

How CSAM AMIS marries functionality with health outcomes

An effective emergency platform needs to help not hinder medical professionals to exercise their judgement

INTRODUCTION: UNIQUE YET UNIVERSAL

CSAM has been a leading technology provider to the Norwegian healthcare system for almost two decades. A cornerstone of its eHealth ecosystem is AMIS, the call centre platform that has registered and handled more than 10 million emergency incidents across all municipalities in Norway since it came onto the market.

AMIS was developed and customised for the health infrastructure in Norway, which is complex, highly individual, and imperfect – just like every other system in the world. But while the way it functions may be unique to the Norwegian context, its function is universal: to provide easily accessible, fast, accurate and compassionate acute care to the public.

This white paper is not a guide or manual to the software; insofar as we explore the functionalities of AMIS it is only to highlight how they make life easier for the operator and improve patient outcomes.

As we shall see, the more highly these are correlated, the better the system.

CSAM has extensively re-engineered its AMIS solution – and relied a great deal on the input of its end-users to do so. One of those users, Louise Kloppenborg Olsen, is responsible for training and supervising staff at the Oslo Accident and Emergency Outpatient Clinic, Department of Emergency General Practice.

“Our team consists of roughly 100 nurses and medical students,” she says, “working round the clock in shifts of 10 to 12 people. CSAM consults us a lot, and it’s great that our experiences are shaping the direction of the software. It’s a smart move on CSAM’s part of course, because if the system can be effective in Oslo, where we receive 1,000 calls a day, you can safely deploy it anywhere.”

Before we look at those experiences of Kloppenborg Olsen and her team, we need to have a brief word on the workings of the Norwegian emergency response infrastructure.

THE NORWEGIAN CONTEXT

There are two emergency care telephone numbers in Norway, where one number - 113 - is for serious, life-threatening situations. The other number - 116 117 - is for out-of-hours medical care when the GP is unavailable, or patients are unable to wait. The number will automatically connect you to the nearest health facility wherever you are in Norway, which is helpful because many callers reach out to 116 117 when they cannot visit their GPs because they are on holiday or travelling.

These facilities are called "legevakt" in Norwegian; Kloppenborg Olsen's call centre supports the Oslo "legevakt", or "Accident and Emergency Outpatient

Clinic", the biggest and busiest in Norway. To preserve the distinction between 113 emergencies and "legevakt" cases, the latter is commonly referred to as "casualty clinics". The AMIS software is deployed in many of Norway's casualty clinics.

Although the first point of contact in Norway should be your GP, people often prefer to contact the out-of-hours number because their doctor's surgery is always busy, or because they rang the casualty clinic before and had a good experience. Many callers do not have a GP in Oslo. It is these 116 117 calls that AMIS captures and processes. And if you are in Oslo and dial 116 117 you are connected to Kloppenborg Olsen's team. "We get a lot of calls, day and night," she says.



Louise Kloppenborg Olsen
Professional development nurse

The range of symptoms and patients is immense, says Kloppenborg Olsen. "People ring for advice, or they have cut their finger and need stitches, or their spouse is having a panic attack, or an elderly relative has had a bad fall, or a child has a wound that won't heal – really there is no limit to the cases we deal with."

The distinction between life-threatening or urgent is not always clearcut, especially for the patients who are suffering the symptoms. This is why it is crucial to have a medical system that allows you to make quick decisions to escalate a call. Over to Louise Kloppenborg Olsen in Oslo.

THE OSLO EXPERIENCE OF AMIS: TWO KEY DIFFERENTIATORS

Like all the operators in the Oslo casualty clinic, Kloppenborg Olsen is a medical professional. This is extremely important. All the people she teaches to use AMIS are either qualified nurses like Kloppenborg Olsen herself, usually with extensive accident & emergency experience, or students who have passed their medical licence exam.

AMIS is not a substitute for medical expertise and judgement; paradoxically it strives to be the opposite: a system that becomes almost invisible as its workflows fall in naturally with the ways that operators leverage their expertise and exercise their judgement.

"AMIS is effective because it strips away the noise from the typical medical system," says Kloppenborg Olsen. "This allows us to concentrate on our conversation with the caller, and that's of course what needs to happen."

