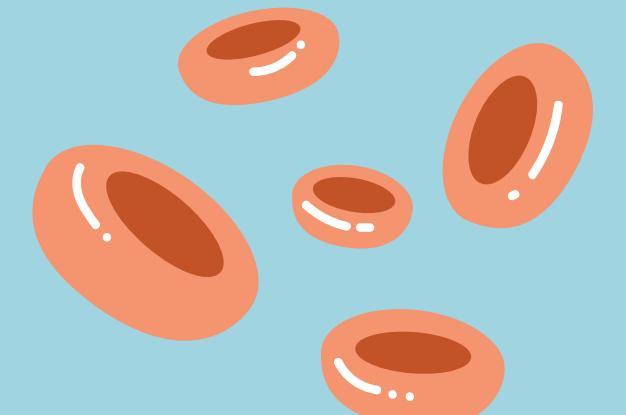


PHARMACORP

Committed to advancing health outcomes through innovative treatments.



By Benji Morris,
Avigdor Felder,
Radhika Srinivasan
Iyengar

Identifying the Challenge

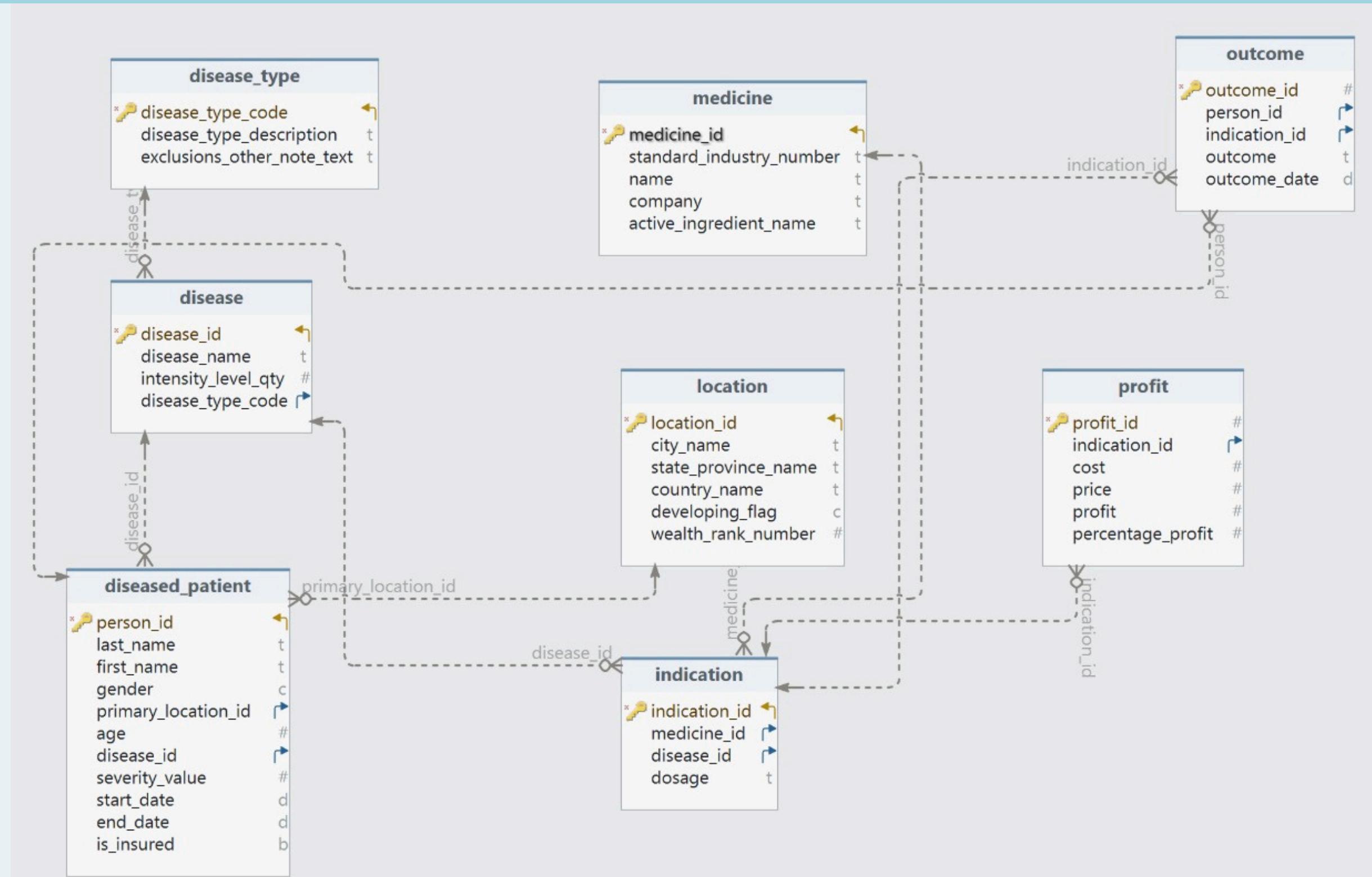
PharmaCorp aims to assess the current state of the pharmaceutical industry to guide strategic decisions on future research, investments, and operational improvements. PharmaCorp faces three major business challenges:

- Should PharmaCorp purchase MediHealth for \$3,000?
- Which disease areas should be prioritized for improving treatment effectiveness?
- How can doctors seamlessly access and view patient records?

To address these challenges, we are building a relational database that captures comprehensive data on patient details, medicine prescriptions, treatment outcomes, and associated costs. This database will enable PharmaCorp to evaluate the effectiveness and cost of existing treatments, identify opportunities to enhance treatment outcomes or reduce costs, and streamline patient record access for doctors to improve care delivery and decision-making. By analyzing these insights, PharmaCorp can make informed decisions on acquisitions, optimize research efforts, allocate resources effectively, and enhance its competitive edge in delivering efficient and effective healthcare solutions.

