

Netc@rds for e-EHIC - a Step Towards the Introduction of the European Health Insurance Card¹

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Abstract: The paper describes the “Netc@rds for eEHIC” project running under the EC eTEN Programme, including some relevant results achieved and lessons learnt. The central project objective is to test the technical options of substitute the present eye-readable European Health Insurance Card for arrangements involving electronic documents and network solutions, for the implementation of health care services across member state borders. The countries already having national electronic health insurance cards in place plan to test the feasibility of application of their systems in this environment. The ultimate aim is to simplify the procedures for the travelling citizens, health care workers, and health insurance providers, and thus to promote free movement of people and services in the EU.

1. Introduction and Background

Since June 2004, EC citizens have been provided with an uniform single document, European Health Insurance Card (EHIC), certifying their health insurance cover when seeking health care assistance in another member country. The card substitutes the different paper forms applied previously. So far, 15 EU Member States have migrated to this document, others are to follow by the end of this year. By unifying the documents and processing setups for the citizens, health care workers and insurance providers, the card is a major step in the process of integrating the internal market, in the aspects of free movement of people and services. In view of the differences in the national organisational and technological arrangements in member countries, the Administrative Commission for Social Security of Migrant Workers, in whose domain falls the EHIC, resolved to start with a minimum common denominator, i.e. with an eye-readable card, with the view on developing and adopting a resolution on the future solution in the time frame up to 2007/2008.

Although EHIC is a major breakthrough in itself, its eye-readable nature presents some obvious disadvantages in terms of organisation, processing workloads, data accuracy and reliability, security and fraud-control, as well as acceptability in the professional and general public. In several countries, electronic systems, predominantly based on smart-card technology, but also on information networks, are already in place on a national, regional or health care segment scales. The positive experience gathered in their application so far, and certainly the trends in other segments of commercial and social services suggest that the

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future EC-scale solution should be sought in the direction of moving the EHIC to the electronic level, commonly denominated eEHIC. By definition, eEHIC is a process of establishing a trustworthy health insurance dataset at the health care service providers. The Netc@rds project seeks to test and verify the concepts to allow coexistence of different platforms and progressive migration of different countries towards advanced IT supported arrangements, while maximising the involvement of the national systems already in place.

The initiative for the Netc@rds project originates from an international consortium of non-profit institutions from 10 European countries: national health insurance providers/sick funds, health care organisations (hospitals) and organisations involved in research in the health sector (an issuer of health insurance cards, a health care informatics association, a research institute, a university). The consortium unites the representative organisations from Austria, Czech Republic, Finland, France, Germany, Greece, Hungary, Italy, Slovak Republic and Slovenia. Under the Netc@rds project, each country is to carry out a pilot project in one or more of its regions.

To this end, the project is to set up pilot workstations to test technical interoperability of different national cards. In this way, the project will test, in practice, the arrangements for electronic acquisition of data concerning the validity of health insurance of foreign citizens. The anticipated project results and benefits include:

- simplified access to health care services abroad (in pilot regions);
- reliable source of health insurance validity data;
- definition of the dataset to facilitate administrative procedures involved in financial flows between the health care service providers and the health insurance providers.
- valuable experience, instrumental in the future introduction of the electronic European health insurance card.

2. Netc@rds Project Context

The apparently most simple approach of introducing a new electronic European Health Insurance Card is hampered by difficulties to justify its costs with the few administrative data primarily in scope and the necessity to have an interoperable reading infrastructure available. To avoid parallel and redundant technical implementations it is therefore unquestioned that a fusion of the eEHIC with existing and planned national health card schemes will become reality. But since such national implementation schemes are inhomogeneous and de-phased no simple convergent strategy seems applicable.

The strategic view of eEHIC introduction must therefore address three options:

- an eEHIC stored on a national chip card with a common eEHIC data set and interoperable behaviour,
- an eEHIC as an additional chip card,
- an eEHIC as a functionality detached from a chip card as carrier medium

No principal impediments against a coexistence of these strategic approaches are identified. Member states opting for an enhancement of national card systems can realize synergy effects and foster the overall introduction of eEHIC since they are more likely to implement a reading infrastructure. On the other hand Member States even without electronic health insurance cards could issue electronic EHIC, since the usage is taking place abroad and requires no decentralized reading infrastructure in the issuing nation. The eEHIC as a functional scenario without electronically reading out cards will be needed to cope with the diversity of national approaches.

