Factors Affecting Labor Risks Severity

By

Nadia Paulina Pérez Guerrero[1] (B.Sc.) & María de los Angeles Yáñez[2] (PhD)

Abstract

Mexican Social Security provides a number of benefits when a labor risk occurs, the benefit is directly determined by the severity of the sequel. Using data from the Mexican Social Security Institute (IMSS) for labor risks registered from 1998 to 2001, this paper classifies the severity of sequels in three: mild, moderate and high; and attempts to relate this level with the characteristics of the worker and his activities at work. Those workers whose valuation was delayed due to administrative process, but very likely will qualify for a disability pension in medical terms, were considered an additional level of sequel: "valuation delayed".

A multilogistic regression model showed that gender, age, time in employment, occupation, physical risk and the risky act performed were significant to predict the level of sequel caused by the labor risk. Cases branded as "valuation delayed" were classified by the model under the high-risk sequel, confirming that they will very likely receive a disability pension.

I. Introduction

Social security is a mechanism to fight poverty through benefits transference, such as: health services, maternity, accidents, retirement and labor risks.

Workers are exposed to labor risks during the accomplishment of their tasks. Consequences of labor risks include accidents, diseases and even death. Depending on the severity of the sequel, social security provides different economic benefits ranking from a temporary license to a disability pension.

In 2002, Mexican Social Security Institute (IMSS) covered 804,389 enterprises with 12,112,405 workers, 2.5% of this workers suffered a labor risk, among them 302,970 suffered a labor accident and 4,511 a labor disease.

Many studies have been performed to analyze the factors influencing the occurrence of labor risks, but none has study the nature of their consequences (sequel) and their relationship to the worker (personal characteristics and behavior).

The objective of this investigation is to analyze the relationship between the severity of the sequel and personal characteristics, including individual behavior of employees who have suffered a labor risk. The study also considers the inherent characteristics of labor risks and their consequences.

The model was built using a multilogistic regression, which allowed predicting the severity of physical sequels caused by a labor risk in 65.5%.

II. Data

Data corresponding to labor risks registered from 1998 to 2002 was provided by IMSS in five databases, each one with 30 variables, these included personal, work and risk characteristics as well as the valuation of the sequel. Data quality and consistency was assured throughout an exploratory analysis. Variables were selected based on their

[1] HSBC México. Risk Management Analyst.

[2] Actuarial Science Department, Instituto Tecnológico Autónomo de México (ITAM).

relationship with the description of the sequel, which was given by the variable *valuation of sequel*. These variables are:

- Gender
- Physical risk (indicates the kind of risk to which the worker was exposed to).
- Risky act (actions leading to the accident or disease).
- Injury cause and nature (indicates if the risk was produced by an accident or by a disease).
- Time in employment
- Job schedule (morning, afternoon, night, cumulative schedule).
- Age (as of date of event)[3].
- Occupation

To assure data in the five different databases were sampled from the same population, several Kolmogorv-Smirnov two-sample tests and Kruskal-Wallis tests were carried out, table A.1. in appendix A, shows the list of variables compared. Kruskal-Wallis test for age, time in employment and valuation of sequel indicate that 1998 and 2000 databases were sampled from different populations; this is a consequence of a poor data input in the corresponding databases. As a result of this analysis, it was decided not to use 1998 and 2000 databases; nevertheless, the complete database includes over 1,200,000 records (see table A.2 in appendix A).

Descriptive analysis of the risk cause showed that 79.6% of labor risks were caused by an accident at the work place, 20.3% were caused by an accident that took place while the worker was traveling from his home to his job or from his job to his home, and 0.1% were caused by a labor disease.

The analysis of the sequel (Table 1.1) showed that 98.4% of labor risks do not register a sequel or a valuable sequel, only 1.5% of sequels get further valuation and a minimum number of cases ended in death.

Table 1.1. Distribution if sequels

Sequel	Frequency	%
No sequel, nor license days	17,218	1.40
License days but no valuable sequel	1,164,770	97.0
License days and sequel <=25%	3,261	0.30
License days and sequel >25%	3,374	0.30
Death	781	0.0
Relapse	3	0
Valuation delayed	3,800	0.30
Labor disease without license days but with valuable sequel	282	0.01
Disability certificate authorized	7,553	0.6
Total	1,201,042	100

Sequels were reclassified as follows:

- Sequel less or equal to 25% (Mild)
- Sequel greater than 25% (moderate)
- Disability certificate authorized (high)
- Valuation delayed

[3] This variable was grouped in 5 categories in order to simplify the analysis: 15-23, 24-29, 30-36, 37-45, 46 and older.

