This chapter explores some of the consequences of strategies used to develop electronic standards in healthcare, especially the consequences of electronic standards for communication work. The two standardization strategies explored are the prototype strategy used to develop intranet applications and the specification strategy used to develop Picture Archiving and Communication Systems (PACS) in healthcare. It was found that computer systems based on different electronic standards intervene in work in different ways, and that they do not always intervene in the ways they were initially intended. For example, the PACS based on the DICOM standard have primarily attained a local role, although its initial aim was to support universal image communication within healthcare. On the other hand the intranet application based on the Internet standards primarily not designed for this particular purpose has come to support communication of images and reports within the heterogeneous hospital network.

INTRODUCTION

During the past 15 years, international organizations and countless dedicated individuals have devoted great effort to the development of electronic standards for storage and transmission of radiological images (Jost, 1994). It is impossible to build large communication networks of people and things unless they are based on standards (Hanseth and Monteiro, in manuscript). As there is a great need for communication within healthcare, the need for standards is obvious. To support this large-scale communication, a number of technical standards have been developed within healthcare, such as Digital Imaging and Communications in Medicine (DICOM). Between 1983 and 1994 this standard was developed mainly by the
American College of Radiology (ACR) and the National Electrical Manufacturers Association (NEMA). It is now also being developed in conjunction with JIRA/IS&C in Japan, and reviewed by IEEE, ASTM, HL7 and ANSI in the USA.

Different strategies are associated with the development of electronic standards. For instance, the European standards for healthcare, including DICOM, are based on a specification-driven approach, seeking more homogeneous solutions, presupposing a common design implementation in all medical units. Simultaneously, other electronic standards have been implemented in healthcare, such as the Internet standard. The Internet society has developed through a prototype-oriented strategy and is growing rapidly. It is based on the idea that there would be multiple independent networks of rather arbitrary design. The idea of the Internet was that any provider could freely design an application and make it work together with the other networks in the Internet. It emphasizes an underlying heterogeneous solution in work.

There has been little research focused on electronic standards in healthcare (Hanseth and Monteiro, in manuscript), although electronic standards are rapidly being introduced. For instance, Laurin (1998) reported that 60% of all radiology departments in Sweden were planning to introduce electronic standards within the next three years. It thus seems important for us to strive to contribute an understanding of some of the consequences of electronic standards in medical work.

We view standards as an agreement that establishes a framework within which to solve particular problems. An example of this is the rules for how many different medical actors should use the radiological examination order. Secretaries use the request to book examinations, radiographers to carry out examinations, radiologists to diagnose patients, archive staff to archive documents, clinicians to request radiological examinations and to carry out patient intervention and treatment, etc. The standard covers more than one local activity, and is applied in the context of making things work together over distance and heterogeneous metrics. Although its aim is to support cooperative work, it cannot guarantee interoperability between entities. Communication must take place according to shared, standardized protocols. Work must follow standardized practices. In the standardized radiological network, actors rely in their actions on other actors following the standards.

The empirical data has been collected from a larger ethnographic study that was initiated in October 1997 at the Radiology Department, Sahlgrenska University Hospital, Gothenburg, Sweden. It has been followed up by several additional studies at the Pediatric Radiology Department, Astrid Lindgren Children’s Hospital, Stockholm, Sweden, and at the Radiology Department, Örebro University Hospital, Sweden. Ethnography has recently become widely recognized in the IS field (Hughes et al., 1994; Bowers et al., 1995; Bellotti and Bly, 1996; Button and Harper, 1996; Button and Sharrock, 1997; Suchman, 1998). The research approach is to investigate and understand the relevant work practice in context. Several different qualitative research methods were used: workplace video studies; interviews illustrated by video documentation; unstructured interviews; observations; discus-