Group 2:
State-wide Reopening

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Overview

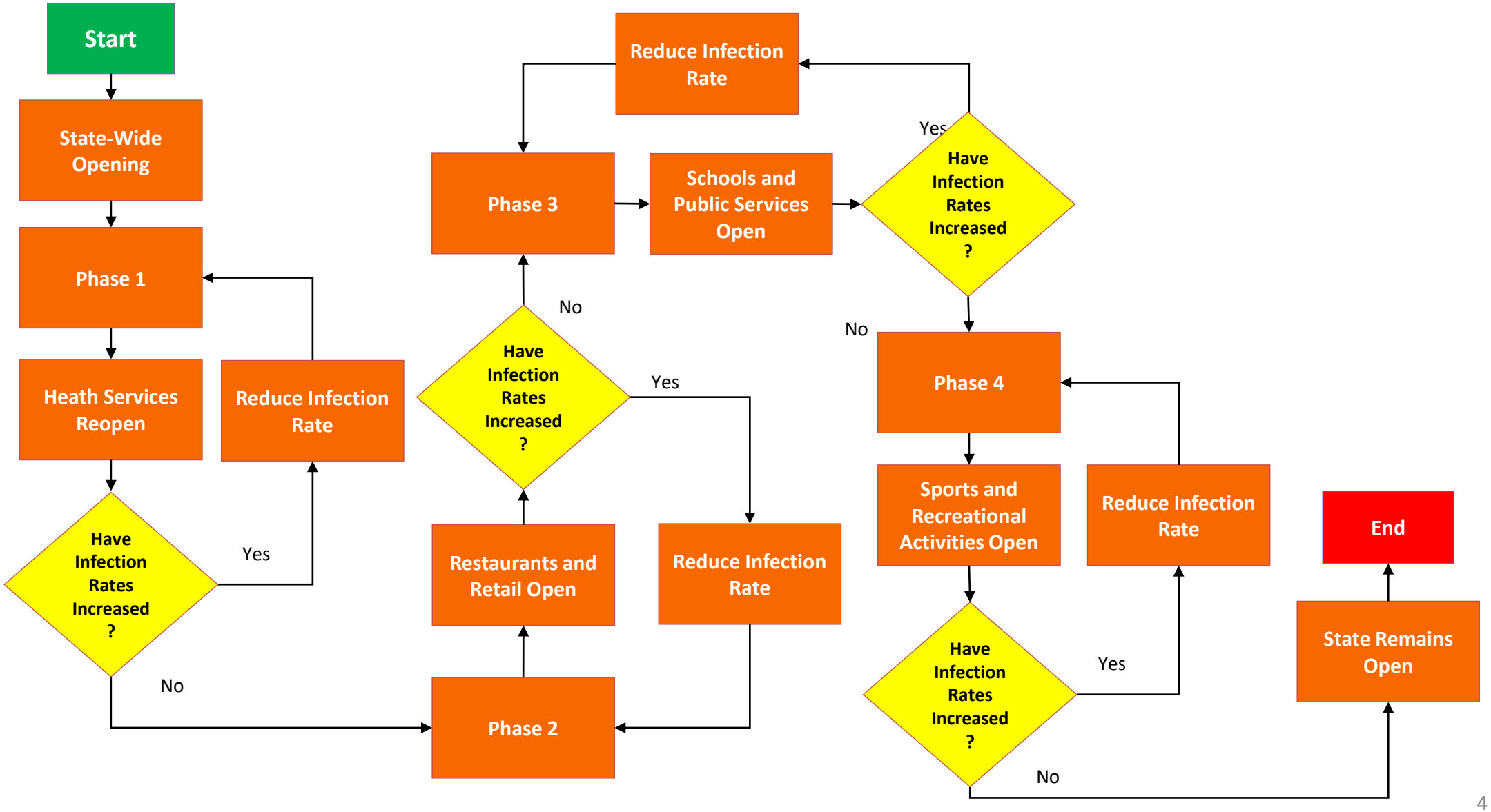
- Background
- Brainstorming
- Ishikawa Chart
- Cost Of Poor Quality (COPQ) Assessment
- Process Capability analysis
- Process Flow Chart

Background

- First coronavirus case in the United States was detected in January 2020 since then 28 million people have been infected and over 500,000 people have died, and this number continues to rise with each day.
- In addition to social distancing, wearing masks and sanitizing surfaces and hands city and state governments implemented lockdown strategies with varying degrees of success.
    - Restaurants, retail shops, schools, places of worship and other public gathering places were effectively shut down resulting in many people losing jobs.
- On March 20th, 2020 Governor of New York State, Andrew Cuomo, issued a Stay-at-Home order that limited "non-essential" travel within the state as well as placed a restriction on gatherings of any size.
- Shutting down the state created many problems that need to be avoided or fixed when reopening commences.
    - Economic – unemployment rates have risen 235% within the last year
    - Social – health and safety of the public
    - Political – public health should not be dictated by political views
- To save the state economy; safe, smart and effective strategies must be implemented in order to ensure the coronavirus will not grow and spread and prevent normal life from starting again
    - Active state-wide monitoring down to local level scope
    - Vaccination availability for most if not all NYS residents
    - New diverse availability of employment opportunities as well as investment opportunities

