Improving the Quality of Hospital Care

Strengthening primary health care by avoiding unnecessary hospitalizations in Tajikistan

Health systems evaluation report
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Health systems evaluation report
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Executive summary

Observations from completed WHO assessment visits in countries in the WHO European Region show that children and pregnant women with common conditions are often admitted to hospital when they could be managed safely in primary care. Previous observations also suggest that treatment of common childhood conditions often includes multiple unnecessary and invasive drugs, use of which is neither evidence-based nor in line with international guidelines.

The health systems evaluation was carried out in Tajikistan with the overall goal of strengthening primary health care (PHC) in the country. Its four aims were to:

• determine hospitalization rates in children and pregnant women over the previous 10 years;
• identify the main causes of hospitalization in these population groups;
• quantify and understand the reasons for unnecessary and unnecessarily prolonged hospitalizations in children and pregnant women; and
• assess and quantify antibiotic use and polypharmacy in children and pregnant women admitted to hospitals for common conditions.

The evaluation was conducted by WHO in collaboration with the Ministry of Health and Social Protection of the Population of Tajikistan. National data were collected from the Republican Medical Statistics and Information Centre of the Ministry. In September and October 2021, WHO international and national consultants and a technical working group (TWG) from the Ministry – including paediatricians and obstetricians – visited 15 hospitals across the country to collect data on unnecessary hospitalizations and use of antibiotics. In each hospital, 30–40 medical records of children and 30–40 medical records of pregnant women hospitalized between January and September 2021 were selected randomly. Inclusion criteria for reviewing the selected records were:

• hospitalized children aged 2–59 months with a primary diagnosis of acute respiratory infection (upper respiratory tract infections, pneumonia, acute bronchitis/bronchiolitis or other lower respiratory tract infections) or intestinal infection (diarrhoea); and
• hospitalized pregnant women with a primary diagnosis of premature labour, threatening abortion, haemorrhages in pregnancy, spontaneous abortion, premature ruptures of membranes or mild pre-eclampsia.

Data were collected on baseline characteristics (including age, time of admission and referral), and on whether/which antibiotics were received prior to admission and drugs were prescribed during hospitalization. Reasons for hospitalization were assessed against standards of care to classify them as necessary or unnecessary. Clinical data on the evolution of the patient’s condition were reviewed and compared against pre-defined discharge criteria to assess whether hospitalizations were unnecessarily long.
National hospitalization rates

National data show that hospitalization rates in Tajikistan were stable between 2011 and 2019, with an average 116.9 hospitalizations per 1000 population per year. In 2020, coinciding with the COVID-19 pandemic, this dropped to 91.5 hospitalizations per 1000 population per year, across all age groups. These data were confirmed by the assessment team’s analysis of monthly hospitalizations at the hospitals visited. Provision of health care services was disrupted during 2020 owing to the repurposing of some hospitals for the COVID-19 response.

Most common diagnoses for admitting children and pregnant women

According to national data, the most common diagnoses reported for hospitalized children between 2011 and 2020 were acute respiratory infections (including upper respiratory tract infections, pneumonia and other acute lower respiratory tract infections), intestinal infections (diarrhoea) and viral hepatitis. The proportion of hospitalizations due to acute respiratory infections was highest in 2020, coinciding with the COVID-19 pandemic, while the proportion of intestinal infections was the lowest since 2011. The latter may be explained in part by the emphasis on hand hygiene during the pandemic, together with limited contacts among children because of the restrictions put in place. In hospitalized pregnant women, oedema, proteinuria and hypertension disorders (including mild and severe pre-eclampsia and eclampsia), venous complications and bleeding were the most common obstetric diagnoses between 2011 and 2020.

Review of medical records – main characteristics

Across the 15 hospitals, 512 records were reviewed for children and 507 for pregnant women. Among these, 440 children and 422 pregnant women met the inclusion criteria and were included in the analysis. The median ages were 13 months among the children and 24 years among the pregnant women. Half of the hospitalized children and two thirds of the hospitalized pregnant women were referred from PHC facilities or other hospitals. Around 8% of the children and pregnant women were admitted during night-time (22:00–06:00). Two thirds of the children were hospitalized with a primary diagnosis of a respiratory infection, and the remaining third with a primary diagnosis of diarrhoea or acute gastroenteritis, including one child with ascariasis and one child with dysentery and confirmed amoebiasis. Half of the pregnant women were hospitalized due to preterm labour. The other half were hospitalized for threatening late or early abortion (15.2% each), haemorrhage (7.1%), mild pre-eclampsia (4.0%), premature rupture of membranes (3.1%) or spontaneous abortion (2.8%). Anaemia was common among both the children (40.5%) and pregnant women (52.6%).

Unnecessary hospitalizations

Unnecessary hospitalizations were common, accounting for 40.5% of hospitalizations among children and 69.2% among pregnant women. The proportion of unnecessary hospitalizations was higher among children with acute respiratory infections (62.7%) and lower among children with acute bronchitis or acute bronchiolitis (19.8%). Among the unnecessary hospitalizations, fever was a frequent reason mentioned for admitting children to hospital. The proportion of unnecessary hospitalizations of pregnant women was higher among those presenting with preterm labour (84.2%) and threatening early (68.8%) or late (79.7%) abortion. No differences were found in the proportions of unnecessary hospitalizations admitted during daytime (06:00–22:00) and night-time (22:00–06:00), or between patients who were from PHC facilities or other
hospitals and those who were not. The proportion of unnecessary hospitalizations ranged from 0% to 71.8% among the 13 hospitals for children, and from 31.4% to 97.2% among the 12 hospitals for pregnant women. A considerable proportion of unnecessary hospitalizations (of children and pregnant women) were from PHC facilities or other hospitals, suggesting unnecessary referrals and scope for improvement by strengthening PHC.

**Duration of hospitalization and unnecessarily prolonged hospitalizations**

Children were hospitalized for an average of eight days and pregnant women for an average of seven days. The duration of hospitalization did not differ between necessary and unnecessary hospitalizations.

All unnecessary hospitalizations were also automatically classified as unnecessarily prolonged. Among necessary hospitalizations, 63.0% (160/254) were unnecessarily prolonged in children and 39.2% (51/130) in pregnant women. In children, the proportion of unnecessarily prolonged hospitalizations did not differ significantly by diagnosis. In pregnant women, the highest proportions of unnecessarily prolonged hospitalizations were among those presenting with threatening early (55.0%) or late (69.2%) abortion, and preterm labour (54.3%). Unnecessarily prolonged hospitalizations were more prevalent among children aged 12–59 months than among infants aged 2–11 months (69.3% versus 55.6%). They were also more prevalent among children in regional hospitals than those in city or district hospitals (68.0% versus 60.9%). The proportion of unnecessarily prolonged hospitalizations varied significantly between hospitals – from 26.3% to 94.6% for children and from 0% to 80% for pregnant women.

**Antibiotic use and polypharmacy**

Antibiotic use was very high, mostly unnecessary and not based on evidence or in line with guidelines among children and pregnant women. One in three children received at least one antibiotic prior to admission. More than half of these antibiotics were given intramuscularly. Most children (92.5%) received at least one antimicrobial during hospitalization, and 26.1% received at least two. The antibiotics most frequently prescribed were ampicillin, ceftriaxone, cefotaxime, gentamicin and amikacin. Most (90.9%) were given parenterally, with at least 79.7% given by intramuscular injection. Almost all children (95.6%) hospitalized with an acute respiratory infection received at least one antimicrobial – most commonly a penicillin or a third-generation cephalosporin. Among children with diarrhoea (intestinal infection), 85.9% received at least one antimicrobial, despite only one child being diagnosed with dysentery.

Among pregnant women, 28.9% were prescribed unreasonable antibiotic therapy – mainly ampicillin – by obstetrician/gynaecologists or related specialists, without clinical manifestation or laboratory confirmation of non-obstetric diagnoses during hospitalization.

During hospitalization, children received an average of 5 drugs and pregnant women an average of 6–7 drugs. Children and pregnant women were frequently prescribed medication when it was not indicated, or with no evidence of benefits. Prescriptions for children included antihistamines, homeopathic interferons, probiotics, spasmolytics, mucolytics and vitamin complexes; and for pregnant women included magnesium, valerian, papaverine suppositories, various types of vitamin, vitamin C and herbal tea for kidney diseases.
Next steps

**Suggested actions to reduce unnecessary hospitalizations and strengthen PHC**

The Ministry of Health and Social Protection of the Population and the assessment team agreed that the main areas for further action are:

- reviewing and potentially revising national regulations that mandate hospitalizations;
- reviewing existing funding and financing mechanisms to identify potential incentives for unnecessary hospitalization;
- investing savings made from the reduction in unnecessary hospitalizations in the salaries of health-care workers – at both hospital and PHC level – as low earnings are one of the main reasons for “brain drain” from Tajikistan and are a major determinant of quality of care.

To this end, the next steps proposed are:

- the Ministry presenting the findings within the context of the quality-of-care project Prikaz No. 708 funded by the Russian Federation to improve quality of hospital care for mothers and children;
- the Ministry considering extending the health system evaluation of unnecessary hospitalizations to the 10 pilot hospitals involved in the previous phase of the quality-of-care project, in order to evaluate the impact of WHO approaches to quality-of-care improvement and take corrective actions for the current phase, if required;
- the Ministry considering carrying out a root-cause analysis to understand the reasons for unnecessary hospitalizations, with a focus on patient/parent and professional behaviour, through:
  - key informant interviews with patients and caregivers to gain greater understanding of both perceptions of the quality of care provided at PHC facilities and hospitals and medical care-seeking behaviour;
  - key informant interviews with doctors to establish the determinants of unnecessary hospitalizations;
- the Ministry, TWG and WHO carrying out further work to understand the root causes of unnecessary hospitalization – engaging in participatory policy dialogue and applying small systems changes with the aim of strengthening PHC, including but not limited to:
  - reviewing rules and regulations to identify which hospitalizations are mandated by law;
  - reviewing existing funding and financing mechanisms to identify potential incentives for unnecessary hospitalization, with the aim of using the savings generated to increase the extremely low salaries of health-care workers;
  - strengthening PHC, including improving infrastructure, financing and capacity-building of staff (potentially within the context of the European Union grant for strengthening PHC);
  - developing and implementing a plan to raise awareness of the harm of unnecessary hospitalization (potentially with partners including the United Nations Children’s Fund) and engage in a participatory policy dialogue with the population to find ways to improve the health care system and avoid unnecessary harm.
**Suggested actions to improve rational use of antibiotics and other medications**

Unnecessary use of antibiotics is harmful for the child, mother and unborn baby; it is also a threat to society through creation of antimicrobial resistance. The assessment’s findings indicate scope for strengthening rational use of antibiotics (including correct indication, choice of antibiotics and route of administration) and community awareness-raising on the ineffectiveness of antibiotics for viral infections to ensure better use.

