HEALTHCARE WORKERS' POLLUTION AND CLIMATE CHANGE KNOWLEDGE, SKILLS AND ADAPTIVE BEHAVIORS IN AZERBAIJAN

ASSESSMENT REPORT
November 2023

ACKNOWLEDGEMENTS

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1. INTRODUCTION

1.1 Background information

The children of Azerbaijan face multiple, overlapping climate and pollution risks that jeopardise their health and well-being.

Climate change, including extreme heat, drought, flooding and storms are leading to increases in heat-related illness, water and food-borne disease and other illnesses among the country's children (*Fig.1* and *Annex IIa*).[1]

Fig.1 Children's exposure to climate hazards in Azerbaijan[2]
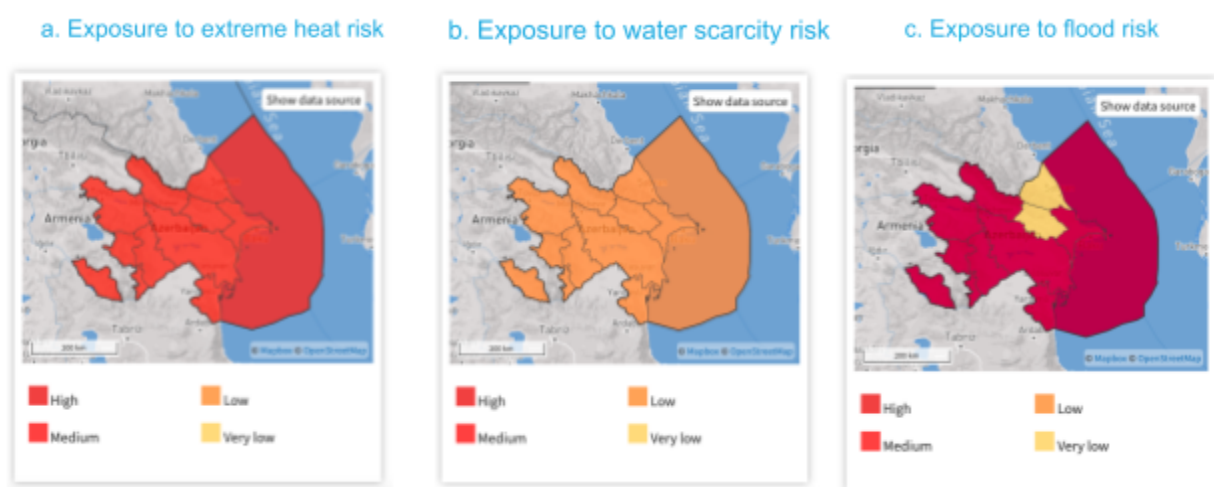
Additionally, the country has one of the highest rates of air pollution-related deaths in the world.[3] Water pollution also poses a serious threat as inadequate sewage treatment and industrial discharge contaminate water sources, leading to long-term health risks for children. Solid waste management, including issues around e-waste also remain a concern. It is unknown to what extent lead, mercury, cadmium and other heavy metals are impacting Azerbaijan's children (*Annex.IIb*).

Combined, these climate and pollution-related risks are posing a direct threat to children's survival and development across the country. Azerbaijan's central regions remain some of the most vulnerable to these combined impacts (*Fig.2*)

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[1]UNICEF Technical Note on "Children's Environmental Health - Country Assessment"
https://www.unicef.org/azerbaijan/reports/childrens-environmental-health-assessment-azerbaijan
[2]Think Hazard (2023) Azerbaijan Climate Risk Profile https://thinkhazard.org/en/report/19-azerbaijan
[3]Our World in Data (2019) Outdoor Air Pollution, the global distribution of deaths from outdoor air pollution
https://ourworldindata.org/outdoor-air-pollution#:~:text=outdoor%20air%20pollution-,7.8%25%20of%20global%20deaths%20are%20attribute
d%20to%20outdoor%20air%20pollution.%25%20of%20deaths%2C%20or%20higher.

Fig.2 Child-centred Climate Change and Environmental Risk Level
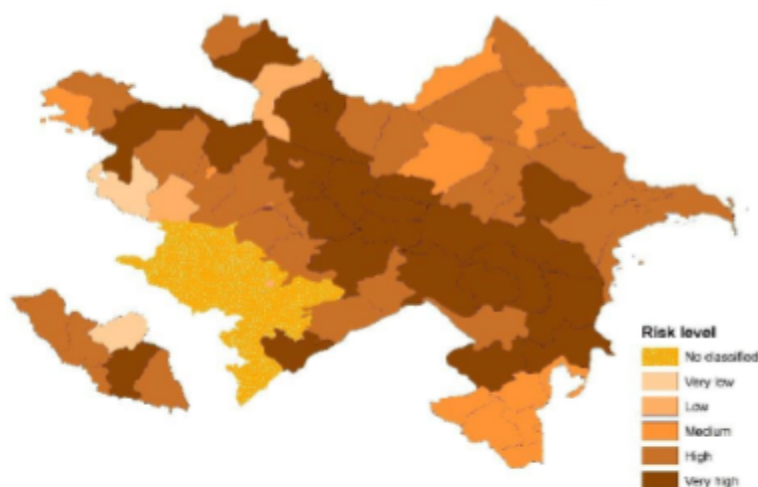
In Azerbaijan, 147 out of every 100,000 children under the age of five die due to the harmful effects of the environment.[4] Conditions originating in the perinatal period (31%), congenital anomalies (11.7%), respiratory system diseases (8.5%), nervous system diseases (4.5%), and certain infectious and parasitic diseases (3.7%) are the main causes of death among children under the age of one in Azerbaijan - all of which can be related to environmental health factors, including climate change and pollution.

Improving the children of Azerbaijan's ability to survive and thrive means addressing the profound ways in which these environmental factors shape their health and well-being. Primary healthcare services, including Universal Health Coverage (UHC) are among the most critical entry points to help prevent and tackle the impacts that climate change and pollution have on Azerbaijan's children. They influence the health and productivity of healthcare workers (HCWs), as well as the accessibility, functionality and security of healthcare systems as the climate and environment changes.

Raising awareness, training, and empowering health workers are critical needs for strengthening the responsiveness of PHC to the health impact of pollution and changing climate on children.

1.2 Aims and methodology

This Assessment aims to evaluate healthcare workers knowledge, skills and adaptive behaviours used to prevent, diagnose and treat climate and pollution-related illnesses in children. The Assessment was conducted by UNICEF, with support from the Ministry of Health and TABIB (the Management Union of Medical Territorial Units) during October 2023. It consisted of five key phases (Fig.3).

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[4]UNICEF Technical Note on "Children's Environmental Health - Country Assessment"
https://www.unicef.org/azerbaijan/reports/childrens-environmental-health-assessment-azerbaijan

Fig.3 Key phases of the Assessment

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Desk review of literature on the HEHC pillars on pollution and climate adaptation	Interviews with Ministry of Health, Ministry of Ecology and National Resources, TABIB and the State Agency for Mandatory Health Insurance	Focus Group Discussions with more than 300 healthcare workers across 7 rayons (districts)	An online survey of an additional 620 healthcare workers across the country	Data analysis and writing of the assessment report

The following report provides a summary of the Assessment findings, including the identified key gaps and recommendations to strengthen the capacity of primary healthcare workers at all levels. These recommendations will be used to strengthen relevant training and other support for healthcare workers and facilities across the country in 2024.