Those cases very likely to attain a disability pension and whose valuation was delayed for administrative causes are grouped under the *valuation delayed* category.

Association tests between variables were carried out to detect correlation or independence and to select those variables related to the sequel variable, results are summarized in table 1.2. More explicit results are shown in tables A.3, A.4 in appendix A.

Table 1.2. Non Parametric One Sample Association Tests[4]

Test	Requirement	Variables	Result
Rank Order Spearman Correlation (ρ) Rank Order Kendall Correlation (τ)	Ordinal Variables	▪ Sequel ▪ Age ▪ Time in employment	All correlations are significant in all data bases considering α = 0.05, with a 2-tail distribution, what implies that these variables are not independent within each data base.
Chi-Square Independence Test	Nominal Variables	▪ Sequel ▪ Gender ▪ Physical Risk ▪ Risky Act ▪ Job schedule ▪ Occupation	Variables are not independent within each data base.

It can be seen that neither *time in employment* nor *Age* are independent of *Sequel*, in fact, the greater the *time in employment* is, the smaller is the *sequel´s severity*. This result can be interpreted as: "The more experience at work, the less damage from a labor risks".
Chi-Square independence test was computed for ordinal variables, table 1.3 shows that all the variables considered are correlated with the sequel.

Table 1.3. Chi-Square Independence Test

	Gender	Job schedule	Occupation	Physical Risk	Risky Act
Chi-Square	437.67	18,411.464	5,664.208	19,145.332	19,226.791
df	3	45	51	33	51
Significance (2-tails)	0	0	0	0	0

III. Model Building

This paper's objective is to build a determinants model for sequel severity. To do so, a multilogistic regression was used. Multilogistic regressions work under the following transformation:

$$\pi(x) = \frac{e^{g(x)}}{1+e^{g(x)}}$$

$$g(x) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots$$

[4] Confidence level equal to 95%.

The model dependent variable was the sequel's severity:

- Mild = between 0% and 25% of disability
- Moderate = between 26% and 50%
- High = More than 51% (this qualifies for disability pension)
- Valuation delayed (those cases which valuation was delivered with delay, but very likely will qualify for disability pension)

In this analysis, 0 denotes the sequel minor or equal to 25% with license; 1, the sequel greater to 25% with license; 2, the valuation delayed and 3 stands for those cases whose disability certificate must be authorized. Regression coefficients associated to the category 0 are denoted α_i, the one associated to category 1 are denoted β_i, and the ones from category 3, are denoted γ_i.

All the variables used are categorical and the selection method was forward. Six variables turn out to be significant:

- Gender } Personal Characteristics
- Age }
- Time in employment } Social Characteristics
- Occupation }
- Physical risk } Risk Characteristics
- Risky act. }

Each one of the variables, as well as the model, was significant with a confidence of 95% (See tables 1.4 and 1.5)

Table 1.4. Model Significance

Model	-2 Log-Likelihood	Chi-Square	df	Significance
Only intercept	31,919.371			
Final	6,572.120	25,347.251	165	.000

Table 1.5. Partial Significant Variables Test

Effect	-2 Log-Likelihood Reduced Model	Chi-Square	df	Significance
Intercept	6,572.118	.000	0	.
Gender	6,751.261	179.142	3	.000
Age	6,611.482	39.363	12	.000
Occupation	6,827.493	255.374	51	.000
Physical Risk	6,810.358	238.238	30	.000
Risky act	6,701.954	129.834	48	.000
Time in employment	7,081.164	509.045	18	.000

Thus, the likelihood that a person suffers an accident with a sequel minor or equal to 25%, can be estimated in the following way:

$$P(Sequel \leq 25\% \mid \underline{X}) = \frac{\exp\left\{\alpha_0 + \sum_{i=1}^{63} \alpha_i X_i\right\}}{1 + \exp\left\{\alpha_0 + \sum_{i=1}^{63} \alpha_i X_i\right\} + \exp\left\{\beta_0 + \sum_{i=1}^{63} \beta_i X_i\right\} + \exp\left\{\gamma_0 + \sum_{i=1}^{63} \gamma_i X_i\right\}}$$

The likelihood that the sequel will be greater to 25%, can be estimated in the next way:

$$P(Sequel \geq 25\% \mid \underline{X}) = \frac{\exp\left\{\beta_0 + \sum_{i=1}^{63} \beta_i X_i\right\}}{1 + \exp\left\{\alpha_0 + \sum_{i=1}^{63} \alpha_i X_i\right\} + \exp\left\{\beta_0 + \sum_{i=1}^{63} \beta_i X_i\right\} + \exp\left\{\gamma_0 + \sum_{i=1}^{63} \gamma_i X_i\right\}}$$

