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MATERIAL FLOWS OF DISCARDED BED MATTRESSES IN DENMARK

An overview of the existing material flows of discarded bed mattresses in Denmark with focus on the private homes, hospitals, nursing homes, and hotels

KEYWORDS: Material flow, life cycle of discarded bed mattresses

SUMMARY

Mattresses have a limited lifespan, typically expected to be between 10 - 15 years in Denmark. Consequently, there is a considerable change of mattresses each year. The majority of these come from private homes, hospitals, nursing homes, and hotels, resulting in around 650,000 annually. Most discarded mattresses end up at recycling facilities, from where they are transported for incineration, while a smaller amount, primarily hospital mattresses, are donated to foreign countries through various organizations.

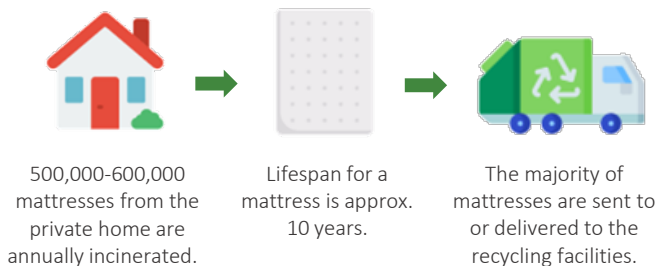
BACKGROUND

The purpose of this research brief is to analyse and document the mattress flow in Denmark and ensure arguments for the need for an efficient recycling and reuse system for discarded mattresses. To obtain a thorough understanding of the mattress flow in Denmark, the focus is on the mattress streams from private homes, hospitals, nursing homes, and hotels. These sources are selected as they are assumed to be responsible for the largest material flow in the country. The lifecycle of mattresses will be examined to understand their flow through the system.

PRIVATE HOMES

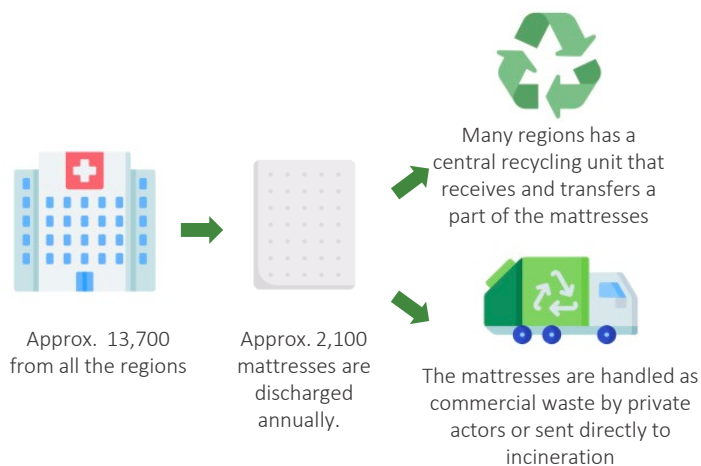
The majority of discarded bed mattresses in Denmark originate from private citizens. Annually, around 500,000-600,000 mattresses are discarded from private homes (1). This figure is an estimate made by the Municipality of Copenhagen and based on the assumption that a mattress in Denmark is expected to have a lifespan of up to 10 years before being replaced. It is expected that each citizen in Denmark owns a mattress, resulting in nearly 6 million mattresses.

When mattresses are replaced, the majority end up at recycling facilities, from where they are sent for incineration. A smaller number of mattresses are sold through direct reuse from citizens to private individuals, primarily through Den Blå Avis, or donated to thrift stores, which then sell them.



HOSPITALS

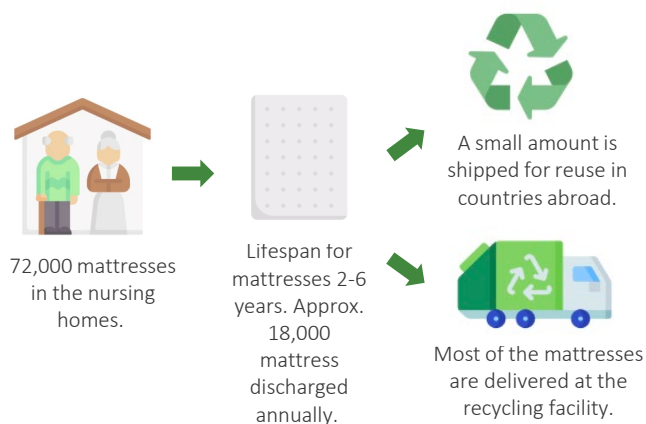
In Danish hospitals (all regions combined), there are nearly 13,700 beds and presumably the same number of mattresses (2). The mattresses have an average lifespan of 3-10 years in hospitals. The wide range is due to the differences in the conditions the mattresses are exposed to during use. Assuming that the average mattress has a lifespan of 6.5 years, based on an estimate, this would mean that around 2,100 mattresses from hospitals are discarded each year. When the mattresses are no longer functional for the hospitals, they are disposed as commercial waste for incineration. In some cases/situations, the mattresses can be donated to emergency aid etc., if they are assessed to have the required functionality for the recipient. For example, the Capital Region has a regional recycling and donation function, from which the mattresses can be forwarded for donation.



