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STEP BY STEP Climbing the stairs from the introduction of electronic health records to electronic collaboration

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Abstract

Collaboration across organizational borders is often needed. Experiences from some of the electronic collaboration projects that have been initiated in the health sector show that it is challenging to establish solutions that are sustainable and can be deployed in wide scale. The case in this paper is from a medium size hospital in Norway where electronic collaboration related to referrals has been introduced through a stepwise process. The first step was to introduce traditional electronic messaging. The next step was to implement decision support in order to improve the quality of the referral. The following step will probably be a dialogue based support where general practitioners and specialists can communicate about patients, and where the dialogue is kept as a part of the patient's electronic health record. This paper sums up the findings after the introduction of the decision support system. The results from the first steps are promising, but they also show that it is a sociotechnical interplay between the different actors that need to be balanced in order to establish a solution that will be used by all actors.

Keywords: Electronic referral, deployment, electronic collaboration, boundary spanners, stepwise process, quality, decision support

INTRODUCTION

The potential of ICT to enhance efficiency and quality of healthcare delivery through collaboration is well rehearsed (Hasman, Ament et al. 1992), (Stroetmann, Jones et al. 2006), (CANNABY, WESTCOTT et al.), (Harno, Paavola et al. 2000). Still the collaboration across geographical, institutional and/ or professional boundaries all too often rely on inaccurate, inconsistent, (partially) irrelevant or outdated information. The development, use and widespread deployment of collaborative ICT in healthcare in Western countries lag significantly behind ambitions and plans. (Greenhalgh, Stramer et al. 2010), (Bal and Mastboom 2005), (Pothier, Awad et al. 2006), (Heimly 2008; Heimly 2009).

Against this background of a rather bleak track-record to date, we report from and discuss a project to improve collaboration between general practitioners (GPs) and hospitals that has been welcomed by the clinicians. The aim of the paper is, without resolving to "critical success factors", to discuss the crucial importance of attention to *detail and a stepwise approach*. If the Devil resides in the details, the opposite also holds true. For instance, rather than reiterate the need for adequate training for the users, we analyse the form, timing and location of this training i.e. the way training is situated. This ia also in line with findings T. Greenhalgh and her researchers did in their evaluation of the SPINE project (Greenhalgh, Stramer et al. 2010).

1 COLLABORATION IN HEALTH CARE, STATUS AND CHALLENGES

Norway has a public health care system, but some private health care actors are also present in the market. Each citizen is assigned to one GP's patient list and the GP is the gatekeeper to specialized care.

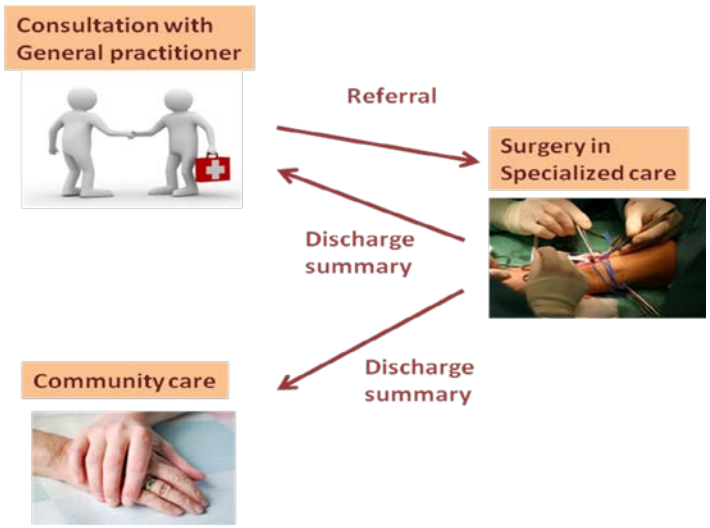


Figure 1: Communication between primary and specialized care

The GP decides whether the patient needs to be referred to specialized care or not. Primary care is the responsibility of the municipalities. Specialized care is organized within four regional health authorities that are funded by the Department of Health. When the GP decides that the patient needs to be transferred to specialized care, a referral will be sent to a specialist who will review the referral and decide what kind of further actions need to be taken. The specialist will consider the patient's rights according to legislation, and will give the patient priority on the waiting lists based on the information

that the GP has provided in the referral. When the patient has finished treatment in specialized care, a discharge summary will be sent back to primary care from the specialist. The document is written or dictated by a specialist and contains information about: diagnosis, finished treatments at the hospital, current medication, planned appointments in specialized care and proposals for further action in primary care.

