

## Modern approach to automation of internal control of quality and safety of medical care

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### Abstract

**Introduction.** Heads of medical organizations operating under the Moscow Healthcare Department are the ones who take care of internal control of quality and safety of medical care [1-7]. However, once the healthcare system in Moscow switched to the Unified Medical Information Analysis System (UMIAS), abandoning all the other automated information systems the city had previously used (such as Medialog, Megaklinika, Asclepius etc.), Moscow's medical workers found it impossible to automatically unload certain statistical (analytical) reports. They have to use paper medical records and logs to register the results of the medical care quality control [1, 2, 6]. Many engineers and programmers working in Moscow's medical system organizations attempted uploading the medical record data and create automated logs within the UMIAS system; however, they failed [4, 8, 9, 10]. That is why they started creating intranet web portals, integrating them with various internal Moscow healthcare systems (such as UMIAS etc.) as well as external Federal Compulsory Medical Insurance Fund systems (like the PUMP system for personalized medical care records). This allowed logging in the results of internal quality control and automatically creating statistical and analytical reports, as well as monitoring the document exchange between various offices of Moscow healthcare organizations [11-13]. To ensure the efficiency of these intranet web portals, medical workers responsible for quality control develop checklists that feature pre-approved criteria for evaluating the results of treatment for certain diseases (conditions) in accordance with medical care provision standards and clinical recommendations. Moreover, the comprehensive introduction of intranet web portals helped ensure that clinical recommendations are followed in Moscow healthcare organizations. In fact, it allowed conducting an automated medical and economic examination, similar to the ones carried out by health insurance organizations within the framework of the compulsory medical insurance system as part of state oversight. **Goal.** To identify the main issues in organizing internal control of quality and safety of medical care associated with the introduction of intranet web portals in Moscow healthcare system's organizations. **Materials and methods.** We identified the main issues in organizing internal control of quality and safety of medical care associated with the introduction of intranet web portals in Moscow healthcare system's organizations. Moreover, we also examined the requirements for checklist development, as well as the difficulties that arise when compiling analytical reports on following the expert criteria and standards of medical care provision and clinical recommendations. **Findings.** The list of the main issues associated with the introduction of an automated system for organizing internal control of quality and safety of medical care via multi-user intranet web portals includes: training heads of structural units responsible for organizing and carrying out the internal control of quality and safety of medical care; developing checklists using the pre-approved criteria, rules and requirements for providing medical care in accordance with standards and clinical recommendations; and developing an activity plan for organizing various checks (audits) and compiling analytical (statistical) reports to assess the activities of the Moscow healthcare organizations' structural units (or employees). The checklists must feature codes of MES (medical and economic standards), ICD-10 (10th revision of the International Statistical Classification of Diseases and Related Health Problems) and medical services, as well expert criteria mentioned in acting legal documents. This is complicated by the fact that the codes of medical services in the UMIAS system differ from the codes featured in the approved medical service nomenclature, whereas expert criteria undergo frequent updates. **Conclusion.** To ensure the successful implementation of management responses, one needs to regularly host internal meetings with heads of structural units as well as employees responsible for organizing and carrying out internal control of quality and safety of medical care, and timely develop checklists in accordance with pre-approved standards, assessment criteria, rules and requirements of enforcement authorities while taking into account the latest clinical recommendations. To ensure proper control over following medical care provision standards in accordance with clinical recommendations and, therefore, avoid deductions and fines issued by oversight bodies, one needs to adopt a comprehensive approach to internal control of quality and safety of medical care at every level (stage), including heads of department, deputy chief doctors, deputy heads for clinical expert work etc.

**Keywords:** intranet web portal; quality control; levels of control; control automation; analytical reporting.

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## Современный подход к автоматизации внутреннего контроля качества и безопасности медицинской деятельности

