN.EQ.'N') GO TO 310
    MFN = MMMEVAC + ENOF; OPEN (3,MFN,OUTPUT)
    WRITE (3,40) RUNDATE, THETR, ENOF, POUT(1,1), (POUT(1,9), I=2,27)
        , (POUT(1,12), I=2,27), (POUT(1,1), I=2,27); CLOSE (3)
310 ACCEPT " SAVE TABLE SUMMARY ? ", NYN; IF (NYN.EQ.'N') GO TO 320
    ACCEPT " FILE NAME = ", MFN, " FILE ID = ", FILID
    OPEN (3,MFN,OUTPUT,BINARY); WRITE (3) FILID, RUNDATE
    WRITE (3) LSW+2, RUNDATE, THID, THETR, ENOF, ISMAX, 0, ISUM, 0, POUT
    CLOSE (3)
320 ACCEPT " PRINT TABLE SUMMARY ? ", NYN
    IF (NYN.EQ.'Y') CALL SQRNT (LSW+2,RUNDATE,POUT)
C:
350 IF (IHSP.EQ.0) GO TO 360
    ACCEPT " HOSP SUMMARY THEATER = ", THETR, " ID = ", THID
    ACCEPT " SAVE HOSP SUMMARY ? ", NYN; IF (NYN.EQ.'N') GO TO 370
    IF (NOHSP.EQ.1) GO TO 360
    ACCEPT " HOSP FILE NAME = ", MFN; OPEN (4,MFN,OUTPUT,BINARY)

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360 WRITE (4) LSW+4, RUNDTE, THID, THETR, ENOF, IHMAX, 0, IHSP, 0, CWIA
CLOSE (4)
370 ACCEPT " PRINT HOSP SUMMARY ? ", NYN
IF (NYN.EQ.'Y') CALL SOPRNT (LSW+4,RUNDTE,CWIA)
900 WRITE (1,2)
END

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SUBROUTINE SOPRNT (NSW,PRNDTE,POUT)
COMMON NDX(27), NDYS(27), IDO(12,2)
COMMON NPD, MDW, MDD, IDLY, DAY, THETR, ENOF, THID, DATE, NYN
COMMON NCON, NFIL

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C:
  DIMENSION POUT(*,*)
  STRING DAY(27)(6), THETR(36), THID(12), DATE(9), NYN(3), NAM(17)(7)
  STRING ENOF(8), NAM2(3)(6), NCON(3,12)(3), PRNDTE(9)

C:
  DATA NAM/'POP','ADJ-POP','BTL CAS','KIA','WIA','BIL LOS','KIA','WIA'
    , 'EVAC','HOSP','DNBI','EVAC','HOSP','DOW','RTD','PATS','REPLS'/
  DATA NBZZ/13/

C:
  2 FORMAT(/12X,14('-----'))
  3 FORMAT(/12X,14('-----'),&)
  4 FORMAT(12X,14('-----'))
  8 FORMAT(/4X,'*REPLACEMENT DELAY = ',I3,' DAYS'/6X,'EVACUATION'
    , ' DELAY: WIA = ',I3,' DAYS'/24X,'DNBI = ',I3,' DAYS'/)
  10 FORMAT(///4X,S9,2X,S12,9X,S36,8X,S8//)
  20 FORMAT(/12X,14(2X,A6))
  22 FORMAT(/4X,S7,1X,14I8)
  24 FORMAT(7X,S4,1X,14I8)

C:
  NPD = 26
  DO 202 N=1,NPD
    202 NDX(N) = N

C:
  NPD = 14
C:
  DO 202 N=1,NPD
C:
  IF (N.LT.12) NDX(N) = N
C:
  IF (N.GT.11) NDX(N) = N + 2*(N-11)
C:202 CONTINUE
C:
  NPD = 25
C:
  DO 202 N=1,NPD
C:202 NDX(N) = N
  IF (NFIL.EQ.0) GO TO 204
  IF (NCON(3,IDO(NFIL,2)).EQ.'S') GO TO 220
  204 NYN = 'N'; IF (NFIL.EQ.0) ACCEPT " STANDARD PRINT ? ", NYN
  IF (NYN.EQ.'Y') GO TO 220
  ACCEPT " # OF PERIODS TO PRINT = ", NPD; NPD = NPD + 1
  ACCEPT " LIST PERIOD(S): ", (NDYS(N), N=2,NPD); NDX(1) = 1
  DO 212 N=2,NPD
  212 NDX(N) = 2 + NDYS(N)/10
  220 IF (NSW.GT.3) GO TO 600

C:
C:
  SQUISH THEATER/SUMMARY
  I = 1
  DO 398 N=2,NPD
    I = I + 1; IF (I.EQ.NDX(N)) GO TO 398
    II = NDX(N) - 1
  DO 378 I=I,II
  DO 368 J=3,15
  IF (J.EQ.4.AND.MOD(NSW,2).EQ.1) GO TO 368
    POUT(NDX(N),J) = POUT(NDX(N),J) + POUT(I,J)