This process has traditionally been paper based, but since specialists in hospitals and GPs use electronic health record systems as a means to support their daily work processes, electronic referrals and discharge summaries have been introduced.

The figure illustrates some possible steps in the process of implementation electronic referrals. Many Norwegian hospitals have started by scanning the paper referrals into their EHR-systems. At the same time GPs have produced paper referrals from the EHR-systems. The referrals have been sent by ordinary mail to the hospital.

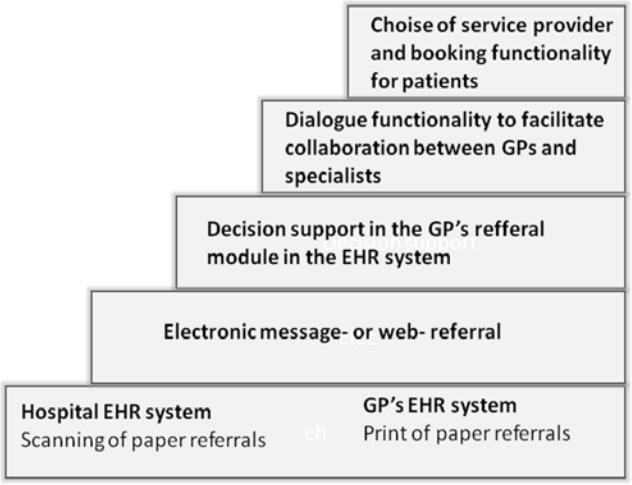


Figure 2: Steps in the introduction of electronic referrals

The next step has been message- or web-based electronic referrals. Decision support assisted by guidelines have been tried out in order to improve quality of the referrals in some projects like Zorg Domain in the Netherlands (Bal and Mastboom 2005) and the Referral Hotel project in Denmark. Further steps can also include functionality that can support a more direct dialogue related to referral that includes both specialist and GPs. Patient can also be provided with software that can be used for booking and choice of service provider. Examples of projects where patients have been involved are the Choose and Book project (Eason 2007) and also again the Danish Referral Hotel.

Standardized health messages, based on international standards from the European standardisation committee CEN/TC251, have been available for the Norwegian Health actors since the mid nineties, but the deployment process has been slow. This has proven to be due to both technical and organizational reasons (Heimly 2008). Experiences from other countries show a similar pattern (Heimly 2009).

2 THEORY

Systems that are intended for collaboration across organizational borders are challenging to design, develop and deploy because many stakeholders with potentially different interests are involved. Issues like how can we best ensure that the collaborating actors have a joint understanding of each other work processes, and how can we make sure that all the involved parties get some benefits are cruicial (Heimly 2010; Heimly 2010), but how do we do this in practice?

According to Berg (Berg, Aarts et al. 2003) sociotechnical approaches aim to increase understanding of how new information systems and communication technologies are developed, introduced and can become part of social practices. Berg suggests that the largest challenge for the sociotechnical approach is how to interrelate the nature of health care work with the characteristics of formal tools.

As an example of a tool that did not fit daily practice Winthereik and Vikkelsø (Winthereik and Vikkelsø 2005) describe how discharge summaries from the hospitals do not "fit" with general physcian's demand: they have to manually rework (filter, delete, rewrite) the discharge summaries to fit their own agenda of deciding what to do with their patient next.

Carlile (Carlile 2002; Carlile 2004) describes progressively complex processes (transfer, translation, transformation) at the three corresponding levels in a framework for managing knowledge across boundaries. Levina and Vaast (Levina and Vaast 2005) have also studied how actors in a new joint field develop interests in spanning boundaries and eventually transforming knowledge.

According to Munkvold and Ellingsen (Munkvold and Ellingsen 2007) it is important to develop mechanisms that strengthen the relationships between different nodes in trajectories in health care. In order to bridge the gap between primary care and specialized care, many hospitals in Norway have employed practice consultants (Heimly 2010) (Kvamme, Olesen et al. 2001; Kvamme, Olesen et al. 2001). The practice consultants are boundary spanners who work as GPs in primary care, but also have a part time position in specialized care. Their role as practice consultants in specialized care is to work with issues that are related to collaboration across organizational borders. Typical work tasks would be to ensure that referrals and discharge letters are structured in a way that benefits the communicating actors both in specialized and primary care.