The Ministry of Health and Social Protection of the Population and the assessment team proposed the following steps to provide a basis for policy change and implementation, leading to rational use of antibiotics:

- the Ministry using the assessment’s findings to raise awareness about overuse of antibiotics in children and pregnant women during World Antimicrobial Awareness Week;
- the Ministry considering the following actions to improve rational use of antibiotics:
  - revising or adopting and enforcing regulations restricting access to antibiotics over the counter;
  - adopting and enforcing adequate regulations controlling pharmaceutical industry access to health-care workers, to prevent their influence on prescribing practices for antibiotics and other medications;
  - reviewing financing schemes to identify potential incentives for misuse of antibiotics;
  - ensuring sound pre-service training and ongoing medical education;
  - supporting health-care workers at all levels and enabling them to adhere to treatment guidelines;
  - carrying out an awareness-raising campaign on the harms of misuse of antibiotics.

**Suggestions for action to strengthen data management systems**

During the COVID-19 pandemic, data were not always readily available for use in decision-making – for example, monthly hospitalization rates for children and pregnant women were collected and reported, but were not used to monitor real-time utilization of care. The following steps are therefore proposed for the Ministry of Health and Social Protection of the Population, with WHO support:

- continuing efforts to strengthen the health information system nationwide to facilitate timely collection of data used for decision-making at all levels;
- improving knowledge and reporting of diagnoses, including coding by health-care staff using International Classification of Diseases, 10th revision;
- involving and building the capacity of clinical staff in data collection, promoting use of data to improve and monitor progress in medical care, and counteracting the punitive culture around reporting.
1. Introduction

Observations from completed WHO assessment visits to countries in the WHO European Region show that paediatric patients with conditions such as upper respiratory virus infections, pneumonia and diarrhoea are often admitted to hospital for treatment, and the available data support such observations (1). Such conditions, however, can often be managed in primary care rather than in an inpatient context. Multiple studies have shown that hospitalization of children and adolescents can lead to unnecessary psychological, emotional and physical disturbances (2–4). A study found that long hospital stays negatively affected the development of toddlers (5). Hospitalizations can also lead to increased familial stress, disruption of education due to missed school days, an increased risk of nosocomial infections and a considerably larger financial burden incurred by both patients and health facilities (6). Similarly, hospitalization of pregnant women can lead to unnecessary psychological, emotional and physical impacts (7–9). Further, patients requiring justified hospital care should be hospitalized only for the time that is strictly required, as unnecessarily prolonged hospital stays also contribute to the negative impacts noted above. As such, timely discharge is a recognized criterion used to assess quality of care of hospitalized children (10).
Hospitalization is considered unnecessary when the disease or condition could have been managed safely and entirely in a primary health care (PHC) setting. Unnecessary hospitalizations differ from potentially avoidable hospitalizations: avoidable hospitalizations might be avoided through government policies ensuring adequate socioeconomic resources and access to high-quality housing; access to timely, appropriate and affordable PHC; and implementation of promotion strategies (11).

Obtaining data on unnecessary hospitalizations of children, adolescents and pregnant women could:

- significantly improve understanding of current barriers to PHC access and utilization;
- aid identification of socioeconomic factors that influence health-care-seeking behaviours; and
- help to improve appropriate delivery and use of health services.

In addition, observations from completed WHO assessments suggest that treatment of common childhood conditions often includes prescriptions of multiple unnecessary and invasive drugs, use of which is neither evidence-based nor in line with international guidelines (12). Fears associated with the COVID-19 pandemic may have exacerbated such practices, leading to overuse of antibiotics for viral infections. Misuse of antibiotics is of particular concern for two reasons: its potential to cause direct harm to patients and its role in accelerating antimicrobial resistance – a global public health challenge. On the other hand, it is commonly found that patients and caregivers do not feel well taken care of if their doctor does not prescribe medication. This perception is likely to exacerbate prescription of unnecessary drugs.

Assessing prescription of antimicrobials and other drugs for common conditions in hospitalized children and pregnant women – and analysing the context of their prescription – will improve understanding of the magnitude of the problem. This will allow policy-makers to develop and implement targeted solutions to improve prescription of antibiotics and drugs following evidence-based international guidelines, and will contribute to strengthening PHC overall.

The health systems evaluation in Tajikistan was carried out within the context of the quality-of-care project Prikaz No. 708 from 12 August 2021, funded by the Russian Federation. The project was managed by the WHO Regional Office for Europe and WHO Country Office in Tajikistan, in collaboration with a technical working group (TWG) from the Ministry of Health and Social Protection of the Population, and was partly funded by the Bill and Melinda Gates Foundation in the context of mitigating the indirect impact of COVID-19 on maternal and child health services.

1.1 Purpose of the evaluation

The health assessment evaluation was carried out in Tajikistan with the aim of:

- determining hospitalization rates in children and pregnant women over the previous 10 years;
- identifying the main causes of hospitalization in these population groups;
- quantifying and understanding the reasons for unnecessary and unnecessarily prolonged hospitalizations in children and pregnant women; and
• assessing and quantifying antibiotic use and polypharmacy in children and pregnant women admitted to hospitals for common conditions.

2. Methodology

The health assessment evaluation was conducted through national and hospital data collection, as summarized in Fig. 1 and detailed below.

![Flow diagram of data collection for the assessment](image)

**2.1 National data collection**

National hospitalization rates per year from 2011 to 2020 for children aged under 18 years and pregnant women were requested and collected from the Republican Medical Statistics and Information Centre of the Ministry of Health and Social Protection of the Population. The main causes of hospitalizations during this period were collected for four groups: children aged 0–17 years, infants aged 0–11 months, children aged 1–4 years and pregnant women.

**2.2 Hospital data collection**

The health system evaluation was conducted in September and October 2021 in 15 public hospitals throughout Tajikistan (Table 1), including the 10 district hospitals identified for the quality-of-care project Prikaz No. 708 funded by the Russian Federation. Three international and national WHO consultants were assigned to conduct overall data collection. A TWG was established by the Ministry of Health and Social Protection of the Population to work jointly on this assessment, comprising three obstetricians, two paediatricians and one expert from the Statistics Department. They travelled to selected hospitals for quantitative data collection and conducted interviews with key informants, including health-care providers, patients and caregivers. Prior to data collection, a one-day workshop was conducted to train the team on data collection and to finalize the hospitalization criteria for each of the selected conditions for pregnant women.
Table 1. Hospitals included in the health system evaluation

<table>
<thead>
<tr>
<th>Regional hospitals</th>
<th>City/district hospitals</th>
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<tbody>
<tr>
<td>• Child Infection Hospital, Dushanbe</td>
<td>• Maternity #2, Dushanbe</td>
</tr>
<tr>
<td>• Istiqol Hospital, Dushanbe</td>
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<tr>
<td>• Republican Hospital Karabolo, Dushanbe</td>
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<tr>
<td>• Khujand Child Clinical Hospital</td>
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**Rayon Republican Subordinations**

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<th>Rayon Republican Subordinations</th>
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<tr>
<td>• Gissar Central District Hospital</td>
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<tr>
<td>• Rudaki Central District Hospital</td>
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<tr>
<td>• Tursunzade Central District Hospital</td>
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<td>• Vahdat Central District Hospital</td>
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**Soghd Region**

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<tr>
<td>• Ayni Central District Hospital</td>
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<td>• Isfara Central District Hospital</td>
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<td>• Istaravshan Central District Hospital</td>
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<tr>
<td>• Kanibadam Central District Hospital</td>
</tr>
<tr>
<td>• Khujand City Maternity Hospital</td>
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<tr>
<td>• Penjikent Central District Hospital</td>
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</tbody>
</table>

### 2.2.1 Hospitalizations and commonest diagnoses

At each hospital, the numbers of children and pregnant women hospitalized in 2019 and 2020 were collected – monthly or quarterly, and for the 10 commonest diagnoses, when available. These two years were chosen to be representative of the situation prior to the COVID-19 pandemic and of the first year of the pandemic.

### 2.2.2 Evaluation of unnecessary and unnecessarily prolonged hospitalizations

Reasons for hospitalization were reviewed for children aged 2–59 months and pregnant women up to 37 weeks of gestation. The focus was on children aged 2–59 months as this age group constitutes the largest proportion of paediatric hospitalizations, and because WHO standards of care are broadly adopted for in Tajikistan for hospital care in this age group (13), facilitating a straightforward assessment of care against these standards.

