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## MEDICAL WASTE MANAGEMENT IN KAZAKHSTAN

Medical waste management is a World Wide actual problem. There are 16 billion injections occurred in the World by statistics of World Health organization, 2019[1] and all this injections done by syringes, which are only one of the stuffs of health caring facilities. It pushes to the fact that medical waste emerges equivalently often as household waste. However the system of medical waste management mostly includes same steps, but condition and stability of it different, because of country developing level. During this research there was identified that waste disposal in Kazakhstan on poor condition. There are many natural dumps, where you can easily find some medical facilities on the landfill that is not concerned to garbage. Moreover disposal of medical waste includes two ways, burning of them and instillation they are ecological harmful and can lead to hazardous consequences connected with public health and environmental issues. The alternative way to prevent this problem is recycling and exchanging with experience of developed country.

**Keywords:** Medical waste, recycling, ecological harmful, disposal, Volatile organic compounds (VOCs), toxic gases, Mottainai idea.

### Introduction

Nowadays to keep clean ecology is an actual problem the development of medicine leads to the need for rapid replacement of equipment. Meanwhile, obsolete devices, used and already unsuitable for further operation tools, require collection, sorting by classes, and further disposal [2]. The main risks that used medical stuff include presence of infected objects or liquids in it; the presence of chemicals, biological active substances; radioactive objects. It is also possible to get purely mechanical damage with instruments that were not returned for proper storage (the most common case, injury and even infection through simply thrown out syringes). Moreover medical waste splits into groups connected with hazard level and chemical consistence, they are infectious waste, sharp objects, chemical substances, pharmaceuticals, cytotoxic waste, and radioactive waste. Furthermore disposal of the waste includes two ways burning them or instillation under special landfills. Despite government's management of waste programs there are some gaps, as natural dumps, where easily can be found certain medical equipment among solid domestic waste. This fact shows up weakness of waste management system of Kazakhstan. However there is an alternative way to solve this problem it is recycling of waste.

### Materials and methods

To deeply evaluate problems with medical waste management and importance of recycling medical waste to our country and based on the experience of developed country to find safe ways of processing.

To deeply evaluate problems with medical waste management there was identified the level of recycling in Kazakhstan by data from 31st channel reports:

\*Kazakhstan today there are only 130 enterprises that sort and process waste [3];

\*On average, each citizen annually throws about 250-260 kg. of household waste every year;

\*100 million tons of garbage accumulated at landfills in Kazakhstan. (Habar-24) [4];

\*3800 landfills for and only 16 of them complies with sanitary standards.

Today, over 43 billion tons of garbage has accumulated at the landfills of Kazakhstan. An additional 5-6 million tons are added to them annually. At the same time, only 9% is processed 2019. Moreover thousands of natural dumps speeded around the regions [5].



Figure 1 - Solid waste landfill near Uralsk, July, 2018[6]



Figure 2 - Household garbage in one of the courtyards of Almaty. Photo courtesy of the society "Green salvation", 2018[7]



Figure 3 - North Kazakhstan Region, Petropavlsk, March, 2018[7]

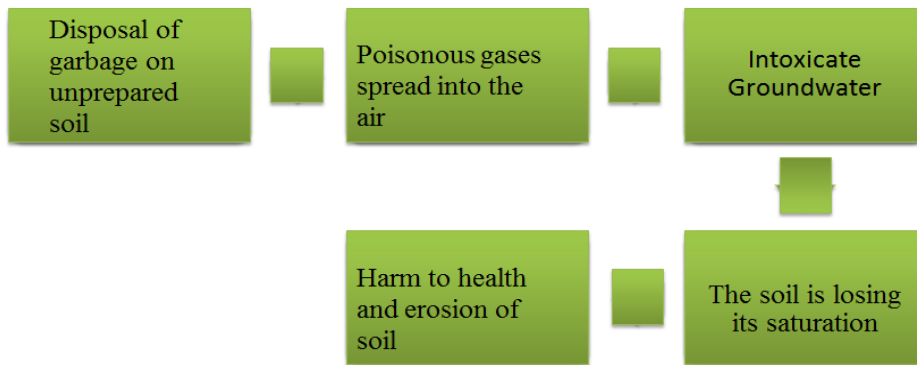


Figure 4 - Consequences of natural dumps - Ecological issues [8]

Attitude for medical wastes in Kazakhstan:

Amputated body parts in plastic bottles, used syringes, containers with leftover blood - these medical wastes have been found by Kazakhstanis three times in the steppes and villages 2019 over the past three months. The last case occurred in late April in Lenger, Turkestan region.