The likelihood that a person has a valuation delayed can be estimated in the next way:

$$P(Valuation \quad delayed \mid \underline{X}) = \frac{\exp\left\{\gamma_0 + \sum_{i=1}^{63} \gamma_i X_i\right\}}{1 + \exp\left\{\alpha_0 + \sum_{i=1}^{63} \alpha_i X_i\right\} + \exp\left\{\beta_0 + \sum_{i=1}^{63} \beta_i X_i\right\} + \exp\left\{\gamma_0 + \sum_{i=1}^{63} \gamma_i X_i\right\}}$$

The likelihood that the sequel will lead to the authorization of the disability certificate can be estimated as:

$$P\left(\begin{array}{c} Disability \quad certificate \\ authorization \end{array} \middle| \underline{X}\right) = \frac{1}{1 + \exp\left\{\alpha_0 + \sum_{i=1}^{63} \alpha_i X_i\right\} + \exp\left\{\beta_0 + \sum_{i=1}^{63} \beta_i X_i\right\} + \exp\left\{\gamma_0 + \sum_{i=1}^{63} \gamma_i X_i\right\}}$$

Where $X_i = \begin{cases} 0 & Doesn't \quad have \quad the \quad characteristic \\ 1 & Does \quad have \quad the \quad characteristic \end{cases}$

Table A.6 in appendix A shows the value of coefficients. Graphics 1.1., 1.2 and 1.3 show the coefficients values and signs for mild, moderate and delayed valuation sequels. Interpretation of the variables within the model is the following:

- ***Gender:*** α_1, β_1 y γ_1 are positive, which means that men are less likely to experience a mild sequel (sequel <=25%), than any other sequel. Therefore it is possible to consider that being a man is an aggravating condition regarding the sequel's severity of a labor risk.

- ***Age as of the moment of accident:*** α_4 is negative, thus the probability that the sequel will be mild, is smaller when age is between 24 and 29 years old. If the

sequel is greater to 25%, all β_i and γ_i where *i*=3,4,5,6, are negative and the likelihood seems unaffected by age.

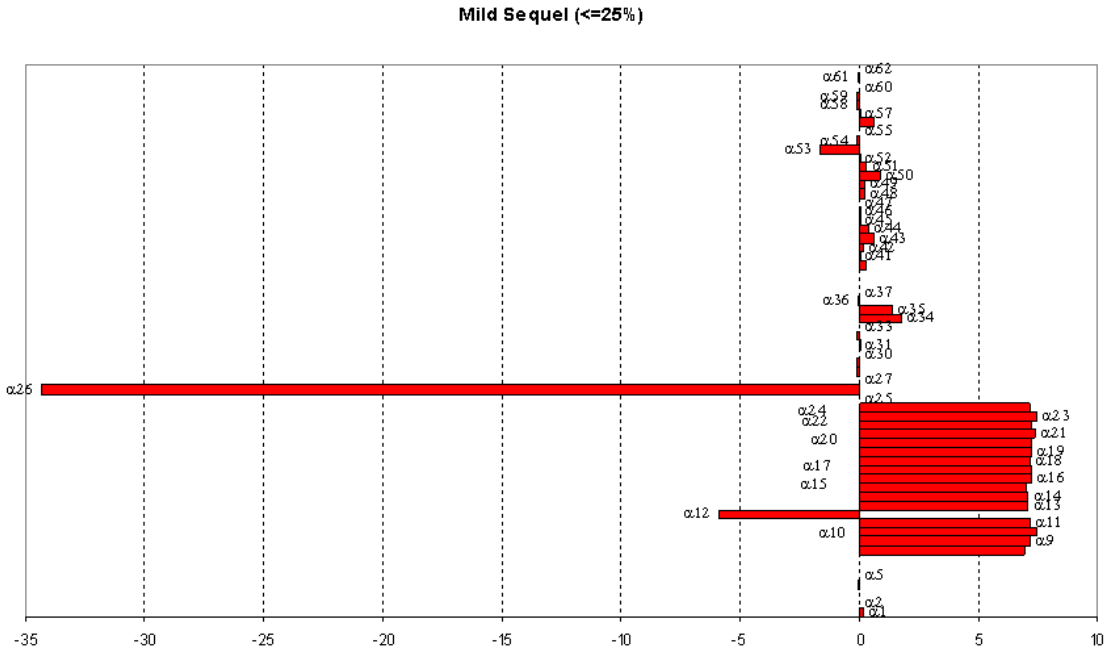
- ***Occupation***: α_{12} is negative, while all the other coefficients for the mild sequel are positive, this implies that teachers have the smallest probability of suffering this sequel. When the sequel is moderated, all coefficients are negative, but β_{12} is the smallest one in absolute value.