Medical records were reviewed for children aged 2–59 months hospitalized with a primary diagnosis of acute respiratory infection or intestinal infection (diarrhoea), and for pregnant women up to 37 weeks of gestation hospitalized with a primary diagnosis of premature labour including threatening and starting premature labour, threatening miscarriage, premature rupture of membranes or mild pre-eclampsia (Table 2). These primary diagnoses were chosen as they were identified as the commonest causes of hospitalization for these population groups in Tajikistan through the national-level data collected in the first part of the evaluation. Codes used are from the International Classification of Diseases, 10th revision (ICD-10).
Strengthening primary health care by avoiding unnecessary hospitalizations in Tajikistan

Table 2. Inclusion criteria for evaluation of unnecessary hospitalizations

<table>
<thead>
<tr>
<th>Children</th>
<th>Pregnant women</th>
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<tbody>
<tr>
<td>• Hospitalized (admitted to the ward and staying overnight)</td>
<td>• Hospitalized (admitted to the ward and staying overnight)</td>
</tr>
<tr>
<td>• Aged 2–59 months</td>
<td>• Confirmed pregnancy up to 37 weeks of gestation</td>
</tr>
<tr>
<td>• Primary diagnosis (ICD-10 code) of:</td>
<td>• Primary diagnosis (ICD-10 code) of:</td>
</tr>
<tr>
<td>o upper respiratory infection (J00–J06)</td>
<td>o premature labour up to 37 weeks of gestation, including threatening and starting premature labour (O60)</td>
</tr>
<tr>
<td>o pneumonia (J12–J18)</td>
<td>o threatening miscarriage up to 22 weeks of gestation (O20–O20.9)</td>
</tr>
<tr>
<td>o acute bronchitis (J20)</td>
<td>o premature rupture of membranes (O42.2)</td>
</tr>
<tr>
<td>o acute bronchiolitis (J21)</td>
<td>o mild pre-eclampsia (O14.0)</td>
</tr>
<tr>
<td>o other acute lower respiratory tract infection (J22)</td>
<td>o intestinal infection (diarrhoea) (A00–A09)</td>
</tr>
<tr>
<td>o other acute lower respiratory tract infection (J22)</td>
<td>o intestinal infection (diarrhoea) (A00–A09)</td>
</tr>
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Unnecessary hospitalization was defined as hospitalization for a disease or condition that could have been entirely managed in a PHC setting and did not need hospitalization according to defined standards of care. To determine whether a hospitalization was unnecessary, the clinical characteristics at the time of admission for the primary condition leading to hospitalization (such as pneumonia or premature labour) were reviewed from the medical records and compared against standards of care (see Annex 1 for the standards used for children and Annex 2 for those used for pregnant women). For each patient meeting the inclusion criteria, the hospitalization was judged to be:

- **necessary** if a clear criterion for hospitalization was found in the medical records (such as oxygen saturation of 84% in a child with a primary diagnosis of pneumonia or bleeding in a pregnant woman with threatening miscarriage);
- **unnecessary** if all the hospitalization criteria were reported in the medical records and the child or pregnant woman did not meet any of these; or
- **unclear** if information was missing from the medical records so that a clear judgement on whether it was necessary or unnecessary could not be made.

Unnecessarily prolonged hospitalization was defined as hospitalization that lasted for 24 or more hours longer than strictly required – i.e. when discharge criteria were present for 24 or more hours before the patient was discharged from the hospital. Clinical data on the evolution of the patient’s condition during hospitalization were reviewed from the medical records and compared against established discharge criteria (see Annex 1 for the discharge criteria used for children and Annex 2 for those used for pregnant women). For each patient included, hospitalization was interpreted as:

- **not unnecessarily prolonged** when the patient was discharged on time;
- **unnecessarily prolonged** when the patient presented all discharge criteria for at least 24 hours prior to discharge and had no new hospitalization criteria; or
- **unclear** if information was missing from the medical records so that a clear judgement on whether it was unnecessarily prolonged or not could not be made.
All unnecessary hospitalizations were also automatically classified as unnecessarily prolonged.

2.2.3 Participant selection and data collection

For children, medical records were selected from the paediatric ward or from relevant paediatric departments in the case of larger regional hospitals (such as the Pneumology Department at Istiqlol Hospital to target children with respiratory infections). For pregnant women, medical records were selected from the maternity wards of pregnancy pathology departments.

In every hospital, 30–40 paediatric medical records and 30–40 medical records of pregnant women were randomly selected from those hospitalized between January and September 2021. The evaluation team selected one in every 3 or 10 medical records, until the agreed number of records was obtained. The number of medical records to review was chosen for feasibility and based on previous similar work (14).

Baseline characteristics of each patient selected were extracted from medical records and recorded in a digitalized database (using an Excel file). Hospitalization was then assessed as necessary or unnecessary as described above and recorded in the database. Lastly, data on antibiotics received in the days prior to admission and all medication received during hospitalization were collected.

For patients who did not fulfil the inclusion criteria – because they were younger than 2 months, older than 5 years, pregnant at more than 37 weeks of gestation or hospitalized with a primary diagnosis other than those of interest – baseline characteristics data were only recorded for age, duration of hospitalization and primary diagnosis.

2.2.4 Interviews with key informants

Interviews were conducted with key informants to gain insight into various aspects related to hospitalization – mainly to establish reasons for admission, to help identify barriers to management of such cases in PHC settings and to determine the net economic benefits of each hospitalization. More specifically, questions were asked to understand the following points.

Interviews with health-care providers aimed to gain understanding of:

- the functioning of the department: number of health-care workers (doctors, nurses), number of beds, bed occupancy rates, circuit for child admission, visits to PHC centres and referrals, and cost of hospitalization for the family;
- guidance used for clinical management and referral – in particular, the routine use of WHO’s Pocket book of hospital care for children (13) and any reflections on the content of this related to their practice; and in pregnant women, follow-up and use of clinical protocols for management of high-risk pregnancies and deliveries, and use of referral guidelines for hospital care of pregnant women (for referral to district hospitals);
- other aspects related to hospitalization or that could influence the duration of hospitalization, such as use of pulse oximeters, oxygen availability, performance of investigations and communication of findings and treatment of anaemia or other diseases;
- their perceptions of the main reasons for hospitalizations and use of antibiotics.
All interviews were confidential and were not recorded.

2.3 Data management and analysis
Quantitative data were analysed with Microsoft Excel and Stata 16.0 (15) and presented in tables and graphs.

Interviewers took notes from the discussions during the interviews. These findings were analysed, coded and discussed by the assessment team using an inductive thematic analysis.

3. Findings

3.1 Number of hospitalizations and hospitalization rates at the national level
Numbers of hospitalizations and hospitalization rates per year in Tajikistan were relatively stable between 2011 and 2019, with an average of 977 168 hospitalizations (among the whole population) and 116.9 hospitalizations per 1000 population per year (Fig. 2 and Fig. 3). In 2020, coinciding with the COVID-19 pandemic, these indicators dropped to 861 077 hospitalizations – an average of 91.5 hospitalizations per 1000 population per year, across all age groups. In 2019, 258 042 children aged under 18 years were hospitalized; this dropped to 190 986 in 2020.

Fig. 2. Hospitalizations per year in Tajikistan, 2011 to 2020

Data source: Republican Medical Statistics and Information Centre, Ministry of Health and Social Protection of the Population.
3.2 Number of hospitalizations in selected hospitals in 2019 and 2020

Overall, lower number of hospitalizations were reported in 2020 compared to 2019 across all the selected hospitals. This trend was observed among children aged under 18 years (Fig. 4) (see Annex 3 for data on infants aged 0–11 months and young children aged 1–4 years) and among pregnant women (Fig. 5).

In some hospitals, the number of hospitalizations was extremely reduced — sometimes down to nil — from February, March or April 2020, coinciding with the start of the COVID-19 pandemic. Provision of health care services was affected in Tajikistan during the first months of the pandemic. Indeed, Istiqlol Hospital was closed for three months and the Child Infection Hospital in Dushanbe for eight months to keep these centres reserved for COVID-19 patients, but they were not occupied during these periods, according to health-care workers during the assessment team's visits to these facilities. In Istaravshan, no hospitalization data were collected in 2020.

Data source: Republican Medical Statistics and Information Centre, Ministry of Health and Social Protection of the Population.
Fig. 4. Hospitalizations of children aged under 18 years, selected hospitals, 2019 and 2020
Strengthening primary health care by avoiding unnecessary hospitalizations in Tajikistan

Note: the scale of the vertical axis varies between the graphs.

Data source: Republican Medical Statistics and Information Centre, Ministry of Health and Social Protection of the Population.

Fig. 5. Hospitalizations of pregnant women, selected hospitals, 2019 and 2020
Note: the scale of the vertical axis varies between the graphs.

Data source: Republican Medical Statistics and Information Centre, Ministry of Health and Social Protection of the Population.

3.3 Commonest diagnoses in hospitalized children

Acute respiratory infections comprising upper respiratory tract infections (ICD-10 codes J00–J06), pneumonia (J12–J18) and other acute lower respiratory tract infections (J20–J22), intestinal infections (A00–A09) and viral hepatitis (B15–B19) were the commonest diagnoses in hospitalized children between 2011 and 2020. Other common diagnoses among hospitalized children in the country included acute appendicitis (K35), hernia (K40–K46), diseases of the skin
and subcutaneous tissue (L00–L99), anaemia (D50–D64), chronic bronchitis (J40–J42), diseases of the eye (H00–H59), and diseases of the ear and mastoid process (H60–H95). Fig. 6 shows the trend of the proportion of the commonest diagnoses between 2011 and 2020. The proportion of hospitalizations due to acute respiratory infections was highest in 2020, coinciding with the COVID-19 pandemic, while the proportion of intestinal infections (diarrhoea) was the lowest since 2011. The latter may be explained in part by the emphasis on hand hygiene during the pandemic, together with limited contacts among children because of the restrictions put in place.

**Fig. 6. Commonest diagnoses in hospitalized children aged under 18 years, 2011 to 2020**

![Bar chart showing the commonest diagnoses in hospitalized children aged under 18 years, 2011 to 2020.]

*Notes:* LRTI: lower respiratory tract infection; URTI: upper respiratory tract infection.  
*Data source:* Republican Medical Statistics and Information Centre, Ministry of Health and Social Protection of the Population.

The distribution of acute respiratory infections and intestinal infections (diarrhoea) were similar in infants aged 0–11 months and children aged 1–4 years (Fig. 7). In these two subgroups, the number of hospitalizations due to diarrhoea in 2020 was lower than that for upper respiratory infections for the first time in 10 years.
Fig. 7. Hospitalizations for acute respiratory infections and intestinal infections in children by age group, 2011 to 2020

Notes: LRTI: lower respiratory tract infection; URTI: upper respiratory tract infection

Data source: Republican Medical Statistics and Information Centre, Ministry of Health and Social Protection of the Population.