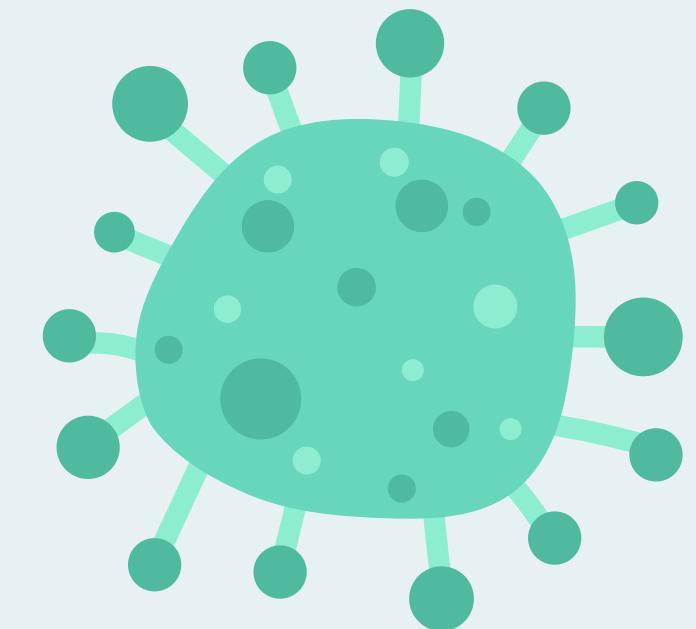


Decoding Our Data Structure



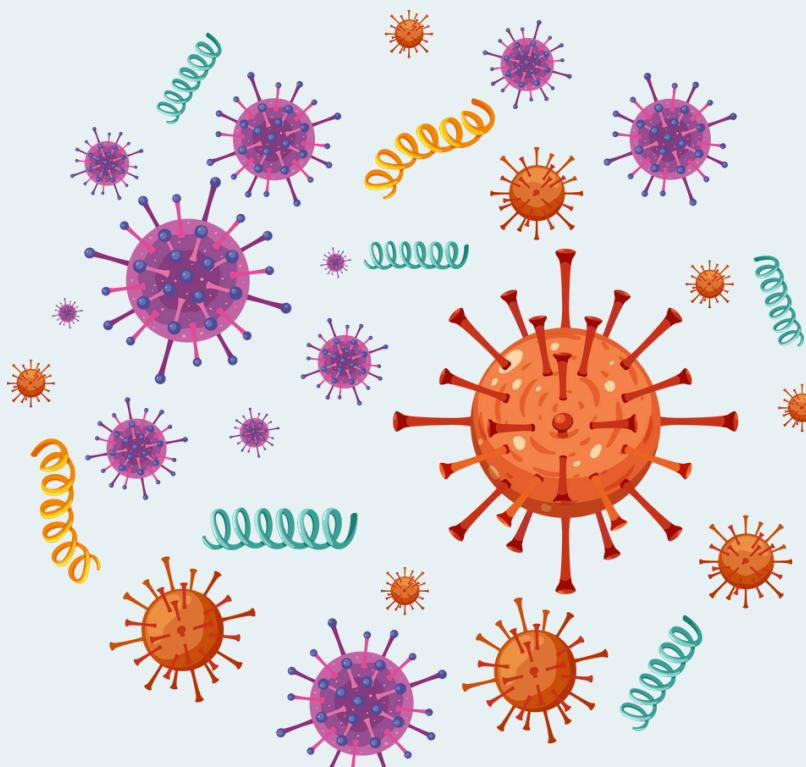
Disease Table

	disease_id [PK] integer	disease_name character varying (100)	intensity_level_qty integer	disease_type_code character (10)
1	1	Ischemic Heart Disease	10	DT01
2	2	Hemorrhagic Stroke	9	DT01
3	3	Pneumonia	8	DT02
4	4	Chronic Bronchitis	9	DT02
5	5	Lung Cancer	10	DT03
6	6	Pulmonary Tuberculosis	9	DT02
7	7	Type 2 Diabetes	8	DT04
8	8	Alzheimer's Disease	9	DT05
9	9	Cholera	7	DT06
10	10	COVID-19	10	DT06



Disease Type Table

	disease_type_code [PK] character (5)	disease_type_description character varying (1000)	exclusions_other_note_text character varying (2000)
1	DT01	Cardiovascular Diseases	Includes conditions affecting the heart and blood vessels, such as ischemic heart disease and stroke.
2	DT02	Respiratory Diseases	Covers diseases affecting the lungs and airways, including pneumonia, bronchitis, and tuberculosis.
3	DT03	Cancers	Includes malignant growths such as lung cancer.
4	DT04	Metabolic Diseases	Covers disorders affecting metabolism, such as type 2 diabetes.
5	DT05	Neurological Diseases	Includes disorders affecting the brain and nervous system, such as Alzheimer's disease.
6	DT06	Infectious Diseases	Covers diseases caused by infections, including cholera and COVID-19.



Diseased Patient Table

	person_id [PK] integer	last_name character varying (50)	first_name character varying (50)	gender character (1)	primary_location_id integer	age integer	disease_id integer	severity_value integer	start_date date	end_date date	is_insured boolean
1	1	Garcia	David	M	6	58	1	10	2020-12-12	2020-12-22	true
2	2	Martinez	Sophia	F	13	45	1	6	2022-06-12	2023-02-07	false
3	3	Johnson	Emily	M	25	65	9	6	2021-07-06	2021-08-02	false
4	4	Smith	Matthew	M	18	93	6	4	2022-01-01	2022-11-05	true
5	5	Davis	Michael	F	11	28	9	5	2021-11-18	2021-12-01	false
6	6	Martinez	Daniel	M	3	56	5	1	2022-03-05	2022-03-27	true
7	7	Smith	Daniel	F	25	31	3	2	2020-04-15	2021-04-01	false
8	8	Davis	Emily	F	5	82	10	4	2022-07-10	2022-09-14	true
9	9	Martinez	Michael	F	21	35	10	3	2020-01-12	2020-12-02	false
10	10	Johnson	Jane	F	3	83	7	7	2021-11-24	2022-02-18	true
11	11	Williams	Emma	F	17	66	1	3	2020-05-11	2020-09-04	false
12	12	Martinez	Michael	F	1	69	6	8	2020-08-10	2021-04-30	false
13	13	Jones	Emily	F	14	65	7	7	2021-09-06	2021-10-20	false
14	14	Rodriguez	Olivia	M	27	14	6	2	2020-01-11	2020-11-06	true
15	15	Garcia	John	F	20	27	1	7	2021-06-03	2022-03-03	true

Total rows: 1000

Query complete 00:00:00.070



Medicine Table

	medicine_id [PK] integer	standard_industry_number character varying (25)	name character varying (250)	company character varying (150)	active_ingredient_name character varying (150)
1	1	SIN10051	ACE-Hypertenol	PharmaCorp	Enalapril
2	2	SIN10052	HyperBloc	MediHealth	Enalapril
3	3	SIN10053	PainReliefMax	PharmaCorp	Naproxen
4	4	SIN10054	PainAway	MediHealth	Naproxen
5	5	SIN10056	LipidControl	MediHealth	Atorvastatin
6	6	SIN10057	AllergyRelief	PharmaCorp	Loratadine
7	7	SIN10058	AllerStop	MediHealth	Loratadine
8	8	SIN10059	AcidEase	PharmaCorp	Pantoprazole
9	9	SIN10060	RefluxRelief	MediHealth	Pantoprazole
10	10	SIN10061	AsthmaCare	PharmaCorp	Salbutamol
11	11	SIN10062	BreathEasy	MediHealth	Salbutamol
12	12	SIN10001	Atorvastatin	PharmaCorp	Atorvastatin
13	13	SIN10002	Aspirin	MediHealth	Aspirin
14	14	SIN10003	Nitroglycerin	CureIt Pharmaceuticals	Nitroglycerin
15	15	SIN10004	Metoprolol	BioMed Solutions	Metoprolol