This caller-focus is apparent from the moment Kloppenborg Olsen activates AMIS to create a new medical journal in response to a call. "AMIS is integrated with the telephone system," says Kloppenborg Olsen, "so if you've called us before the system will recognize your ID and give us a list of medical journals that correspond with that ID."

"Few medical systems for casualty clinics work like that. With most systems you have to ask the caller for his personal ID number every time before you can start the conversation. Of course, we always have to make sure we have the right ID. The crucial difference with AMIS is that we don't have to ask about the ID first, we can concentrate on listening and asking questions, and save that part for later."

Kloppenborg Olsen adds: "This is why we use AMIS."

The system instantly provides context. "I can see this person has called before on behalf of her children or an elderly parent; AMIS gives me suggestions about whom the call might be about. And I can choose from that list once I know who it is.

"There's a lot of people who call us more than once. So that's a big help. I can say: 'Are you calling on behalf of yourself or your daughter Ingeborg?' That is often the start of the conversation; you would get the hint of who they're calling for. And if it's for their daughter, you click on the name Ingeborg on the list in AMIS to get her personal ID which saves the operators a lot of typing." This is not a mere matter of productivity, but of saving lives. "The first thing you have to assess is whether the problem is acute – whether the caller ought to have dialled 113, if you like. If that is our judgement or instinct as experienced medical practitioners, we take control of the

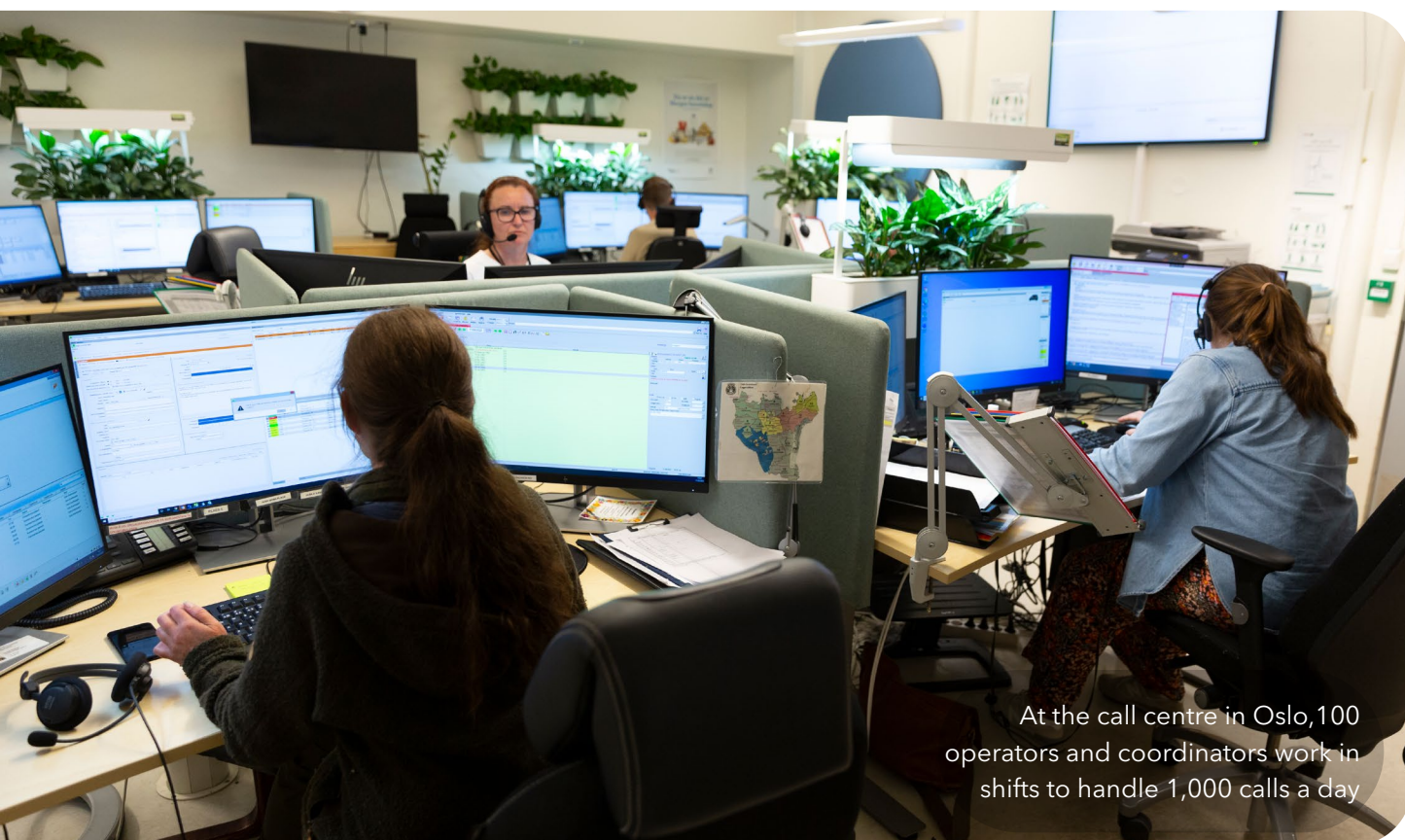
situation to find out if immediate help is needed. "The second huge benefit of AMIS, in the Oslo region at any rate, is that it links directly with the ambulance system. Help can be on its way even as I transfer my medical journal to the ambulance service. I can connect the patient with the ambulance team so all three of us are speaking; there is no need for the caller to hang up and dial 113. They stay on the line to make sure that the medical journal with all the information and the phone call are transferred safely to my colleague at the ambulance service."

