TÉCNICO LISBOA

ETPN 2022 Project

Group 11

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Assumptions

- If there is a problem with the script at Pick-up, the customer must wait in line until it is fixed.
- We assume that if a customer doesn't show up to Pick-up the script after 7 days, the drugs from the script are taken from the bag and stored back into the shelves.
- After contacting the customer or the doctor, if the script is considered harmful the script is canceled.
- We assume that the boxes "Dr. Call" and "Dr. Call Back" correspond to the same box.
- If there isn't enough stock to fulfill a script, the Pharmacy Tech waits until there is enough to complete production.
- When trying to resolve a difficult issue during an insurance check, the data entry tech only needs feedback from the doctor or insurer.
- The customer only cancels their prescription or changes the time of pick-up before production.
- We assumed pharmacists do not commit mistakes during Quality Assurance.

Opportunity Assessment

What percentage of defecting customers in 2000 are light users? Same question for heavy users.

$Light\ users\ =\ X,\ Heavy\ users\ =\ Y$
$X\ +\ Y\ =\ 7.2\ million$
$5X\ +\ 40Y\ =\ 55\ million$

$X\ =\ 7.2\ million\ -\ Y$
$5(7.2\ million\ -\ Y)\ +\ 40Y\ =\ 55\ million\ \Leftrightarrow\ 35Y\ =\ 55\ -\ 36\ million\ =\ 19\ million$

$Y\ =\ 0.542\ million\ =\ 7,53\%$
$X\ =\ 6.658\ million\ =\ 92,47\%$

What is the volume of scripts lost annually to light defectors? Same question for heavy defectors?

$Light\ users$: $6.658\ million \times 5\ prescriptions\ =\ 33.29\ million\ prescriptions$
$Heavy\ users$: $0.542\ million \times 40\ prescriptions\ =\ 21.68\ million\ prescriptions$

How many scripts are filled annually by CVS pharmacies?

$55\ million\ scripts \rightarrow 2.5\ billion\ in\ revenue$
$X \rightarrow 20\ billion\ in\ revenue$

$X\ =\ 440\ million\ scripts$

What is the average revenue per script?

$2.5\ billion\ /\ 55\ million\ =\ 45.455\$$

What revenue improvement could be obtained by reducing the defection rate due to poor customer service by 60%?

$6.658\ \times\ 0.13\ =\ 0.866\ million\ (number\ of\ light\ users\ that\ leave\ due\ to\ poor\ service)$
$0.542\ \times\ 0.44\ =\ 1.231\ million\ (number\ of\ heavy\ users\ that\ leave\ due\ to\ poor\ service)$
$0.866\ \times\ 5\ =\ 4.33\ million\ (scripts\ that\ would\ be\ filled\ by\ these\ light\ users)$
$1.231\ \times\ 40\ =\ 49.24\ million\ (scripts\ that\ would\ be\ filled\ by\ these\ heavy\ users)$
$(4.33\ +\ 49.24)\ \times\ 45.455\ =\ 2435.024\ million$
$0.6\ \times\ 2435.024\ =\ 1461.144\ million\ (60\%\ reduction)$

Business Process Architecture

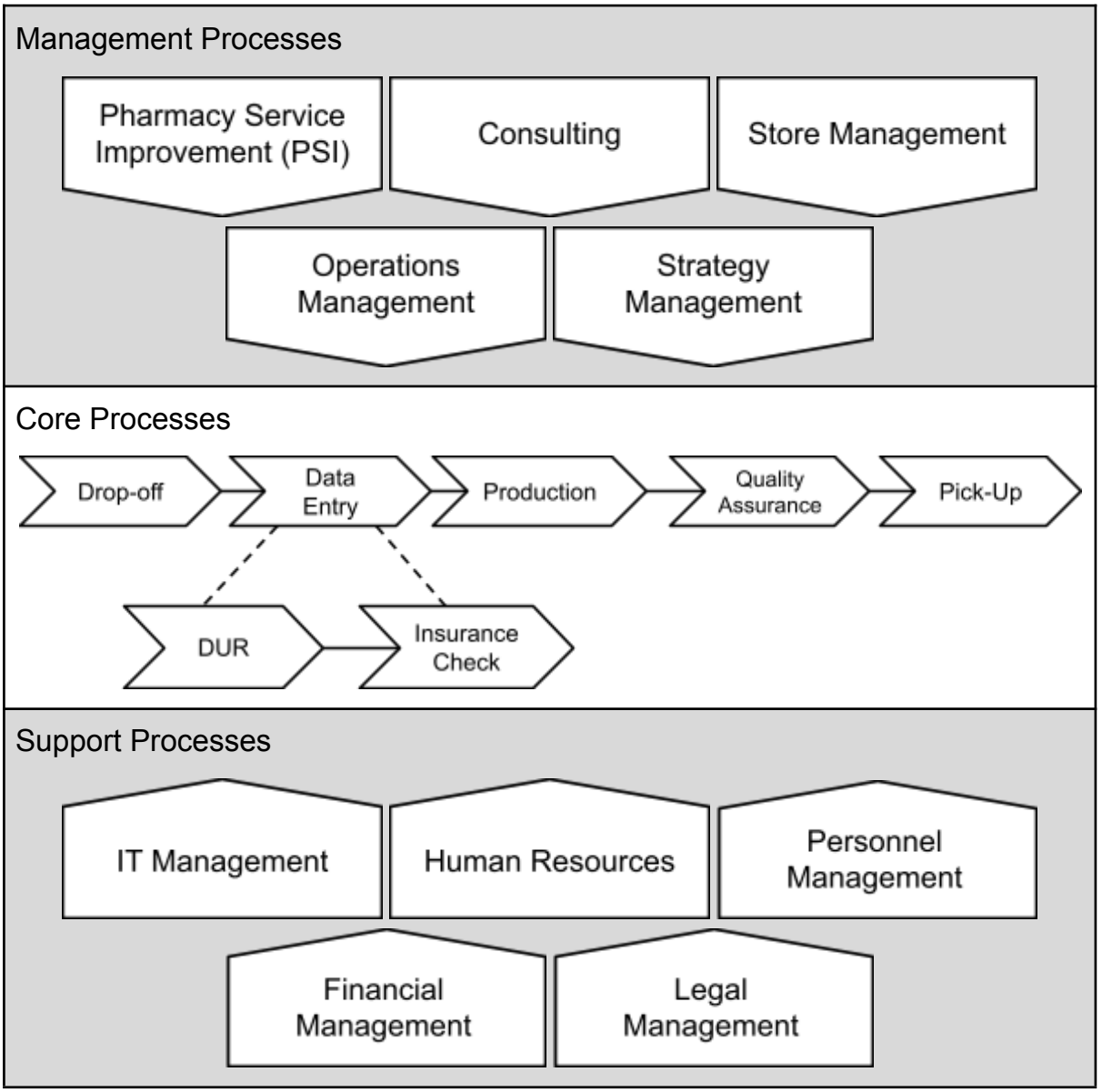


Figure 1 - Process Landscape

Name of process: Drop Off	
Vision: The objective of the drop off process is to receive the script from the customer, record the time they will come pickup the meds correctly and put the script in the box.	
Process Owner: Drop Off technician	
Customer of process: ● Data Entry tech	**Expectation of customer:** ● Script forwarded to next step of fulfillment and pickup time recorded successfully
Outcome: Pickup time of customer recorded and script put in the script box	
Trigger: Customer drops off script	
First activity: Receive dropped off script **Second activity:** Ask pickup time **Last activity:** Receive and write pickup time	
Interfaces inbound: None **Interfaces outbound:** Data Entry	
Required resources: ● Customer ● Script ● Script Box	
Process Performance Measures: ● Cycle Time ● Operational Costs ● Error Rate	

<table>
<tr><td colspan="2">Name of process: Data Entry</td></tr>
<tr><td colspan="2">Vision: The objective of the data entry process is to enter all required data about the scripts into the pharmacy information system so it can go through a drug utilization review and an insurance check to see if there is any problem with the script.</td></tr>
<tr><td colspan="2">Process owner: Data Entry technician</td></tr>
<tr><td>Customer of process:
Pharmacy tech</td><td>Expectation of customer:
Customer’s data from the script entered correctly without problems</td></tr>
<tr><td colspan="2">Outcome: All data from script is in the pharmacy information system and script is safe to use</td></tr>
<tr><td colspan="2">Trigger: Each hour</td></tr>
<tr><td colspan="2">First activity: Take hour’s scripts
Second activity: Put data in pharmacy information system
Third activity: Check if script is eligible
Fourth activity: Perform drug utilization review
Last activity: Perform insurance check</td></tr>
<tr><td colspan="2">Interfaces inbound: Drop-off</td></tr>
<tr><td colspan="2">Interfaces outbound: Production</td></tr>
<tr><td colspan="2">Required resources:
Data Entry technician
Pharmacist
Pharmacy information system
Script box
Script</td></tr>
<tr><td colspan="2">Process Performance Measures:
Cycle Time
Operational Costs
Error Rate</td></tr>
</table>