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### Аннотация

**Введение.** Необходимость организации внутреннего контроля качества и безопасности медицинской деятельности возложена на руководителя медицинской организации Департамента здравоохранения города Москвы (далее – МО ДЗМ) [1-7]. Однако после перехода в единую медицинскую автоматизированную информационную систему и отказа от всех ранее используемых в МО ДЗМ автоматизированных информационных систем (Medialog, Megaklinika, Asclepius и др.) медицинские работники МО ДЗМ столкнулись с невозможностью автоматизированной выгрузки части статистических (аналитических) отчетов. Фиксация результатов внутреннего контроля качества медицинской помощи осуществляется на соответствующих бумажных картах и журналах [1, 2, 6]. В этой связи многие инженеры и программисты МО ДЗМ попробовали загрузить данные карт и создать автоматизированные журналы в системе ЕМИАС, но их попытки не увенчались успехом [4, 8, 9, 10]. Поэтому они стали создавать интранет web-порталы в МО ДЗМ и интегрировать их с различными внутренними системами МО ДЗМ (ЕМИАС и др.) и внешними системами ФОМС (ПУМП и др.), позволяющими фиксировать результаты внутреннего контроля качества, автоматически формировать статистический и аналитический учет, контролировать движение медицинской документации между различными структурными подразделениями МО ДЗМ [11-13]. Для результативной работы интранет web-порталов ответственные медицинские работники внутреннего контроля качества и безопасности медицинской деятельности (ВККиБМД) МО ДЗМ разрабатывают «чек-листы» с утвержденными критериями оценки результатов лечения по различным заболеваниям (состояниям), в соответствии со стандартами оказания медицинской помощи с учетом клинических рекомендаций. Кроме этого, комплексное внедрение интранет web-порталов в МО ДЗМ обеспечило соблюдение клинических рекомендаций в МО ДЗМ. Данный процесс фактически реализовал возможность проведения автоматизированной медико-экономической экспертизы наподобие проводимой страховыми медицинскими организациями в системе обязательного медицинского страхования при осуществлении государственного контроля. **Цель.** Выяснить основные вопросы организации внутреннего контроля качества и безопасности медицинской деятельности, связанные с внедрением интранет web-порталов в медицинских организациях Департамента здравоохранения города Москвы. **Материалы и методы.** Были выявлены основные вопросы организации внутреннего контроля качества и безопасности медицинской деятельности, связанные с внедрением интранет web-порталов в МО ДЗМ. Кроме этого, были изучены требования к разработке «чек-листов» и сложности при создании аналитических отчетов по результатам соблюдения экспертных критериев и стандартов оказания медицинской помощи с учетом клинических рекомендаций. **Результаты.** К основным вопросам внедрения системы автоматизированного ВККиБМД с многопользовательским интранет web-порталом относят: обучение руководителей структурных подразделений, ответственных за организацию и проведение ВККиБМД; разработку «чек-листов» с учетом критериев оценки, правил и требований, предъявляемых к оказанию медицинской помощи, стандартов медицинской помощи с учетом клинических рекомендаций; совершенствование плана мероприятий по проведению различных проверок (аудитов); формирование аналитических (статистических) отчетов для оценки деятельности структурных подразделений (работников) МО ДЗМ. Что касается «чек-листов», то в них обязательно должны содержаться коды медико-экономических стандартов (далее – МЭС), коды Международной классификации болезней 10 пересмотра (далее – МКБ-10), коды медицинских услуг и экспертные критерии, имеющиеся в действующих нормативно-правовых документах РФ. Это осложняется тем, что коды медицинских услуг в системе ЕМИАС не соответствуют утвержденной номенклатуре медицинских услуг, а экспертные критерии часто обновляются. **Заключение.** Для организации результативных мер управленческого характера необходимо систематически проводить внутренние совещания с заведующими структурными подразделениями (отделениями), ответственными работниками за организацию и проведение ВККиБМД, своевременно разрабатывать «чек-листы» с учетом утвержденных стандартов, критериев оценки, правил и требований контрольно-надзорных органов с учетом обновляющихся клинических рекомендаций. Единый подход к организации работы ВККиБМД на всех уровнях (этапах) контроля (заведующие отделений, заместители главного врача по профилям, заместитель главного врача по КЭР и др.) обеспечит контроль за соблюдением стандартов оказания медицинской помощи с учетом клинических рекомендаций и приведет к уменьшению применения удержаний и штрафных санкций со стороны контрольно-надзорных органов.

**Ключевые слова:** интранет web-портал; контроль качества; уровни контроля; автоматизация контроля; аналитическая отчетность.

