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PROJECT STATUS REPORT : Initiation I.

January 2005

General summary of period 01/12/2004 – 15/01/2005

1. Project was successfully initiated, guaranteed on national level by Czech Oncological Society and Masaryk Memorial Cancer Institute
2. Initial phase assessed aims and topics of the project and developmental team addressed both theoretical and realization phase of the project.
3. Strategic technology decision was made
4. project team was definitely established

To this date, there were no negative circumstances or drawbacks that can hold up the working plan.

Team building

Project coordinators offered participation in the project to software developers, HTA specialists and physicians working in the field of oncology. The team will be working both in the Faculty of Medicine (FM) and Masaryk Memorial Cancer Institute (MOÚ). The proposal for the 1st phase of the project is as follows:

- *Project coordinators*: L. Dušek, J. Vydlák
- *SW developers, IT specialists*: P. Brabec, D. Klimeš, M. Brož
- *HTA specialists, physicians*: O. Coufal, P. Andres, J. Koptíková
- *Publication plan*: J. Koptíková

The above listed team is to be expanded after theoretical phase of the project by operating IT specialists of MOÚ. Project team was built under the guarantee of the director of MOÚ and the dean of FM.

Working plan was based on regular meetings and workshops (theoretical base) focused on three major topics:

1. Project documentation, initial publications
2. SW development, SW architecture
3. Implementation into hospital information system of MOÚ

Other negotiations (12/2004 – 01/2005)

All the negotiations were arranged as initial presentation of project goals and aims to leading professionals of Czech oncology. All meetings resulted in full agreement and acceptance of project plan, or in promised collaboration, professional support, etc.

1. Head of Czech Oncological Society, prof. Vorlíček
2. Board of Czech Oncological Society acknowledged the project as official research platform granted by AMGEN (January 2005) and agreed with proposed team, institutional background and external reviewers/guarantees.
3. Director of Masaryk Memorial Cancer Institute accepted written contract and agreed with operational initiation of the project in the institute
4. Renowned representatives of Czech Oncological Society and Czech Hematological Society, as well.

Task I.
Theoretical background, publication plan

12/2204 – 01/2005: Two initial meetings aimed on early publication plan, namely:

- Review of international literature with key words "HTA", "Oncology", "Dose intensity", "Dose density": J. Koptíková, O. Coufal. L. Dušek (supported by J. Vydlák)
- Initial phase of monographic work (still in progress) of this Status Report (Working Title: *Dose Intensity as Indispensable Endpoint of Computerized Health Technology Assessment in Oncology: Efficacy and Safety Measures*).
  - Editorial proposal
    - *PART I. (Medical)* Introduction. Importance and potential benefits of dose-oriented approach in health care assessment. Consequences for organization and optimization of anti-tumour therapy. Comparative evaluation of time-related therapeutic plans in different fields of oncology.
    - *PART II. (HTA)* HTA principles and methodology from the viewpoint of dose-intensity evaluation. Comprehensive parametric set for relevant evaluation of therapeutic plans. Prospective and retrospective approach.
    - *PART III. (Computer assisted evaluation)* Software solution for data processing without support of institutional information systems. IT solution and guideline for implementation "inside" health care institutions.
    - *PART IV (Comprehensive, case studies).* Model evaluation of clinical data focused on dose approach. Prospective evaluation in pediatric oncology. Novel dose-related biomarkers of efficacy and safety measures.
- Presentation of project strategy and first outcomes in congress BOD (May, 2005): the biggest Czech congress focused on oncology. Proposed title of the presentation (lecture): "*Project DIOS: Computerized Dose Approach in Prospective and Retrospective Monitoring of Efficacy in Anti-Tumour Therapy*".

Task II.
Masaryk Oncology Institute as model health care institution

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12/2204 – 01/2005: Several operational workshops that opened key topic of the project: model implementation of dose-oriented monitoring approach to hospital information system. Final target: automatic data processing and evaluation implemented directly in every day routine of the institute.

