# EU*US eHealth Work Project H2020-SC1-HCO13-2016

*Mapping Skills and Competencies; Providing Access to Knowledge, Tools and Platforms; and Strengthening, Disseminating and Exploiting Success Outcomes for a Skilled Transatlantic eHealth Workforce*

## Case Study: Patient Safety and Continuity with an Evidence-Based Decision Support Tool for Nursing Practice and Documentation

VAR Healthcare, Cappelen Damm, Norway

## TITLE Patient Safety and Continuity with an Evidence-Based Decision Support Tool for Nursing Practice and Documentation

### AUTHOR
Ann Kristin Rotegård, PhD, Department Manager, and Anne-Karine Hjortnæs, MScN, Editor/ Special Advisor, VAR Healthcare, Cappelen Damm, Norway

### ORGANIZATION

The Norwegian health legislation, in collaboration with the health and quality reform of 2000/2001, imposed heightened requirements for the coordination and quality assurance of health services. At the same time, the health authorities in Norway initiated requirements for increased use of information and communication technology (ICT) to streamline, coordinate and improve communication between the various organisations and institutions. VAR Healthcare was developed to support the requirements of these new initiatives.

The name VAR has its origin from the old Norse "vǫr", which, among other things, means "take care of, watch over, guard, be aware of". In old Norse mythology, Var is a goddess related to wisdom. She is so wise that no secret can be hidden from her. This meaning fits well the intention with our evidence-based tool: to contribute to wise and visible nurses who practice quality, efficient and safe patient care.

VAR Healthcare started as a public research and development project within the Norwegian Industrial and Regional Development Fund (now called Innovation Norway) in 2001. The project involved various hospitals, nursing home and education institutions. The Norwegian Nurses Organisation (NSF) assumed ownership of the project in 2002 to ensure the further development and practical implementation of VAR, as well as to process the results of the project. Cappelen Damm AS purchased VAR Healthcare in the spring of 2012 as a separate division and digital initiative within its publishing house. The organisation now consists of 15 employees, 13 of which are highly educated, skilled and experienced nurses.

### BACKGROUND

Good competence in nursing has direct benefits for patient safety and quality of care. This has been an important political health initiative in Norway since the health and quality reforms of 2000-01. These requirements are also present in several countries globally, including Denmark, Scotland, the US, Wales, and others. Health care procedures have traditionally been developed locally and with little or no coordination for each hospital unit or health institutions, nor with educational texts. For example, one hospital with whom we collaborated had up to 60 variations of the same procedure. Clinical practice experience shows that developing and maintaining health care procedures according to the latest research/best practices is a challenging and time consuming process. Considerable resources are required to keep up with the latest research and to formulate the findings in a precise and easily understandable manner. This requires time, knowledge and continuity, resources that are often scarce in clinical practice. Because of the new demands from the health authorities, there was a clear need for utilizing available technology and developing a system for health care procedures. This system needed to be based on best evidence in order to improve efficiency, save money, improve communication and treatment throughout units and institutions and bridge education and practice.

**STATUS/CURRENT DEVELOPMENTS**

VAR Healthcare has undergone several platform changes through 16 years of development, and the content has been consistently updated. The latest platform consists of 400 procedures, all anchored in best practice and research. VAR Healthcare provides knowledge summaries in an easily accessible language as a foundation for practical procedures. The underlying concept is to bridge the academic and practical aspects of nursing.

Today, VAR Healthcare is used to educate nursing students pursuing bachelor degrees in Norway, in two of the largest university colleges/nursing educations in Denmark, in the majority of municipalities in Norway and Denmark, as well as in hospitals and other health institutions. This contributes to consistency in care and treatment regardless of the setting. Nursing students are consequently better prepared for practice from day one, since what they learned during their education is the same tool used in the workforce.

**ACTIVITIES/MEASURES**

The aim was to:

- Develop and evaluate a practical digital tool for updated and quality controlled procedures, as well as a knowledge base for nursing care to replace the paper-based and "home-made" procedures currently employed
- Provide a solid foundation for education and life-long learning at all levels, and ensure consistent, continuous care and patient safety

The project was conducted in the following phases:

***Phase 1 and 2: Identification of content and development of a prototype***

A resource group was established consisting of experts from universities / colleges that offer bachelor education for nurses, along with nursing experts from hospitals.