3 CASE

3.1 The project site

In this paper we address experiences with the first steps in the introduction of referrals a hospital that in the following text is called HOSPA, in Southern Norway. The hospital moved to a new site in 2008. As part of the building process for the new hospital, some funding for development of ICT solutions to support collaboration between primary care and the hospital was also provided.

Already in 2006/2007 a project that intended to deploy standardized messaging of discharge letters and referrals was initiated. At the time when the first project was evaluated (Petersen 2008), electronic discharge letter were in widespread use, but electronic referrals were only in limited use.

One of the experiences from the first project was that the introduction of electronic solutions did not necessarily mean that the quality of the referrals was improved. It was recommended to initiate a following deployment project that also included decision support for the GPs.

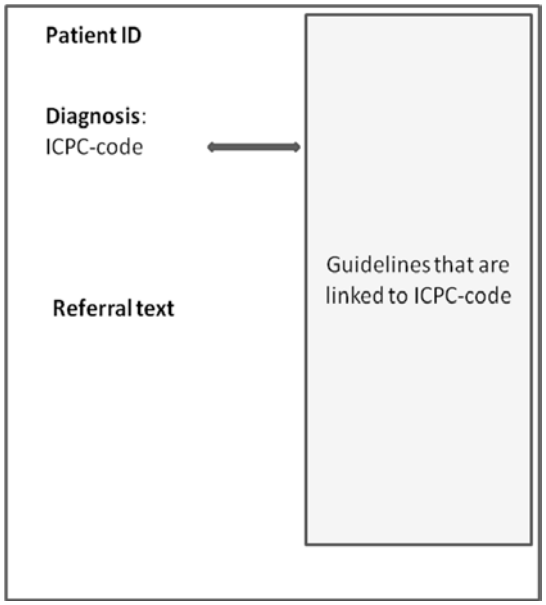
3.2 The patient trajectory

An illustration of the hospital internal trajectory for a case where the patient is referred from primary to specialized care is shown in figure 3.

The figure shows that the patient might have to go to the hospital for 5 visits before the actual surgery can take place. This is a process that requires a lot of resources from the hospital, and the patient does also have a long waiting time before he or she finally can be admitted for surgery.

Figure 3: The patient's visits to the hospital

3.3 Introducing clinical guidelines



The idea behind introducing clinical guidelines in the GPs EHR system was that the guidelines could prevent the GPs form referring patients who did not need to be treated by a specialist, and also ensure that necessary results from laboratory tests and image diagnostics were made available to the specialist. This could reduce the number of visits needed, and also reduce hospital costs per patient.

Two wards were selected for the project: Urology and Gastro. The basis for the selection of these wards was that they requested improved referral quality, the specialist showed interest in the project and that there had also been complaints from the GPs about the hospital service level regarding waiting time for the patients and feedback in the referral process. A pre project for a decision support project was therefore introduced in parallel with the deployment of traditional electronic messaging.

Figure 4: Guidelines in the EHR system

3.4 Technical solution

The referral is produced from the GP's EHR system, partly based on information that has been written in the patient's record and additional information that has been recorded in the referral module that is an integrated module in the EHR-system . When the GP decides to refer a patient to specialized care, information from the patients EHR will automatically be transferred to the referral form. This includes information about current medication, family history and present status. Once the relevant diagnosis code is filled in, a window with relevant guidelines will show up on the right side of the screen, if such guidelines are available. There is no strict control on whether the GP follows the guidelines or not, they are only made as a support in their daily work process. The referral is then sent as an electronic message to the hospital. There is technically no difference in how the referral message is sent if the decision support has been used or not.

The guidelines are maintained in a web-based tool that is available for the specialist at the hospital. When a new guideline is updated at the hospital, it will also immediately be made available in all the

GP's EHR systems. The guidelines are linked to ICPC (International Classification of Primary Care) codes. Some guidelines are only linked to one ICPC-code, while others are linked to a group of codes.