The experience gathered in implementing project activities in the pilot regions – during the first project year concrete implementations through workstations installation have been deployed in Greece, Germany (Baden Württemberg), Italy (Regione Lombardia) and France



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– have reinforced the awareness that, notwithstanding different approaches in setting up an EHC strategy leading to digitalisation, all eEHC deployment activities require a high level of European coordination and operational standardisation, because the use-cases are to happen in other than the issuers member states detached from the immediate executive chain of control. Therefore additional procedures to guarantee working interoperability beyond reliance on standards are necessary. Especially the slow pace of infrastructure modernisation in eHealth and long life-cycle of components once they are deployed in the field demand for an effective coordination as early as possible.

3. Technical and Organisational Solutions

Already in its early steps the Netc@rds project has appreciated the diversity of different national and regional approaches for eEHC introduction and offered a wide range of options to:

- allow implementation at different speeds,
- use existing infrastructure,
- enable competitive testing of various techniques,
- increase the robustness of the service, and
- ensure acceptance.

3.1 Patient - Health Care Provider Environment

On technical level, a multi-option approach for an eEHC introduction has already been proposed by the architecture model of the Netc@rds scenario cases (*Figure 1*). The scenario cases definitions encompass various sources and organizational embedding of electronic data sets to constitute an electronic European Health Insurance Card. The elements to constitute these scenario cases are a card reading functionality and a network functionality. Netc@rds scenario case 3 also permits the detachment of the eEHC from its “classical” carrier medium - the chip card. A coexistence of these options constitutes a main principle within the Netc@rds project:

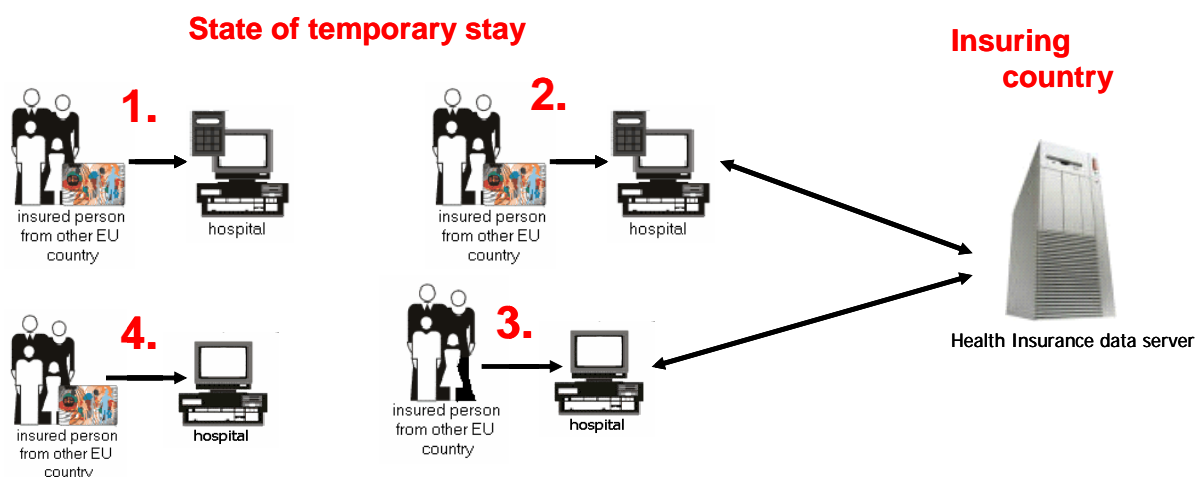


Figure 1. The four Netc@rds scenario cases



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- *Scenario 1*, off-line scenario. The Netc@rds dataset is read from the chip card, employing an off-line software application. Under this scenario, data security can be augmented through the application of PIN codes.
- *Scenario 2* combines the application of chip cards and network services. The Netc@rds dataset is acquired from the server, whereas the chip card serves as the key to access the server data. The chip card is used in the establishment of a secure network link with the relevant health insurance provider (on-line authentication). Upon a successful authentication, the dataset is transferred. As a backup, the entire dataset may also be stored in the chip card itself, for cases where the link to the data server can not be established, e.g. for technical reasons.
- *Scenario 3* is an on-line scenario, not employing a chip card. The Netc@rds dataset is acquired from the health insurance provider's data server, based on the typed-in insured person's identification details. Personal data security can be augmented by means of health professional cards for health care workers and health insurance officers.
- *Scenario 4* is applied in the cases none of the above three scenario is practicable. The Netc@rds dataset is read and manually entered from the European health insurance card or other appropriate documents.