Systematic literature search and reviews were performed. Two external editors with advanced education were the project managers for content development: one with a PhD in the field of practical skills in nursing, the other with a Master of Science in Nursing (MSN) and a position as a lecturer.

The content was thereafter further validated by medical and nurse specialists from other hospitals and university colleges.

The technology and design were developed in collaboration with an external IT-vendor.

***Phase 3: System development***

The content is structured based on the model of practical skills performance in nursing [1] and was inspired by Virginia Henderson's model of basic needs and the VIPS model. The VIPS model was developed in 1991 to provide a common structure and keywords for representation of nursing care in patient records. The intention of the VIPS model is to support nursing documentation in individual patient records. The VIPS model is a conceptual model based on four key concepts: well-being, integrity, prevention and safety. The model consists of keywords on two levels. The first level corresponds to the nursing process model, with the keywords nursing history, nursing status, nursing diagnosis, nursing goal, nursing intervention, nursing outcome, nursing transfer report and nursing discharge note. A second level of keywords consists of subdivisions for nursing history, nursing status and nursing interventions. Since its beginning, the model is

further developed and in use all over Scandinavia and was translated into German, Spanish and Latvian [2-3].

The model of Practical Skill Performance forms the basis for the procedures in VAR, and consists of six mutually dependent categories: substance, sequence, accuracy, fluency, integration and caring component. These components set out the quality characteristics for performing complex nursing activities.

The procedures in VAR relate to the complexity inherent in daily practice, and the content is developed based on the best available knowledge, including legal, ethical, theoretical, practical and aesthetic knowledge.

The structure of the procedures builds on the International Organization for Standardization (ISO)-9000 Quality Management systems, fundamentals and vocabulary (1994). A release management system with a unique version number keeps control of the changes.

### Phase 4: Testing, evaluating and adjusting the tool
Qualitative and quantitative methods were used. The evaluation was conducted in two steps:

**Step 1:** January 2001 – March 2002, tested at two major hospitals and one University College offering bachelor education of nurses.

**Step 2:** August 2002- March 2003, tested in two municipalities and one nursing home.

A local project manager and a dedicated nurse manager / lecturer in each organization were responsible for the evaluation along with a local working group.

Evaluations were made on both the content (quality and usefulness in performance, patient documentation and education) and the technology (user sequence and utility value, usability, implementation) experiences. Adjustments and improvements were performed between steps one and two, as well as prior to release of the final version.

### Phase 5: Operation and maintenance
The project was completed in 2005 and the tool was thereafter made available for community and home health care providers, as well as hospitals and Universities / Colleges. VAR Healthcare is currently widely used in Norwegian and Danish municipalities, as well as the two largest Universities / Colleges in Denmark.

Operation and maintenance is ensured by continuous development of content and technology. The core of this process is user involvement. Professional specialists develop the content together with highly skilled editors, consultants and a research librarian. Medical and nursing consultants and experts using universally accepted methods (e.g. PICO, AGREE II, 6S model) further validate the content. These methods are also used in VAR Healthcare's ongoing continual development. A yearly seminar is arranged for designated super-users with regard to new content, practice and education.

### CHANGES
The evaluation of the project showed:

1. The tool yields quick access to up-date and evidence-based procedures, leading to improved efficiency and profitability

2. The tool is highly applicable for guidance, self-study and for use in education and practice. The self-test application was highly appreciated by the teachers and managers
3. The overall platform, its templates and structure, were good and applicable to other areas and professions, e.g. procedures for physicians, physiotherapy
4. It was highly appreciated that the content is brand-neutral and could easily be linked to other IT-systems, e.g. Electronic Patient Record systems (EPR)

**RESULTS**

VAR Healthcare (previously Practical Procedures in Nursing (PPN) care), is a knowledge- and decision-support tool consisting of nearly 400 practical procedures, with underlying knowledge summaries, knowledge tests and medical calculators. The procedures are richly illustrated. VAR is available via the internet, can integrate with EPRs and is also accessible on mobile devices.