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## Introduction

Heads of medical organizations operating under the Moscow Healthcare Department are the ones who take care of internal control of quality and safety of medical care [1-7]. However, once the healthcare system in Moscow switched to the Unified Medical Information Analysis System (UMIAS), abandoning all the other automated information systems the city had previously used (such as Medialog, Megaklinika, Asclepius etc.), Moscow's medical workers found it impossible to automatically unload certain statistical (analytical) reports. They have to use paper medical records and logs to register the results of the medical care quality control [1, 2, 6]. Many engineers and programmers working in Moscow's medical system organizations attempted uploading the medical record data and create automated logs within the UMIAS system; however, they failed [4, 8, 9, 10]. That is why they started creating intranet web portals, integrating them with various internal Moscow healthcare systems (such as UMIAS etc.) as well as external Federal Compulsory Medical Insurance Fund systems (like the PUMP system for personalized medical care records. This allowed logging in the results of internal quality control and automatically creating statistical and analytical reports, as well as monitoring the document exchange between various offices of Moscow healthcare organizations [11-13]. To ensure the efficiency of these intranet web portals, medical workers responsible for quality control develop checklists that feature pre-approved criteria for evaluating the results of treatment for certain diseases (conditions) in accordance with medical care provision standards and clinical recommendations. Moreover, the comprehensive introduction of intranet web portals helped ensure that clinical recommendations are followed in Moscow healthcare organizations. The methods used for automated comparison of data (codes of MES (medical and economic standards), ICD-10 (10th revision of the International Statistical Classification of Diseases and Related Health Problems) and medical services featured in the medical service provision standards, expert criteria of assessment and clinical recommendations etc.) allowed compiling analytical reports. These reports contain data on failures to provide medical care and (or) unnecessary provided medical services, structural units of medical professionals who failed to provide the care. This allowed to develop management and organizational measures to address the logged issues by involving heads of departments (1st level of control), deputy chief doctors (2nd level of control), medical specialists perpetrating these violations, ensuring

the automation of production (technological) processes for monitoring the compliance with expert criteria and standards for medical care provision as well as clinical recommendations. This process allowed conducting an automated medical and economic examination, similar to the ones carried out by insurance medical organizations within the framework of the compulsory medical insurance system as part of state oversight.

## Goal

To identify the main issues in organizing internal control of quality and safety of medical care associated with the introduction of intranet web portals in Moscow healthcare system's organizations.

## Materials and methods

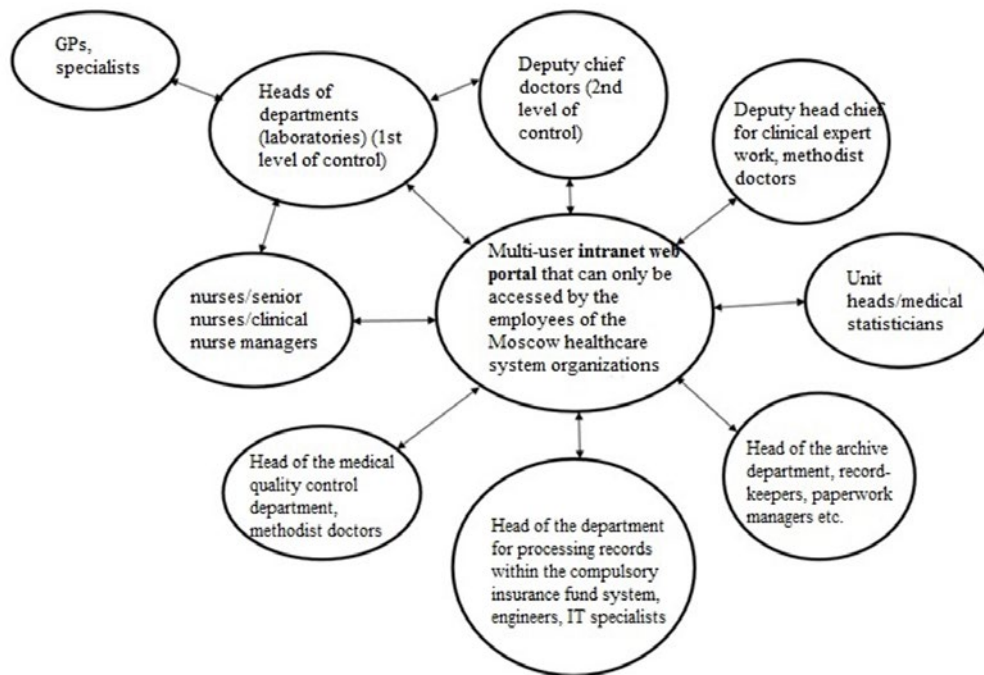
The authors identified the main issues in organizing internal control of quality and safety of medical care associated with the introduction of intranet web portals in Moscow healthcare system's organizations. Moreover, they also examined the requirements for checklist development, as well as the difficulties that arise when compiling analytical reports on following the expert criteria and standards for medical care provision and clinical recommendations.