NYTimes Coronavirus Statistics
NYS Governor Executive Order
NYS Labor Statistics

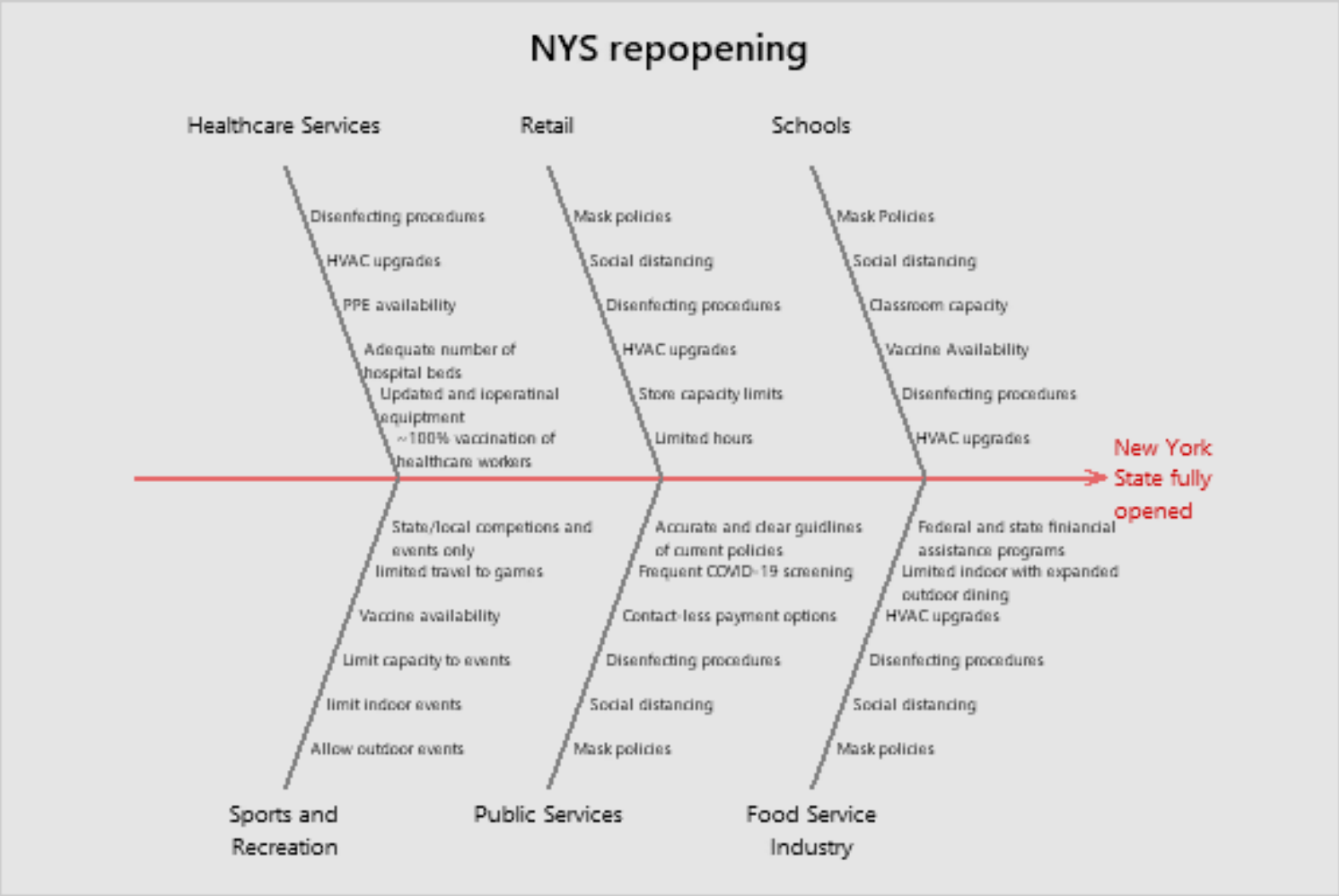
Flow Chart


Start
State-Wide Opening
Phase 1
Heath Services Reopen
Have Infection Rates Increased ?
Yes
Reduce Infection Rate
No
Phase 2
Restaurants and Retail Open
Have Infection Rates Increased ?
No
Yes
Reduce Infection Rate
Phase 3
Schools and Public Services Open
Have Infection Rates Increased ?
Yes
Reduce Infection Rate
No
Phase 4
Sports and Recreational Activities Open
Have Infection Rates Increased ?
Yes
Reduce Infection Rate
No
State Remains Open
End

Brainstorming

Schools	Food Service Industry	Retail	Public Services	Healthcare services	Sports and Recreation
Mask policies	Mask policies	Mask policies	Mask policies	Disinfecting procedures	Allow outdoor events
Social Distancing	Social Distancing	Social Distancing	Social Distancing	HVAC upgrades	Limited indoor events
Classroom capacity	Disinfecting procedures	Disinfecting procedures	Disinfecting procedures	PPE availability	Limit capacity for events
Vaccine availability	HVAC upgrades	HVAC upgrades	Contactless payment options	Adequate number of hospital beds	Vaccine availability
Disinfecting procedures	Limit indoor seating and increase outdoor	Store capacity limits	Frequent COVID-19 testing available	Updated and operational equipment	Limited travel for games
HVAC upgrades	Financial assistance waivers/programs	Limited hours	Accurate and clear guidelines of current policies	~100% vaccination of healthcare workers	State/local competitions and events

Ishikawa Chart



Cost of Poor Quality (COPQ) Assessment

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COPQ	Internal	External	Appraisal	Prevention
Infection	·Extremely contagious ·Long incubation period multiple modes of transmission	·Advance transportation makes virus easy to pass ·Lack of awareness ·Large flow of people at downtown	·Trace contacted people and do nucleic acid detection ·Mandatory two-week quarantine for foreign visitors	·Prepare quarantine rooms ·Appeal to residents to stay at home if possible ·Keep disinfecting everyday
Monitoring	·Lack of detection staff and equipment ·Hard to inform everyone to have nucleic acid detection	·Infected people do not immediately show symptoms ·There are people who fake their travel trajectory	·Check the registration forms of each unit for the temperature and health of visitors on time ·Establish a statewide database of personal health information	·Prepare spare inspection equipment and personnel ·Prepare plan for apply multiple and large-scale nucleic acid tests for one region in emergency

Cost of Poor Quality (COPQ) Assessment

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COPQ	Internal	External	Appraisal	Prevention
Medical treatment	·lack of equipment and medical staff ·It takes months to completely cure a patient ·Overwork can make medical workers sick	·Too many patients can cause cross-infection ·Other kind of patients are unable to see doctors, the contradiction between doctors and patients increase	·Count the length and life of the device ·Carry out survey of the working status of doctors ·Nucleic acid testing in hospital environments	·Gather patients who cannot be treated yet in case enlarge infection ·Popularize medical knowledge of the epidemic to the population ·Minor patients who treated can isolated at home on their own ·Build additional hospitals to deal with the covid-19
Vaccination	·Some people are allergic to the vaccine or certain ingredients in it ·It can't guarantee 100 percent effective	·Availability of vaccines ·Access to reliable transportation networks ·Improper handling of vaccine ·Misinformation of vaccine statistics	·Investigate the severity of epidemic in different regions ·Ensure that the vaccine storage equipment has a backup power supply and check all equipment in a timely manner ·Check the skills of workers of injecting others.	·Train nurses and make sure people that are injected with vaccine continue to follow all health and safety mandates ·Make vaccine sites convenient and readily available to large portion of population ·Optimize transportation routes

Assessment

People and Organizations to Interview

- Students
- Teachers
- Retail
- Bus drivers
- Restaurateurs
- Residents
- Security in Scenic Spot
- Government Officials

Assessment

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Questions to Ask

- **Students**
  - Has the epidemic affected your study and life? What are the specific aspects? Do you have plans to catch up with your study progress after the reopening?
- **Teachers**
  - Do you have any changes in your teaching style? Is there any reduction in your teaching quality? Do you have any suggestion to better adapt to this epidemic situation?
- **Retail**
  - What are the changes of customer's flow after reopening and before the covid-19 comparing with closing period? Do you add extra ways to check if there are viruses on your goods now compared with before the epidemic?
- **Bus drivers**
  - Are you responsible for checking whether passengers wear masks and keeping distance from each other? According to your observation, are passengers following all these rules? How does the current passengers flow?
- **Restaurateurs**
  - What are the specific requirements for incoming customers before they enter the restaurant? Do you limit the number of customers in there? How do you sterilize the restaurant? And how to ensure the food safety?