Total rows: 61

Query complete 00:00:00.096



Indication Table

	indication_id [PK] integer	medicine_id integer	disease_id integer	dosage character varying (50)
1	1	1	1	1 tablet daily
2	2	1	1	20mg
3	3	2	1	50mg
4	4	2	1	500mg 2x daily
5	5	2	1	50mg
6	6	3	1	2 tablets daily
7	7	3	1	100mg
8	8	4	1	1 tablet daily
9	9	4	1	2 tablets daily
10	10	5	1	1 tablet daily
11	11	5	1	20mg
12	12	6	2	500mg 2x daily
13	13	6	2	2 tablets daily
14	14	7	2	50mg
15	15	7	2	100mg

Total rows: 146

Query complete 00:00:00.091



Profit Table



	profit_id [PK] integer	indication_id integer	cost numeric (10,2)	price numeric (10,2)	profit numeric (10,2)	percentage_profit numeric (10,2)
1	1	1	47.58	102.39	54.81	115.20
2	2	2	93.27	140.48	47.21	50.62
3	3	3	80.75	121.65	40.90	50.65
4	4	4	140.59	212.11	71.52	50.87
5	5	5	66.74	142.97	76.23	114.22
6	6	6	10.00	15.00	5.00	50.00
7	7	7	12.00	17.50	5.50	45.83
8	8	8	8.50	14.00	5.50	64.71
9	9	9	9.00	13.00	4.00	44.44
10	10	10	11.00	18.50	7.50	68.18
11	11	11	7.50	11.25	3.75	50.00
12	12	12	15.00	22.00	7.00	46.67
13	13	13	10.00	16.00	6.00	60.00
14	14	14	9.50	12.50	3.00	31.58
15	15	15	8.00	11.50	3.50	43.75

Total rows: 146

Query complete 00:00:00.069

Location Table

	location_id [PK] integer	city_name character varying (100)	state_province_name character varying (100)	country_name character varying (100)	developing_flag character (1)	wealth_rank_number integer
1	1	New York	New York	USA	N	8
2	2	Los Angeles	California	USA	N	9
3	3	Chicago	Illinois	USA	N	6
4	4	Houston	Texas	USA	N	6
5	5	Miami	Florida	USA	N	10
6	6	Toronto	Ontario	Canada	N	7
7	7	Vancouver	British Columbia	Canada	N	8
8	8	London	England	UK	N	9
9	9	Manchester	England	UK	N	6
10	10	Birmingham	England	UK	N	7
11	11	Sydney	New South Wales	Australia	N	7
12	12	Melbourne	Victoria	Australia	N	8
13	13	Paris	Ile-de-France	France	N	9
14	14	Berlin	Berlin	Germany	N	8
15	15	Munich	Bavaria	Germany	N	7
16	16	Tokyo	Tokyo	Japan	N	9
17	17	Osaka	Osaka	Japan	N	10
18	18	Seoul	Seoul	South Korea	N	9
19	19	Beijing	Beijing	China	Y	4
20	20	Shanghai	Shanghai	China	Y	3
21	21	Rio de Janeiro	Rio de Janeiro	Brazil	Y	2
22	22	Sao Paulo	Sao Paulo	Brazil	Y	3
23	23	Cape Town	Western Cape	South Africa	Y	5
24	24	Johannesburg	Gauteng	South Africa	Y	4
25	25	Mumbai	Maharashtra	India	Y	3
26	26	Delhi	Delhi	India	Y	2
27	27	Mexico City	Mexico City	Mexico	Y	4
28	28	Guadalajara	Jalisco	Mexico	Y	3
29	29	Buenos Aires	Buenos Aires	Argentina	Y	5
30	30	Lagos	Lagos	Nigeria	Y	2



Outcome Table



	outcome_id [PK] integer	person_id integer	indication_id integer	outcome character varying (30)	outcome_date date
1	1	1	27	worsened	2020-12-17
2	2	2	30	recovered	2022-11-25
3	3	2	30	relapse	2023-03-13
4	4	3	128	worsened	2021-07-23
5	5	4	94	recovered	2022-05-23
6	6	5	123	worsened	2021-11-29
7	7	6	83	worsened	2022-03-10
8	8	7	21	died	2020-12-18
9	9	8	145	recovered	2022-08-21
10	10	9	136	died	2020-08-04
11	11	10	107	recovered	2021-12-02
12	12	11	7	worsened	2020-07-10
13	13	12	90	died	2021-03-29
14	14	13	99	died	2021-10-20
15	15	14	89	recovered	2020-09-12
16	16	15	33	died	2021-06-08
17	17	16	85	recovered	2021-12-23
18	18	16	85	relapse	2022-03-06
19	19	17	97	recovered	2021-06-26
20	20	17	67

Total rows: 1050 | Query complete 00:00:00.059

Data Dictionary

Table	Column	Data Type
disease	disease_id	serial
	disease_name	varchar(100)
	intensity_level_qty	integer DEFAULT 1
	disease_type_code	char(10)
disease_type	disease_type_code	char(5)
	disease_type_description	varchar(1000)
	exclusions_other_note_text	varchar(2000)

Table	Column	Data Type	Description
diseased_patient	person_id	serial	
	last_name	varchar(50)	
	first_name	varchar(50)	
	gender	char(1)	
	primary_location_id	integer	Where Patient is primarily located
	age	integer	
	disease_id	integer	
	severity_value	integer DEFAULT 1	How severe the patients case is
	start_date	date	
	end_date	date	
	is_insured	boolean DEFAULT false	

Data Dictionary

Table	Column	Data Type
indication	indication_id	serial
	medicine_id	integer
	disease_id	integer
	dosage	varchar(50)
	location_id	serial
location	city_name	varchar(100)
	state_province_name	varchar(100)
	country_name	varchar(100)
	developing_flag	char(1)
	wealth_rank_number	integer

Table	Column	Data Type
diseased_patient	person_id	serial
	last_name	varchar(50)
	first_name	varchar(50)
	gender	char(1)
	primary_location_id	integer
	age	integer
	disease_id	integer
	severity_value	integer DEFAULT 1
	start_date	date
	end_date	date
	is_insured	boolean DEFAULT false

Data Dictionary

Table	Column	Data Type	
medicine	medicine_id	serial	
	standard_industry_number	varchar(25)	A way to reference the drug among other pharmaceutical companies
	name	varchar(250)	
	company	varchar(150)	
	active_ingredient_name	varchar(150)	
outcome	outcome_id	serial	
	person_id	integer	
	indication_id	integer	
	outcome	varchar(30)	
	outcome_date	date	

Table	Column	Data Type
profit	profit_id	serial
	indication_id	integer
	cost	numeric(10,2)
	price	numeric(10,2)
	profit	numeric(10,2)
	percentage_profit	numeric(10,2)

PHARMACORP MARKET SHARE

* Number of patients being treated by PharmaCorp:

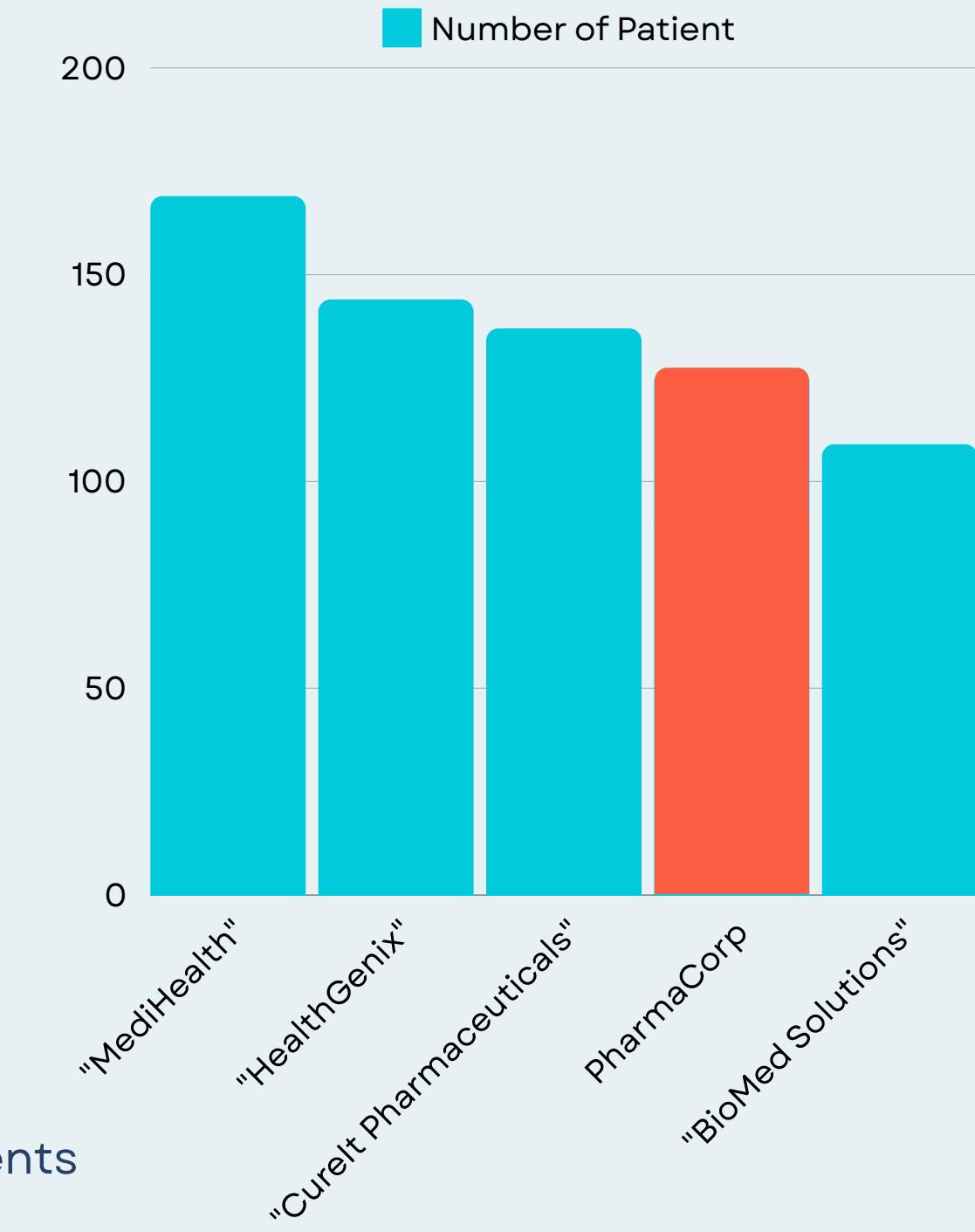
	pharma_patients	bigint
1		127

* Number of patients being treated by an alternative company:

	non_pharma_patients	bigint
1		873

PharmaCorp currently holds a 12.7% market share, treating 127 patients compared to 873 patients being treated by alternative companies. The leading competitor is MediHealth, serves

Given this competitive landscape, PharmaCorp is evaluating whether acquiring MediHealth would be a strategic move.



PHARMACORP PROFIT



PharmaCorp Profit

pharma_total_profit	🔒
numeric	
5243.12	

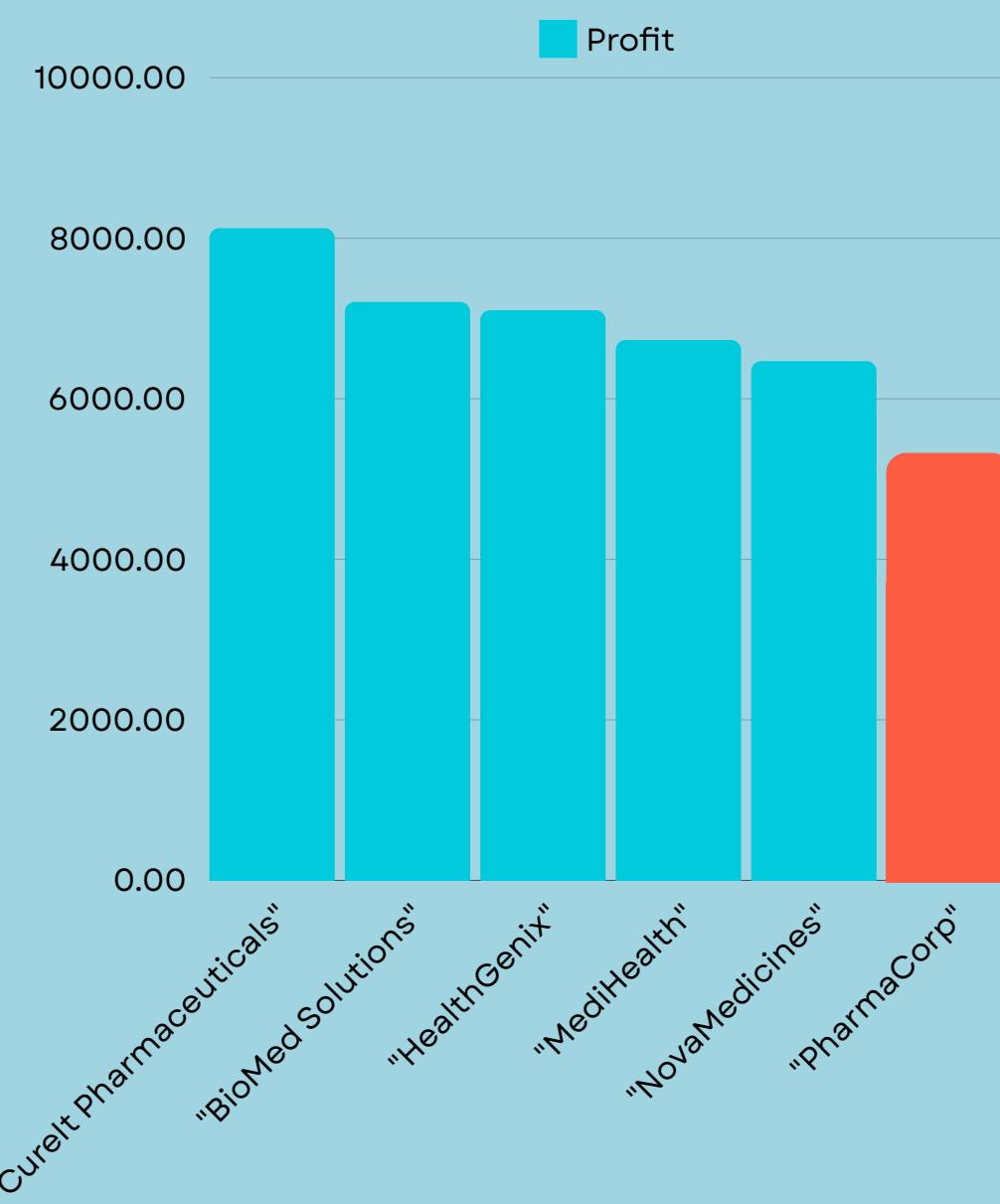


Non PharmaCorp Profit

non_pharma_total_profit	🔒
numeric	
47247.49	

PharmaCorp currently generates \$5,243.12 in total profit, compared to \$47,247.49 generated by competitors. This represents a market profit share of approximately 10%.