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368 CONTINUE
      POUT(NDX(N),17) = POUT(NDX(N),17) + POUT(I,17)
378 CONTINUE
      I = NDX(N)
398 CONTINUE
C:
C:      PRINT THEATER/SUMMARY
      NT = 0;      IF (MOD(NSW,2).GT.0) GO TO 404
      NAM(3) = 'BTL CAS'; NAM(8) = 'WIA'; NAM(12) = 'EVAC'
      NAM(13) = 'HOSP'; NAM(14) = 'DOW'; GO TO 410
404 NAM(3) = 'DNBI'; NAM(8) = 'WIA-TR'; NAM(12) = 'TR'
      NAM(13) = 'OTHR'; NAM(14) = 'DOW-DIS'
410 NB = NT + 1; NT = MIN(NB+NBZZ,NPD)
      WRITE (1,10) PRNDATE, THID, THETR, ENOF
      WRITE (1,20) (DAY(NDX(N)), N=NB,NT); K = 0
      DO 428 J=1,17
      IF (J.EQ.7.OR.J.EQ.17) WRITE (1,2)
      JA = 0
      IF (MOD(NSW,2).EQ.0) GO TO 412
      IF (J.EQ.1) JA = 3
      IF (J.LT.11) GO TO (422,422,422,428,428,428,428,422,428,428), J
      IF (J.GT.10) GO TO (422,424,424,422,422,422,422), J-10
412 IF (J.EQ.11) K = 3
      GO TO (422,422,422,424,424,428,422,422,424,424,422,422,422,422), J-K
422 WRITE (1,22) NAM(J), (POUT(NDX(N),J+JA), N=NB,NT); GO TO 428
424 WRITE (1,24) NAM(J), (POUT(NDX(N),J), N=NB,NT)
428 CONTINUE
      DO 432 N=NB,NT
      IF (N.GT.1) POUT(NDX(N),17) = POUT(NDX(N),17) + POUT(NDX(N-1),17)
432 CONTINUE
      WRITE (1,22) 'CUM-REP', (POUT(NDX(N),17), N=NB,NT)
C:      WRITE (1,22) 'EVACS', ((POUT(NDX(N),9)+POUT(NDX(N),12)), N=NB,NT)
      IF (NSW.EQ.0) WRITE (1,8) 10*IDLY, MDW, MOD
      WRITE (1,2); DISPLAY CHAR(108); IF (NT.LT.NPD) GO TO 410
      RETURN
C:
C:      SQUISH/PRINT HOSPITAL DATA
400 I = 1
      DO 618 N=2,NPD
      I = I + 1; IF (I.EQ.NDX(N)) GO TO 618
      II = NDX(N) - 1
      DO 612 I=I,II
      DO 612 J=1,3
612 POUT(NDX(N),J) = POUT(NDX(N),J) + POUT(I,J)
618 I = NDX(N)
      NT = 0; WRITE (1,10) PRNDATE, THID, THETR, ENOF
      NAM2(1) = 'WIA'; NAM2(2) = 'DNBI'; NAM2(3) = 'DOW'
430 NB = NT + 1; NT = MIN(NB+NBZZ,NPD); WRITE (1,20) (DAY(NDX(N)), N=NB,NT)
      DO 638 J=1,3
638 WRITE (1,22) NAM2(J), (POUT(NDX(N),J), N=NB,NT)
      IF (NT.GE.NPD) GO TO 650
      DISPLAY " "; DISPLAY " "; GO TO 630
650 WRITE (1,2); WRITE (1,4); DISPLAY CHAR(108); RETURN
      END

```

MMMHOSPRG

Function

Produces peak medical staff requirements, by time period, by staff designation (doctors, nurses, corpsmen), for WIA/NBI patients and for DISEASED patients.

Input

- . WIA, DNBI, POW & DISCHARGE data extracted from casualty tables and stored in hospital data file(s) by MMMPRNPRG. Any combination of files and data sets within files may be pooled for processing
- . A policy file produced by NUPOLPRG appropriate for the particular casualty sources. This is usually, but not necessarily, the same theater or non-theater policy file used by the casualty program (MMMCASPRG)
- . Designation of the rate of admissions in any specified time period. i.e., 10% per day, 40% on day 4 and 60% on day 5, etc.

Output

- . A medical requirements file containing tables of peak staff requirements for WIA/NBI patients and DISEASED patients by time period
- . Printed versions of each table produced

Use

- . Input to printing program (MEDPRN)
- . Input to the demand program (MMMDENPRG)

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C:   MMMHOSPRG      ESTIMATES MEDICAL REQ'MENTS, CREATES MED REQ FILE
C:
      STRING      DAY(27)(6), THETR(36), IFN(15), MFN(15), PFN(15), NYN(3)
      STRING      TYP(2)(8), THID(12), FILID(15), DATE(9), RUNDAT(9), ENDF(8)
      STRING      ECHORG(8)
      DIMENSION   MDL(2), IDO(15), INLST(15), MDA(2)
      DIMENSION   WIA(26), INB(26), DOW(26), WIAx(26), INBx(26), DOWx(26)
      DIMENSION   MPOL(270), MFOL(26), IRTD(3,2), RWDV(3,2), HWW(2), HDW(2)
      DIMENSION   AEV(26,2), EVX(26,2,3), RVX(2,3)
      DIMENSION   JB(8), JT(8), KB(8)
      DIMENSION   FHP(7,2), FHN(6,2), FHC(6,2), RCHP(3,2), FHPX(3,2)
      DIMENSION   FNP(5,2), FNN(5,2), FNC(5,2), FNPX(3), LPNC(5)

C:
      DIMENSION   HSP(26), PAT(26), WHF(26), WHN(26), WHC(26)
      DIMENSION   ADF(270), ADN(270), ADC(270), PEP(270), FRT(500), FDW(5)

C:
      DATA      DAY//PRE-M/
               ,M/,M+10/,M+20/,M+30/,M+40/,M+50/,M+60/,M+70/,M+80/
               ,M+90/,M+100/,M+110/,M+120/,M+130/,M+140/,M+150/,M+160/
               ,M+170/,M+180/,M+190/,M+200/,M+210/,M+220/,M+230/,M+240/
      DATA      DAY(27)//M+250/
      DATA      FHP/1.196, 5*.107, 0, .114, 5*.04, 0/
      DATA      RCHP/.04,.05,.06, .017,.022,.022/
      DATA      FHPX/.02,.01,0, .01,.005,0/
      DATA      FHN/.908,.363,.338,.338,.334,.312, .242,.242,.229,.229,.209,.186/
      DATA      FHC/1.89,.503,.465,.465,.458,.426, .321,.321,.301,.301,.272,.236/

C:
      DATA      FNP/.33,.074,0,0,.015, .210,.038,.038,.016,.016/
      DATA      FNPX/.056,.059,.061/
      DATA      FNN/.595,.495,.242,.242,.202, .302,.280,.204,.204,.195/
      DATA      FNC/.827,.693,.302,.302,.236, .386,.354,.241,.241,.227/

C:
      DATA      HWW/1.0,0.0/, HDW/0.2,.8/, FDW/.6,.7,.8,.9,1.0/
      DATA      ILM/26/, LPNC/1,10,15,50,270/
      DATA      TYP//WIA\NBI/,DISEASED//

C:
      2 FORMAT(/14X,8(/-----/))
      4 FORMAT(14X,8(/-----/))
      6 FORMAT(///)
      7 FORMAT(15X,S12,2X,A9)