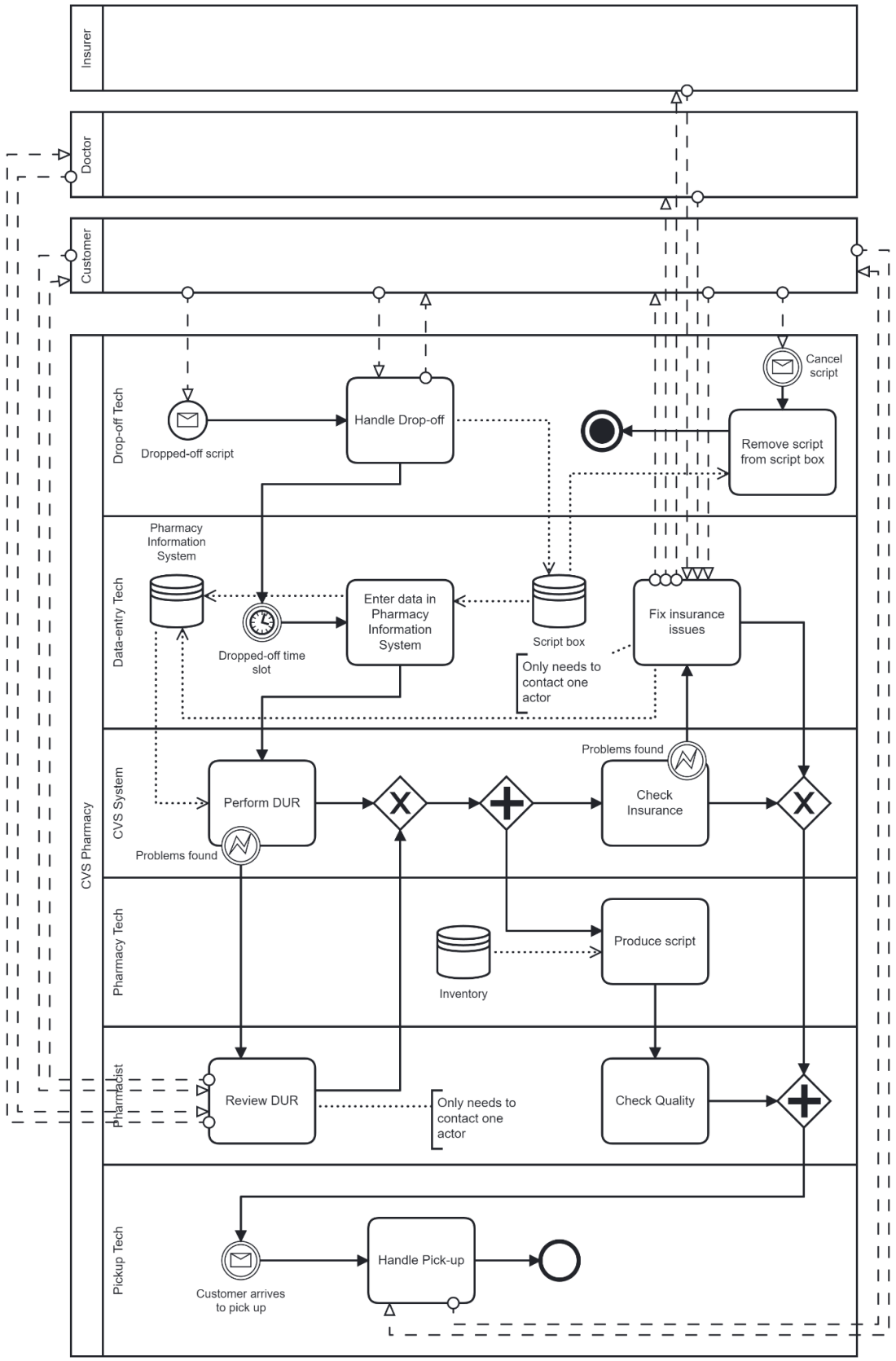
Name of process: Production	
Vision: The objective of the production process is to obtain the drugs necessary to fill a prescription correctly, with the right products in the appropriate amounts.	
Process Owner: Pharmacy technician	
Customer of process: ● Pharmacist	**Expectation of customer:** ● Script complete and correct
Outcome: Pharmacist obtained the drugs for the script	
Trigger: Data-entry complete	
First activity: Count the script drugs **First activity:** Wait for stock availability **Last activity:** Verify the script drugs	
Interfaces inbound: Data Entry **Interfaces outbound:** Quality Assurance	
Required resources: ● Pharmacy technician ● Pharmacy information system (data of the prescription) ● Inventory (drugs)	
Process Performance Measures: ● Cycle Time ● Operational Costs ● Error Rate	

<table>
<tr><td colspan="2">Name of Process: Quality Assurance</td></tr>
<tr><td colspan="2">Vision: The objective of the Quality Assurance process is to ensure that each script contains exactly the right drugs in the right quantities and that all other details are correct</td></tr>
<tr><td colspan="2">Process Owner: Specialized Quality Assurance Technician</td></tr>
<tr><td>Customer of Process: Pharmacist</td><td>Expectation of Customer:
No mistakes, drugs and dosage according to the script</td></tr>
<tr><td colspan="2">Outcome: It is guaranteed that the drug is in accordance with the prescription</td></tr>
<tr><td colspan="2">Trigger: Production Completed</td></tr>
<tr><td colspan="2">One Activity: Review script for right quantities and other details</td></tr>
<tr><td colspan="2">Interfaces Inbound: Production
Interfaces Outbound: Pick-up</td></tr>
<tr><td colspan="2">Required Resources:
Human Resources: Pharmacist
High Knowledge (pharmacist course required)</td></tr>
<tr><td colspan="2">Process Performance Measures:
Cycle Time
Operational Costs</td></tr>
</table>

Name of process: Pick-Up	
Vision: The purpose of the collection is to deliver to the customer the bag/s relating to his/her prescription and receive payment for it.	
Process owner: Technician staffing the pickup window	
Customer of process: ● Customer	**Expectation of customer:** ● That the bag delivered matches your prescription and is correctly prepared
Outcome: The client raised all his prescriptions (correctly prepared) and paid what was required to be paid	
Trigger: Arrival of a customer at the pickup window	
First activity: Search for the right prescription **Second activity:** Check if everything is ok with the script **Third activity:** Verify customer identification **Last activity:** Take any required payments	
Interfaces inbound: Quality Assurance	
Interfaces outbound: None	
Required resources: ● Technician staffing the pickup window ● Script box ● Bags ● Till	
Process Performance Measures: ● Cycle Time ● Operational Costs ● Error Rate	