2. ASSESSMENT RESULTS

2.1 Focus group discussions

a. A summary

From 4-11 October UNICEF and TABIB carried out a series of focus group discussions in 7 rayons (districts) across Azerbaijan. These rayons were selected based on their overall vulnerability to climate and pollution-related impacts (Fig.2).

In each location, focus group discussions were completed with healthcare staff at all levels, including from health centres, doctors' offices and family health centres. Around 300 health care staff were interviewed in total. Healthcare staff were asked a series of questions (Annex I) and assessed based on various capacity criteria, outlined in the tables below. An average capacity score (between 0-1), based on each of these criteria was then allocated to each group (rayon). An average capacity score across all rayons was also established.

Capacity scorecard categorisation

Extremely weak capacity	Weak capacity	Moderate capacity	Strong capacity
0 - 0.25	0.26 - 0.50	0.51 - 0.75	0.76 - 1

A summary of interviewed healthcare workers' capacities across all themes and rayons is listed in Table. 1 below.

Table.1 Healthcare worker's capacity summary table (by category and rayon)

No.	Rayon name	1. Overall understanding of climate change hazards and their impacts on children	2. Overall understanding of pollution and its impacts on children	3. Understanding of children's physiological vulnerabilities to climate and pollution-related hazards	4. Capacity to diagnose climate and pollution-related illnesses in children	5. Capacity to include climate and pollution-related questioning during clinical history examination	6. Ability to advise parents and caregivers	AVERAGE SCORE
1	Neftchala	0.08	0.33	0.38	0.19	0.25	0.25	0.25
2	Aghjabadi	0.32	0.50	0.38	0.13	0.63	0.38	0.39
3	Aghdam	0.15	0.33	0.43	0.30	0.43	0.21	0.31
4	Barda	0.50	0.08	0.35	0.00	0.80	0.67	0.40
5	Yevlakh	0.50	0.17	0.25	0.20	0.38	0.46	0.33
6	Sheki	0.83	0.25	0.90	0.28	0.63	0.50	0.56
7	Zagatala	0.50	0.53	0.78	0.00	0.28	0.35	0.41
Average score		**0.42**	**0.31**	**0.49**	**0.16**	**0.48**	**0.40**	**0.38**

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b. Overall understanding of climate change hazards and their impacts on children

Overall, healthcare workers presented a weak knowledge and awareness of climate-related hazards (including extreme heat, drought, flooding and storms). Most were unable to differentiate between weather patterns and longer-term changes in climate. Many were also unable to separate the concept of climate change from more general environmental pollution and used the terms interchangeably unless prompted.

When pressed further on the issue, healthcare workers were able to discuss the health-related impacts of extreme heat and cold on children (including heat-stroke and increases in Acute Respiratory Infections). However, few were able to confidently discuss other climate-related hazards (e.g. drought, flooding, storms and global sea-level rise) and their impacts on children.

Overall, the concept of climate change to many appeared to be abstract, with the perception being that climate change impacts remained small and insignificant compared to other issues communities faced. This was particularly the case in the conflict-affected zones in the south-west.

"Our summers are cooler now and the number of rainy days has increased. Flooding also becoming more frequent, but we can't say for sure how it's impacting our children."

**NURSE,
ZAGATALA DISTRICT**

"The concept of climate change seems so abstract to us - if it's happening what can we do about it? Pollution seems like an issue that we at least have some control over.

**DOCTOR,
BARDA DISTRICT**

Table.2 Overall understanding of climate change and its health impacts on children

No.	Rayon name	Capacity indicators			CAPACITY SCORE
		a. Able to name and describe the key climate hazards, specific to their region?	b. Able to list specific ailments and diseases relating to climate change	c. Able to explain exact mechanisms of children's exposure and vulnerability	
1	Neftchala	0.25	0.00	0.00	0.08
2	Aghjabadi	0.45	0.50	0.00	0.32
3	Aghdam	0.25	0.00	0.20	0.15
4	Barda	0.25	0.75	0.50	0.50
5	Yevlakh	0.25	0.75	0.50	0.50
6	Sheki	0.75	0.75	1.00	0.83
7	Zagatala	0.75	0.50	0.25	0.50
Average score		**0.42**	**0.46**	**0.35**	**0.42**

c. Overall understanding of pollution and its impacts on children

Overall, healthcare workers exhibited a very weak understanding of pollution, including the most locally-relevant sources and their impacts on children. Of the few healthcare workers that were able to identify key sources and causes, indoor air and water pollution were the most frequently mentioned. However, the vast majority of those interviewed were unable to name specific pollutants or their specific health impacts on children.

"We know that cancer and neurological disorders are increasing in children, but we don't know why."

DOCTOR, NEFTCHALA DISTRICT

There was limited mention or knowledge of heavy metals and e-waste, although mercury in relation to "broken thermometers" was mentioned several times, despite its relative impact on children remaining negligible.

Several healthcare workers also believed that outdoor air pollution was not an issue outside of Azerbaijan's major cities. Pesticide contamination was not mentioned, however several healthcare workers across all rayons raised concerns over food quality (particularly in relation to GMOs, processed foods and their impacts on children).

Radioactive waste was perceived as a threat in Sheki and Zagatala due to the historical Uranium storage activities that had reportedly occurred closeby. This was anecdotally thought to be linked to various neurological disorders and cancers in children, despite the lack of official evidence.

Focus group discussions with healthcare workers in Aghjabadi ©UNICEF Azerbaijan

Table.3 Overall understanding of key pollution and its health impacts on children

Rayon No.	Location / facility	Capacity indicators			CAPACITY SCORE
		a. Can name key causes and sources	b. Can name key impacts / symptoms in children	c. Can name the specific mechanisms	
1	Neftchala	0.5	0.5	0	0.33
2	Aghjabadi	0.5	0.5	0.5	0.50
3	Aghdam	0.25	0.5	0.25	0.33
4	Barda	0.25	0	0	0.08
5	Yevlakh	0	0.25	0.25	0.17
6	Sheki	0.3	0.2	0.25	0.25
7	Zagatala	0.8	0.4	0.4	0.53
Average score		0.37	0.34	0.24	0.31

d. Understanding of children's physiological vulnerabilities to climate and pollution-related hazards

Overall, across all rayons, healthcare workers exhibited a moderate understanding of why children are more vulnerable to climate and pollution-related hazards than adults. Healthcare workers in particular expressed a good understanding of children's physiology, including their physical and mental vulnerabilities, which left them more vulnerable to illnesses. However, in most cases (with the exception of Sheki and Zagatala), due to their lack of climate and pollution knowledge, they were unable to directly link these vulnerabilities to climate and pollution-related hazards.