      10 FORMAT(///8X,A36,22X,S12//34X,98)
      12 FORMAT(/15,2X,S36,1X,98,2X,S12,2X,A6)
      20 FORMAT(/12X,'ADMISSIONS',4X,'PATIENTS',5X,'DOCTORS',6X,'NURSES'
               ,4X,'CORPSMEN'/28X,'PEAK'/)
      22 FORMAT(4X,A6,S112)

C:
      WRITE (1,6);      ACCEPT " RUN DATE = ", RUNDAT
      100 ACCEPT " MEDICAL REQ'MENTS FILE = ",MFN, " ID = ", FILID
      OPEN (4,MFN,OUTPUT,BINARY)
      ACCEPT " ADD-ON ? ", NYN; IF (NYN.EQ.'N') WRITE (4) FILID, RUNDAT

C:
      ACCEPT " POLICY FILE = ", PFN; OPEN (3,PFN,INPUT,BINARY)
      READ (3) JSW, JNUM, MPOL, RWDV, IRTD
      JB(1) = 0
      DO 122 J=1,JNUM
      READ (3) KB(J), JT(J), (FRT(K+JB(J)), K=1,JT(J))
      122 JB(J+1) = JT(J) + JB(J)
      CLOSE (3)

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ACCEPT " RUN THRU DAY M+", NTT
DISPLAY " "; DISPLAY " ENTER ADM RATES: "; NT = -10
130 NN = NT + 1; DISPLAY " FROM", NN
ACCEPT " TO ", NT, " = ", PDPCT
DO 132 M=NN+10,NT+10
132 PDP(M) = PDPCT
IF (NT.LT.NTT) GO TO 130
ITPX = NTT/10 + 1
ACCEPT " EVAC DELAY: WIA\NBI = ", MDL(1), " DIS = ", MDL(2)
C:
WRITE (1,2): NONT = 0; NCONT = 0
180 ACCEPT " HOSPITAL FILE = ", MFN; OPEN (7,MFN,RANDIN (189),BINARY)
190 ACCEPT " # OF RECORDS TO PROCESS = ", NUMR
ACCEPT " REC'D #S = ", (INLST(N), N=1,NUMR); NREC = 0
C:
200 NREC = NREC + 1
READ (7)(INLST(NREC)) ISW, DATE, THID, THETR, ENOF, ITP, NF1,NF2,NF3
,XNF, WJAX, XNF, DNBX, XNF, DOWX; ISW = MOD(ISW,2)
IF (ISW.NE.ISW) GO TO 200
NONT = NONT + 1; NCONT = NCONT + NF2
WRITE (1,2) INLST(NREC), THETR, ENOF, THID, DAY(ITP+1)
DO 218 I=1,ITP
WIA(I) = WIA(I) + WJAX(I)
DNB(I) = DNB(I) + DNBX(I)
218 DOW(I) = DOW(I) + DOWX(I)
IF (NREC.LT.NUMR) GO TO 200
CLOSE (7)
ACCEPT " ANOTHER HOSPITAL FILE ?",NYN; IF (NYN.EQ.'N') GO TO 240
DO 222 N=1,15
222 INLST(N) = 0
GO TO 180
240 DISPLAY " ", NONT, " REC'DS USED"; WRITE (1,2)
C: IX = ICH
C:150 DISPLAY " EVAC TO ECH ", IX+1
C: ACCEPT " ZWIA\NBI = ", RVX(IX,1), " ZDIS = ", RVX(IX,2)
C: IX = IX + 1; IF (IX.LE.3) GO TO 150
C:
C: ACCEPT " EVACUEE FILE FOR OTHER ECHELONS = ", IFN
C: OPEN (3,IFN,OUTPUT,BINARY)
C:
ACCEPT " MEDICAL TABLE THEATER = ", THETR, " ID = ", THID
C:
IW = 0; ITP = ITPX; ISWI = 1 - ISW
400 IW = IW + 1; MEV = MDL(IW); IIA = 0; KDOMAX = 0; MAV = MDA(IW)
DO 408 I=1,ILM
WHP(I) = 0; WHN(I) = 0; WHC(I) = 0; FAT(I) = 0
408 CONTINUE
DO 498 I=1,ITP
IB = 10*(I-1); PDPX = 0; HS21 = 0
FHP(7,IW) = RCUP(MPOL(I),IW)
FNP(3,1) = FNPX(MPOL(I)); FNP(4,1) = FNP(3,1)
HSP(I) = HWW(IW)*WIA(I) + HDW(IW)*DNB(I)
EVT = RWDV(MPOL(I),IW)*HSP(I)
JU = IRTD(MPOL(I),IW); KFR = JB(JU) + 1
KBGN = KB(JU)-1; KTOP = KBGN + JT(JU) - 1
KDO = MIN(KTOP,10*ILM-IB); KLM = MIN(21,KDO)
KDOMAX = MAX (KDO+10,KDOMAX); KDOMAX = MIN (KDOMAX,10*ILM-IB)
C: DO 412 IX = ICH,3
C:412 EVX(I,IW,IX) = EVT*RVX(IW,IX)
C:
DO 458 N=1,10

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      NN = IB + N
      ADM = PDP(NN) * HSP(I);   EVN = PDP(NN) * EVT
      DWN = PDP(NN) * DOW(I);   RTN = ADM - DWN - ISWI*EVN
C:    AEN = PDP(NN) * AEV(I,IW)
      FEV = 0;   KX = 1;   FEVA = 0
      DO 438 K=1,KLM
        KK = MAX(0,K-KBGN);   IF (K.GT.MEV) FEV = 1.0
C:    IF (K.GT.MAV) FEVA = 1.0
C:    HSX = FEVA*AEN;   RTN = RTN + HSX
      HSS = ADM - FDW(MIN(K,5))*DWN - FRT(KFR+KK)*RTN - ISWI*FEV*EVN + HSX
      IF (HSS.LE.0) GO TO 440
      L = N - 1 + K;   PEP(L) = PEP(L) + HSS
      IF (L.EQ.21) HS21 = HS21 + HSS
      IF (ISW.EQ.0) GO TO 430
      IF (K.GT.LPNC(KX)) KX = KX + 1
      ADP(L) = ADP(L) + FNP(KX,IW) * HSS
      ADN(L) = ADN(L) + FNN(KX,IW) * HSS
      ADC(L) = ADC(L) + FNC(KX,IW) * HSS;   GO TO 434
430  ADP(L) = ADP(L) + FHP(MIN(K,7),IW)*HSS
C:    ADP(L) = ADP(L) + FHPX(MIN(MAX(K-MAV,1),3),IW)*HSX
      ADN(L) = ADN(L) + FHN(MIN(K,6),IW)*HSS
      ADC(L) = ADC(L) + FHC(MIN(K,6),IW)*HSS
434  IF (L.GE.KLM) GO TO 440
438  CONTINUE
440  WHP(I) = MAX(WHP(I),ADP(N));   WHN(I) = MAX(WHN(I),ADN(N))
      WHC(I) = MAX(WHC(I),ADC(N));   PAT(I) = MAX(PAT(I),PEP(N))
      PDPX = MAX(PDPX,PDP(NN))
458  CONTINUE
C:    IF (KDO.LE.21) GO TO 480
      KX = 4
      DO 478 L=31,KDO+10,10
        KK = MAX(0,L-10-KBGN)
        HS21 = HS21 - FRT(KFR+KK)*RTN/PDPX
      IF (HS21.LE.0) GO TO 480
      PEP(L) = PEP(L) + HS21
      IF (ISW.EQ.0) GO TO 470
      IF (L.GT.50) KX = 5
      ADP(L) = ADP(L) + HS21*FNP(KX,IW)
      ADN(L) = ADN(L) + HS21*FNN(KX,IW)
      ADC(L) = ADC(L) + HS21*FNC(KX,IW);   GO TO 478
470  ADP(L) = ADP(L) + HS21*FHP(7,IW)
      ADN(L) = ADN(L) + HS21*FHN(6,IW)
      ADC(L) = ADC(L) + HS21*FHC(6,IW)
478  CONTINUE
480  DO 482 L=1,31
      PEP(L) = PEP(L+10);   ADP(L) = ADP(L+10);   ADN(L) = ADN(L+10)
482  ADC(L) = ADC(L+10)
      DO 486 L=41,KDOMAX+10,10
      PEP(L) = PEP(L+10);   ADP(L) = ADP(L+10);   ADN(L) = ADN(L+10)
486  ADC(L) = ADC(L+10)
      IF (I.LT.ITP) GO TO 498
      IF (IIA.EQ.0) IADD = MIN(1+KDOMAX/10, ILM-ITP)
      IF (IIA.GE.IADD) GO TO 498
      IIA = IIA + 1
      DO 492 N=1,10
      WHP(I+IIA) = MAX(WHP(I+IIA),ADP(N));   WHN(I+IIA) = MAX(WHN(I+IIA),ADN(N))
      WHC(I+IIA) = MAX(WHC(I+IIA),ADC(N));   PAT(I+IIA) = MAX(PAT(I+IIA),PEP(N))
492  CONTINUE
      GO TO 480
C:

