



Occupation Coding of Carpal Tunnel Syndrome

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Overview

- Background
- NIOCCS occupation coding
- Lessons learned

BACKGROUND

Carpal Tunnel Syndrome (CTS)

- Compression of the median nerve
- 5 – 50 workers per 10,000
- Highly repetitive work, force, vibration, awkward posture



What do these three occupations have in common?



Whizard

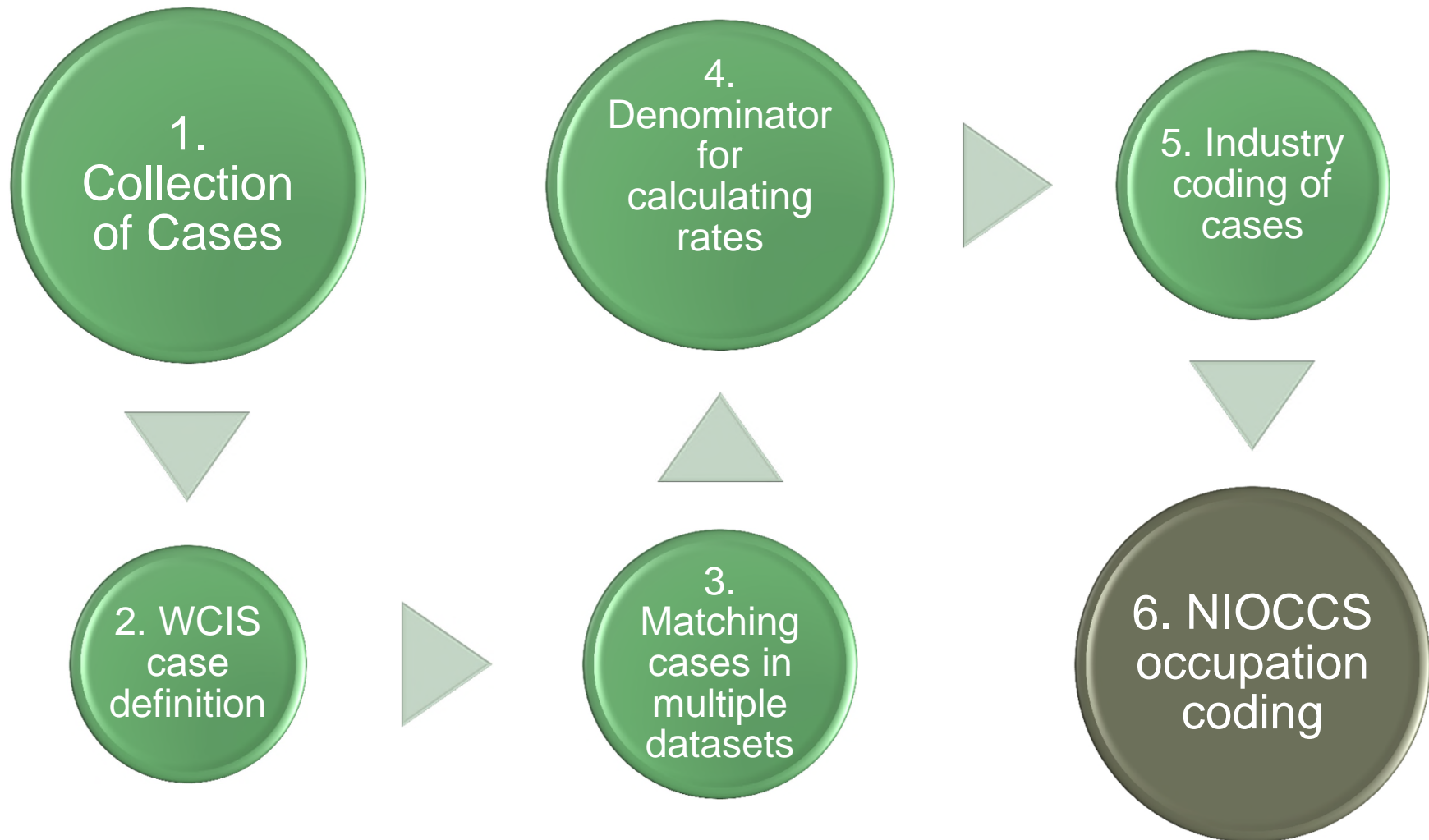


Burrito Roller



Office Worker

California CTS Surveillance Project



CTS Case Characteristics, WCIS 2006-2011

Characteristic	Cases	Denominator	Rate x 100,000 FTE (95% CI)
Overall	89,762	84,063,352	106.8 (106.3—107.3)
Age Category			
15-24	4,663	9,250,600	50.4 (49.6—51.1)
25-34	18,178	21,204,757	85.7 (84.9—86.5)
35-44	23,390	21,250,744	110.1 (109.0—111.2)
45-54	28,126	19,384,346	145.1 (143.8—146.4)
55-64	13,877	10,799,772	128.5 (130.3—126.7)
65 +	1,254	2,155,828	58.2 (56.4—60.1)
Gender			
Male	24,116	47,427,627	50.8 (50.6—51.1)
Female	65,121	36,635,726	177.8 (176.5—179.0)

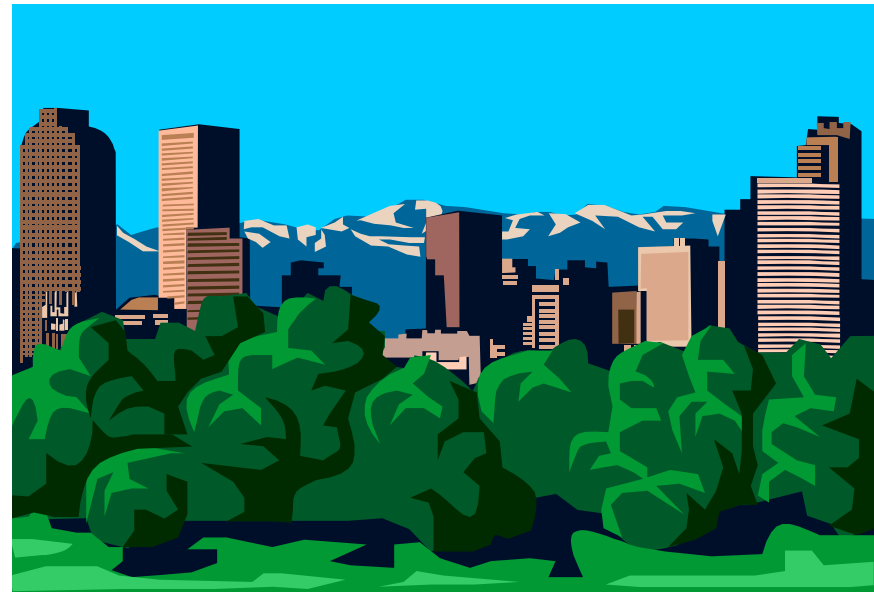
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Previous NIOCCS Experience



Data Sharing
Pilot of System



Two-day training
In Denver