In hospitalized children aged 1–4 years, cerebral palsy (ICD-10 code G80) and burns and corrosions (T20–T32) were also found among the 10 commonest diagnoses, but these always ranked behind respiratory and intestinal infections.

In infants aged 0–11 months, conditions originating in the perinatal period (P00–P96) always ranked highest between 2011 and 2020. This broad category of diagnoses was not disaggregated into more specific diagnoses in the national data made available. In this age group, sepsis (A40–A41) constantly ranked in the sixth position after perinatal diseases, acute respiratory infections and intestinal infections (Fig. 8).
Fig. 8. Hospitalizations for the commonest diagnoses, infants aged 0–11 months, 2011 to 2020

![Graph showing hospitalizations for commonest diagnoses, 2011 to 2020](image)

**Notes:** LRTI: lower respiratory tract infection; URTI: upper respiratory tract infection

**Data source:** Republican Medical Statistics and Information Centre, Ministry of Health and Social Protection of the Population.

3.4 Commonest diagnoses in hospitalized pregnant women

According to the data from Medical Statistics and Information Centre of the Ministry of Health and Social Protection of the Population, oedema, proteinuria and hypertension disorders (ICD-10 codes O10–O16), venous complications (O22) and obstetrics bleeding (O20, O46) were the commonest diagnoses in hospitalized pregnant women between 2011 and 2020. Fig. 9 shows the increasing trend of the proportion of venous complications, overtaking hypertension disorders consistently in recent years. The data collected for 2011–2020 show that the leading condition of hospitalization of pregnant women was hypertensive disorders, which are characterized as one of the most common complications during pregnancy and potential causes of maternal mortality.

Fig. 9. Hospitalizations for the commonest obstetric diagnoses, 2011 to 2020

![Graph showing hospitalizations for commonest obstetric diagnoses, 2011 to 2020](image)

**Data source:** Republican Medical Statistics and Information Centre, Ministry of Health and Social Protection of the Population.
Changes in hospitalizations for pre-eclampsia and eclampsia (O14.0, O14.1 and O15) over the last 10 years are detailed in Fig. 10. It should be noted that until 2014 the data were collected in one group, combining pre-eclampsia and eclampsia. From 2014, the data were disaggregated into sub-categories as mild pre-eclampsia, severe pre-eclampsia and eclampsia, in recognition of how serious a condition this can become. The data show the evolution of cases of mild and severe pre-eclampsia, which remain high. The higher number of cases in 2014 could be due to the change in data collection.

Fig. 10. Hospitalizations for pre-eclampsia and eclampsia, 2011 to 2020

Data source: Republican Medical Statistics and Information Centre, Ministry of Health and Social Protection of the Population.

Fig. 11 shows number of hospitalizations of pregnant women for the commonest non-obstetric diagnoses between 2011 and 2020. The commonest diagnoses were anaemia (O99.0); endocrine, nutritional and metabolic disorders complicating pregnancy (O99.2); infections of the genitourinary tract in pregnancy (O23); and diseases of the cardiovascular system complicating pregnancy (O99.4). The high rate of anaemia among pregnant women is one of the most frequent complications related to pregnancy and is linked closely to the second commonest diagnoses of endocrine, nutrition and metabolic disorders.
Overall, 512 medical records were reviewed for children and 507 for pregnant women.

### 3.5 Review of medical records

At each hospital selected, the team reviewed 38–43 medical records of hospitalized children and 40–53 records of hospitalized pregnant women, except in the first hospital visited, where 28 paediatric medical records were reviewed, while the team was becoming familiar with the methodology and data collection tools.

Overall, 512 records were reviewed for children and 507 for pregnant women.

### 3.6 Baseline characteristics of children and pregnant women

#### 3.6.1 Children

A total of 512 medical records of hospitalized children were reviewed from 13 hospitals. Records were randomly selected from January to September 2021, except for one hospital, which was closed due to COVID-19 for a few months at the beginning of 2021 and remained closed for a few more months for renovation. In that hospital, records from January to December 2020 were reviewed. Among the reviewed records, 440 met the inclusion criteria and were included in the analyses. Reasons for exclusion of the 72 medical records were:

- child’s age was under 2 months or over 59 months (47 children);
- child was hospitalized for less than 12 hours (2 children); and
- primary diagnosis was something other than respiratory or intestinal infections (17 children).

Reasons for exclusion were not collected in the first hospital visited while the data collection tool was being piloted (6 children).

The average age of children was 15.8 months (median 13 months; interquartile range (IQR) 7–20.5 months). Half of the children (205/410) were referred from PHC facilities or other hospitals. Overall, 7.7% (34/440) of the children were admitted during night-time (22:00–06:00).
Around two thirds of the children were hospitalized with a primary diagnosis of respiratory infection, including pneumonia (20.7%), acute bronchitis (18.2%), acute bronchiolitis (1.4%), bronchopneumonia (0.7%), acute laryngotracheitis (0.4%) and acute respiratory infection (26.3%). The remaining third were hospitalized with a primary diagnosis of diarrhoea or acute gastroenteritis, including one child with ascariasis and one child with dysentery and confirmed amoebiasis. These diagnoses are based on the terms written by the medical staff in the medical records. The assessment team intended to conduct analysis using ICD-10 coding, but such data were not available for a considerable proportion of the files, and coding did not correspond to the written diagnoses in some cases (for example, J41 or J44 – the codes for simple and mucopurulent chronic bronchitis and other chronic obstructive pulmonary disease – were used in several cases of acute bronchitis, and A44 – the code for bartonellosis – was used in a case of acute bronchitis). Due to the small number of children in some of the categories, the assessment team merged children with pneumonia and bronchopneumonia (categorized as “pneumonia”), those with acute bronchitis and bronchiolitis (categorized as “acute bronchitis/bronchiolitis”), and those with acute laryngotracheitis and acute respiratory infections (categorized as “acute respiratory infections”), and considered four groups of primary diagnoses for further analysis (Fig. 12).

**Fig. 12. Main primary diagnoses in children**

![Graph showing proportions of children with different diagnoses](image)

Other common diagnoses present at admission or during hospitalization in children are presented in Fig. 13. The most common conditions were anaemia (reported in 40.5% of the children) and neurotoxicosis (11.8%). Reporting of secondary diagnoses differed by hospitals. In one hospital, for example, all children except one were diagnosed with anaemia.

**Fig. 13. Other diagnoses in children at admission or during hospitalization**

![Graph showing percentages of children with different diagnoses](image)

*Notes: febrile seizure was specified for one child. The diagnosis of sepsis was questioned for three of these children.*
3.6.2 Pregnant women

A total of 507 medical records of pregnant women hospitalized between January and September 2021 were randomly selected and reviewed from 12 hospitals. Among these, 422 met the inclusion criteria and were included in the analyses. The reason for exclusion was a primary diagnosis other than those selected for the purpose of this evaluation.

The median age of the pregnant women was 24 years. More than half (56.9%) were aged 18–24 years, 35.8% were aged 25–34 years and 7.3% were aged 35–44 years. Almost two thirds of the women (64.7%) were referred from PHC facilities or other hospitals. Overall, 7.8% (33/422) of the women were admitted during night-time (22:00–06:00).

Half of the pregnant women were hospitalized due to preterm labour (52.6%). In many medical records, the diagnosis of threatening preterm labour did not match the ICD-10 coding reported. The other pregnant women were hospitalized with a primary diagnosis of threatening late or early abortion (15.2% each), haemorrhage (7.1%), mild pre-eclampsia (4.0%), premature rupture of membranes (3.1%) or spontaneous abortion (2.8%) (Fig. 14).

Almost half of the pregnant women (47.9%) had a secondary diagnosis of anaemia, and 21.8% had a diagnosis of chronic pyelonephritis. Other secondary diagnoses were goitre and underweight (Fig. 15).

3.7 Unnecessary hospitalizations

Across all the hospitals visited, 40.5% (178/440) of hospitalizations of children and 69.2% (292/422) of hospitalizations of pregnant women were judged to be unnecessary. In a low proportion of medical records (1.8% in children and none in pregnant women), it was unclear
whether hospitalization was necessary or not, owing to missing information. This low proportion of unclear cases reflects good data reporting in the medical records throughout the hospitals visited.

### 3.7.1 By diagnosis

The proportion of unnecessary hospitalizations was highest among children with acute respiratory infections (62.7%), and lowest among children with acute bronchitis or acute bronchiolitis (19.8%) (Fig. 16). For children presenting with wheeze, WHO’s *Pocket book of hospital care for children* (13) recommends administration of a rapid-acting bronchodilator and reassessment of the child’s condition after 15 minutes. Hospitalization is then indicated in children who still have signs of severe pneumonia (oxygen saturation of below 90% or central cyanosis, severe respiratory distress or inability to drink due to respiratory distress) or fast breathing. In the hospitals visited in Tajikistan, however, the patient flow was organized in such a way that if a child showed signs of severe pneumonia in the admissions department, they usually did not receive a rapid-acting bronchodilator in that department but were hospitalized directly in the paediatric ward. This demonstrates a missed opportunity to identify children with wheeze responding well to a rapid-acting bronchodilator who could be managed at home, avoiding potentially unnecessary hospitalizations.

Fever was the main reason for hospitalization among those judged to be unnecessary. Other common reasons for unnecessary hospitalizations were fast breathing, not improving at home after a few days of disease, and family wish to have the child hospitalized.

**Fig. 16. Unnecessary hospitalizations in children among all diagnoses and by primary diagnosis**

![Bar chart showing the proportion of children in different diagnoses](chart)

In pregnant women, the proportion of unnecessary hospitalizations was highest among women presenting with preterm labour (84.2%) and those presenting with threatening early (68.8%) or late (79.7%) abortion (Fig. 17).