This database bridges the gap between research and practice, and facilitates communication between professions in health care. Experience and business cases demonstrate cost savings. In addition, an important aim is to contribute to the motivation for work and professionality. VAR Healthcare:

- Contributes to lifelong learning in a cost-effective and time-effective manner
- Consequently has both a positive influence on individual nurses' competence, the organization (e.g. hospital) and in the community and country
- Contributes to a focus on practical care and treatment and on patient outcomes
- Can strengthen the responsibility and collaboration between health care professionals

The patient meets professional nurses who conduct the same procedure, based on the same knowledge—always updated—whether the patient is in hospital, receives nursing care at home, or is in an institution. This increases the possible positive treatment outcomes based on coordinated care and continuity.

**OUTLOOK/LESSONS LEARNED**

VAR Healthcare is a web-based solution that covers many needs: ready access to procedures that are continuously updated and evidence-based; contribution to improved nursing documentation and care planning; continuous care and patient safety; education and lifelong learning; quality improvement in clinical practice.

The advantages of using the tool are summarized as:

a. Reduced resources in the development and maintenance of procedures, resulting in more time with the patient
b. Increased quality of treatment, documentation and care–consequently reduced malpractice claims along with increased patient safety
c. Consistent treatment of the patient within and across units/healthcare settings
d. More efficient and better quality of nursing documentation
e. Efficient education of new employees and students—fewer resources spent on teaching and seminars
f. An important element of a national strategy for quality insurance in nursing care—building professionalism

The latest version (version 13) of VAR Healthcare goes beyond knowledge support for nursing to also include initial support for decision-making. This may contribute to increased collaboration between professions in healthcare, e.g. between nurses and physicians.

VAR uses International Classification for Nursing Practice (ICNP) terminology in its application. The search engine has been developed for best possible use and support throughout the solution. Nurses can now search for nursing diagnosis/patient problems or risks, and receive suggestions for actual procedures to document and follow up in practice. Evidence-based *procedures* are consequently a natural part of nursing documentation/care planning, which in turn is essential for evidence-based *practice* and patient safety.

VAR is also integrated with EPRs, as well as with digital quality management systems. This integration may improve the foundation for research and statistics in nursing practice and patient outcome. In addition, the knowledge foundation in VAR provides good support for obtaining an overview of the research and potential research gaps.

VAR Healthcare is a key tool for management support in systematic competence building and resource management.

## References

[1] Bjørk, Ida. (1999). Practical skill development in new nurses. Nursing Inquiry. 6. 34 - 47. 10.1046/j.1440-1800.1999.00005.x.

[2] Ehnfors, M. , Ehrenberg A. og Ingrid Thorell-Ekstrand. Translated by Kari Marie Thorbjørnsen 2015. Nye VIPS boken – Velvære, Integritet, Profylakse, Sikkerhet. (The new VIPS book –Well-being, Integrity, Prophylaxis, Security) Cappelen Damm A/S, Oslo.

[3] Ehrenberg, A., Ehnfors M. & Thorll-Ekstrand , 1996. Nursing documentation in patient records: experience of the use of the VIPS model. J Adv Nurs. 1996 Oct; 24(4):853-67.

## Case Study Checklists

### Checklist of eHealth topics (competencies)

*Role of "Peopleware":* human factors, awareness, satisfaction and acceptance of health IT, usability measurements, evaluation of health IT, communication, leadership, change management, ethics and IT and similar topics

The users (nurses in clinical practice as well as education) have been involved in developing and evaluating the technology (usability, ease of use, etc.). Interdisciplinary collaboration across areas of responsibility in close dialogue with users provides interesting challenges, exciting ideas and new thoughts.

*Role of inter-professional approaches:* Inter-professional versus mono-professional training and learning activities. What subjects lend themselves to inter-professional vs. mono-professional classes, learning environments and similar topics

Other professions such as physicians, physiotherapists, health lawyers and medical illustrators have been involved in the development, evaluation and use of VAR (education and clinical practice).

*Role of healthcare data sciences:* data and information acquisition including documentation, data quality, data, information and knowledge management, data analysis and statistics, clinical decision making instruments, reporting and similar topics

The content in VAR contributes to evidence-based documentation and care. The search engine is developed to support nurses in finding relevant procedures / interventions due to patient problems or risks. The template includes, amongst others, indications and goals for the procedure and descriptions of increasing efficacy of nursing documentation.

