



## **Relevant Aspects Of Best Practices In Solid Waste Collection Activities**

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### **Abstract**

Given the conditions of vulnerability that are present in a target population such as those engaged in the activity of garbage collection and sorting, an investigation was proposed within the framework of the descriptive quantitative in order to describe the general problems that frame the risks they face, which is why the research was aimed at verifying compliance with safety standards that the recyclers under study must have. A total of 94 people who work in this activity were surveyed in order to make a proposal aimed at improving their conditions as workers in this activity. At present, one of the social problems that arise in the sector of the population investigated is the lack of personal protection to face the problems they face daily. The work is done outdoors, with exposure to the sun, rain, wind, dust, smoke, stench and toxic gases. For this reason it is necessary to provide them with adequate personal protective equipment (PPE) to protect them from these conditions.

**Keywords:** PPE, occupational safety, waste pickers, waste pickers

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### **1. Introduction**

Currently in society there is a need to confront this massive consumption and begin to generate new models based on industrial systems or processes that define a sustainable and achievable development. From the above arises the idea of transforming these wastes to reincorporate them into their life cycle again and produce products in Adequate conditions for consumption and use, hence the need to recycle becomes evident (LIBIA, 2017).

The phenomenon of migration affects all countries, albeit in different ways. Governments continuously develop policies for the legal access of immigrants; however, in many occasions, there is a high influx

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of irregular migration which is difficult to quantify leading to a series of social and economic problems. Hundreds of thousands of Venezuelans remain without any kind of documentation or permission to stay regularly in nearby countries, and therefore lack formal access to basic rights and services. This makes them particularly vulnerable to labor and sexual exploitation, human trafficking, violence, discrimination and xenophobia. The majority of refugees and migrants from Venezuela arriving in neighboring countries are families with children, pregnant women, the elderly and people with disabilities. Often forced to take irregular routes to reach safety, they may fall victim to smugglers, traffickers and irregular armed groups. More and more families arrive with dwindling resources and are in immediate need of documentation, protection, shelter, food and medicine due to this crisis most opt for informal work which in most cases is waste recycling.(UN 2019).

Employment and working conditions constitute a social determinant of health and quality of life (Benach et al., 2010), the ILO (2002, p.56) defines informal work as "the regular tasks of undeclared workers, performed in declared or unregistered companies, without receiving the necessary social protection, security guarantees or representation rights. In turn, informality is assumed to be a social problem that significantly affects health and is due to the working conditions to which those who work under this modality are subjected; in terms of social security, the situation of Colombian workers is quite precarious. Informal sector work, in addition to bringing together the most vulnerable population, is poorly remunerated, since the working hours are long and exhausting and are associated with precarious working conditions that affect quality of life and health. Health reflects the conditions of the cultural, social, work and family environment. By emphasizing the existing correlation between the labor condition and the worker's health, it can be inferred that some conditions such as an optimal organizational environment and climate, contractual guarantees, environmental factors and appropriate job designs, are factors that positively influence health, occupational performance and extra-work activities, specifically those related to the socio-family environment. (Barreto, L. F. C 2017).

Currently, the work of the recycler is mostly precarious and informal, which implies a state of insecurity and lack of minimum socioeconomic conditions that affect the family and social environment of the worker, which is slowly beginning to change, both with the integration and recognition of the figure of the recycler.

Associated with the above, the purpose of the research is mainly focused on helping waste pickers improve their working conditions and generate community welfare that allows them to develop their labor potential and thus grow in proportion to the activity performed.

## **2. Method**

Descriptive research has as its objective the precise description of the event under study, this type of research is associated with diagnosis; the purpose is to expose the event under study, making a detailed enumeration of its characteristics, so that in the results two levels of analysis can be obtained depending on the phenomenon or the purpose of the researcher, this research works with one or several elements of study in a given context, but its intention is not to establish causal relationships between them for this reason they do not merit the formulation of hypothesis. (Hurtado de Barrera, 2002a)..