- ***Time in employment:*** In this case, employees with 1 to 11 years working are less likely of undergoing a mild sequel, although this probability does not vary much from the other values of this variable. For the moderate sequel the probability is greater if the person underwent a relapse or a valuation delayed, whereas for the rest of the values of *Time in employment*, probability decreases as Time in employment increases.

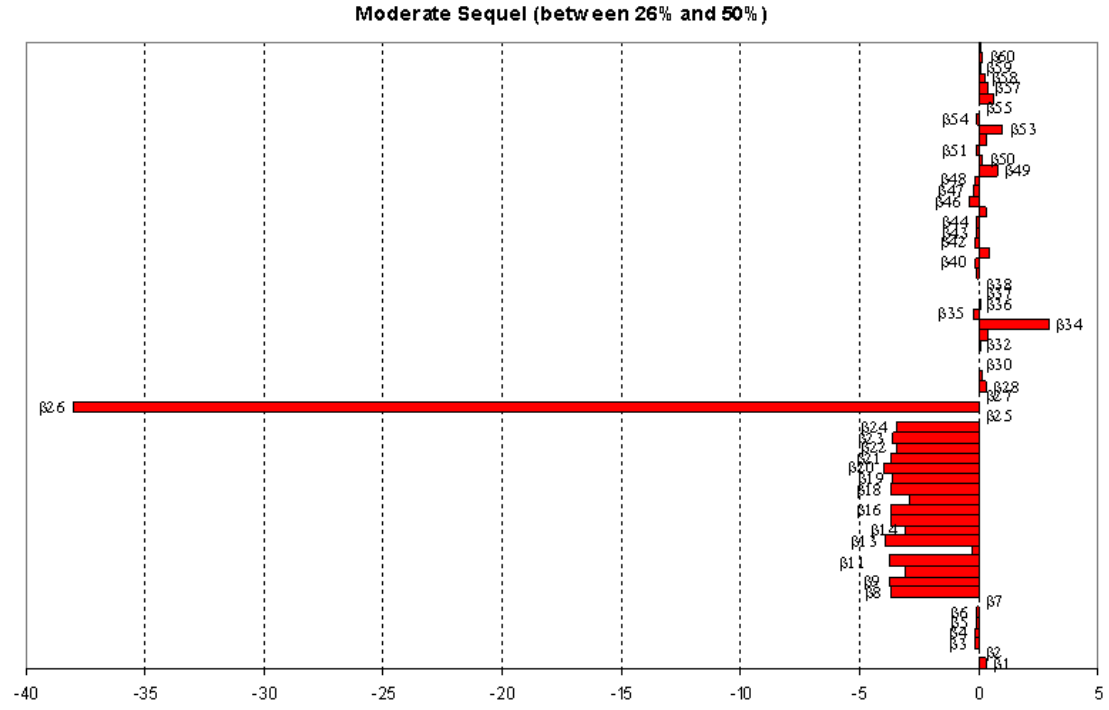
- ***Risky act (activities that employee was performed when the risk occurred):*** For mild sequels, α_{53} and α_{54} are negatives, which implies that the probability of this sequel is smaller for those cases where there were no classification of the risky act by insufficient data. The probability that the sequel will be moderated is greater for the cases where the risky act was not classified by insufficient data or it the equipment was not properly used (α_{53} and α_{49}). The probability to be in the valuation delayed cathegory is greater if the risky act is related to wear risky personal accessories (rings, loose hair, very high chains, necklaces, heels, etc.).

- ***Physical Risk*****:** People with physical risk equal to "dressing dangers", "environmental dangers", "inadequate protection", or those presenting a *relapse* or a *delayed valuation*, are less likely to suffer a mild sequel than people with any other physical risk; this is because α_i <0 for i=26, 28, 29, 32, 36. The probability of suffering a moderate or a high sequel is smaller if the physical risk is "positioning fault" or if the risk was not classified due to lack of information.

