External evaluation of the project “Regionalization of the Paediatric Emergency and Intensive Care Medical Services System in Moldova (REPEMOL)”

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Acknowledgments

This report is the product of an external evaluation of the project “Regionalization of the Paediatric Emergency and Intensive Care Medical Services System in Moldova (REPEMOL)”. It has been implemented by the Centre for Health Policies and Services (CPSS) from Bucharest, Romania, with financial support from the Swiss Agency for Development and Cooperation (SDC) through a local project implementation office in Chisinau.
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We are hopeful that the findings and recommendations of this evaluation will help to ensure the continued support of SDC, MoH, REPEMOL and all health staff to improve the safety of children from accidents and injuries as well as the delivery of emergency care throughout the country ultimately saving the lives of children in Moldova.

Chisinau, May 2017,
Andreas Hansmann
Susanne Carai

Acronyms

AMED	Agenţia Medicamentului şi Dispozitivelor Medicale (Drug and Medical Device Agency)
BCC	Behavioural Change Campaign
CNAM	Compania Naţională de Asigurări în Medicină /National Health Insurance
CPAP	Continuous Positive Airway Pressure
CPSS/ CHPS	Centre for Health Policies and Services
DRG	Diagnosis Related Groups
ED/UPU	Emergency Department
ETAT	Emergency Triage Assessment and Treatment
FD	Family Doctor
GP	General Practitioner
HFNC	High-Flow Nasal Cannula
HTM	Health Technology Management
IDH	Infectious Diseases Hospital for Children Chisinau
IEC	Information, Education, Communication
ICU	Intensive Care Unit
KAP	Knowledge, Attitudes, Practices survey
MCIH	Mother and Child Institute Hospital
MDGs	Millennium Development Goals
MoH	Ministry of Health
NCPEC	National Centre of Pre-hospital Emergency Care
PALS/SVAP	Paediatric advanced life support/ Suport Vital Avansat Paediatric
QM	Quality Management
REPEMOL	Regionalization of Paediatric Emergency and Intensive Care Services in Moldova
SCO	Swiss Cooperation Office in Moldova
SDC	Swiss Agency for Development and Cooperation
SDGs	Sustainable Development Goals
SIMDM	Information System for Management of the Medical Devices (Sistem Informational pentru Managementul Dispozitivelor Medicale)
V. Ignatenco	V. Ignatenco Trauma and Surgical Hospital for Children in Chisinau

Executive summary

Background
SDC has been supporting the reform of the paediatric emergency care system in Moldova through the REPEMOL project since September 2008. Through an international tender, SDC mandated the Centre for Health Policies and Services (CPSS) from Bucharest, Romania, to implement the project, for which a local project implementation office was set up in Chisinau.
The overall project goal is to increase the chances of survival of children that need emergency medical services and the prevention of children's accidents and injuries.
Methodology
The external evaluation used a generic framework to assess the logical relationships between inputs, processes, outputs, outcomes, and impact, and sustainability of the project. During in-country work primary data was collected - obtained through interviews with health care managers and providers and other key informants - using with semi-structured questionnaires, focus group discussions and direct observation. Secondary data was gathered from progress reports, reports of previous missions and reviews and national level data.
Findings
Relevance and input:
The projects´ objectives, plans and activities are aligned with national and international goals and strategies. The project is in line with the country strategies related to health or health services and also with the country international commitments and goals. Plans, activities and inputs are consistent with their intended outputs and outcomes (impact).
Efficiency and process/output:
The project achieved adequate coverage with the set-up of five ICUs and EDs in three regions and by supporting the set-up of EDs in seven rayonal hospitals. Recently there has been a MoH order to mandate the establishment of EDs in all rayonal hospitals, which will ensure nation-wide coverage in the future. The project worked efficiently, carrying out the activities according to the plan using available resources efficiently and in close collaboration with MoH, and other collaborating institutions. The project was implemented in a responsive manner making good use of presenting opportunities beyond the initial plan.
Effectiveness and outcome:
The project improved access to services at the regional level, both in terms of geographical access and in terms of access to services of improved quality. However, inefficiencies of the current system are very likely due to underutilization of primary health care, overuse of EDs for specialist consultations and over-hospitalization as well as likely use of ambulance services with specialized medical personnel for transport of patients that could be transported without medical supervision or private transport. While there are national treatment guidelines (10 paediatric protocols and 48 algorithms) on paediatric conditions published in 2012, which were developed by national experts with support from REPEMOL in an effort to increase evidence-based treatment, these do not consistently correspond to international treatment guidelines and are not always based on the latest evidence.
Sustainability:
The project used available resources efficiently and – given it is well integrated into the existing infrastructure of the health care system and has strong support of the Ministry of Health, outcomes are likely to be sustained beyond the end of the project. Changes at policy level have been endorsed and institutionalized by the Government of Moldova. A detailed cost-effectiveness study is being carried out contemporarily and detailed information on cost-efficiency and effectiveness will become available in a separate report.
Impact:
The impact of the project could not be fully assessed, as the evaluation was done prior to the end of the project with results of critically important surveys still awaited. There are indirect indicators that awareness of parents, caretakers and health professionals on how to prevent

accidents have increased and barriers to quality emergency care has been reduced. Pre-hospital care has started to benefit from the regionalised approach in the North of the country, whilst regional hospitals throughout Moldova offer vastly improved facilities for emergency and intensive care of children.

Conclusion and recommendations

Much has been achieved by REPEMOL across the chain of emergency care from awareness on accident prevention, implementation of pre-hospital emergency care, emergency care in hospitals as well as access to intensive care for children in Moldova. Many of these improvements were spearheaded by or carried out with support of the REPEMOL project, which operated well integrated within the Moldovan health care system. We have found a still partly inefficient paediatric hospital care system that risks diminishing the effects of the investments made. To avoid unnecessary presentation to hospital emergency departments, unnecessary hospital admissions and unnecessary PICU admissions, further investments in terms of training, implementation of evidence based guidelines, quality improvement efforts and change of health care incentives would be needed.

Many challenges remain in the health care system in Moldova, and improving the care of sick and injured children is one of them.

Background

SDC has been supporting the reform of the paediatric emergency system in Moldova through the REPEMOL project since September 2008. Through an international tender, SDC mandated the Centre for Health Policies and Services (CPSS) from Bucharest, Romania, to implement the project, for which a local project implementation office was set up in Chisinau.
The overall project goal is to increase the chances of survival of children that need emergency medical services and the prevention of children's accidents and injuries. In order to reach the overall goal, the intervention strategy for the third phase aims to achieve the following outcomes:

Outcome 1:
Mothers, fathers, foster parents, other caregivers and communities have improved the supervision of their children, prevent both domestic and traffic accidents and know how and when to use appropriate emergency services.

Outcome 2:
Children in need have improved access to effective and efficient pre-hospital care in case of an emergency.

Outcome 3:
Regionalized paediatric hospital care is available and accessible to Moldovan children.

Outcome 4:
A responsive health system, with improved national policies and regulations regarding all levels of paediatric care.

Currently, the project is getting close to its end. It is thus important to document the results, lessons learned and challenges. Therefore, SDC decided to commission an external evaluation of the project.

Objectives of the evaluation

The general objective of the evaluation is to assess the project's results to date, including positive and negative, primary and secondary, intended or unintended long-term effects, produced directly or indirectly by the project during the entire period of implementation. In this respect, the main specific objectives of the evaluation are the following:

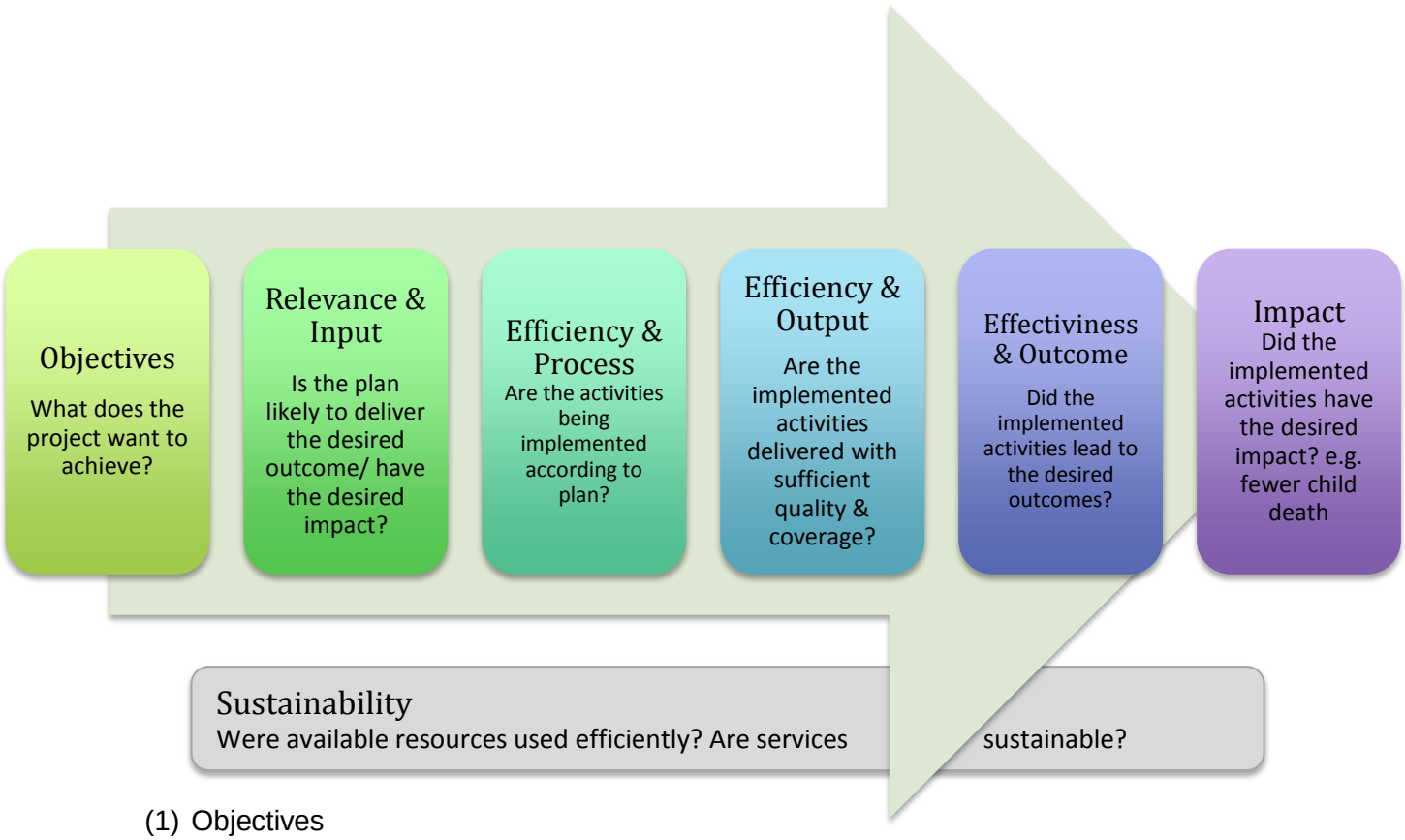
- To assess the model of regionalized paediatric emergency care in terms of its effectiveness and efficiency in improving the access and utilization of paediatric pre-hospital and hospital care and the quality of services provided at all levels of care.
- To assess and document the behaviour change of mothers, fathers, foster parents, other caregivers and communities towards improved supervision of the children, better prevention of accidents and usage of appropriate emergency services.
- To assess the effect of the project interventions at policy level on the health system responsiveness to the Moldova population needs regarding paediatric care in general and emergency services in particular.