Assessment

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Questions to Ask

- **Residents**
  - Is there a special testing and quarantine site in your community? Will community managers test and quarantine residents with a history of travel to high-risk areas? Can the number of daily infections in the community be known from some websites or news reports? Will the recent routes of the infected person be made public? Can you get help from relevant personnel when you have symptoms of infection?
- **Security staff in scenic spot**
  - Do visitors follow the rules that they must wear mask and disinfect hands before getting in? What are your checking processes? And what is your measures when you finding someone has symptoms?
- **Government officials**
  - What measures should authority take to ensure the health and safety of more people during the outbreak?

Assessment

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Answers to Questions

- **Students**
  - Schools have closed around two more months than before the epidemic, and class time online is always changing. It was inefficient for senior school and high school students to study during that period. However, this situation promoted improvement of online education, so after reopening, students will combine online and offline ways to study which will make effort for their study progresses.
- **Teachers**
  - Teachers used an online education model for nearly a whole semester, which is easier for students to learn knowledge by teacher talking and showing PPT at the same time, meanwhile, students can search on the internet about their questions or confusion immediately. Also, they can watch recordings of class to get better reviews. But for teachers, this method is hard to communicate with students because without seeing students physically, teachers can't get information that do students get their points or even are students still listening. All in all, online model is a great tool and teachers will keep using it in some fields after reopening.
- **Retail**
  - During the epidemic period, nearly half of the stores closed, and the opening stores are mostly selling daily necessities and food. The number of customers of these stores did not decrease much actually. But people always got there and bought a lot of stuff, which resulted in others coming there for nothing. Reopening has relieved such phenomenon and the customer's flow keeps increasing and supplies of many commodities have resumed. Things are getting normalized every day. However, the situation of restaurants is much worse that many of them closed not because of policy but because there were no customers for several weeks. And the food in their warehouse had expired so they had to drop many goods. Such damage made many restaurateurs go broke.

Assessment

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Answers to Questions

- **Bus drivers**
  - It is hard to monitor passengers whether they follow rules because the government did not publish a clear policy about it. And there are many kinds of passengers that some people have good awareness about, some people do not, some people even don't believe the existence of covid-19. What drivers can do is protect themselves and provide disinfectants for people who need these supplies.
- **Restaurateurs**
  - Before customer come in, they need to wear mask and body temperature must be normal and it cannot exceed 98.6°F. We have no limit on the number of people. Special staff will use disinfectant to disinfect the dining table and doors and open the window to ventilate occasionally. We know that viruses are afraid of high temperatures, so when the cook is cleaning dishes, soak them in hot water for 10 minutes first.
- **Residents**
  - Some communities have testing and isolation sites, but there are cases where the number of medical personnel is insufficient. For people with high-risk tourism history, if they are no symptoms of infection, won't be forced quarantine. People will get data on the news about the number of new infections and deaths, but recent routes of the infected person will not be reported. When people feel symptoms, most people will take medicine and home quarantine, because there is not enough space to accommodate the hospital patients.

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Answers to Questions

- **Security in Scenic Spot**
  - Wearing a mask and disinfection are mandatory requirements, most people will follow the rules, if someone does not abide by, they will be no admittance. Security staff will test every tourist's body temperature, if it is found that the body temperature is not normal, then they will take tourist to the quarantine for testing immediately, and will go to the hospital when necessary, meanwhile, security staff requires close contacts for detection and quarantine to prevent infect more people.
- **Government Officials**
  - Public health is as important as national security. As the number of infected people increases, the government should pay more attention than before.
  - The medical and health system should be further strengthened, such as medical services, medical security and medicine supply.
  - Recruitment of medical experts is also important because scientists, doctors, epidemiologists, and other professionals play an indispensable role in dealing with diseases and natural disasters.
  - In addition to improving the health management system, advanced technological means are also necessary, for instance, internet medical, health care big data, medical artificial intelligence, and other technological means. These methods can play a role in predicting the development trend of the epidemic, tracing the journey of suspected patients, assisting doctors with CT scan reading and providing rapid diagnostic reference and so on.

Process Capability Analysis

- **Analysis:**
  - To check if the re-opening process meets quality standards.
  - To check whether the outbreak is well under control or not.
  - How much time it should take to eliminate pandemic and achieve full reopening.
  - The rate of infections stays below a certain percentage.
- **Estimators:**
  - Process capability ratio Cp, Capability Index Cpk.
- **Process:**
  - The number of new COVID-19 patients per region per day.
- **Problem Statement:**
  - The regions of the state, there is a re-outbreak of the break after re-opening.

