These actions would enhance efficiency and not impact any *mix* of x-rays that could be produced during the future 3-month period. If imaging hours were reduced by ninety (90), imaging would still have an excess capacity of 102 hours. Slack would be 102 (i.e., 192 − 90 = 102). If the x-ray department was called upon to only produce special x-rays, reducing imaging by 90 staff hours would leave zero slack.

The situation with the developing stage is similar. If only general x-rays were done, reducing staffing by 180 hours over the next 3 months would still leave 312 excess hours (i.e., 492 − 180 = 312). Reducing the developing stage by 180 staff hours would leave zero excess if only special x-rays were produced.

As demonstrated by this example, the capacity analysis model identifies the production frontier associated with multistep production processes and can be used to develop strategies to increase or reduce resources so that capacity and output are an efficient aspect of the operation of the system or subsystem. It is important to note that different services require different resources. The example classified x-rays into either general or special and states different resource requirements for each at each stage in the production process. More often than not, service stations in medical care production systems provide more than one type of service. The capacity analysis models are designed to assist when two or more variables (e.g., special versus general x-rays) are present. These models provide the ability to estimate production frontiers when faced with this type of situation.

EXERCISES

8-1 Two types of visits are provided by the Durham Health Clinic, first-time visits and return visits. Table 8-5 provides the processing time for each work station and the available staff hours per week. Determine the production frontiers for this clinic and indicate which station should be expanded to increase the overall capacity of the clinic. Which service station could be reduced?

Table 8-5 Processing Time and Staff Hours Data for Durham Health Clinic (Exercise 14-1)

	Time estimates (hours)	
Work station	*First Visit*	*Return Visit*
Reception/discharge	0.25	0.12
Nursing and testing	0.40	0.38
Medical exam and treatment	0.50	0.25

8-2 Durham Health Clinic has a contribution margin of $35 per visit. Calculate the break-even point in visits with fixed costs at $4000, $6500, and $8500 per week. Given this analysis, as a manager, what would you recommend and why?

8-3 Durham Health Clinic is considering signing a contract to perform 50 pre-employment physicals per week for a specific corporation. In terms of staff time, a pre-employment physical requires 0.20 hours in Reception/Discharge, 0.45 hours in Nursing and Testing, and 0.20 hours in Medical Examination. By work-station, determine how many work hours per week will be needed to perform these physicals.

8-4 Currently the clinic does 250 visits per week, with 50% of all visits as return visits. Each employee (physician, nurse, and receptionist) is scheduled to work 35 hours per week.

a. How many employees by type does the clinic currently need?
b. How many employees by type will the clinic need if it signs the contract for pre-employment physicals?
c. If return visits shift to 10% of all regular visits, how many employees by type will the clinic need with and without the contract for pre-employment physicals?
d. How will the answers to "b" and "c" change if the number of physicals is modified to 35 pre-employment physicals per week?

Throughout these analyses, specify all assumptions, including assumptions concerning worker productivity.

8-5 How would your answers change for problem 8-1 if nursing and testing time was increased to 0.50 hours for both first and repeat visits, and medical exam and treatment time was reduced to 0.30 hours for a first visit and 0.20 hours for a return visit?