NURSING HOMES

The Danish nursing homes have around 72,000 residents, according to Statistics Denmark (figures compiled in 2021) (3), and presumably the same number of mattresses. A mapping of the life cycle of mattresses in nursing homes has been conducted through contact with 5 selected nursing homes in Denmark. The average lifespan of the mattresses ranges from 2-6 years. When residents move into the nursing home, they are given the mattress that belongs to the residence, if the mattress is still functional and not contaminated. Therefore, mattresses are often used by more than one resident. The annual number of discarded mattresses can therefore be difficult to estimate, but according to sources and an average lifespan of 3 years, it is approximately 18,000.

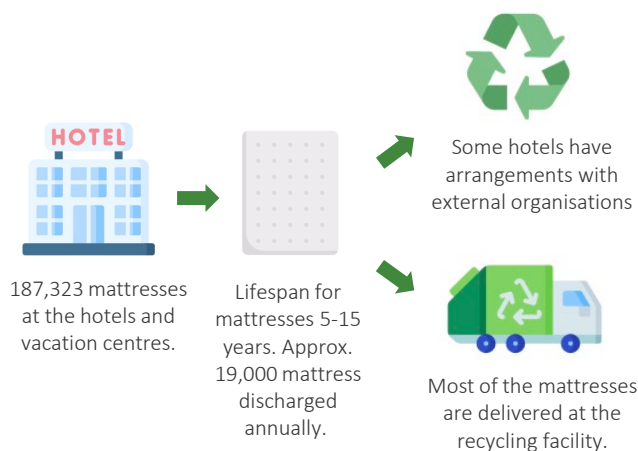
Nursing homes send the mattresses to recycling facilities when the mattresses are no longer functional. Some nursing homes also have agreements for the reuse of mattresses, where they are sent to developing countries.



HOTELS AND VACATION CENTERS

In Danish hotels and vacation centers there are a total of 187,323 beds, and presumably the same number of mattresses according to Statistics Denmark (4). After a survey conducted across the country among selected Danish hotels, it was stated that the mattresses here have an average lifespan of 5-15 years. The lifespan typically depends on the quality of the mattress. Based on this information, it can be estimated that with an average lifespan of 10 years for mattresses, approximately 19,000 mattresses are discarded annually from hotels.

When mattresses are no longer functional, the majority are sent to recycling centres. A smaller portion of hotels send their mattresses for reuse by external organisations, such as the Red Cross, or give them away or sell them on Den Blå Avis.



CONCLUSION

As the above illustrates, it is difficult to estimate the total number of discarded mattresses in Denmark per year. An estimate is 650,000 discarded mattresses in the mattress stream. These mattresses originate from private homes, nursing homes, hospitals, and hotels. This figure is high and is expected to increase, among other reasons, due to a slightly increasing population growth in Denmark and because the frequency of moving among citizens is expected to remain high. It is often when changing home that mattresses are discarded. On average, Danes move 6 times in their lives, especially between the ages of 17-35. 35-year-old women and men have moved on average 9.3 and 8.8 times respectively throughout their lives. From the age of 18 to the beginning of their 30s, young people often move: They move away from home (and back again), move to and from educational institutions, including to and from dormitories (nearly two out of three live there for less than two years), and move to and from cohabiting partners (5). Many mattresses are discarded in these transitions.

In general, a significant number of discarded mattresses are in circulation in Denmark annually. Currently, these mattresses are sent for incineration. To change this practice, it is important to improve and expand the opportunities for recycling and reuse of mattresses, especially with a focus on circular solutions. This can - as the project itself illustrates - involve increased collaboration between industry, authorities, and voluntary organizations to find innovative methods for better recycling and increased reuse of mattresses, thereby reducing the number of mattresses ending up as waste.

By tackling the mattress stream in a sustainable manner, such as developing new ways to extend the lifespan of mattresses or improving the recycling and reuse system for mattresses, we can reduce the environmental impact of discarded mattresses and contribute to a more circular economy. This is fully in line with the purpose of this research project.

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Source to paragraph about hospital mattresses (Reg H): Thomas Madsen, Region H.

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