Methodology

Evaluation process

The qualitative evaluation will enquire the following questions (Figure 1):

Figure 1: Conceptual framework guiding the evaluation



(1) Objectives
What did the project want to achieve?
(2) Relevance & Input
Is the plan likely to deliver the desired results (outcome)/ have the desired impact? What was planned to be implemented?
(3) Efficiency & Process
Are the activities being implemented according to plan?
(4) Output
Were the implemented activities delivered with sufficient quality and coverage?
(5) Effectiveness & Outcome
Did the implemented activities lead to the desired outcomes? E.g. improved access
(6) Impact*[1]
Did the implemented activities have the desired impact? If so, what are the lessons learnt? If not, what needs to be done differently?
(7) Sustainability & Cost

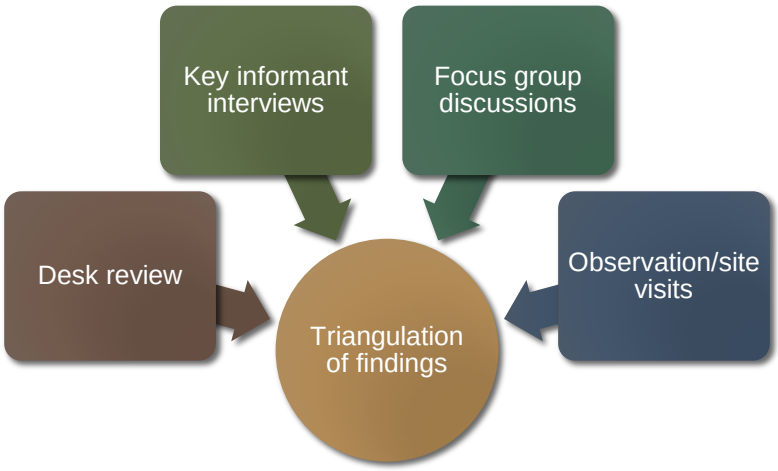
[1] *Given the scope of the review no full impact analysis will be possible, however, questions on perceived impact and plausible causes will be discussed with stakeholders

Were available resources used efficiently? Are services sustainable? If not, why not? Could available resources be used more efficiently?

Methods

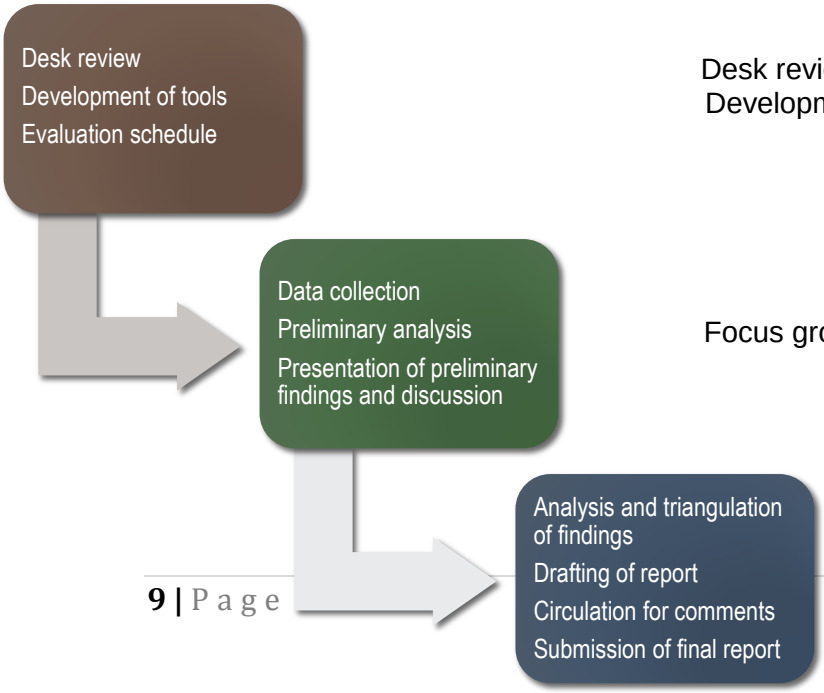
Methods used to enquire into these questions are depicted in Figure 2. They included a desk review of relevant documents and information, site visits to paediatric services, selected health services and other partners, in-depth interviews and focus group discussion with key informants such as policy-makers, health care providers, as well as patients and carers and affected communities.

Figure 2: Evaluation methods I



The evaluation process is summarized in Figure 3 and included three phases:
Firstly, the preparation phase with the desk review, development of the evaluation schedule and tools.
Secondly, the in-country phase for data collection, preliminary analysis of findings and a presentation of preliminary results and recommendations.
And thirdly, the reporting phase for the analysis and triangulation of findings, preparation of a draft report, its circulation for comments to relevant stakeholders and the submission of final report.

Figure 3: Evaluation Methods II



Preparatory phase
Desk review of available information and documents
Development of evaluation tools and questionnaires
Ethical clearance
Agreement on evaluation schedule

In-country phase
Data collection:
Key informant interviews;
Focus group discussions and observation/ site visits
Preliminary analysis
Presentation of findings and discussion

Collation and reporting phase
Analysis and triangulation of findings

Drafting of report
Circulation for comments
Submission of final report

Ethical Considerations

While designing the evaluation methodology, the UNEG ethical guidelines[2] for evaluations was consulted and the following principles were followed throughout the evaluation:

- Evaluation procedures (focus group discussions and key informant interviews) were kept as brief and convenient as possible to minimize disruptions in respondents' life and work processes
- Participants of focus group discussions and key informants were informed about the purpose of evaluation, the process and duration of interview and/or FGD and consent was obtained
- Respondents were also informed about confidentiality and their rights to retain from answering any questions and discontinuing the interviews /discussions at any time
- Identities of key informants and participants of focus groups discussion will not be revealed nor statements attributed to a source
- Information were analysed and findings reported accurately and impartially

Limitations of the evaluation

We acknowledge a number of limitations that have had an effect on this evaluation. The evaluation was carried out over a brief time period, which limits the justice that the results can do to such a complex and multi-facetted project implemented over many years. We only talked to selected key informants and stakeholders, whilst the project interacted with many more and had many beneficiaries. We are thankful for the expert translation provided throughout the visit but acknowledge the potential risk of misinterpretation and loss of information. Equally, we were only able to review and appreciate documents and legislation that were written in or translated into English, while many more documents in Romanian remained out of reach.

[2] http://www.unevaluation.org/document/detail/102

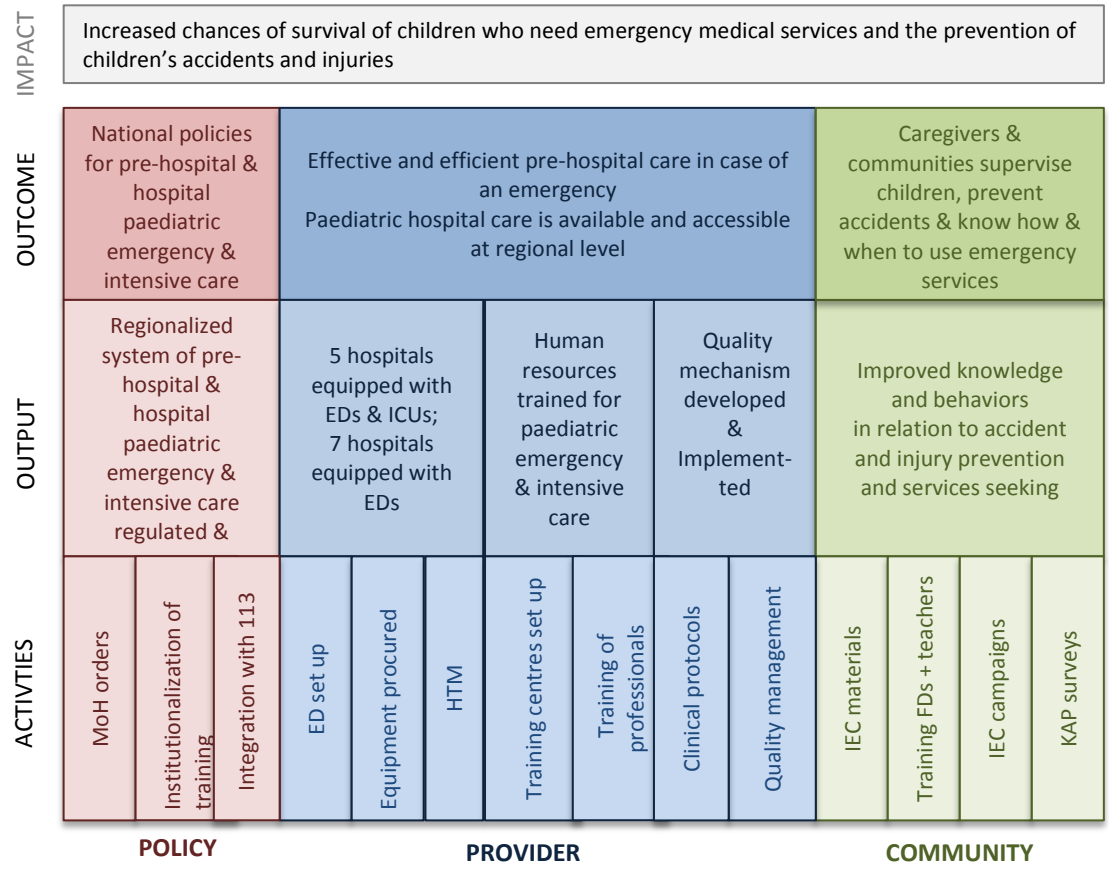
Findings

(1) Objective

What did the project want to achieve? What was planned to be done?

The overall project goal is to increase the chances of survival of children who need emergency medical services and the prevention of children's accidents and injuries. The project plan includes the creation of regional paediatric emergency centres in Bălți serving the Northern Region, in Chisinau serving the Central Region and in Cahul, serving the Southern Region of Moldova by setting up emergency departments (EDs) and establishing and/or upgrading intensive care units (ICUs) for children. In addition, emergency departments were to be set up in several rayonal hospitals. The sub-sequent phases of the project were to focus on improving pre-hospital care/ambulance services and information campaigns to increase awareness and change the health-seeking behaviour of caretakers.
The project aimed to combine top-down and bottom-up approaches, by providing multiple level interventions (policy, provider and community level), multiple types of actions (legislation changes, innovative services, modern equipment, new tools for quality control, an emphasis on capacity building for health care professionals, behaviour change campaigns for the general population) and multiple layers of interventions (national, regional and local actions).
An overview of activities, outputs and outcomes can be found in Figure 4 below.

Figure 4: Overview of activities, outputs and outcomes of REPEMOL project



(2) Relevance & Input

Is the plan likely to deliver the desired results (outcome)/ have the desired impact?

The projects´ objectives, plans and activities are aligned with national and international goals and strategies. The project is in line with the country strategies related to health or health services and also with the country international commitments and goals, such as the National Policy for Health of Moldova (2007 – 2021)[1], the Hospital Master Plan 2009 – 2018[2], as well as the Millennium Development Goals (MDGs) and their successors the Sustainable Development Goals (SDGs). The project answers a direct request formulated by the Moldovan Ministry of Health, and the local partners and it is in line with the SDC Cooperation Strategy 2010-2013 and 2014-2017 in Republic of Moldova.[3] Prior to the joint SDC and Government initiative to improve emergency care in Moldova, no dedicated emergency departments existed in the country, neither for adult nor paediatric care.

Plans, activities and inputs are consistent with their intended outputs and outcomes (impact). Regionalization is to be understood in terms of centralization from rayon to regional level for ambulance-services and paediatric emergency care as well as de-centralization of intensive care from Chisinau to regional level. It is a logical and rational approach to paediatric emergency care within the geographic and socio-economic context of Moldova and aligned with the above-mentioned government policies.

All of the 6 paediatric ICUs that benefited from REPEMOL support were renovated using funds generated by MOH whilst equipment required for paediatric intensive care and piped oxygen was supplied by REPEMOL. Overall the inputs in terms of equipment provided by the project was adequate for the Moldovan context and the outcomes that are intended to be achieved. Detailed assessments of equipment purchased can be found elsewhere (see REPEMOL tender evaluation documents[4]). An overview over all equipment purchased and distributed can be found in Annex 2 and 3.