Table.4 Overall understanding of children's physiological vulnerabilities to climate and pollution-related hazards

No.	Rayon name	Capacity indicators		CAPACITY SCORE
		a. Able to explain why children physiologically are overall are more vulnerable	b. Able to provide information on which groups of children are the most vulnerable	
1	Neftchala	0.50	0.25	0.38
2	Aghjabadi	0.50	0.25	0.38
3	Aghdam	0.50	0.40	0.45
4	Barda	0.25	0.50	0.38
5	Yevlakh	0.25	0.25	0.25
6	Sheki	1.00	0.85	0.93
7	Zagatala	0.75	0.85	0.80
Average score		0.54	0.48	0.51

e. Capacity to diagnose climate and pollution-related illnesses in children

Overall, healthcare workers across all rayons expressed a lack of knowledge and confidence in diagnosing climate-related, and especially pollution-related illnesses in children. Healthcare workers stated they felt relatively confident in diagnosing seasonal heat stroke and water and food-borne disease, linked to increasing temperatures and changes in rainfall patterns. A real lack of confidence was displayed around diagnosing and treating pollution-related illnesses, including pesticide and heavy metal poisonings. Healthcare workers stated this was due to a lack of previous training and guidance materials. They also lacked access to testing kits - meaning that in most cases, they wouldn't, for example, be able to tell the difference between heavy metal poisoning and other acute stomach issues. This meant that in extreme cases, children would need to be referred to Baku for diagnosis and treatment. However, this would only happen in extreme circumstances, and only if parents were able to determine that their child had been exposed to high levels of pollutants.

Table.5 Capacity to diagnose climate and pollution-related illnesses in children

No.	Rayon name	Capacity indicators		CAPACITY SCORE
		a. Self-reported capacity to differentiate	b. Able to give examples of how to differentially diagnose climate/pollutant and non-climate/pollutant-related illnesses	
1	Neftchala	0.25	0.13	0.19
2	Aghjabadi	0.13	0.13	0.13
3	Aghdam	0.30	0.30	0.30
4	Barda	0.00	0.00	0.00
5	Yevlakh	0.20	0.20	0.20
6	Sheki	0.30	0.25	0.28
7	Zagatala	0.00	0.00	0.00
Average score		0.17	0.14	0.16

f. Capacity to include climate and pollution-related questioning during clinical history examinations

Overall, healthcare workers expressed that they lacked confidence in questioning parents and caregivers, about key environmental exposure factors (including exposure to toxins, water safety and access, play areas and supervision etc.). They stated that they lacked the knowledge, resources and confidence to be able to do this effectively. As such, in most cases, healthcare workers stated that they only "sometimes ask," for more details on the child's living environment, and that this focused mostly on the child's internal living conditions. Very few were able to list more than one or two key environmental exposure points and pathways for children.

Table.6 Capacity to include climate and pollution-related questioning
during clinical history examinations

No.	Rayon name	Capacity indicators		CAPACITY SCORE
		a. Frequency of asking	b. Can name key exposure points in child's environment	
1	Neftchala	0.25	0.25	0.25
2	Aghjabadi	0.75	0.50	0.63
3	Aghdam	0.35	0.50	0.43
5	Barda	0.85	0.75	0.80
6	Yevlakh	0.50	0.25	0.38
7	Sheki	0.75	0.50	0.63
8	Zagatala	0.25	0.30	0.28
Average score		0.53	0.44	0.48

g. Ability to advise parents and caregivers

Overall, healthcare workers across all rayons reported that they had a weak capacity to carry out climate and pollution-related outreach and investigation activities, beyond their current scope of work. Whilst healthcare workers stated that they regularly checked children's home environments during home-visits, most of these checks related to children's basic needs, including feeding practices and sleeping arrangements. As such, they did not include general environmental cleanliness factors, and exposure to pollutants (e.g. pesticides, heavy metals, e-waste, microplastics) and other environment-related hazards. Healthcare workers stated that this was because they lacked the guidance and training required to effectively do so.

Table.7 Capacity to include climate and pollution-related outreach and questioning of
parents and caregivers

No.	Rayon name	Capacity indicators			CAPACITY SCORE
		a. Self-reported frequency and type of outreach activities	b. Relevance of guidance given to parents and caregivers	c. Confidence in advising parents and caregivers	
1	Neftchala	0.25	0.25	0.25	0.25
2	Aghjabadi	0.50	0.40	0.25	0.38
3	Aghdam	0.25	0.25	0.13	0.21
4	Barda	0.25	0.75	1.00	0.67
5	Yevlakh	0.13	0.25	1.00	0.46
6	Sheki	0.25	0.75	0.50	0.50
7	Zagatala	0.00	0.30	0.75	0.35
Average score		0.23	0.42	0.55	0.40

Additionally, whilst some rayon-level programmes reportedly existed, encouraging healthcare workers to visit schools to promote healthy lifestyles, these visits remained ad-hoc and did not systematically include the topics of climate change and pollution. Healthcare workers reportedly chose to cover the topics they felt were most relevant, and most comfortable speaking about during these sessions.

h. Knowledge gaps and resources required

During each focus group discussion, healthcare workers were asked to self-report their own specific knowledge gaps and the capacity support that they felt would be most useful in filling these gaps.

Several mandatory modules at the medical training colleges touch upon the external environmental factors affecting disease[5], but are not covered in enough detail to equip doctors, nurses and other medical staff with the knowledge required to effectively prevent, diagnose and treat climate and pollution-related illnesses in children.

The diagnosis and treatment of climate and pollution-related illnesses and pollution (including sources, exposure points and impacts) were cited by all focus groups as being the most critical knowledge gaps for healthcare workers.

Climate change and its impacts was described as "less relevant" and "more abstract" due to a general lack of understanding of its causes and impacts on children (*Fig.4*).

All groups stated that they would like to receive additional training, although in several cases there was some debate about training format. Generally, those working in the most remote rural areas and older staff members preferred in-person training, due to a lack of internet and digital device access. Younger healthcare staff and those based in urban areas stated that they preferred online training. Overall, a consensus was reached that providing opportunities for both training options would be critical, moving forward. (*Fig.5*).

"In order to understand the issues facing children here, we need real data and evidence to show us which pollutants and other environmental hazards are an issue."

**DOCTOR,
SHEKI DISTRICT**

"It's hard for me to even think about environmental factors when poverty is so high and children are so traumatised and fearful because of the conflict."

**NURSE,
YEVLAKH DISTRICT**

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[5]These include Public Health and Hygiene, Hygiene with Sanitary Hygiene Examination Methods and Child and Adolescent Health modules for nurses, and public health students. Source: Ministry of Health 2023, Educational program for the students studying at the sub-bachelor level of medical colleges and bachelor level of Azerbaijan Medical University

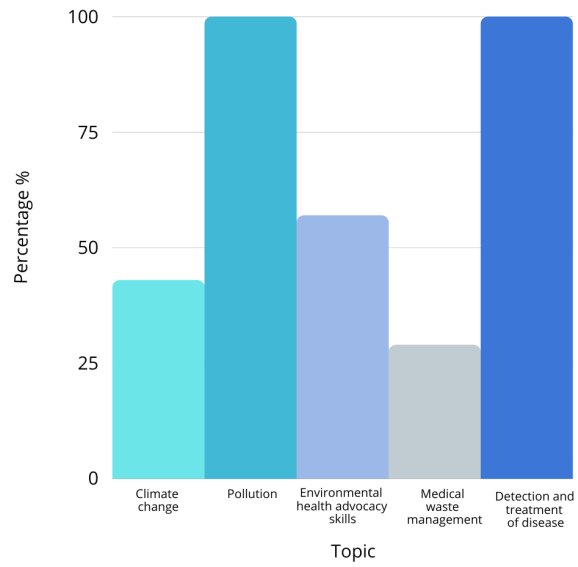## Fig.4   Specific knowledge gaps (self-reported)