The Netc@rds project underlying idea is a unified workstation, capable of processing/reading different chip cards and/or transferring data from a remote health insurance data server over a secure extranet link. A workstation consists of the following components:

- a web oriented Netc@rds application (HTML page + applet) with a multilingual user interface, allowing data entry and data export in the XML file format or a paper printout;
- a module for secure access to the national portal, possibly employing health professional cards for maximum security; in essence, this is a mutual authentication HTTPS link;
- specific national modules with a common definition of I/O functions, for card reading, card authentication and/or safe downloading of data from the portal;
- suitable card reader capable of handling different card types, with a common driver library, to provide a common interface for all national scenarios;
- data exchange between different national portals, based on the SSL v3.0 protocol.

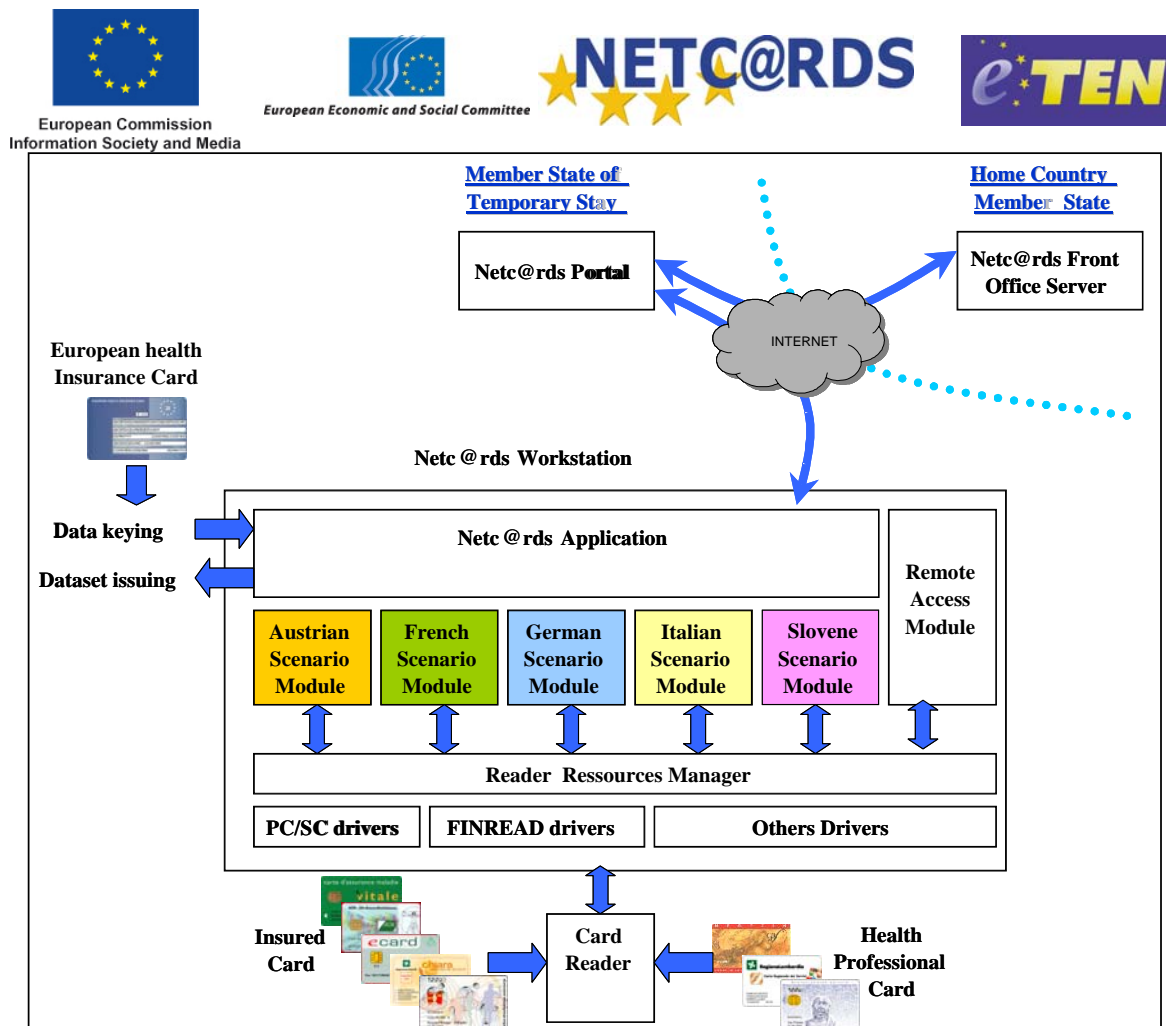


Figure 2. The Netc@rds workstation architecture

3.2 Health Insurance Data Postprocessing Environment

Regardless of the source of the eEHIC data set - whether it has been delivered from card or server - it is evident that a simple transfer of all data items of the eye-readable EHIC to constitute an electronic version is not sufficient, since the field selection and carrier reflect the requirements