In relation to the objective on prevention of injuries and accidents by improving knowledge and behaviours of caregivers and communities, a multi-pronged, collaborative approach has been taken and the plan and input seem overall strategic and adequate for the objective.

The logic model guiding the interventions is depicted below. While it encompasses all necessary areas and interventions, it lacks an explicit focus on quality of paediatric hospital care (in italics noted in Figure 5). For more observation on quality of care please refer to section on efficiency.

Figure 5: Logic model guiding the implementation of the REPEMOL project

<table>
<tr><th>Intervention</th><th>Determinants</th><th>Outcomes</th><th>Impact</th></tr>
<tr><td>Equipment procurement/ renovation</td><td>Ambulance systems, Competent service providers Equipment and drugs</td><td>Access to effective and efficient pre-hospital care in case of an emergency (1)</td><td rowspan="4">Reduced pre-/ hospital child mortality / improved survival

Reduced incidence of accidents and injuries</td></tr>
<tr><td>Trainings/ Health promotion/ first aid curriculum, / Educational materials</td><td>ED, ICU, general paediatrics Competent service providers Equipment and drugs</td><td>Paediatric hospital care is available and accessible at regional level (2) (quality?)</td></tr>
<tr><td>Prevention campaign road & domestic accidents</td><td>Patient ability to use services Community awareness and support</td><td rowspan="2">Caregivers & communities supervise children, prevent accidents & know how & when to use emergency services (3)</td></tr>
<tr><td>Policy documents /MoH order</td><td>Policies and regulations (4)</td></tr>
</table>

Numbers in () refer to the outcomes as outlined in the project plans

(3) Efficiency & Process

Are the activities being implemented according to plan?

The REPEMOL project has been well integrated into the existing health care system, through close collaboration with the MoH as well as a cost-sharing approach, e.g. SDC purchased the ED and ICU equipment and provided piped oxygen in hospitals while the respective hospitals secured funding for the renovation and creation of a suitable physical environment for emergency care. The project took also advantage of arising opportunities, such as collaboration with the police department on road safety campaigns and the SDC´s Healthy Generation project on awareness raising among young people to name just two occasions. REPEMOL also acted as a catalyst resulting in positive changes beyond the scope of the project by stimulating the development of a MoH order on the set-up of emergency departments in rayon hospitals and nationwide expansion of the regionalized pre-hospital ambulance service system. The gap between regulation and implementation of the regionalization noted in the Mid Term Review of the Project in 2012[5] partially still persist. Some problems related to the implementation of the regionalization derive from the historically fragmented organization of the emergency services in the country, namely the two emergency systems - *AVIASAN*[3] and ambulance services – without clear delineation of their roles. (For more information also refer to the next section). It remains unclear how the government

[3] Aviasan has been operational for a long time and originally consisted of a helicopter-based service that was dispatched from Chisinau to peripheral hospitals. More recently there has been a helicopter stationed in Romania close to the Moldovan border that offered transport and evacuation for emergency cases. Since it crashed a few years ago, there has been no air transport service available in Moldova and AVIASAN now uses ambulances to transport specialists from Chisinau to emergency cases in the districts.

approved and the European Community funded implementation of the 112 emergency-call services will affect the work that has been carried out to date.
REPEMOL also capitalized upon capacities of existing structures for awareness raising in relation to injury and accident prevention by working with public health centres who were open to take up new health promotion activities.
While the support of the project through the backstopping office in Bucharest may have been required, cost-efficient and highly useful during the inception and initial implementation phase of the project, the high relative share of the cost of the headquarters office in Bucharest for phase 3 (see table 1) may unnecessarily reduce cost-efficiency in more recent times. The capacity of the local office to coordinate the project, with occasional external support, seems sufficient.

Table 1: Overview cost drivers 3rd phase

Budget	CHF
Total HQ	1.121.038
Total Local	1.492.959
Activities	2.341.604

A detailed cost-effectiveness study is being carried out contemporarily to the evaluation and detailed information on can be found in a separate report.

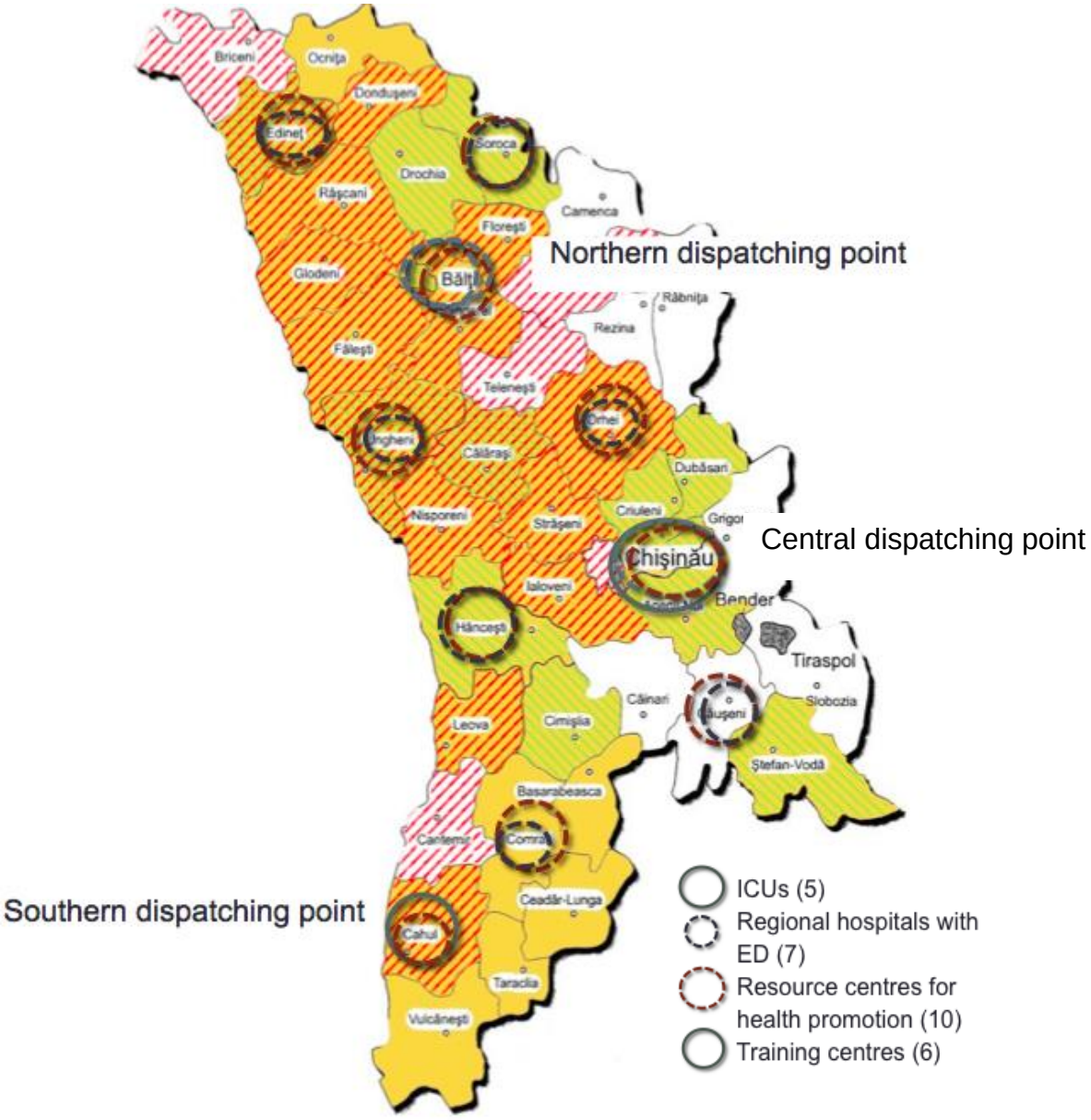
(4) Efficiency & Output

Are the implemented activities delivered with sufficient coverage?

The project achieved adequate coverage with the set-up of five ICUs and EDs in three regions and by supporting the set-up of EDs in seven rayonal hospitals. Recently there has been a MoH order to set up EDs in all rayonal hospitals ensuring nation-wide coverage in the future.
Four Type C ambulances were endowed with REPEMOL support to transport children from one level to the other within the referral system.
REPEMOL supported the set-up of 10 Public Health Centres as resource centres for health promotion evenly distributed throughout the country (see Figure 6). In addition, with REPEMOL six training centres were created and equipped with materials to carry out PALS trainings and others (see Figure 6 for distribution of centres throughout the country).
Through the integration of training centres within existing structures and mechanism the project achieved a wide coverage of trainings and awareness raising activities covering family doctors, who carry out home visits of newborns informing parents about accident and injury prevention, as well as staff in kindergartens, schools and social assistance. A group of adolescents were trained as peer-to-peer educators.

Awareness raising campaigns on accident and injury prevention as well as road safety in collaboration with the General Police Inspectorate achieved a wide reach through a variety of channels, such as television and radio as well as the development of 31 video spots. The Ministry of health mandated that that these 31 video spots are to be screened on the TVs in the waiting rooms at the hospitals.

Figure 6: Map of rayons where activities where implemented, including the establishment of five ICUs, seven EDs in rayonal hospitals, ten resources centres for health promotion at Public Health Centres and six training centres for PALS


Northern dispatching point
Central dispatching point
Southern dispatching point
Briceni
Ocnița
Dondușeni
Edineț
Soroca
Drochia
Rășcani
Camenca
Florești
Glodeni
Bălți
Rîbnița
Rezina
Fălești
Telenești
Orhei
Ungheni
Călărași
Dubăsari
Nisporeni
Strășeni
Criuleni
Grigor
Chișinău
Ialoveni
Bender
Hîncești
Tiraspol
Căinari
Slobozia
Cimișlia
Leova
Ștefan-Vodă
Basarabeasca
Cantemir
Comrat
Ceadîr-Lunga
Cahul
Taraclia
Vulcănești
ICUs (5)
Regional hospitals with ED (7)
Resource centres for health promotion (10)
Training centres (6)

Are the implemented activities delivered with sufficient quality?

While very important work of excellent quality has been done by the project, some important concerns regarding the quality of care remain. In the following, these are described in relation to the emergency departments, the paediatric ICUs, pre-hospital emergency care, including other emergency care services, quality management, TOXAPEL and health technology management.

Paediatric Hospital Care

Emergency Departments (EDs)

During the in-country assessment, four paediatric emergency departments were visited and assessed, namely the EDs of the V. Ignatenco Hospital in Chisinau (V. Ignatenco), Bălți Rayonal Hospital, Infectious Diseases Hospital Chisinau (IDH) and Mother and Child Institute Hospital Chisinau (MCIH). Additionally, two mixed adult and paediatric EDs in the Rayonal Hospitals in Cahul and Orhei were seen, both of which had also received support from REPEMOL. All had a reception/triage area, a resuscitation room (for patients triaged into the red category) and a room for urgent care (for patients triaged into the yellow category). Organization of rooms and patient flow seemed appropriate and conductive to efficient emergency paediatric care. The exception was the IDH where patients are mainly referred to from other hospitals. It has and a number of separate entrances for patients and triage is carried out by hospital doctors inside the ambulances. Patients are then directed to either one of the three separate entrances of the consultation rooms or the entrance to the resuscitation room in a separate wing of the building. There are plans to renovate the ED this year that might improve the patient flow. Overall, the newly created physical structures constitute a huge improvement vis-à-vis the areas used for admission in the past.