```

C:

498 CONTINUE

C:

```
ACCEPT "?",NYN; WRITE (1,10) THETR, THID, TYP(IW); WRITE (1,20)
DO 518 I=1,ITP+IADD
518 WRITE (1,22) DAY(I+1), HSP(I), PAT(I), WHP(I), WHN(I), WHC(I)
WRITE (1,2); WRITE (1,4); ACCEPT "?", NYN
WRITE (4) 100+ISW, RUNDAT, THID, THETR, TYP(IW), ITP, IW,NFCNT, 0
WRITE (4) ZER,HSP, ZER,PAT, ZER,WHP, ZER,WHN, ZER,WHC
DO 522 L=1,270
ADP (L) = 0; ADN(L) = 0; ADC(L) = 0
522 PEP (L) = 0
IF (IW.EQ.1) GO TO 400
CLOSE (7); NCNT = 0
ACCEPT " ANOTHER MEDICAL TABLE ? ", NYN; IF (NYN.EQ.'N') GO TO 900
DO 532 I=1,ILM
WIA(I) = 0; DNB(I) = 0
532 DOW(I) = 0
GO TO 180
900 CLOSE(4); WRITE (1,4)
END
```

MEDPRN

Function

Aggregates medical requirements tables and tallies enlisted, officer and total requirements.

Input

- Medical requirements files generated by the medical requirements program (MMMHOSPRG). Any data sets from any files may be pooled for processing.

Output

- Printed tables of peak medical staff requirements by staff type, enlisted, officers and totals, by time period

```

STRING      DAY(27)(6), THETR(36), ENOF(8), THID(12), DATE(9)
STRING      MFN(15), FILID(15), FILDATE(9), RUNDATE(9), NYN(3)
STRING      NAM(14)(9), ENOFL(8), TYP(3)(8), RNID(12), TYPA(8)
DIMENSION   NDX(27), NDYS(27), PINP(27,17), PMED(27,5)
DIMENSION   PCD(27), DEM(27,3), DNS(27,2), DTE(27), PNS(27)
DIMENSION   AMED(27,5), DMED(27,2), IDO(12)

```

C:

```

DATA      DAY//PRE-M', 'M'
           , 'M+10', 'M+20', 'M+30', 'M+40', 'M+50', 'M+60', 'M+70', 'M+80', 'M+90'
           , 'M+100', 'M+110', 'M+120', 'M+130', 'M+140', 'M+150', 'M+160', 'M+170'
           , 'M+180', 'M+190' /
DATA      (DAY(I), I=22, 27) // 'M+200', 'M+210', 'M+220', 'M+230', 'M+240', 'M+250' /
DATA      TYP//WIA\NBI', 'DISEASED', WIA&DIS' /
DATA      PCD/27*.10/, ILM/27/,   NBZZ/13/

```

C:

```

1  FORMAT(//)
2  FORMAT(/12X, 6('-----'), 22X, 6('-----'))
4  FORMAT(12X, 6('-----'), 22X, 6('-----'))
7  FORMAT(15X, S12, 2X, A9)
10 FORMAT(///4X, S9, 2X, S12, 9X, S36, 8X, S8//)
12 FORMAT(/15, S36, 1X, S8, 2X, S12, 2X, A6)
20 FORMAT(/12X, 'ADMISSIONS', 4X, 'PATIENTS', 5X, 'DOCTORS', 6X, 'NURSES'
           , 4X, 'CORPSMEN', 22X, 'OFFICERS   ENLISTED', 7X, 'TOTAL' / 28X, 'PEAK' /)
22 FORMAT(4X, A6, S112, 18X, S112)
30 FORMAT(/14X, 'OFFICERS', 4X, 'ENLISTED', 7X, 'TOTAL' /)
14 FORMAT(8X, I4, ' RECS USED' /)

```

C:

```

WRITE (1,1):   ACCEPT " RUN DATE = ", RUNDATE, "      "

```

C:

```

200  LIW = -1:   ACCEPT " MEDICAL FILE = ", MFN
OPEN (7, MFN, INPUT, BINARY):           NFIL = 0
READ (7) FILID, FILDATE:                 WRITE (1,7) FILID, FILDATE
CALL GETDO (IDO, NUMR):                   NUMR = NUMR + NRECH
210  READ (7, END=250) ISW, DATE, THID, THETR, TYPA, ITP, IW, NF1, NF2, PMED
      NFIL = NFIL + 1:   IF (IDO(NFIL).EQ.0) GO TO 210
WRITE (1,12) NFIL, THETR, TYPA, THID, DAY(ITP+1)
NRECH = NRECH + 1:      KSW = MOD(ISW, 2)
IF (LIW.LT.0) LIW = IW
IF (IW.NE.LIW) LIW = 3

```

C:

```

DO 238 J=1, ILM
  DMED(I,1) = DMED(I,1) + PMED(I,3) + PMED(I,4)
  DMED(I,2) = DMED(I,2) + PMED(I,5)
DO 238 K=1, 5
  AMED(I,K) = AMED(I,K) + PMED(I,K)
238 CONTINUE
  ITPX = MAX (ITPX, ITP):   IF (NRECH.LT.NUMR) GO TO 210
250 CLOSE (7):   ACCEPT "      ANOTHER MEDICAL FILE ? ", NYN
IF (NYN.EQ.'Y') GO TO 200
WRITE (1,14) NRECH:   WRITE (1,2)

```

C:

```

ACCEPT " MEDICAL TABLE THEATER = ", THETR, "      ID = ", THID
DISPLAY CHAR(108)
WRITE (1,10) RUNDATE, THID, THETR, TYP(LIW):   WRITE (1,20)
DO 518 I=2, ILM
518 WRITE (1,22) DAY(I), (AMED(I,K), K=1,5), (DMED(I,K), K=1,2)
      , (DMED(I,1)+DMED(I,2))

```

```
C:  WRITE (1,2)
C:  WRITE (1,10) RUNDAT, THID, THETRD, TYP(LIW);  WRITE (1,30)
C:  DO 522 I=2,ILM
C:522 WRITE (1,22) DAY(I), (DMED(I,K), K=1,2), (DMED(I,1)+DMED(I,2))
      WRITE (1,2);  WRITE (1,4);  DISPLAY CHAR(108)
      DO 532 K=1,5
      DO 532 I=2,ILM
      IF (K.LT.3) DMED(I,K) = 0
532  AMED(I,K) = 0
      CLOSE (7);  NCNT = 0
      ACCEPT "  ANOTHER MEDICAL TABLE ? ", NYN;  IF (NYN.EQ.'Y') GO TO 200
900  CLOSE(4);  WRITE (1,4)
      END
```

```
SUBROUTINE GETDO (IDO,NUMR)
DIMENSION IDO(*), INLST(12)
DO 112 N=1,12
112  IDO(N) = 0
      ACCEPT "  # OF RECORDS TO PROCESS = ", NUMR
      ACCEPT "  RECD #S = ", (INLST(N), N=1,NUMR)
      DO 122 N=1,NUMR
122  IDO(INLST(N)) = 1
      RETURN
      END
```

MMDEMPRG

Function

This program produces detailed demand tables.

