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“CLEANER PRODUCTION FOR ACHIEVING SUSTAINABLE DEVELOPMENT GOALS”

## Social Reverse Logistics of Used, Non-Expired Medicines (UNEM) with Public Economic Burden? An Impact Appraisal from a Municipal Program

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### Abstract

There is little research on the reverse logistics of medicines, because the wastes of the pharmaceutical industry are incinerated, or undergo other forms of physical-chemical destruction, given the potential risks they pose to the environment and to public health when incorrectly disposed. This situation is more problematic in developing countries, where the management of wastes is usually neglected by governments and citizens. Whilst product innovation thrives in the pharmaceutical sector, and an ageing population represents an increase in the demand for medicines, little effort is made to avoid their incorrect disposal. The negative impacts to the water and to the soil quality derived from improper management of used medicines is a challenge in emerging economies. This research describes a local government program of reverse logistics for used, non-expired medicines (UNEM) in a small municipality in Southern Brazil. Taking as a reference the available data of collected and donated quantities of UNEM, and the number of persons that received UNEM for free from July 2015 to December 2017, it was possible to perform an environmental and socioeconomic appraisal of the program. The main findings are that reverse logistics, besides the strictly economic aspect stated by law (as return of a good to the business sector), can have a socioeconomic benefit for needy communities. In the studied case, the reverse logistics avoided environmental harms and economic spending of around US\$ 1.5 million with the proper destruction of UNEM medicines; an average of 90 persons benefited every week through receiving UNEM for free; the indirect income distribution per capita, with the program, reached more than 17% of the minimum wage established by law in Brazil. However, the Public Administration carries an economic burden for the correct disposal of the medicines that expire before being dispensed. It amounted around US\$ 4,000 since July 2015 to December 2017. As the population does not correctly separate and dispose used medicines, and considering that incorrect disposal of these products represents health risks that will end in the public health system as another type of economic burden, public and private, the Public Administration initiative, even ending in economic spending for the collectivity, results probably less costly than to simply do nothing and push this problem for the future. This private-public economic burden is an open issue for the current local system of reverse logistics. Further investigation is necessary to enable the possibility to replicate this program to other municipalities; and it presents an opportunity worthy of investigation in other newly industrialised countries.

*Keywords: medicines wastes; impact assessment; impact appraisal; reverse logistics.*

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