The majority if not all of the equipment used in the EDs was purchased through the REPEMOL project and all EDs were equipped with wall-mounted piped oxygen. The equipment in all EDs was kept at its logical place, was sufficient for the patient load at the respective hospitals and ready-to-use. One exception was the ventilator in the MCIH's ED, which was not placed in the resuscitation room but would have to be moved there when needed. All required supplies for the use of the equipment was present or stored near-by. It was unusual to see the presence of ventilators in all of the EDs that were visited, without the presence of other forms of respiratory support other than supplemental oxygen. What seems to be lacking is non-invasive ventilation, e.g. high-flow nasal cannula (HFNC) or continuous positive airway pressure (CPAP) machines for children with respiratory failure. These offer respiratory support without the need for intubation and ventilation, which is frequently associated with severe complications and more expensive. However, while at cost well below that of ventilators, additional machines would need to be purchased and supplies are more expensive compared to nasal prongs or oxygen masks. ICUs would also need to be supplied with these machines to ensure continuity of care and additional training would be required for all staff involved in patient care in paediatric EDs and ICUs.

Most essential drugs for paediatric resuscitation and care were stocked in the EDs and had not expired when randomly checked. Staffing levels seemed sufficient (for medical and nursing personnel) both during the days visited as well as for all shifts as reported by the doctors in charge of the respective EDs.

All EDs looked clean, bright and relatively child-friendly. Although some posters/job-aids were posted on the walls of the treatment rooms, a general lack of wall-mounted guidelines and algorithms could be observed (e.g. to remind staff and parents about hand hygiene, resuscitation algorithms, drugs dosages etc.).

Patient numbers during visits did not seem very high, however, reportedly workload in EDs is variable and annual figures of consultations in the EDs suggest a steady stream of patients. It was mentioned that after opening of the EDs the number of presentations increased significantly but this had levelled off in more recent years. Interview partners also stated that many caretakers self-present to hospital EDs, essentially bypassing primary health care

facilities. This raises concerns about access to quality of care at the primary health care level and constitutes an in-efficient use of available resources.

The project supported the implementation of a triage system for children arriving at the emergency departments. Unfortunately, the triage guidelines found in use at the EDs are neither comprehensive nor evidence-based. Evidence-based paediatric triage guidelines based on symptoms and signs of patients have been developed and published by WHO[6,7]. Similar to the ones used in the EDs paediatric patients are sorted according to severity of signs and symptoms into emergency, urgent or routine care categories. However, in Moldova current triage guidelines are partially incomplete, differ in different EDs and sometimes use laboratory tests to categorize patients. This counteracts the idea to consistently sort patients into different categories and identify those in need of emergency treatment within few seconds. Reportedly, the national guidelines for triage are currently under review and the project should urgently ensure that the MoH adopts evidenced-based triage criteria adapted to local epidemiology based on international standards.

Admission rates to the paediatric wards from the EDs seem surprisingly high in most of the visited hospitals (see table 2).

Table 2: Proportion of admissions of presentations per year in selected hospitals

Hospital	N° of children presenting to the ED/year	Paediatric admissions/year	Percentage
Orhei Hospital	3700	1700	46%
Bălți Regional Hospital	18000	7000	39%
Cahul Regional Hospital	7620	1840	24%
Infectious Diseases Hospital	11920	5170	43%
Mother and Child Health Hospital	12000	4000	33%
V. Ignatenco Hospital Chisinau	44400	13300	30%
Total	**97640**	**33010**	**34%**
In comparison			
Blantyre University Hospital/Malawi	100000	25000	25%
St.-Marien-Hospital in Bonn/ Germany	25000	5000	20%

For Cahul and Orhei admission percentages might be under-reported as paediatric patients are also admitted to adult wards for specialised care (e.g. to surgical wards) but not included in the number of patients admitted to the paediatric ward

A more detailed review of the reasons for presenting to the EDs as well as for the high admission rates may be warranted to assess whether children that should be treated at the primary care level are treated at the ED and whether children who should be treated as outpatients are being admitted to the hospitals. Both factors would constitute inefficiencies for the health care system. Costs in both cases are significantly higher and savings could be anticipated, if children were treated correctly as outpatients and/or at the primary health care facility. It may be useful to review payment schemes that may incentivize unnecessary hospitalization, as many patients were observed as inpatients that would not necessarily

require hospitalization. In addition, hospitalization in general entails stress for patients and their families as well as additional risks in terms of nosocomial infections and over-medicalization.

Intensive Care Units (ICUs)

Six paediatric ICUs were visited that were refurbished and equipped with support of REPEMOL

Table 3: Paediatric ICUs

Hospital	N° of ICU beds	N° of children admitted /year	N° of deaths/ year	ICU mortality
Bălți Regional Hospital	6	300	5	1,7%
Cahul Regional Hospital	4	200	3	1,5%
Infectious Diseases Hospital	7	350	0	0,0%
Mother and Child Health Hospital/Medical ICU	15	1000	20	2,0%
Mother and Child Health Hospital/ Surgical ICU	20	1800	61	3,4%
V. Ignatenco Hospital Chisinau	9	2100	6	0,3%
TOTAL	**61**	**5750**	**95**	**1,7%**

Further, two other ICUs were visited: the mixed adult and paediatric ICU in Orhei, which had not benefited from REPEMOL support, and the neonatal ICU in Cahul, which had benefited in the past from the PERINAT support, a former SDC project.

All six paediatric ICUs supported by REPEMOL seemed bright, well-staffed and clean. The multi-disciplinary support in place seemed also sufficient (e.g. x-ray, ultrasound, laboratory, cleaning) whilst there seemed to be a lack of physiotherapists entering the ICUs for patient support. None of the six ICUs were full when visited, particularly those in Bălți and Cahul (1 patient each). The exception was the MCIH, where all eight ventilated beds (four each in the paediatric and paediatric-surgical ICU) were occupied. Other beds in the MCIH were roughly 50% occupied. Of note was the absence of caretakers in V. Ignatenco (none of the 7 children was accompanied by parents during the time of our visit), while this was different in Cahul, IDH and partially at MCIH. In terms of availability of medicines and supplies, range and quantity seem to be sufficient, however, detailed verification was beyond the scope of the evaluation.

Many children seen in the PICUs during our short visit to Moldova would not qualify for admission to PICUs in well-resourced settings as they appeared reasonably well and were without continuous cardio-respiratory monitoring or ventilatory support. This finding is substantiated by the very low number of patients' deaths in the ICUs (see Table 3), which are usually reported higher in high and low-and high-income countries. In high-income countries PICUs are reserved for the sickest children needing continuous monitoring, ventilatory support and/or cardiac support. Depending on the patient population and care offered mortality rates are usually reported in the range of 2-5% despite the highest level of support. We were not able to find data on PICU mortality rates in Eastern European Countries but from other countries in low-resource settings even higher mortality rates are reported. However, it is difficult to interpret care levels and mortality rates between hospitals as the patients usually differ greatly by cause for admission, age and severity of illness all influencing the risk of mortality.

Hygiene prevention measures in place in the ICUs differ by hospital. While at the Ignatenco, Cahul and Bălți Hospitals visitors were required to wear single use or medical coats, this was not the case in the IDH ICU or MCIH ICU. Children and caregivers admitted to the MCIH are required to leave the rooms 6 times a day for 30 min each time for UV light disinfection and cleaning of the rooms. These measures seem excessive for a paediatric ICU while at the same time simple and effective hand hygiene procedures are not promoted as much. Although all rooms had filled hand disinfectant dispensers, they were often not close to the patients bed and lacked poster-aids on when and how to use them.

While there are national treatment guidelines (10 paediatric protocols and 48 algorithms) on paediatric conditions published in 2012, which were developed by national experts with support from REPEMOL in an effort to increase evidence-based treatment, these do not consistently correspond to international treatment guidelines and are not consistently based on the latest evidence. When asked for the rationale behind some of the more unusual treatments observed, doctors often referred to these or other national treatment guidelines. Indeed, in all ICUs and EDs patients were often found not to be managed according international standards and evidenced-based guidelines.

Illustrative examples include:

- Children admitted with respiratory distress and/or oxygen treatment without continuous pulse-oxymetry monitoring.
- Children with meningitis are treated with preventive phenobarbitone against seizures and intermittent oxygen but without continuous pulse-oxymetry (in fact one toddler with bacterial meningitis was lying asleep on a large bed without any caretaker at his bedside and no monitoring).
- A patient with subdural hematoma from a fall with subsequent hemiplegia was not operated despite the availability of a neuro-surgeon or referred for treatment.
- Children with symptoms of gastro-enteritis were seen to be treated with Maaloxan™ (Magnesiumhydroid and Algeldrat) and pancreatic enzymes for pancreatitis.
- A patient with 30% burns including the face was transferred for specialist care to Chisinau only after 2 days.
- One child diagnosed as radiologically-proven lobar pneumonia with an x-ray showing no lobar opacity.
- Children without referral from a health care provider are undergoing gastroscopy or colonoscopy without clear indications or medical referral because of the parent's wish.
- A patient with cerebral palsy was seen being transported on the arm of a nurse to an ICU whilst having a seizure without any monitoring or previous treatment on the ward.

WHO has published and translated evidence based paediatric treatment guidelines in the form of the 'Pocketbook for Hospital Care for Children'[6], which has been translated into Romanian and distributed widely within the paediatric medical and nursing community in Moldova. However, these guidelines are not used for organising triage in the EDs or the treatment of common conditions such as gastroenteritis and respiratory tract infections. If there should be concerns regarding the suitability of the WHO guidelines for the Moldovan context, they should be adapted to the local setting with changes made based on local or international evidence and by making explicit all changes, the reason for and the evidence behind them. Local evidence could include statistics about children presenting to emergency departments with certain conditions and their respective outcome. If a certain condition is found to have a poor outcome in Moldova but is considered 'green' on international guidelines, then it might be sensible to make it a 'yellow' or 'red' condition for triage in Moldova. For example, the annual TOXAPEL report could be used to say that certain severe intoxications should be triaged as 'yellow' if this specific condition has a potentially bad outcome. This would require follow up of TOXAPEL calls to find out the outcome of the patients.

Sick children in Chisinau are currently cared for in several hospitals in Chisinau and the division of tasks could not be fully understood during this short visit. In addition to the three paediatric hospitals visited in Chisinau: V. Ignatenco, IDH and MCIH, there are reportedly at

least three other hospitals caring for children with specific conditions (burns, HIV TB). This division of care seems not efficient and confusing also for paediatricians working in the hospitals, e.g. one head of an ED was unable to explain the criteria by which children with upper respiratory tract infection are either referred to the IDH or treated in her/his own institution. It would seem more logical to at least treat all children with infectious diseases including TB and HIV in one hospital and all children with trauma and burns together in one hospital. Given the size of the paediatric population in Chisinau, 2-4 paediatric hospitals would seem sufficient for inpatient care. It may well be that these concerns are already addressed within the Moldovan Hospital Master Plan[2]. If not, they may warrant further consideration and funding should be withheld from smaller hospitals treating a single condition only (see Annex 6).

Pre-Hospital Services

REPEMOL has supported the reorganisation of the pre-hospital services for children. Previously the dispatch of ambulances has been organised on a rayonal level, which led to inefficiencies. The new structure divides the country in 4 regions: the Northern Region with its centre in Bălți, the Central Region with the centre of Chisinau and the Southern Region with the centre of Cahul and Comrat anticipated to become the centre for the Gagauz Region. The Northern Region has piloted a new system dispatching all ambulances from one regional dispatch centre in Bălți, where all emergency calls are received in a central command. Those calls that require emergency ambulance services are then transferred to an ambulance dispatch centre, where medically trained dispatchers coordinate the dispatch of ambulances to the emergency call. These ambulances are stationed across the Northern Region and not centrally located in one location. There are plans to merge the command centre and the dispatch centre into one unit. Previously there were dispatch centres in all 11 rayons in the Northern Region. This not only led to inefficiencies in terms of number of dispatchers but also made it difficult to coordinate ambulances between the different rayons.