Fig.5 Type of capacity support required
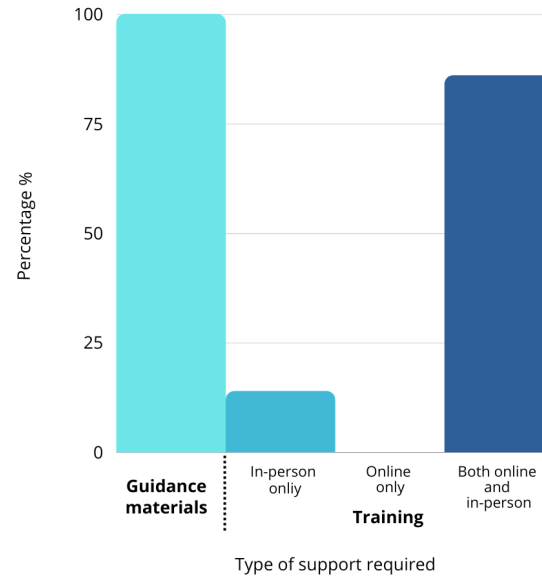
Fig.6 Additional resources required

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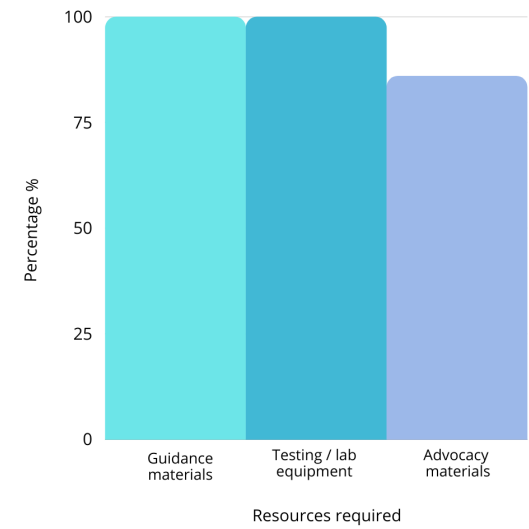
All healthcare workers requested to have training packages and guidance materials available (*Fig.6*). This included quick-reference, colour-coded tools and portable clinical history and diagnosis checklists. They requested that both digital and soft copies were made readily available to all staff. Healthcare workers also requested the provision of Information Education and Communication (IEC) materials, to support their advocacy efforts with parents and communities. This included posters and stickers placed around healthcare centres. Finally, all staff requested an increased availability of testing kits for key contaminants (including pesticides, mercury and lead).

Overall, healthcare workers, particularly in the conflict-affected regions, stated they had a limited bandwidth to learn new skills - especially if they seemed abstract and irrelevant to the communities they worked in. Helping them understand how critical environmental health is to their everyday work, treatment and diagnosis of illness in children, will be critical.

Focus group discussions with healthcare workers in Aghdam ©UNICEF Azerbaijan

2.2 Online survey

An online survey of 622 healthcare workers, across all rayons, was conducted in October 2023, to generate additional capacity gap information for the study. A summary of the key findings is listed below. The full results of the Online Survey can be accessed here.

1. Around **58% of those surveyed stated they had limited or no knowledge of key environmental health issues for children**.

2. **72% of healthcare workers stated that they would mostly access relevant information on this topic from the internet**. Around half of those surveyed stated they had also received some information on the topic from courses and conferences.

3. Overall, healthcare workers stated they felt they had the greatest awareness of air pollution both indoor and outdoor (ambient), food pollution and childhood injury (*Fig.7*). **Knowledge of lead, mercury, radioactive waste and pesticides was reported to be low.**

4. **Around 65% of healthcare workers stated they took into account environmental factors when discussing a child's clinical history.** They also stated that they regularly received information from parents on these issues.

5. **The majority of those surveyed (>90%) expressed concern over children's exposure to air (both indoor and outdoor) and water pollution.** These were also considered to be among the key environmental risk factors for children (*Fig.8*).

6. **Poisoning, burns and drowning were among the most common environment-related injuries witnessed among children** (*Fig.9*).

Fig.7   Key areas of knowledge among participants (self-reported)

● Indoor air pollution	418
● Ambient air pollution	460
● Childhood injuries	418
● Waste disposal	318
● Water pollution	471
● Pollutants of industrial origin	298
● Lead	123
● Mercury	210
● Pesticides consumption	160
● Electromagnetic fields	166
● Noice	282
● Heat	246
● Food pollution	442
● Mobility and transport	302
● Endocrin disorders	244
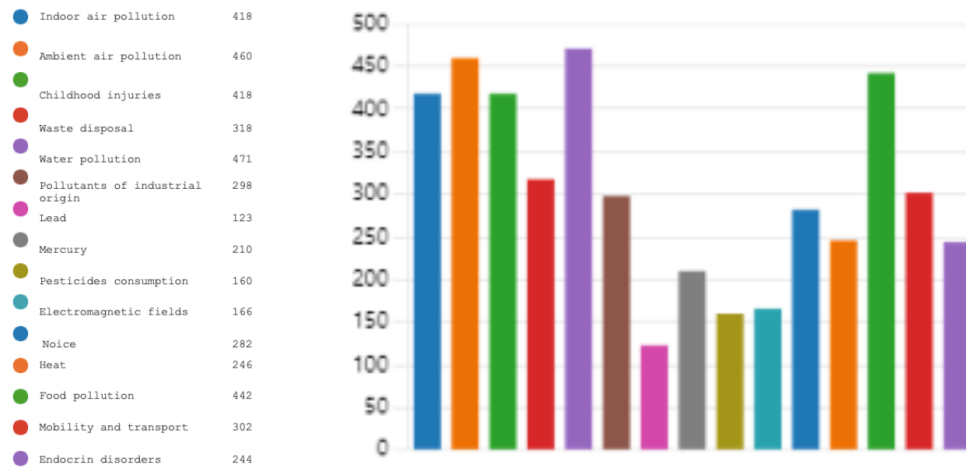
Fig.8   Top 5 Environmental risk factors for children

● Household air pollution	485
● Outdoor air pollution	540
● İnjures	320
● Waste disposal	198
● Water pollution	483
● Lead	31
● Mercury	89
● Pesticides	74
● Electromagnetic field	89
● Noice	128
● Heat	76
● Food pollution	357
● Mobility and transport	141
● Endocrin disorders	89
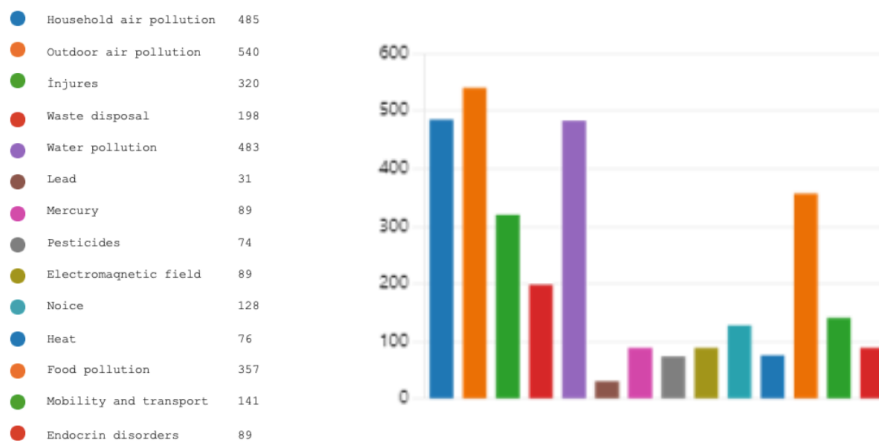
Fig.9   Most common injuries among children

