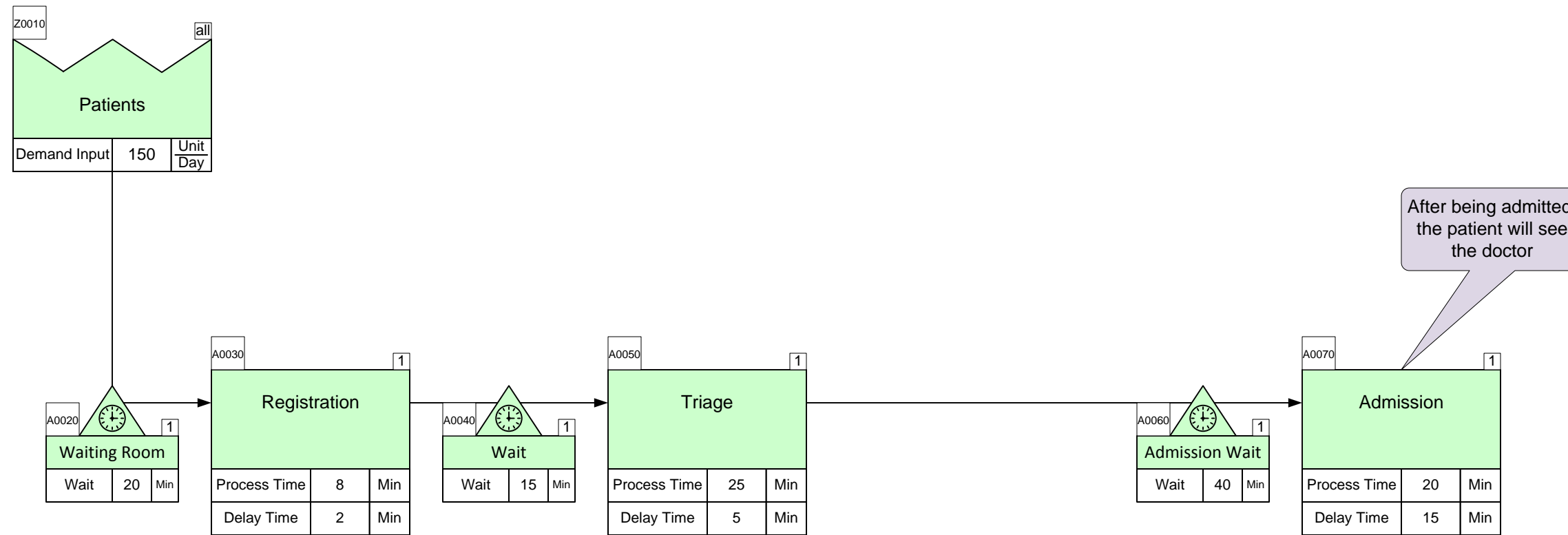# Healthcare Problem: Door-to-Admission Time

Your system has logged the time when a patient arrives through to when discharged. Can you calculate how long the patient had to wait to see the doctor?