Industries with highest rates of CTS, California 2006-2011

Rank	Industry Description	Cases	Rate x 100,000 FTE
1	Textile and fabric finishing and coating mills	54	393
2	Animal slaughtering and processing	396	342
3	Sugar and confectionery products	148	326
4	Telecommunications	2674	325
5	Navigational and control instruments manufacturing	588	280
6	Public administration	4752	268
7	Insurance carriers and related activities	3632	262
8	Aluminum production and processing	67	252
9	Bus service and urban transit	808	238
10	Miscellaneous petroleum and coal products	27	234

NIOCCS OCCUPATION CODING

Common Occupation Titles

Industry	Occupation	Employers	Cases
Telecommunications	Service represe	1	357
Grocery stores	Food clerk	4	253
Department and discount stores	Cashier	9	182
Government	Eligibility worker ii	8	157
Telecommunications	Customer servic	4	135
Government	Intermediate typist-clerk	1	111
Grocery stores	Cashier	26	89
Aggregated government	Intermediate clerk	1	89
Bus service and urban transit	Bus operator (f/t)	1	84

What We Gave to NIOCCS

- Industry is already coded
- Cleaned before submission
- Submitted each industry separately
- Confidence level - medium
- 14,000 cases
- 5,500 aggregated occupation descriptions