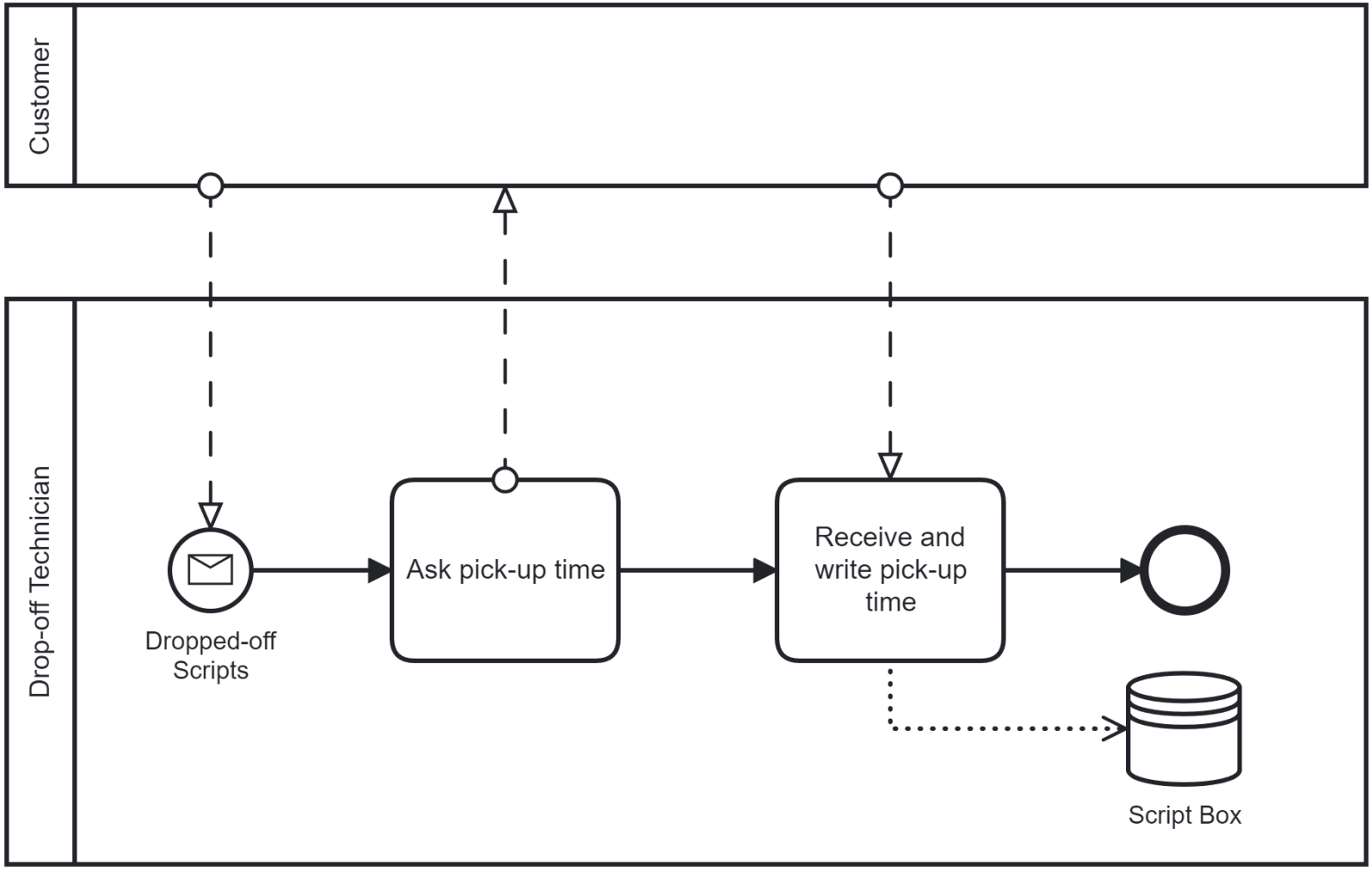
As-Is Business Process Model

General high-level model

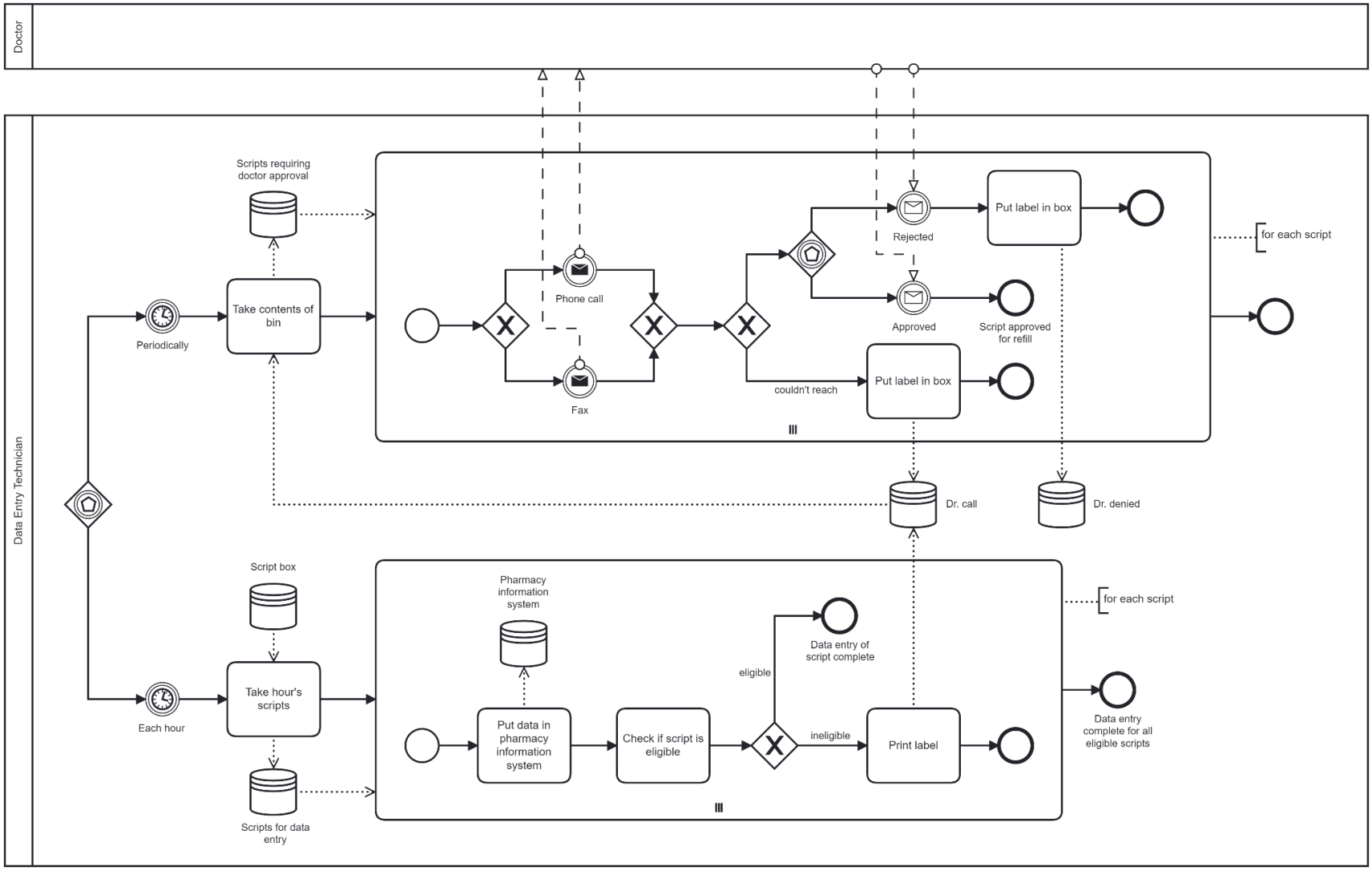


Note: this diagram represents the Prescription Fulfillment Process of one script only.

Drop-off

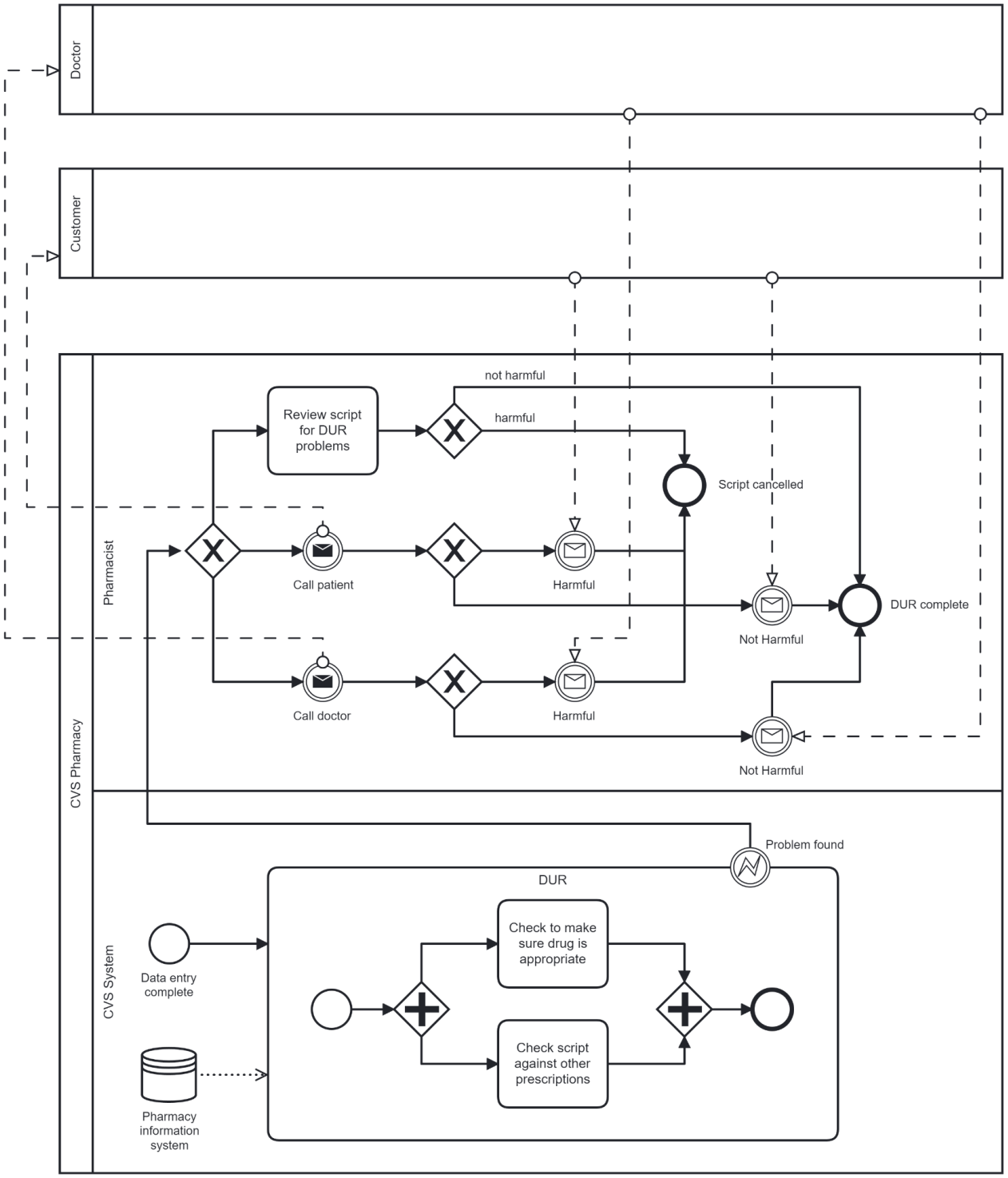

Customer
Drop-off Technician
Dropped-off Scripts
Ask pick-up time
Receive and write pick-up time
Script Box