It is descriptive since the research was based on the socioeconomic situations of the people dedicated to recycling. The previous process was evaluated through the application of the survey where patterns were established that indicated a social characterization in aspects of education, housing, health, income, which allowed us to diagnose the current situation of the quality of life of the population under study.

## 2.1. *Technique*

The first level of scientific knowledge about a research problem is achieved through exploratory studies; their objective is the formulation of a problem to enable a more precise investigation or the development of a hypothesis. "Their essential purpose is to familiarize us with an unknown, novel or scarcely studied topic. They are the starting point for subsequent studies of greater depth". (Behar Rivero, 2008a)

Descriptive studies: They are used to analyze how a phenomenon and its components are and how they manifest themselves.(Arias, 2006). They make it possible to detail the phenomenon studied basically through the measurement of one or more of its attributes. "These studies describe the frequency and the most important characteristics of a problem. In order to carry out descriptive studies, two fundamental elements must be taken into account: Sample and Instrument". (Behar Rivero, 2008b; Hurtado de Barrera, 2002b).

The type of study to be carried out was exploratory and descriptive, since we traveled to the study area where recycling activities are carried out, in order to know the social responsibility of the recyclers who make their living formally and informally in this activity; this study was supported by a survey to the target population.(Balestrini, 2002).

## 2.2. *Population*

The population that was taken into account for the development of this research and that will be the object of study is made up of recycling suppliers in the border context, which is made up of 27 formal workers and some 67 informal suppliers.

## 2.3. *Sample*

The total size of the population is 94 suppliers within which 27 are formal employees and 67 are informal, the type of sampling is intentional or convenience because the researcher will voluntarily choose elements that will make up the sample, assuming that this will be representative of the reference population. In which the population under study will be the total of formal and informal workers 94 suppliers.

### 2.3.1. *Convenience sampling:*

Purposive sampling: also known as biased sampling. The researcher selects the elements that in his opinion are representative, which requires prior knowledge of the population under investigation (Rivero, 2008).

The researcher chooses members only because of their proximity and does not consider whether they really represent a representative sample of the entire population or not. When this technique is used, habits, opinions, and points of view can be observed more easily.

Researchers use sampling techniques in situations where there are large populations to be evaluated, since, in most cases, it is almost impossible to test an entire population.

## 2.4. *Instrument design*

The next instrument for data collection is a questionnaire to evaluate the different socioeconomic factors of the company's supplier population, the instrument is composed of a total of 25 questions of which

several of them are multiple choice. The research approach was quantitative, since the analysis was based on quantities and statistical tools that allowed establishing a numerical process to weight the different variables. The instrument was created to know the socioeconomic conditions of the recyclers and finally allowed analyzing impacts with a descriptive method, at the same time allowing the socioeconomic situations of the population under study dedicated to recycling to be known. The survey established patterns that indicated a social characterization in aspects of education, housing, health, income, which allowed us to diagnose the current situation of the quality of life, income and risk factors to which they are exposed performing these activities, as well as to know the social responsibility that the association of recyclers has towards the recyclers who get their livelihood formally and informally within this activity.

We sought to stratify the study population, as well as to know the characteristics and individual and collective circumstances that allow us to identify risks, prioritize activities and obtain data. In relation to the above, we sought to respond and categorize the amount in alphanumeric value of the study population that is the focus of support for the family nucleus, to describe the conditions to which they are exposed as immigrants.