REPEMOL has been able to support the reorganisation by procuring the dispatch software, IT hardware and furniture for the dispatch centre in the Northern Region. The project also equipped four ambulances specifically for paediatric care across the country and was very active in improving training for the ambulance crews to raise standards of emergency paediatric care. Equipping the national training school to deliver practical training courses in paediatric emergency care to health professionals has institutionalised these training activities. An additional important new feature of the pre-hospital services that was also introduced with REPEMOL support is the GPS tracking available on the screens of the dispatchers, enabling them to track the ambulance live throughout the emergency response. This allows them to give directions where needed but also allows for a more rational use of the ambulances. It was noted that the dispatchers do not use headphones for communication that would free up their hands for other tasks.

For every emergency attended, ambulance staff fill a reporting form, which are then collated into a daily report of the Region by the dispatch coordinator. While a lot of information is being collected on these forms, type and number of emergency are not analysed and reported on. No information was available on the frequency of specific emergencies, the exact number of paediatric emergencies, the location (rural vs. urban) of emergencies or the time it takes from call to ambulance arrival or call to arrival at the hospital.

Reportedly, 47 emergency care doctors were on duty on ambulances in the Northern Region on 2nd of May 2017 and 33 on 3rd of May 2017. These numbers seem excessive when compared to ambulance services in other countries (see Annex 7). It must be assumed that most children could be transported without specialist care. At the same time, we were informed from the head of the dispatch team in Balti, that the one ambulance best equipped for paediatric emergency treatment (category C1) would not be dispatched to remote areas of the Northern Region. The reason we were given was that sending it to a remote location would make it unavailable for a long time-period to attend to emergency calls closer to Balti. As this finding was disputed by the head of the NCPEC it might be worth investigating this issue

again. But if this was found to be true, we think a second ambulance should be equipped so that all parts of the region have access to quality paediatric emergency care and transport.

Other emergency ambulance services

In addition to the regular ambulance service, a service is operational that transports medical specialists from central hospitals in Chisinau to peripheral hospitals, called 'AVIASAN'[3]. In addition to raising questions on duplication of efforts, a number of concerns were mentioned with this form of emergency transport: it reportedly takes often long for the specialist to reach the patient particularly in remote settings; the specialist often finds himself without the necessary equipment and drugs to assist the patient; the specialist occasionally declares the patient 'unfit for transport' and returns to Chisinau, severely limiting the therapeutic options for this patient. In 2016, there were 1000 dispatches using the AVIASAN system.

Patient transport service is also offered by the perinatal centre in Chisinau, who retrieve either pregnant mothers or neonates from peripheral hospitals, e.g. from January to April 2016 reportedly one newborn and 50 women with complications from pregnancy were transferred from Cahul to Chisinau using this mode of transport. This service seems to be working well and is highly appreciated by the staff at the Cahul Hospital.

While there is some merit in offering specialised ambulance transport for critically ill children and newborns outside the normal emergency call system, requiring specialised staff able to stabilise patients and adequately equipped ambulances, they should only be dispatched to the level II hospitals in Cahul and Bălți in the Northern and Southern Region, or other level II hospitals within the Central Region. These hospitals would have sufficient experience and equipment to correctly triage, diagnose and stabilise critically ill children prior to transport. This way many transports involving long distance travel could be avoided as there would be less inappropriate use of the services. All rayonal hospitals and primary health care centres would be asked to refer patients to the level two regional hospitals It is expected that these transports are only needed on a few occasions in a year. All other transport of paediatric patients could be done by the respective ambulance services of the regions.

Quality management (QM)

With support of REPEMOL some hospitals have introduced quality management (QM) activities and meetings. The MCIH QM board meets 3-monthly and during the last meeting hospital-acquired infections were discussed. It remained unclear, however, what measures were taken as result of this discussion. The IDH reported that REPEMOL helped establishing multidisciplinary QM meetings that are taking place on a monthly basis. As part of these activities patient satisfaction surveys are being conducted and a complaint registration system was encountered in one hospital (also see section on outcome).

Implementation of systematic deaths reviews to guide change in patient management and a 'clinical incidence' or 'near miss' reporting system for staff to be able to anonymously raise concerns seems not to be implemented. These systems allow for analysis of possible errors without attributing blame to a particular person. They could be used to learn from each other's mistakes and improve patient safety through an improvement of the hospital management system.

TOXAPEL

REPEMOL in collaboration with the MCIH has supported the set-up a national hotline for advice on intoxications (Tel: 022 555220). This centre is based in the medical ICU of the MCIH where calls are registered and advice provided. Unfortunately, we were unable to assess the system due to time constraints. The annual report for 2016 provides a good overview of the number and type of calls received (see annex 4). The report shows a high percentage of ingestions of medicines and it should be considered how to best protect children in the future, e.g. awareness campaigns, labelling of packages, reducing package size etc.

It is also interesting to note that only few calls from emergency care personnel/ambulances are registered. Additional efforts to promote the hotline might be warranted.

The report does not contain any outcome data of the various ingestions and systematic follow-up of cases to inquire about the development and outcome of all ingestions is suggested, which would be important for quality assurance and to adjust advice according to outcomes.

Health Technology Management (HTM)

With a large amount of money spent on medical equipment in several hospitals across the country and ambulances, extensive trainings on these devices and the introduction of a health technology management system appears most relevant to ensure long term use and maintenance of procured equipment. Activities to this effect are still underway and encouraged with the launch of the information system for management of medical devices/SIMDM (see outstanding activities). It has to be acknowledged that when the perinatal ward in Cahul was visited during this evaluation, which had received support and equipment through the SDC some years back, the equipment was well maintained and still in working order.

Outstanding activities

At the time of the in-country data collection of the evaluation the following activities were yet to be finalised:

- Launch of the online platform for monitoring of the Patient Satisfaction Index
- Implementation of the information system for management of medical devices/SIMDM. The next steps are as planned: during May 2017, a cascade training will be implemented starting with a training of trainers who then will be able to train users. It is expected that more than 250 participants will be trained. While AMED took the lead and is monitoring the trainings, REPEMOL covers the expenses related to the logistics. After the training, each user will receive a user name and a password for the SIMDM account. After the trainings during June-July, all hospitals in Moldova will be assisted to introduce data regarding the medical devices in use.
- 2nd round of the KAP survey

Given that the evaluation was carried out before the end of the project, it is to be expected and appropriate that some of the activities were still ongoing and results of surveys still pending. The project team requested and was granted a 6-months, no cost extension of the project from SDC to complete its activities.

(5) Effectiveness & Outcome

Did the implemented activities lead to the desired outcomes?

The project improved access to services at the regional level, both in terms of geographical access and in terms of access to services of improved quality, however, inefficiencies of the current system are very likely due to underutilization of primary health care, overuse of EDs for specialist consultations and over-hospitalization as well as likely use of ambulance services with specialized medical personnel for transport of patients that could be transported without medical supervision.

1. No of patients treated by the emergency departments and ICUs in the 3 regional centres (Indicator I7 in the logframe) – increasing trend with 21% from 2014 (88458 cases - baseline) to 2015 (107321 cases). Target of 10% increase already achieved. Partial results for June 2016: 57367 cases, including 54319 cases in EDs and 3048 in ICUs.

   While an increase in the number of patients in EDs and ICUs in the two newly created regional centres, is warranted as outcome indicator, to measure whether or not the regionalized system is working. However, this number should not necessarily be increasing indefinitely. The total under 18 population according to UNICEF data is 718

800 children[4]. Thus, on average every 7th child in Moldova visited the EDs in the 3 centres in 2015 at least once (or a smaller number of children more than once = repeat visits)[5] of which around 30% are admitted to the hospitals. Further analysis beyond this evaluation of the data may be warranted because the number of children presenting to EDs seems high and the number of admissions to hospitals from these EDs also seem high. Those numbers are a good marker of how well a primary health care system is working and how good EDs services are operating. Several stakeholders could potentially have an interest in the analysis of ED presentation data: e.g. SDC, MOH, UNICEF, WHO, CNAM, the respective hospitals etc. . The health care system would be most efficient if sick children were seen by their primary health care physician/nurse who decides which child can safely be treated at home or might need referral to a hospital. A well-functioning primary health care system can take care of the vast majority of children without the need for hospital presentation or admission, which are costly and potentially harmful to children and carry social costs to families.
It would therefore be interesting to find out what the incentives are for families to bypass the primary health care system and for ED physicians to admit children that could possibly be treated as out patients. If this analysis suggests that there is a lack of training of the physicians in the EDs or primary health care system further investments in terms of training, implementation of evidence based guidelines and quality improvement activities should be supported. If the reasons for many admissions is the reimbursement of costs to the hospital other financial incentives need to be thought of to ensure only those children are admitted that need it based on the severity of their illness.

2. Patient's Satisfaction Index – calculated with a new, improved methodology since 2015 (Indicator I8 in the logframe) – Partial results as for October 2016: ED - ED-71.1% and ICU - 69.7%, compared to ED – 71.87%; ICU – 69.77% at the end of 2015 The patient satisfaction study continued with two rounds during the reporting period. The latest values of the Patient Satisfaction Index were: ED - 71.1%, ICU - 69.7%.

   Patient satisfaction was highest in relation to renovation and availability of equipment and this very positive reaction is to be expected and merited particularly considering the previous state of the infrastructure and equipment. The lowest score received staff friendliness and communication with the child and caregiver and further work and capacity building may be needed on participation and communication and the right of the child based on his/her evolving capacities as well as their caregivers to participate in process and decisions regarding care. Particularly participation of caregivers in care provision also in the ICUs should be further promoted.
   No outcome data on improved services for the pre-hospital system is available to the evaluation team. Neither "time from call to ambulance arrival" nor "time from call to hospital arrival" were collected and we were not shown any statistics showing increased speed in reaching injured patients. While key informants raised concerns that ambulance services are not being used correctly and often for children that would not require an ambulance to reach the hospital, no data is captured on correct use of pre-hospital services to support this claim. Standards exist in Western European countries on time from call to time of arrival at the emergency, which will influence also the positioning of ambulances (standards on max km to reach every location within the country). While key informants reported existence of these standards for Moldova, it did not seem that data to measure whether these standards are met are being collected, analysed and used for improvement of activities. REPEMOL should work with the

[4] https://www.unicef.org/infobycountry/moldova_statistics.html

[5] Please note that is a very crude estimate which is meant only to provide a broad idea on the size of population accessing services

national agencies and implementers to revise existing data collection sheets to reflect the "time from call to ambulance arrival", "time from call to hospital arrival" as well as distance covered in km, collect these data and analyse it to use it for informing quality improvement of services offered. The mechanism to be established should be part of routine reporting and sustainable beyond the end of the project.
As the results of the KAP study are outstanding, information on the outcome of the information and awareness raising campaigns in relation to knowledge and behaviour change of caregivers and communities are not yet available.

(6) Impact*[6]

Did the implemented activities have the desired impact?

The following two impact indicators were chosen at the outset of the implementation to measure the impact of the project: under-five mortality rate and under-five mortality rate by trauma and poisoning. The following trend was reported by the project for both indicators based on national statistics as follows:
-Under-five mortality rate: 2012 – 12.1 (baseline); 2013 – 11.9‰, 2014 – 11.7‰; 2015 – 11.7‰; 2016: not available.
-Under-five mortality rate by trauma and poisoning, with a decreasing trend: 2012 – 1.5 ‰ (baseline); 2013 – 1.4 ‰; 2014 – 1.1 ‰; 2015 – 1.2 ‰; June 2016: 1.1‰. 2016: not available.