Conclusions are summarized in enclosed figures 1 – 3:

- Dose-intensity monitoring cannot be separated from complex measures of health care results, safety and quality, as well:
  - WHO is treated: risk stratification of patients, prognostic factors.
  - HOW is treated: therapeutic strategy, therapeutic plans
  - WHAT are the results: markers of therapeutic response and short term surviving, overall results.
  - WHY there were changes, problems (if any): safety measures, AE monitoring.
- Dose intensity monitoring in every day operation of hospital can be viewed as "black-box" with data inputs and outputs. Black box functionality can be managed both prospectively and retrospectively. In order to implement the evaluation inside the system, we must define data interface for dose monitoring – it is to be closely associated with CHT/RT planning.
- Implementation into hospital information system must respect modular organization of data sources (Fig. 1). We propose the solution through "core parameters", i. e. minimum set of descriptors, necessary for evaluation and their connections via data links to separated modules. These modules have already been defined including their role in DI monitoring.
- Dose intensity monitoring must by analytic, not simply descriptive. The proposal will be oriented rather to *benchmarking approach* as opposed to simplified evaluation of absolute numbers. We need simultaneously processed multivariate set of markers, informing about reality in therapeutic plans as well as reasons for violation, problems. All longitudinal data must be related to final descriptors in order to assess the level of risk and consequences for therapeutic results.

Task III.
Software development

12/2204 – 01/2005: Several meetings of SW developers, aimed to two topics.
1/ implementation into hospital information system
2/ technological solution for local SW tool (DIOS SW)

- Proposed solution of system DIOS consists of two main components. First is web application interfering data gathered using web data forms (data-management system), second consists of automated analytical and presentation tools (data browser, presentation tools, automated summaries). First one should be web application using Oracle 9i database and ASP technology on the server side. Data can be viewed, entered and modified using MS Internet Explorer 5.5 or higher. Second part of the system (local services) is developed with MS Visual C++ 6.0.
  => on-line solution is definitely proposed, as effective and flexible tool

- **Data-management system** will be created in standardized developmental environment that finally allows quite prompt building of on-line register from prearranged standard components. This

environment allows very flexible modification of register parametric structure according to actual needs (= very suitable for monitoring of therapeutic plans, with changed preparations, dosage or timing). System for data collections requires only MS Internet Explorer, no more local software. Data acquisition will be fully transparent and user friendly.

- **Security** of the proposed system will be ensured through four basic elements
  - Organizational and local restriction of access to database servers
  - Precise defining of individual users' rights and security of entry accounts administration politics.
  - Protocol monitoring of all events, updates or common administration's activities over central databases
  - Firewall protection of central database and of the whole local network.
  - Coding of all network communication using standard 128-bit SSL protocol.

  Server with ORACLE database will be completely separated from external network and access is possible only from local network, protected by firewall. The system of access rights will be defined by database administrator directly in ORACLE environment. Rights of individual users can be strictly specified according to needs and professional experience of the user. Only selected users, participating on a given project, have the access rights to internal data of submitter. These users are controlled not to share information in process to third party, any violation of the rules is forbidden. For data transfer, external disks connected directly to a server are being used.

- Analytical outputs and other services will be provided as **local services** by local SW. the proposl is to develop automatic system for statistical processing (complex statistical analysis generated in set of pre-prepared slides, working actively over central database). In this way we can guarantee final and comprehensive outputs for scientists and clinicians that participate in the project, the analyses provided in real time, automatically and on validated data.

- Main advantage of this online solution is direct centralization of collected data on shared fully secured database server. The process of application upgrade is also trouble free; web application changes are available immediately to all connected centres. A partial disadvantage is the dependence of solution on internet connection of data-collecting centers.

The proposed system will be very suitable even during project solution, it should be set on real routine during pilot case studies planned in the project.

Software development: preliminary technological conclusion

SW solution for case studies or individual monitoring without support of hospital information systems: on-line technology, web-form data interface + local analytical service via automated tools.

IT implementation into hospital information system: model solution as developed on MOÚ, implementation of parameters directly into data modules of hospital information system + client-type SW for automated data processing

Connectivity to different hospital information systems:

- Not dependent on type of the system, but on parametric structure or data model of its databases. If all required parameters are accessible for export, connectivity will be ensured automatically.