Z0010 / all

Patients

Demand Input	150	Unit Day

After being admitted, the patient will see the doctor

A0020 / 1

Waiting Room

Wait	20	Min

A0030 / 1

Registration

Process Time	8	Min
Delay Time	2	Min

A0040 / 1

Wait

Wait	15	Min

A0050 / 1

Triage

Process Time	25	Min
Delay Time	5	Min

A0060 / 1

Admission Wait

Wait	40	Min

A0070 / 1

Admission

Process Time	20	Min
Delay Time	15	Min

Day
24
Hr

Healthcare Solution: Door-to-Admission Time

Your system has logged the time when a patient arrives through to when discharged. Can you calculate how long the patient had to wait to see the doctor?
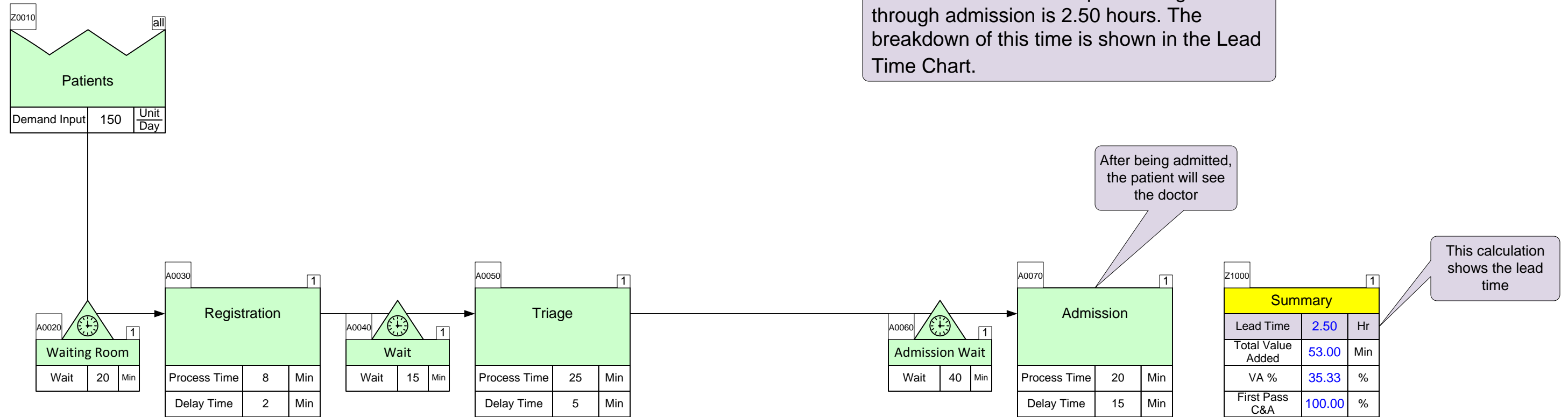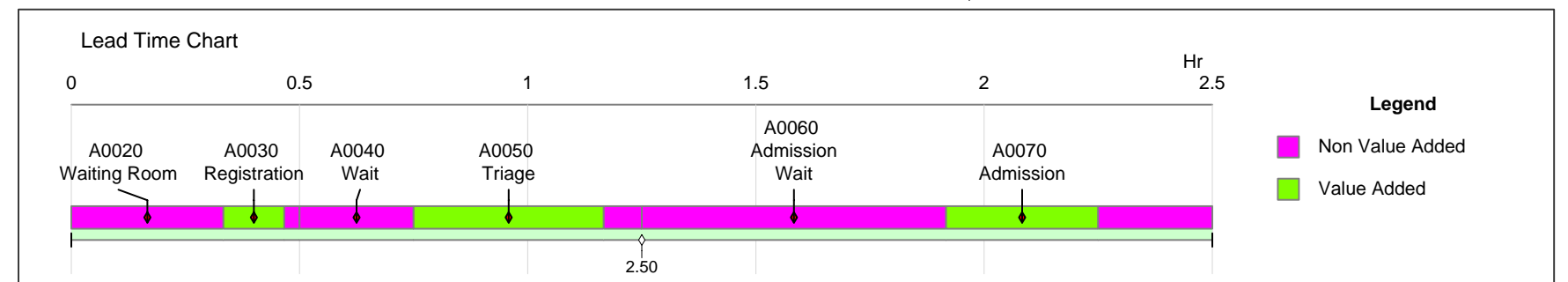
Answer:

The time it takes for the patient to get through admission is 2.50 hours. The breakdown of this time is shown in the Lead Time Chart.

Z0010
all

Patients

Demand Input	150	Unit Day

A0020

Waiting Room — 1

Wait	20	Min

A0030 — 1

Registration

Process Time	8	Min
Delay Time	2	Min

A0040 — 1

Wait

Wait	15	Min

A0050 — 1

Triage

Process Time	25	Min
Delay Time	5	Min

A0060 — 1

Admission Wait

Wait	40	Min

A0070 — 1

Admission

After being admitted, the patient will see the doctor

Process Time	20	Min
Delay Time	15	Min

Z1000 — 1

Summary		
Lead Time	2.50	Hr
Total Value Added	53.00	Min
VA %	35.33	%
First Pass C&A	100.00	%

This calculation shows the lead time

The Lead Time Chart shows which time was value-added and non value-added

Lead Time Chart

Hr

0	0.5	1	1.5	2	2.5

A0020 Waiting Room | A0030 Registration | A0040 Wait | A0050 Triage | A0060 Admission Wait | A0070 Admission

2.50

Legend

- Non Value Added
- Value Added

Day
24
Hr

Healthcare Problem: Complete and Accurate

We have a quality issue with the patient flow. Can we pin-point the problem area?

Z0010		all
Patients		
Demand Input	150	Unit Day

Is the recorded patient information complete and accurate?

A0010		2	1
Waiting Room			
Wait	20	Min	

A0020		2	1
Registration			
Process Time	8	Min	
Delay Time	2	Min	
Complete and Accurate	90	%	

A0030		2	1
Wait			
Wait	15	Min	

A0040		2	1
Triage			
Process Time	25	Min	
Delay Time	5	Min	
Complete and Accurate	100	%	

A0050		2	1
Decision			

80%

A0060		1
Admission Wait		
Wait	40	Min

A0070		1
Admission		
Process Time	25	Min
Delay Time	10	Min
Complete and Accurate	97	%
Stations	2	STN

Is the admission process complete and accurate?