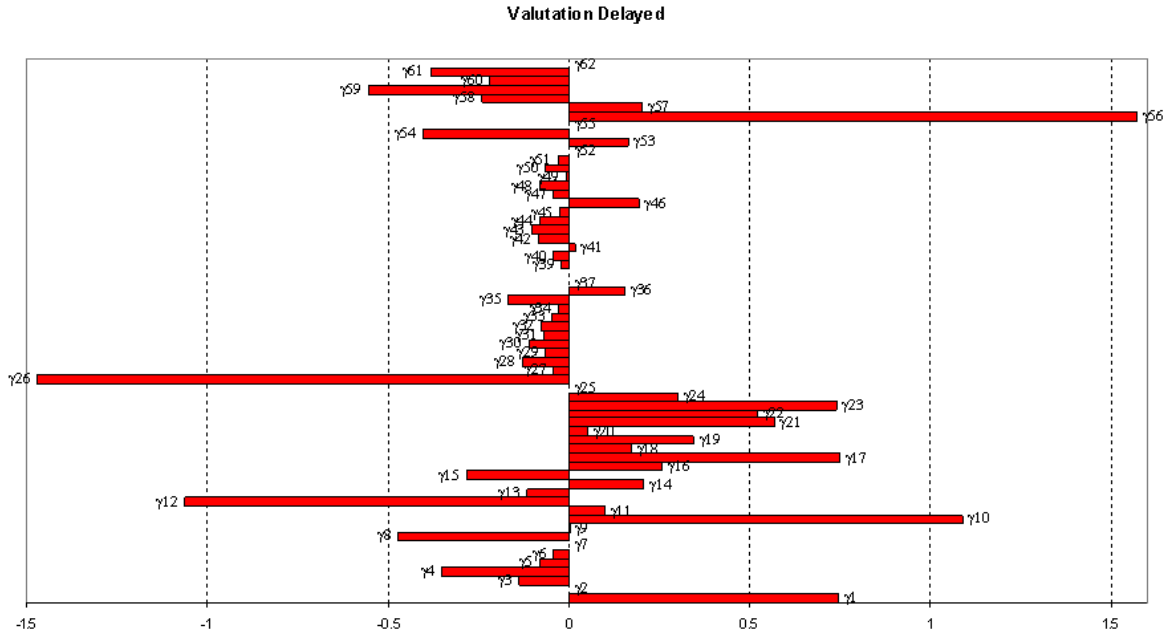
Graphic 1.1. Coefficients for mild sequel



Graphic 1.2.Coefficients for moderate sequel



Graphic 1.3. Coefficients for valuation delayed



V. Model validation

General Model

Pearson test was used in order to measure the model Goodness-of-fit. According to this test (Table 1.6), the dependent variable deviance proportion that cannot be explained by the model is not significant

Table 1.6. Model Goodness-of-Fit

	Chi-Square	df	Significance
Pearson	4111.638	11556	1
Varianza	4941.729	11556	1

Additionally pseudo-R squares of Cox-Snell, Nagelkerke and MacFadden show a good data fitting (Table 1.7).

Table 1.7. Pseudo R-Square

Cox and Snell	0.756
Nagelkerke	0.814
McFadden	0.535

The classification table provides another way to validate the model. Results in table 1.78 reveals that 65.5% of the cases were correctly predicted by the model.

Table 1.8. Classification Table

	Predicted severity				
Observed severity	**Mild**	**Moderate**	**Valuation delayed**	**High**	**Correct %**
Mild	2,417	844	0	0	74.10%
Moderate	1,601	1,773	0	0	52.50%
Valuation delayed	0	0	429	3,371	11.30%
High	0	0	393	7,160	94.80%
Global %	22.30%	14.50%	4.60%	58.50%	65.50%

As it can also be seen, most of the "Valuation delayed" cases are classified by the model into the *high severity* category, which is consistent with the operational issues involved, given that these cases qualify for the disability certificate, but it has not been issued due to administrative reasons.

Model by Gender

In order to determine if determinants of sequel's severity are different by sex, two separated models were built. Models for males and females presented an acceptable goodness of fit (see table A.6 and A.7 in appendix).

A likelihood test was computed to verify if the significant variables in the general model are also significant in the models by sex. Tables 1.9 and 1.10 show these tests.

Table 1.9. Likelihood Test (Males)

	-2 Log-Likelihood Reduced model	**Chi-Square**	**df**	**Significance**
Intercept	5367.060	.000	0	.
Physical Risk	5463.379	96.318	30	.000
Risky Act	5483.273	116.212	48	.000
Occupation	5538.507	171.446	51	.000
Time in employment	5812.986	445.925	18	.000
Age as of date of event	5401.812	34.752	12	.001

Table 1.10. Likelihood Test (Females)

	-2 Log-Likelihood Reduced model	**Chi-Square**	**df**	**Significance**
Intercept	1098.536(a)	.000	0	.
Physical Risk	1506.506(a)	176.690	30	.000
Risky Act	1126.536(a)	-203.280	48	1.000
Occupation	1382.841(a)	53.025	48	.287
Time in employment	1275.814(a)	-54.003	18	1.000
Age as of date of event	1250.484(a)	-79.333	12	1.000

Male's model share the same set of significant variables with the general model. Female's model has a different set of significant variables. Computing the female model allowed to detect as significant: physical risk, time in employment and occupation (table s1.11 and 1.12 show the corresponding results).