Process Capability Analysis

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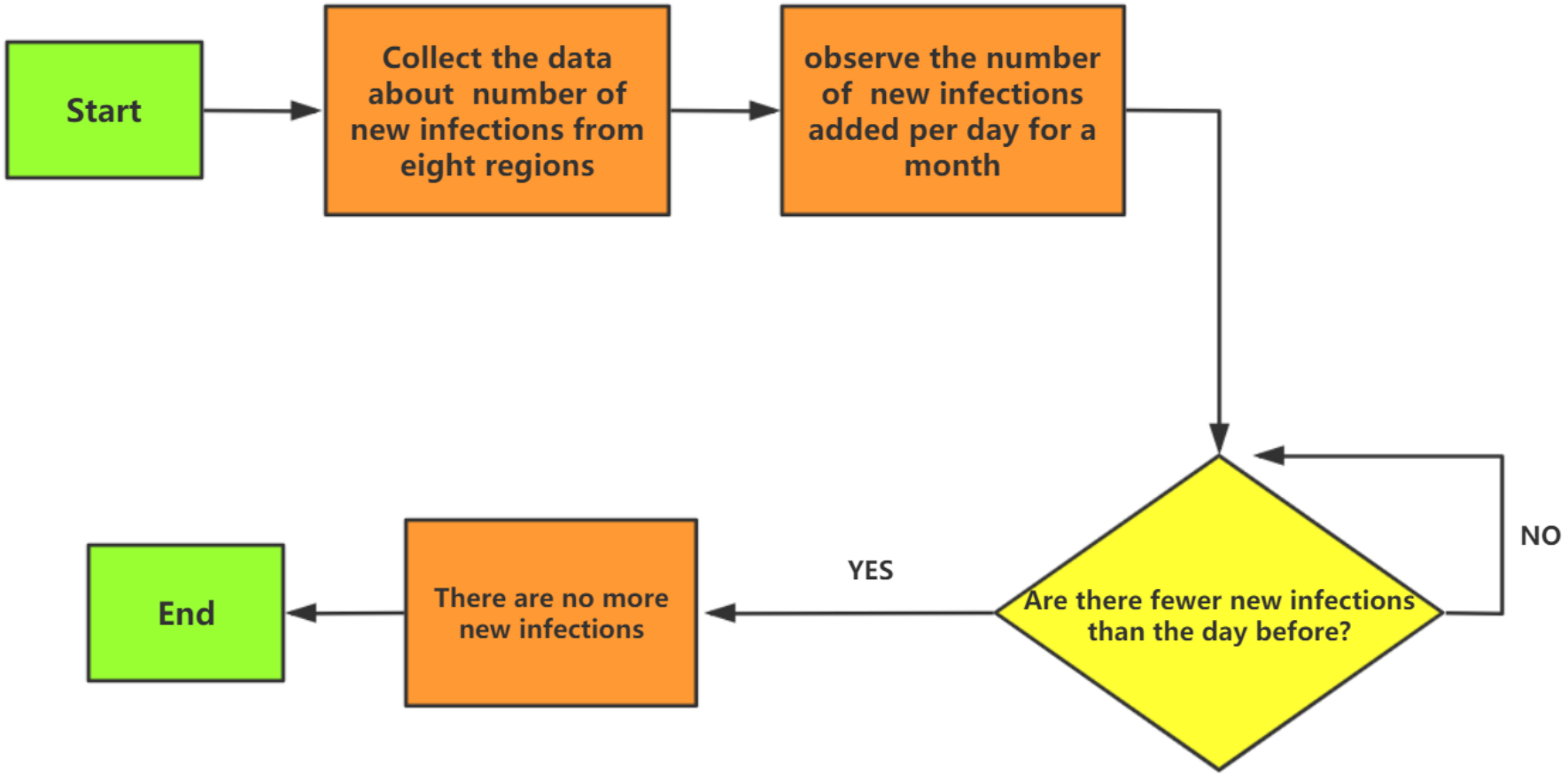
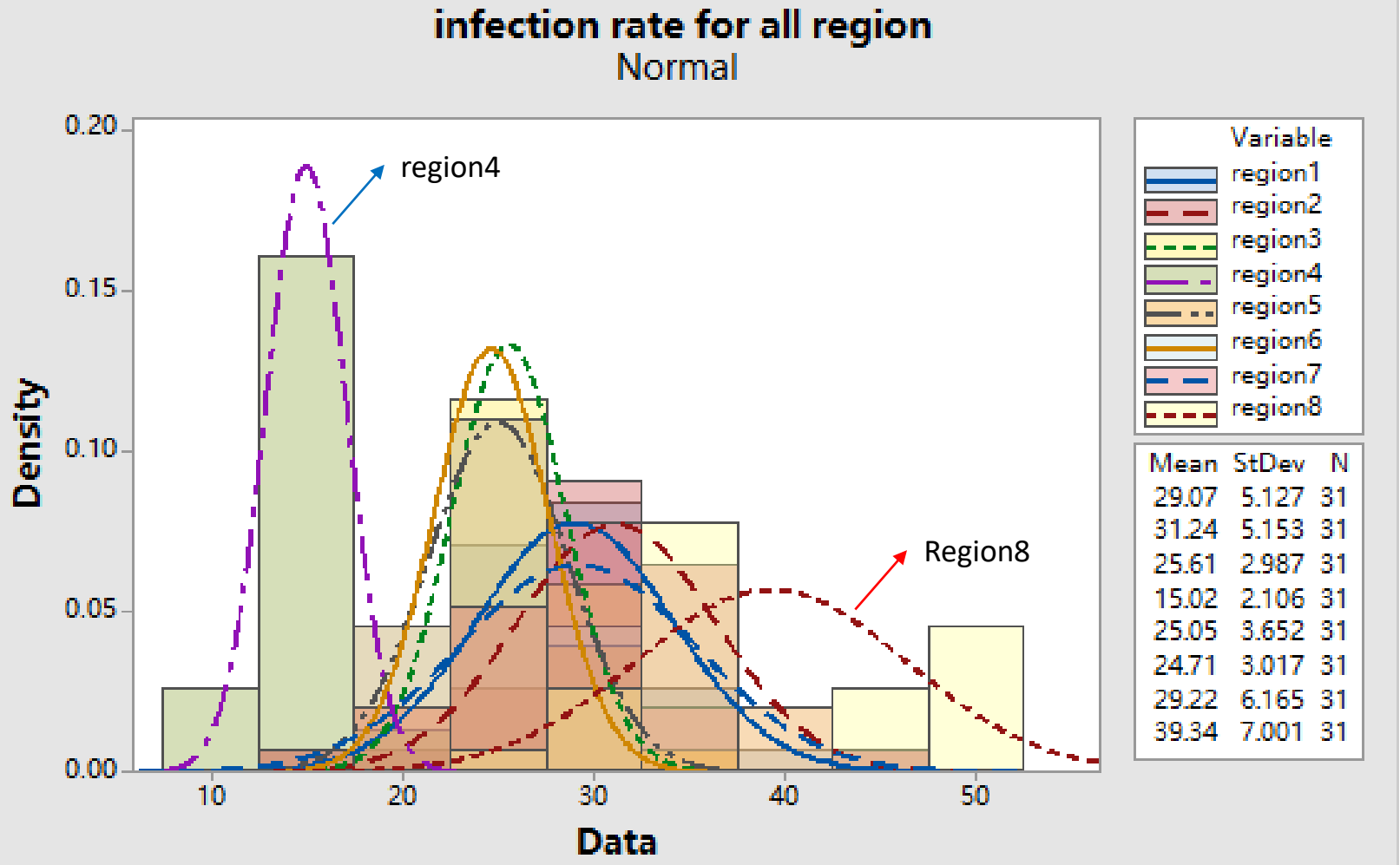
Problem Areas

- The reopening of the store increases flow of people.
- The reopening of flights may bring foreign COVID-19 viruses.
- The announcement of the re-opening will lead to a decline in public awareness of this crisis. Could lead to new spikes in new cases
- The scope of residents' activities has increased and the outbreak has not been thoroughly monitored.