Z1000		1
Summary		
Lead Time	2.50	Hr
Total Value Added	58.00	Min
VA %	38.67	%
First Pass C&A	87.30	%

20%

A0080		2
Fast Track Wait		
Wait	10	Min

A0090		2
Treatment		
Process Time	22	Min
Delay Time	0	Min
Complete and Accurate	94	%

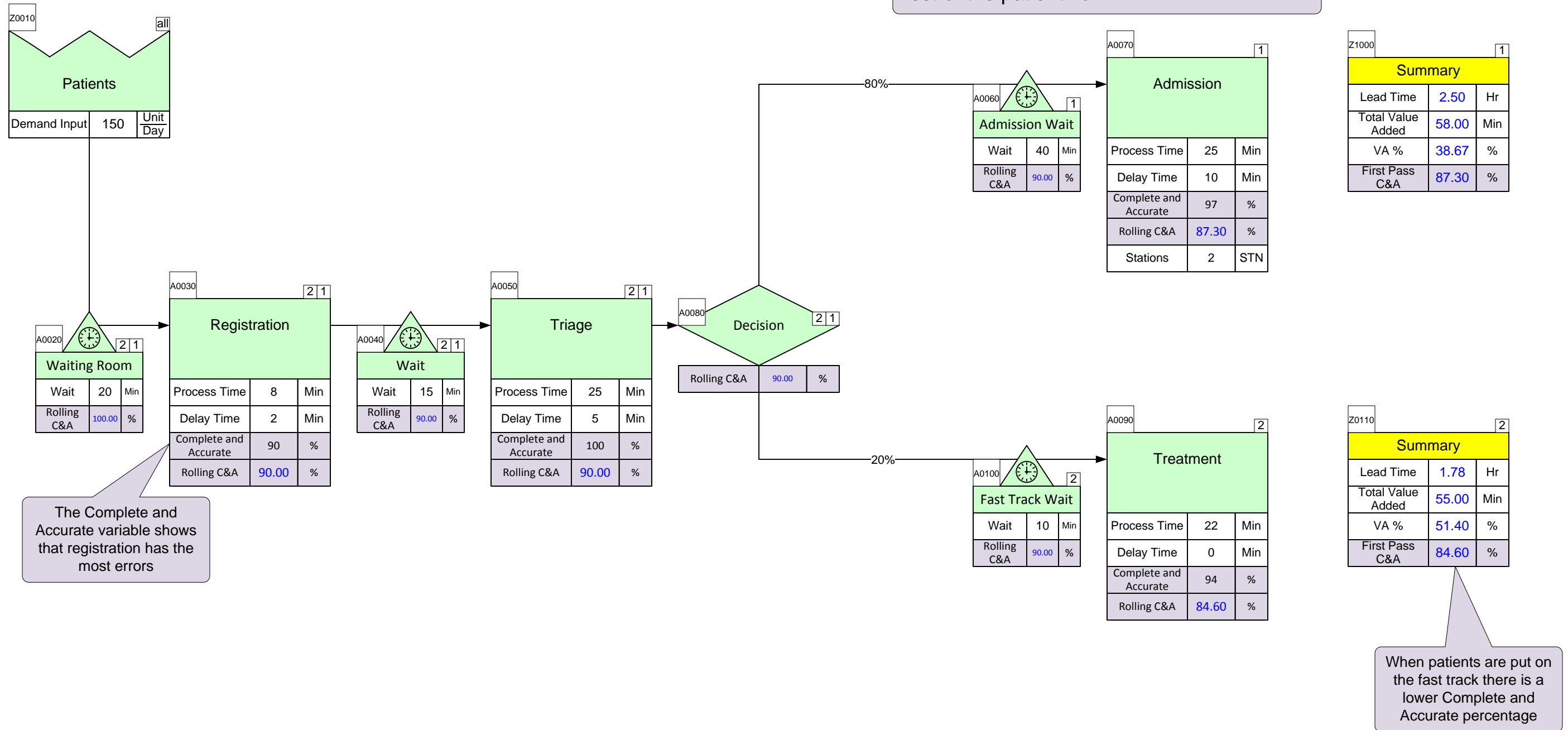| Z0110		2
Summary		
Lead Time	1.78	Hr
Total Value Added	55.00	Min
VA %	51.40	%
First Pass C&A	84.60	%