Figure 7 plots under-five mortality rates based on World Bank data[7] and shows a slight decrease in mortality rates, however, while the case specific mortality rate for trauma and poisoning is even smaller. Given the relatively small absolute numbers and the fact that burns are also included in the indicator it is difficult to attribute the impact to the project[8]. In addition, as the largest proportion of death from trauma, burns and intoxications is reported for the age group of 5-18 years (88 of 148, 59%) and not in under-fives (49 of 437 deaths, only 11%), it may be worthwhile for the project to consider reporting on mortality rates for under 18 years in addition to the age category of under 5 years. Improvements will have taken place also for the age category of 5-18 and may even be higher. This might underline the true impact the project even better thant the figure for the under 5s.

[6] *Given the scope of the evaluation no full impact analysis is possible, however, perceived impact and plausible causes are discussed.
[7] http://data.worldbank.org/indicator/SH.DYN.MORT?locations=MD
[8] However, the fact that burns are included in the indicator may be a minor issue, as burns are also included in the prevention campaign and no death from burns in 2016 were reported from the hospital were paediatric burns patients are treated.

Figure 7: Under-five mortality, 2012-2015 according to World Bank data

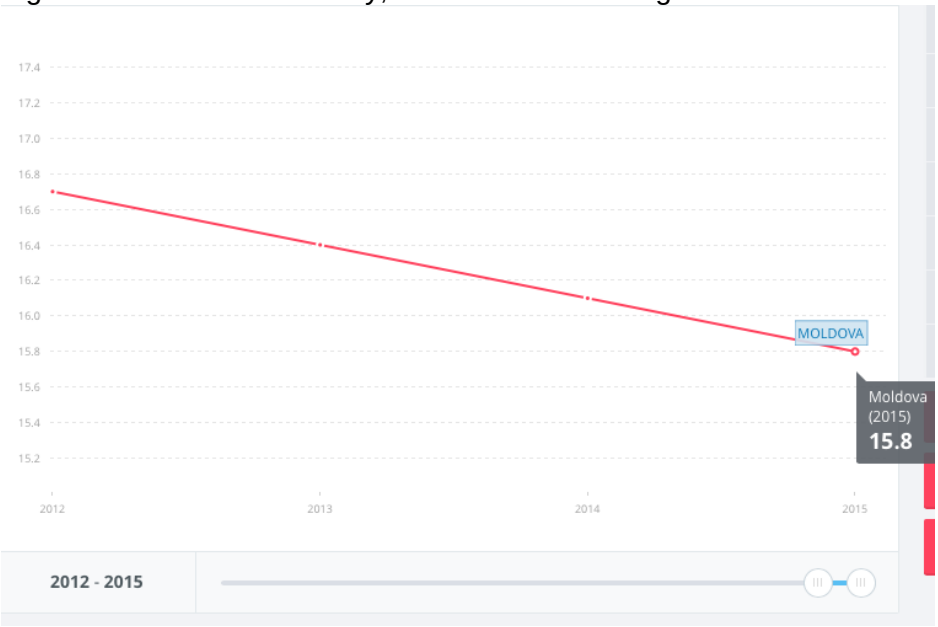


Table 4. Number of absolute deaths in children, Moldova, 2011- 2016

Deaths (abs no)	2011	2012	2013	2014	2015	2016
0 - < 18 years	685	664	590	608	583	585
From which:						
<5 years	526	477	449	450	452	437
1- 4 years	95	90	90	78	77	85
<1 years	431	387	359	372	375	352

Cause of deaths for 2016

Children under 5 (absolute numbers):

I. Perinatal diseases 160
II. Congenital malformations 109
III. Respiratory diseases 55
IV. Trauma, burns and intoxications 49

Children 5-18 years (absolute numbers):

I. Trauma, burns and intoxications 88
II. Tumours 23
III. Respiratory diseases 11

Source: Centre for Health Management

Table 5. Number of death by location in 2016

	<1	1-4 years	<5	<18
Home death	49	32	81	134
Hospital death	294	46	340	381
Other (incl. ambulance and institutional care)	9	7	16	70

Source: Centre for Health Management

Table 6: Self-reported paediatric deaths by hospital in 2016.

Hospital	No. of deaths
V. Ignatenco	3
ICU-Medical MCH Chisinau	20
ICU-Surgical MCH Chisinau	61
Infectious Diseases H. Chisinau	0
Bălți Regional Hospital	6
Cahul Regional Hospital	5
Orhei Rayonal Hospital	3
Total	**98**

Source: Hospital Data as provided by hospitals

Police inspectorate for traffic: number of paediatric deaths per year: 15-20.
In relation to pre-hospital care 2 children are reported to have died in the Northern Dispatch Region Bălți in 2016 during care in ambulances.

(7) Sustainability & Cost

Were available resources used efficiently? Are services sustainable?

A detailed cost-effectiveness study is being carried out contemporarily to evaluate and detailed information on cost-efficiency and effectiveness will become available in a separate report.
The REPEMOL project has been directly contributing to the healthcare reform in the Republic of Moldova, its actions and recommendations are being recognized and incorporated into the legal framework that regulates the health sector (for example Regionalization Orders (MoH Order no 841/27.12.2010 and MoH Order 1215/29.10.2013; MoH Order 1495/29.12.2014 – Regulation of the Centralized EMS Dispatch; Governmental Decision 377/16.06.2015 - Centralization of the pre-hospital emergency services, MoH order for regionalization of dispatch for Southern, Central and Gagauz region under development, MoH decision on the development of EDs in all hospitals and an order to this effect is being finalized with REPEMOL input). In fact, the MoH acknowledges that the project had a broad view and addressed the determinants from different and comprehensive aspects and that for all project components a continuation mechanism has been established and sustainability is ensured.
A special financing mechanism has been created by CNAM for the financing of the newly established emergency departments. Budgets for procurement of the consumables and maintenance of the equipment procured by REPEMOL seems ensured.
The functioning emergency departments are anticipated to act as a filter for admissions to the hospitals and number of admissions to decrease. In some of the settings this trend started already to materialize.
Some concerns remain regarding the sustainability of the information and health promotion campaigns and activities. The health promotion training topics have been included into the

curricula for on-going education of nurses, feldshers and other ambulance staff allowing for sustainability of the respective training activities. And the establishment of 10 public health centres to function as resource centres for health promotion was an additional important step towards sustainability and should be capitalized upon for all health promotion activities in the future. However, CNAM only offers a small budget for all health promotion activities combined and a high level of competition for funds with other diseases/public health problem is anticipated. Thus, it is rather uncertain to which extend trainings, printing of information leaflets and streaming of materials for injury and accident prevention will continue beyond the end of the project. Furthermore, while fully committed to the continuation of the road safety campaign, the police directorate does not have a dedicated budget to do so.

Recommendations

1. SDC to consider extending support to the improvement of general paediatric care. Considerable efforts and investments have been made to improve hospital care for neonates and children, i.e. through the PERINAT project (improving perinatal care) as well as through the REPEMOL project (improving paediatric emergency and intensive care) and impressive gains were achieved. Given the persisting relatively weakness of general paediatric care at hospital level there is a risk of not achieving the full potential of investments made.

2. REPEMOL project to ensure that the MoH orders on triage that have recently been finalized are evidence-based and in line with international recommendations. REPEMOL should work with MoH to integrate evidence-based triage training into the health worker curricula using the WHO Emergency Triage, Assessment and Treatment (ETAT) as template for adaptation to the Moldovan setting (see module 1 of the ETAT manual for participants[7]) (MoH orders were approved while the report was finalized - 424/02.06.2017 and 441/07.06.2017. It is hoped that these orders are based on evidence and in line with international guidelines. If not, they should be adjusted prior to implementation. The evaluator would be interested to view and comment on these new triage guidelines if this would be considered helpful.)

3. REPEMOL to update the 10 paediatric protocols and 48 algorithms from 2012 to ensure they are in line with international recommendations by resolving the inconsistencies based on evidence involving WHO/EURO. Adaptations should highlight each deviation from international recommendations and provide an evidence-based explanation on the reasons for non-conforming with international recommendations.

4. REPEMOL should work with MoH to review current paediatric hospital services and centralise paediatric hospital care to 2-4 hospitals in Chisinau (see Annex 6). This would ensure adequate capacity for holistic paediatric care and good utilization of hospitals. The number of referrals of patients between hospitals would be reduced and significant synergies could lead to the creation of hubs of expertise and of clinical excellence.

5. REPEMOL to work with implementers to make use of data being is used to influence planning and fine-tuning of ambulance services. Data could be collected from sheets already filled by ambulance crews or from the dispatch software. No extra data collection is suggested beyond the routine filling of work sheets by ambulance crews or computation of information from dispatch activities. Information suggested for collection include: time from emergency call to arrival of ambulance at emergency, type and number of paediatric emergencies attended; number, nature and outcome of domestic accidents; number, nature and outcome of traffic accidents; cause specific morbidity and outcome of paediatric illnesses; requirement for presence of medical personnel and paediatric equipment; need ambulance to attend specific emergency vs. unnecessary use of ambulance service; geographical spacing of calls. This data should then be used to inform the fine-tuning of the health prevention campaigns, reform and direct the investment in ambulance services, guide the training of ambulance personnel and the development of standards for the most common conditions. Good arguments speak for the regionalised ambulance services and improvements for emergency care are expected with the national roll-out. The AVIASAN service should be integrated into the hospital based retrieval system.

6. REPEMOL should carefully review the results of the KAP study, and possibly develop a uniform information sheet with prevention messages for healthy newborns, e.g. the benefits of breast feeding, ‘sudden infant deaths syndrome (SIDS)’ prevention, vaccinations, domestic accident prevention, clinical danger signs…). There could be a

separate paediatric health promotion sheet for caretakers of older toddlers e.g. to be given out when getting vaccinations or entering kindergarten covering topics such as vaccinations, prevention of domestic and traffic accidents, healthy diet, important phone numbers including TOXAPEL, when/how to use pre-hospital emergency care system and hospital emergency care. This might be more sustainable and effective compared to giving out leaflets with single prevention messages only.

7. REPEMOL to work with implementers of TOXAPEL to institute an evaluation and monitoring mechanism of the impact of TOXAPEL beyond the end of the project: use the annual reports to raise awareness, fine-tune messages of the public prevention campaigns and reduce frequent ingestions by changing legislation to ensure potentially hazardous medications are sufficiently labelled and packages contain a limited number of tablets only. It is recommended that all cases are followed up to ascertain outcome of the ingestion. This will act as a quality assurance measure and inform advice provided for future calls.

8. ICUs and EDs of the partner-hospitals are sufficiently equipped with quality equipment that is still operational a few years after they were introduced. REPEOMOL/SDC may consider equipping Bălți, Cahul and Chisinau PICUs with CPAP/HFNC machines (see a proposal in Annex 5). Ambulance services in Bălți might benefit from fitting an additional C1-type ambulance with paediatric equipment as remote areas of the region are currently not served raising concerns about inferior services to those areas.

9. REPEMOL to continue rolling out the required HTM system as planned with continued monitoring of its effectiveness.

10. REPEMOL should to encourage hospital managers and heads of departments to monitor the patient load segregated for workday or weekend, working hours or after working hours and season of the year of paediatric emergency departments beyond the end of the project in order to support planning of staff levels and supplies for the different emergency departments. This data could also be used to investigate gaps in the primary health care system as many patients are said to be bye-passing the primary health care setting. To document this misuse of the hospital EDs could be used to optimise patient flow within the health care system. Similarly, the high percentage of admitted patients from ED are a concern and could be further investigated for possible reasons leading to over-hospitalisation. If remuneration of hospitals for care of children in EDs is a problem that leads to their admission, REPEMOL should lobby with partners for MOH or CNAM to reimburse hospitals for this activity in addition to the overall hospital budget.

Conclusion

The REPEMOL project is a very relevant, coherently designed and efficiently implemented project that achieved important goals. It successfully acted as a catalyst for change on many important issues related to paediatric emergency care and prevention in Moldova, whilst always remaining well integrated into the health care system and making efficient use of existing structures. This has earned it the respect and admiration of many health care professionals as it has significantly strengthened the capacity of the health care system to change and improve prevention and treatment of paediatric emergencies.

