

STD → LTD: Understanding the Factors that Predict Transferring from Short to Long-term Disability



IBI Annual Forum
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Linda Willbrandt, Tower International
Kara Contreary, Mathematica
Fraser Gaspar, MDGuidelines



AGENDA

1. Using predictive analytics for early identification of short-term disability claimants who will exhaust their benefits
2. Case Study: Analytics and case review using Guardian and Tower International's data

CASE STUDY: ANALYTICS AND CASE REVIEW USING GUARDIAN AND TOWER INTERNATIONAL'S DATA

RESEARCH PARTS

1. Data analytics
 - Guardian's STD book of business
 - Tower International's STD records
2. Pilot study reviewing case notes on 20 Tower International claims
3. Tower International's perspective on the STD to LTD research

DATA

- Received ~225K Guardian STD claims records
 - Reaching maximum benefits is outcome
 - Primary and secondary diagnoses
 - Sex, age, previous disability (generated), yearly salary, industry
- Tower International records included 512 claims. Maximum benefits = 181 days
- Guardian's benefit duration varies by employer:
 - **38% 181 days**
 - 33% 90 days
 - 10% 76 days
 - 8% 83 days
 - 11% other

COMPARING MATHEMATICA'S MODEL PARAMETERS USING GUARDIAN'S DATA

DEMOGRAPHIC AND BENEFIT CHARACTERISTICS

- Comparison of direction of associations in data sets
- NS = not significant

Variable	Mathematica Model	Mathematica Model Applied to Guardian
Age	Positive	Positive
Female	Negative	Negative
Wage	Negative (NS)	Positive (NS)
Elimination period	Positive (NS)	Positive