## Findings

The authors identified the main approaches of those participating in the Moscow healthcare organizations' automated system for managing the internal control of quality and safety of medical care via multi-user intranet web portals. Scheme 1.

**Scheme 1.** Scheme of interaction between those participating in the automated system for managing the internal control of quality and safety of medical care via intranet web portals.

**Схема 1.** Схема взаимодействия участников системы автоматизированного внутреннего контроля качества и безопасности медицинской деятельности в интранет web-порталах



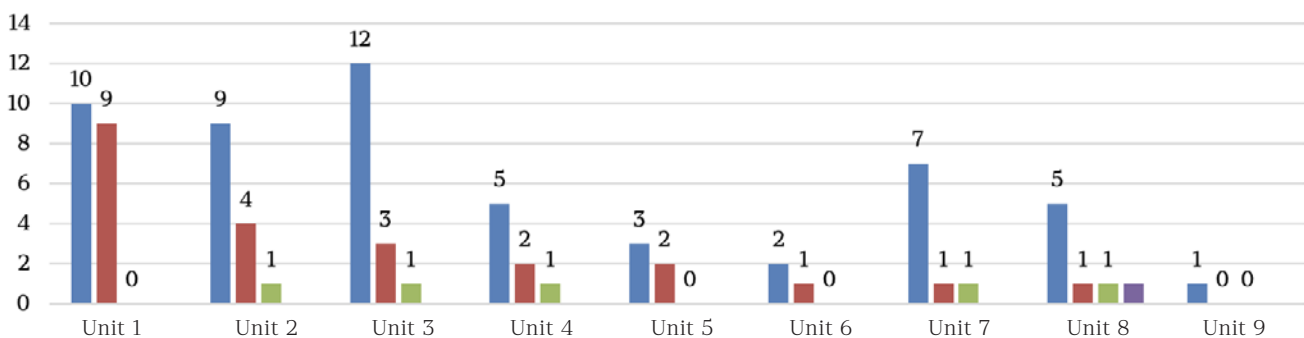
The analysis results helped identify an issue that is very important at early stages: the collaboration between deputy heads for clinical expert work, heads of departments for internal control of quality and safety of medical care as well as methodist doctors with engineers and IT department programmers. At this stage, they draw up technical projects describing

the stages of work, the employees' functional responsibilities while working with the web portal, as well as logistics. At later stages, the interaction between IT departments with heads of departments and deputy chief doctors becomes increasingly important. This is when checklists and management measures are developed.

**Figure 1.** Results of internal control of quality and safety of medical care (by units).

**Рисунок 1.** Результаты внутреннего контроля качества и безопасности медицинской деятельности (по отделениям)

**Report by units. Total violations identified during the analysis of compliance with the standards, clinical guidelines and evaluation criteria in providing medical care to patients with intracranial injuries (abs.)**



- The total number of patients diagnosed according to ICD-10, choice S06, 54 total
- The number of violations of the Russian Healthcare Ministry Standard dated 7.11.2012 No. 636n "On approving the standard for providing specialized medical care to intracranial injury patients", 25 total
- The number of violations of the Russian Healthcare Ministry Standard dated 10.05.2017 No. 203n "On approving the criteria for evaluating the quality of medical care", 5 total
- The number of violations of the 2014 Clinical recommendation, "Treating intracranial injury patients", 1 total

The introduction of a multi-user intranet web portal allows monitoring the exchange of medical records between the organizations' structural units (clinical units, diagnostic and morbid anatomy departments, archives etc.) as well as carrying out retrospective analysis of medical records at all stages (levels) of control, thus ensuring proper control over compliance with standards and criteria for evaluation of medical care in accordance with clinical recommendations. Moreover, intranet web portals allow keeping various electronic logs and generating analytical (statistical) indicators of the Moscow healthcare system organizations. Figure 1 shows that unit 5 had the most patients with intracranial injury; however, unit 1 had the largest number of violations of the standards for providing medical care to patients with intracranial injuries.

## Conclusion

The introduction of a multi-user intranet web portal will allow monitoring the exchange of medical records between the organizations' structural units (clinical units, diagnostic and morbid anatomy departments, archives etc.), keeping record of all violations in filling in medical records and failures to follow the standards of providing medical care in accordance with clinical recommendations, and timely mitigating violations. This will allow reducing the number of deductions and fines issued by oversight bodies, thus ensuring better compliance of medical workers with the standards of providing medical care according to clinical recommendations.

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