The chart shows that competitors like CureIt Pharmaceuticals, BioMed Solutions, and HealthGenix lead the market with significantly higher profits. Given this disparity, PharmaCorp decides to acquire MediHealth to enhance its market position and profitability.



PharmaCorp's Strategic Acquisition of MediHealth

PharmaCorp is facing a database issue after the acquisition due to competing drugs from MediHealth having different names, despite being the same medication.

To resolve this, PharmaCorp wants to standardize drug names across the database, ensuring that all competing drugs acquired through the acquisition appear under the PharmaCorp drug name.

MediHealth

	medicine_id [PK] integer	standard_industry_number character varying (25)	name character varying (250)	company character varying (150)	active_ingredient_name character varying (150)
1	12	SIN10001	Atorvastatin	PharmaCorp	Atorvastatin
2	5	SIN10056	LipidControl	MediHealth	Atorvastatin
3	1	SIN10051	ACE-Hypertenol	PharmaCorp	Enalapril
4	2	SIN10052	HyperBloc	MediHealth	Enalapril
5	7	SIN10058	AllerStop	MediHealth	Loratadine
6	6	SIN10057	AllergyRelief	PharmaCorp	Loratadine
7	4	SIN10054	PainAway	MediHealth	Naproxen
8	3	SIN10053	PainReliefMax	PharmaCorp	Naproxen
9	9	SIN10060	RefluxRelief	MediHealth	Pantoprazole
10	8	SIN10059	AcidEase	PharmaCorp	Pantoprazole
11	10	SIN10061	AsthmaCare	PharmaCorp	Salbutamol
12	11	SIN10062	BreathEasy	MediHealth	Salbutamol

Competitive Medications: PharmaCorp vs. MediHealth



	medicine_id [PK] integer	standard_industry_number character varying (25)	name character varying (250)	company character varying (150)	active_ingredient_name character varying (150)
1	12	SIN10001	Atorvastatin	PharmaCorp	Atorvastatin
2	5	SIN10056	Atorvastatin	PharmaCorp	Atorvastatin
3	1	SIN10051	ACE-Hypertenol	PharmaCorp	Enalapril
4	2	SIN10052	ACE-Hypertenol	PharmaCorp	Enalapril
5	6	SIN10057	AllergyRelief	PharmaCorp	Loratadine
6	7	SIN10058	AllergyRelief	PharmaCorp	Loratadine
7	3	SIN10053	PainReliefMax	PharmaCorp	Naproxen
8	4	SIN10054	PainReliefMax	PharmaCorp	Naproxen
9	8	SIN10059	AcidEase	PharmaCorp	Pantoprazole
10	9	SIN10060	AcidEase	PharmaCorp	Pantoprazole
11	10	SIN10061	AsthmaCare	PharmaCorp	Salbutamol
12	11	SIN10062	AsthmaCare	PharmaCorp	Salbutamol

Updated Outcomes: Reflecting PharmaCorp's Acquisition of MediHealth

Following the acquisition of MediHealth, PharmaCorp has resolved the database issue by standardizing the drug names and updating the outcome table. As shown, all medications now reflect PharmaCorp as the company name, ensuring consistency across the database.

This update eliminates confusion caused by competing drugs with different names and provides a unified view of PharmaCorp's market performance, streamlining data analysis and reporting.

	outcome_id integer	person_id integer	indication_id integer	outcome character varying (30)	outcome_date date	medication_name character varying (250)	company character varying (150)
1	8	7	21	died	2020-12-18	AsthmaCare	PharmaCorp
2	12	11	7	worsened	2020-07-10	PainReliefMax	PharmaCorp
3	24	20	12	recovered	2020-03-28	AllergyRelief	PharmaCorp
4	25	20	12	relapse	2020-07-15	AllergyRelief	PharmaCorp
5	29	24	6	worsened	2022-08-06	PainReliefMax	PharmaCorp
6	30	25	8	died	2021-10-28	PainAway	MediHealth
7	46	39	20	recovered	2022-10-12	AsthmaCare	PharmaCorp
8	47	39	20	relapse	2023-02-17	AsthmaCare	PharmaCorp
9	71	57	15	worsened	2022-11-09	AllerStop	MediHealth
10	72	58	23	died	2021-12-17	BreathEasy	MediHealth
11	73	59	13	worsened	2020-07-17	AllergyRelief	PharmaCorp
12	78	63	1	died	2020-05-26	ACE-Hypertenol	PharmaCorp
13	100	83	25	recovered	2022-06-28	Atorvastatin	PharmaCorp
14	102	85	12	died	2021-12-11	AllergyRelief	PharmaCorp
15	136	117	2	worsened	2022-11-15	ACE-Hypertenol	PharmaCorp
16	140	121	16	died	2020-08-31	AcidEase	PharmaCorp
17	155	134	8	recovered	2023-01-03	PainAway	MediHealth
18	156	134	8	relapse	2023-03-12	PainAway	MediHealth
19	168	144	26	died	2023-02-20	Atorvastatin	PharmaCorp
20	176	152	8	died	2020-08-18	PainAway	MediHealth



	outcome_id integer	person_id integer	indication_id integer	outcome character varying (30)	outcome_date date	medication_name character varying (250)	company character varying (150)
1	8	7	21	died	2020-12-18	AsthmaCare	PharmaCorp
2	12	11	7	worsened	2020-07-10	PainReliefMax	PharmaCorp
3	24	20	12	recovered	2020-03-28	AllergyRelief	PharmaCorp
4	25	20	12	relapse	2020-07-15	AllergyRelief	PharmaCorp
5	29	24	6	worsened	2022-08-06	PainReliefMax	PharmaCorp
6	30	25	8	died	2021-10-28	PainReliefMax	PharmaCorp
7	46	39	20	recovered	2022-10-12	AsthmaCare	PharmaCorp
8	47	39	20	relapse	2023-02-17	AsthmaCare	PharmaCorp
9	71	57	15	worsened	2022-11-09	AllergyRelief	PharmaCorp
10	72	58	23	died	2021-12-17	AsthmaCare	PharmaCorp
11	73	59	13	worsened	2020-07-17	AllergyRelief	PharmaCorp
12	78	63	1	died	2020-05-26	ACE-Hypertenol	PharmaCorp
13	100	83	25	recovered	2022-06-28	Atorvastatin	PharmaCorp
14	102	85	12	died	2021-12-11	AllergyRelief	PharmaCorp
15	136	117	2	worsened	2022-11-15	ACE-Hypertenol	PharmaCorp
16	140	121	16	died	2020-08-31	AcidEase	PharmaCorp
17	155	134	8	recovered	2023-01-03	PainReliefMax	PharmaCorp
18	156	134	8	relapse	2023-03-12	PainReliefMax	PharmaCorp
19	168	144	26	died	2023-02-20	Atorvastatin	PharmaCorp
20	176	152	8	died	2020-08-18	PainReliefMax	PharmaCorp