● Drowning	260
● Sinking	143
● Falling	539
● Burning	474
● Poisoning	488
● Child abuse	142
● Traffic accidents	342

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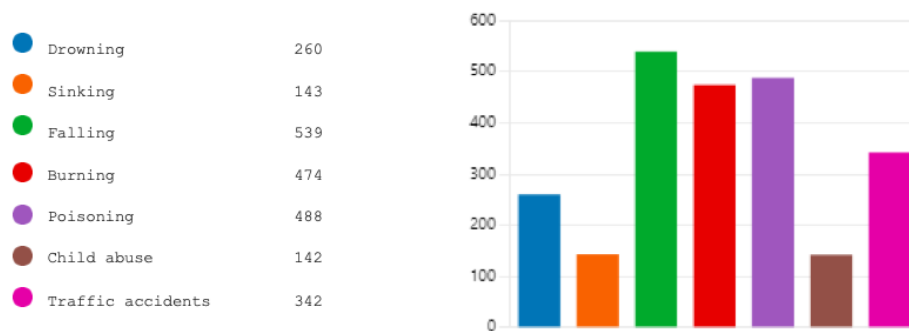
3. KEY GAPS

The Assessment highlighted several key gaps which must be addressed moving forward, to strengthen healthcare workers' capacity to prevent, diagnose and treat children impacted by environmental health hazards such as climate change and pollution. A summary of these challenges are listed below.

1. A lack of local data and evidence on environmental health risks: A lack of locally-relevant research, in addition to a lack of diagnosis and testing capacity means local information on these hazards is limited. This issue, in addition to a lack of training opportunities, means that healthcare staff have a limited awareness and understanding of climate change and pollution risks. The current hierarchical approach to government management also inhibits the flow of information both from the bottom up and from the top down. As such, there is a significant lack of child-focussed health data, not least in relation to climate and pollution. Additionally, this data is not disaggregated by gender, region, rural/urban, age or socio-economic status, limiting understanding of health and healthcare access issues faced by particular subgroups of children and adolescents.

2. A mismatch between the health workforce and the population's environmental health needs: The Assessment has shown that healthcare workers currently lack the training and resources required to address the specific health impacts of climate change and pollution on children, including identifying and managing climate-related health conditions. There are many reasons for this. Historically, the Soviet system also created more specialists than generalists who have the skillset to implement primary care, yet often lack a specialised focus, for example in treating heavy metal poisoning. Additionally, the current curricula at the country's medical university and colleges provided limited training to healthcare staff to prevent, diagnose and treat illnesses related to key environmental hazards, such as climate change and pollution. On-the-job training opportunities around these issues additionally remain limited and ad-hoc, with environmental health training provided mostly for Sanitary, but not Medical Doctors.[6]

3. Shortages of healthcare staff: Overall, Azerbaijan faces a shortage of staff specialised in treating climate and pollution-related diseases. In addition, paediatricians, paediatric nurses, and other child healthcare specialists are often insufficient in rural areas, leading to longer waiting times and reduced quality of care. This is also leading to burn-out and a reduced capacity to take on additional responsibilities and learning opportunities. Polyclinics and other healthcare centres, especially in rural communities, often remain understaffed.[7]

4. Limited paediatric healthcare infrastructure, including testing equipment: There is currently a limited availability of specialised paediatric healthcare facilities and resources, including hospital beds for children in rural areas, which may lead to an inadequate provision of care for those children impacted by environmental health hazards. In addition, paediatric healthcare infrastructure is rarely considered climate-resilient, meaning services may face significant disruption during climate-related hazards (such as floods and storms), depriving children of healthcare when they need it the most. Additionally, testing

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[6]Interviews with Ministry of Health, 4 October 2023
[7]USAID (2022) POLITICAL ECONOMY ANALYSIS OF THE HEALTH SYSTEM IN AZERBAIJAN: A LITERATURE REVIEW
https://pdf.usaid.gov/pdf_docs/PA00ZB6Q.pdf

kits (e.g. for heavy metals) and other diagnostic tools, including laboratory equipment remains extremely limited across the country. These issues are related to funding constraints, limiting the procurement of modern medical equipment and the implementation of advanced technologies. Reforming health financing to increase public health spending and protect households from out-of-pocket costs will be important to increase health care access.

5. A lack of guidance materials for healthcare workers: Healthcare workers reported that they lacked access to adequate guidance materials, including clinical history checklists, diagnosis and treatment protocols and other reference materials. They stated that this information needed to be made more easily accessible, allowing them to quick-reference it as needed, to provide more effective diagnosis and care to children.

6. A lack of public awareness and preventative education: Raising awareness among parents and caregivers about the health risks associated with pollution and climate change is essential to promote preventive measures and timely healthcare seeking behaviour. However, according to the Assessment, healthcare staff felt that they did not have the knowledge or confidence to be able to inform parents and other caregivers, and children on key environmental health-related issues, such as pollution and climate change. They also stated they lacked the resources (including IEC materials) to be able to effectively advocate for these issues.

4. CONCLUSION AND RECOMMENDATIONS

The Assessment found that healthcare workers in the 7 rayons, overall, displayed a weak knowledge and capacity to prevent, diagnose and treat climate and pollution-related illnesses in children. This included a limited awareness of climate-related hazards and their relevance for children's health, a limited understanding of locally-relevant pollution sources and their impact and children's overall physiological vulnerability to these hazards. Many healthcare workers also stated they did not have the guidance or resources required to effectively diagnose and treat children who had been exposed to these environmental hazards. These results were in contrast to the results of the online survey, where healthcare workers, overall, generally reported a better understanding of these core environmental health issues for children. This understanding was however self-reported.

The following recommendations have been developed to help address some of the key capacity gaps. It is hoped that the results of the Assessment and Survey will help ensure urgent and decisive action to better protect the children of Azerbaijan from the impacts of climate change and pollution in the future.

1. Strengthen the integration of child-focused climate considerations into policies and action plans in the healthcare sector. This includes:

- Ensuring a strong representation of climate and health-related issues for children in the country's upcoming National Adaptation Plan (NAP), including efforts to ensure a more resilient, low-carbon healthcare system.

- Ensuring all existing healthcare policies and strategies include specific measures to protect children from the impacts of climate change and pollution, improving the siting and construction of healthcare facilities, including WASH and medical waste disposal facilities, to prevent contamination during climate hazard-related events and other disasters.

- Carrying out an assessment of greenhouse gas emissions from the healthcare system, and integrating the use of renewable energy and reducing hospital waste.

- Developing a Climate-resilient Healthcare Services Roadmap outlining key measures and responsibilities for strengthening health service capacity and resilience.

2. Increase the local availability of data and evidence on environmental health risks: Ensuring healthcare staff have better access to environmental hazard information and child health data is critical in improving their knowledge and capacity. More specifically, this includes:

- Improving the collection and flow of environmental health data, both from the bottom-up and from the top-down, to ensure healthcare workers have the real-time evidence required to better protect children. For example, this includes better monitoring and sharing of information relating to heat stroke, water and food-borne disease and heavy metal poisoning. It is also imperative that this data is disaggregated by gender, age, location and socio-economic status, to ensure a better

understanding of health and health care access issues faced by particular subgroups of children and adolescents.