NIOCCS Results

Industry	Combos	Claims	% Combos Autocoded	% Claims Autocoded
Overall	5,506	14,017	56%	66%
Bus service and urban transit	353	863	69%	82%
Telecommunications	883	2,943	67%	79%
Animal slaughtering and processing	243	428	80%	74%
Aluminum production and processing	69	69	70%	70%
Navigational & measuring instrument manufacturing	514	550	60%	61%
Insurance carriers and related activities	1613	3,876	47%	61%
Public Administration	1615	5,042	39%	59%
Textile and fabric finishing and coating mills	47	55	55%	56%
Miscellaneous petroleum and coal products	29	29	55%	55%
Sugar and confectionery products	140	162	45%	44%

66% is not bad, but it still left 34% (over 4,700 CTS claims) to hand code

NIOCCS Accuracy

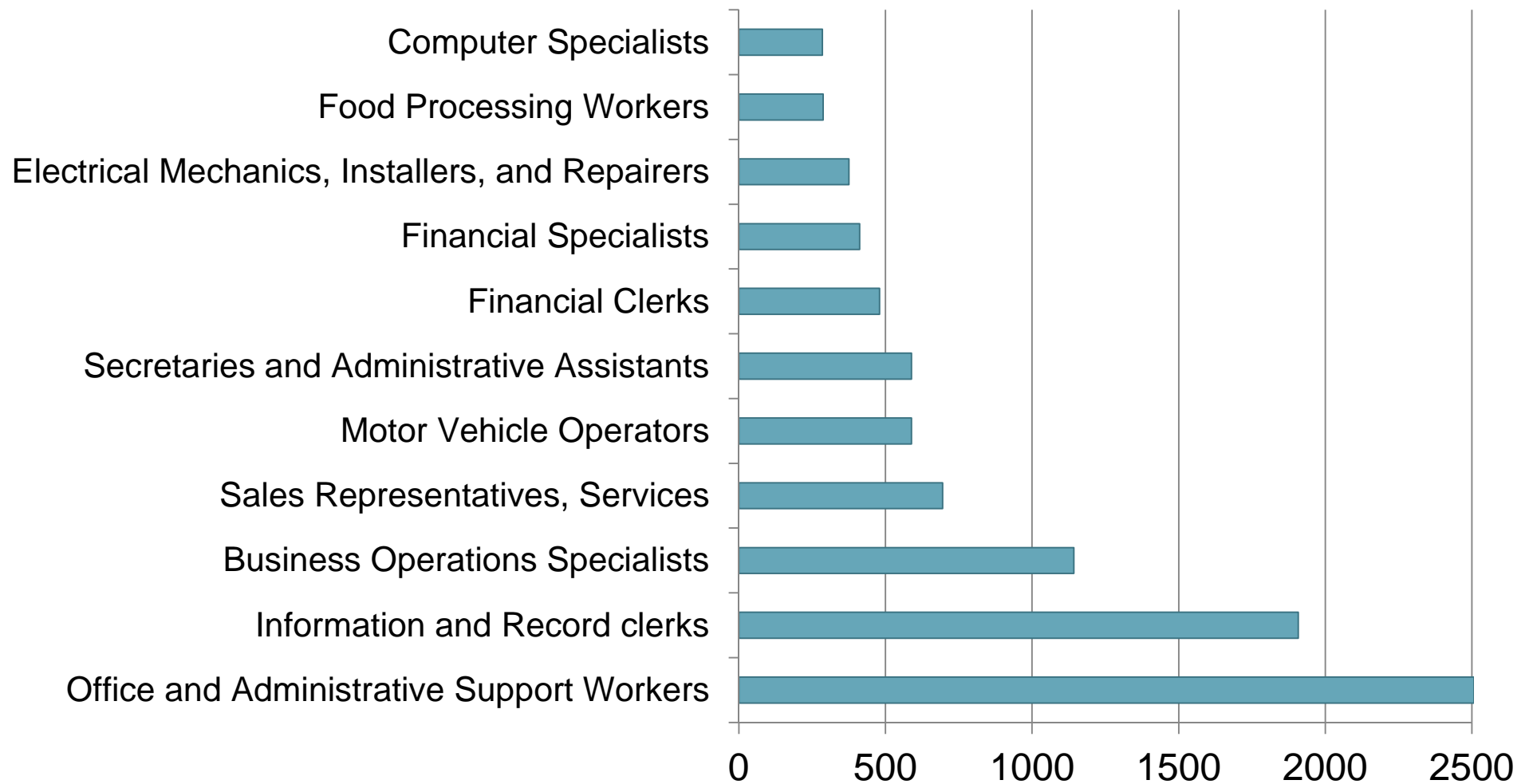
Industry	Combos	Autocoded	Correct autocode	% Correct
Overall		747	632	83%
Miscellaneous petroleum and coal products	29	16	16	100%
Animal slaughtering and processing	243	194	188	97%
Telecommunications*	883	594	86/100	86%
Sugar and confectionery products	140	63	52	83%
Textile and fabric finishing and coating mills	47	26	21	81%
Aluminum production and processing	69	48	39	81%
Navigational & measuring instrument manufacturing*	514	306	80/100	80%
Public Administration*	1615	629	75/100	75%
Insurance carriers and related activities*	1613	756	72/100	72%