Data Entry

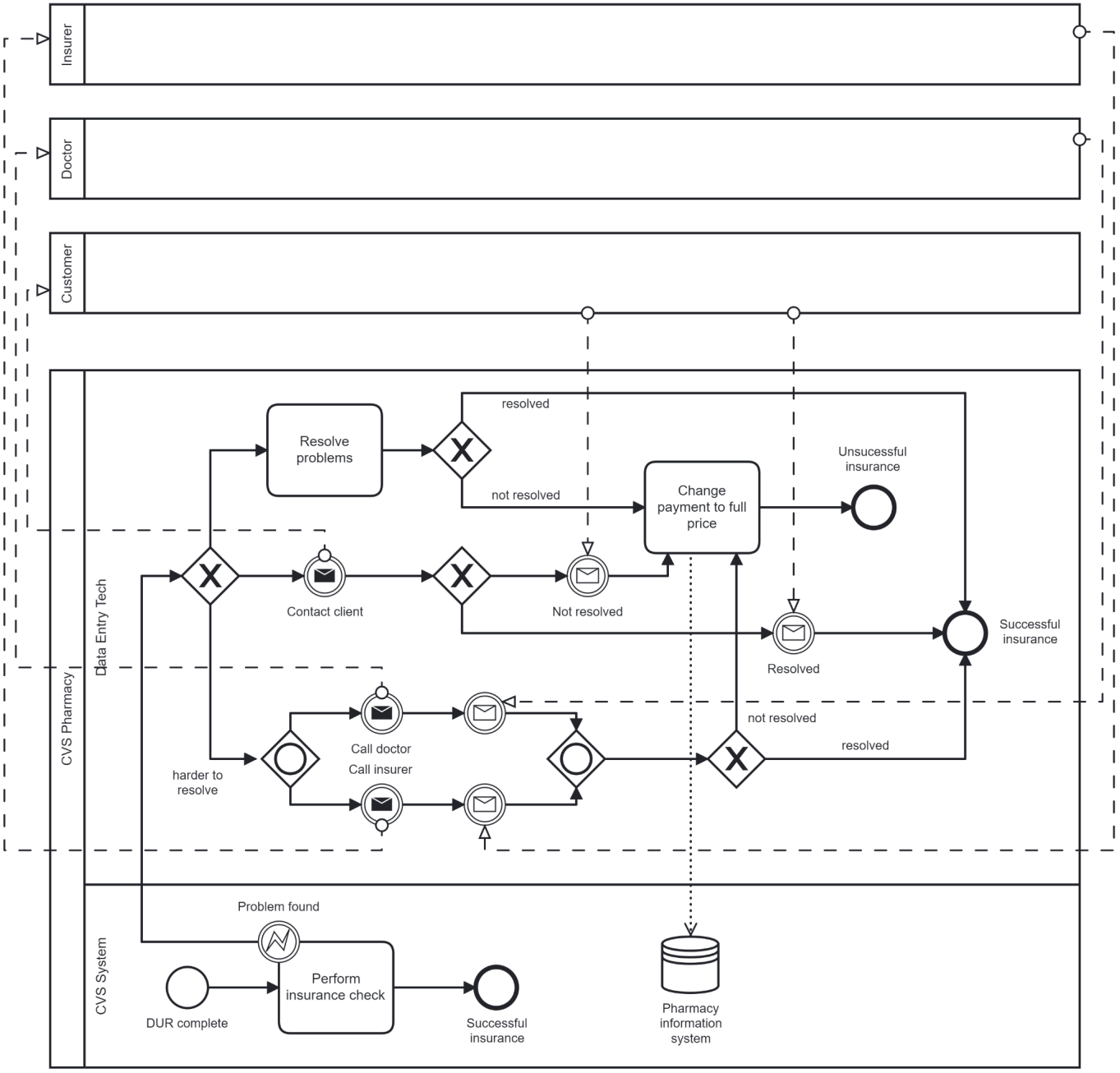


Note: this diagram represents the Data Entry process for all scripts in the script box.

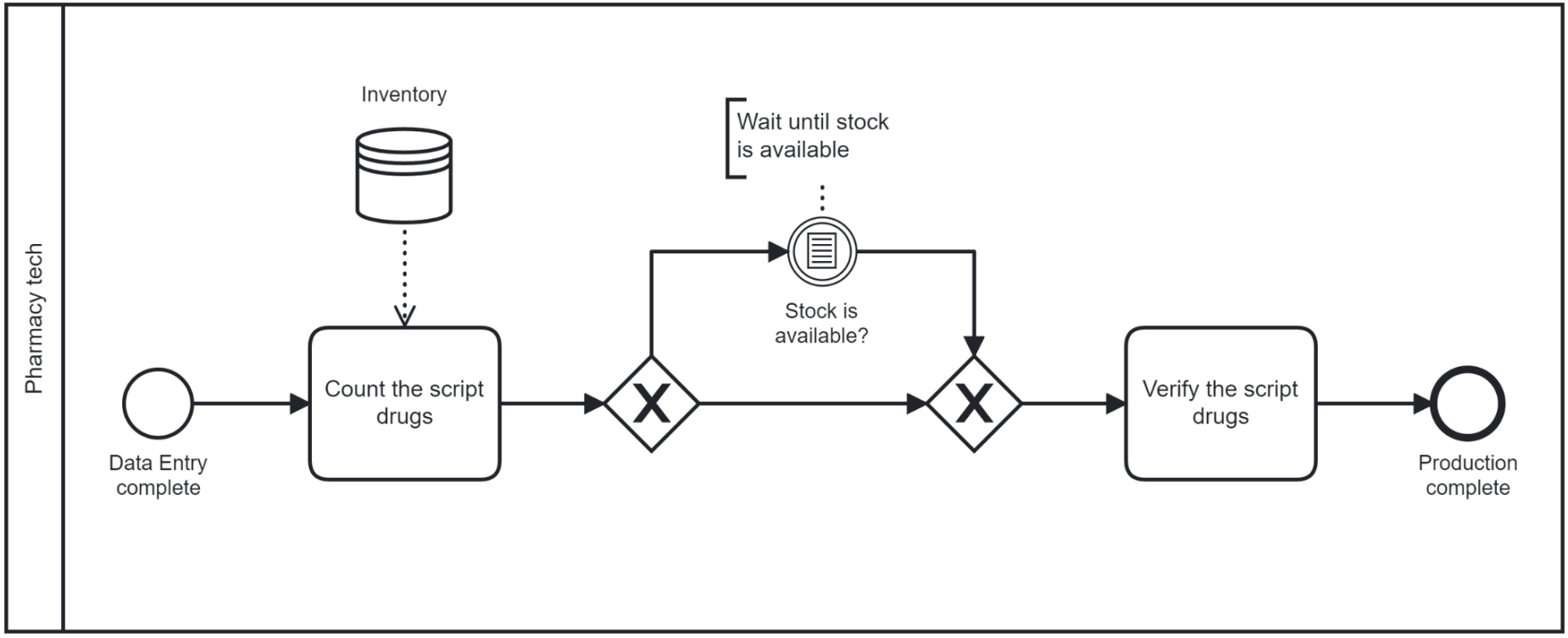
DUR


Doctor
Customer
CVS Pharmacy
Pharmacist
Review script for DUR problems
not harmful
harmful
Script cancelled
Call patient
Harmful
Not Harmful
DUR complete
Call doctor
Harmful
Not Harmful
Problem found
CVS System
Data entry complete
DUR
Check to make sure drug is appropriate
Check script against other prescriptions
Pharmacy information system