- Ensuring children's health and nutrition information is used to further strengthen the country's Early Warning System. It is also imperative that healthcare staff are alerted in advance of extreme weather events, before they happen, so healthcare centres can plan accordingly.

- Carrying out more detailed research and assessments at the local level, to help improve the targeting of further support. This, for example, could include testing children for heavy metal contamination in higher risk areas and exploring links between the increases in childhood cancers and neurological disorders, reported by healthcare workers.

3. Strengthening national coordination mechanisms for climate change, pollution and health: There should be Whole-of-Government approach and intersectoral coordination on children's environmental health issues. The Ministry of Health has already established an institutional focal point for CEH. This should be further strengthened through engagement of other relevant stakeholders and agencies (sanitary-epidemiology service, SAMHI, TABIB, Ministry of Ecology and Natural Resources, sectors like food safety, education, transport, agriculture, industry, economy) as a working group or task force endorsed by the President or Cabinet of Ministers to formalise coordination and advance children's environmental health issues in agenda and policies across sectors.

4. Increase the availability and quality of Environmental Health training for all medical staff: More specifically, this includes:

- Ensuring Environmental Health training is part of the core curriculum at all medical universities and colleges. This includes specific modules on preventing, diagnosis and treating climate and pollution- related illnesses.

- Establishing Environmental Health training for existing healthcare workers, ensuring that all healthcare workers receive in-service training on environmental health issues, specific to their local context. Training packages should be developed based on the latest international recommendations and tailored to the local needs and available evidence on key exposure risks as was outlined in the Children's Environmental Health Assessment report (2023).[8]

- Ensuring online training modules and other resources are made publicly available through existing digital platforms (i.e. of Ministry of Health, Public Health and Reforms Center, TƎBIB, Ministry of Ecology and Natural Resources, and the National Early Childhood Development Digital Resource Hub) and publicised among healthcare workers.

5. Improve access to paediatric healthcare infrastructure, including testing equipment and antidotes: More specifically, this includes:

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[8]UNICEF Technical Note on "Children's Environmental Health - Country Assessment"
https://www.unicef.org/azerbaijan/reports/childrens-environmental-health-assessment-azerbaijan

- Increasing the availability of specialised resources, including heavy metal testing kits (e.g. mercury and lead), laboratory equipment, other diagnostic tools and antidotes, prioritising the most at-risk regions. Healthcare workers must also receive training on how to utilise these resources. The positioning of these kits should be directly related to specific hazards children are exposed to - and based on a proper assessment.

- Ensuring healthcare infrastructure, including its water, sanitation and waste management systems, are climate-resilient to ensure healthcare services remain functional in the face of climate-related hazards, and that healthcare centres do not create an additional environmental hazard for the surrounding communities.

6. Increase the availability of guidance materials for healthcare workers: More specifically, this includes developing Environmental Health guidance materials for healthcare workers, including clinical history checklists, diagnosis and treatment protocols and other reference materials. These materials must be designed in a comprehensive and straight-forward manner, colour coded and laminated to allow for easy-use and quick-referencing as required. These materials must also be made available

7. Provide healthcare workers with the training and resources required to raise public awareness and protect children from locally-relevant environmental health hazards: Healthcare workers must be provided with the training and resources required to raise awareness among parents and caregivers, and children, about the health risks associated with pollution and climate change. This includes training on effective advocacy messages and methods and the provision of IEC materials. These IEC materials must be made visible in healthcare centre waiting rooms and public restrooms, and should also be used during healthcare workers' outreach visits and consultations with parents. These materials must also be made available through existing digital platforms, including the Ministry of Health, Public Health and Reforms Center, TABIB, Ministry of Ecology and Natural Resources, and the National Early Childhood Development Digital Resource Hub

5. STUDY LIMITATIONS

The focus group discussions and survey were both valuable tools for gathering qualitative and quantitative data from healthcare workers across the country. However, there were several limitations to this study, including:

1. Time constraints meant a limited depth of response: Due to time and resource constraints, focus groups remained relatively large (between 20-40 people) meaning participants did not always have enough time to express their opinions fully. Some individuals also tended to try and dominate the conversation, limiting the diversity of perspectives, although significant efforts were made to overcome this. The use of the online questionnaire also helped create a broader, more in-depth understanding of the capacity gaps experienced by healthcare workers, but was only able to provide a limited snapshot of the key capacity gaps.

2. Social desirability and other biases: It is possible that participants were hesitant to express unpopular opinions or concerns, or appear uninformed, especially in a mixed group where there were hierarchical differences, management pressures and social norms that may have discouraged dissenting views. This may have led to biassed or overly positive responses. Additionally, self-reported confidence in environmental health knowledge for children remained relatively high, despite detailed knowledge of these issues being lacking.

3. Groupthink: In large groups, there is often a risk of groupthink, where participants conform to the majority opinion rather than expressing their genuine thoughts. This can lead to distorted or overly homogenised perspectives.

4. Data Analysis Challenges: Analysing data from large and mixed groups can be complex. Sorting through a wide range of responses to assign an overall capacity score remained subjective and a challenge.

ANNEXES

ANNEX I: SURVEY QUESTIONS

1. What do you understand by the term Climate Change? Which natural phenomena or climate hazards does it refer to, in the case of your region?

2. Which forms of pollution do you believe have the worst impact on children in Azerbaijan - and why? Why do you think children are particularly vulnerable to these impacts? Which pollution-related illnesses are the most common at your healthcare facility? Have there been any examples of pesticide or heavy metal poisoning of children at your facility? Do you know what symptoms to look out for? How would the child be tested and treated?

3. In terms of health, why and how do you think children are particularly vulnerable, physiologically, to climate change?

4. Are climate and pollution-related illnesses easy to detect or can they be confused with other illnesses? How do you usually diagnose? How do you tell the difference between heavy metal poisoning and other stomach issues?

5. When conducting a clinical history, do you gather information about the environment where the child lives, grows, plays and studies? Why do you think this is important - and how is this information used?

6. Do you do any other outreach work in the communities? Do you feel confident in the knowledge and guidance you're able to provide parents?

7. What are the current knowledge gaps relating to climate change and pollution? How can they best be filled? Which types of training do you prefer?

8. What resources do healthcare centres need to better treat and diagnose children, affected by climate and pollution-related health issues?

ANNEX II: A SUMMARY OF THE CLIMATE AND POLLUTION-RELATED IMPACTS ON CHILDREN IN AZERBAIJAN

a. A Summary of the climate-related hazards and the impacts on children

Climate hazard	The most affected children	Impacts on children
1. Extreme heat	The poorest children including: • Children under-5, particularly infants • Children with disabilities and other medical conditions • Girls and adolescents • Migrant children • Children engaged in child labour	• Heatstroke and dehydration[9] • Increased incidence of pre-eclampsia in pregnant women[10] • Increased risk of low birth weights in infants[11] • Increased risk of food and water-borne diseases.[12] • Increased risk of malaria and dengue fever. • Increased risk of violence and abuse[13] • Reduced concentration and learning at school.[14] • Increased risk of social isolation, obesity, anxiety and depression[15]
2. Drought and water scarcity	The poorest children including: • Children under-5 • Girls and adolescents • Children with disabilities and other medical conditions • Children from remote rural communities that rely on rain-fed agriculture • Those without access to safe water at school and at home • Girls and adolescents • Oprhans and other vulnerable children (including migrant children and those engaged in child labour).	• Increased risk of alnutrition due to food insecurity and loss of livelihoods. • Increased risk of malaria, dengue fever and other vector-borne diseases. • Increased risk of fire (burns and child mortality).[16] • Increased concentration of toxins, bacteria and other contaminants in water, increasing risk of water-borne disease[17] • Increased risk of dehydration
3. Flooding and storms	The poorest children including: • Children living in poorly constructed homes, including urban slums • Children in urban, mountainous and riverine regions. • Children under-5 • Children with disabilities and other medical conditions • Girls and adolescents • Oprhans and other vulnerable children (including migrant children and those engaged in child labour).	• Injury, death and displacement.[18] • Salinisation of water sources, leading to health issues such as high blood pressure and hypertension. • Destruction of homes, infrastructure and essential services for children. • Financial hardship and stress for families. • Increased exposure to chemicals, pathogens and other toxins, which contaminate soil and water sources. • Increased risk of water and vector-borne disease.