Process Flow Chart



Process Capability Report (Before)



We want number of new Patients from all regions to be lower than 20 per day, it's easy to make a conclusion that region4 is the best meanwhile Region8 is the worst.
We plan to learn from Region4's strong points to offset region8's weakness.

Process Capability Report (Before)

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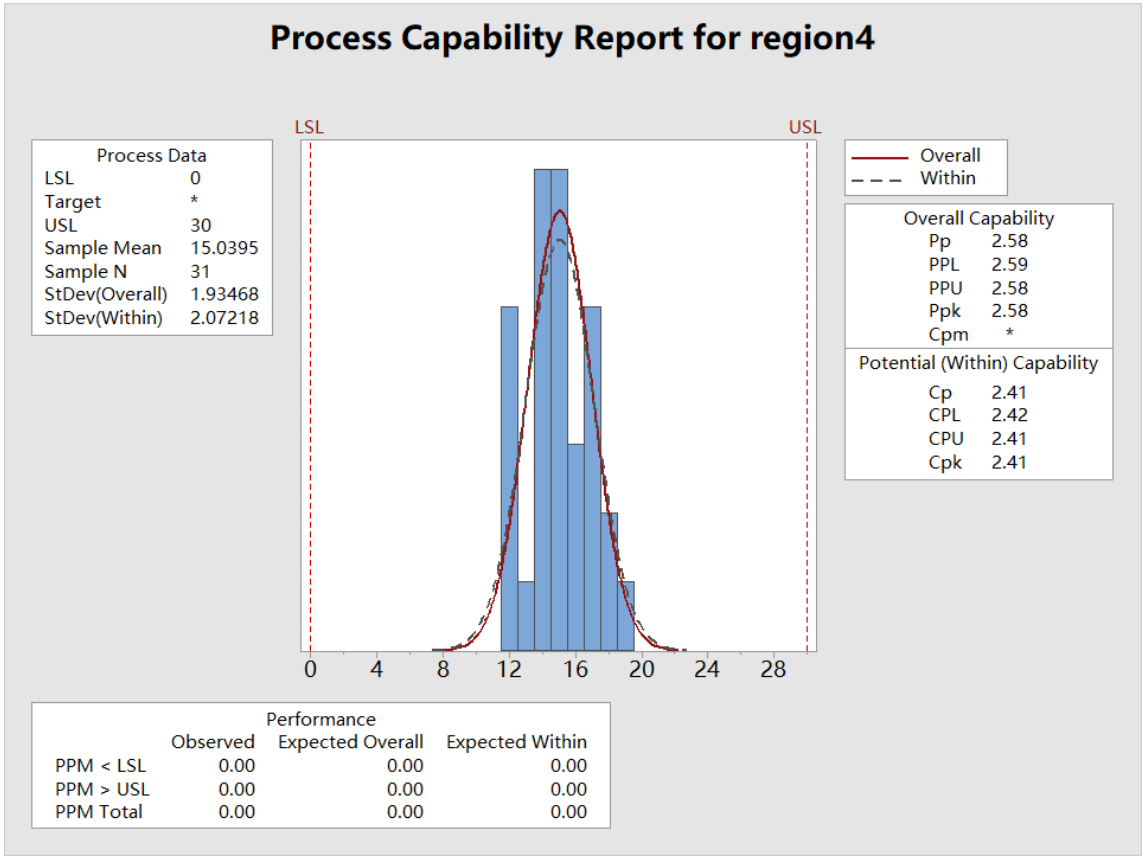
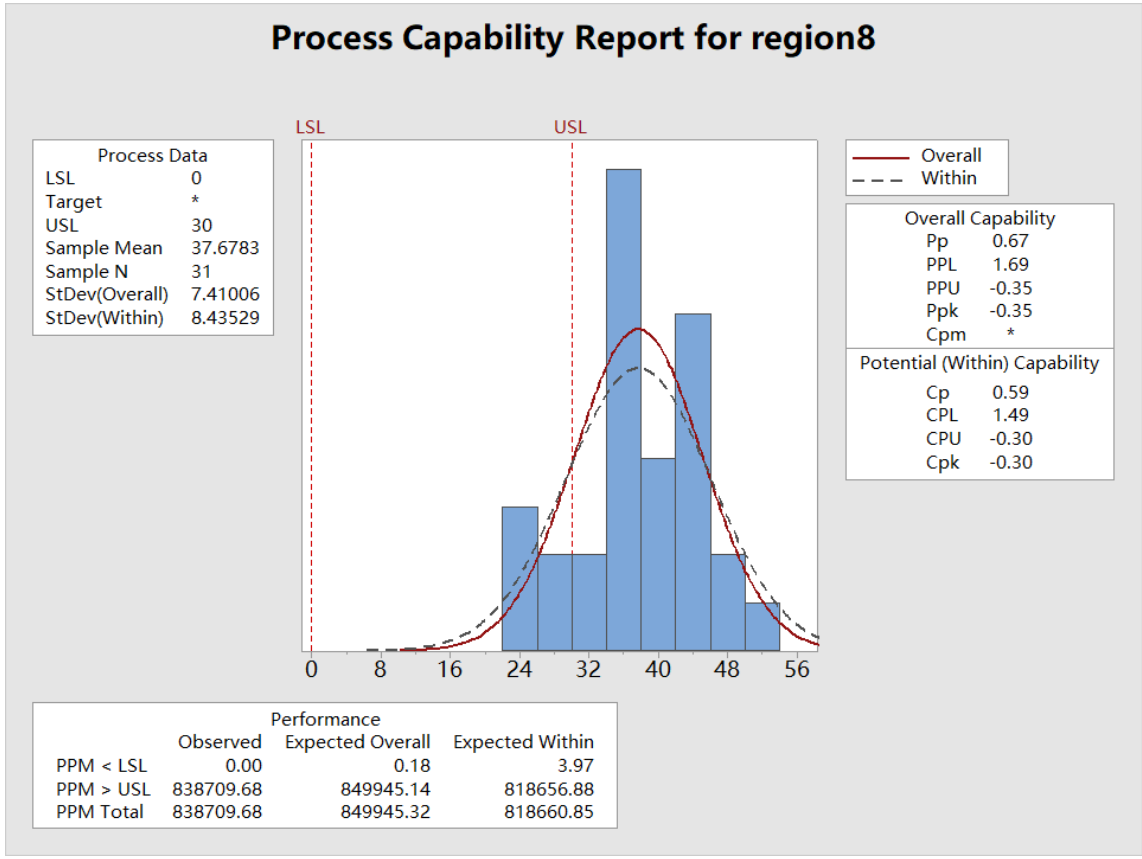
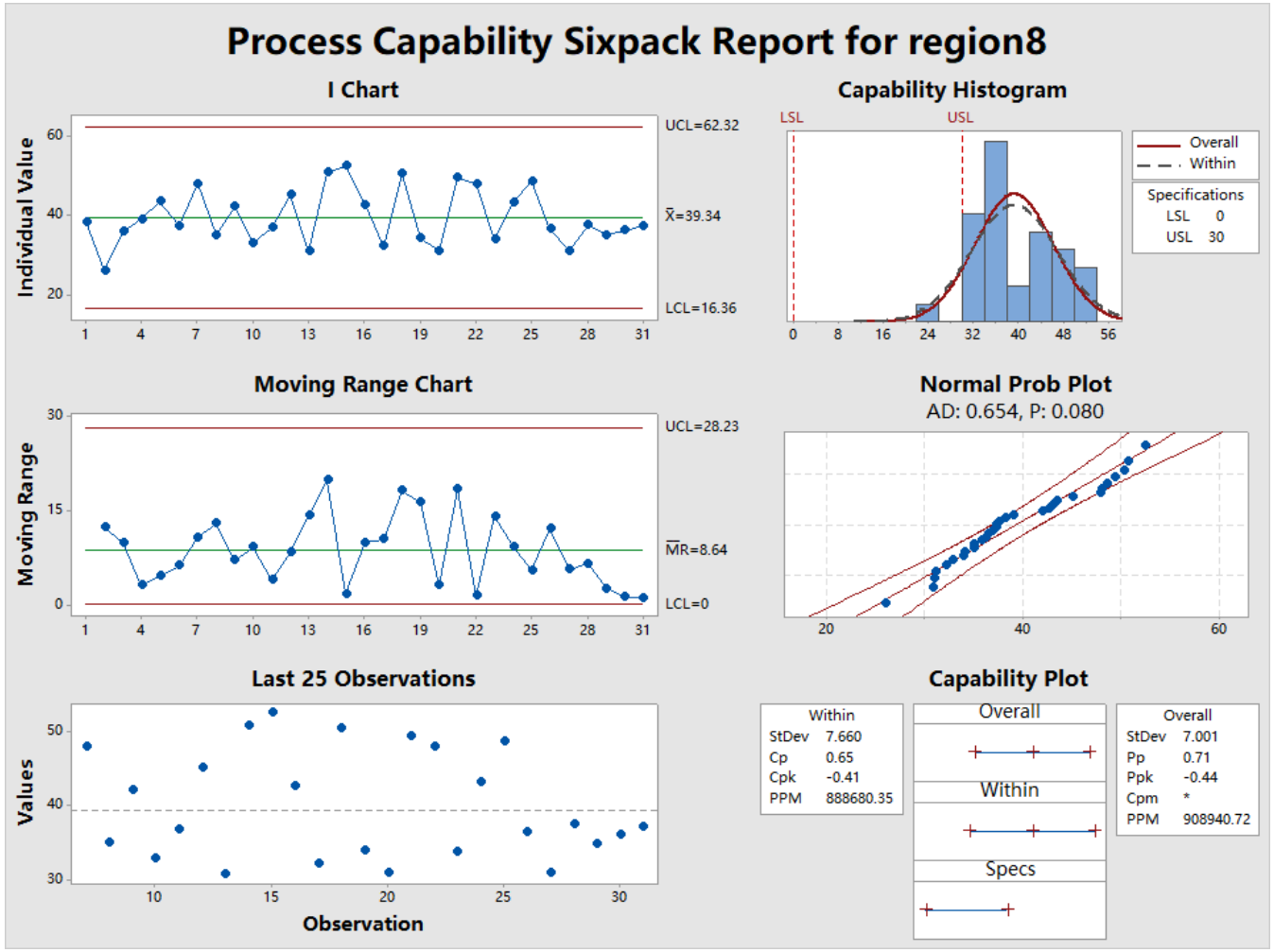




