ACTIQ

Case Study

Continuously improving patient safety with NewCompliance

zaans medisch centrum

Ommelander Ziekenhuis Groningen

MST

NEW COMPLIANCE

One in every twenty patients who undergo a surgical procedure experience some kind of harm, of which at least half could be prevented.[1]

Case Study

Continuously improving patient safety with NewCompliance

Dutch hospitals Zaans Medisch Centrum, Medisch Spectrum Twente and Ommelander Ziekenhuis Groningen have been some of NewCompliance's best performing clients when it comes to patient safety in the OR.

This case study takes a closer look at their approach to continuous improvement and NewCompliance's supporting role in this.

1: Panagioti, M. et al. Prevalence, severity, and nature of preventable patient harm across medical care settings: Systematic review and meta-analysis. BMJ 366, (2019).

NewCompliance has been working together with hospitals Zaans Medisch Centrum (ZMC), Medisch Centrum Twente (MST) and Ommelander Ziekenhuis Groningen (OZG) for years – we are about to celebrate the fifth year of partnership with MST. The aim of our joint efforts is to demonstrably improve patient safety and further develop our products.

In each of these hospitals, several NewCompliance solutions have been implemented inside and outside of the operating room. Dashboards at the entrance to, and inside of, the operating rooms visualize realtime patient- and procedure-specific information collected from different source systems, such as electronic medical records (EMR) and the building management system. In addition, overview dashboards have been installed for the day coordinator of the OR department and in breakrooms. The MST hospital also uses dashboards in the holding and post anesthesia care unit (PACU) areas. In each of these three hospitals, our analytics platform is used to gain insight into parameters and trends regarding the quality and efficiency of provided care.

After implementation, NewCompliance continues to support hospitals in their continuous improvement efforts. Below you will find a few examples of the aforementioned hospitals to illustrate this process and show the results accomplished in collaboration with NewCompliance.
All three hospitals mentioned above form outstanding examples since they have performed excellently with respect to patient safety for the last few years and take an active approach to continuous improvement.

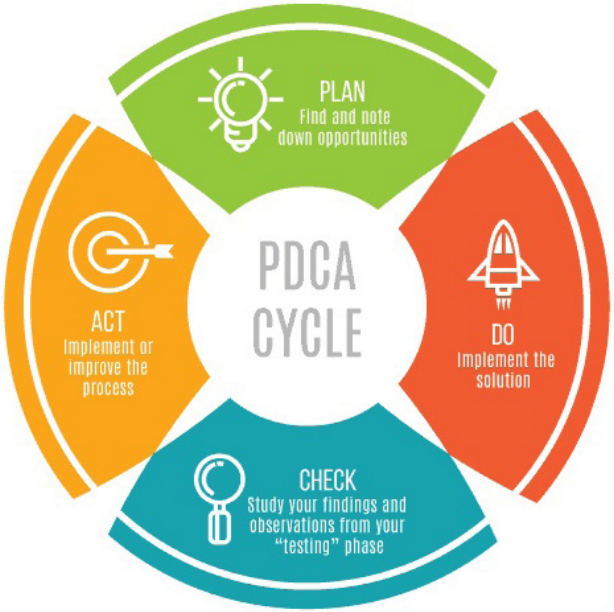
Figure 1. Example of the NewCompliance workflow dashboards.
The data shown on the dashboards can be adjusted to the specific needs of any hospital.

Continuously improving patient safety

When it comes to patient safety, there are many different aspects that can be visualized on NewCompliance dashboards and in the analysis tool. Our objective is to enable hospitals to get the most added value out of our ACTIQ platform by optimally using the system to continuously improve the safety and efficiency of care.

To this end, NewCompliance helps to establish expert teams within client hospitals consisting of various experts (such as a quality coordinator, OR manager, OR planner, etc.) for monthly discussions about setting goals and priorities, and to reflect on progress made. Data insights from OR Analytics are used to support this process. Every improvement process goes through several plan-do-check-act-cycles (PDCA, see image below).