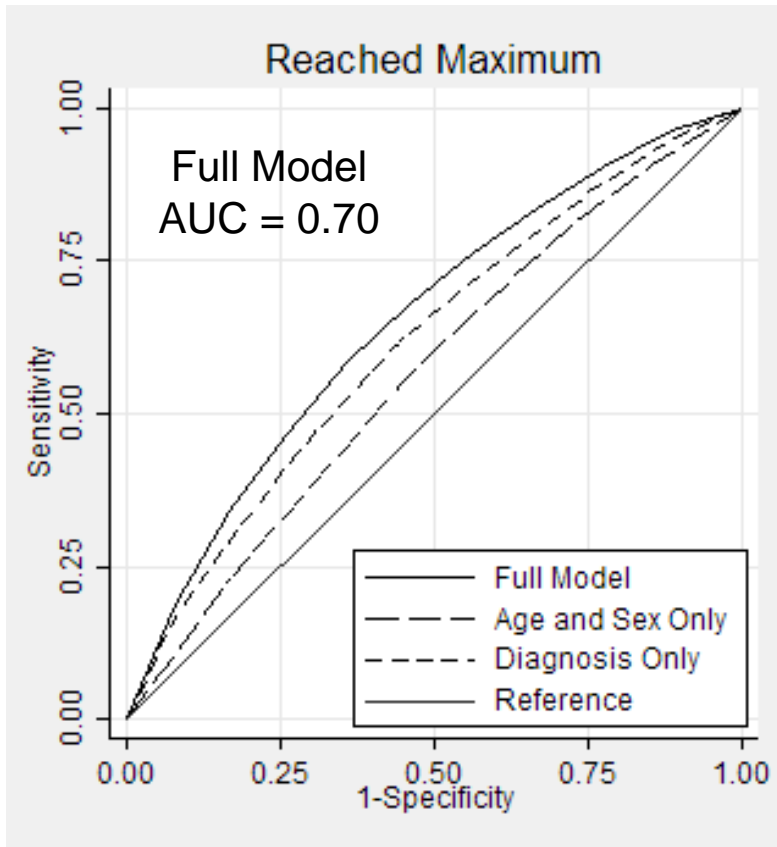
COMPARING MATHEMATICA'S MODEL PARAMETERS USING GUARDIAN'S DATA

DIAGNOSTIC CATEGORIES

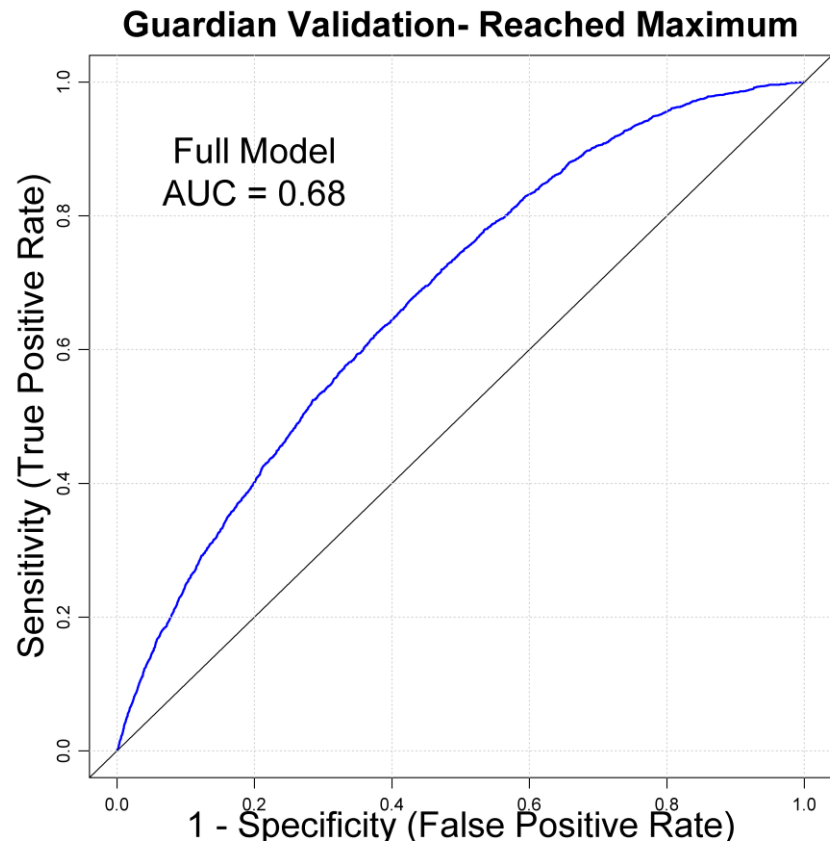
Variable	Mathematica Model	Mathematica Model Applied to Guardian
<u>Least Likely</u> to Reach Maximum Benefit	<ul style="list-style-type: none"> Digestive System Benign Neoplasms 	<ul style="list-style-type: none"> Digestive System Benign Neoplasms
<u>Most Likely</u> to Reach Maximum Benefit	<ul style="list-style-type: none"> Malignant neoplasms Intervertebral disc disorders, spondylosis, etc 	<ul style="list-style-type: none"> Malignant neoplasms Depression/affective disorders, PTSD