The third phase of the project is currently underway. Whilst important milestones have been achieved, other activities are still being implemented and information on outcomes awaited. In this context, we favourably note the recently approval of a six-months, no-cost extension of the programme.

Whilst physical layouts and equipment for paediatric care are now at a very high level thanks to support from REPEMOL and MoH, clinical practice of emergency care is frequently not based on best evidence and general paediatric care is further lacking behind in quality. Issues that persist include incoherent triage of patients, use of national guidelines for common emergency conditions that are not in line with international evidenced based guidelines, polypharmacy, over-hospitalisation (large proportion of patients seen in ED are admitted), insufficient data collection of implemented activities to inform future plans and improve services as well as prevention campaigns.

With the long and trusting relationship that has developed with the MoH, clinical staff and others, REPEMOL/SDC is uniquely placed to promote further change to improve the care of children in Moldova and reduce childhood morbidity and mortality.

Annexes

Annex 1 Agenda

External evaluation of the project "Regionalization of the Paediatric Emergency and Intensive Care Medical Services System in Moldova (REPEMOL)"

Agenda

Dates: 01. - 07. May 2017

Time	Meetings	Participants	Place
Arrival Monday 1st May			
16:00	Chisinau airport	Andreas Hansmann Susanne Carai	
	Day 1, Tuesday, 2nd May		
9.00-10.30	Briefing at SDC	**Simone Giger**, Director of Cooperation; **Matthias Leicht-Miranda**, Senior Program Manager, **Valeriu Sava**, National Program Officer in Health, **Dan Popov**, the local consultant contracted for cost-effectiveness analysis	
11.00 – 12.30	Meeting with project staff Centre For Health Policies And Services, local REPEMOL team	**Silvia Morgoci**, REPEMOL project manager **Natalia Dinu**, communication campaign coordinator(domestic accidents) **Natalia Ciubarov**, communication campaign coordinator(road safety and communication of change) **Tatiana Buzdugan**, coordinator Quality management **Iana Miglei**, coordinator trainings **Larisa Andronachi**, chef accountant **Victoria Vicol**, Project assistant **Alexandru Andrievchi**, procurement assistant	
13.00 – 14.30	Ministry of Health Deputy Minister	**Oleg Creciun**, Deputy Minister of health	
15.00 – 17.00	Intensive care and emergency department in Municipal hospital for Children "V.Ignatenco"	**Alexandru Holostenco**, hospital director **Natalia Buzatu**, head of ED **Tatiana Covalschi**, head of ICU **Lilia Chrosea**, medical director	
	Day 2, Wednesday, 3rd May		
7.00 – 9.00	Departure from Chisinau, trip to Bălți		
9.00 – 10.30	Intensive care and emergency department, Bălți, including training centre	**Maria Neamtu**, head of paediatric department **Ala Condrea**, head of ED **Oleg Bozbei**, ICU head **Svetlana B**ologa, Chief nurse	
11.00 – 13.00	Visit North station of the National Centre for Pre-hospital Emergency Care (NCPEC), including	**Irina Blandu**, head of North dispatch	

Time	Meetings	Participants	Place
	dispatch		
13.00	Departure from Bălți		
14.30 – 15.30	Rayon hospital Orhei	**Andrei Stratulat**, medical director **Elena Tetelea**, head of ED	
16.00 – 19.30	Public health centre Orhei	**Vasile Gustiuc**, Director **Rafail Shlearov**, trainer in health promotion	
19.30 – 20.30	Trip to Chisinau		
	Day 3, Thursday 4th May		
7.00 – 10.00	Departure from Chisinau, trip to Cahul		
10.00 – 11.30	Intensive care and emergency department, Cahul hospital	**Elena Jerebetcaia**, head of ED **Boris Spinu**, medical Director **Vlad Andreev**, doctor ICU **Eugen Tatarli,** head of paediatric ward	
	ICH for neonates in Cahul Perinatal Centre	**Victor Rotaru**, director of perinatal centre **Natalia Sindirinscaya**, head of ICU	
12.00 – 13.00	South branch of the National Centre for Prehospital Emergency Care (NCPEC), including centralised dispatch	**Angela Manole** head of Cahul ambulance **Dispatchers/operators** at common dispatch(2 persons)	
14.00 – 15.00	Cahul Public Health Centre	**Vladimir Lisenco**, director **Vitalie Vintu**, trainer in health promotion **Andrei Sindirinschi**, head of PHC center **Maria Pila**, family doctor involved in health promotion	
17.00 – 19.30	Trip to Chisinau		
	Day 4, Friday 5th May		
9.00 – 10.00	National Centre for Prehospital Emergency Care (NCPEC)	**Boris Golovin**, head of NCPEC **Alexandru Ghidirimschi**, deputy director	
10.30 – 12.00	Visit children hospital for infectious diseases in Chisinau	**Ludmila Birca**, hospital director **Diana Vlad**, head of ED **Stela Cornilov**, paediatrician **Ludmila Manic**, head of ICU	
13.30 – 14.30	Meeting with National Centre for Evaluation and Accreditation(NCEA) and National Centre for Health Management for quality management(NCHM)	**Maria Cumpana**, executive director NCEA **Anatol Prisacari**, deputy director NCEA **Luminita Vasilachi**, responsible for QM in NCHM	
15.00 – 16.00	Visit EMC nurse centre, including training centre	**Vera Loghin**, director **Galina Galit**, trainer	
16.30 – 18.00	Ministry of Internal Affairs, National Patrol Inspectorate	**Neli Lelenco**, responsible for road safety education **Natalia Ciubarov,** REPEMOL communication campaign	

Time	Meetings	Participants	Place
		coordinator(road safety)	
18:00 - 19:30	Debriefing at SDC Discussion of preliminary findings	**Matthias Leicht-Miranda**, Senior Program Manager, **Valeriu Sava**, National Program Officer in Health, **Dan Popov,** the local consultant contracted for cost-effectiveness analysis	
	Day 5, Saturday 6th May		
09.30 – 14.00	Intensive care and emergency department in Chisinau, Mother and Child Institute, including training centre and endoscopic division	**Ana Oglinda**, head of paediatric ICU **Mihail Maltev**, head of surgical ICU **Victor Scarevnea**, head of ED **Valentina Rascov**, head of endoscopy department	
	Analysis of findings		
15:50	**Departure from Chisinau**		

Annex 2 Medical Equipment: Quantities and Location

In red: testing and calibration equipment

Item	Description of goods	IMC	Cotaga Clinical ICU for burns)	Balti Hospital	Ignatenco Hospital	Cahul Hospital	Contagious Diseases Hospital	Ambulance	SR Edinet	SR Soroca	SR Ungheni	SR Hincesti	SR Causeni	SR Orhei	SR Comrat	SR Briceni(ICU)	SR Glodeni(ICU)	SR Leova(ICU)	Technical University	Total
1	Intensive care bed/stretchers	21		13	8	12			4	4	4	4	4	4	4					82
2	Anesthesia machine	2	4	3	2	1														12
3	Basic Incubator	2		1		1														4
4	Bedhead rail for medical devices with accessories								2	2	2	2	2	2	2					14
5	Biochemistry Analyzer			1		1														2
6	Bronchoscope	2	1	1	1	1														6
7	Cervical collar different sizes	4		3	3	2		4	1	1	2	2	1	1	1					25
8	Compressor for ventilator		1			1														2
9	Continuous Ambulatory Peritoneal Dyalisis(CAPD) set	7																		7
10	Defibrillator	2		2	1	1		17	1	1	1	1	1	1	1					30
11	Drug cabinet	2		1	1															
12	Ultrasound machines, different types	3		2	2	2	1					1								11
13	Electric dermatome with blades		1																	1
14	Electrocardiograph (EKG)	1		1	1	2			1	1	1	1	1	1	1					12
15	Electroencephalograph (EEG)			1																1
17	Fluid warmer							6												6
18	Gas and electrolyte analyzer	1	1	1	1	1	1													6
19	Glucometer								1	1	1	1	1	1	1					7
20	Hematological analyzer			1		1														2
21	Infant Incubator Analizer	1																		
22	Instrument Table	3	2	2		4	3		2	2	2	2	2	2	2					28
23	Intensive care monitor	10		2	4	3	1	4	2	2	2	2	2	2	2					38
24	Intraosseous access kit							6												6

Item	Description of goods	IMC	Cotaga Clinic (ICU for burns)	Balti Hospital	Ignatenco Hospital	Cahul Hospital	Contagious Diseases Hospital	Ambulance	SR Edinet	SR Soroca	SR Ungheni	SR Hincesti	SR Causeni	SR Orhei	SR Comrat	SR Briceni (ICU)	SR Glodeni (ICU)	SR Leova (ICU)	Technical University	Total
25	Laminar flow for preparation of sterile solutions	2																		2
26	Laryngoscope with various size blades	3		3	1	2		4	1	1	1	1	1	1	1					20
27	Medical gas and pipeline distributions	1		1		1	1													
28	Microscope for laboratory			1																1
29	Microscope microsurgical interventions	1			1															2
30	Mobile examination lamp	3	1	3	3	2	2		1	1	1	1	1	1	1					21
31	Mobile oxigen (bottles)							74												74
32	Mobile Radiographic Unit	2		1	2	1	1				1		1		1					10
34	Monitor for triage in emergency departments	2		2	2	1			1	1	1	1	1	1	1					14
35	Nebulizer for Drugs	10	2	10	2	4	6		4	4	3	4	4	4	4	1	1	1		64
36	Neuroendoscope with trolley	1																		1
37	Otoscope	3				1														4
38	distributor								1	1	1	1	1	1	1					7
39	Oxygen hood	8	4	4	2	2														20
41	stand	2		1																3
42	unit	1																		1
43	Poket pulse oxymeters				2				2	2	2	2	2	2	2					16
44	Portable oxygen system								1	1	2	1	1	1	1					8
45	Portable Suction Unit	6	2	8	2	4	4	4	3	3	2	3	3	3	3	1	1	1		53
46	Pressure perfusion system								1	1	1	1	1	1	1					7
47	Pulse oxymeter monitor	11	2	5	9	5	4	4	1	1		1	1	1	1	1	1	1		49

Item	Description of goods	IMC	Cotaga Clinic (ICU for burns)	Balti Hospital	Ignatenco Hospital	Cahul Hospital	Contagious Diseases Hospital	Ambulance	SR Edinet	SR Soroca	SR Ungheni	SR Hincesti	SR Causeni	SR Orhei	SR Comrat	SR Briceni (ICU)	SR Glodeni (ICU)	SR Leova (ICU)	Technical University	Total
47	Pulse oxymeter monitor	11	2	5	9	5	4	4	1	1		1	1	1	1	1	1	1		49
48	Radiant warmer with resuscitation unit	1		1																2
49	Resuscitable baloon with masks of various sizes	2		3	1	2		4	1	1	2	2	2	1	1					22
50	Resuscitation Trolley	3		2	1	1	1		1	2	1	1	1	1	1					16
51	Scoop stretcher								1	1	1	1	1	1	1					7
52	Sphyngomanometers			1				31	4	4	2	4	4	4	4	2	2	2		64
53	Spine boards and straps with head fixation for child and adults	1		2	1	1		4	1	1	1	1	1	1	1					16
55	Surgical Instruments	8		8																
56	Surgical lamp					1														
57	Syringe Infusion Pump	16	4	8	4	6	6	4	3	3	2	3	3	3	3	1	1	1		71
58	Table for general surgery	1	1			2														4
59	Transport ventilator							4												
60	Vacuum splints different size	2		1	2	1		4	1	1	1	1	1	1	1					17
61	Ventillator/Pediatric ventilator	9		2	2						1									14
62	Video Gastroscope	2	1	2		1														6
63	X-Ray screen/negatoscope	2		1	1															4
64	Gas Flow Analyzer	1																		
65	SMD components tester	1																		