Figure 5 - Late April in Lenger, Turkestan region[9]

According to data medical waste management companies of Kazakhstan on case only burn garbage in stoves, which harms ecology. The open burning medical waste ensure emitting of toxic gases and substrates, as nitrogen oxides, Volatile organic compounds (VOCs), carbon monoxides, Particle Pollution (PM). VOC is are carbon-based compounds that undergo photochemical reactions when released into the atmosphere. The VOCs and the compounds they form in the atmosphere, such as ozone, contribute to the formation of smog[10].

**Materials:**

\*Scientific researches

\*Public web sites statistics and data

To Identify a safe and environmentally friendly form of medical waste treatment from a public perspective was done Survey by online platform “Survey Monkey” among citizens of Kazakhstan by online based platform includes:

\*6 questions

\*above 80 respondents answers

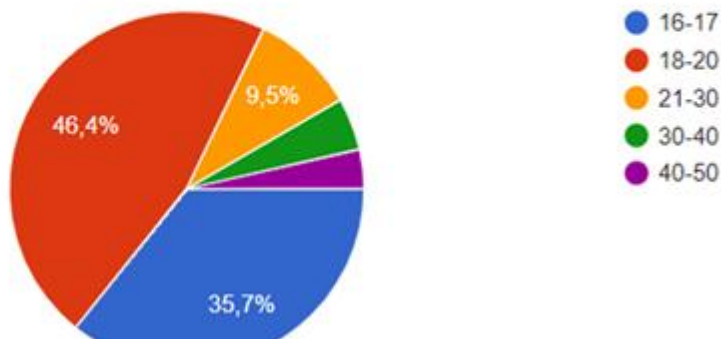
\*Between 16-50 ages citizens of Kazakhstan

**The results of survey and discussion**

Particle Pollution (PM)

**Ваш возраст**

84 ответа

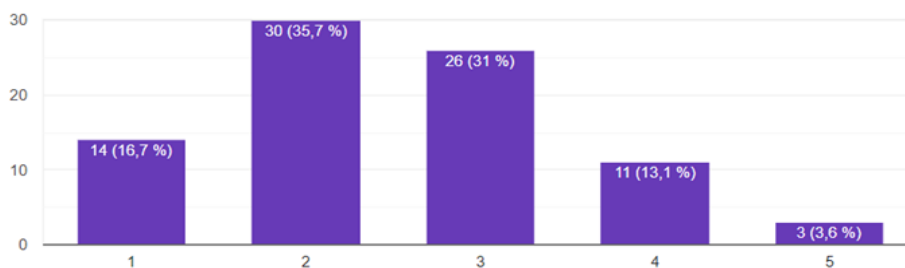


**Figure 6 - Age of respondents**

This pie chart demonstrates that the main survey respondents were between 18-20 ages.

**Насколько вы оцениваете уровень переработки в Казахстане?**

84 ответа



**Figure 7 - Five-point scale-evaluation question**

The histogram shows five-point scale demonstration question that oriented on giving mark for waste management level of Kazakhstan and due to histogram was been analyzed that majority of citizens marks it between two and three scales.

По вашему мнению, какая страна является лидером в сфере переработки?

84 ответа

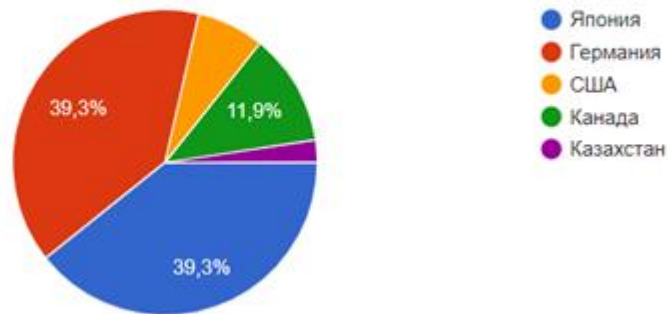


Figure 8 - Identify super-recycling country

To analyze which country is the best example or directly Super-recycling there was identified that Japan and Germany shares first place and Canada on the second place.

Оцените важность переработки и утилизации медицинских отходов

84 ответа

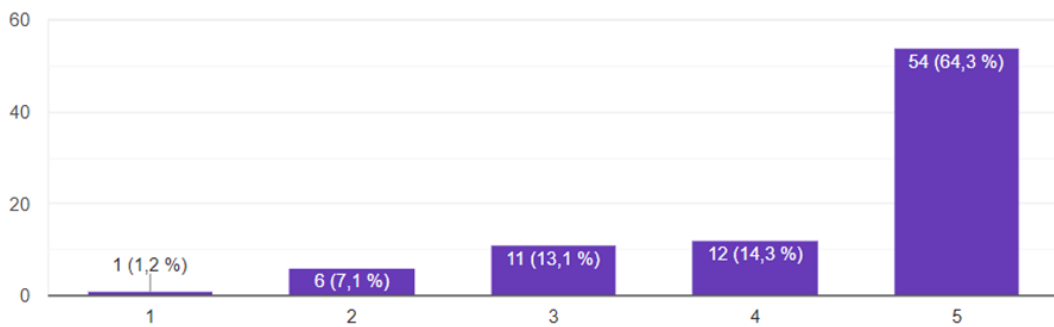


Figure 9 - Five-point scale-evaluation question to identify importance of recycling

This results show the importance of the medical waste recycling and majority of respondents support this idea.