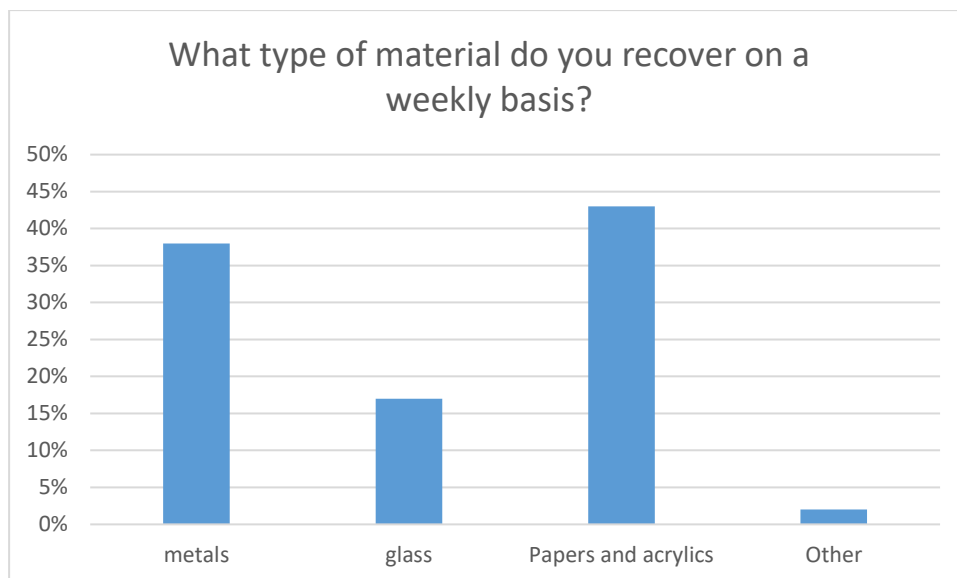
The pilot test (PP) is part of the Methodological Framework of Research Projects, according to (Navarrete, 2006). Until proven otherwise, direct measurement is the one that guarantees the most accurate values of the dimensions considered. Neither the instrument nor the technique used requires a special validation of results, it is advisable to ensure the goodness of the measurement procedure, including the instrumentation, through a PP The anthropometric data to be valid must be obtained with methodology defined by experts in that field, which guarantees: respectability (r), reproducibility (R), linearity, reliability (R), and is maintained in the ranges that minimize measurement errors. The general objective is to perform a PP to validate the results of the measurements obtained with the method and physical instruments for anthropometric data collection.

### 3. Results

Table 1. What type of material do you recover on a weekly basis?

RANGE	QUANTITIES	PERCENTAGE
metals	87	38%
glass		17%
Papers and acrylics		43%
Other		

Figure 1. What type of material do you recover on a weekly basis?

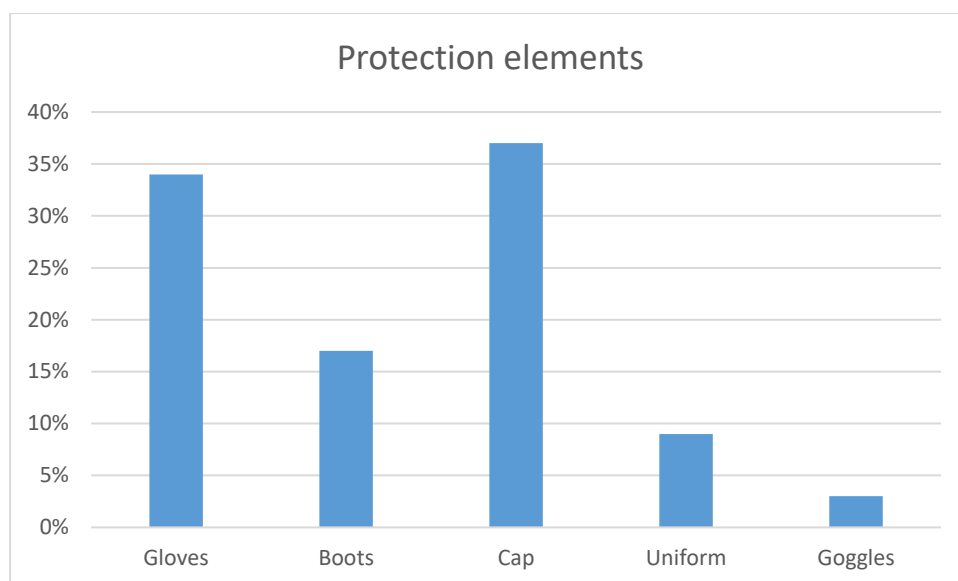


When asked what type of material is recovered weekly, 100% answered paper (cardboard) and acrylics (junk, PET, PVC), metals as the second most requested type of material with 37%, glass is not usually collected because it is not very remunerative and difficult to transport due to its fragility with a percentage of 17%, and 4% answered among others. One of the most common problems of collecting such material is the lack of culture of households that does not allow an adequate separation of reusable solid waste, since if this habit was taken the procedure of recyclers would be easier and less dangerous for them, reducing injuries, punctures with short sharp objects.