MODEL TEST AND VALIDATION RESULTS

TEST SET



VALIDATION SET

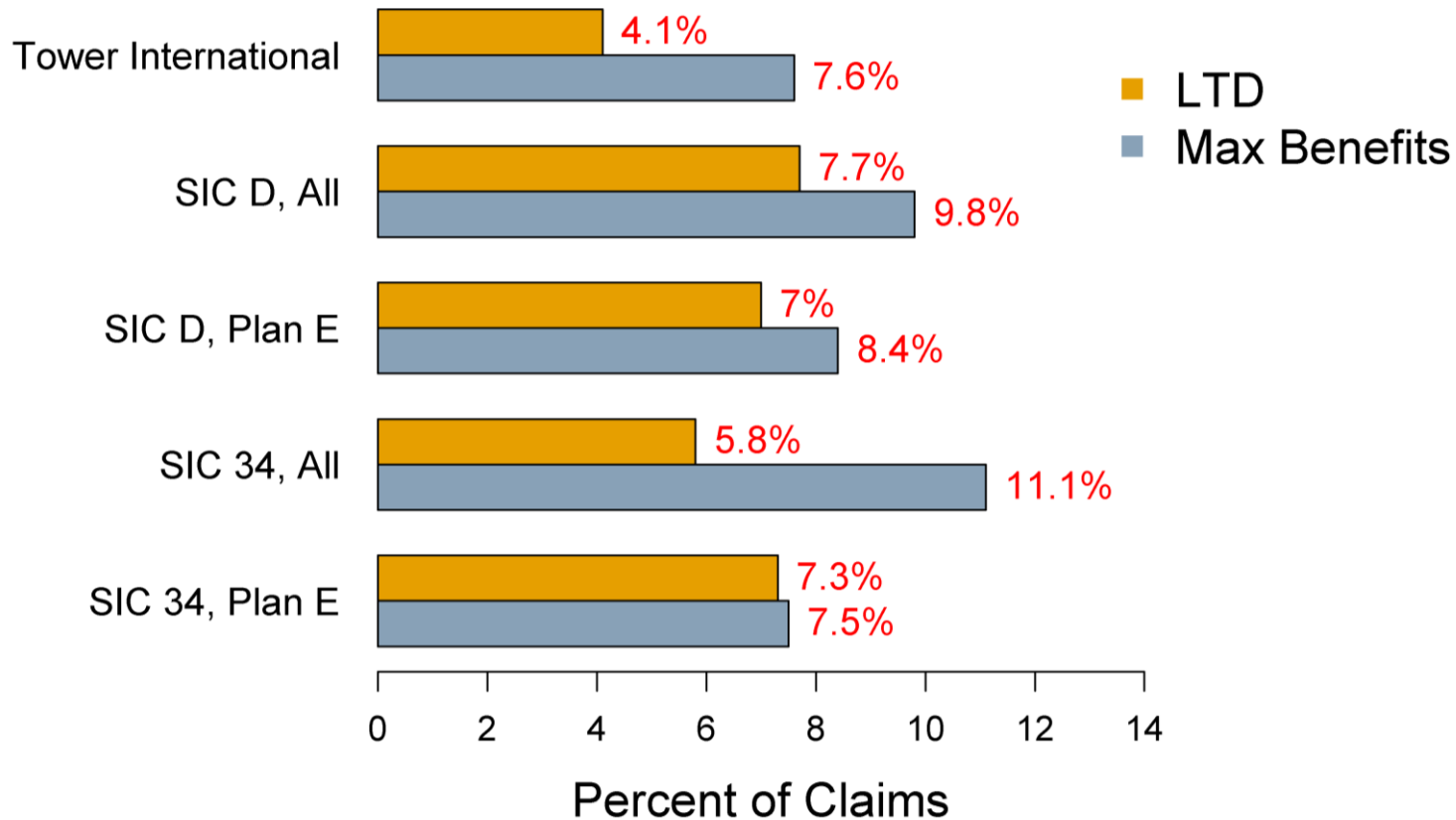


TOWER INTERNATIONAL AS A CASE STUDY

- Leading global manufacturer of engineer automotive structural metal components
- \$2 billion in revenue
- ~8,000 employees
- 23 production facilities in North America and Europe
- STD and LTD claims managed by Guardian Insurance



MAX BENEFIT AND LTD BENCHMARKING



- Used IBI's "Plan E" – elimination of 7 days, duration of benefits of 181 days
- SIC D = Manufacturing
- SIC 34 = Fabricated Metal Products
- Does not consider diagnosis

GUARDIAN BENCHMARKING

	Tower	Guardian All (n = 61,992)	Guardian SIC D (n = 23,002)	Guardian SIC 34 (n = 4,600)
% Claims Reaching Maximum Benefits	7.6%	9.2%	7.8%	8.5%

TOWER VS. GUARDIAN: DIAGNOSTIC CATEGORIES

SIC D- MANUFACTURING

Major Diagnostic Category	Guardian N	Tower N	Guardian % Max	Tower % max
Diseases of Musculoskeletal System and Connect	6337	137	9	10.2
Injury and Poisoning	3962	89	5.3	3.4
Diseases of Digestive System	2846	66	1.6	3
Diseases of Circulatory System	2003	46	11.4	13
Neoplasms	1604	34	18.9	23.5
Diseases of Nervous System and Sense Organs	1111	34	11.4	5.9
Diseases of Genitourinary System	1023	24	3.2	0
Diseases of Respiratory System	991	8	6.2	12.5
Symptoms, Signs, and Ill-Defined Conditions	978	20	9.1	5
Mental Disorders	932	24	8	0
Diseases of Skin and Subcutaneous Tissue	524	9	3.2	0
Endocrine, Nutritional, Metabolic, Immunity Disorders	352	13	4.5	15.4
Infectious and Parasitic Diseases	193	7	5.7	0
Diseases of Blood and Blood-Forming Organs	54	1	13	0

TOWER VS. GUARDIAN: DIAGNOSTIC SUBCATEGORIES

SIC D- MANUFACTURING; TOP 10 BY NUMBER

Diagnostic Subcategory	Guardian N	Tower N	Guardian % Max	Tower % Max
Dorsopathies	2289	39	12.8	20.5
Arthropathies and Related Disorders	2225	45	6.6	6.7
Rheumatism, Excluding the Back	1319	39	6.4	5.1
Hernia of Abdominal Cavity	1296	34	0.5	0
Sprains and Strains of Joints and Adjacent Muscles	1005	15	5.6	6.7
Symptoms	927	17	8.8	5.9
Other Diseases of Digestive System	705	11	3	0
Fracture of Lower Limb	694	18	6.1	0
Ischemic Heart Disease	637	3	6.8	0
Fracture of Upper Limb	634	11	4.3	0

TOWER CASE REVIEW

PILOT STUDY

- What additional information could help predict employees at risk for going to LTD?
- Picked 20 total cases, 10 went to LTD
- Matched to non-LTD cases:
 - Matched by diagnoses: ICD-10 > code category > subcategory
 - If further matching needed: reaching maximum benefits, leave number, gender, then age.
- Categories explored:
 - Demographics
 - Disability history
 - Medical diagnoses and treatment
 - Psychosocial aspects

CASE REVIEW EXAMPLE QUESTIONS

Did the employee express/share motivation to return to work?