Как вы думаете, что является причиной замедленной переработки отходов в Казахстане?

84 ответа

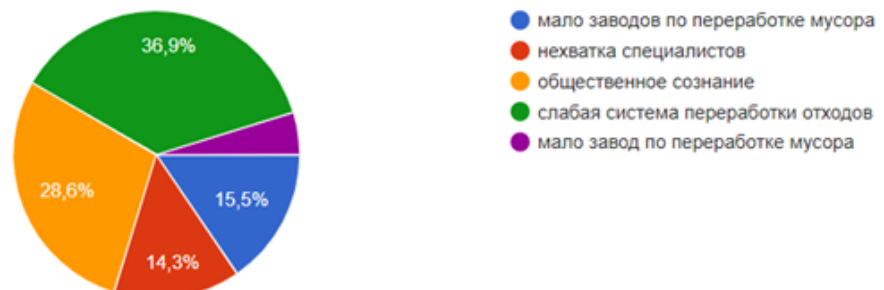


Figure 10 - Identify the cause of problems with recycling in Kazakhstan

The main cause of waste recycling why Kazakhstan in poor condition describes by weak system of waste management and weak public consciousness.

## Подлежат ли медицинские отходы переработке?

84 ответа

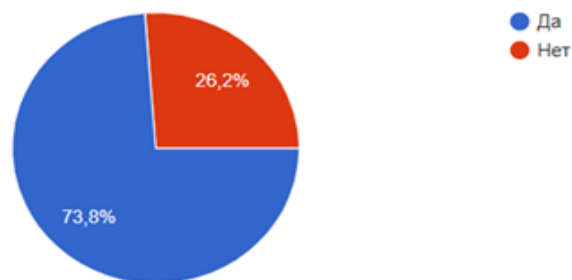


Figure 11 - Medical wastes

Above 73% of respondents subject medical waste as recycling waste it shows awareness of citizens with this problem.

Super recycling - country which shows strong performance in recycle management sphere is Japan. There are over 90% of waste recycled [10] and due to Zero waste program and Mottainai idea.

Mottainai idea - is an Japanese philosophy related with maximum waste minimization, which teaches young generation from childhood to respect nature, to minimize waste, to select them by appearance [11].

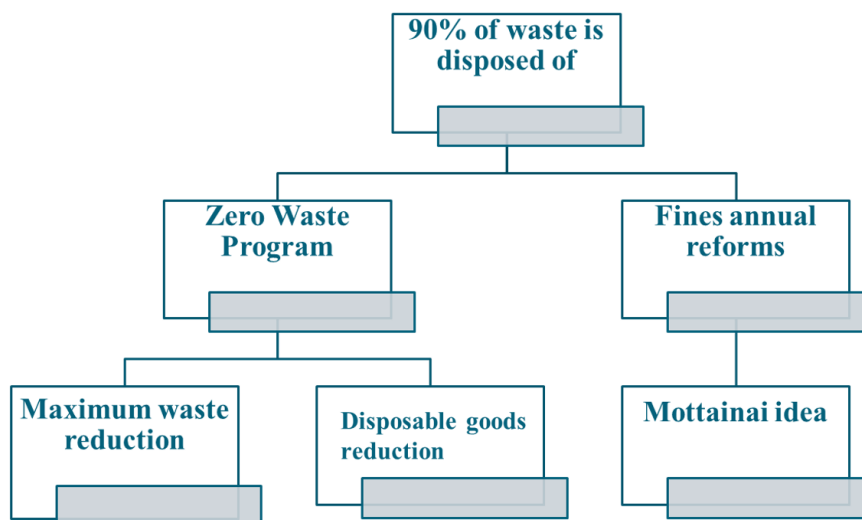


Figure 12 - Super-recycling country-Japan[11]

### Conclusion

Research results show the different sides of opening recycling companies and how it would effect on Kazakhstan economy and social live. There were identified strengths of recycling companies and they are: economically proficient, less harm to ecology, because of using environmentally friendly way of recreating, by reusing raw materials from medical garbage saving the amount of renewable fossil fuels. Moreover opening recycling entrepreneurships positively effect on social live by providing citizens with workplaces and stable salary. To make it real there are some weaknesses that should be solve before opening recycling companies as need for initial investment, lack of professional specialists who will be responsible for comprehensive work planning, reaction and opinion of society should be counted. Furthermore as in Japanese culture teaching of future generation from their childhood to be friendly with nature, selecting waste and make it value of the nation is a right way of solving problems with wastes.