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[9]UNICEF (2022) The coldest year of the rest of their lives https://www.unicef.org/media/129506/file/UNICEF-coldest-year-heatwaves-and-children-EN.pdf
[10]Shashar et al (2020) Temperature and preeclampsia: Epidemiological evidence that perturbation in maternal heat homeostasis affects pregnancy outcome https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0232877
[11]Ibid
[12]Van Elsas et al (2011) Survival of E.Coli in the environment https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3105702/
[13]Shashar et al (2020) Temperature and preeclampsia: Epidemiological evidence that perturbation in maternal heat homeostasis affects pregnancy outcome https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0232877
[14]Hyunkuk Cho, The effects of summer heat on academic achievement: A cohort analysis, Journal of Environmental Economics and Management, Volume 83, 2017, Pages 185-196, ISSN 0095-0696, https://doi.org/10.1016/j.jeem.2017.03.005.
[15]Chan EYY, Lam HCY, So SHW, Goggins WB III, Ho JY, et al. 2018. Association between ambient temperatures and mental disorder hospitalizations in a subtropical city: a time-series study of Hong Kong Special Administrative Region. Int. J. Environ. Res. Public Health 15(4):754
[16]Beegum SN, Gherboudj I, Chaouch N, Temimi M, Ghedira H (2018) Simulation and analysis of synoptic scale dust storms over the Arabian Peninsula. Atmos Res 199:62–81. https://doi.org/10.1016/j.atmosres.2017.09.003
[17] Ibid.
[18]Ibid.

b. Key pollutants affecting children in Azerbaijan

Pollution category	Example types	Key sources	Impacts on children	Evidence from Azerbaijan
Air pollution	Particulate Matter	Wind dust and hydrocarbon sources. Can also be produced by construction sites, unpaved roads, smokestacks or fires, or formed as a result of complex reactions of chemicals such as sulphur dioxide and nitrogen oxides in the atmosphere[19]	• Children breathe twice as fast as adults, taking in more air per unit of body weight. In addition, children's bodies are still growing and developing and their detoxification mechanisms are not fully developed. Harm to their organs in this delicate and critical stage can have lifelong implications.[20] For example, lung damage in early childhood due to air pollution can be irreparable and affect lung capacity through to adulthood. • Air pollution has been found to lead to an increased incidence of cancers, asthma, neurological disorders and lower respiratory infections in children.[21][22] • Particulate matter (PM2.5) is a leading cause of cancer and respiratory illness in children.[23] Around 7% of deaths attributable to fine particle outdoor air pollution are among infants.[24] • High levels of fine particles also contribute to other illnesses, like diabetes, can hinder cognitive development in children and also cause mental health issues. • Sulphur dioxide has been linked to respiratory diseases such as Bronchitis and Asthma.[25][26]	• In Baku, air pollution exposure during pregnancy has been linked to congenital heart defects in infants.[27] • Air pollution is a top 10 risk factor for death in Azerbaijan, accounting for approximately 11% of all deaths in 2019. Fine particulate matter (PM2.5) ranks as the most dangerous form of pollution.[28] • Eight percent of deaths due to air pollution are children under the age of five.[29] • Nine percent of neonatal deaths are associated with air pollution. • In addition, acute respiratory infections, especially pneumonia, are the leading cause of death among young children. Roughly half of these deaths occur due to smoke resulting from the burning of solid fuels in confined spaces.[30]
	Carbon Monoxide	Vehicle emissions, leaking chimneys and furnaces and gas stoves.[31]		
	Nitrogen Oxides (NOx)	Vehicle emissions, energy production, agriculture, industrial processes and human waste.[32]		
	Sulphur Dioxide	Energy production (especially those that burn coal), petroleum refineries, cement manufacturing and metal smelting and processing facilities.		

[19]Ibid.
[20]Ibid.
[21]EEA (2021) Health impacts of air pollution https://www.eea.europa.eu/themes/air/health-impacts-of-air-pollution
[22]UNICEF (2017) Danger in the Air https://www.unicef.org/sites/default/files/press-releases/glo-media-Danger_in_the_Air.pdf
[23]IARC (2013) Outdoor air pollution a leading environmental cause of cancer deaths
https://www.iarc.who.int/news-events/iarc-outdoor-air-pollution-a-leading-environmental-cause-of-cancer-deaths/
[24]Ibid.
[25]Herbarth O, Fritz G, Krumbiegel P, Diez U, Franck U, Richter M. Effect of sulfur dioxide and particulate pollutants on bronchitis in children--a risk analysis. Environ Toxicol. 2001 Jun;16(3):269-76. doi: 10.1002/tox.1033. PMID: 11409199
[26]Smargiassi A, Kosatsky T, Hicks J, Plante C, Armstrong B, Villeneuve PJ, Goudreau S. Risk of asthmatic episodes in children exposed to sulphur dioxide stack emissions from a refinery point source in Montreal, Canada. Environ Health Perspect. 2009 Apr;117(4):653-9. doi: 10.1289/ehp.0800010. Epub 2008 Oct 21. PMID: 19440507
[27]Tujar M. G. Environmental pollution and congenital heart defects in Baku. EurAsian Journal of Biosciences. Jan-Jul 2020, Vol. 14 Issue 1, p1345-1351
[28]UNICEF Technical Note on "Children's Environmental Health - Country Assessment"
https://www.unicef.org/azerbaijan/reports/childrens-environmental-health-assessment-azerbaijan
[29]UNICEF Technical Note on "Children's Environmental Health - Country Assessment"
https://www.unicef.org/azerbaijan/reports/childrens-environmental-health-assessment-azerbaijan
[30]Center for Public Health and Reforms, Health Portal, Environment and Children, Constitution of the Republic of Azerbaijan,
https://saglamliq.isim.az/news/2015/etraf-muhit-ve-usaqlar
[31]EPA (2022) Basic Information about Carbon Monoxide (CO) Outdoor Air Pollution
https://www.epa.gov/co-pollution/basic-information-about-carbon-monoxide-co-outdoor-air-pollution
[32]S.C. Gad (2014) Encyclopedia of Toxicology https://www.sciencedirect.com/referencework/9780123864550/encyclopedia-of-toxicology