Table 1.11. Model Fitting (Females 2)

Model	-2 Log-Likelihood	Chi-Square	df	Significance
Only intercept	4514.006			
Final	473.959	4040.047	99	.000

Table 1.12. Likelihood Test (Females 2)

	-2 Log- Likelihood Reduced model	Chi-Square	df	Significance
Intercept	473.953	.000	0	.
Physical Risk	1237.636	763.677	33	.000
Time in employment	541.965	68.006	18	.000
Occupation	624.669	150.711	48	.000

Goodness-of-Fit Chi square test and pseudo R squares are presented in tables A.7,A.8, A.9 and A.1o in appendix A. Male´ s classification table showed that model classified correctly 63.3%, this percentage raises to is 75.5% for the female´ s model (see tables 1.13 and 1.14).

Table 1.13. Classification Table (Males)

	Predicted Severity				
Observed Severity	**Mild**	**Moderate**	**Valuation delayed**	**High**	**Correct %**
Mild	2,040	776	0	0	72.4%
Moderate	1,385	1,581	0	0	53.3%
Valuation delayed	0	0	353	2,942	10.7%
High	0	0	302	5,352	94.7%
Global %	23.3%	16.0%	4.4%	56.3%	63.3%

Table 1.14. Classification Table (Females)

	Predicted Severity				
Observed Severity	**Mild**	**Moderate**	**Valuation delayed**	**High**	**Correct %**
Mild	352	93	0	0	79.1%
Moderate	200	208	0	0	51.0%
Valuation delayed	0	0	0	505	.0%
High	0	0	0	1,899	100.0%
Global %	16.9%	9.2%	.0%	73.8%	75.5%

VI. Conclusions

Labor Risk sequel's severity level can be grouped into four categories: *mild, moderate, high and valuation delayed*. To predict the level of sequel, physical social and risk characteristics can be used.

Physical characteristics include gender and age; social characteristics are occupation and time in employment, finally risk characteristics refer to the physical risk and risky activity. The multilogistic model used correctly classified 65.5% of overall cases. Valuation delayed cases were assigned by the model to the *high severity* category which implies the authorization of the disability certificate, which confers a pension. This increases the prediction of the model to 84.2%, given than valuation delayed refers to administrative processes independent of the medical valuation. Similar results were obtained for males once separated from females.

Female's model has as determinants of severity: physical risk, time in employment and occupation.
Prediction of the severity of the sequel could allow to:

- Schedule budget for expenses related to labor risks sequels according to severity.
- Implement new security rules considering the worker profile aiming to reduce the number of cases in the high severity category.

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Appendix A

Table A.1. Variables tested

Personal Characteristics	Risks Characteristics	Sequel Characteristics
Age	Injury cause	Valuation of sequel
Gender	Risky act	Sequel
Occupation	Physical risk	Injury nature
	Job schedule	Incapacity days

Table A.2 records integrating the whole database

Data Base	Records	Erroneous Cases	% Erroneous Cases	Valid Cases	% Valid Cases
1999	438,197	23,983	5%	414,214	95%
2001	431,166	24,948	6%	406,218	94%
2002	405,233	24,623	6%	380,610	94%

Table A.3. Kendall's Tau Test

		Time in employment	Age	Sequel
Time in employment	**Correlation Coef.**	1	.026(**)	-.153(**)
	Significance (2-tails)	.	0	0
Age	**Correlation Coef.**		1	.020(**)
	Significance (2-tails)		.	0.001
Sequel	**Correlation Coef.**			1
	Significance (2-tails)			.
** Significant correlation at 0.01 level (2-tails).				
* Significant correlation at 0.05 level (2-tails).				

Table A.4. Spearman's Rho

		Time in employment	Age	Sequel
Time in employment	**Correlation Coef.**	1	.032(**)	-.660(**)
	Significance (2-tails)	.	0	0
Age	**Correlation Coef.**		1	.025(**)
	Significance (2-tails)		.	0.001
Sequel	**Correlation Coef.**			1
	Significance (2-tails)			.
** Significant correlation at 0.01 level (2-tails).				
* Significant correlation at 0.05 level (2-tails).				