This case study will highlight two practical examples of patient safety improvement at OZG, MST and ZMC: WHO Surgical Safety checklist compliance during surgery, and the safety score after surgery.



Surgical Safety Checklist

At the appropriate moments, during a surgical procedure, the NewCompliance OR dashboards display the corresponding checklist, so that it can be filled out on the large touchscreen or in the EMR (see Figure 2 below). The dashboards show, in realtime, whether or not the checklists have been fully filled out, highlighting any incomplete sections in red. The checks take place during the following stages of surgery:

1. Sign in, prior to anesthesia
2. Time out, prior to incision
3. Sign out, prior to patient leaving the OR

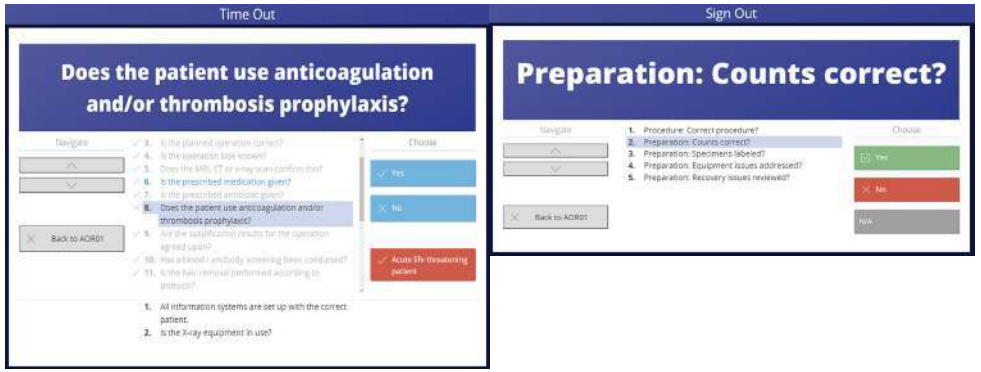


Figure 2. Visualization of time out (left) and sign out (right) checklists in NewCompliance's workflow dashboards.

These checks are based on the WHO's Surgical Safety Checklist to prevent medical errors during surgery and to improve communication within OR teams.[1] Each check helps to ensure all relevant aspects of patient care and the surgical process are systematically and thoroughly checked, and the entire OR team is properly informed. These double checks include, for example, the patient's identity, the side of the body to be operated on, the procedure, the OR team members and their roles, and recounting of used materials such as the gauzes. Not until all checks have been performed, can the OR team proceed to the next step of the surgery.

Multiple studies have indicated that adherence to the Surgical Safety checklist may decrease surgery-related harm to patients by 36% to 42%.[1-4] Mortality within 30 days after surgery could even be reduced by 47%.[1-4]

Compliance with these checks helps prevent medicament mix-ups (such as using the wrong infusion bag because it looks similar or has a similar name), wrong-site surgery, or instruments or gauzes being left behind in the patient's body after surgery. Unfortunately, these mistakes still occur every year in hospitals in The Netherlands.

Dutch insurance company MediRisk receives 26 claims per year on average relating to such mix-ups.[5] In reality the number is even higher, considering the fact that not all incidents lead to insurance claims. On average, patient harm occurs in 5.7% of all hospital admissions in the Netherlands, 54% of which is related to surgery.[5] Roughly 34% was potentially avoidable.[5] International literature shows similar data: patient harm occurs in one in every twenty patients undergoing surgery, around half of which could have been prevented.[6]

Such incidents can have dire consequences for the patient: in 18.3% of these cases the patient faces a long-term or permanent disability, and 3.6% of these cases even has a fatal outcome.[6,7] Preventable harm is also costly: it generally increases medical costs by at least € 4.710 (in 2012) due to an extended hospital stay, which on average is twice as long.[8] In addition, there may be extra costs related to revision surgeries or disability.