Table 2. What protection elements do you use?

RANGE	QUANTITIES	PERCENTAGE
Gloves		34%
Boots		17%
Cap		37%
Uniform		9%
Glasses	5	

Figure 2. What protection elements do you use?

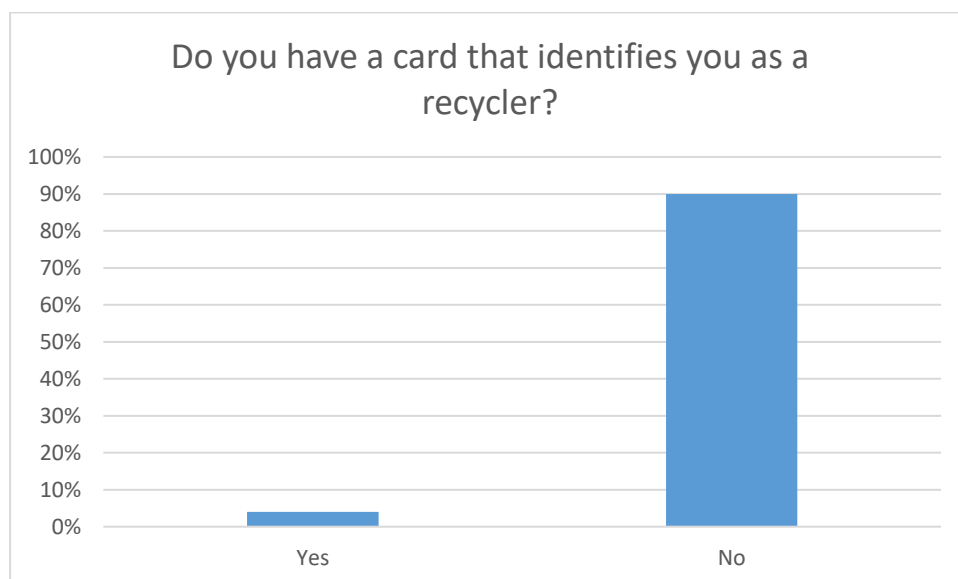


In the question related to the personal protection elements they use, 50% of the population answered gloves, 56% a cap, 25% boots, 14% a uniform, 5% goggles. The rest of the population does not use the complete protective equipment, only gloves and caps to protect themselves from the sun, because they have to pay for these elements themselves, which makes it more difficult to acquire them if they do not use them, This is because they have to pay for these items themselves, which is more difficult to acquire because they are not affiliated with an association, so the risk of accidents is always high, as it is considered a high-risk job, with a high level of contamination, sharing their spaces with animals that carry viruses such as rodents and other microorganisms, exposing their health.

Do you have a recycler identification card?

RANGE	QUANTITIES	PERCENTAGE
Yes		4%
No	90	90%

Figure 3. Do you have a card that identifies you as a recycler?



In the question "Do you have a recycler's identification card?" 96%, equivalent to 90 people of the population answered no and 4%, equivalent to 4 people answered yes, highlighting that the people who have a card are recyclers by trade and have been involved in this activity from a very early age. This activity is not constant because many enter this activity due to lack of opportunities and to earn a daily living.

### *3.1. Proposed strategy for the improvement of the situation of waste pickers*

According to the results obtained, it was possible to detect the shortcomings that recyclers experience on a daily basis, such as the lack of personal protective equipment, they are exposed to occupational diseases, most are not linked to social security due to low income, there is no evidence of regular training, most of the recyclers are not linked to an association which makes them informal workers so they have no benefits and are vulnerable, so the decision was made to make proposals to help improve this activity.