PHARMACORP MARKET SHARE

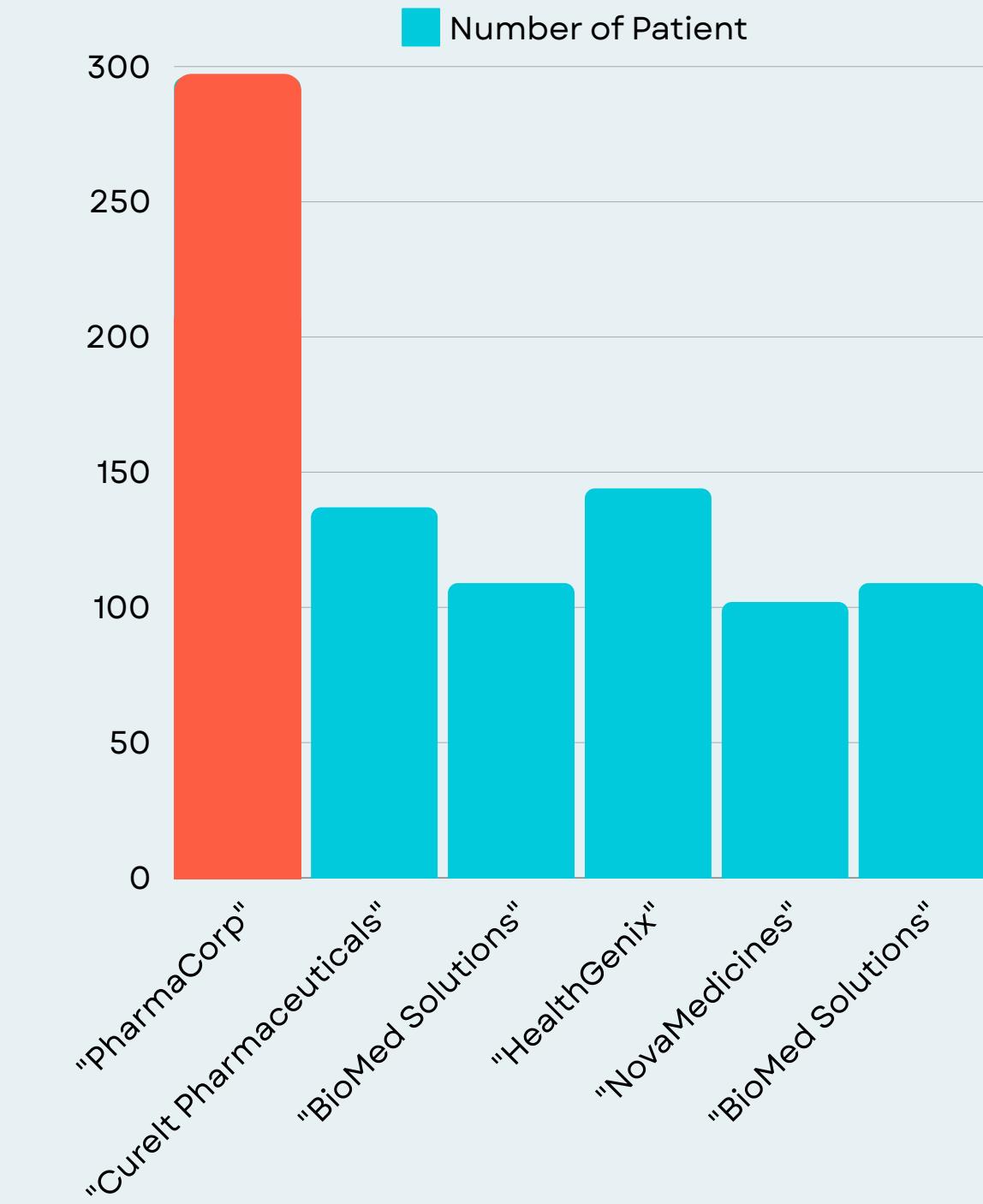
* New Number of patients being treated by PharmaCorp:

pharma_patients	bigint
	296

* New Number of patients being treated by an alternative company:

non_pharma_patients	bigint
	704

Following the acquisition of MediHealth, PharmaCorp's market share has seen a noticeable shift. The number of patients being treated by PharmaCorp has increased significantly to 296, compared to the 127 patients before the acquisition. This shows a marked growth in PharmaCorp's share of the market, signaling a successful integration of MediHealth's patients.