Input

- . Casualty data sets from either MMCCASPRG or MMMPRNPRG
- . Medical requirements data sets from MMMHOSPRG
- . Non-structure input as one of the following:
 - 1) %, by time period, of non-theater structure
 - 2) personnel by time period

Output

- . A demand file containing each demand table created
- . A printout, by time period, for each demand table

Use

The demand file is an input for the demand-supply comparison program (MMDSMODL)

Options

- . Both casualty data sets and medical data sets are individually selected for use in creating each demand table. This allows flexibility in determining the cross-sections represented in each demand table; i.e., for officers or enlisted, for subset theaters(s), total theater, etc.
- . Table printouts are optional, and the time periods for which data is printed may also be specified

C: MMMDMPRG DEMAND MODEL

C: STRING DAY(27)(6), THETR(36), ENDF(8), THID(12), DATE(9)
 C: STRING MFN(15), FILID(15), FILD(9), RUND(9), NYN(3)
 C: STRING NAM(14)(9), ENDFL(8), TYP(8), DTHETR(36), RNID(12)
 C: STRING RORP(2)(9)
 C: DIMENSION NDX(27), NDYS(27), PINP(27,17), PMED(27,5)
 C: DIMENSION PCD(27), DEM(27,3), DNS(27,2), DTE(27), PNS(27)
 C: DIMENSION DOUT(27,14), DMED(27,2), IDO(12)
 C: EQUIVALENCE (DEM,DOUT), (DNS,DOUT(1,8)), (DTE,DOUT(1,14))
 C: DATA DAY//PRE-M', 'M'
 ', 'M+10', 'M+20', 'M+30', 'M+40', 'M+50', 'M+60', 'M+70', 'M+80', 'M+90'
 ', 'M+100', 'M+110', 'M+120', 'M+130', 'M+140', 'M+150', 'M+160', 'M+170'
 ', 'M+180', 'M+190' /
 C: DATA DAY(22) //M+200', 'M+210', 'M+220', 'M+230', 'M+240', 'M+250' /
 C: DATA NAM//DEMAND', 'TRAINED', 'STRUCTURE', 'THEATER', 'NON-THETR'
 ', 'MEDICAL', 'BIL LOS', 'NON-STRUC', 'CAS-REPLS', 'KIA', 'WIA'
 ', 'DNBI', 'RTDS', 'TRAINEES' /
 C: DATA RORP//RATES ', 'PERSONNEL' /
 C: DATA PCD/27*.10/, ILM/27/, NBZZ/13/

C: 1 FORMAT(//)
 2 FORMAT(6X,15('_____'))
 7 FORMAT(15X,S12,2X,A9)
 9 FORMAT(2X,S36,1X,A12,1X,S3,1X,A9,1X,A6)
 10 FORMAT(//2X,S9,2X,S12,3X,S8,2X,S36//)
 12 FORMAT(15,2X,S36,2X,S8,2X,S12,A6)
 14 FORMAT(8X,14,' RECS USED//')
 16 FORMAT(7X,'ANOTHER ',A8,&)
 18 FORMAT(6X,'ENTER ',S9,' PRE-M = (%)
 19 FORMAT(6X,'FROM M+',S4,&)
 20 FORMAT(//14X,14(2X,A6))
 62 FORMAT(//2X,S9,3X,14I8)
 64 FORMAT(//4X,S9,1X,14I8)
 66 FORMAT(6X,S8,14I8)

C: WRITE (1,1)
 ACCEPT " RUN DATE = ", RUND(9), " ID = ", FILID, " "
 ACCEPT " RUN THRU DAY M+", NTT; DISPLAY " "; WRITE (1,2)
 ITPX = NTT/10 + 1
 ACCEPT " DEMAND FILE = ", MFN, " "; OPEN (4,MFN,OUTPUT,BINARY)
 WRITE (4) FILID, RUND(9); WRITE (1,2)
 RNID = FILID
 110 DO 112 I=1,27
 PNS(I) = 0
 112 PCD(I) = 0
 ACCEPT " NON-STRUCTURE INPUT ? ", NYN, " "
 IF (NYN.EQ.'N') GO TO 130
 IRORP = 1; ACCEPT " RATE ? ", NYN, " "
 IF (NYN.EQ.'N') IRORP = 2
 WRITE (1,18) RORP(IRORP); ACCEPT PCDIN
 IF (IRORP.EQ.1) PCD(1) = PCDIN
 IF (IRORP.EQ.2) PNS(1) = PCDIN
 NN = -10; GO TO 122
 120 NN = NT + 1; WRITE (1,19) STR(NN)
 122 ACCEPT " TO M+",NT, " = ", PCDIN
 DO 126 M=NN/10+3,NT/10+2


```

      IF (IRORP.EQ.1) PCD(M) = PCDIN
      IF (IRORP.EQ.2) PNS(M) = PCDIN
126 CONTINUE
      IF (NT.LT.NTT)      GO TO 120
C:
130 DO 134 I=1,27
      DO 132 J=1,14
132   DOUT(I,J) = 0
      DMED(I,1) = 0;      DMED(I,2) = 0
134   DOUT(I,8) = PNS(I)
      NREC = 0;      NSW = -1
C:
140 DISPLAY " "
      ACCEPT " CASUALTY FILE = ", MFN; OPEN (7,MFN,INPUT,BINARY)
      READ (7) FILID, FILDATE;      WRITE (1,7) FILID, FILDATE
      CALL GETDO(IDO,NUMR);      NUMR = NUMR + NREC
      NFIL = 0;      ENOFL = '/'
C:
150 READ (7,END=190) ISW,DATE,THID,THETR,ENOF,ITP,M,M,M,PINP
      NFIL = NFIL + 1;      IF (IDO(NFIL).EQ.0) GO TO 150
      IF (ENOFL.EQ. '/') ENOFL = ENOF
      IF (ENOFL.NE.ENOFL) GO TO 150
      WRITE (1,12) NFIL, THETR, ENOF, THID, DAY(ITP+1)
      NREC = NREC + 1;      KSW = MOD (ISW,2)
      IF (NSW.LT.0) NSW = KSW
      IF (KSW.NE.NSW) NSW = 2
      DO 168 I=1,ITP+1
        DOUT(I,11) = DOUT(I,11) + PINP(I,8)
        DOUT(I,12) = DOUT(I,12) + PINP(I,11)
        DOUT(I,13) = DOUT(I,13) - PINP(I,15)
      IF (KSW.EQ.1) GO TO 164
C:
        DOUT(I,8) = DOUT(I,8) + PCD(I)*PINP(I,1)
        DOUT(I,4) = DOUT(I,4) + PINP(I,1)
        DOUT(I,10) = DOUT(I,10) + PINP(I,7)
        DOUT(I,7) = DOUT(I,7) - PINP(I,6)
      GO TO 168
164   DOUT(I,5) = DOUT(I,5) + PINP(I,4)
        DOUT(I,8) = DOUT(I,8) + PCD(I)*PINP(I,4)
168 CONTINUE
      IF (NREC.LT.NUMR) GO TO 150
190 CLOSE (7);      WRITE (1,16) ENOF;      ACCEPT " CASUALTY FILE ? ", NYN
      IF (NYN.EQ. 'Y') GO TO 140
      WRITE (1,14) NREC;      NRECH = 0;      LIW = -1
C:
200 ACCEPT " MEDICAL FILE = ", MFN;      IF (MFN.EQ. 'N') GO TO 320
      OPEN (7,MFN,INPUT,BINARY);      NFIL = 0
      READ (7) FILID, FILDATE;      WRITE (1,7) FILID, FILDATE
      CALL GETDO (IDO,NUMR);      NUMR = NUMR + NRECH
210 READ (7,END=250) ISW,DATE,THID,THETR,TYP,ITP,IW,NF1,NF2,PMED
      NFIL = NFIL + 1;      IF (IDO(NFIL).EQ.0) GO TO 210
      WRITE (1,12) NFIL,THETR, TYP, THID, DAY(ITP+1)
      NRECH = NRECH + 1;      KSW = MOD(ISW,2)
C:
      DO 238 I=1,ITP+1
      IF (KSW.EQ.1) GO TO 230
      IF (ENOF.EQ. 'ENLISTED') GO TO 224
        DMED(I,1) = DMED(I,1) + PMED(I,3) + PMED(I,4);      GO TO 238
224   DMED(I,1) = DMED(I,1) + PMED(I,5);      GO TO 238
230 IF (ENOF.EQ. 'ENLISTED') GO TO 234
        DMED(I,2) = DMED(I,2) + PMED(I,3) + PMED(I,4);      GO TO 238
234   DMED(I,2) = DMED(I,2) + PMED(I,5)