*Checked accuracy on random sample on 100 auto-coded records for industries with more than 200 claims

Prevalent Occupations, Industries with 10 Highest CTS Rates, California 2006 - 2011

Occupation in the Industries with the Highest CTS Rates			
Rank	Industry Title (CIC)	Most Prevalent Occupation	n (%)
1	Textile and fabric finishing and coating mills	Material moving workers	14 (25%)
2	Animal slaughtering and processing	Butchers & other animal processing workers	277 (63%)
3	Sugar and confectionery products	Other production occupations	63 (38%)
4	Telecommunications	Customer service representatives	1,033 (34%)
5	Navigational & control instrument manufacturing	Assemblers and fabricators	92 (16%)
6	Public Administration	Other office and admin support workers	1,475 (28%)
7	Insurance carriers and related activities	Insurance claims & policy processing clerks	820 (20%)
8	Aluminum production and processing	Metal workers and plastic workers	27 (36%)
9	Bus service and urban transit	Motor vehicle operators	564 (65%)
10	Miscellaneous petroleum and coal products	Other production occupations	12 (38%)

Prevalent Occupations, Industries with 10 Highest CTS Rates, California 2006 - 2011



In spite of everything we know about office ergonomics, there are still 1,000s of cases of CTS among office workers

LESSONS LEARNED

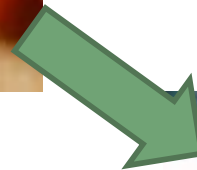


Three Common Questions

1. Why did it code to that?



Payroll processor



Photographic process workers

Common Questions

1. Why did it code to that?



Collection Representative



Legislator

Common Questions

2. How do you distinguish between?



Hand packers and machine packers

Common Questions

- How do you distinguish between?



Packers

Common Questions

3. What about vague descriptions (and levels of responsibility)?

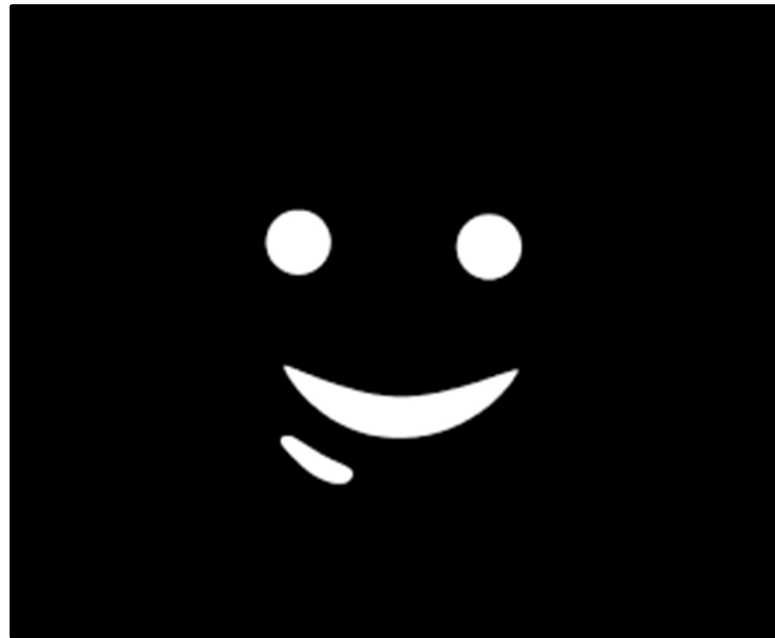
- Laborer
 - Sales
 - Clerk
-
- All problems of natural language processing

Co-reference - Pilot



On a scale
of 1 to 5
with 1
meaning...