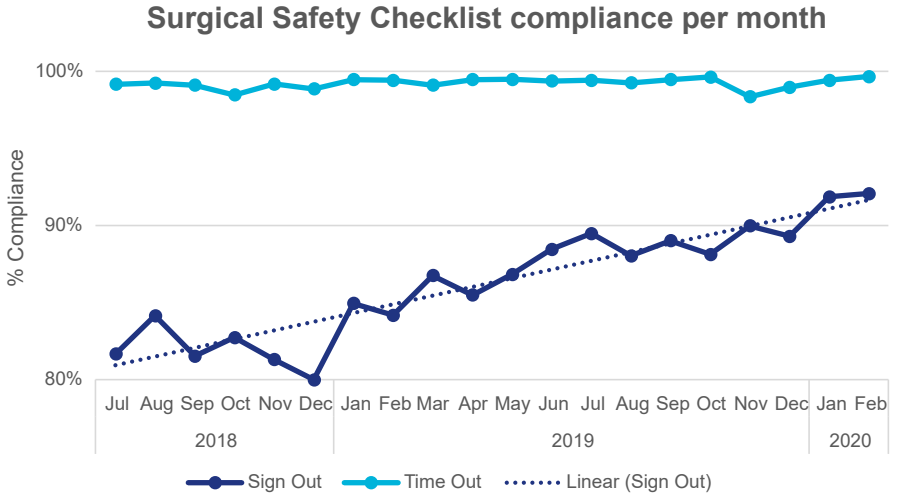


Figure 3. Avarage compliance to time out/sing out per month in three hospitals since July 2018.

The chart above (Figure 3) shows that ZMC, MST and OZG have excellent compliance scores when it comes to time out and sign out checklists. The time out procedure is being done for nearly all surgeries, while there was still some room for improvement for the sign out in 2018.

Together with NewCompliance, these hospitals set to work improving the compliance on the sign out checklist. They set measurable, achievable goals in accordance with the SMART method within expert teams consisting of specialists of different areas within the OR department. For example, the objective of ZMC was to increase the average sign out compliance percentage to at least 90% by June 2020. The expert team helped realize this objective by translating it to the workplace and incorporating it in work processes. Compliance with sign out procedures increased considerably due to three contributing factors:

1. The importance of the sign out was emphasized and brought to the attention of the staff.
2. The NewCompliance dashboards visualized checklist items and compliance in realtime during surgical procedures.
3. The NewCompliance analysis tool offers a retrospective view on procedure, team, or specialist level to show in which cases checklists were not adhered to (example in Figure 4).

Figure 3 shows the average sign out compliance in ZMC, MST and OZG increased from 81% in July 2018 to 92% in February 2020 (a relative increase of 14%!). Due to COVID-19 and the impact it has had on the number of procedures performed per month, February 2020 was chosen as the end date for the purposes of the graph below.