```

238 CONTINUE

```

      ITPX = MAX (ITPX,ITPX);   IF (NRECH.LT.NUMR) GO TO 210
250 CLOSE (7);   ACCEPT "      ANOTHER MEDICAL FILE ? ", NYN
      IF (NYN.EQ.'Y') GO TO 200
      WRITE (1,14) NRECH;   WRITE (1,2)

```

C:

```

320 DO 358 I=1,ITPX+1
      IF (I.EQ.1) GO TO 350
      DOUT(I,7) = DOUT(I,7) + DOUT(I-1,7)
      DO 338 J=10,13
338   DOUT(I,J) = DOUT(I,J) + DOUT(I-1,J)
350   DOUT(I,9) = DOUT(I,10)+DOUT(I,11) + DOUT(I,12)+DOUT(I,13)
      DOUT(I,4) = DOUT(I,4) - DOUT(I,7) - DMED(I,1)
      DOUT(I,5) = DOUT(I,5) - DMED(I,2)
      DOUT(I,6) = DMED(I,1) + DMED(I,2)
      DOUT(I,3) = DOUT(I,4) + DOUT(I,5) + DOUT(I,6) + DOUT(I,7)
      DOUT(I,2) = DOUT(I,3) + DOUT(I,8) + DOUT(I,9)
358   DOUT(I,1) = DOUT(I,2) + DOUT(I,14)

```

C:

```

      ACCEPT " DEMAND THEATER NAME = ", THETR
      WRITE (4) 200+NSW,RUNDATE,RNID,THETR,ENOF,ITPX,0,NREC,NRECH,DEM,DNS,DTE
      NPD = 14
      DO 402 N=1,NPD
      IF (N.LT.12) NDX(N) = N
      IF (N.GT.11) NDX(N) = N + 2*(N-11)
402 CONTINUE
      ACCEPT " PRINT DEMAND DETAIL ? ", NYN;   IF (NYN.EQ.'N') GO TO 500
      ACCEPT " STANDARD PRINT ? ", NYN;   IF (NYN.EQ.'Y') GO TO 430
      ACCEPT " # OF PERIODS TO PRINT = ", NPD;   NPD = NPD + 1
      ACCEPT " LIST PERIOD(S): ", (NDYS(N), N=2,NPD);   NDX(1) = 1
      DO 412 N=2,NPD
412   NDX(N) = 2 + NDYS(N)/10
430 ACCEPT " ", NYN
      NT = 0
450   NB = NT + 1;   NT = MIN(NB+NBZZ,NPD)
      WRITE (1,10) RUNDATE, RNID, ENOF, THETR
      WRITE (1,20) (DAY(NDX(N)), N=NB,NT)
      DO 448 J=1,14
      GO TO (462,462,464,466,466,466,466,464,464,466,466,466,466,468), J
462 WRITE (1,62) NAM(J), (DOUT(NDX(N),J), N=NB,NT);   GO TO 468
464 WRITE (1,64) NAM(J), (DOUT(NDX(N),J), N=NB,NT);   GO TO 468
466 WRITE (1,66) NAM(J), (DOUT(NDX(N),J), N=NB,NT)
468 CONTINUE
      WRITE (1,1);   WRITE (1,2);   IF (NT.LT.NPD) GO TO 450
      ACCEPT " ", NYN
500 ACCEPT " ANOTHER DEMAND TABLE ? ", NYN;   IF (NYN.EQ.'Y') GO TO 110
      CLOSE (4);   WRITE (1,2)
      END

```

```

SUBROUTINE GETDO (IDO,NUMR)
  DIMENSION IDO(*), INLST(12)
  DO 112 N=1,12

```

```

112   IDO(N) = 0
      ACCEPT " # OF RECORDS TO PROCESS = ", NUMR
      ACCEPT " RECORD #S = ", (INLST(N), N=1,NUMR)
      DO 122 N=1,NUMR
122   IDO(INLST(N)) = 1
      RETURN
      END

```

MMDSMODL

Function

This program computes trainee demand as a function of trained demand shortfall and trainee supply, and displays a supply table, demand table, summary table, and demand-supply graphs.