Day
24
Hr

Healthcare Solution: Complete and Accurate

We have a quality issue with the patient flow. Can we pin-point the problem area?
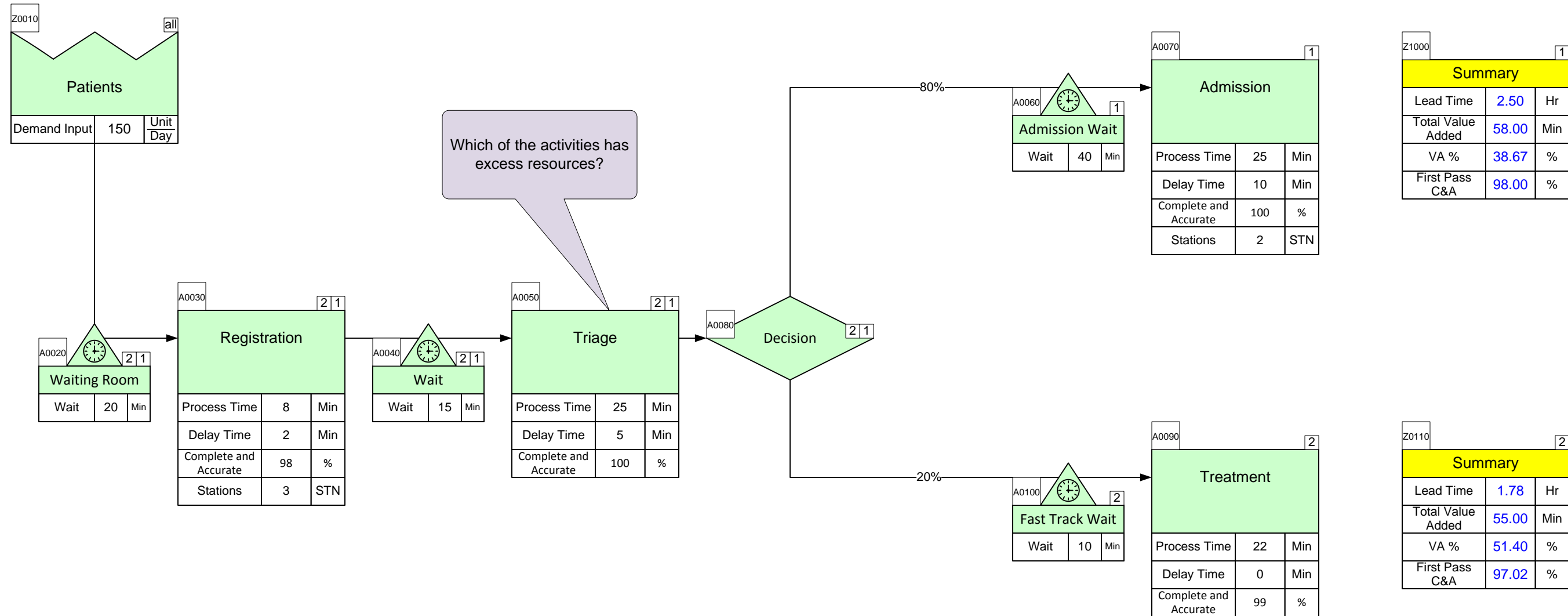
Answer:

The Complete and Accurate variable shows that quality suffers after registration. If the accuracy is improved there it will help the rest of the patient flow.

Z0010 / all

Patients

Demand Input	150	Unit Day

A0020 — 2 | 1

Waiting Room

Wait	20	Min
Rolling C&A	100.00	%

A0030 — 2 | 1

Registration

Process Time	8	Min
Delay Time	2	Min
Complete and Accurate	90	%
Rolling C&A	90.00	%

The Complete and Accurate variable shows that registration has the most errors

A0040 — 2 | 1

Wait

Wait	15	Min
Rolling C&A	90.00	%

A0050 — 2 | 1

Triage

Process Time	25	Min
Delay Time	5	Min
Complete and Accurate	100	%
Rolling C&A	90.00	%

A0080 — 2 | 1

Decision

Rolling C&A	90.00	%

80%

A0060 — 1

Admission Wait

Wait	40	Min
Rolling C&A	90.00	%

A0070 — 1

Admission

Process Time	25	Min
Delay Time	10	Min
Complete and Accurate	97	%
Rolling C&A	87.30	%
Stations	2	STN

Z1000 — 1

Summary

Lead Time	2.50	Hr
Total Value Added	58.00	Min
VA %	38.67	%
First Pass C&A	87.30	%

20%

A0100 — 2

Fast Track Wait

Wait	10	Min
Rolling C&A	90.00	%

A0090 — 2

Treatment

Process Time	22	Min
Delay Time	0	Min
Complete and Accurate	94	%
Rolling C&A	84.60	%

Z0110 — 2

Summary

Lead Time	1.78	Hr
Total Value Added	55.00	Min
VA %	51.40	%
First Pass C&A	84.60	%

When patients are put on the fast track there is a lower Complete and Accurate percentage