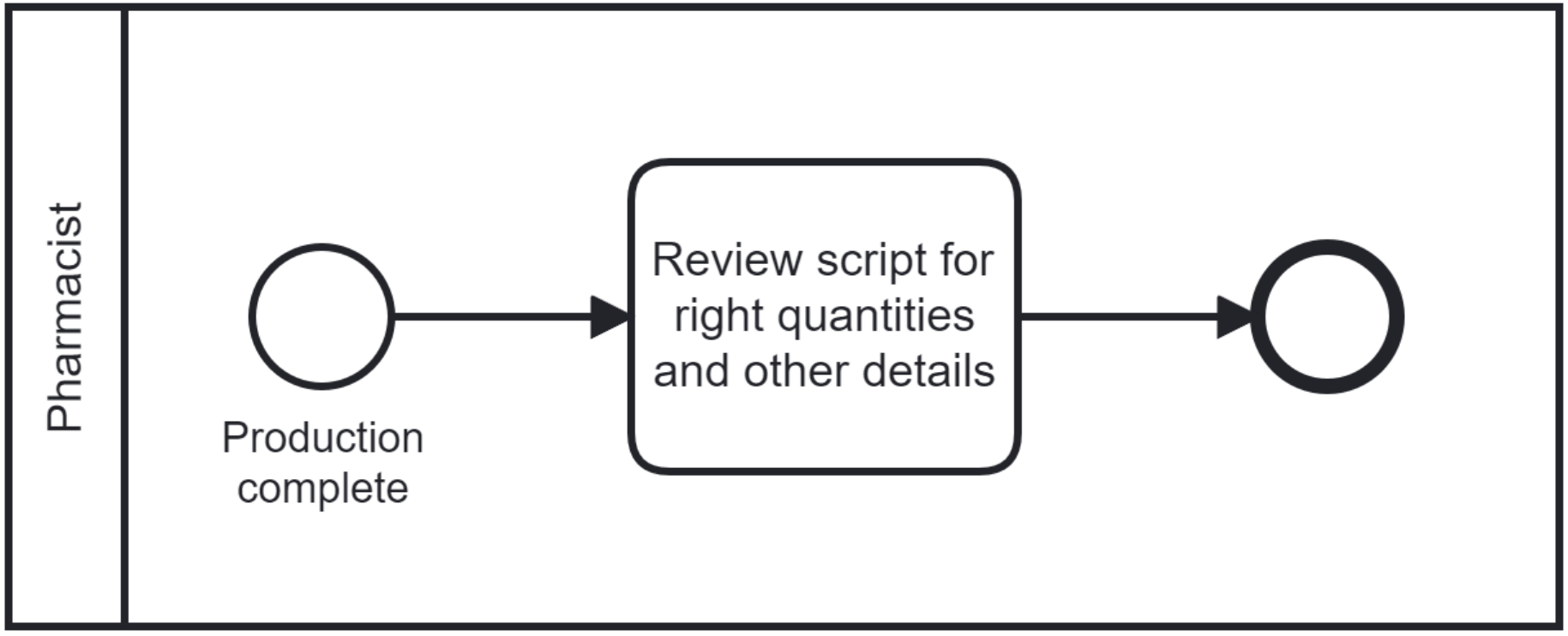
Insurance Check



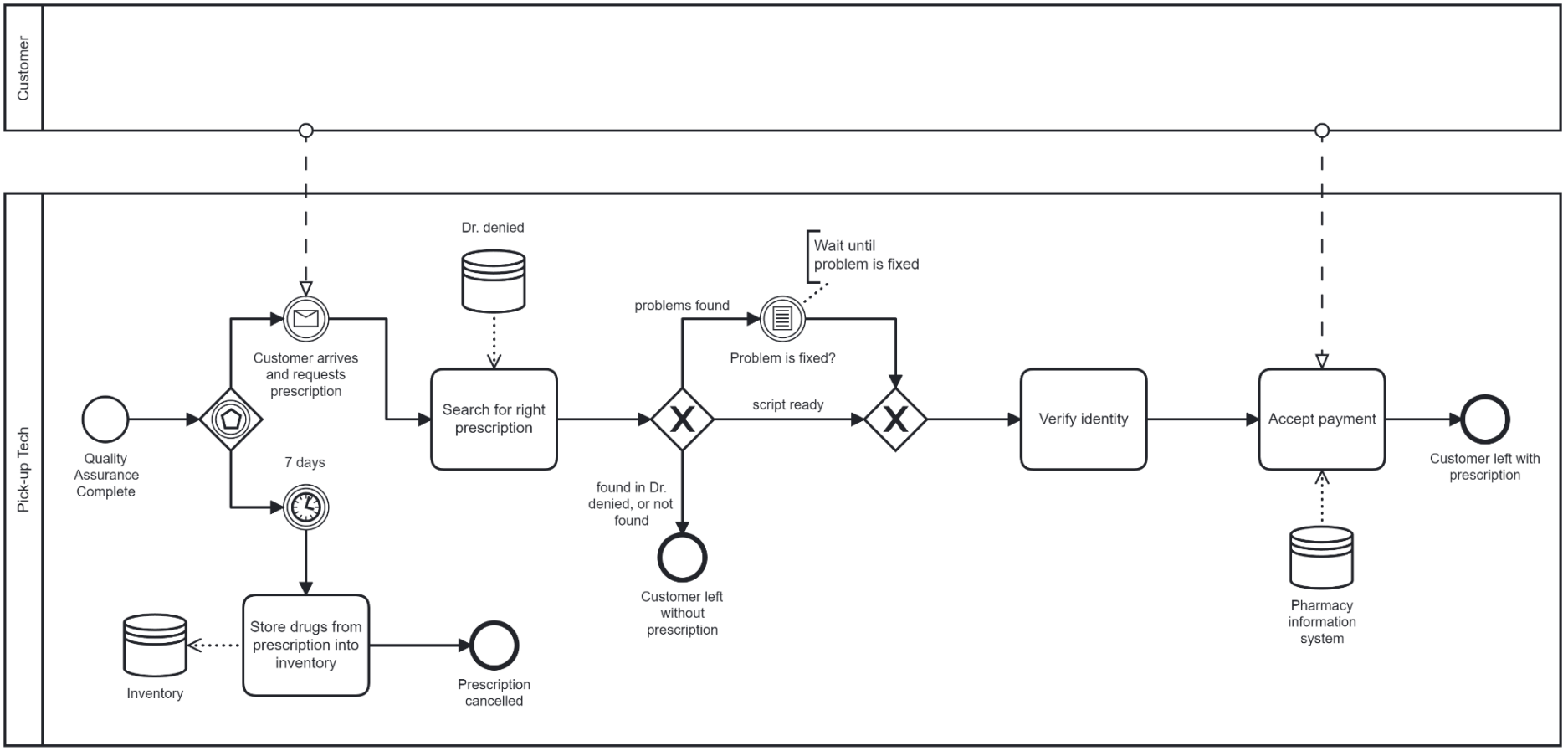
Production


Pharmacy tech
Inventory
Wait until stock is available
Stock is available?
Count the script drugs
Data Entry complete
Verify the script drugs
Production complete

Quality Assurance



Pick-up


Customer
Pick-up Tech
Quality Assurance Complete
Customer arrives and requests prescription
7 days
Dr. denied
Search for right prescription
problems found
Wait until problem is fixed
Problem is fixed?
script ready
found in Dr. denied, or not found
Customer left without prescription
Verify identity
Accept payment
Customer left with prescription
Pharmacy information system
Store drugs from prescription into inventory
Inventory
Prescription cancelled

As-Is Business Process Analysis

Issue Register

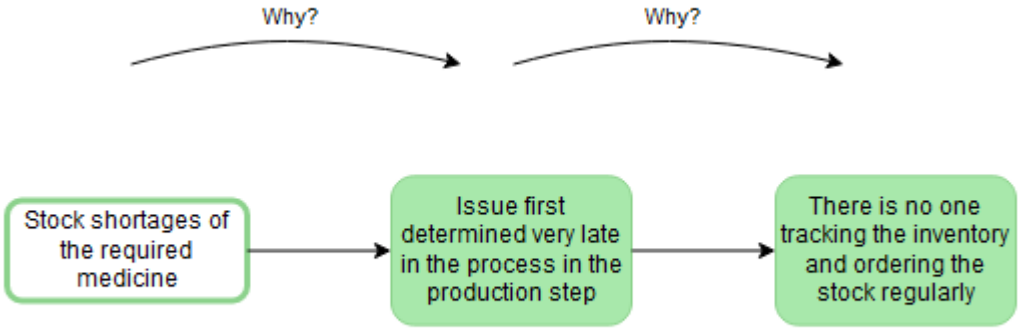
Issue Priority Number	Name	Description	Assumptions	Qualitative Impact	Quantitative Impact
1	Stock shortages of the required medicine	During the production step there was insufficient inventory to completely fill the script.	200 prescriptions in a given workday; 7% of total scripts encountered partial or complete stock shortages; Average revenue per script is 45.455$	Customers couldn't get the medicine in time and, consequentl y their health condition can get worse	0.07 x 200 x 45.455 = 636.37$ per day
2	No Refill Allowed	The customer lost track of how many refills were allowed, and then the doctor rejected the refill.	200 prescriptions in a given workday; "No refill allowed" scripts were 6% of total scripts; Average revenue per script is 45.455$	Customers would only be informed of the "No refill allowed" when they went to pick up the drugs causing customer frustration and a poor perception of the service.	0.06 x 200 x 45.455 = 545.46$ per day
3	Insurance Check Problems	If a problem occurred during an insurance check the data-entry technician could solve it alone or call the customer, and with problems that were harder to resolve they would call the insurer and/or the prescribing	200 prescriptions in a given workday; 17% of all scripts encountered a problem during the automated insurance check; Manual resolution of a problem during automated insurance check takes 120 seconds on	Customers complain about paying more than expected to the Pickup Tech.	200 x 0.17 x 120 = 4080 seconds per day ≈ 1 hour and 8 minutes per day (0.06 x 21.68 million x 45.455 = 59127864 $ per year)

		doctor.	average (6% of customers (heavy customers) leave because of insurance problems per year; 21.68 million heavy customer scripts are lost a year; each script is 45.455$)		
4	DUR hard stop	If the DUR revealed any potential problems, the systems came to a “hard stop” and fulfillment could not proceed until the DUR was reviewed by a pharmacist, and in more serious cases he calls the doctor.	200 prescriptions in a given workday; Happens to 20% of all scripts; 90% were resolved by pharmacists without involving the doctor; Takes 60s to resolve without doctor; 10min with doctor		200 x 0.20 x (0.90 x 60 + 0.10 x 600) = 4560 seconds per day ≈ 1 hour and 16 minutes per day

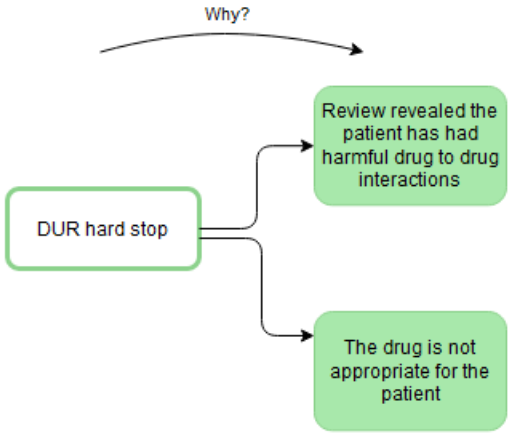
Note: In the insurance problems we used the opportunity assessment data because it is these problems that are causing heavy users to leave the service so we could calculate the losses because of this problem. For service problems like stock shortages and others we do not have sufficient data to separate these types of problems so we didn’t calculate those values.

Why-Why Diagrams

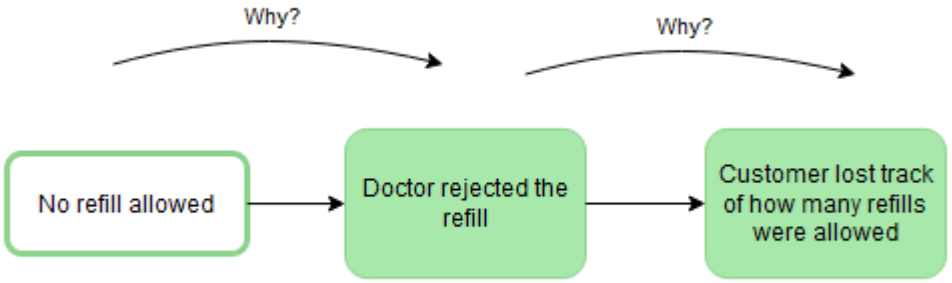
Stock shortages of the required medicine



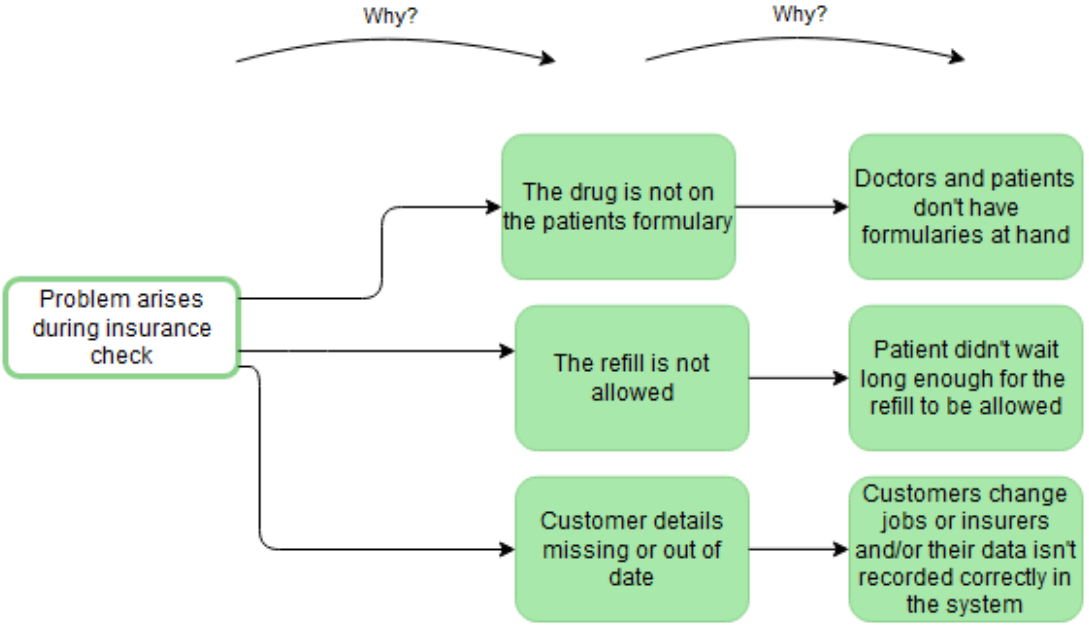
DUR hard stop



No Refill Allowed



Insurance Check Problems



Business Process Redesign

Regarding **Drop-off changes** we suggest the following:

- Hire more Drop Off technicians because there is a lack of response from the available techs at the in-store drop-off window and the drive-thru which is causing long waits at drive thru and even the closing of drive thru because there is no capacity of response to the customers. This would also fix the problem of the voicemail and fax machine not being regularly checked, there should be a technician tending to these two only. This is doable because of the low price for hiring technicians.
- Have a Drop Off technician receiving scripts by email from customers (this could be the same technician that is handling the fax and voicemail) because there is at least 40% of customers with the ability to scan their prescriptions and use the internet so this would avoid the customers having to come to the pharmacy physically and make lines at the pharmacy even longer.
- Have the Drop Off technician register the dropped off scripts in an information system that keeps an entry for each script with the time they were dropped off at and the pickup time because this would fix the problem of the scripts being out of priority. The system would keep the timestamp for that script and it would also keep the urgency of the script and make a weighted calculation to attribute a priority to the script, this would prioritize the script throughout the whole process (this system would be connected to the Information System in the DE step to transfer the priority and the pickup time for that script).
- Train Drop Off technicians to ask the right questions to customers to obtain the necessary information, this would fix the problem of Drop Off techs not being able to obtain important information from customers and cause problems of missing information in the system.

- Fix insurance issues at Drop Off by email or with customers there in the pharmacy, the idea is to fix the problems that are easy to solve (the ones that originally called a phone call to the customer) and avoid later wastes of time during the insurance check, so insurance check only handles the harder problems to resolve, which are rarer, therefore we waste less time.

Regarding **Data Entry changes** we suggest the following:

- Associate the customer's email and/or phone number to their prescription because the customer is never notified about third-party issues until Pickup, this would make it so that the customer would be notified if any issues arose beforehand. In the case the customer does not answer in a time limit the script goes back to the shelves. This also fixes another problem: in the case there are details missing about the customer, contact the customer and make them fill their missing details through email or phone, this also fixes the problem of the DE tech not being able to read handwritings.
- Send an email to the customer for them to see the status of their script so they can see at which step of the fulfillment process it is at, this would fix the overall problem of there being a lack of communication between the pharmacy and their clients, they could see what is happening with their order at each time. However, this solution only works for the customer that uses the internet and has an email registered in the system.
- Have a Database System integrated into CVS that tracks the inventory to fulfill the scripts, this would fix the Out of Stock problem that happens in Production (this problem must be identified before this step), order more stock when inventory is low. In the case there is no inventory before the customer comes to pick up their prescription, call/email the customer and reschedule the pick up time. This would fix the problem of the customer not being informed about the components for their script being out of stock.

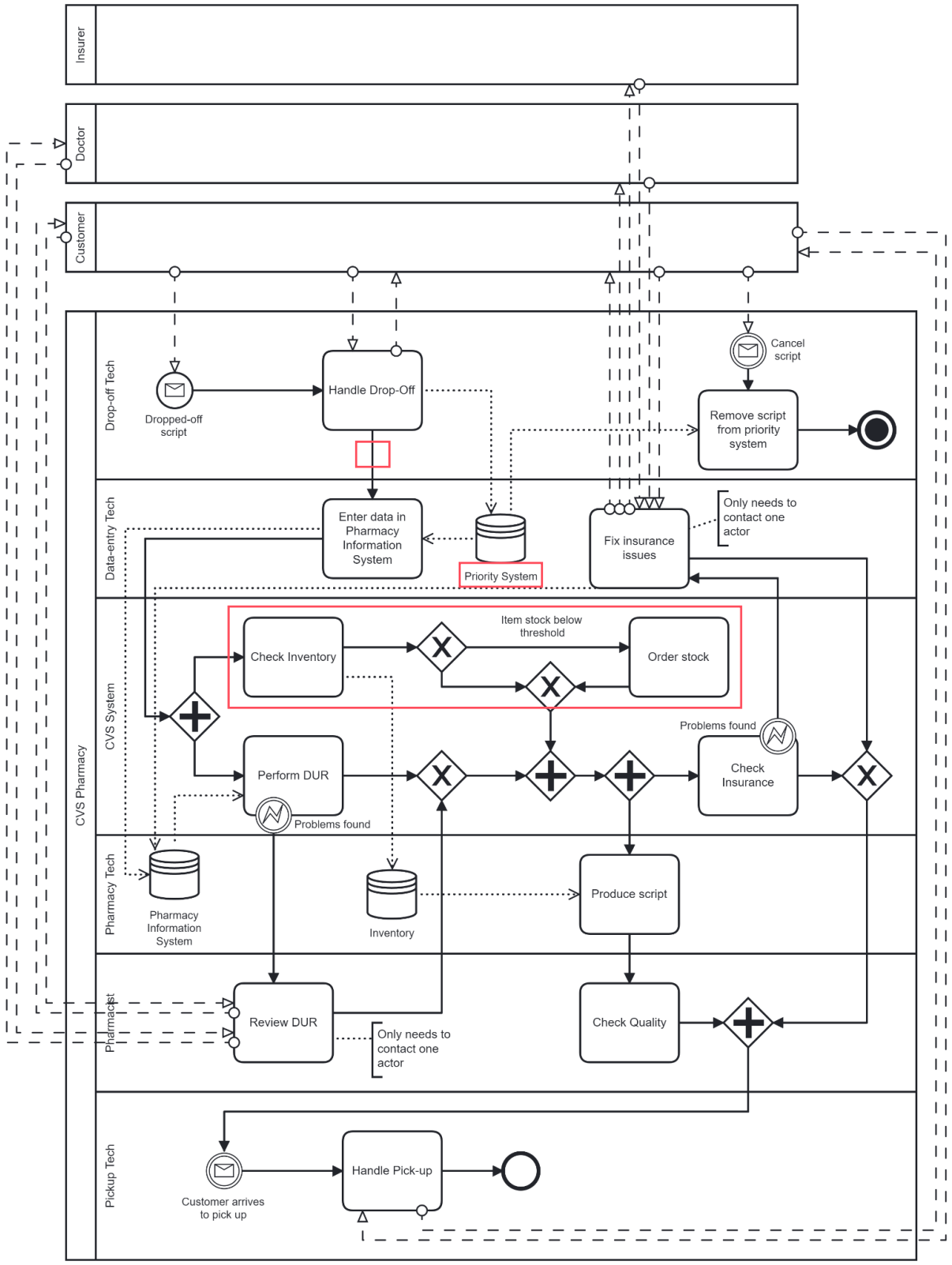
Regarding **Pickup changes** we suggest the following:

- Hire more Pickup technicians because nobody is responding to drive thru this would increase customer satisfaction and avoid a lot of people clogging drive-thru.
- Add a cash register to drive thru because Pickup techs should be able to perform payments at drive thru too this would also make the drop off process quicker because the cashier doesn't have to move to the other one.

We proposed a change to start insurance check earlier in the process since it can be done in parallel, however we decided not to change it because we fix most insurance problems by verifying the details with the customer at drop off and because that would require an additional change to the system because insurance check starts only after DUR is complete so it was not worth it overall.