NIOCCS Occupation Coding



The challenge in coding is in the detail...

Information and Record Clerks

- Customer service reps
- Computer operators
- Data entry keyers
- Work processors\typists
- Desktop publishers
- Office clerks, general
- Statistical assistants
- Eligibility interviewers

Retail Sales Workers

- Cashiers
- Counter and rental clerks
- Parts salespersons
- Retail salespersons

Are risk factors the same for...

Financial Specialists

- Accountants and auditors
- Budget analysts
- Credit analysts
- Financial analysts
- Insurance Underwriters
- Tax examiners, collectors
- Tax preparers

Computer Science Occupations

- Computer Scientists
- Computer programmers
- Computer software engineers
- Computer support specialists
- Network and computer administrators
- Database administrators

Are risk factors the same for...

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Are risk factors the same for...

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Computer Science Occupations



How does NIOCCS identify these risk factors?



Whizard



Burrito Roller



Office Worker

Conclusions

- Identified at risk occupations for CTS
- Auto-coding of occupation useful after industry is coded
- Accurate auto-coding (occupation) on medium
- Look at results for abnormalities
- Broader categories BUT there is value in the detail!
- Don't get caught in the weeds



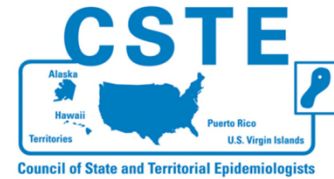
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Questions?



Case Classification Scheme

Procedure code	ICD-9 Dx Code	Number of Acceptable Criteria Variables				
		4	3	2	1	0
64721 or 29848	Any	Probable	Probable	Possible	Uncertain	Uncertain
Any	354 or 354.0	Probable	Probable	Possible	Uncertain	Uncertain
Other or N/A	Other or N/A	Possible	Uncertain	Uncertain	Uncertain	Uncertain

Acceptable Values for Criteria Values

Criteria Variable	Acceptable Values	
Nature of injury	78, Carpal tunnel syndrome 49, Sprain or tear 52, Strain or tear 80, All other cumulative injury	
Cause of injury	97, Repetitive motion 60, Strain or injury by 98, Cumulative 94, Rubbed or abraded by	
Part of body	33, Lower arm 34, Wrist 35, Hand 36, Finger(s)	37, Thumb 39, Wrist(s) & Hand(s) 30, Multiple upper extremities 90, Multiple body parts
Injury description	Contains a variation of the term “carpal,” “CTS,” etc. or “numbness” or “tingling”	

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11	Power companies (AAAA)	1179	231
12	Employment services	1267	229
13	Apparel accessories and other apparel manufacturing	22	228
14	Data processing, hosting, and related services	158	228
15	Pharmaceutical and medicine manufacturing	809	215
16	Software publishers	268	203
17	Pottery, ceramics, and plumbing fixture manufacturing	26	195
18	Department stores and discount stores	1925	189
19	Seafood and other miscellaneous foods, n.e.c.	279	188
20	Grocery stores	2859	178
21	Bakeries, except retail	261	172

The Twelve Steps to Industry Coding

The Twelve Steps to Industry Coding of CTS Cases		Coded n (%)	Cumulative % coded
1.	NAICS to CIC crosswalk	14,152 (25%)	25%
2.	SIC to 2002 NAICS to CIC crosswalk	15,298 (27%)	52%
3.	SIC to 1997 NAICS to CIC crosswalk	963 (2%)	54%
4.	Assign CIC for 12 SIC codes that crosswalked to multiple CIC codes	1,539 (3%)	57%
5.	Identify schools	1,353 (2%)	59%
6.	Identify transit	170 (0%)	60%
7.	Identify public administration (government)	3,432 (6%)	66%
8.	Assign CIC for 76 employers	2,199 (4%)	70%
9.	Identify and aggregate banks	490 (1%)	71%
10.	Identify and aggregate other problematic industries	4,791 (9%)	79%
11.	Assign CIC for 4 class codes	540 (1%)	80%
12.	Assign CIC using claims with the same master employer / FEIN	1,502 (3%)	83%