Day
24
Hr

Healthcare Problem: Excess Capacity

We have hold-ups in several places because we are always short-staffed. Do we have any excess resource we might re-deploy?
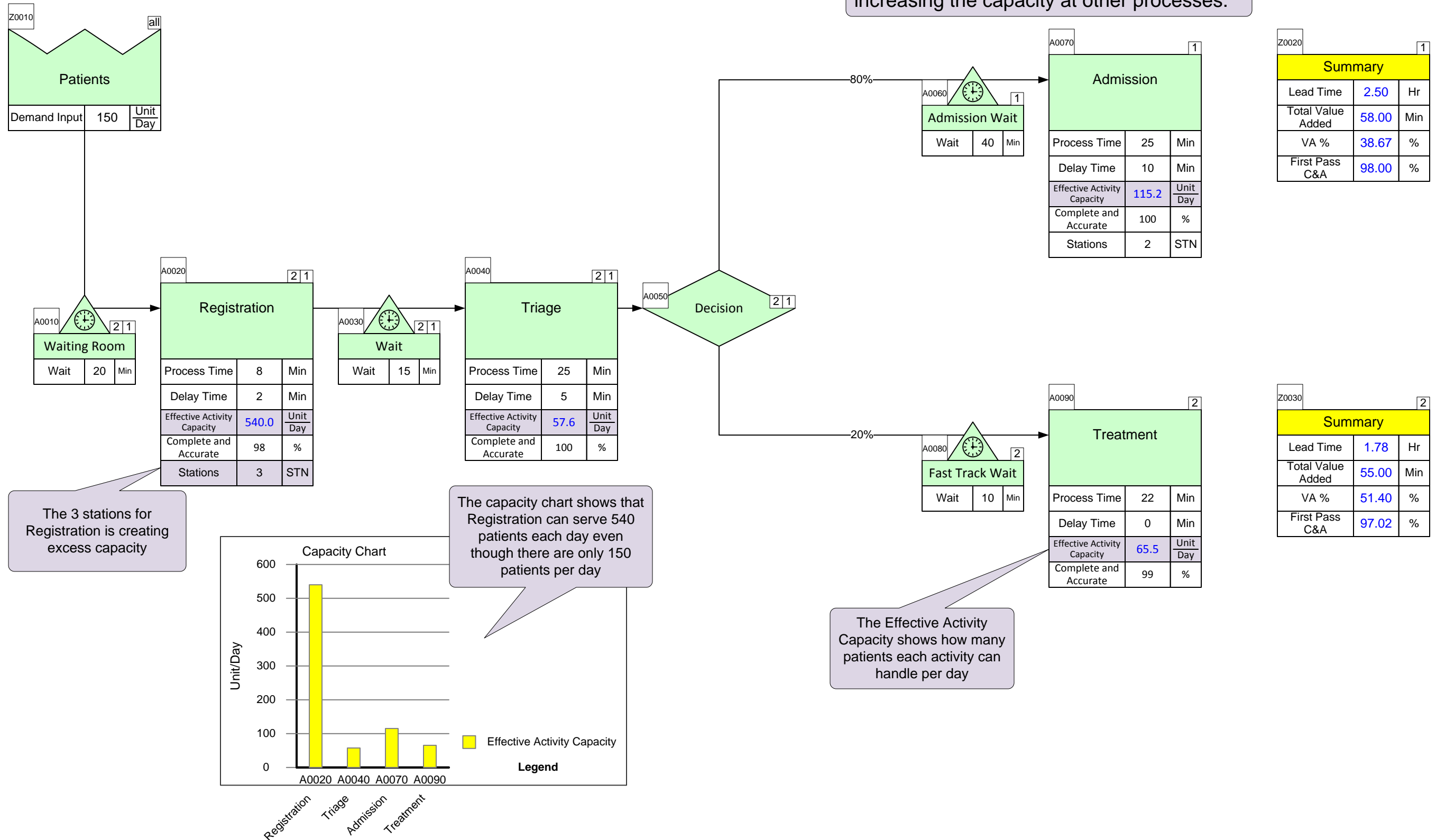
Z0010 — all

Patients

Demand Input	150	Unit Day

A0020 — 2 | 1

Waiting Room

Wait	20	Min

A0030 — 2 | 1

Registration

Process Time	8	Min
Delay Time	2	Min
Complete and Accurate	98	%
Stations	3	STN

A0040 — 2 | 1

Wait

Wait	15	Min

A0050 — 2 | 1

Which of the activities has excess resources?

Triage

Process Time	25	Min
Delay Time	5	Min
Complete and Accurate	100	%

A0080 — 2 | 1

Decision

80%

A0060 — 1

Admission Wait

Wait	40	Min

A0070 — 1

Admission

Process Time	25	Min
Delay Time	10	Min
Complete and Accurate	100	%
Stations	2	STN

Z1000 — 1

Summary

Lead Time	2.50	Hr
Total Value Added	58.00	Min
VA %	38.67	%
First Pass C&A	98.00	%

20%

A0100 — 2

Fast Track Wait

Wait	10	Min

A0090 — 2

Treatment

Process Time	22	Min
Delay Time	0	Min
Complete and Accurate	99	%

Z0110 — 2

Summary

Lead Time	1.78	Hr
Total Value Added	55.00	Min
VA %	51.40	%
First Pass C&A	97.02	%

Day
24
Hr

Healthcare Solution: Excess Capacity

We have hold-ups in several places because we are always short-staffed. Do we have any excess resource we might re-deploy?

Answer:

The Capacity Chart shows that the Registration process has excess capacity. If these resources were redeployed it would decrease the likelihood of hold-ups by increasing the capacity at other processes.