Following the clinical protocol for high-risk pregnancies, hospitalization for management of preterm labour is recommended in cases of three or more regular and irregular contractions of the uterus within 30 minutes, structural changes of the cervix and rupture of fetal membranes. In the hospitals visited, however, women were hospitalized based mainly on complaints (such as of abdominal pain) and the hospitalization criteria did not meet WHO recommendations and national clinical protocols. The same picture was observed in management of threatening abortion, where the criteria for hospitalization of bloody discharge and/or bleeding or cramping pains in the lower abdomen were not met.
3.7.2 By age, time of admission, referral and hospital level

In children, the proportions of unnecessary hospitalizations were similar between age groups (infants 2–11 months versus children 12–59 months); between children admitted during daytime (06:00–22:00) and night-time (22:00–06:00); between children referred from PHC facilities or other hospitals and those brought directly to the hospital by decision of the caregivers; and between regional and city or district hospitals (Fig. 18).

Fig. 18. Unnecessary hospitalizations in children by age group, time of admission, referral and hospital level

In pregnant women, the proportions of unnecessary hospitalizations were similar between women admitted during daytime (06:00–22:00) and night-time (22:00–06:00); and between women who were referred from PHC facilities or other hospitals and those who came by themselves (Fig. 19).
Fig. 19. Unnecessary hospitalizations in pregnant women by time of admission and referral

Most hospitalizations of pregnant women referred from antenatal care level were unjustified and based on requests from the pregnant women and her relatives (Fig. 20).

Fig. 20. Unnecessary hospitalizations in pregnant women who were referred, by primary diagnosis

3.7.3 By hospital

The proportion of unnecessary hospitalizations ranged from 0% to 71.8% among the 13 hospitals for children, and from 31.4% to 97.2% among the 12 hospitals for pregnant women (Fig. 21). The lowest and highest proportions of unnecessary hospitalizations for children and pregnant women were found in different hospitals.
3.7.3.1 By hospital and diagnosis in children

Fig. 22 shows the proportion of unnecessary hospitalizations for each hospital, by primary diagnosis in children. In one hospital (Hospital 13), no hospitalizations of children were unnecessary among the 37 medical records reviewed. Among the 22 children with primary diagnosis of respiratory infection (pneumonia, acute respiratory infection, acute bronchitis or acute bronchiolitis) in that hospital, 18 (81.8%) had data on oxygen saturation, and 13 (59.1%) received oxygen. The picture was different in another hospital (Hospital 3), where almost three out of four hospitalizations (71.8%) were unnecessary among the 39 medical records reviewed. In that hospital, oxygen saturation was reported for only three children, and none received oxygen therapy.

No pattern could be found across the hospitals on whether the proportion of unnecessary hospitalizations was higher among children with respiratory or intestinal infections. In Hospital 8, for example, the proportion of unnecessary hospitalizations was much higher among children with respiratory infections (85.0%) than among those with intestinal infections (19.1%), while in Hospital 4, the proportion of unnecessary hospitalizations was higher among children with intestinal infections (66.7%) than among those with respiratory infections (26.3%).
3.7.3.2 By hospital and diagnosis in pregnant women

In all hospitals except one (Hospital 3), the highest proportion of pregnant women with unnecessary hospitalizations were admitted with a primary diagnosis of preterm labour. The assessment team did not calculate the proportion of unnecessary hospitalizations of pregnant women by primary diagnosis for each hospital, due to the small number of cases in each subgroup. In addition, the commonest diagnosis in all hospitals was preterm labour.

3.7.3.3 By hospital and referral

In some hospitals, most unnecessary hospitalizations of children or pregnant women had been referred from PHC facilities or other hospitals, suggesting inadequate referral mechanisms and room for improvement by strengthening PHC (Fig. 23).
Fig. 23 Unnecessary hospitalizations of children and pregnant women referred from PHC facilities or other hospitals

Note: the hospitals in the graph were allocated random numbers to maintain anonymity of the findings; they do not follow the order of their listing in Table 1.

3.7.3.4 By use of WHO’s Pocket book in hospitals

WHO’s *Pocket book of hospital care for children* (13) was not introduced in the hospitals in the Soghd region, and health-care workers were not trained to use it. Nevertheless, the assessment team found no significant differences in the proportions of unnecessary hospitalizations in hospitals in the Soghd region versus the other hospitals where the *Pocket book* had been introduced (44.3% versus 37.7%, \( P = 0.110 \)).

3.8 Duration of hospitalization

Children were hospitalized for an average of 8 days (median 8, IQR 6–10) and pregnant women for an average of 7 days (median 7, IQR 4–8). The duration of hospitalization did not differ between necessary and unnecessary hospitalizations for either children or pregnant women. Children with a primary diagnosis of pneumonia were hospitalized for slightly longer (median 9 days, IQR 7–13) than children with other primary diagnoses. Among pregnant women, the shortest duration of hospitalization was found among those presenting with spontaneous abortion (median 2 days, IQR 1–5) (Fig. 24).
The duration of hospitalization varied by hospital in both children (Fig. 25) and pregnant women (Fig. 26).

An early discharge was requested by the parents of the children in 11 cases; 3 of these were judged to be unnecessarily prolonged hospitalizations. Information on early requested discharge was not part of the assessment’s data collection but was acquired from notes by some data collectors. As such, these data need to be considered anecdotal.

**Fig. 24. Duration of hospitalization in children and pregnant women, by primary diagnosis**

**Note:** the orange (children) and blue (pregnant women) dots show the median duration of hospitalization in days; the horizontal black lines show the IQR of duration.

**Fig. 25. Duration of hospitalization in children, by hospital**

**Notes:** the hospitals in the graph were allocated random numbers to maintain anonymity of the findings; they do not follow the order of their listing in Table 1. The orange dots show the median duration of hospitalization in days; the horizontal black lines show the IQR of duration.
Fig. 26. Duration of hospitalization in pregnant women, by hospital

![Graph showing duration of hospitalization in pregnant women by hospital]

**Notes:** the hospitals in the graph were allocated random numbers to maintain anonymity of the findings; they do not follow the order of their listing in Table 1. The blue dots show the median duration of hospitalization in days; the horizontal black lines show the IQR of duration.

### 3.9 Unnecessarily prolonged hospitalizations

All unnecessary hospitalizations were judged to be unnecessarily prolonged. Among necessary hospitalizations, 63.0% (160/254) were unnecessarily prolonged in children and 39.2% (51/130) were unnecessarily prolonged in pregnant women. Not enough data were available in the medical records to judge whether hospitalization was unnecessarily prolonged for five children, and data collection was missed for two children.

#### 3.9.1 By diagnosis

In children, the proportion of unnecessarily prolonged hospitalizations did not differ significantly by primary diagnosis (Fig. 27). In one hospital, all children with diarrhoea were asked for a stool culture and had to wait at least three days for the results before discharge. In many cases, it seems that a reason for unnecessarily prolonging hospitalization was perception of the need to complete a parenteral antibiotic course (according to notes in medical records and interviews with health-care staff).

Fig. 27. Unnecessarily prolonged hospitalizations among necessary hospitalizations in children, by primary diagnosis

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Proportion of unnecessarily prolonged hospitalizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>All diagnoses</td>
<td>63.0%</td>
</tr>
<tr>
<td>Intestinal infections</td>
<td>63.4%</td>
</tr>
<tr>
<td>Acute respiratory infections</td>
<td>61.0%</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>66.7%</td>
</tr>
<tr>
<td>Acute bronchitis/bronchiolitis</td>
<td>60.9%</td>
</tr>
</tbody>
</table>
In pregnant women, the highest proportions of unnecessarily prolonged hospitalizations were in those presenting with threatening early (55.0%) or late (69.2%) abortion, and preterm labour (54.3%) (Fig. 28).

Fig. 28. Unnecessarily prolonged hospitalizations among necessary hospitalizations in pregnant women, by primary diagnosis

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Proportion of unnecessarily prolonged hospitalizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>All diagnoses</td>
<td>39.2%</td>
</tr>
<tr>
<td>Threatening early abortion</td>
<td>55.0%</td>
</tr>
<tr>
<td>Threatening late abortion</td>
<td>69.2%</td>
</tr>
<tr>
<td>Haemorrhage in pregnancy</td>
<td></td>
</tr>
<tr>
<td>Spontaneous abortion</td>
<td>0.0%</td>
</tr>
<tr>
<td>Preterm labour</td>
<td>29.2%</td>
</tr>
<tr>
<td>Premature ruptures of membranes</td>
<td>54.3%</td>
</tr>
<tr>
<td>Mild pre-eclampsia</td>
<td>14.3%</td>
</tr>
</tbody>
</table>

Proportion of unnecessarily prolonged hospitalizations

3.9.2 By age, referral and hospital level

The proportion of unnecessarily prolonged hospitalizations was higher among children aged 12–59 months than among infants aged 2–11 months (69.3% versus 55.6%). The proportion of unnecessarily prolonged hospitalizations was also higher among children hospitalized in regional hospitals than among those in city or district hospitals (68.0% versus 60.9%), and slightly higher among children who were brought by parental decision than among those referred from other PHC facilities or hospitals (65.3 versus 57.7%) (Fig. 29).

Fig. 29. Unnecessarily prolonged hospitalizations among necessary hospitalizations in children, by age, referral and hospital level

<table>
<thead>
<tr>
<th>Age range</th>
<th>Proportion of unnecessarily prolonged hospitalizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2–11 months</td>
<td>55.6%</td>
</tr>
<tr>
<td>12–59 months</td>
<td>69.3%</td>
</tr>
<tr>
<td>Referral</td>
<td>57.7%</td>
</tr>
<tr>
<td>No referral</td>
<td>65.3%</td>
</tr>
<tr>
<td>Regional</td>
<td>68.0%</td>
</tr>
<tr>
<td>City/district</td>
<td>60.9%</td>
</tr>
</tbody>
</table>

Proportion of unnecessarily prolonged hospitalizations
3.9.3 By hospital

The proportion of unnecessarily prolonged hospitalizations varied significantly by hospital, from 26.3% to 94.6% for children, and from 0% to 80% for pregnant women (Fig. 30).

Fig. 30. Unnecessary prolonged hospitalizations among necessary hospitalizations in children and pregnant women, by hospital

Note: the hospitals in the graph were allocated random numbers to maintain anonymity of the findings; they do not follow the order of their listing in Table 1.