Table A.5. Coefficients obtained for the multilogistic model (1/3)

i	Variable X_i	Value	SPSS Name	Symbol	α_i	β_i	γ_i
0			Intercept		9.640	20.465	-1.225
1	Gender	Male	[SEX=1]	X_1	.175	.284	.745
2	Gender	Female	[SEX=2]	X_2	0(a)	0(a)	0(a)
3	Age as of time of accident	15 a 23	[EDAD_5=1]	X_3	4.954E-02	-.128	-.135
4	Age as of time of accident	24 a 30	[EDAD_5=2]	X_4	-5.077E-02	-.167	-.353
5	Age as of time of accident	31 a 36	[EDAD_5=3]	X_5	4.516E-02	-8.607E-02	-8.293E-02
6	Age as of time of accident	37 a 45	[EDAD_5=4]	X_6	2.563E-02	-4.497E-02	-4.157E-02
7	Age as of time of accident	More than 46	[EDAD_5=5]	X_7	0(a)	0(a)	0(a)
8	Occupation	Administrative and financial	[OCU_GPO=1]	X_8	6.963	-3.658	-.473
9	Occupation	Scientists and scientific technicians	[OCU_GPO=2]	X_9	7.149	-3.805	4.948E-03
10	Occupation	Engineers and architects	[OCU_GPO=3]	X_{10}	7.457	-3.084	1.087
11	Occupation	Field Scientists	[OCU_GPO=4]	X_{11}	7.163	-3.785	9.912E-02
12	Occupation	Teachers	[OCU_GPO=5]	X_{12}	-5.885	-.296	-1.062
13	Occupation	Creatives, philosophers, religious people	[OCU_GPO=6]	X_{13}	7.100	-3.918	-.115
14	Occupation	Security and protection workers	[OCU_GPO=7]	X_{14}	7.140	-3.114	.208
15	Occupation	Personal services, tourism, hygiene	[OCU_GPO=8]	X_{15}	7.025	-3.687	-.285
16	Occupation	Farming and natural resources workers	[OCU_GPO=9]	X_{16}	7.226	-3.710	.258
17	Occupation	Mining workers	[OCU_GPO=10]	X_{17}	7.283	-2.910	.749
18	Occupation	Construction workers	[OCU_GPO=11]	X_{18}	7.180	-3.700	.173
19	Occupation	Mechanics, installers and repairers	[OCU_GPO=12]	X_{19}	7.226	-3.591	.344
20	Occupation	Craftsmen	[OCU_GPO=13]	X_{20}	7.258	-3.968	5.229E-02
21	Occupation	Food workers	[OCU_GPO=14]	X_{21}	7.401	-3.728	.570
22	Occupation	Textile workers	[OCU_GPO=15]	X_{22}	7.255	-3.442	.522
23	Occupation	Operators and mounters of machinery	[OCU_GPO=16]	X_{23}	7.486	-3.643	.740
24	Occupation	Operators and drivers of vehicles	[OCU_GPO=17]	X_{24}	7.205	-3.444	.303
25	Occupation	Equal to 9999 if it is a relapse, a delayed valuation or a certificate authorization	[OCU_GPO=9999]	X_{25}	0(a)	0(a)	0(a)

Table A.5. Coefficients obtained for the multilogistic model (2/3)

i	Variable X_i	Value	SPSS Name	Symbol	α_i	β_l	γ_i
26	Physical Risk	Vale 0 debido a que se trata de una recaída, una val. posterior a fecha de alta o una autorización del certificado de incapacidad	[CLARFIS=0]	X_{26}	-34.349	-38.037	-1.469
27	Physical Risk	Defectos de los agentes	[CLARFIS=1]	X_{27}	1.616E-04	-1.088E-02	-4.091E-02
28	Physical Risk	Peligros de indumentaria y vestido	[CLARFIS=2]	X_{28}	-8.790E-02	.307	-.127
29	Physical Risk	Peligros del medio ambiente	[CLARFIS=3]	X_{29}	-.103	.166	-6.575E-02
30	Physical Risk	Métodos, materiales o procedimientos peligrosos	[CLARFIS=4]	X_{30}	3.546E-02	1.273E-02	-.110
31	Physical Risk	Peligros por la colocación	[CLARFIS=5]	X_{31}	6.872E-02	-2.056E-02	-7.020E-02
32	Physical Risk	Protegido inadecuadamente	[CLARFIS=6]	X_{32}	-.113	5.510E-02	-7.818E-02
33	Physical Risk	Peligros ambientales de trabajo a la intemperie, diferentes a los peligros públicos	[CLARFIS=7]	X_{33}	1.498E-02	.402	-4.818E-02
34	Physical Risk	Public dangers	[CLARFIS=8]	X_{34}	1.742	2.945	-2.761E-02
35	Physical Risk	Without classifying by insufficient data	[CLARFIS=9]	X_{35}	1.437	-.235	-.169
36	Physical Risk	Physical risk, S.C.E.	[CLARFIS=10]	X_{36}	-1.485E-02	7.562E-02	.154
37	Physical Risk	Without physical risk	[CLARFIS=11]	X_{37}	0(a)	0(a)	0(a)
38	Risky act	Recaída, val. posterior a fecha de alta o autorización del certificado de inc.	[CLA_AIN=0]	X_{38}	0(a)	0(a)	0(a)
39	Risky act	Adoptar posiciones o actitudes peligrosas	[CLA_AIN=1]	X_{39}	2.777E-02	-.109	-2.195E-02
40	Risky act	Colocar, mezclar, combinar, etc., en forma insegura	[CLA_AIN=2]	X_{40}	.294	-.121	-4.048E-02
41	Risky act	Falta de atención a la base de sustentación o sus alrededores.	[CLA_AIN=3]	X_{41}	.101	.454	1.569E-02
42	Risky act	Falla al asegurar o prevenir	[CLA_AIN=4]	X_{42}	.203	-.152	-8.580E-02
43	Risky act	Hacer inoperantes los dispositivos de seguridad	[CLA_AIN=5]	X_{43}	.609	-4.637E-02	-.104
44	Risky act	Limpiar, engrasar o reparar equipo móvil, con carga eléctrica	[CLA_AIN=6]	X_{44}	.372	-8.466E-02	-8.123E-02
45	Risky act	No usar el equipo de protección personal disponible	[CLA_AIN=7]	X_{45}	.122	.299	-2.335E-02
46	Risky act	Usar accesorios de indumentaria personal inseguros	[CLA_AIN=8]	X_{46}	.105	-.371	.195
47	Risky act	Operar o trabajar a velocidad insegura	[CLA_AIN=9]	X_{47}	6.164E-02	-.241	-4.035E-02
48	Risky act	Inappropriate behavior in the work	[CLA_AIN=10]	X_{48}	.227	-.137	-8.169E-02