PHARMACORP PROFIT



New PharmaCorp Profit

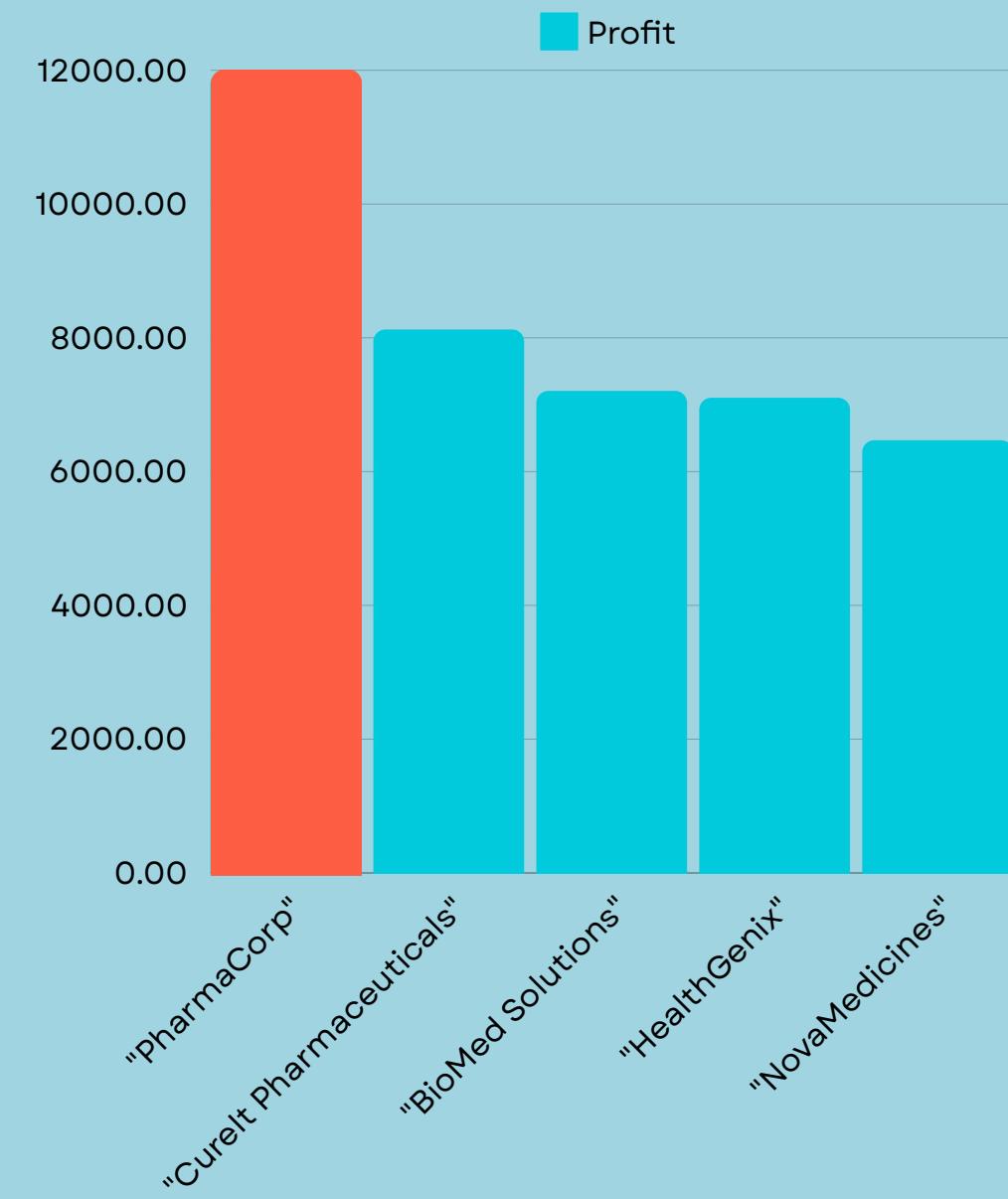
pharma_total_profit	🔒
numeric	
11975.02	



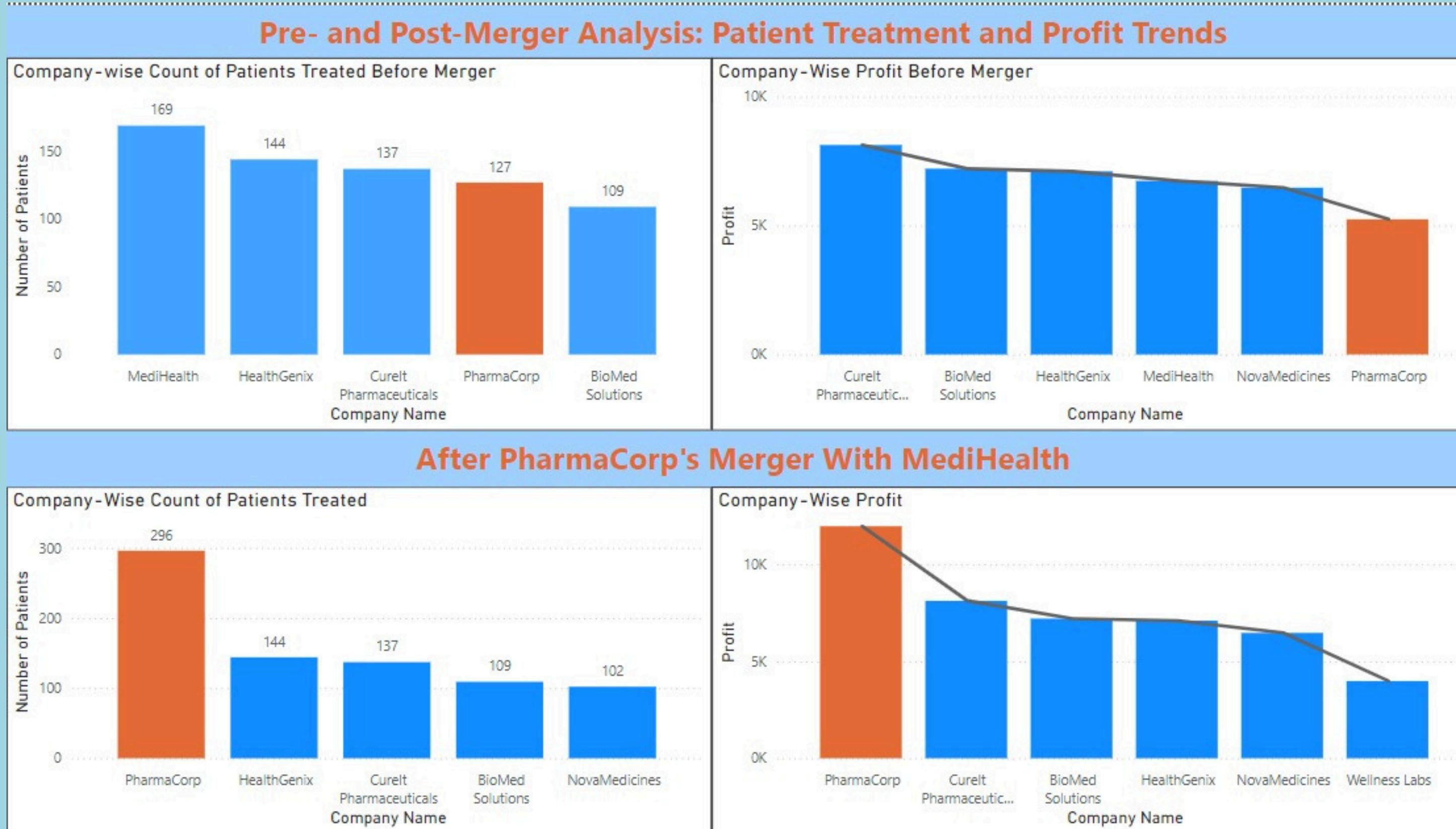
New Non PharmaCorp Profit

non_pharma_total_profit	🔒
numeric	
40515.59	

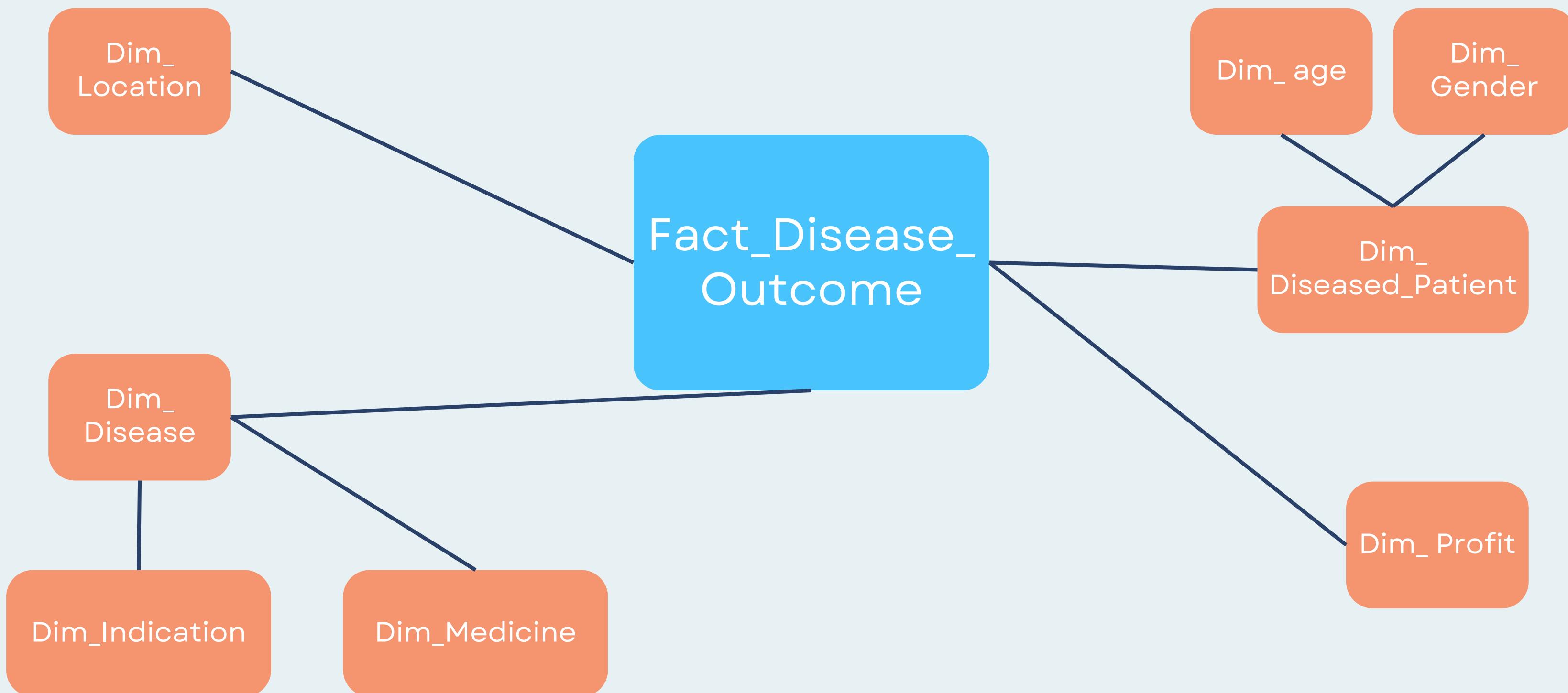
After the acquisition of MediHealth, PharmaCorp's profit has increased significantly to \$11,975.02, reflecting the larger patient base and integration of MediHealth's market. In comparison, the profit from non-PharmaCorp companies is \$40,515.59, demonstrating a noticeable difference in profitability between PharmaCorp and its competitors.



PHARMACORP ACQUISITION DASHBOARD



Introducing Our Data Warehouse (Outcome)



Introducing Our Data Warehouse (Intensity)



Disease Intensity Levels by Year

To assess which diseases PharmaCorp should focus their research on, they analyzed the intensity levels for various diseases over the years 2020 to 2022. This analysis helped PharmaCorp determine if there have been any significant changes in the intensity of diseases, which could signal a need for further treatment research or development. The table shows no change in intensity levels across the diseases analyzed from 2020 to 2022.

	year integer	disease_name character varying (100)	intensity_level integer
7	2020	Lung Cancer	10
8	2020	Pneumonia	8
9	2020	Pulmonary Tuberculosis	9
10	2020	Type 2 Diabetes	8
11	2021	Alzheimer's Disease	9
12	2021	COVID-19	7
13	2021	Cholera	7
14	2021	Chronic Bronchitis	9
15	2021	Hemorrhagic Stroke	9
16	2021	Ischemic Heart Disease	10
17	2021	Lung Cancer	10
18	2021	Pneumonia	8
19	2021	Pulmonary Tuberculosis	9
20	2021	Type 2 Diabetes	8
21	2022	Alzheimer's Disease	9
22	2022	COVID-19	7
23	2022	Cholera	7
24	2022	Chronic Bronchitis	9
25	2022	Hemorrhagic Stroke	9
26	2022	Ischemic Heart Disease	10
27	2022	Lung Cancer	10
28	2022	Pneumonia	8
29	2022	Pulmonary Tuberculosis	9
30	2022	Type 2 Diabetes	8

Identifying the Costliest and Least Effective Drug