of manual and optical processing and effective industrial production of a plastic card. For the electronic equivalent the limited but nevertheless existing security features of a plastic card concerning the integrity of the data and single existence of the object compared to duplicable electronic files must be covered by other means.

For the eEHIC data set, it is necessary to:

- set up a file structure,
- define mandatory and optional content,
- define items for integrity, attributability and object identification.

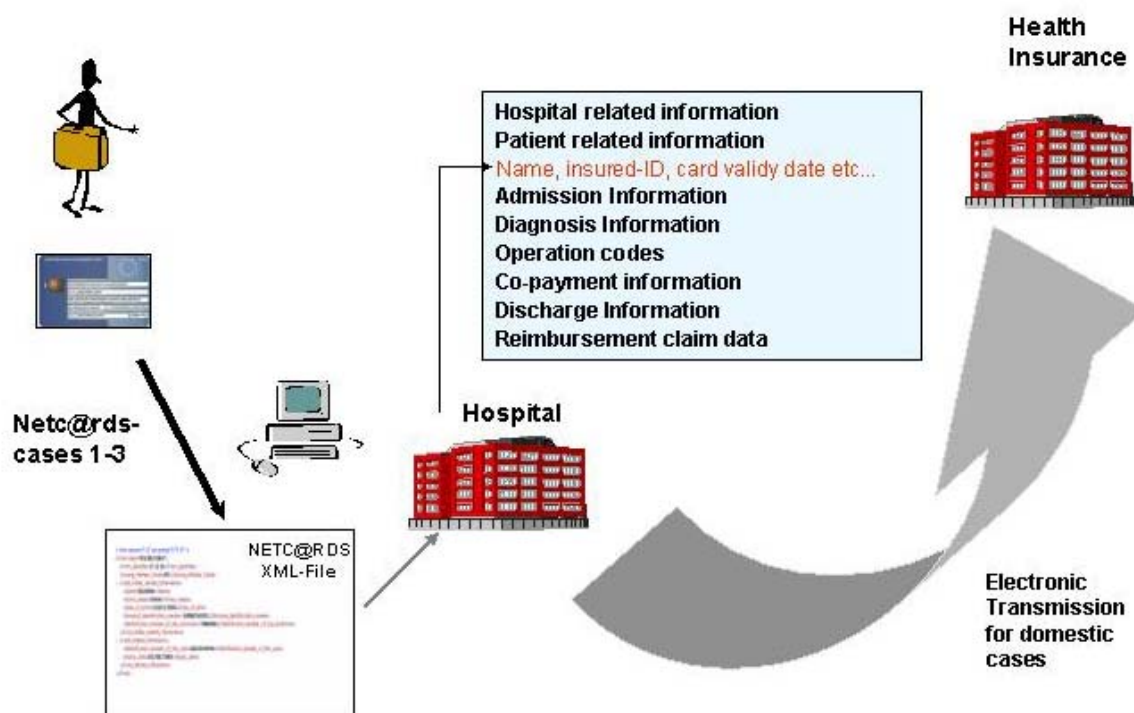


Figure 3: The eEHIC-data set feeding-in into existing electronic reimbursement systems

Fostering electronic post-processing is frequently declared as main goal of the introduction of the eEHIC. It must however be appreciated that electronic reimbursement does already exist in various countries. With implementation of diagnosis related groups (DRG) and case tariffs in various European countries a huge amount of structured data is to be transmitted between health care institutions. IT-Systems are standard for handling these data within most hospitals and ambulatory units. These datasets both within the institutions and for national transmission provide fields to tag foreign patients. An alteration to add additional fields for e.g. EHIC numbers will be only a minor issue in respect of the huge update rounds frequently taking place for reasons of medical and procedural coding.