Z0010 / all

Patients

Demand Input	150	Unit Day

A0010 2 1

Waiting Room

Wait	20	Min

A0020 2 1

Registration

Process Time	8	Min
Delay Time	2	Min
Effective Activity Capacity	540.0	Unit Day
Complete and Accurate	98	%
Stations	3	STN

> The 3 stations for Registration is creating excess capacity

A0030 2 1

Wait

Wait	15	Min

A0040 2 1

Triage

Process Time	25	Min
Delay Time	5	Min
Effective Activity Capacity	57.6	Unit Day
Complete and Accurate	100	%

A0050 2 1

Decision

80%

A0060 1

Admission Wait

Wait	40	Min

A0070 1

Admission

Process Time	25	Min
Delay Time	10	Min
Effective Activity Capacity	115.2	Unit Day
Complete and Accurate	100	%
Stations	2	STN

Z0020 1

Summary		
Lead Time	2.50	Hr
Total Value Added	58.00	Min
VA %	38.67	%
First Pass C&A	98.00	%

20%

A0080 2

Fast Track Wait

Wait	10	Min

A0090 2

Treatment

Process Time	22	Min
Delay Time	0	Min
Effective Activity Capacity	65.5	Unit Day
Complete and Accurate	99	%

> The Effective Activity Capacity shows how many patients each activity can handle per day

Z0030 2

Summary		
Lead Time	1.78	Hr
Total Value Added	55.00	Min
VA %	51.40	%
First Pass C&A	97.02	%

> The capacity chart shows that Registration can serve 540 patients each day even though there are only 150 patients per day

Capacity Chart
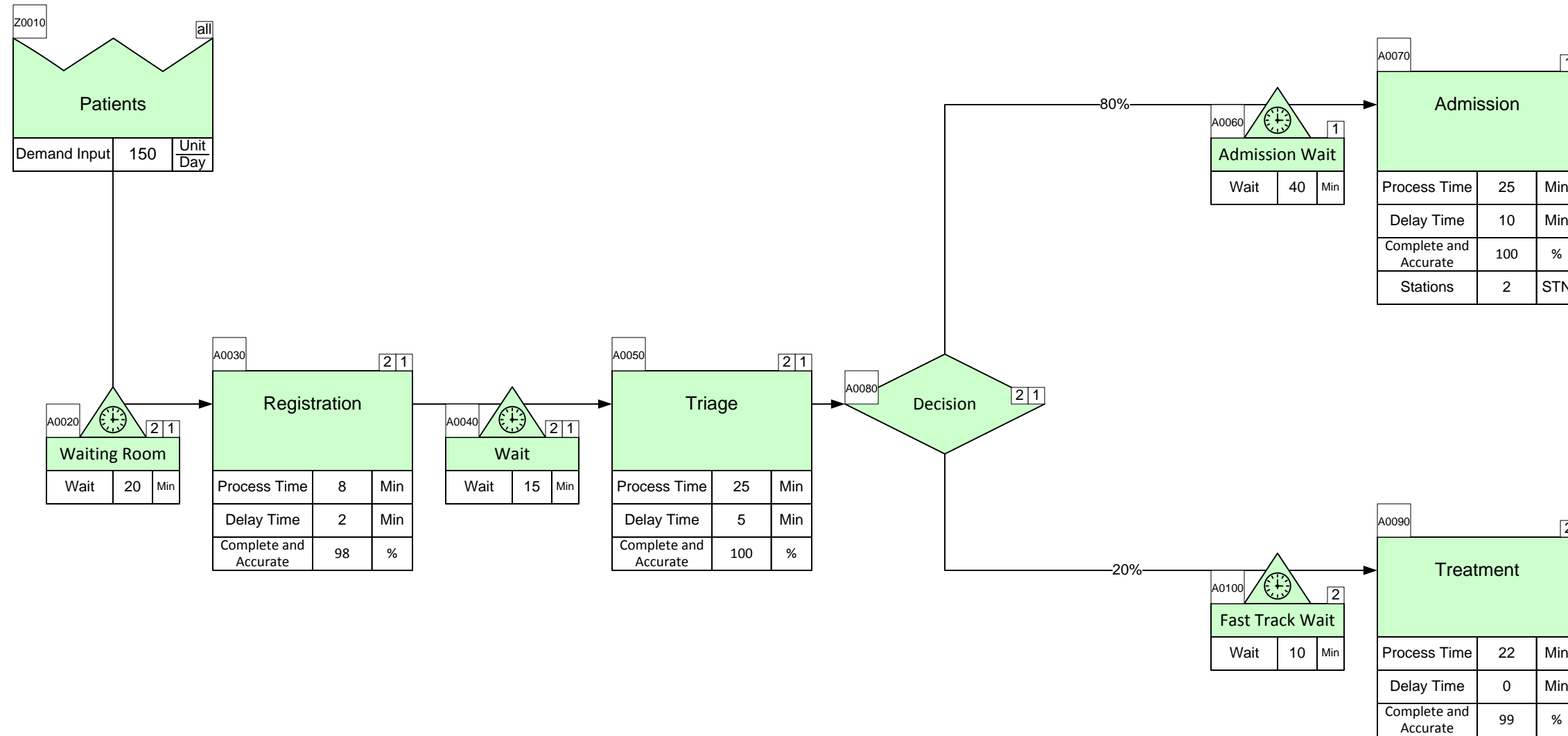

Legend: Effective Activity Capacity (A0020, A0040, A0070, A0090 — Registration, Triage, Admission, Treatment)