Is there any motivation to not return to work including extra benefit payment or avoidance of work?

Does employee's geographic location prevent access to health care?

Was an opiate prescribed at any time?

Any other underlying factors contributing to the disability? Yes-specify.

Case Review Abstraction Form	
Reviewer:	Claim # (Discreet ID):
Reviewer Email:	Date of review:
Reviewer Role:	
A. Employee Demographics	
1. Date of birth	Month: ___ Day: ___ Year: ___
2. Sex	<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Don't know
3. Date of Hire	Month: ___ Day: ___ Year: ___
4. Physical demand level of occupation	<input type="checkbox"/> Sedentary <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy <input type="checkbox"/> Very heavy <input type="checkbox"/> Don't know
5. Highest Level of Education	<input type="checkbox"/> Less than high school/GED <input type="checkbox"/> High school graduate/GED <input type="checkbox"/> Some College <input type="checkbox"/> Technical/ Trade School <input type="checkbox"/> College degree <input type="checkbox"/> Don't know
6. Race (check all that apply)	<input type="checkbox"/> White (not Hispanic) <input type="checkbox"/> Hispanic (any race) <input type="checkbox"/> Black or African American <input type="checkbox"/> American Indian and Alaska native <input type="checkbox"/> Asian <input type="checkbox"/> Native Hawaiian and Other Pacific Islander <input type="checkbox"/> Other <input type="checkbox"/> Don't know
7. Height	Feet: Inches: <input type="checkbox"/> Don't know
8. Weight	Pounds: <input type="checkbox"/> Don't know

VARIABLES MOST ASSOCIATED WITH LTD

Treatment	Did Not Go to LTD	Went to LTD
Had Surgery	40%	80%
Was Hospitalized	56%	78%
Had Underlying Factors	30%	70%

“UNDERLYING FACTORS” MOST IMPORTANT

UNDERLYING FACTORS FOR 10 CLAIMS

Underlying factor	Went to LTD?
DM, acute asthma, HBP	No
Job requirements, repetition	No
Family history	No
Depression, anxiety/bipolar, hx of poly substance abuse	Yes
Smoking	Yes
Hypertension	Yes
Diabetes, history of joint replacements	Yes
Age	Yes
Diabetes, HTN, neuropathy, vertigo, RAD, pedan edema, urinary frequency, sinus tachycardia	Yes
Claimant has DM which may delay healing	Yes

DIFFERENCE BETWEEN WHAT A DATA ANALYST WOULD SEE COMPARED TO A NURSE

	Case #1	Case #2
Went to LTD		
Primary Dx	Cervical intervertebral disc displacement	Cervical intervertebral disc displacement
Secondary Dx	None	None
Age	52	55
Sex	Male	Male
Yearly salary	\$40k	\$30k
Previous Leave	No	No
Treatment for Primary Dx		
Underlying factors		

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DIFFERENCE BETWEEN LEAVE REASON AND DISABILITY DIAGNOSIS

Starting Diagnosis	Disabling Diagnosis
Osteoarthritis, degenerative joint disorder	Carpal tunnel syndrome (Had two carpal tunnel releases)
Type II diabetes	Atrial fibrillation
Lumbago, low back pain	Depression
Vertigo of central origin	Cervical spine stenosis
Closed fracture of one rib	Pilon fracture right lower extremity

OTHER ANECDOTES

- Of the 13 claimants where nurses could answer, “Did claimant have motivation to not RTW?”:
 - 0/7 (0%) not going to LTD answered “yes”
 - 3/6 (50%) going to LTD answered “yes”
- Of the 12 claimants where nurses could answer, “Did claimant have motivation to RTW?”:
 - 2/4 (50%) not going to LTD answered “yes”
 - 1/8 (13%) going to LTD answered “yes”
- Only 1 claimant believed to have “symptom magnification”
 - “Claimant anticipating retirement and has been awarded SSDI”

HOW THIS RESEARCH WILL ADVANCE LEAVE MANAGEMENT AT GUARDIAN

- MDGuidelines working on advanced predictive modeling to help users allocate resources
 - Predicting disability durations (could still be used to predict those reaching max benefits)
 - Incorporates additional prognostic factors like surgery, hospitalization, procedures, previous work disability, geographic location, opioid use, etc.
 - Meetings between MDGuidelines and Guardian to collaborate already started
- Free-text mining of case notes
- Continued training on the psychosocial aspects that contribute to a leave
- Continued collaboration between all parties to improve worker health