### REFERENCES

1. Resource saving. Waste treatment. Terms and definitions// GOST 30772-2001.
2. Bodrova, E. 2019, the requirements for waste processing were tightened. What for? And what has changed? » // News channel-information Bureau. – 2019.
3. ISA, D. "« Why is garbage disposal in Kazakhstan a Problematic issue? ".Radio Azattyk URL: Rus.Azattyk.org
4. Zakharchuk, V. TV show checked, Khabar 24. URL: <https://www.youtube.com/watch?v=YG1ngBF6edw> //may 30, 2019
5. Malyutina, A. "how garbage is sorted and processed in Japan" URL: <https://recyclemag.ru/article/kak-sortiruyut-i-pererabatyivayut-musor-v-yaponii>//November 10, 2015
6. Anderson, E. W assessment of zones of use // Journal of range management. – 1973. - №26. – P. 87-91.
7. "Health care waste". URL: <https://www.who.int/ru/news-room/fact-sheets/detail/health-care-waste>
8. Nikonov, A. "«cities of Kazakhstan with the dirtiest air are Named" // News channel-inform the BUREAU. – 2019.

9. "Air Apocalypse. China has record air pollution" Корреспондент.net, URL: <https://korrespondent.net/world/3587142-vozdushnyi-apokalypsys-v-kytae-rekordnoe-zahriaznenye-vozdukh//> November 9 ,2015
10. Site Chemist, electronic encyclopedia, URL: <http://www.xumuk.ru/encyklopedia/2/4973.html> Ivansky V. I. // 1978, Chemistry of heterocyclic compounds
11. The Website of the Chemist, electronic encyclopedia, URL: <http://www.xumuk.ru/encyklopedia/2/4971.html> Mashkovsky M. D., // Medicines, 10 ed.
12. Site Celitron, "Integrated Sterilizer and Shredder for clinical waste disposal" URL: <https://celitron.com/en/products/medical-solutions/iss#>

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### ҚАЗАҚСТАНДАҒЫ МЕДИЦИНАЛЫҚ ҚАЛДЫҚТАРДЫ ӨНДЕУ ЖҮЙЕСІ

**Түйін:** Медициналық құрал-жабдықтарды өңдеу, ғаламдық мәселе болып табылады. Себебі көптеген медициналық құрал-жабдықтарды көбісі бір рет қолдануға бағытталған және ДДСҰ-ның статистикасы бойынша бір жылда 16 миллиард инъекция жасалуының нәтижесінде қолданған шприцтардың қоқысқа айналуы, медициналық қалдықтардың санының күннен-күнге өсуінің дәлелі[1]. Ол қолданылған медициналық құралдар әрі қарай қауіп-қатер деңгейіне байланысты сұрыпталып қоқыс полигондарына немесе оларды жандырумен айналысатын кәсіп орындарға жіберіледі. Жеке кәсіп орындарда қоқыстысты жандыру нәтижесінде ауаға бөлінетін оксидтер мен улы газдар кезегімен экологияға кері әсер етеді. Қоқыстарды қайта өңдіруді іске қосу арқылы алдын алуға болады.

**Түйінді сөздер:** Медициналық қалдықтар, қайта өңдіру, экологияға зияны, қоқыс өңдеу, ұшқыш органикалық қосылыстар, улы газдар, Моттайнай идеясы.

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### УПРАВЛЕНИЕ МЕДИЦИНСКИМИ ОТХОДАМИ В КАЗАХСТАНЕ

**Резюме:** Утилизация и переработка медицинских отходов является Глобальной проблемой. Многие медицинские принадлежности в основном для одноразового использования. В мире по статистике ВОЗ 16 миллиардов инъекции сделано за год и столько же шприцов для инъекции было использована и выброшена[1]. Это приводит к выводу, что количество медицинских отходов приравнивается с бытовыми отходами. В дальнейшем эти отходы по уровню опасности сжигаются или отправляются в мусорные. В результате открытого сжигания медицинских отходов, проводимого в некоторых обстоятельствах, могут образовываться диоксиды, которые негативно влияют на экологию, но есть альтернатива, как переработка отходов.

**Ключевые слова:** Медицинские отходы, переработка, экологический вред, утилизация, летучие органические соединения, токсичные газы, идея Моттайнай.