#### *3.1.1. Personal Protective Equipment (PPE) and identification card*

Fire, toxic fumes, chemical residues, medical or sharp objects that come in contact with the skin or are exposed to infectious diseases are just some of the health and safety risks that waste pickers face when working at solid waste disposal sites. Measures to reduce these risks can begin with the distribution of proper work clothing, personal protective equipment, drinking water and disinfectants. You can also take action in response to medical emergencies and improve access to basic medical services such as vaccinations, HIV testing and regular medical check-ups. First aid kits should be available on site and both plant personnel and waste pickers should be trained in their use. Waste pickers and their families can receive training and education in health, safety, first aid, basic hygiene and family planning.

Personal protective equipment (PPE) to help waste pickers perform their activities more safely and effectively is one of the most desirable actions that can be taken to improve the safety and professional dignity of the waste pickers' work environment. An initial set of PPE can be provided to each recycler at a very low cost, and replaced at set intervals depending on the wear and tear involved. The use of this type of equipment should be strictly enforced, and authorized recyclers should not be allowed on site without PPE once they have been issued. In this sense, it is necessary to take the necessary precautions in terms of monitoring and enforcement of these measures. Items lost, stolen or broken by recyclers can be replaced at their expense through a payment scheme negotiated with them or through a partial subsidy. A security team should include at least:

- Caps
- Cotton coverall
- Gloves (waterproof and with good grip, such as gardening gloves).
- Long safety boots with steel toe cap.
- Protective goggles
- Masks (dust masks or surgical masks)

It is important to note that waste pickers do not always see the need to use such equipment. In many cases they may find that it hinders their work, or they may be tempted to sell it for a profit. These risks must be mitigated. It is important that the equipment is comfortable and easy to use.

Safety within a company is essential to prevent risks, therefore, they must have optimal conditions so that their employees can carry out their activities as safely as possible. To this end, it is essential that

each employee has his or her ID card. The distribution of identification cards can also help to consolidate the self-esteem and social legitimacy of the waste pickers working at the site, encouraging them to obey the site's rules and to organize themselves. Among the various benefits it brings to the company:

- Increases the safety of the company and its employees
- Promotes mutual commitment
- Brings benefits and recognition to the association
- Emergency assistance

This new document will allow a more reliable identification of the people who carry out this trade. Likewise, thanks to a QR code, which links the data of the personnel, the document will avoid falsifications and will allow the recyclers to identify themselves to the Police or to the citizens when performing their work.

### 3.1.2. *Educational campaigns*

One of the strategies to be implemented is the training of employees in the knowledge of the type, behavior and processing of the various plastic materials that can allow the prevention and solution of the various problems typically encountered during recycling, providing an increase in recycling techniques, as well as promoting the use of the recovered material, allowing to give it an added value.

### 3.1.3. *How to obtain the certificate*

The National Apprenticeship Service - SENA is the institution in charge of training, evaluation and issuing the certificates, which are valid for 3 years. It is important to prepare the following documentation for each recycler to carry out the certification process:

- Copy of the identification document enlarged to 150%.
- Photocopy of a public utility bill (preferably telephone bill)

Recyclers should also be trained in industrial safety, separation and classification of usable materials to increase their market value, and administrative and financial training, in order to be able to follow up economically and take corrective measures - if necessary - or investments to improve their income. Health training should be provided to prevent them not only from acquiring diseases, but also from transmitting them to their families. Likewise, training and accompaniment in operational issues will be required to support the development and implementation of operational work procedures; training courses may constitute an important element of broader programs or initiatives that include insertion in the labor market.

Strategies defined in the utilization program of the Integral Solid Waste Management Plans (PGIRS), the territorial entity and the person providing the utilization activity must implement permanent and coordinated educational campaigns, in order to raise awareness among users about recycling, reuse, utilization and proper presentation of usable waste.

The association can encourage a program of training and door-to-door collection of recyclables, whether at the household level, housing estates, schools, businesses, markets or government buildings, providing waste pickers with a steady and formally recognized flow of materials in improved conditions. Facilitating the acquisition of small, inexpensive vehicles (such as carts and motorized vehicles) can help them expand the volume and coverage of initial collection.