The guidelines are based on international guidelines and recommendations, but they are also to some extent adjusted to local needs. The specialists originally wanted the guidelines to be more extensive than they are today, but the user representatives from primary care pinpointed that a maximum number of five bullet points can be expected read in every guideline. The decision support module was installed in six general practices. As an average, 5-7 GPs work in each general practices, and the intention was that all the GPs should start using the system.

4 METHOD

4.1 Approach

The project management wanted an evaluation report in order to decide what further steps should be made based on the experiences from six locations. The study was initiated by the project manager and steering committee of the project. The work was done in the winter/spring of 2010 and started 6 months after the GPs had started to use the module that included decision support. The main focus was on the current step on introducing the decision support, but information about the first steps of the introduction of the message based electronic referrals and further expectations for electronic referrals was also gathered.

A qualitative approach was used because the intention was to get hold of information about the GPs daily use of the system and how it interrelated to their work processes.

4.2 Data collection

The work has been based on:

- Participation in meetings at HOSPA and notes from these meetings. This includes a meeting in the steering committee, a project group meeting and meetings with project members at HOSPA.
- Group meetings with the GPs at their local practices. All the GPs who were present in the office participated together with project group members from HOSPA. The project staff from HOSPA included project manager, technical staff and preferably also one of the practice consultants or GPs who had been active in the project. The meetings started with a brief presentation from HOSPA, but apart from that the GPs talked about the experiences they had with the system so far and ask questions about issues they were unsure of, or things they wanted to be improved.
- Semi structured interviews with:
    - Administrative staff that is responsible for handling of the referrals when they first reached the hospital.
    - Specialists who had been responsible for the development of the clinical guidelines.
    - GPs who had been participating in the project as user representatives or practice consultants.
    - GPs who have experiences with use of the decision support system in their daily work

The GPs work in general practice locations, and there are usually 5-7 GPs who are employed at each location, but they are seldom present at time same time. All the GPs who were present at the time of the visit were interviewed, regardless of what their role in the project had been. A total number of 20 GPs were interviewed.

The interviews were semi structured. That means that the GPs were free to provide all the input that they wanted about experiences with the project, but some questions were asked to all GPs. Examples of such questions were:

- To which actors do you send electronic referrals and what is the volume?
- Which improvements do you think should be made to the existing electronic referral system?
- Do you collaborate with the practice consultants and which results do you eventually see from their work?

- What do you think of the collaboration with the hospital regarding referrals, and how could it possibly be improved by means of ICT-support?
- What are your experiences with the technical solution?
- What are your experiences with use of the national recommendation for content: "The good referral"?

The GPs were also asked a set of questions that were specifically related to the use of the clinical guidelines. The results from this part of the study are analyzed in more details in a separate paper (Heimly 2011) but a summary of the results is also included in the results chapter in this paper.

The GPs were often very busy, and the interviews were done between patient visits or during lunchtime.

Meetings with the representatives from the HOSPA and the GPs were held as lunch meetings at the GPs premises. HOSPA provided lunch and came to visit on days when the GPs had announced that they were not too busy.

5 RESULTS

The interviews showed that the GPs were positive to the use of electronic referrals in general and preferred to use them if they had an option to send electronically instead of paper referrals.

The GPs were mostly positive to the way that the hospital had handled the relation to them during the design, development and pilot phase. The GPs said that the collaboration between the project team and the general practices had been good. The GPs felt that they had got the help they needed, but the bugs had also been so few that they did not have to spend a lot of time on contact with the hospital. They had been involved through their representatives (practice consultants and one GP that worked part time in the project team). Even if the GPs had not directly been in contact with the practice consultants, they signalled that they trusted them as their representatives.

The GPs pointed out that it was very important that the system could be adjusted to their needs and that the requirements from the specialists should not restrict the way they wrote their referrals too much. Two of the comments were:"Even if you refer two patients for the same diagnosis, the cases can be very different. It is therefore meaningless to have a predetermined set of questions that must be answered. It should be the GP's decision to provide the relevant information. If not so, the system will not get out of the testbed". "The specialists at the hospital have had to understand that a two-page overview with information that in nice to have is not going to be produced by the GPs. It must be information that is summarized and to the point. If the requested referral process is too time consuming, other hospitals than HOSPA will be preferred".