Input

- . Supply data sets created by the supply program (MMSUPPRG)
- . Demand data sets created by the demand program (MMDEMPRG)

Output

- . A supply table (cumulative), by time period
- . A demand table (cumulative), by time period
- . A summary table showing supply overages (shortages), by time period
- . A graph of total demand and supply curves
- . A graph of trained demand and supply curves

```

C:   MMMDSMODL   SUM,PRINT,COMPARE,GRAPH DEMAND-SUPPLY
C:
COMMON   DAY, NPD, NDX(27), RNID, RDATE, ETYP, ENOF1, ENOF2
STRING   DAY(27)(6), FILID(15), FILDATE(9), DATE(9), THID(12)
STRING   THETR(36), IFN(15), LFN(15), NYN(3), RNID(9), ENOF(8)
STRING   ENOF1(8), ENOF2(8), ETYP(9), RDATE(9)
DIMENSION SINP(27,7), DINP(27,6), SUP(27), DEM(27), NDYS(27), IDO(12)
DIMENSION SOUT(27,7), DOUT(27,6), COUT(27,9), TRS(27), TRD(27)

C:
EQUIVALENCE (DINP,SINP), (NDYS,SINP), (TRS,SOUT(1,2))
EQUIVALENCE (SUP,SOUT), (DEM,DOUT), (TRD,DOUT(1,2))

C:
DATA     DAY//PRE-M',M'
          ,M+10',M+20',M+30',M+40',M+50',M+60',M+70',M+80',M+90'
          ,M+100',M+110',M+120',M+130',M+140',M+150',M+160',M+170'
          ,M+180',M+190',M+200',M+210',M+220',M+230',M+240//
DATA     DAY(27)//M+240',M+250'//, ENOF1//'', ENOF2//'', ILM/27/

C:
2  FORMAT(////)
4  FORMAT(/4X,12('_____'//))
7  FORMAT(15X,S12,2X,A9)
12  FORMAT(15,2X,S36,2X,S8,2X,S12,A6)
16  FORMAT(15,13H REC'DS READ/)

C:
      NPD = 14
DO 102 N=1,NPD
  IF (N.LT.12) NDX(N) = N
  IF (N.GT.11) NDX(N) = N + 2*(N-11)
102 CONTINUE
  WRITE (1,4):   ACCEPT " RUN DATE = ", RDATE, "   ID = ", RNID
  ACCEPT "   STANDARD PRINT ? ", NYN:   IF (NYN.EQ.'Y') GO TO 130
  ACCEPT " # OF PERIODS TO PRINT = ", NPD:   NPD = NPD + 1
  ACCEPT " LIST PERIOD(S): ", (NDYS(N), N=2,NPD):   NDX(1) = 1
C:   ACCEPT " ENTER PRINT OPTIONS: ", IPRB, IPRD, IPRY, IGRY
DO 122 N=2,NPD
122  NDX(N) = 2 + NDYS(N)/10
130  ITPY = NDX(NPD):   WRITE (1,4):   NREC = 0
C:
200  ACCEPT " SUPPLY FILE = ", IFN:   IF (IFN.EQ.'N') GO TO 300
OPEN (3,IFN,INPUT,BINARY)
READ (3) FILID, FILDATE:   WRITE (1,7) FILID, FILDATE
  NFIL = 0:   CALL GETDO(IDO,NUMR):   NUMR = NUMR + NREC
C:
220  READ (3,END=290) ISW, DATE, THID, THETR, ENOF, ITP, SINP
  NFIL = NFIL + 1:   IF (IDO(NFIL).EQ.0) GO TO 220
  WRITE (1,12) NFIL, THETR, ENOF, THID, DAY(ITP+1):   NREC = NREC + 1
DO 238 I=1,ITP+1
DO 238 J=1,7
238  SOUT(I,J) = SOUT(I,J) + SINP(I,J)
  IF (ENOF1.EQ.'') ENOF1 = ENOF
  IF (ENOF.EQ.ENOF1) GO TO 240
  IF (ENOF2.EQ.'') ENOF2 = ENOF
  IF (NREC.LT.NUMR) GO TO 220

  IF (3)
    ACCEPT "   ANOTHER SUPPLY FILE ? ", NYN:   IF (NYN.EQ.'Y') GO TO 200
  IF (1,16) NREC:   WRITE (1,4):   NREC = 0

```

```

C:
300 ACCEPT " DEMAND FILE = ", LFN;      IF (LFN.EQ.'N') GO TO 500
    OPEN (7,LFN,INPUT,BINARY)
    READ (7) FILID, FIDATE;  WRITE (1,7) FILID, FIDATE
    NFIL = 0;      CALL GETDO(IDO,NUMR);      NUMR = NUMR + NREC

C:
320 READ (7,END=390) ISW, DATE, THID, THETR, ENOF, ITP, NF,NF,NF, DIMP
    NFIL = NFIL + 1;      IF (IDO(NFIL).EQ.0) GO TO 320
    WRITE (1,12) NFIL, THETR, ENOF, THID, DAY(ITP+1);      NREC = NREC + 1
    DO 338 I=1,ITP+1
    DO 338 J=1,6
338  DOUT(I,J) = DOUT(I,J) + DIMP(I,J)
    IF (ENOF1.EQ.' ') ENOF1 = ENOF
    IF (ENOF.EQ.ENOF1) GO TO 340
    IF (ENOF2.EQ.' ') ENOF2 = ENOF
340 IF (NREC.LT.NUMR) GO TO 320

C:
390 CLOSE (7)
    ACCEPT " ANOTHER DEMAND FILE ? ", NYN;  IF (NYN.EQ.'Y') GO TO 300
    WRITE (1,16) NREC;      WRITE (1,4)
    DO 398 I=1,ITPX
    TEMP = 0
    IF (I+9.LE.ILM) TEMP = MIN (0, ((SOUT(I+9,2)-DOUT(I+9,2))/9) )
    DOUT(I,6) = SOUT(I,7) - TEMP
398  DOUT(I,1) = DOUT(I,1) + DOUT(I,6)

C:
400 DO 458 I=1,ITPX
    COUT(I,1) = SOUT(I,1);  COUT(I,2) = SOUT(I,2);  COUT(I,3) = SOUT(I,7)
    COUT(I,4) = DOUT(I,1);  COUT(I,5) = DOUT(I,2);  COUT(I,6) = DOUT(I,6)
    COUT(I,7) = SOUT(I,1) - DOUT(I,1)
    COUT(I,8) = SOUT(I,2) - DOUT(I,2)
458  COUT(I,9) = COUT(I,3) - COUT(I,6)

C:
    ETYP = ENOF1;      IF (ENOF2.NE.' ') ETYP = ETYP + '/'
500 DISPLAY CHAR(108);  CALL DSPRNT (2,SOUT)
    WRITE (1,2);      CALL DSPRNT (1,DOUT)
    DISPLAY CHAR(108);  CALL DSPRNT (3,COUT)
    DISPLAY CHAR(108);  CALL DSGRPH (DEM,SUP)
    DISPLAY CHAR(108);  CALL DSGRPH (TRD,TRS);  DISPLAY CHAR(108)
    END

    SUBROUTINE GETDO (IDO,NUMR)
    DIMENSION IDO(*), INLST(12)
    DO 112 N=1,12
112  IDO(N) = 0
    ACCEPT " # OF RECORDS TO PROCESS = ", NUMR
    ACCEPT " RECD #S = ", (INLST(N), N=1,NUMR)
    DO 122 N=1,NUMR
122  IDO(INLST(N)) = 1
    RETURN
    END

    SUBROUTINE DSPRNT (NEW,FMAT)
    COMMON DAY, NPD, NDX(27), RNID, RDATE, ETYP, ENOF1, ENOF2
    STRING DAY(27)(6), RNID(9)
    STRING WDO(3)(7), WD1(3)(9), WD2(4,2)(10)
    STRING ENOF1(8), ENOF2(8), ETYP(9), RDATE(9)
    DIMENSION FMAT(*,*)

C:
    DATA WDO/'DEMAND', 'SUPPLY', 'SUMMARY'/