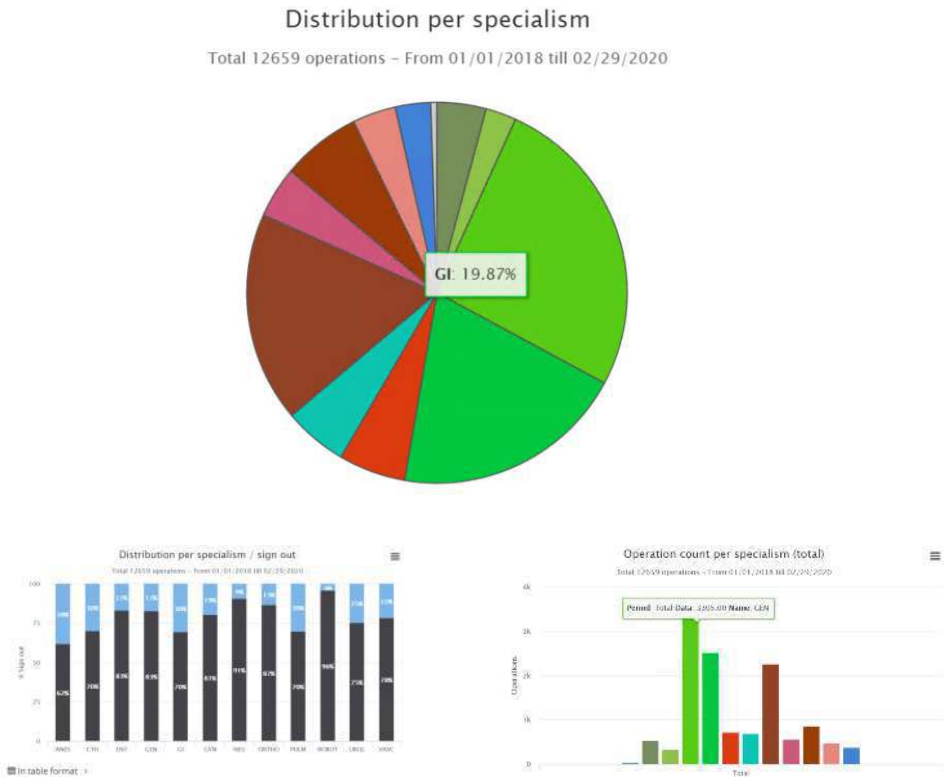


Figure 4. Examples of analyses possible in NewCompliance's analytics tool on the number of uncompleted sign out checklists per specialty.

Patient Safety Score

In order to see in a glance how safe a procedure is being or has been performed, NewCompliance developed an algorithm in collaboration with hospitals that calculates a patient safety score in realtime. The patient safety score is shown in the bottom right corner of the OR dashboard, as displayed in Figure 1. This score is based on a combination of different patient safety parameters measured and visualized during surgery. Examples are compliance with checklists (sign in, time out, sign out) and the so-called SSI prevention bundle aimed at reducing surgical site infections (which includes perioperative patient normothermia, limiting the number of door movements during surgery, timely administration of prophylactic antibiotics, and the avoidance of preoperative hair removal).

There is scientific evidence for each of these elements that adherence could prevent complications both during and after surgery (as already stated above for compliance with stop points).[1,2,9,10]
Non-compliance with certain elements of the local protocols – for example, a higher number of door movements than the maximum number allowed for that procedure – will lower the score. The different elements making up the algorithm and weighting of each element may vary for each hospital, depending on specific priorities, preferences and local protocols.

However, the number of door movements essentially always forms part of the patient safety score, as shown in Figure 5. Other elements often included in the algorithm are compliance with the prophylactic antibiotics regulations (65% of clients) and perioperative normothermia (59%).

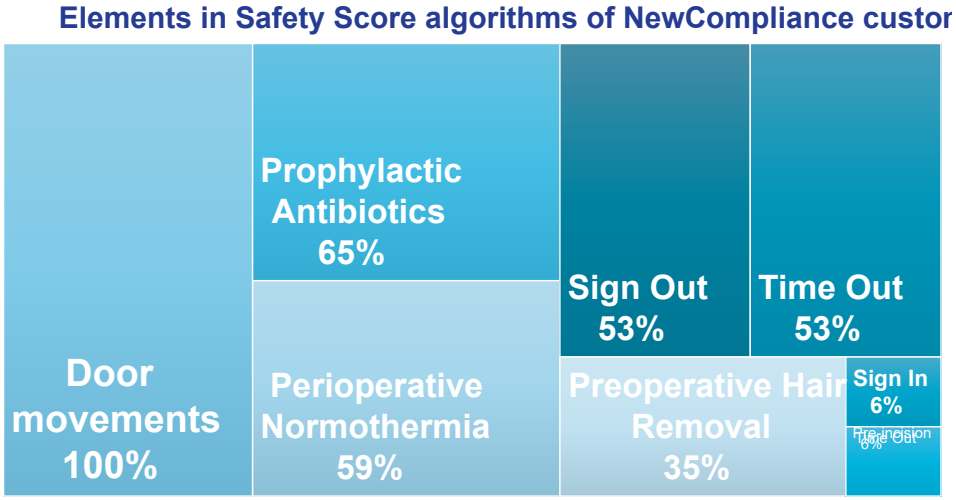
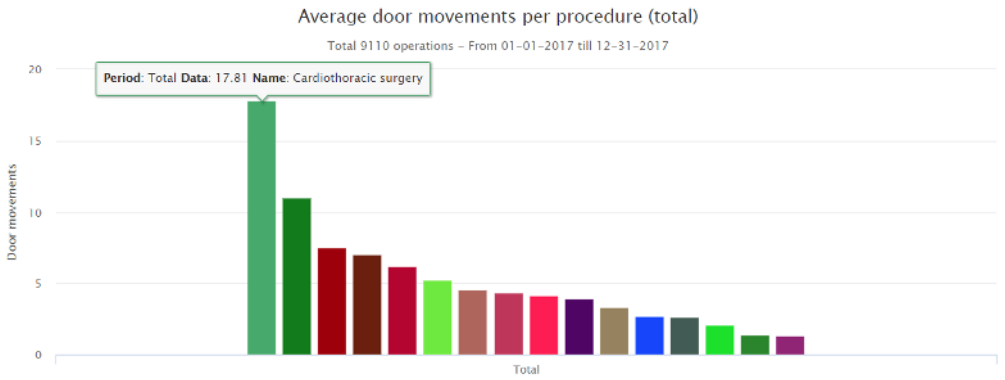