Kloppenborg Olsen adds: "In municipalities where these systems don't talk to each other

they would have to start all over again, wasting valuable seconds. But if the patient is in cardiac arrest, these are seconds you don't have."

TRIAGE AND OUTCOMES

For the vast majority of calls, Kloppenborg Olsen relies on the triage flowchart in AMIS to help determine follow-up. "There are quite a few possible outcomes," she says. "Often, people ring for advice, especially parents. We provide the advice. We can recommend they go to their GP; we can ask them to come to us or we can send a doctor to them. For every shift, the Oslo



At the call centre in Oslo, 100 operators and coordinators work in shifts to handle 1,000 calls a day

casualty clinic has one or two doctors on call.” The AMIS flowchart creates a triage of red, yellow, and green to determine the level of urgency. But there is no such thing as a strict “red”, “yellow”, or “green” outcome; these differ according to the context.

“I can have a patient who is green, so they are not at all in any immediate danger, but it’s an old woman who is not able to live on her own anymore and I can see on AMIS that she’s been gradually getting worse. I might send one of our doctors to her, which is not the usual response to a ‘green’ situation.

“There is a huge element of judgement; we need to think about the whole context. I can have a patient who shows up as red in the system, but maybe it’s a childhood fever and they haven’t been given any pain or fever-reducing medicine. So that could be the first step. In other words, the colour of the triage doesn’t necessarily correspond to the action we recommend.”

The mission that the AMIS software sets itself is to create optimal conditions for operators to exercise their judgement without being distracted by navigational pain points.

This was the driving force behind all the changes AMIS implemented for in its latest version.

HOW AMIS LISTENED TO ITS END-USERS

In 2021, the new release of AMIS introduced significant changes under the hood. The software had been written in the somewhat outdated and limited programming language C++, significantly

undermining its interoperability with other systems and the possibilities for future development. In addition, there are fewer developers around with C++ skills to maintain the software.

The new iteration of AMIS was developed on a modern technical platform with components that provide a lot of extra functionality to the users. “This version of AMIS is easier to maintain and troubleshoot,” says Kjellrun Borgmo, the product owner of AMIS at CSAM Health Group, “and it’s faster and less complex to build new features.”

Of the new features that improve Kloppenborg Olsen’s interaction with the system, she highlights three.

The first was to have the Manchester triage system embedded in the system. Kloppenborg



Kjellrun Borgmo
Domain Manager,
Prehospital Emergency in CSAM Public Safety

Olsen explains the background to this upgrade. "AMIS was originally conceived for ambulances. The way you worked through the program was built on the flow of an ambulance call centre, which is not the same as ours. My colleagues and I suggested we should re-orient the system

to have the natural flow that would help us. As part of that, CSAM put in our flowchart for the Manchester triage which is different from the triage system used in ambulances."