As a basis for how the GPs and specialists should use and understand the electronic referral form, a national recommendation called the "Good referral", has been developed by GPs and specialists based on a consensus process. The GPs were encouraged to use this recommendation for content. The interviews showed that with a few exceptions the GPs used this recommendation and were satisfied with it as a basis. Comments from the GPs were:

- The structure is ok, and the template is well integrated with the EHR system.
- It suits with my needs.
- I have not heard any complaints and I think all the GPs here use it.
- It works well.

One of the GPs suggested a change to the recommended order of the elements in the structure and wanted to put the actual description of the patient's current problem more up front.

The GPs had limited education in use of the system. It was commented that the system was very simple to use, and the GPs did not have to spend a lot of time on education. Representatives from the project team had visited for lunch meetings, the GPs had assisted each other to some extent, but most of all the users relied on that the user interface was easy enough to use without spending time on education. A few of the users had experienced problems with the system that had been solved with

assistance from colleagues, and one had stopped using the system because he did not want to spend time on solving the problem, but overall the technical solution seemed to work well and was trusted. Some of the GPs even trusted the system so much that they expected that all referrals would go through the system without errors, and one if the practices did not even check the log to see if all application receipts had been received from the hospital.

In theory patients in Norway has a free choice of hospital, but in practice both GPs and patient select the local hospital as their first choice unless the waiting lists are exceptionally long. This is line with experiences that Green et. Al. found when they asked patient about their use of the Choose and Book system in England (Green, McDowall et al. 2008). This would often also save the GPs from spending extra time in contact with a hospital where they are not familiar with the internal organization, and the referral process can also be more time consuming. As an example one of the GPs told of a patient who had a grandmother who lived close to another hospital, and that she (the GP) had to send the referral to this hospital first, before the patient finally wanted the referral to be redirected to the local hospital.

Many of the interviewed GPs had a good relation to HOSPA because they had worked there themselves or because they had a long term relationship with HOSPA and had a trust in that they offered high quality services. On the other hand HOSPA, had a reputation for long waiting lists for patients that were referred to the gastro department. One of the main reasons why HOSPA had chosen Gastro as one of their pilot wards was that they wanted to provide the GPs with better service from this department and hopefully attract more patients that were handled by private specialist today. During the pilot period this strategy did not seem to work. The interviewed GPs still referred many of the cases that did not require acute surgery at the hospital to private specialists. The interviewed GP told that this was mainly due to the long waiting time for the patient. They did not have any objections to the quality of the services from the hospital, but improved possibilities for electronic collaboration did not make them change service provider as long as the waiting times still were longer.

With a few exceptions, all of the GPs had used the decision support system. Some of the positive aspects they mentioned were:

- They felt more confident about which patients they should refer to specialized care and which cases they were expected to handle at a local level.
- Useful to have guidelines on which test that should be analyzed prior to referral.
- The level of the decision support was not too detailed, and they could decide by themselves if they wanted to adhere to the guidelines or not.
- Focus on the decision support system lead to extended use of electronic referrals in general.

Some negative aspects with the current version of the decision support system were:

- Some GPs write the referral after the patient has left the office, and the decision support would then be available too late in the work process.
- The current version of the system offers a very limited number of guidelines. Guidelines are needed for other specialties than gastro and urology, and some of the more general guidelines should also be connected to more than one ICPC code.
- Experienced GPs say that they seldom need the guidelines

It was noted as important that the GPs liked the solution because it was not compulsory to fill in a number of predefined fields. The guidelines were just optional guidelines, but most GPs found them useful. The GP's representatives in the project team had pointed of that the it was important that the system should not require more time to be used for the referral process than before the system was introduced. This is in line with findings in a study from the UK (Rabiei, Bath et al. 2009) where the GPs were reluctant to use the Choose and Book system because of additional workload.