#### 3.1.4. *Formalization of recyclers*

Professional recycler: Natural person who habitually performs the activities of recovery, collection, transportation, or classification of solid waste for its subsequent reincorporation into the productive economic cycle as raw material; who derives his own and family's livelihood from this activity". (Departamento Administrativo de la Función Pública, 2016)

The users of the public sewage service shall have the right to:

- Receive training on separation at the source of usable solid waste.
- Receive the separation at source incentive (DINC) when the established rejection levels are achieved.
- To be included in the collection route of usable solid waste.
- Access support from municipal and national authorities.
- Personal Protective Equipment
- Human transaction vehicle (cart)
- attend celebrations on special dates

Requests for inclusion in the single registry of professional recyclers (ruro)

For the process of requesting inclusion in the Sole Registry of Recyclers by Trade-RURO, the provisions of Resolution 355 of 2017 "Whereby the criteria, mechanisms and procedure for updating the Sole Registry of Recyclers by Trade-RURO are established and Resolutions 066 of 2014 and 523 of 2014 are repealed" must be taken into account.

Requirements for inclusion in the RURO: The natural person requesting to be included in the Sole Registry of Recyclers by Trade-RURO, must comply with the following requirements:

- To be a Colombian citizen, of legal age.
- Venezuelan with special residence permit
- File duly filled out the inclusion request form established by the UAESP.
- Attach to the application, a photocopy of the citizenship card or a photocopy of any of the three (3) types of vouchers that certify the application for the processing of a document for the first time, duplicate, rectification or renewal issued by the National Civil Registry Office (Registraduría Nacional del Estado Civil).
- Attach to the application, a certificate of disciplinary, criminal, contractual, fiscal and loss of office background, issued by the Attorney General's Office of the Nation and/or certificate of citizenship card status issued by the National Civil Registry, which can be consulted on the website of these entities.

Through talks, the recyclers will be explained the steps to belong to the association and the benefits they can have will be explained to them.

#### 3.1.5. *proposed personal accident policy for waste pickers*

The recyclers do not have any type of labor contract, they do not have access to social security or pension benefits, and they cannot afford these expenses as independent workers because their resources are not sufficient to cover all their basic needs. Because of this, it is proposed to the ARVO association to link the recyclers to an accident policy, so that the recyclers are safeguarded in case of an accident at work.

The ARVO association would be the intermediary in the collection of funds and the management of the linkage of each recycler to access the service of the accident policy, through fixed fees at the time the recycler brings the solid waste.

The accident policy quoted with the Solidaria de Colombia insurance company consists of: The Platinum Personal Accident Policy is a voluntary insurance policy whose basic purpose is to provide protection, with very favorable coverage for accident and death due to illness for the insured.

### 3.1.6. *Benefits*

- Insurance that can be marketed on a group or individual basis.
- Specific additional coverage in case of QUADRIPLÉJIA AND HEMIPLEJIA.
- Coverage of the Canasta (death due to illness).
- Serious Illness Coverage at 50% of the basket coverage.
- Age of permanence up to 70 years of age.
- Possibility of cross-selling.

**ACCIDENTAL DEATH (basic coverage):** To cover against the risk of accidental death suffered by the insured as a consequence of an accident covered by the policy, provided that this occurs within 365 days following the date of the accident.

**TOTAL AND PERMANENT DISABILITY FROM ACCIDENT:** When rated according to the criteria established in the single disability rating manual (decree 1507 of 2014, or that in force at the time of the disability rating) is equal to or greater than 50% of the loss of working capacity.

**ADDITIONAL INDEMNIFICATION FOR QUADRIPLÉJIA OR HEMIPLEJIA IN ACCIDENT:** Quadriplegia: as a direct consequence of a bodily injury caused by an accident, the insured suffers total and permanent paralysis of the upper and lower extremities. Hemiplegia: as a direct consequence of bodily injury caused by an accident, the insured suffers total and permanent paralysis of one side of the body and both extremities.

Note: These coverages are mutually exclusive, as well as with Total and Permanent Disability due to Accident.