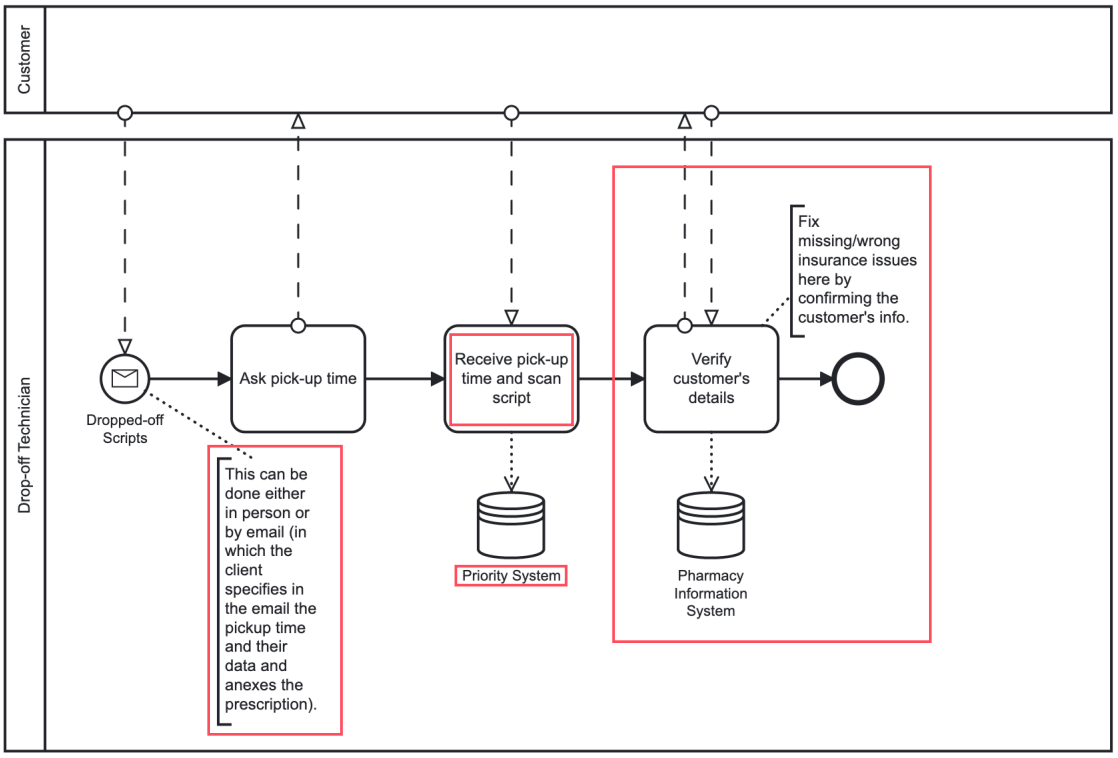
To-be Business Process Model

General high-level model

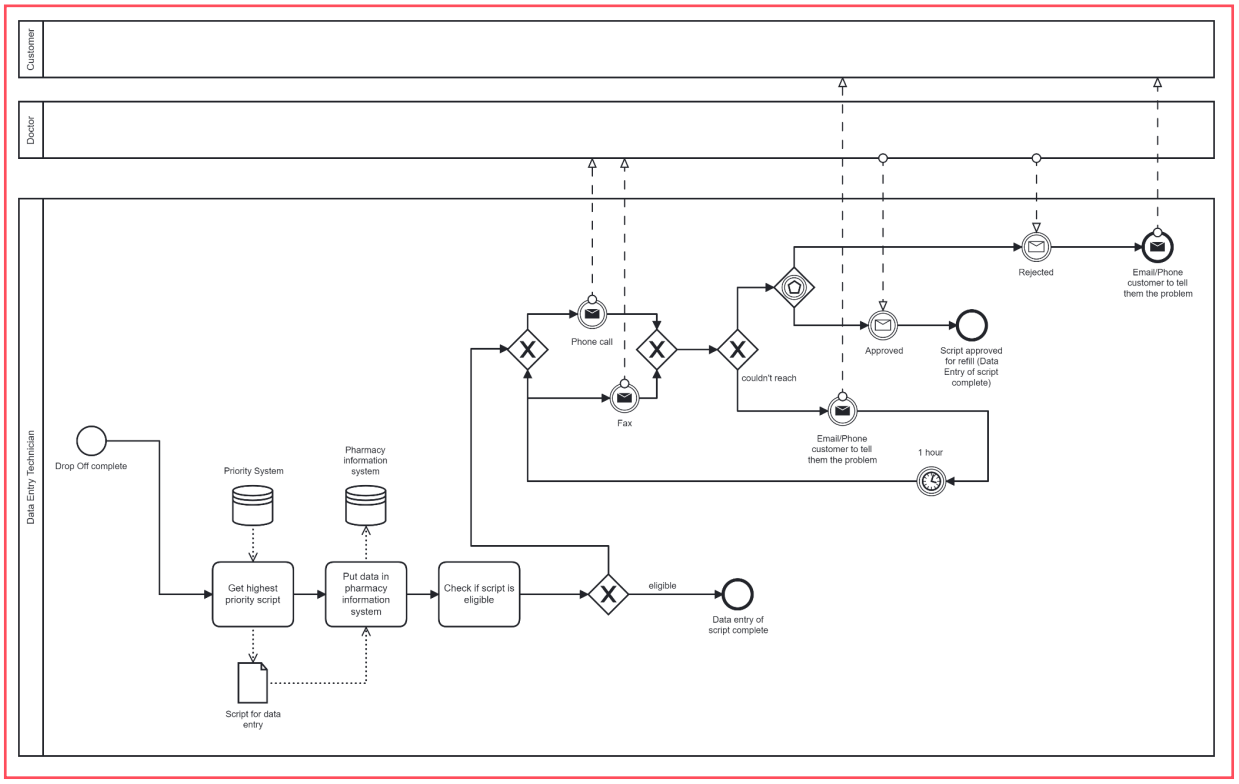


Note: In the CVS System, Checking the Inventory and Ordering Stock should always be faster than the DUR.