The GPs did also not have a good understanding of whether the results of their use of the clinical guidelines were important or not. Some of the GPs had a clear understanding of that if their use of the guidelines could improve the quality of the referrals and thus influence on the time span until the patient was admitted to specialized care, they should use the guidelines. Many of the GPs on the other hand told that they missed feedback from the hospital: "It is difficult to improve your work, if you do not get any feedback on what the expected quality requirements from the specialist are". The hospital

on their side also said that they had too little time for asking for supplementary documentation or providing feedback on missing information or misunderstandings regarding addressing. In many cases the result was that the patient was scheduled for an appointment at the outpatient clinic that might have been unnecessary if the quality of the referral had been better. “It is an ongoing dialogue inside the hospital about the low quality of referrals” was one of the comments. The GP would sometimes need to add additional information after the referral was sent. This could include new test results or a notification about changes is the patient’s status that could indicate that the patient should be prioritised. Sometimes the GP would also like to request what the status of the referral was. In rare cases the referral had also become lost at the hospital site.

Many of the GPs told that they also used the referrals for sending requests about a referral that was already in the system or additional information about the patient. This initiated problems in the receiving end, because more manual work was needed to sort out which documents were updates or questions related to referrals. As one of the GPs said: ”In the future I would like to see what the status of the referral is at the hospital. Then I can communicate this to the patient. I would also like to communicate directly with the specialist who is responsible for the patient at the hospital.”

The specialists who were interviewed at the hospital would also like to have the possibility to request more information about the patient electronically. This could include more information about the patients function level in order to decide if the patient was likely to need to stay an extra day at the hospital before/after surgery or additional test results.

6 DISCUSSION

Because HOSPA to a large extent installed most of the ICT systems at their new site from scratch, they did not have the same installed base of ICT systems that had been developed and extended over a long period, as many actors in Norwegian health sector have. The introduction of electronic referrals had already started two years prior to the introduction of the decision support project. Many of the GPs had originally been sceptical to the electronic referrals. As the system had been in use for a while, they started to trust the technical solution. This first “simple” step seemed to be an important basis for further deployment of the decision support system. The next step is planned to be the implementation of a dialogue tool.

The electronic referral can be used as an example of a boundary object in relation to Carlile’s framework: format standards for referrals developed by CEN, ISO or other standardization organizations will be at the bottom layer. The semantic layer will consist of interpretations of the standard for daily use, where clinicians and other health workers have made agreements on which information they exchange. At the pragmatic level, different interests among actors have to be sorted out and may lead to changes in daily work processes. Bal et al (Bal, Mastboom et al. 2007) describes how referrals can influence the integration of those two domains. “It does so, however, not through the technical application, but because this application forms a new shared object in the context of which ideals of integrated care can be further developed and actors are able to get hands-on experience.”

This can also be seen as a process where agreements about standards and the implementation of infrastructure and EHR systems are building blocks that are a basis for deployment. At the same time theses building blocks are not necessarily fixed, and changes would often be needed, especially if the project is a pilot or one of the first to use this basis. If so, the development of the standards would often also be a part of the projects and to a large extent influenced by the users’ requirements.

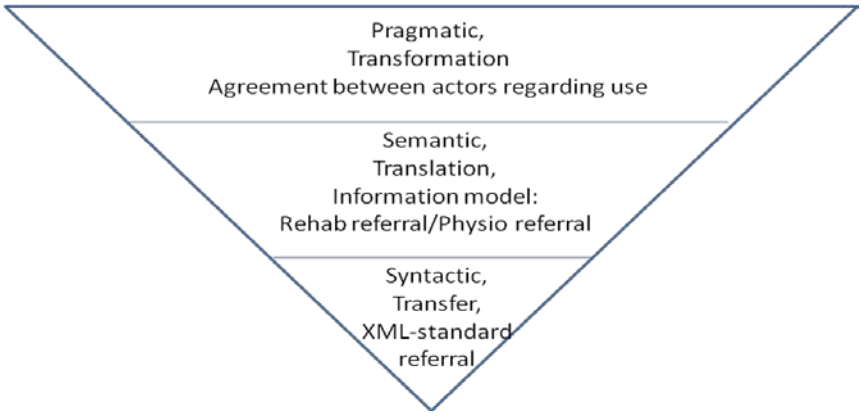


Figure 5: Boundary Framework, Referrals

At the semantic layer, agreements about which information that is needed and how this should be interpreted need to be made. Although not all GPs in the project use the "Good referral" as a basis for the work, the interviews indicated that most of them do. Still this is only a general recommendation, and adjustments at a local level can be needed as indicated by the GP who wanted to change the order of the elements in the structure. It should also be considered to develop recommendations for extension of the "Good electronic referral" for the different specialties at a local level as long as there are no national recommendations.