The capability of region4 perfectly corresponds with our goal. Region8 contains a lot of problems in its capability. The only problem is p is over value. It means region4 doesn't correspond with normal distribution. However, there might be a positive effect in it, which we can use to improve region8

Process Capability Sixpack Report (After)



- People Awareness
- Government Execution
- Poor Transportation
- Inefficient Vaccination

It shows the lowest process capability. We can inspect it from the problem area.

Process Capability Report (After)

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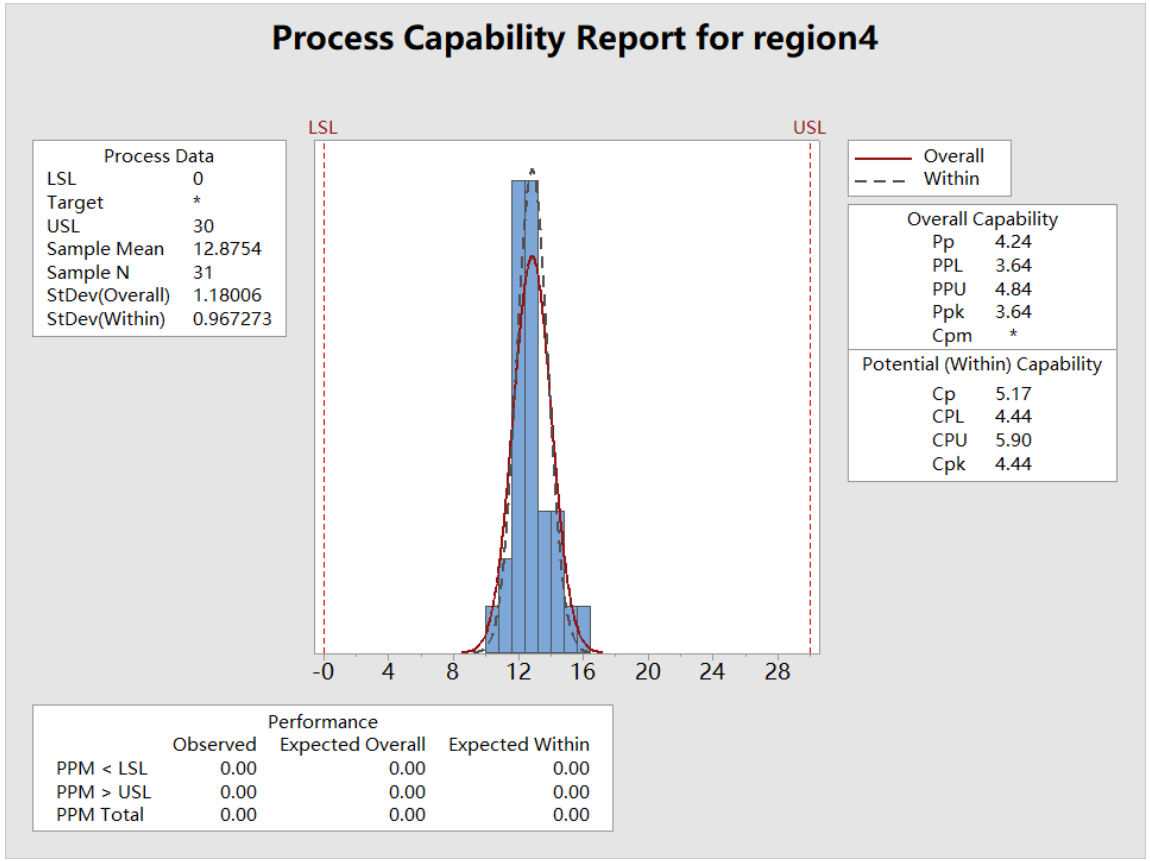
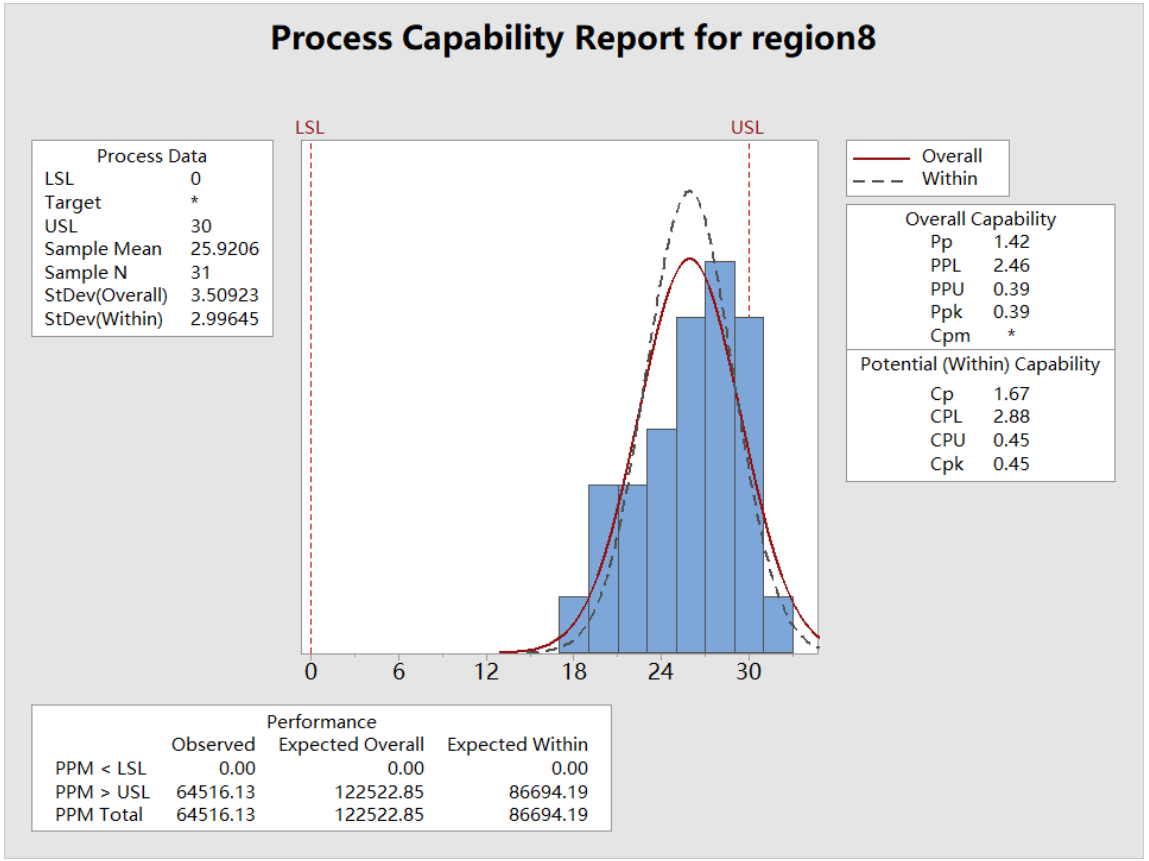