```

```

DATA   WD1/'TOTAL','TRAINED','TRAINEE'/
DATA   WD2/'STRUCTURE','NON-STRUCT','CAS-REPLS',' ','INITIAL AF'
        , 'SELECT RES','OTHR INACT','TRAIN OUTP'/
DATA   WD3/'INDIVID','KIA','WIA','DNBI','BIL LOSS','SHRTD'S/
DATA   NBZZ/13/

```

C:

```

10 FORMAT(/2X,S9,4X,S8,4X,S9,S8/48X,'* CUMULATIVE-',S8,'*')
12 FORMAT(//14X,14(2X,A6))
20 FORMAT(//2X,S9,3X,14I8)
22 FORMAT(/4X,S7,4X,14I8)
24 FORMAT(/6X,S10,14I8)
26 FORMAT(//2X,'SHORT(OVER)'/2X,'TOTAL'      ',3X,14I8)

```

C:

```

      NT = 0
200   NB = NT + 1;      NT = MIN(NB+NBZZ,NPD);  WDO(3) = 'SUMMARY'
      WRITE (1,10)  RDATE, RNID, ETYP, ENOF2, WDO(NSW)
      WRITE (1,12)  (DAY(NDX(N)),N=NB,NT)
      GO TO (220,220,260), NSW
220   WRITE (1,20)  WD1(1), (FMAT(NDX(N),1), N=NB,NT)
      WRITE (1,22)  WD1(2), (FMAT(NDX(N),2), N=NB,NT)
      DO 224  J=1,NSW+2
224   WRITE (1,24)  WD2(J,NSW), (FMAT(NDX(N),J+2), N=NB,NT)
      WRITE (1,22)  WD1(3), (FMAT(NDX(N),NSW+5), N=NB,NT)
      GO TO 290

```

C:

```

260   WDO(3) = 'TOTAL'
      DO 268  J=1,3
      IF (J.EQ.3) GO TO 264
      WRITE (1,20)  WDO(3-J), (FMAT(NDX(N),3*J-2), N=NB,NT);  GO TO 266
264   WRITE (1,26)  (FMAT(NDX(N),3*J-2), N=NB,NT)
266   WRITE (1,22)  WD1(2), (FMAT(NDX(N),3*J-1), N=NB,NT)
268   WRITE (1,22)  WD1(3), (FMAT(NDX(N),3*J), N=NB,NT)

```

C:

```

290   IF (NT.LT.NPD) GO TO 200
      END

```

SUBROUTINE DSGRPH (DEM,SUP)

COMMON DAY, NPD, NDX(27), RNID, RDATE, ETYP, ENOF1, ENOF2
 STRING DAY(27)(6), DY(27)(3), DY1(3)(3), SI(3), RNID(9), DID(2)(7)
 STRING P1(21)(1), P2(21)(1), RDATE(9), ETYP(9), ENOF1(8), ENOF2(8)
 STRING AFM(18), BFM(15), CFM(42), DFM(24), CFM3(42), CFM2(30)
 DIMENSION DEM(*), SUP(*), IDM(27), ISP(27), INC(10), KINT(10)

C:

DATA DY1/'PRE', 'M', 'M+', 'DY/' 'M', 'DAY', '10', '20', '30',
 '40', '50', '60', '70', '80', '90', '100', '110', '120',
 '130', '140', '150', '160', '170', '180', '190', '200', '210'//

DATA LIM/26/, LENSET/115/, INC/1,2,5,10,20,25,40,50,100,200/

DATA KINT/5*5,4,4*5/, DID/' TOTAL ', 'TRAINED'//

C:

2 FORMAT(////)

10 FORMAT(1X,S9,1X,S9/1X,S9,S8,4X,'CUMULATIVE DEMAND AND SUPPLY',
 'COMPARISONS',10X,S7//3X,'MANPOWER'/4X,'(THOUS)')//

C:

NP = MIN(LIM,NPD); DMX = 0; SPX = 0; IDID = IDID + 1

DO 118 N=1,NP

DMX = MAX (DMX,DEM(NDX(N))); SPX = MAX (SPX,SUP(NDX(N)))

118 CONTINUE

DMX = DMX/1000; SPX = SPX/1000; DSX = MAX(DMX,SPX)

DO 128 J=1,8

IF (45*INC(J).GT.DSX) GO TO 130

128 CONTINUE

STOP

130 DIV = INC(J); JC = J

DO 138 N=1,NP

IDM(N) = DEM(NDX(N))/(1000*DIV)

138 ISP(N) = SUP(NDX(N))/(1000*DIV)

LEN = LENSET/NP; AFM = '(T11,' + STR(LEN*NP+1) + '(1H),SI)'

BFM = '(T' + STR(LEN*NP+12) + '(1H)'; SI = STR (LEN-2-LEN/2)

DFM = '(11X,' + SI + 'X,S3,' + STR(NP-1) + '(' + STR(LEN-3) + 'X,S3))'

SI = STR (LEN-1-LEN/2)

CFM2 = SI + 'X,A1,' + STR(NP-1) + '(' + STR(LEN-1) + 'X,A1,?)'

CFM3 = '(T12,' + CFM2

WRITE (1,10) RDATE,RNID,ETYP,ENOF2,DID(IDID); WRITE (1,AFM) 'L'

DO 178 JJ=1,46

K = 46-JJ

DO 178 N=1,NP

P1(N) = ' '

178 P2(N) = ' '

DO 188 N=1,NP

IF (IDM(N).EQ.K) P1(N) = 'D'

IF (ISP(N).EQ.K) P2(N) = 'S'

188 CONTINUE

C:

IF (MOD(K,KINT(JC)).GT.0) GO TO 192

CFM = '(5X,I4,2H,I,' + CFM2; WRITE (1,CFM) K*INC(JC), (P1(N), N=1,NP)

WRITE (1,CFM3) (P2(N), N=1,NP); GO TO 194

192 CFM = '(10X,1H,I,' + CFM2

WRITE (1,CFM) (P1(N), N=1,NP); WRITE (1,CFM3) (P2(N), N=1,NP)

194 IF (K.GT.0) WRITE (1,BFM)

198 CONTINUE

WRITE (1,AFM) 'I'; WRITE (1,DFM) (DY1(MIN(NDX(N),3)), N=1,NP)

WRITE (1,DFM) (DY(NDX(N)), N=1,NP)

END

DAT
ILM