**DAILY INCIDENT DISABILITY RENT:** If within thirty (30) days following the occurrence of an accident covered by this policy the insured is temporarily disabled as a result of an accident, (30) days per event - term, with a maximum of two (2) events per year.

**BASKET - DEATH FOR ANY CAUSE:** covers the event of the death of the insured due to natural causes (this operates as from the 60th day from the inception of the policy).

**SERIOUS ILLNESS:** With a maximum of 50% of the insured value contracted for the basket coverage, if during the term of this coverage the insured is medically diagnosed for the first time with any of the following illnesses: cancer, myocardial infarction, chronic renal insufficiency, stroke, coronary artery disease requiring surgery.

Vital Organ Transplantation (Heart, Lung, Liver and Pancreas), Alzheimer's Disease, Severe Burns or major burns, Aplastic Anemia, Multiple Sclerosis, Major Head Trauma, Parkinson's Disease and Coma.

**FUNERAL ASSISTANCE:** If during the term of this policy the insured should die as a consequence of an event covered by the policy.

**Insurability requirements:** The policyholder for the issuance of the policy must only send us a list of the insurability requirements:

Full name and surname.

Identity card number.

Date of birth or age.

Figure 4. accident insurance plans

	plan 1	plan 2	plan 3
	renta dia 60.000	renta dia 10.000	renta dia 10.000
COBERTURAS	VALOR ASEGURADO	VALOR ASEGURADO	VALOR ASEGURADO
MUERTE ACCIDENTAL	30,000,000	20,000,000	20,000,000
INCAPACIDAD TOTAL Y PERMANENTE POR ACCIDENTE	10,000,000	20,000,000	30,000,000
INDEMNIZACIÓN POR CUADRIPLÉJIA O HEMIPLEJIA POR ACCIDENTE	10,000,000	20,000,000	30,000,000
RENTA DIARIA DE INCAPACIDAD POR ACCIDENTE (30 días)	1,800,000	300,000	300,000
CANASTA POR MUERTE POR CUALQUIER CAUSA	4,000,000	1,000,000	1,000,000
ENFERMEDADES GRAVES (COMO ANTICIPO DE CANASTA)	2,000,000	500,000	500,000
AUXILIO FUNERARIO	2,000,000	3,000,000	4,000,000
<b>PRIMA ANUAL INDIVIDUAL</b>	<b>100,558</b>	<b>44,582</b>	<b>54,016</b>

Sources: aseguradora solidaria de Colombia

#### 4. Discussion and conclusion

Through the survey applied, it was possible to observe the different risks to which the recyclers are subjected at the time of performing this activity, most of them do not have uniforms that identify them as recyclers, they do not have the appropriate work elements for this activity without established safety guidelines, This helps to detect a series of factors that expose them to risks, such as respiratory diseases due to the lack of implements such as masks, diarrheal diseases, and other non-specific diseases, as well as autoimmune diseases due to the risk of puncturing themselves with sharp objects. Handling solid waste involves exposure to different risk factors that affect human health, including exposure to microorganisms, vapors and toxic leachates, as well as exposure to vehicular traffic and excessive physical loads, extreme temperatures and ultraviolet radiation. These risk factors are heightened because many recyclers enter the trade unaware of the different risks to which they will be exposed and the diseases and injuries that can be caused by them, and most of them do not receive training before performing their activities.

One of the barriers that prevent the realization of safe work is the lack of knowledge about safety, training about the risks associated with work if it is not done in a safe manner and with the appropriate implements to provide safe conditions to ensure employees a better performance within the organization, through laws to which every organization must adhere. These laws allow for the structuring of programs, activities and groups that favor safe work environments and help improve occupational health.

The organization has identified its recyclers, their routes, their warehouse, their means of transportation, the main collection sources, the challenges they face, and the failures in government intervention. There is a lack of coordination between the different public entities, mainly with the territorial entities. The organizations are still in an early stage of formalization from the rigid perspective. Migration to social protection mechanisms is still incipient, and although solidarity is the principle that replaces social

security payments, this mechanism is not sustainable in the current circumstances of the organizations, in which they lack resources to protect their associates against illness or disability.

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