No pattern could be found across the hospitals on whether unnecessarily prolonged hospitalizations were more common among children with respiratory or intestinal infections (Fig. 31). In two hospitals, 100% of necessary hospitalizations of children with a respiratory infection were unnecessarily prolonged (three children in Hospital 8 and 22 children in Hospital 13). In three other hospitals, this was the case for intestinal infections, where all children hospitalized with this primary diagnosis had unnecessarily prolonged hospitalization (five children in Hospital 2, eight children in Hospital 3 and one child in Hospital 7). These data need to be interpreted with caution, however, because of the small number of children in each group.
Fig. 31. Unnecessarily prolonged hospitalizations among necessary hospitalizations in children, by hospital and primary diagnosis

Note: the hospitals in the graph were allocated random numbers to maintain anonymity of the findings; they do not follow the order of their listing in Table 1.

3.10 Antibiotics and polypharmacy

3.10.1 Antibiotics received prior to admission in children

Among the 299 children for whom such data were collected, 36.8% (110/299) received at least one antibiotic prior to admission, corresponding to 39.7% (77/194) of children with a respiratory infection and 31.4% (33/105) of children presenting with diarrhoea. Ampicillin and amoxicillin were the commonest antibiotics prescribed, followed by intramuscular ceftriaxone and oral ciprofloxacin (Fig. 32). Around 58% of these drugs were given intramuscularly.

When asked about antibiotic prescription practices during the interviews with key informants, a paediatrician replied (translated from Tajik): “Parents want antibiotics. If we don’t give antibiotics, they will go and see another doctor.”
Fig. 32. Children receiving antibiotics prior to admission

<table>
<thead>
<tr>
<th>Antibiotics</th>
<th>Proportion of children who received antibiotics</th>
</tr>
</thead>
<tbody>
<tr>
<td>At least 1 antibiotic</td>
<td>36.8%</td>
</tr>
<tr>
<td>2 antibiotics</td>
<td></td>
</tr>
<tr>
<td>Ampicillin</td>
<td>12.4%</td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>8.0%</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>5.0%</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>4.0%</td>
</tr>
<tr>
<td>Cefotaxime</td>
<td>3.3%</td>
</tr>
<tr>
<td>Amikacin</td>
<td>2.3%</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>1.3%</td>
</tr>
<tr>
<td>Cefazoline</td>
<td>1.0%</td>
</tr>
<tr>
<td>Cefixim</td>
<td>0.7%</td>
</tr>
<tr>
<td>Azithromycin</td>
<td>0.3%</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>0.3%</td>
</tr>
<tr>
<td>Erithromycin</td>
<td>0.3%</td>
</tr>
<tr>
<td>Nalidixic acid</td>
<td>0.3%</td>
</tr>
<tr>
<td>Sulfadiazine/Trimethoprim</td>
<td>0.3%</td>
</tr>
<tr>
<td>Name not specified</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

### 3.10.2 Antibiotics prescribed for children during hospitalization

Most of the children (92.5%, 407/440) received at least one antimicrobial during hospitalization, and 26.1% (115/440) received at least two antimicrobials (simultaneously or one after the other) (Fig. 33). The commonest antibiotics prescribed were ampicillin (received by 30.7% of the children), ceftriaxone (22.3%), cefotaxime (10.2%), gentamicin (7.7%) and amikacin (6.6%).

The proportion of children receiving each antimicrobial is detailed in Fig. 34, while Fig. 35 shows the proportion of children receiving each class of antimicrobials. At least 69% of them were given parenterally (via intramuscular or intravenous injection). Among those for which route of administration was reported in the medical records, the proportion of antimicrobials given parenterally increases to 90.9%, with at least 79.7% of prescribed antimicrobials given by intramuscular injection. Some children received a full antibiotic course of seven or eight days via intramuscular injection.

Fig. 33. Children receiving one or several antimicrobials during hospitalization

<table>
<thead>
<tr>
<th>Number of antimicrobials</th>
<th>Proportion of children who received antimicrobials</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>7.5%</td>
</tr>
<tr>
<td>1 antimicrobial</td>
<td>66.4%</td>
</tr>
<tr>
<td>2 antimicrobials</td>
<td>21.8%</td>
</tr>
<tr>
<td>3 antimicrobials</td>
<td>3.6%</td>
</tr>
<tr>
<td>4 antimicrobials</td>
<td>0.5%</td>
</tr>
<tr>
<td>5 antimicrobials</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

Proportion of children who received antimicrobials
Fig. 34. Antimicrobials prescribed, and proportion of children receiving each during hospitalization

- Ceftriaxone: 22.3%
- Amoxicillin: 30.7%
- Gentamicin: 7.7%
- Cefotaxime: 10.2%
- Nifuroxazide: 6.6%
- Piperazine: 5.2%
- Penicillin: 4.8%
- Fluconazole: 4.8%
- Viferon: 4.8%
- Trimethoprim/Sulfamethoxazole: 4.8%
- Mercatsin: 4.8%
- Trimethoprim/Sulfadiazine: 4.8%
- Acyclovir: 4.8%
- Interferon: 4.8%
- Amikacin: 5.2%
- Cycloferon: 5.2%
- Ceftazidime: 5.2%
- Nalidixic acid: 5.2%
- Anaferon: 5.2%
- Ciprofloxacin: 5.2%
- Metronidazole: 5.2%
- Ampicillin/Sulbactam: 5.2%
- Trimethoprim/Sulfamethoxazole: 5.2%
- Mercatsin: 5.2%
- Ampicillin/Sulfacillin: 5.2%
- Methenamine: 5.2%
- Cefazolin: 5.2%
- Trimethoprim/Sulfadiazine: 5.2%
- Interferon: 5.2%
- Metronidazole: 5.2%
- Trimethoprim/Sulfamethoxazole: 5.2%
- Mercatsin: 5.2%
- Antistaphilococcal Ig: 5.2%
- Name not specified: 5.2%
- Piperazine: 5.2%
- Nifuroxazide: 5.2%
- Chloramphenicol: 5.2%
- Cefepime: 5.2%

Proportion of children who received antimicrobials
Almost all the children (95.6%, 285/298) hospitalized with an acute respiratory infection received at least one antimicrobial – most commonly a penicillin or a third-generation cephalosporin (Fig. 36 and Fig. 37). When asked about antibiotic therapy for children with acute respiratory infections, a paediatrician replied (translated from Tajik): “The WHO Pocket book recommends penicillin for cough and pneumonia. But here this does not work, because most children already receive ceftriaxone at home, so penicillin will not do anything when they come here: we need to give more.”

An antiviral was prescribed for 13.1% of the children with acute respiratory infections, although rapid diagnostic tests or multiplex panels for detection of respiratory pathogens to guide antiviral therapy were not available in the hospitals visited. This proportion was higher in some hospitals. In Hospital 3, for example, 78.9% (15/19) of the children hospitalized with an acute respiratory infection were prescribed an antiviral (acyclovir, anaferon or viferon) in addition to an antibiotic such as ampicillin or a third-generation cephalosporin (except one child who received only an antiviral with no additional antibiotics). Among the children with diarrhoea (intestinal infection), 85.9% (122/142) received at least one antimicrobial, despite only one child being diagnosed with dysentery.
Fig. 36. Children receiving antimicrobials during hospitalization, among all diagnoses and by primary diagnosis

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Proportion of children who received antimicrobials</th>
</tr>
</thead>
<tbody>
<tr>
<td>All diagnoses</td>
<td>92.5%</td>
</tr>
<tr>
<td>Respiratory infections</td>
<td>95.6%</td>
</tr>
<tr>
<td>Intestinal infections</td>
<td>85.9%</td>
</tr>
</tbody>
</table>

Fig. 37. Groups of antimicrobials received by children, by primary diagnosis
3.10.3 Antibiotics prescribed for pregnant women during hospitalization

Overall, 28.9% of the pregnant women were prescribed antibiotics during hospitalization – mostly ampicillin, ceftriaxone or metronidazole. Use of antibiotics was higher among pregnant women with primary diagnoses of mild pre-eclampsia (41.2%) and preterm labour (35.6%) (Fig. 38).

Fig. 38. Pregnant women prescribed antibiotics, by primary diagnosis

Women mostly received two types of antibiotics – ampicillin and ceftriaxone – via intramuscular injection. Routine unjustified antimicrobial therapy was frequently prescribed due to secondary diagnoses of chronic pyelonephritis or respiratory infections (bronchitis or pneumonia), and assigned by obstetricians and profile specialists (urologists and internal therapists). It should be noted that diagnoses mentioned were mostly not confirmed by clinical indications or laboratory tests at admission, and prescription of antibiotics was commonly based on diagnoses in referral notes. It was observed that nearly all pregnant women with chronic pyelonephritis were prescribed unjustified antibiotics. In fact, according to the clinical protocols, pregnant women with non-obstetric diseases (such as pyelonephritis or bronchitis) should be hospitalized in the relevant departments for those (urology, respiratory or haematology) and receive treatment there.

Fig. 39 shows the proportion of pregnant women receiving antibiotics by hospital. In Hospital 2, a high proportion of women were prescribed antibiotics (71.0%), and the medical records assessed again confirmed that antibiotics were prescribed mostly for other diagnoses (such as chronic pyelonephritis, hydronephrosis or bronchitis). In Hospital 12, pyelonephritis in pregnancy (ICD-10 code O23.0) was managed with metronidazole, following national clinical protocols on management of urinary tract infection during hospitalization – including for pregnant women (Prikaz No. 584 from 2014), despite the known teratogenic effect.
Fig. 39. Pregnant women prescribed antibiotics, by hospital

Note: the hospitals in the graph were allocated random numbers to maintain anonymity of the findings; they do not follow the order of their listing in Table 1.

3.10.4 Polypharmacy

During their hospitalization, the children received an average of 5 drugs each (IQR 4–6), ranging from 1 to 16 drugs, and the pregnant women received an average of 6–7 drugs each.