Other improvements are what you might call ergonomic. There is a new dropdown list with symptoms ("I can select the symptom; I don't have to type it"); search and filtering is more advanced; the layouts can be rearranged almost at will and dashboards can be set for different user roles.

"AMIS is extremely flexible," Kloppenborg Olsen explains, "but for our team of 100 operators we decided to impose certain limits on that flexibility as there was always a slight risk someone could move certain elements and then be unable to retrieve them. So we now have two fixed standard operator dashboards."

The other roles within the organizational structure of the Oslo casualty clinic are the doctors and coordinators. "The trick is to show each what they need to see. We are currently testing out a few different versions for the coordinators. One of the setups they can choose has a map of Oslo which is very useful; the coordinator can see where the different doctors are located so they can allocate house calls smartly."

The final major change helps Kloppenborg Olsen do a more efficient job in monitoring the performance of her 100-strong team.

"I suggested to Kjellrun [Borgmo] that we implement a function that would enable me to search for operators. In the old system, if I wanted to do an evaluation of how a colleague was performing, I first had to figure out on which day she was working and then I had to go through

OUT-OF-HOURS AND ACUTE CARE IN OSLO

100 operators and coordinators work in shifts to receive **1,000** calls a day from a population of **700,000** as well as visitors to Oslo.

How does CSAM AMIS optimise this process?

- Medical records came with a lot of 'pre-filled' information because the system recognises caller numbers
- Flexibility of UI saves time, and avoids navigational pain points
- All relevant information is on one screen, allowing operators to give her full attention to the patient
- Manchester triage is implemented in AMIS, with time-saving dropdowns for medical conditions
- System functionality is designed to give operators time and space to listen to the patient, especially during the critical first 30 seconds

all the medical journals from that day to find which ones she handled. We deal with more than 1,000 calls a day so it's a huge relief for me that I'm now able to navigate that sensibly."

Smaller casualty clinics were quicker to adopt AMIS 3, but the Oslo centre, serving a population of some 700,000 inhabitants, went through a period of acceptance testing. "We implemented formally in February," says Kloppenborg Olsen, "and we are noticing how much more fluid and efficient the system is. Exactly how much time we save is very hard to quantify because so much else has changed over the past two years."

"But the improvements are tangible. This is doubly gratifying: we are able to do a better job partly because of changes that we suggested. We can see the results of our commitment to the Oslo casualty clinic and to AMIS."



Finn Guttormsen
Senior Developer

CONCLUSION: 30 SECONDS TO MAKE A DIFFERENCE

The latest version of AMIS responds to demands of the market for agility and time-to-market. Earlier this year, the commune of Bjørnafjorden leveraged this agility to become the first casualty clinic to integrate with the new National Population Register. "Once we have fully integrated its new functionalities, the register will give you access to different addresses," explains Borgmo. "For instance, if you have a child living with both the mother and father, you can get access to both addresses. If the father is calling, then you automatically get his address and vice versa if the mother calls. So that's what's new there."

The old Norwegian population register will close, so all casualty clinics have to make the switch. Bjørnafjorden, the Norwegian Health Network and the AMIS product team worked together to do this, making CSAM AMIS the first medical system to integrate.

The flexibility and thoughtfulness of AMIS count most when it comes to patient care. The system gives operators the tools and the headspace to make sound medical decisions, which is why even small adaptations or incremental improvements in user-friendliness can make a world of difference. Kloppenborg Olsen: "Everything we need to do we can do on one screen. There are no distractions. With a lot of medical systems, you lose a lot of information because you are trying to figure out who is calling, where they live, if they have children, and so on. I have to take down your information, open the medical journal and only then can I turn my attention back to you. 'What did you say? You had a fever, or your child was unwell?' This slows down

the process, and communication can be missed.” AMIS frees operators to engage with callers immediately, because the system accesses the caller’s name and context.

“We see in conversations with the patients that you get most of the relevant information in the first 30 seconds,” Kloppenborg Olsen concludes. “So being able to listen without having to look at different screens and different systems, but just to write

down what they’re saying straight away saves them repeating themselves and saves you a lot of time.”

For a healthcare centre that receives as many as 1,000 calls a day, efficiency is vital. But more than that, patients want to communicate their concerns and need health professionals to listen actively. CSAM AMIS creates the space for that dialogue and that rapport.