i	Variable X_i	Value	SPSS Name	Symbol	α_i	β_i	γ_i
49	Risky act	Inappropriate equipment use	[CLA_AIN=11]	X_{49}	.255	.795	-7.303E-03
50	Risky act	Inappropriate use of hands or other parts of the body	[CLA_AIN=12]	X_{50}	.895	.143	-6.442E-02
51	Risky act	Use of non safe equipment	[CLA_AIN=13]	X_{51}	.313	-8.853E-02	-3.093E-02
52	Risky act	Fault or uncertain act of third persons	[CLA_AIN=14]	X_{52}	9.989E-02	.306	1.362E-03
53	Risky act	Without classifying by insufficient data	[CLA_AIN=15]	X_{53}	-1.637	1.020	.166
54	Risky act	Risky act, S.C.E.	[CLA_AIN=16]	X_{54}	-.112	-6.723E-02	-.402
55	Risky act	Without risky act	[CLA_AIN=17]	X_{55}	0(a)	0(a)	0(a)
56	Time in employment	0 if it was a later relapse, a delayed valuation or an incapacity certificate authorization	[ANT_GPO=0]	X_{56}	.598	.641	1.570
57	Time in employment	1 a 30 days	[ANT_GPO=1]	X_{57}	6.849E-02	.348	.201
58	Time in employment	1 a 4 months	[ANT_GPO=2]	X_{58}	-8.880E-02	.208	-.242
59	Time in employment	5 a 11 months	[ANT_GPO=3]	X_{59}	-.142	.108	-.555
60	Time in employment	1 a 3 years	[ANT_GPO=4]	X_{60}	5.837E-02	.133	-.218
61	Time in employment	More than 4 years	[ANT_GPO=5]	X_{61}	-6.775E-02	.111	-.382
62	Time in employment	0 if it was an accident in passage (except later relapse, delayed valuation or incapacity certificate authorization)	[ANT_GPO=6]	X_{62}	0(a)	0(a)	0(a)

Table A.6. Model Fitting (Male)

Model	-2 Log- Likelihood	Chi-Square	df	Significance
Only intercept	26302.564			
Final	5367.061	20935.504	162	.000

Table A.7. Model Fitting (Female)

Model	-2 Log- Likelihood	Chi-Square	df	Significance
Only intercept	5183.589			
Final	1329.816	3853.772	159	.000

Table A.8. Goodness-of-Fit (Male)

	Chi-Square	df	Significance
Pearson	3294.131	9258	1.000
Deviance	4000.310	9258	1.000

Table A.9. Goodness-of-Fit (Female)

	Chi-Square	df	Significance
Pearson	212.836	639	1.000
Deviance	244.561	639	1.000

Table A.10. Pseudo R-Square (Male)

Cox and Snell	.759
Nagelkerke	.814
McFadden	.530

Table A.11. Pseudo R-Square (Female)

Cox and Snell	.711
Nagelkerke	.792
McFadden	.546