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Most important future tasks (01 – 02/ 2005)

1. To finalize editorial proposal of monographic issue /chapters, authors, brief summary, introduction/
2. To define minimum "core" set of parameters that form frame for dose-intesity monitoring and interpretation of outputs
3. To carry out audit of data sources in Masaryk memorial Cancer Institute and to define technological strategy for implementation of DI monitoring.
4. To develop project documentation for software tool (SW architecture, functionality, technology, data interface, ...)

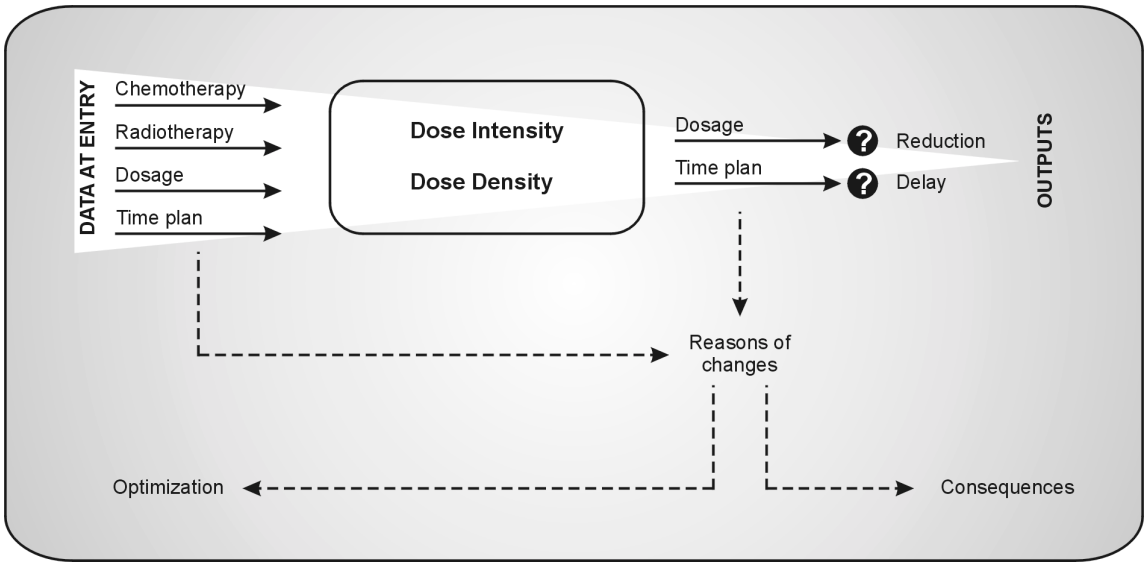

Fig. 1.: Dose intensity as challenging „ black-box" in complex evaluation of anti-tumour therapy