Therefore it is to accept that modernisation impact of the eEHIC to following procedures will be limited in systems where electronic post-processing is used. In a first step it is however useful to support the integration of patient-related data fields as present of the EHIC into subsequent systems. For the users in the health care units this could provide a very convenient and attractive simplification and avoid transcription errors.

4. Challenges Addressed by the Project

The introduction of a health and insurance card and definition of next stages through digitalisation drive member countries to both technical and institutional changes. The Netc@rds project addresses a number of problems, which directly relay with the capacity of healthcare providers, public administration and health-insurance bodies to cope with the inherent complexity of such a introduction, on one hand ensuring the control of national and regional governmental bodies to act according the their own scheme of competence depending on the different local regulatory frameworks, and on the other hand, effectively proposing shared solutions acceptable for each of them. More particularly public administrations and governmental bodies involved in this domain have to address:



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- rising demand for health and social services;
- increasing expectations of citizens who want the best care available, and at the same time a reduction in inequalities in access to good health care;
- increasing mobility of patients and health care professional within a better functioning internal market;
- the difficulties experienced by public authorities in matching investment in technology with investment in the complex organisational changes needed to exploit its potential;
- management of huge amounts of health information that need to be available securely, accessibly and in a timely manner at the point of need, processed efficiently for administrative purposes;
- the need to provide the best possible health care under limited budgetary conditions, and
- the need to cover the development of standards addressing the interoperability of diverse systems and services.

5. Challenges Facing the Project

The eEHIC implementation is an ambitious endeavor that operates in a complex environment, lacks a clear target definition and allocation of organizational responsibility. As the main lesson learnt during the project implementation phase, it is recommended not to waste effort and credibility into an all-embracing gigantic deployment scheme, but to focus on two key elements:

- the card reading functionality, which encompasses basically cards and associated reading infrastructure. All efforts should be directed to guarantee interoperability of upcoming national solutions to be read out administrative data, wherever card reading infrastructure is deployed in Europe.
- the network functionality, which includes server and network structures for the remote access to databases of health insurances. This functionality should be developed in migration steps, enabling low cost routing of point-to-point connections integrating existing infrastructure elements like the code-list-database of DG Employment up to a full-scale European server-network.

This twofold approach, being in line with the [Netc@rds](#) scheme, is the unique real practicable path for providing convergent solutions for eEHIC. Also, starting from these evidences it is advisable to consider further two elements when introducing an eEHIC: the first one dealing with the need to ensure a proper level of security in data exchange; the second one involving aspects referred to possible additional services associated with the eEHIC such as interstate clearing/billing procedures.

6. Conclusions

Building on eEurope's focus on accelerating the roll-out of e-health services through advanced infrastructure and technologies, full use should be made of IT and e-solutions to support public administrations in delivering e-Health systems and services. Public authorities can play a pivotal role in stimulating both supply and demand for e-Health services – particularly those provided through health and insurance cards.

The Netc@rds central and underlying principle is to accommodate coexistence of different environments, technological and organisational setups, through the set of scenario cases. In this way, the project and the resulting concept allows the joining by a broader range of countries, from those with relatively obsolete technological solutions in place to those with state-of-the-art national solutions. With the offered and accommodated options



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of entering at any appropriate stage and phased and progressive transition to the higher stages, the project builds a bridge from the past to the future.

The project partners come from the "real life" environment, and are major actors in their national health insurance and health care environments. This is a guarantee for the project focussing on relevant issues, true verification of the proposed concepts in practice, and the significance of the project results, deliverables and suggestions for the political decision makers in their deliberations on the next phase in the process of developing internal market in the segment of health care and health insurance.