Day
24
Hr

Capacity Chart

Healthcare Problem: Resource Estimation

We are dealing with around 150 patients per day in ER 7x24.
How many full-time nurses, administrators, and personal
*care assistants do we need per day?*

Z0010 / all

Patients

Demand Input	150	Unit Day

A0020 2 1

Waiting Room

Wait	20	Min

A0030 2 1

Registration

Process Time	8	Min
Delay Time	2	Min
Complete and Accurate	98	%

A0040 2 1

Wait

Wait	15	Min

A0050 2 1

Triage

Process Time	25	Min
Delay Time	5	Min
Complete and Accurate	100	%

A0080 2 1

Decision

80%

A0060 1

Admission Wait

Wait	40	Min

A0070 1

Admission

Process Time	25	Min
Delay Time	10	Min
Complete and Accurate	100	%
Stations	2	STN

Z1000 1

Summary		
Lead Time	2.50	Hr
Total Value Added	58.00	Min
VA %	38.67	%
First Pass C&A	98.00	%

20%

A0100 2

Fast Track Wait

Wait	10	Min

A0090 2

Treatment

Process Time	22	Min
Delay Time	0	Min
Complete and Accurate	99	%

Z0110 2

Summary		
Lead Time	1.78	Hr
Total Value Added	55.00	Min
VA %	51.40	%
First Pass C&A	97.02	%

Day
24
Hr

# Healthcare Solution: Resource Estimation

We are dealing with around 150 patients per day in ER 7x24. How many full-time nurses, administrators, and personal care assistants do we need per day?

Resource Balance Chart
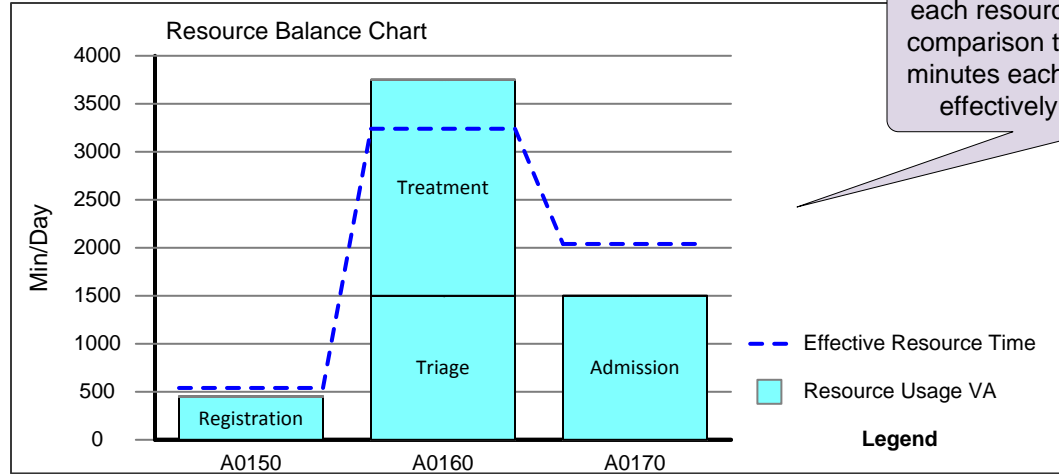
The chart shows how long each resource is used in comparison to how many minutes each resource is effectively available

Legend:
- --- Effective Resource Time
- Resource Usage VA

Answer:

The Resource Balance Chart and Summary shows that we need 1 administrator, 6 nurses, and 4 personal care assistants to be on duty at all times. The RN resource utilization is over 100% though so we should consider having an additional nurse on staff.
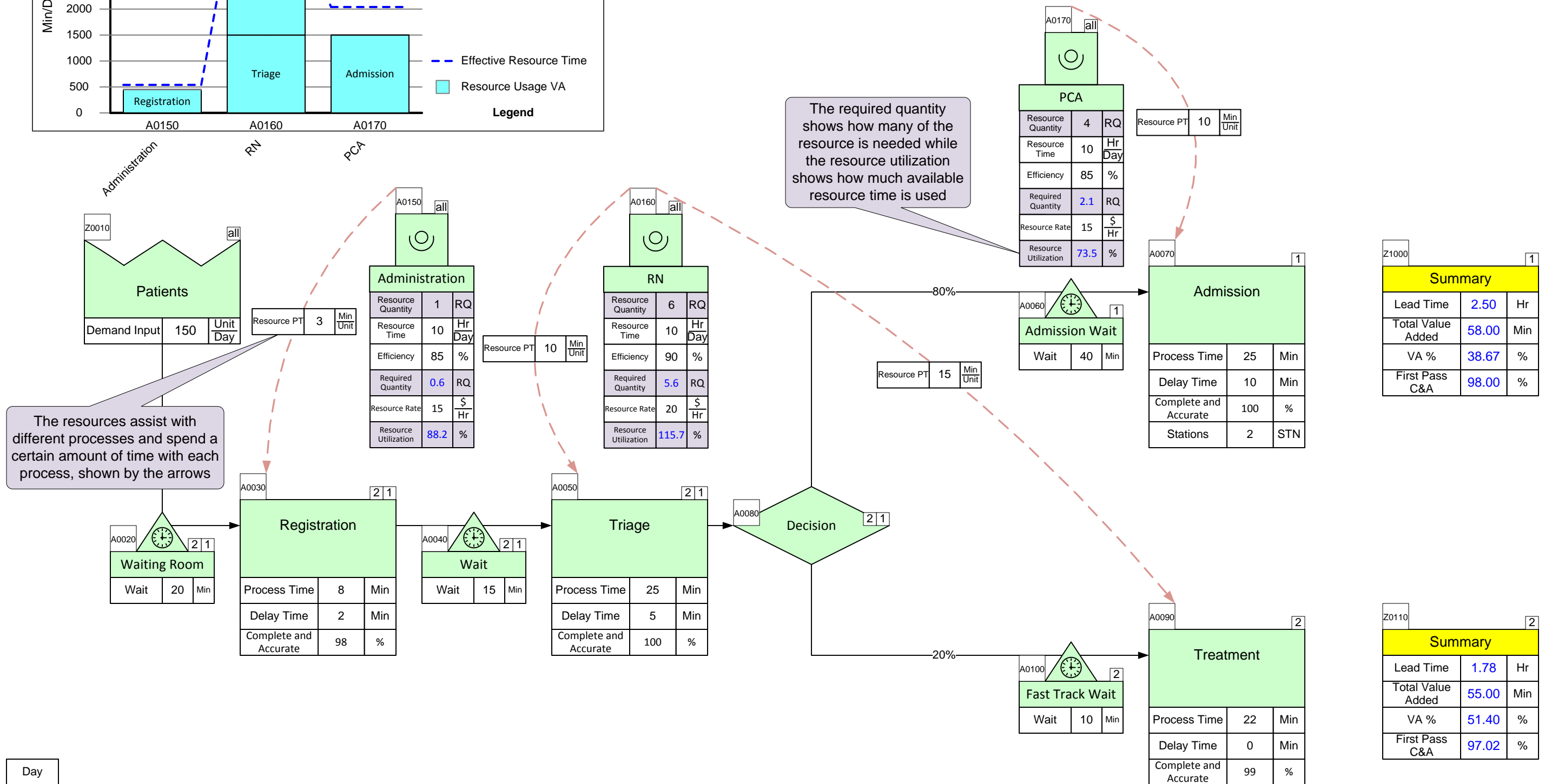
The required quantity shows how many of the resource is needed while the resource utilization shows how much available resource time is used

The resources assist with different processes and spend a certain amount of time with each process, shown by the arrows

Z0010 Patients (all)

Demand Input	150	Unit/Day

A0150 Administration (all)

Resource Quantity	1	RQ
Resource Time	10	Hr/Day
Efficiency	85	%
Required Quantity	0.6	RQ
Resource Rate	15	$/Hr
Resource Utilization	88.2	%

Resource PT | 3 | Min/Unit

A0160 RN (all)

Resource Quantity	6	RQ
Resource Time	10	Hr/Day
Efficiency	90	%
Required Quantity	5.6	RQ
Resource Rate	20	$/Hr
Resource Utilization	115.7	%

Resource PT | 10 | Min/Unit

A0170 PCA (all)

Resource Quantity	4	RQ
Resource Time	10	Hr/Day
Efficiency	85	%
Required Quantity	2.1	RQ
Resource Rate	15	$/Hr
Resource Utilization	73.5	%

Resource PT | 10 | Min/Unit

A0020 Waiting Room [2|1]

Wait	20	Min

A0030 Registration [2|1]

Process Time	8	Min
Delay Time	2	Min
Complete and Accurate	98	%

A0040 Wait [2|1]

Wait	15	Min

A0050 Triage [2|1]

Process Time	25	Min
Delay Time	5	Min
Complete and Accurate	100	%

A0080 Decision [2|1]

- 80%
- 20%

Resource PT | 15 | Min/Unit

A0060 Admission Wait [1]

Wait	40	Min

A0070 Admission [1]

Process Time	25	Min
Delay Time	10	Min
Complete and Accurate	100	%
Stations	2	STN

A0100 Fast Track Wait [2]

Wait	10	Min

A0090 Treatment [2]

Process Time	22	Min
Delay Time	0	Min
Complete and Accurate	99	%

Z1000 Summary [1]

Lead Time	2.50	Hr
Total Value Added	58.00	Min
VA %	38.67	%
First Pass C&A	98.00	%

Z0110 Summary [2]

Lead Time	1.78	Hr
Total Value Added	55.00	Min
VA %	51.40	%
First Pass C&A	97.02	%

Day
24
Hr