Drugs prescribed in children included oral rehydration salts, intravenous fluids and short-acting bronchodilators, in addition to the antimicrobials described above. Further, the children were commonly prescribed medication when it was not indicated, or with no evidence of benefits, such as antihistamines, probiotics, spasmolytics, mucolytics and vitamin complexes. Some children received intravenous insulin alongside glucose intravenous fluids.

In term of the financial burden placed on the families, seven days of pancreatine (twice a day), linex (twice a day), smecta (twice a day), kreon, nalidixic acid and zinc (free) for a child with diarrhoea was estimated to cost 285 Tajik somoni (around €22), which corresponds to around 20% of an average monthly salary. For seven days of ampicillin or ceftriaxone, ambroxol, viferon and nebutamol for a child with an acute respiratory infection, the cost was estimated at 320 Tajik somoni (around €25).

Similarly, pregnant women were also commonly prescribed medication that was not indicated or with no evidence of benefits, such as valerian, papaverine suppository, various vitamins, vitamin C and herbal tea for kidney diseases for pregnant women.

3.11 Pulse oximeter and oxygen

Overall, 36/440 children received oxygen therapy, of whom 35 had any acute respiratory infection and one had a primary diagnosis of intestinal infection and secondary diagnosis of neurotoxicosis, although no oxygen saturation information was recorded in this patient’s medical record.

Among children with a primary diagnosis of respiratory infections, 11.7% (35/298) received oxygen, in 9 of the 13 hospitals. One hospital accounted for 19 children with oxygen therapy.
Measurement of oxygen saturation was available from 9.7% (29/298) of the children hospitalized with a primary diagnosis of respiratory infection. These measurements correspond to five hospitals, among which one hospital accounted for 18 of these measurements.

Interviews with health-care workers at various hospitals confirmed that use of pulse oximeters was rare, despite most hospitals having one in the paediatric ward since the COVID-19 pandemic. Except in one hospital, a pulse oximeter was almost only used in children who required care in the paediatric intensive care unit.

4. Strengths and limitations

The strengths of this health system evaluation are multiple. First, data were collected in 15 hospitals throughout Tajikistan, making the findings applicable to the whole country. Second, the random selection of medical records and the transparent and systematic approach used for data collection make the evaluation reproducible for data comparison and progress tracking by following the same methodology. Third, the assessment focused on the commonest diagnoses in hospitalized children and pregnant women in Tajikistan according to national data. Use of these findings to strengthen management of these common diagnoses in PHC is likely to have a considerable impact on the overall quality of care for children and pregnant women.

The evaluation has some limitations, however. It is mainly based on quantitative data collected retrospectively from medical reports. Thus, reasons for hospitalization other than strict clinical signs (inclusion criteria) and other relevant information not recorded in the medical charts may lead to overestimation of unnecessary and unnecessarily prolonged hospitalizations. Nevertheless, all children and pregnant women for whom data in the medical records were insufficient to judge their hospitalization as necessary or unnecessary were classified as “unclear” to limit the potential overestimation of unnecessary hospitalizations. An average of 40 medical records were reviewed at each hospital, providing consistent findings overall, but the findings need to be interpreted with caution when comparing data by hospital and by primary diagnosis, as numbers are smaller in these subgroups.

5. Summary of findings and suggested actions

5.1 Reducing unnecessary hospitalizations and strengthening PHC

5.1.1 Summary of findings and context analysis

Unnecessary hospitalizations were common, accounting for 40.5% of hospitalizations among children and 69.2% and among pregnant women. Many necessary hospitalizations of children and pregnant women were unnecessarily prolonged after they could have been discharged safely. While high-quality education and training for doctors on referral and hospitalization criteria following standards of care are clearly needed to limit unnecessary hospitalizations, other actions are also required.

Allocation of public resources to the health sector is limited in Tajikistan; this is reflected in low salaries of health-care workers in the public sector and high out-of-pocket payments for health care. Spending on medicines accounted for 37% of out-of-pocket payments in 2019 (16). The practice of informal payments is reported at all levels. Reliance on informal payments to
supplement salaries, and salaries and workforce being directly linked to hospital bed occupancy are likely to lead to non-evidence-based treatment and prescribing practices, and to unnecessary hospitalizations.

Hospitalizations were often unnecessarily prolonged. Some of these could be explained, at least in part, by awaiting the results of investigation and completing antibiotic courses (even though these were sometimes inadequate or could have been given orally so that treatment could be completed at home).

In addition, Tajik people seem to consider hospital care superior to the care they could receive at in PHC. This lowers the threshold for admitting people to hospitals, leading to increased unnecessary hospitalizations.

5.1.2 Next steps

The Ministry of Health and Social Protection of the Population and the assessment team agreed that the main areas for further action are:

- reviewing and potentially revising national regulations that mandate hospitalizations;
- reviewing existing funding and financing mechanisms to identify potential incentives for unnecessary hospitalization;
- investing savings made from the reduction in unnecessary hospitalizations in the salaries of health-care workers – at both hospital and PHC level – as low earnings are one of the main reasons for “brain drain” from Tajikistan and are a major determinant of quality of care.

To this end, the next steps proposed are:

- the Ministry presenting the findings within the context of the quality-of-care project Prikaz No. 708 funded by the Russian Federation to improve quality of hospital care for mothers and children;
- the Ministry considering extending the health system evaluation of unnecessary hospitalizations to the 10 pilot hospitals involved in the previous phase of the WHO quality-of-care project, in order to evaluate the impact of WHO approaches to quality-of-care improvement and take corrective actions for the current phase, if required;
- the Ministry considering carrying out a root-cause analysis to understand the reasons for unnecessary hospitalizations, with a focus on patient/parent and professional behaviour, through:
  - key informant interviews with patients and caregivers to gain greater understanding of both perceptions of the quality of care provided at PHC facilities and hospitals and medical care-seeking behaviour;
  - key informant interviews with doctors to establish the determinants of unnecessary hospitalizations;
- the Ministry, TWG and WHO carrying out further work to understand the root causes of unnecessary hospitalization – engaging in participatory policy dialogue and applying small systems changes with the aim of strengthening PHC, including but not limited to:
  - reviewing rules and regulations to identify which hospitalizations are mandated by law;
o reviewing existing funding and financing mechanisms to identify potential incentives for unnecessary hospitalization, with the aim of using the savings generated to increase the extremely low salaries of health-care workers;

o strengthening PHC, including improving infrastructure, financing and capacity-building of staff (potentially within the context of the European Union grant for strengthening PHC);

o developing and implementing a plan to raise awareness of the harm of unnecessary hospitalization (potentially with partners including the United Nations Children’s Fund) and engage in a participatory policy dialogue with the population to find ways to improve the health care system and avoid unnecessary harm.

5.2 Improving rational use of antibiotics and other medications

5.2.1 Summary of findings and context analysis

The assessment showed that misuse of antibiotics was considerable – both at the PHC level in children prior to hospitalization and during hospital care of children and pregnant women. The choice and indication of antibiotics was not in line with WHO and international recommendations in many cases. In addition, antivirals and antifungals were prescribed with unjustified indications. The findings indicate scope for improvement in rational use of antibiotics. Unnecessary use of antibiotics is harmful for the child, mother and unborn baby; it is also a threat to society through creation of antimicrobial resistance.

While antibiotics are clearly indicated in children hospitalized with severe pneumonia, the choice of antibiotics (such as third-generation cephalosporine or aminoglycosides) was inadequate in a considerable proportion of cases. This may be explained in part by the fact that some children had already received antibiotics prior to admission, and by doctors’ perceptions of the need to scale antibiotics up when hospitalizing children replied (translated from Tajik): “because they still have a fever and are not improving despite antibiotic treatment”. Most acute respiratory infections in young children are caused by viruses, however, and 2–3 days of fever is normal. Persistence of fever when an antibiotic was (most likely wrongly) prescribed at the beginning of the febrile condition is therefore likely to be the normal course of a viral infection, rather than a bacterial infection not responding to antibiotics. The situation is even more worrying in children with diarrhoea. Except for dysentery (loose stools mixed with blood), antibiotics are not indicated in children with diarrhoea; they can cause harm. Nevertheless, 85.9% of children hospitalized with diarrhoea received antibiotics, despite only one child being diagnosed with dysentery.

Interviews with health-care workers indicated that patients and caregivers push to receive antibiotics and see the parenteral route as more effective.

In addition to the overuse of antibiotics, children received an average of five drugs during hospitalization. Medications not indicated or with no evidence of benefits – such as antihistamines, probiotics, spasmyotics, mucolytics and vitamin complexes – were commonly prescribed.

5.2.2 Next steps

Strengthening rational use (including correct indication, choice of antibiotics and route of administration) and community awareness-raising on the ineffectiveness of antibiotics for viral infections are crucial to ensuring better use of antibiotics.
The Ministry of Health and Social Protection of the Population and the assessment team proposed the following steps to provide a basis for policy change and implementation, leading to rational use of antibiotics:

- the Ministry using the assessment’s findings to raise awareness about overuse of antibiotics in children and pregnant women during World Antimicrobial Awareness Week;
- the Ministry considering the following actions to improve rational use of antibiotics:
  - revising or adopting and enforcing regulations restricting access to antibiotics over the counter;
  - adopting and enforcing adequate regulations controlling pharmaceutical industry access to health-care workers, to prevent their influence on prescribing practices for antibiotics and other medications;
  - reviewing financing schemes to identify potential incentives for misuse of antibiotics;
  - ensuring sound pre-service training and ongoing medical education;
  - supporting health-care workers at all levels and enabling them to adhere to treatment guidelines;
  - carrying out an awareness-raising campaign on the harms of misuse of antibiotics.

5.3 Strengthening data management systems

5.3.1 Summary of findings and context analysis

During the COVID-19 pandemic, data were not always readily available for use in decision-making – for example, monthly hospitalization rates for children and pregnant women were collected and reported, but were not used to monitor real-time utilization of care.