*Fusion of medical technology & informatics:* software as a device, smart devices, automatic data acquisition via devices, risk and safety management

N/A

*Role of process and workflow management*: clinical and administrative processes, information continuity and information logistics, management of processes, workflow management systems and similar topics

VAR Healthcare supports the nursing process and documentation. The procedure in itself is an intervention that can be linked or integrated into the EPR Record system or Health Information system and thus contribute to improved overview and less documentation.

*Role of ethics, legal and data protection issues:* ethics and IT, legal requirements, data protection and information self-determination, data safety and similar topics

The procedure template includes information about legal aspects of the procedure, based on national health legislation.

*Role of learning and teaching:* learning techniques ("learn how to learn"), learning and teaching styles (online, blended, face-to-face), learning management, information management for learning and teaching and similar topics

VAR is founded in a model of practical skill performance to describe important elements of quality in a performance (performing a procedure). In addition, the knowledge summary that the procedure is based on increases the understanding and the knowledge behind the procedure. This may increase the nurses' ability to describe the rationale and knowledge behind their actions. Pedagogical illustrations visualising the procedure from both an external and internal view, with detailed anatomic elements, increase learning. VAR also has knowledge tests based on the procedures and knowledge summaries to increase learning.

*Role of management related topics in health informatics and IT:* principles of management, strategic management, stakeholder and change management, leadership, financial management, risk management, quality and safety management, resource planning and management and similar topics

N/A

*Role of technology:* information and communication systems, telemedicine, telematics, assistive technologies, mHealth, life-cycle-management including systems development/engineering

VAR is accessible on all media (computers, tablets and mobile phones) as well as in the EPR systems, digital quality management systems and learning portals through linkages or integrations.

*Role of consumers and populations:* consumer health informatics, public health informatics

N/A (the tool is made for the nurse)

*Role of Research:* information management in research, data analytics

We include research in our knowledge summary and describe what research and development exists (and also the gaps of it) within the area /categories of procedures (e.g. chronical wounds).

*Role of interoperability:* systems integration, IT standards, terminologies and classifications

N/A

## Checklist of eHealth topics (gaps and deficiencies)

*Teaching the teachers:* Are there any activities in your organisation to teach health IT/eHealth to teachers in healthcare?

No, except for courses in using / utilizing the tool in clinical practice and documentation.

*Supporting participatory design and acceptance testing/research:* Are there any educational activities to teach or practice participatory design? Are there any activities including research in user acceptance testing and satisfaction measurement?

N/A

*Integrating eHealth/health informatics into traditional curricula:* Are there any activities to include eHealth/health informatics into traditional curricula of physicians, nurses and other health professionals with direct patient care?

N/A (except that VAR is used in bachelor education for evidence-based practice / demo-rooms education. The knowledge summaries is also on the curriculum in many universities / colleges because it is continuously up-dated).

*Motivating clinicians and managers:* Are there any incentives and opportunities for clinicians and healthcare managers to acquire and update digital eHealth/health informatics skills and knowledge?

N/A

*Engaging women:* Are there any activities to attract female students in eHealth/health informatics or employ female health IT staff?

N/A

*Adjusting job descriptions and enable continuing education:* Are there any activities to adjust job descriptions, e.g., for clinicians, that include health informatics competencies (also proper use of health IT/eHealth systems) and are there activities to support staff updating and upgrading their health IT related skills and knowledge? This topic is mainly related to provider organisation and also to IT vendors.

N/A

*Updating teaching and learning material:* Are there any activities to ensure that the material is up-to-date and of high quality?

That is what we do. The quality is ensured by strict demands regarding the development process, use of sources and level of qualifications of our employees.

*Availability of courses including electronic courses:* Are there any additional activities to improve the availability of courses such as implementation of new courses, new course formats that recognise previous experiences/training in particular for continuing education?

N/A (Except courses in using the tool in clinical practice, documentation and for management support)

*Informal caregivers:* Are there any educational activities to teach health IT usage to informal caregivers, e.g. for assistive technologies?

N/A

*Shortage of health informatics specialists:* Are there any programmes to attract health informatics specialists?

 N/A

*eHealth Budget:* Does your organization, area or region have a dedicated budget set aside for eHealth/health informatics training, education or workforce development initiatives?

N/A

*eHealth Specialty Areas:* Does your organization address any of these speciality settings/areas of training or outreach for eHealth education or workforce development: ambulatory care, social medicine, geriatric/ageing medicine, rehabilitation?

N/A