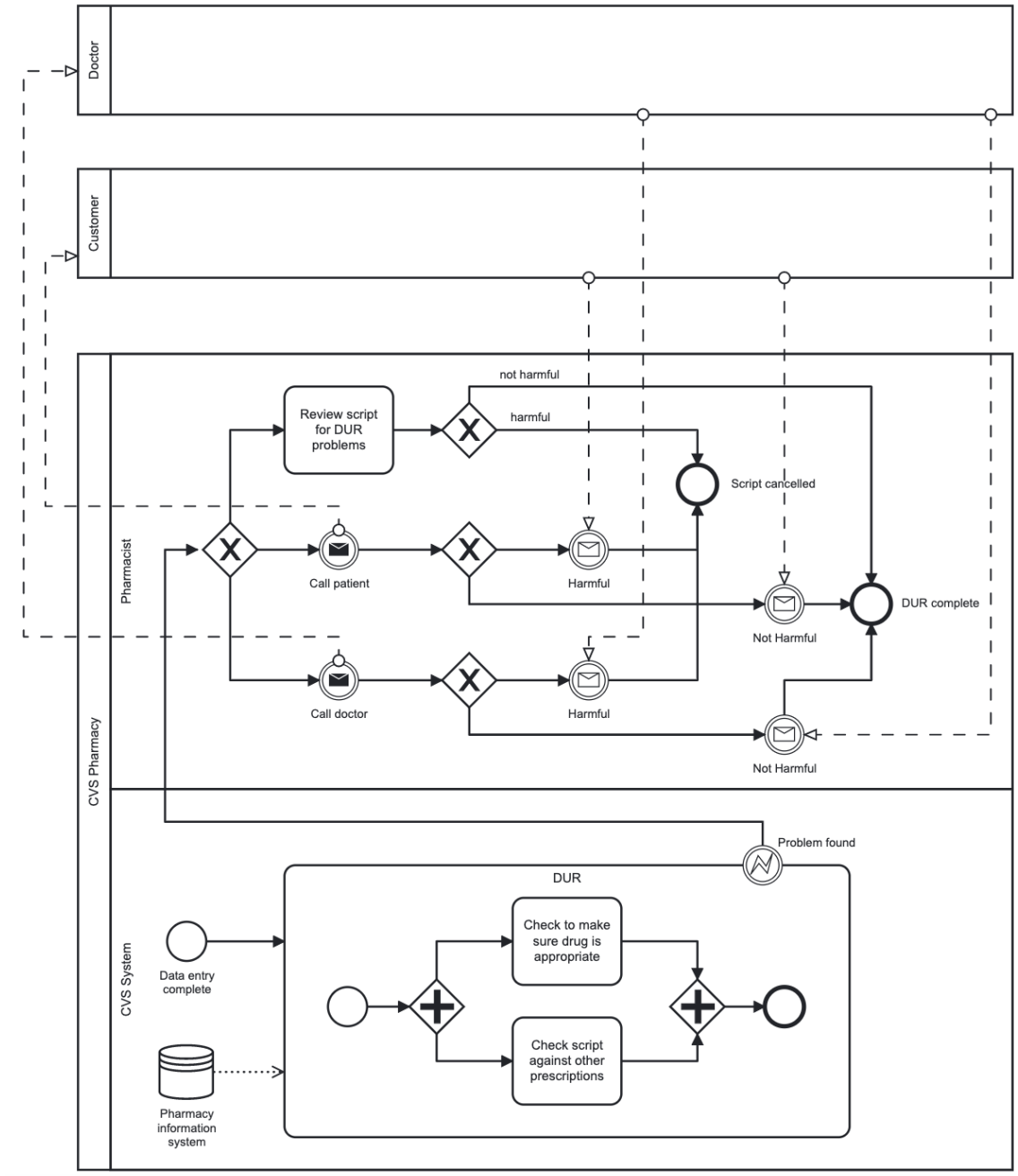
Drop-off



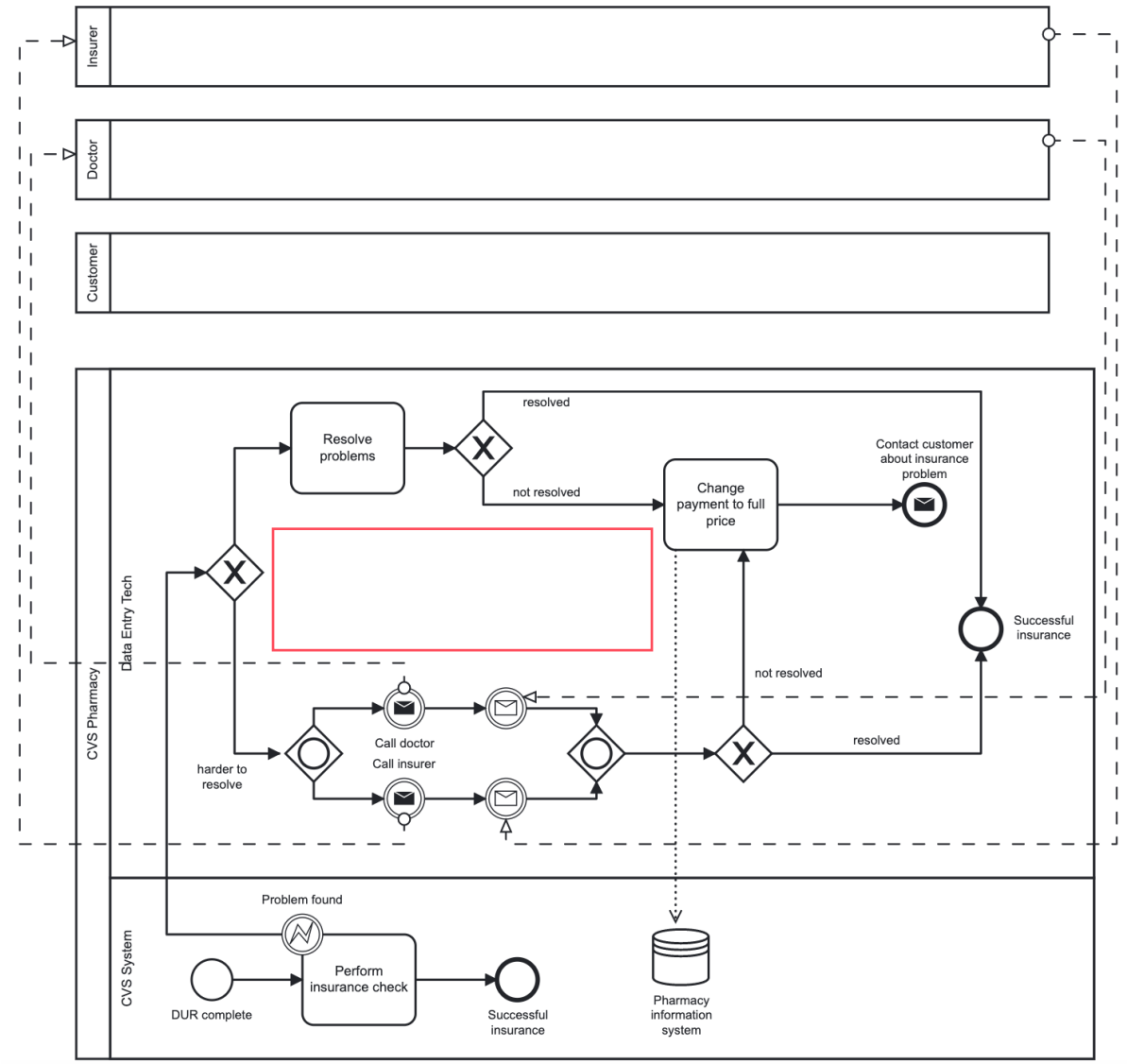
Data Entry



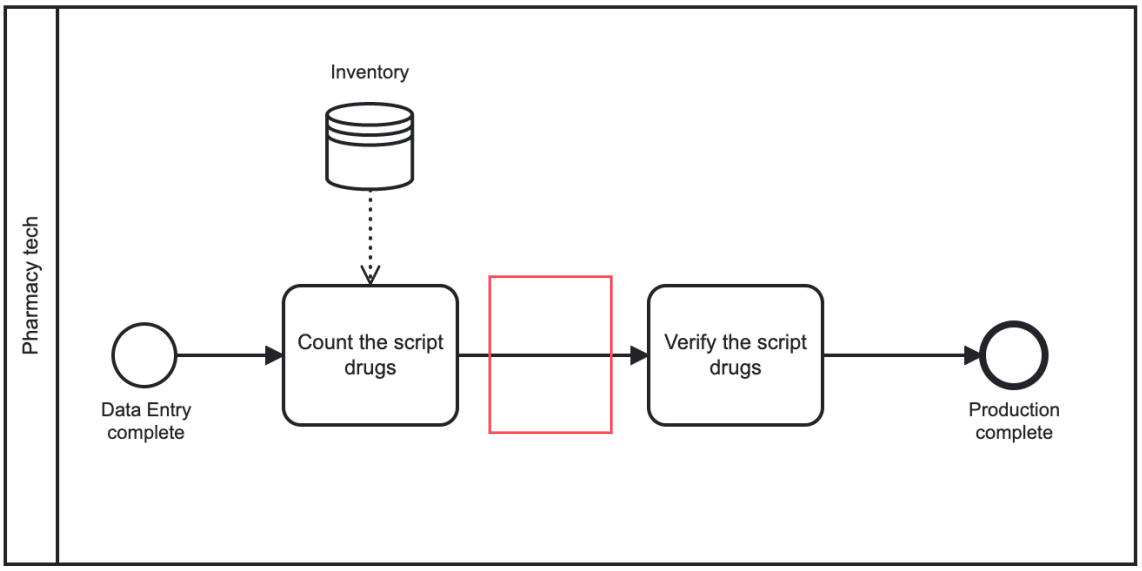
DUR


Doctor
Customer
Pharmacist
CVS Pharmacy
CVS System
Review script for DUR problems
not harmful
harmful
Script cancelled
Call patient
Harmful
Not Harmful
DUR complete
Call doctor
Harmful
Not Harmful
Problem found
DUR
Check to make sure drug is appropriate
Check script against other prescriptions
Data entry complete
Pharmacy information system

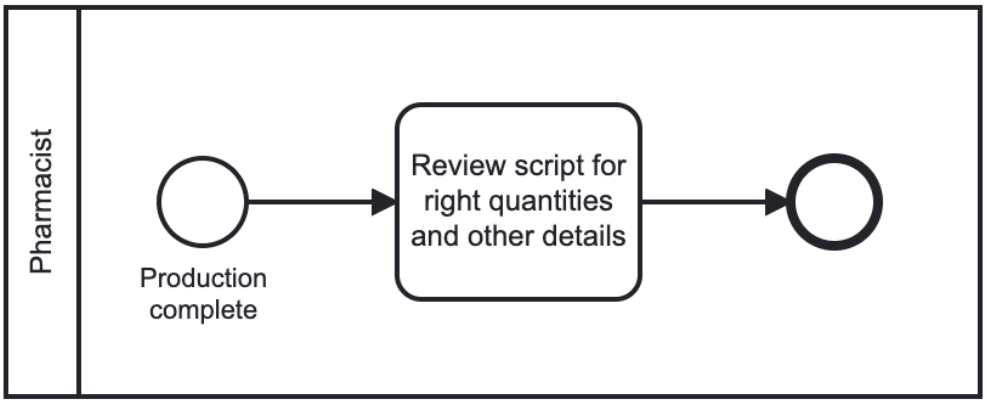
Insurance Check



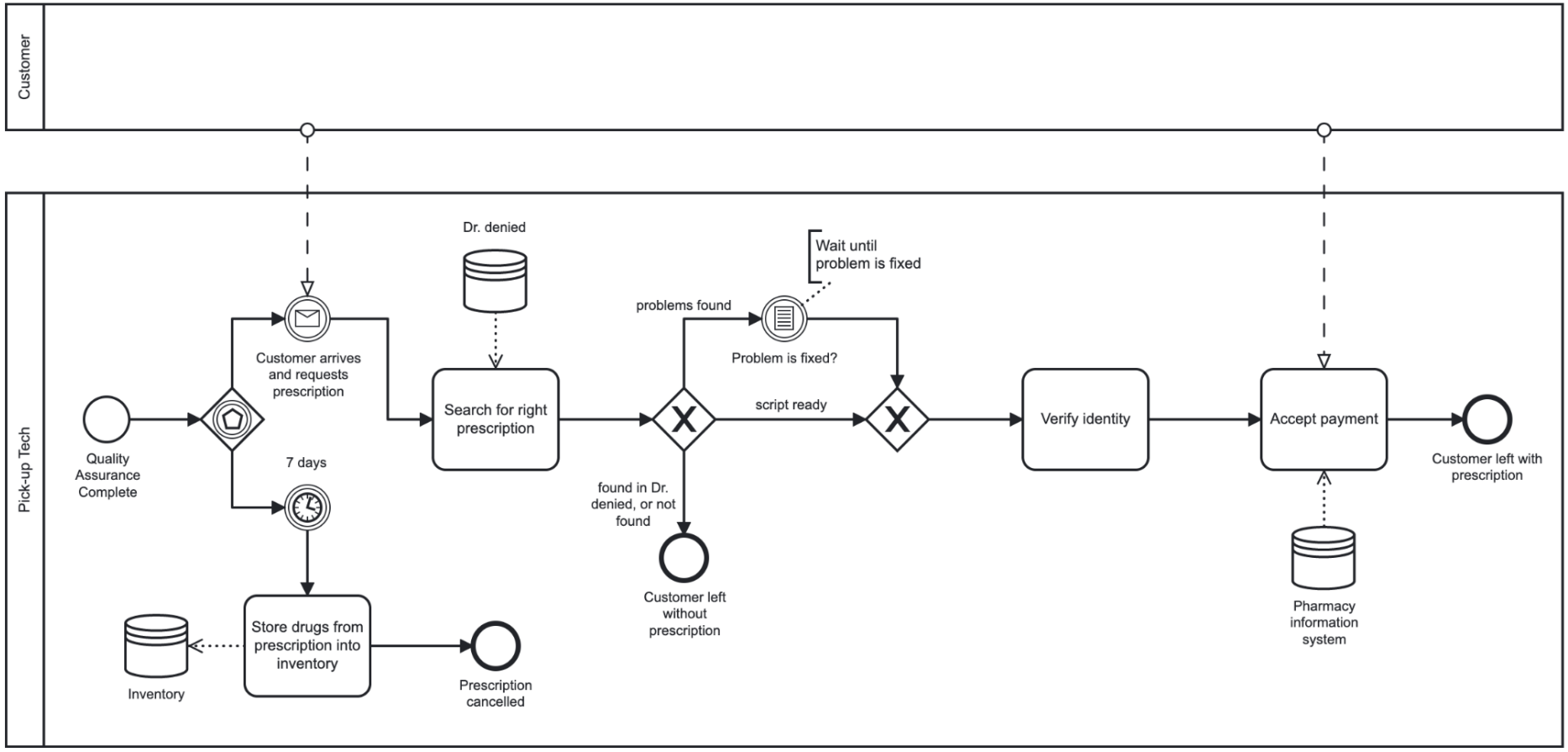
Production



Quality Assurance



Pick Up


Customer
Pick-up Tech
Quality Assurance Complete
Customer arrives and requests prescription
7 days
Dr. denied
Search for right prescription
problems found
Wait until problem is fixed
Problem is fixed?
script ready
found in Dr. denied, or not found
Customer left without prescription
Verify identity
Accept payment
Customer left with prescription
Pharmacy information system
Store drugs from prescription into inventory
Inventory
Prescription cancelled