5.3.2 Next steps

The following steps are proposed for the Ministry of Health and Social Protection of the Population, with WHO support:

- continuing efforts to strengthen the health information system nationwide to facilitate timely collection of data used for decision-making at all levels;
- improving knowledge and reporting of diagnoses, including ICD-10 coding, by health-care staff;
- involving and building the capacity of clinical staff in data collection, promoting use of data to improve and monitor progress in medical care, and counteracting the punitive culture around reporting.
References


15. Stata v.16. College Station, TX: StataCorp; 2019 (https://www.stata.com/stata16/).

1 All references accessed 12–13 April 2022.
Annex 1.

STANDARDS OF CARE FOR ASSESSMENT OF UNNECESSARY AND UNNECESSARILY PROLONGED HOSPITALIZATIONS IN CHILDREN

Hospitalization and discharge criteria were extracted for each of the commonest causes of hospitalization among children aged 2–29 months from WHO’s *Pocket book of hospital care for children* (Table A.1).¹ This source was chosen as the standard-of-care reference for children as it had been implemented and was broadly used in Tajikistan; further, it had already been used in similar quality-of-care assessments.²

Table A.1. Hospitalization and discharge criteria for the commonest causes of hospitalization among children aged 2–29 months

<table>
<thead>
<tr>
<th>Disease, condition</th>
<th>ICD-10 code</th>
<th>Hospitalization criteria</th>
<th>Discharge criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>–</td>
<td>The presentation of any <strong>general danger sign</strong> entails a hospitalization criterion by itself:</td>
<td>A decision on when to discharge should be made on an individual basis, taking into consideration factors such as:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• inability to drink or breastfeed</td>
<td>• the family’s home circumstances and how much support is available to care for the child</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• vomiting everything</td>
<td>• staff judgement of the likelihood that the treatment course will be completed at home, or that the family will return immediately to hospital if the child’s condition worsens</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• history of convulsions during the current illness</td>
<td>• Respiratory distress resolved</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• lethargy, unconsciousness or convulsions</td>
<td>• No hypoxaemia (oxygen saturation of below 90%) on room air</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• No apnoea</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• No stridor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Alert</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Afebrile</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No severe dehydration</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Feeding/eating well</td>
</tr>
</tbody>
</table>

Upper respiratory tract infection including common cold and croup

|                      | J00–J06     | Severe pneumonia (see below)                                                             |                                                                                     |
|                      |             | Severe croup, defined by any of the following:                                           |                                                                                     |
|                      |             | • stridor even when the child is at rest                                                 |                                                                                     |
|                      |             | • rapid breathing and low chest indrawing                                                |                                                                                     |
|                      |             | • oxygen saturation of below 90% or central cyanosis                                    |                                                                                     |


<table>
<thead>
<tr>
<th>Disease, condition</th>
<th>ICD-10 code</th>
<th>Hospitalization criteria</th>
<th>Discharge criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia</td>
<td>J12–J18</td>
<td>Severe pneumonia, defined by any of the following:</td>
<td>• Not vomiting everything</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• oxygen saturation of below 90% or central cyanosis</td>
<td>• Able to take oral medication (if needed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• severe respiratory distress (grunting, very severe chest indrawing)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pneumonia not improving after three days (of oral antibiotics)</td>
<td></td>
</tr>
<tr>
<td>Acute bronchitis</td>
<td>J20</td>
<td>• Oxygen saturation of below 90% or central cyanosis</td>
<td></td>
</tr>
<tr>
<td>Acute bronchiolitis</td>
<td>J21</td>
<td>• Apnoea or history of apnoea</td>
<td></td>
</tr>
<tr>
<td>Unspecified acute lower respiratory tract infection</td>
<td>J22</td>
<td>• Gasping and grunting (especially in young infants)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not improving 15 minutes after administration of a rapid-acting bronchodilator (e.g. salbutamol)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Signs of severe pneumonia (see above)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fast breathing:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>o ≥50 breaths/minute in ages 2–11 months</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>o ≥40 breaths/minute in ages 1–5 years</td>
<td></td>
</tr>
<tr>
<td>Diarrhoea, acute gastroenteritis, intestinal infectious diseases</td>
<td>A00–A09</td>
<td>Severe dehydration, defined as two or more of the following signs:</td>
<td>• No severe dehydration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• lethargy or unconsciousness</td>
<td>• Feeding/eating well</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• sunken eyes</td>
<td>• Not vomiting everything</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• unable to drink or drinking poorly</td>
<td>• Alert</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• skin pinch goes back very slowly (≥2 sec) or “reduced turgor”</td>
<td>• Afebrile</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Severe persistent diarrhoea, defined as:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• diarrhoea lasting ≥ 14 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• with signs of dehydration: see severe dehydration signs above, or ≥2 of the following signs:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• restlessness or irritability; sunken eyes; drinking eagerly and thirsty; skin pinch going back slowly</td>
<td></td>
</tr>
<tr>
<td>Dysentery (frequent loose stools mixed with blood) if any of the following criteria:</td>
<td></td>
<td>• No severe dehydration</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Feeding/eating well</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not vomiting everything</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Alert</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Afebrile</td>
<td></td>
</tr>
<tr>
<td>Disease, condition</td>
<td>ICD-10 code</td>
<td>Hospitalization criteria</td>
<td>Discharge criteria</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------</td>
<td>--------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>under 2 months old</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>severely ill children, who look lethargic, have abdominal distension and tenderness or convulsions</td>
<td></td>
</tr>
</tbody>
</table>
Annex 2.

STANDARDS OF CARE FOR ASSESSMENT OF UNNECESSARY AND UNNECESSARILY PROLONGED HOSPITALIZATIONS IN PREGNANT WOMEN

No WHO publication providing clear hospitalization and discharge criteria for pregnant women had been implemented in Tajikistan that could be used as a reference for standards of care. The assessment team therefore used national standards and protocols published by the Ministry of Health and Social Protection of the Population,¹ which are widely used in the country and endorsed by experts including those from WHO (Table A.2).

Table A.2. Hospitalization and discharge criteria for the commonest causes of hospitalization among pregnant women

<table>
<thead>
<tr>
<th>Disease, condition</th>
<th>ICD-10 code</th>
<th>Hospitalization criteria</th>
<th>Discharge criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threatening premature labour up to 37 weeks of gestation</td>
<td>O60</td>
<td>• Regular and irregular contraction of the uterus three or more in 30 minutes&lt;br&gt;• Rupture of fetal membranes&lt;br&gt;• Dilatation of the cervix of more than 2 cm&lt;br&gt;• Smoothing of the cervix of more than 80%&lt;br&gt;• Structural changes of the cervix&lt;br&gt;• Pain in the lower abdomen increasing in intensity</td>
<td>• No labour or contractions in 48 hours&lt;br&gt;• Full course of respiratory distress syndrome prevention, received at least 48 hours</td>
</tr>
<tr>
<td>Threatening miscarriages up to 22 weeks of gestation</td>
<td>O20–O20.9</td>
<td>• Bloody discharge and/or bleeding&lt;br&gt;• Cramping pains in the lower abdomen&lt;br&gt;• Structural changes of cervix (the cervix skips the finger)</td>
<td>• No bleeding in 24 hours</td>
</tr>
<tr>
<td>Premature rupture of membranes</td>
<td>O42.2</td>
<td>• Presence of amniotic fluid at instrumental examination with vaginal speculum&lt;br&gt;• Presence of fluid on the control pad within one hour</td>
<td>• Ultrasound test (amniotic fluid normal)&lt;br&gt;• Lack of amniotic fluid on control pad in 24 hours</td>
</tr>
</tbody>
</table>

¹ National standards on haemorrhages during pregnancy, delivery and postpartum, prevention, diagnosis and obstetric tactics (2008); Clinical protocols on management of hypertensive disorders in obstetrics (2015); Methodological recommendations: procedures for organizing the hospital care for pregnant women, women in childbirth, postpartum and newborns in first, second levels of hospitals and perinatal centers (2012); Methodological recommendations for development of local protocols: pathology conditions in pregnancy (2012); National standards on management of high risk deliveries (2009); National standards on antenatal care (2008). All are accessible via a website that is only available from Tajikistan, from where it was accessed; it is not available for viewers from any other place in the world.
<table>
<thead>
<tr>
<th>Disease, condition</th>
<th>ICD-10 code</th>
<th>Hospitalization criteria</th>
<th>Discharge criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• Ultrasound examination suggestive of rupture of membranes</td>
<td></td>
</tr>
<tr>
<td>Mild pre-eclampsia</td>
<td>O14.0</td>
<td>• Blood pressure over 140/90 mmHg to 159/105 mmHg AND • Protein in urine 0.3 g/l to 3 g/l</td>
<td>• Blood pressure below 130/80 mmHg for two days • Decreased urine protein below 0.2 g/l • Under 37 weeks of gestation</td>
</tr>
</tbody>
</table>
Annex 3.

HOSPITALIZATIONS OF INFANTS AND YOUNG CHILDREN IN SELECTED HOSPITALS
IN 2019 AND 2020

Fig. A.1 and Fig. A.2 show the data on infants aged 0–11 months and young children aged 1–4 years hospitalized in 2019 and 2020 in the hospitals visited. Note that the scale of the vertical axis varies between the different graphs.
Strengthening primary health care by avoiding unnecessary hospitalizations in Tajikistan

Data source: Republican Medical Statistics and Information Centre, Ministry of Health and Social Protection of the Population.
Fig. A.2. Hospitalizations of children aged 1–4 years, selected hospitals, 2019 and 2020

<table>
<thead>
<tr>
<th>Hospital Name</th>
<th>Children 1–4 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child Infection Hospital</td>
<td></td>
</tr>
<tr>
<td>Istiqlol Hospital</td>
<td></td>
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<td>Republican Hospital Karabolo</td>
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<td>Khujand Child Clinical Hospital</td>
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<td>Rudaki Central District Hospital</td>
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<td>Tursunzade Central District Hospital</td>
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<td>Vahdat Central District Hospital</td>
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<td>Ayni Central District Hospital</td>
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<td>Isfara Central District Hospital</td>
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Strengthening primary health care by avoiding unnecessary hospitalizations in Tajikistan

Data source: Republican Medical Statistics and Information Centre, Ministry of Health and Social Protection of the Population.
The WHO Regional Office for Europe

The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

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