Item	Description of goods	IMC	Cotaga Clinical (ICU for Burns)	Balti Hospital	Ignatencoi Hospital	Cahul Hospital	Contagious Diseases Hospital	Ambulance	SRL Edinet	SRL Soroca	SRL Ungheni	SRL Hincesti	SRL Causeni	SRL Orhei	SRL Comrat	SRL Briceni (ICU)	SRL Glodeni (ICU)	SRL Leova (ICU)	Technical University	Total
66	Non-Invasive Blood Pressure simulator	1																		
67	Infusion Device Analyzer	1																		
68	Soldering station SMD hot air	1						2												
69	ECG-Simulator				1			1												
70	Digital Soldering Station				1	1													3	
71	Portable Digital Multimeter																		10	
72	DC Power Supply				1	1		1											2	
73	Drill				1	1		1												
74	Digital Oscilloscope																		2	
75	Arbitrary Waveform function generators																		1	
76	Digital Multimeter							1											1	
77	Medical Devices repair toolkit	1		1	1	1		2												
78	Multichannel System for captoring analyses and processing of the biomedical signs																		1	
79	Compressor for maintenance							1												
80	Grinder							1												
81	SPO2-Simulator							1												
82	Defibrillator analyzer							1												
83	Digital Manometer NIBP							1												
84	Set of keys							1												
85	Set of tubular keys							1												

Annex 3 Training Equipment: Quantities And Locations

Item	Description of goods	IMC	Balti Hospital	Ignatenco Hospital	Cahul Hospital	Nurse College	State University of Medicine and Pharmacy(different departments/trening units)	Centre for pre-hospital care	trainings for community members	Technical University	Total
1	Cervical collars	3				5	3	5			16
2	Child Manikin for Intubation and Upper Respiratory Airway Management Techniques	1	1								
3	Child manikin for resuscitation techniques with electronic control of CPR							4			
4	Complex Child Manikin for Resuscitation Techniques (ECG rhythms, defibrillation, intra-osseous infusion administration)	1	1				4				
5	Complex Manikin for Child Advanced Life Support Training (ECG rhythms,defibrillation Intraosseous Infusion administration)	1									1
6	Defibrilator						2				2
7	Full Body Pediatric Manikin for Nursing Training (vital sings, sounds auscultation, IV canulation and general pediatric intensive care)		1			1					2
8	Infant Manikin for Airway Management	2				1		1			4
9	Infant Manikin for Nursing with Vital Signs		1			1					
10	Infant manikin for resuscitation techniques with electronic system to control quality CPR							4			
11	Infant Manikin for Resuscitation Training with Heart Rhythm Simulator	1				1		1			3
12	Infant Manikin for Resuscitation Training with Heart Rhythm Simulator and vascular acces	1	1				1				
13	Laryngeal masks	2									
14	Laryngoscope with various size blades	3				1		2			6

Item	Description of goods	IMC	Balti Hospital	Ignatenco Hospital	Cahul Hospital	Nurse College	State University of Medicine and Pharmacy(different departments/trening units)	Centre for pre-hospital care	trainings for community members	Technical University	Total
15	Manikin for Infant resuscitation techniques					3		4	5		
16	Nebulizer for drugs						3				3
17	Newborn manikin for peri-scapular approach		1			1					
18	Newborn manikin for the simulation of intubation techniques	1									
19	Pediatric Intubation Manikin	1				1		1			3
20	intravenous therapy)	1	1			1	1	1			5
21	Pediatric manikin for resuscitation techniques								5		5
22	Pediatric manikin for resuscitation techniques with electronic system to control quality CPR					3		4			
23	Portable Suction Unit					1	3				4
24	Resuscitable baloon with masks of various sizes	3				4	1	5			13
25	Sphyngomanometers						1				1
26	Spine boards and straps with head fixation for child and adults	1				1	3				5

Annex 4: Annual report of TOXAPEL for 2016

	Number	%
Total number of calls in the year 2016 1. related to a paediatric ingestion **2.** related to an adult ingestion 3. other	336 218 13 105	100 65 5,9 29,7
Caller:		
Paediatrician or Internal Medicine Specialist	57	26,1
SR +medic s. internare	4	1,8
Emergency care physician	10	4,5
Anaestetist	15	6,8
Other specialist	10	4,5
Relative of patient	109	50,0
Adult	13	5,9
Total	218	100
Age of child affected:		
Infant <1year of age	26	11,9
1-3 years of age	121	55,5
4-5 years of age	24	11,0
7-12 years of age	18	8,2
13-18 years of age	16	7,3
>18 years of age	13	5,9
Total	218	100
Ingested substance:		
Medicines	99	45,4
Household items (detergent, soap, glue, etc.)	62	28,4
Food (Vinegar, salami, fruit, fish..)	11	5,0
Plants	9	4,1
Carbonmonoxide	3	1,3
Alcohol	4	1,8
Hydrocarbs (fuel, kerosene)	5	2,2
Mushrooms	4	1,8
Batteries	1	0,4
Nitrite/Nitrate	2	0,9
Rat poison	6	2,7
Herbicides	3	1,3
Unknown/other	9	4,1
Total	**218**	**100**

Annex 5

HFNC/CPAP respiratory support

High flow Nasal Cannula (HFNC) machines for children are available from different manufacturers e.g. Vapotherm (Precision Flow), Fisher & Paykel (Optiflow junior, Airvo) and others. Similar to ventilators, they come as stand-alone machines, to which special tubing with a heater/humidifier and patient interfaces are attached.

Their great advantage is that they offer superior support compared to supplemental oxygen via face masks or nasal prongs, whilst they are almost as easy to apply by nurses, as comfortable for patients and much safer compared to ventilators. Whilst CPAP machines (e.g. Infant flow from BD/Carefusion, bCPAP system from Fisher & Paykel and others) offer slightly better respiratory support they are less comfortable to patients and require more nursing care supervision. We would therefore prefer to supply HFNC machines to the ICUs compared to CPAP machines. They would probably also be useful in EDs but that could be considered as a second step.

The aim of using CPAP or HFNC machines would be to avoid risky intubation and ventilation in children with moderately to severe respiratory distress. Most children requiring them would be infants and toddlers with bronchiolitis or pneumonia but could also be older children with asthma or other causes of respiratory distress. Another indication would be patients that are extubated but still need more respiratory support than just supplemental oxygen. HFNC or CPAP will be able to prevent unnecessary re-intubation of these children.

As none of the EDs or PICUs during our visit expressed the need for CPAP or HFNC machines, we are unsure if these are known or seen to be useful. There would be no value in providing these machines when they are not considered urgent or useful and medical staff reluctant to use them. There is also a need to ensure maintenance of these machines and continued procurement of the tubing, which is single use only.

With these caveats in mind, we could see a need to supply the PICUs in Cahul and Balti each with one HFNC machine each, although patient numbers in these PICUs are relatively low. The medical and surgical PICUs at MCI in Chisinau would possibly also benefit from the provision of 2 machines each to the surgical and the medical PICU as would the PICU in the V. Ignatenco Hospital with also 2 machines. Similarly only one machine for each PICU could be supplied and then the use of them observed before possibly providing a second one.

For more information see:

-Milési C et al. High-flow nasal cannula: recommendations for daily practice in pediatrics. Ann Intensive Care 2014;4. –

-Essouri S et al. Improved clinical and economic outcomes in severe bronchiolitis with pre-emptive nCPAP ventilatory strategy. Intensive Care Med 2014;40:84–91

Annex 6

Reorganisation of paediatric hospital care in Chisinau

During out visit to Moldova it has come to our attention at least 6 hospitals exist in Chisinau in which children are treated. Whilst some offer comprehensive paediatric care, such as the MCI Hospital, other deal with single conditions only such as paediatric hospitals for children with burns, HIV and TB. We assume they are attached to adult hospitals that offer care to patients with the same condition. However, there are good reasons it might be best to integrate with other paediatric hospitals in Chisinau.

We suggest merging the hospital that treats children with burns with the hospital that treats children with trauma or surgical conditions (V. Ignatenco). Both conditions require a very similar infrastructure (e.g. theatres, PICUs pain management, nutritional management, physiotherapy and rehabilitation facilities) and patients often have not only burns but also trauma at the same time.
Similarly, the two hospitals where children are treated with HIV and TB should be merged with the Infectious Diseases hospital for children. Alternatively, all three hospitals could be transferred to the site of the Mother and Child Institute. The advantage would be that children with HIV or TB would benefit of the comprehensive care that is available at MCI without the need for difficult transfers. Particularly HIV patients often suffer from opportunistic infections and are co-infected with Tb. These patients would benefit from improved laboratory facilities for diagnosing and staging of the disease, transfusion services (not available in the ID hospital visited), surgical facilities (e.g. for biopsies from lymph nodes…), PICU services... .
Apart from these tertiary care centres (MCI, V. Ignatenco and possibly ID hospital), there could be one or two general paediatric hospitals that deal with the most common conditions and offer social services that link hospital care with community care close to the respective homes of the patients. These hospitals could also be attached to an adult hospital to be able to make use of existing services such as theatres, radiology and laboratories.

For other parts of Moldova it would be feasible to have 3-5 regional hospitals (as currently being the case) with separate paediatric departments. The size of these would be depending on the demographics of the area as well as the distances to other hospitals offering paediatric care. These referral hospitals should act as referral centres for district hospitals or primary health care physicians.

Annex 7

Organisation of pre-hospital Emergency Care

Emergency ambulance care is very differently organised in individual countries or even within individual countries. Whilst Emergency care in most European countries use emergency care physicians which attend the most severe emergencies , other systems are organised where only paramedics staff the ambulances (particularly in the English speaking countries).

In countries where emergency physicians are used, they are usually attached to a emergency department or ICU in a hospital and are mostly trained in anaesthesia, surgery and/or critical care medicine with additional training in emergency care. They would be requested to attend to emergencies by dispatch based on defined criteria suggesting life-threatening conditions of a patient. The emergency physician will be dispatched to the emergency by a separate vehicle and would join the ambulance crew in treating the critically ill patient and transporting him to the next available hospital. This would typically be the case in a patient with significant problems with the airway, breathing, circulation, coma or pain or a severe accident or paediatric emergency. Emergencies outside these categories would be attended only by paramedical staff.

As an example, the Region of Bonn/Rhein Sieg in Germany with a population of 850 000 (Balti 1 million) and an area of 1600 km^2 (Northern dispatch region?) has 10 emergency physicians on call 24/7, who only attend the most severe accidents and emergencies. Smaller towns or villages would not have a separate emergency physician on call but would be served by paramedical staff locally and an emergency care physician from the next city as needed.

The efficiency of ambulance services is monitored by computing data from the time of emergency call as recorded by dispatch, to the arrival of the ambulance at the street where the emergency call was placed. The standards vary by region depending on the population densitiy. In towns legislation suggests that emergency services should arrive for 90%-95% of calls within 8-10 minutes of placing the emergency call. In more rural areas this threshhold would typically be 12 minutes. These are figures for well resourced settings in Europe with a relatively high patient density. This is just mentioned as an example to highlight how quality of services are monitored and not to suggest critieria for Moldova. We suggest that there might need to be slightly different time spans in more rural areas of Moldova but 10 minutes should be achieved in small or bigger towns. Shoud ambulances crews not be able to arrive within the defined time period there will be efforts address longer response times and there might be efforts to relocate the ambulances or increase the number of ambulances.

References

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[6] Pocket book of hospital care for children, Guidelines for the management of common illnesses with limited resources, ISBN: 9241546700, World Health Organization, 2013 http://www.who.int/maternal_child_adolescent/documents/9241546700/en/

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