Figure 5. Overview of different elements making up the safety score algorithms at NewCompliance's clients.

One example of a hospital using the safety score to improve patient safety is OZG. The implementation of NewCompliance's door sensors and OR Cockpit with built-in analysis tool, provided insight into the number of door movements per procedure (an example of which is shown in Figure 6). Using these insights, the hospital wanted to minimize the number of door movements per procedure. Therefore, OZG carried out a PDCA cycle in collaboration with NewCompliance to gradually reduce the maximum number of door movements allowed. If the number of door movements exceeded the maximum number, it would be at the expense of the patient safety score. OR teams would now be given a lower score after surgery for the same number of door movements.

Ultimately this resulted in increased awareness in OR teams of the importance of minimizing door movements. Due to the decrease in movements, the patient safety score increased considerably.



Figuur 6. Visualisation of an analysis of the avarege door movements per department in the analytic tool of NewCompliance.

Similar to the example of OZG, other hospitals have also implemented PDCA cycles in order to improve patient safety. Figure 7 shows that, partly because of these measures, the average patient safety score at ZMC, MST and OZG improved from roughly 7.1 in July 2018 to 7.8 in February 2020 (+9%). At NewCompliance, we will continue to support hospitals in their efforts to improve patient safety, efficiency, and cost efficiency as best we can.

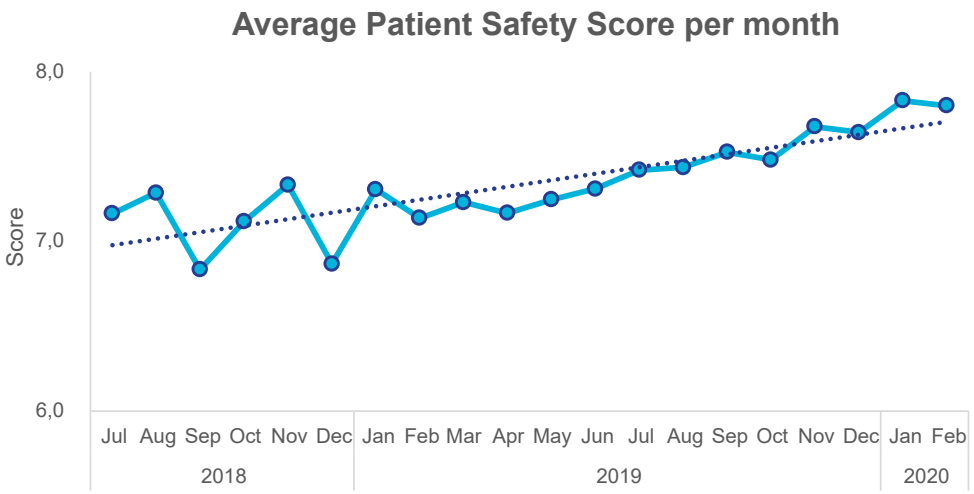


Figure 7. Average patient safety scores per month for the three hospitals since July 2018.

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