One of the main findings from the case, was that there is not a common understanding of how the GPs would like their referral solution to be, because their work processes differ a lot, even within the same practice. Some GPs write the referral when the patient is in the office while others write the referrals at the end of the day. It also varies if the GPs use clinical guidelines actively in their work, and how they communicate with the patient. This relates to requirements from the GPs about flexibility in use and that there should be no mandatory input controls to check whether the guidelines have been followed or not. It seems to be a difficult task to standardize the GP's work processes, and it is probably also a better option to let the ICT-systems be flexible enough to support different work processes.

The mismatch between expectations from the hospital and the GPs might partly be solved by ICT-support as clinical decision support, but a better understanding of each other's work process and need across organizational borders is also needed. Practice consultants and the GP in the project played an important role as boundary spanners in the design phase to ensure that the system would be usable in general practice. The GPs trusted them as representatives for themselves. As a consequence, the practice consultants should probably also be given a more visible role in communication of the hospital's needs back to primary care. This should be done in collaboration with the hospital.

As a success factor for further development and deployment of the system, one of the GPs said: "Ownership to the solution is essential. Even if it is the specialists who have the most benefits from the system in terms of better referral quality, it is essential that the GPs feel a strong ownership. If the specialist will be the future owners of the system, the GPs will probably dislike this and not feel so committed to use the system. It would be better to give the ownership of the system to the GPs who work as practice consultants at the hospital, or the GP who has a special responsibility for collaboration issues at the hospital".

Building the basis for an improved collaboration between the actors can be seen as a stepwise process.

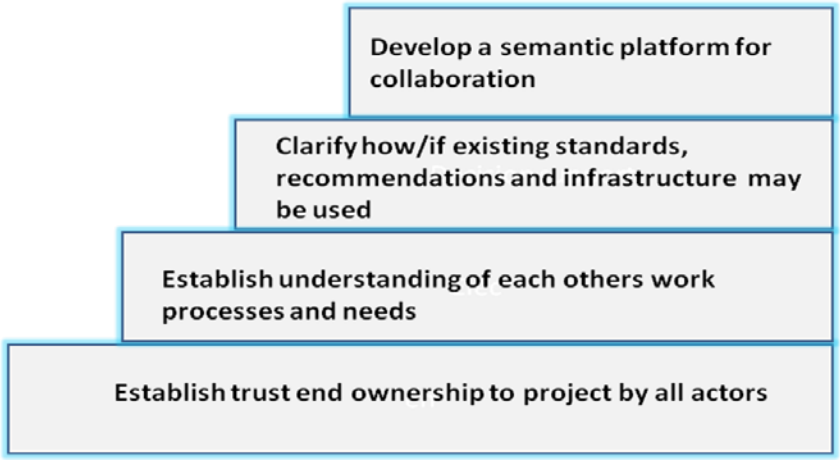


Figure 6, stepwise collaboration

If the bottom steps are not present, it will be very challenging to develop collaboration system the will adopted by the involved actors.

7 CONCLUSION

HOSPA seems to be successful with their deployment of electronic referrals despite that many other Norwegian hospitals struggle with their deployment. All GPs except from one said that they preferred to use electronic referrals when they could. Traditional electronic messaging has been the first step, followed by a slow move towards the solution supported by decision support. Based on the feedback from the GPs, it seems like the focus on electronic referrals in general in the project, has led to a situation where electronic referrals are preferred also when decision support is not available.

There can be small differences between projects that are adapted by the users, and projects that fail. In this project it seems like a rather slow, but stepwise approach has been successful. The technical solution supports most the GP's work processes in a good manner. The involved actors also seem to trust each other and most of them see benefits of using the electronic referrals. The use of practice consultants as boundary spanners and active representatives in the project may also have led to a situation where the GPs feel a stronger sense of ownership and commitment to the system.

When it comes to further development of the decision support solution, more guidelines are requested. Clinical guidelines should also be developed for the other specialties at the hospital. There is also a need for extended collaboration about additional information to the original referral and requests around status of the referral. The next step will probably be to extend the system with a dialogue based service, where GPs and specialists can communicate about the patient cases.

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