Faecal contamination	Bacteria and other pathogens[33]	• Unprotected latrines and poorly maintained sewerage systems. • Faecal contamination from farm animals.	• Diarrhoea and other forms of water-borne disease • Reduced nutrient absorption and stunted growth • Decreased cognitive development and school attainment.	• Limited research available on the impact of faecal contamination on children in Azerbaijan.
	Pharmaceuticals, narcotics and stimulators[34]		• Hormone disruption in children, including early puberty and thyroid issues. • Antibiotic resistant bacteria • Impacts on mood and mental health • Obesity	
Chemical contamination	Pesticides[35]	• Agriculture • Household gardens	• Hormone disruption in children, including early puberty, obesity and thyroid issues. • Low birth weights, impaired cognitive functioning and development.	• In Azerbaijan, dozens of fatal cases, including acute poisoning from toxic pesticides belonging to various chemical groups, are recorded among children every year.[36] • Vast areas contaminated with obsolete and prohibited pesticides that could be dangerous for children's health remain common. • Additionally, more than 70 sites (where pesticides were buried) have been identified that are in close proximity to residential areas and pose immediate threats to human health.[37]
	Fertilisers[38]		• Promote algal blooms, toxic to children. • Hormone disruption, including thyroid disruption • Cancer	
	Salt[39 40]	• Agriculture fertilisers • Mining operations	• Hypertension • Reduced cognitive development in children.	• No research on child salt exposure in Azerbaijan
	Heavy metals (e.g.arsenic lead, cadmium, mercury etc)[41]	• Corrosion of old pipes and plumbing fixtures • Paint, batteries, electronic and household waste • Unprotected landfills • Gasoline and petroleum products	• Lifelong neurological, cognitive and physical impairment. • Mental health and behavioural problems and an increase in crime and violence • Liver and kidney problems • Foetal impacts, including low birth weights, skeletal malformations, and increased incidence of miscarriage	• In Azerbaijan, no acute cases of poisoning from mercury, lead, and cadmium in children have been recorded. Although oral intake of metallic mercury from medical thermometers and other sources usually does not cause poisoning, exposure through inhalation

[33]Gilmartin AA, Petri WA Jr. Exploring the role of environmental enteropathy in malnutrition, infant development and oral vaccine response. Philos Trans R Soc Lond B Biol Sci. 2015 Jun 19;370(1671):20140143. doi: 10.1098/rstb.2014.0143. PMID: 25964455; PMCID: PMC4527388

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[35]Meeker JD. Exposure to environmental endocrine disruptors and child development. Arch Pediatr Adolesc Med. 2012 Jun 1;166(6):E1-7. doi: 10.1001/archpediatrics.2012.241. PMID: 22664748; PMCID: PMC3572204

[36]Afandiyev I. N., Huseynova N. A. Acute poisoning in children: epidemiology, risk factors and possible ways of prevention. Azerbaijan Journal of Perinatology and Pediatrics. 2018, Volume 4, No. 1, p. 30-36

[37]UNICEF Azerbaijan (2018) Climate Landscape Analysis for Children (CLAC)

[38]Ahmed M, Rauf M, Mukhtar Z, Saeed NA. Excessive use of nitrogenous fertilisers: an unawareness causing serious threats to environment and human health. Environ Sci Pollut Res Int. 2017 Dec;24(35):26983-26987. doi: 10.1007/s11356-017-0589-7. Epub 2017 Nov 14. PMID: 29139074.

[39]Akter (2019) Impact of drinking water salinity on children's education https://www.sciencedirect.com/science/article/abs/pii/S0048969719330311?via%3Dihub
[40]Ibid.

		• Hazardous waste sites • Children can be exposed through ingestion, inhalation and prenatally, through food and water.	• Decreases in the numbers of blood-forming cells • Respiratory difficulties including bronchitis, asthma, and wheezing • Cancer, including blood and lymph cancers. • Chronic exposure raises the risk of bladder, lung and skin cancers. • Early-life exposures, including prenatal exposures, are especially dangerous.	is extremely dangerous for children.[42] • The levels of certain heavy metals, especially arsenic, barium, chromium, copper, lead, and zinc, exceed the permissible limits, in and around the oil fields of Absheron.[43] • Unfortunately, there is no information available in Azerbaijan regarding the level of lead in children's blood. • In Azerbaijan, arsenic poisoning among children mainly occurs as a result of accidental ingestion of rodenticides (pest control products against rodents).[44]
	Benzines[45]	• Crude oil and gasoline • Cigarette smoke • Forest fires • Vehicle exhausts • Building materials and furniture	• Leukaemia • Neurological impacts • Respiratory problems • Coma and convulsions • Skin and eye irritation	• Baku's air exceeds the safe limits for Benzine.[46]
	Asbestos	• Walls and roofing • Landfills, soil and water.[47]	• Mesothelioma and other respiratory diseases.	• In Azerbaijan, the main risk related to asbestos, comes from the inhalation of asbestos fibres, imported from the United States.[48] • No scientific or statistical information on asbestos in Azerbaijan.
Other forms of contamination	Microplastics[49]	• Plastic waste and unprotected landfills	• Hormone disruption, including early puberty • Low birth weights	• High levels of microplastics have been found in the Caspian Sea.[50]

[41]UNICEF (2020) The toxic truth: Children's exposure to lead pollution undermines a generation of future potential https://www.unicef.org/reports/toxic-truth-childrens-exposure-to-lead-pollution-2020

[42]Эфендиев И. Н. Отравления веществами антихолинэстеразного действия. Евразийский Журнал Клинических Наук. 2021. Том 3, № 1.http://www.ejcs.org/index.php/main/article/view/98

[43]UNICEF Azerbaijan (2018) Climate Landscape Analysis for Children (CLAC)

[44]Эфендиев И. Н., Гусейнова Н. А. Острые отравления у детей и возможные пути их профилактики. Педиатрия. 2018; 97 (5): 189–193 DOI: 10.24110/0031-403X-2018-97-5-189-193

[45]US EPA (2009) U.S. EPA, Toxicity and Exposure Assessments for Children's Health https://archive.epa.gov/region5/teach/web/pdf/benz_summary.pdf

[46]S. Mammadova. Ecogeographical Problems of Air Pollution in the Big Cities of Azerbaijan. Bulletin of Science and Practice. 2020. 6(2):20-41. DOI: 10.33619/2414-2948/51/02

[47]WHO (2021 Asbestos in Drinking Water) https://www.who.int/publications-detail-redirect/WHO-HEP-ECH-WSH-2021.4

[48]Trading Economics (2023) Azerbaijan Imports from the United States https://tradingeconomics.com/azerbaijan/imports/united-states/fabricated-asbestos-fibers-items-mixtures

[50]Nematollahi, Mohammad Javad & Moore, Farid & Keshavarzi, Behnam & Vogt, Rolf & Nasrollahzadeh Saravi, Hasan. (2020). Microplastic particles in coastal waters of the southern Caspian Sea.

			● Impaired cognitive functioning and development	● No research has been conducted on the impact of microplastics on children in Azerbaijan.
	Medical waste		● Lung infections. Parasitic infections. Skin infections. Spread of viral illnesses such as HIV, Hepatitis B and C.[51]	● In Azerbaijan, anatomical waste is regularly mixed with infectious waste.[52] ● 43% of primary healthcare institutions reported a lack of waste containers, plastic bags, and similar equipment.[53] ● It is not known how much medical waste ends up contaminating land and water sources in Azerbaijan.

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[49]Ibid.
[51]WHO (2018) Healthcare waste factsheet https://www.who.int/news-room/fact-sheets/detail/health-care-waste
[52]UNICEF (2022) Azerbaijan Situational Analysis on Healthcare Waste Management
[53]Ibid.