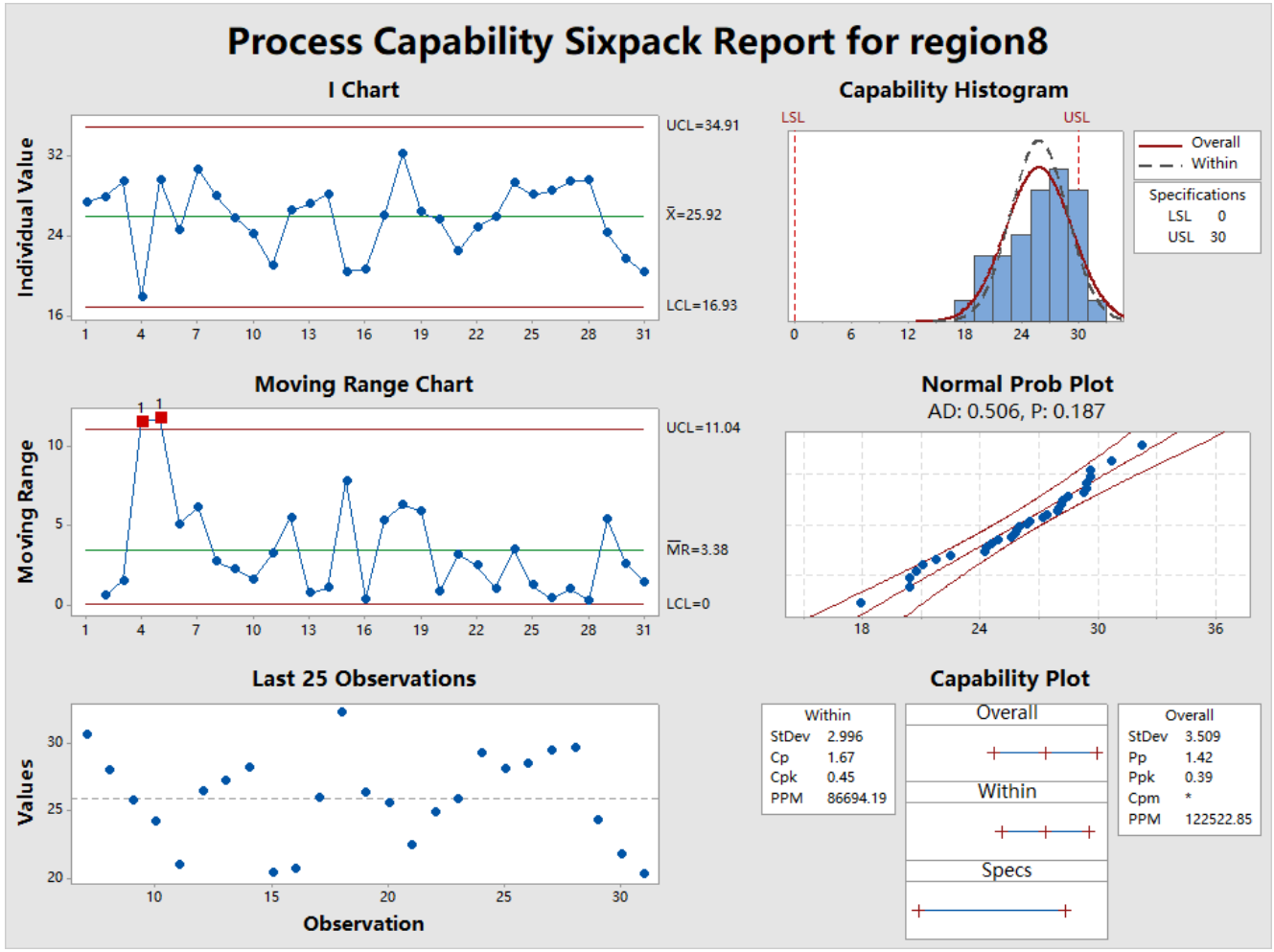


Region4's capability index is double what it was before.

Region8's capabilities have also improved significantly.

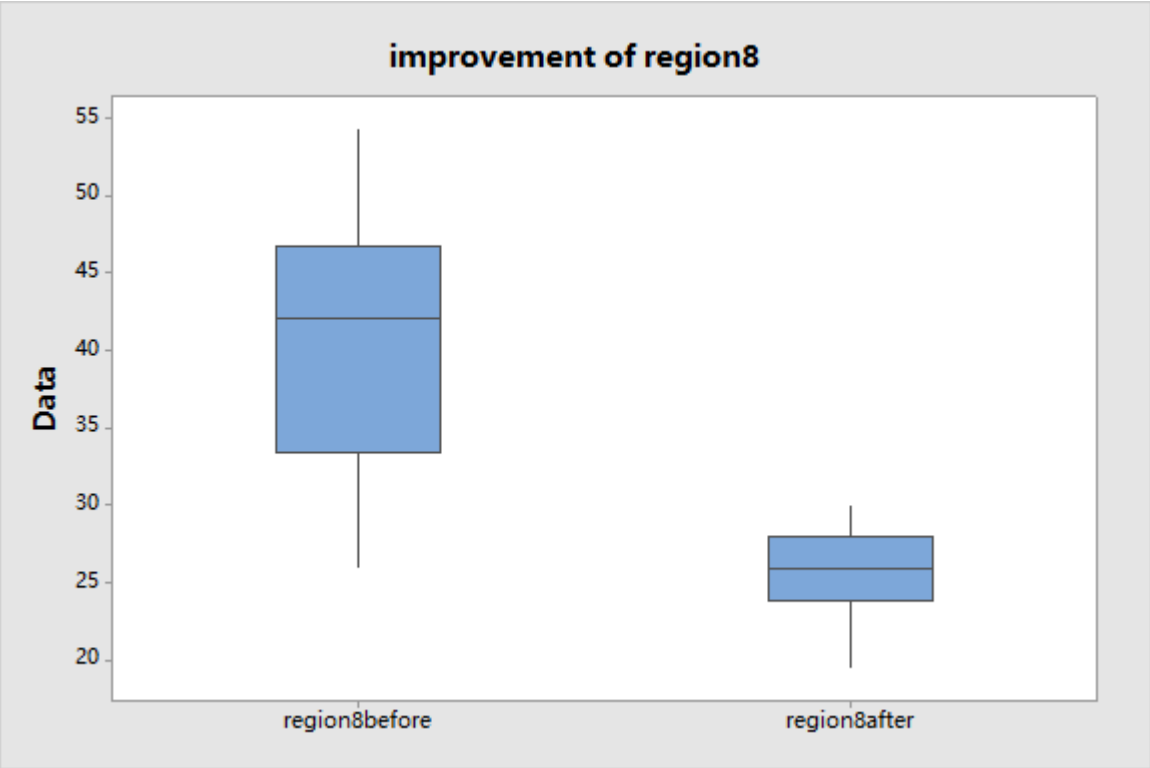
Still, region4 is the best while Region8 is the worst, however, all qualities have improved

Process Capability Sixpack Report (After)



It shows some improvements which indicates our methods are working.

Conclusion



From the previous plots, we can conclude the following:

- Regions before had poor fits
- Regions after improved and have better fits
- Region 4 aligns with Target goal
- Region 8 is not centered on the Target goal
- Ppk is < 1.33 which many industries use as a benchmark, this means the process can be improved.
- Cpk and Ppk are approximately equal, meaning the process is in statistical control.
- Pp and Ppk are not approximately equal, meaning the process is not centered between the specification limits.