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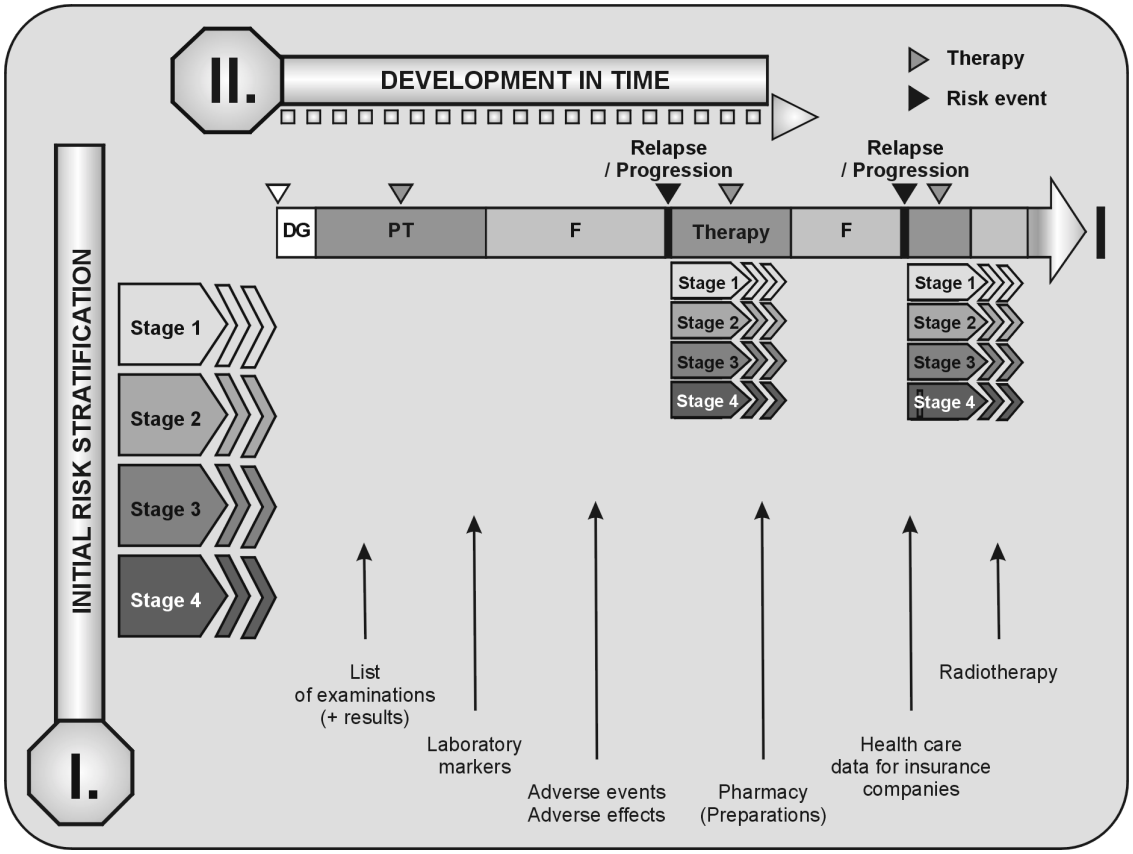

Fig. 2.: List of data modules involved in complex examination

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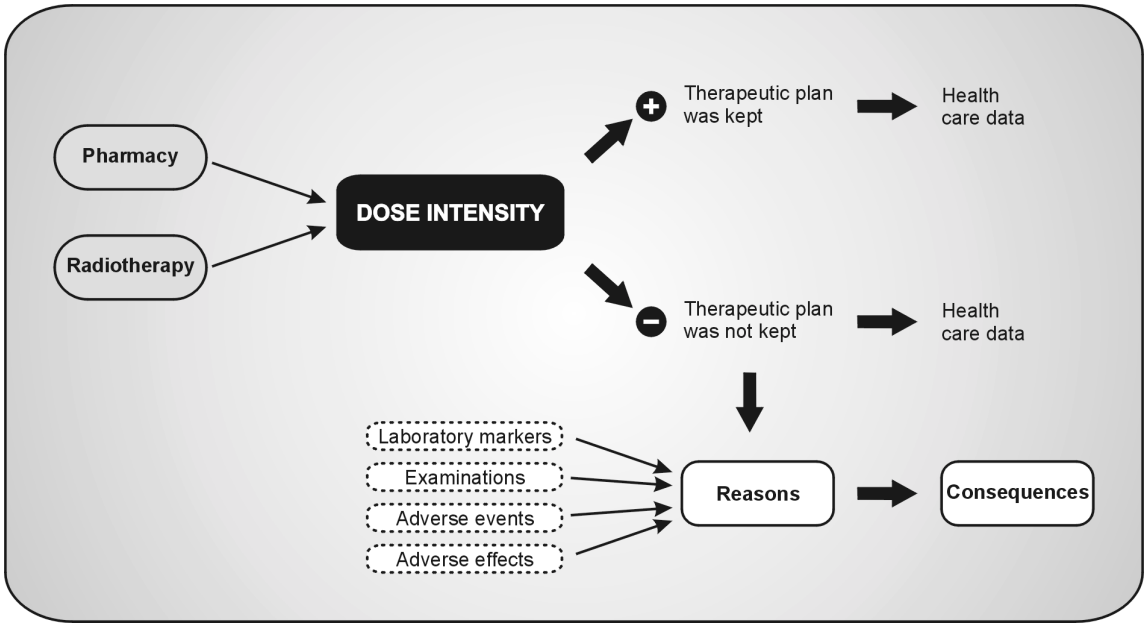

Fig. 3.: Data modules associated with dose intensity evaluation

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