	fact_disease	disease_name	age_range	gender	country_name	recovered_count	worsened	died_count	relapsed_c	effectiveness	avg_cost_per	overall_avg_c	avg_profit
	integer	character varying (100)	character varying (20)	character (1)	character varying (100)	integer	integer	integer	integer	numeric (10,2)	numeric (10,2)	numeric (10,2)	numeric (10,2)
1	748	COVID-19	61-70	F	UK	1	0	0	0	100.00	149.12	70.46	64.26
2	51	Lung Cancer	61-70	M	India	1	0	0	0	100.00	144.66	70.46	31.66
3	792	Hemorrhagic Stroke	31-40	M	UK	1	0	0	0	100.00	144.10	70.46	35.48
4	140	Alzheimer's Disease	41-50	M	Germany	1	0	0	0	100.00	143.88	70.46	49.82
5	150	Alzheimer's Disease	61-70	M	Australia	1	0	0	0	100.00	143.88	70.46	49.82

	fact_dise	disease_name	age_range	gender	recovered_count	worsened_count	died_count	relapsed_count	effectiveness	avg_cost_per_drug	overall_avg_cost	avg_profit
	integer	character varying (100)	character varying (20)	character (1)	integer	integer	integer	integer	numeric (10,2)	numeric (10,2)	numeric (10,2)	numeric (10,2)
1	133	COVID-19	11-20	F	0	0	1	0	0.00	107.34	70.46	31.94
2	136	COVID-19	41-50	M	0	4	2	0	0.00	103.51	70.46	38.74
3	71	Cholera	51-60	M	0	0	3	0	0.00	99.08	70.46	60.96
4	132	COVID-19	11-20	M	0	3	2	0	0.00	97.69	70.46	56.37
5	93	Ischemic Heart Disease	0-10	M	0	1	3	0	0.00	97.15	70.46	47.49

Given that there were no significant changes in the intensity levels of diseases, PharmaCorp decided to shift focus and analyze treatment success across different age ranges, genders, and countries.

After conducting the analysis, PharmaCorp discovered that COVID-19 was the least cost-effective drug to treat, as it had the highest development cost among the diseases they had no effective treatment for. This prompted PharmaCorp to exclude location as a factor in their analysis and determine if this trend was consistent across all countries.

Upon further investigation, they found that COVID-19 appeared in 3 out of the top 5 spots for the least cost-effective diseases to treat, emphasizing the high costs associated with its treatment compared to other diseases.



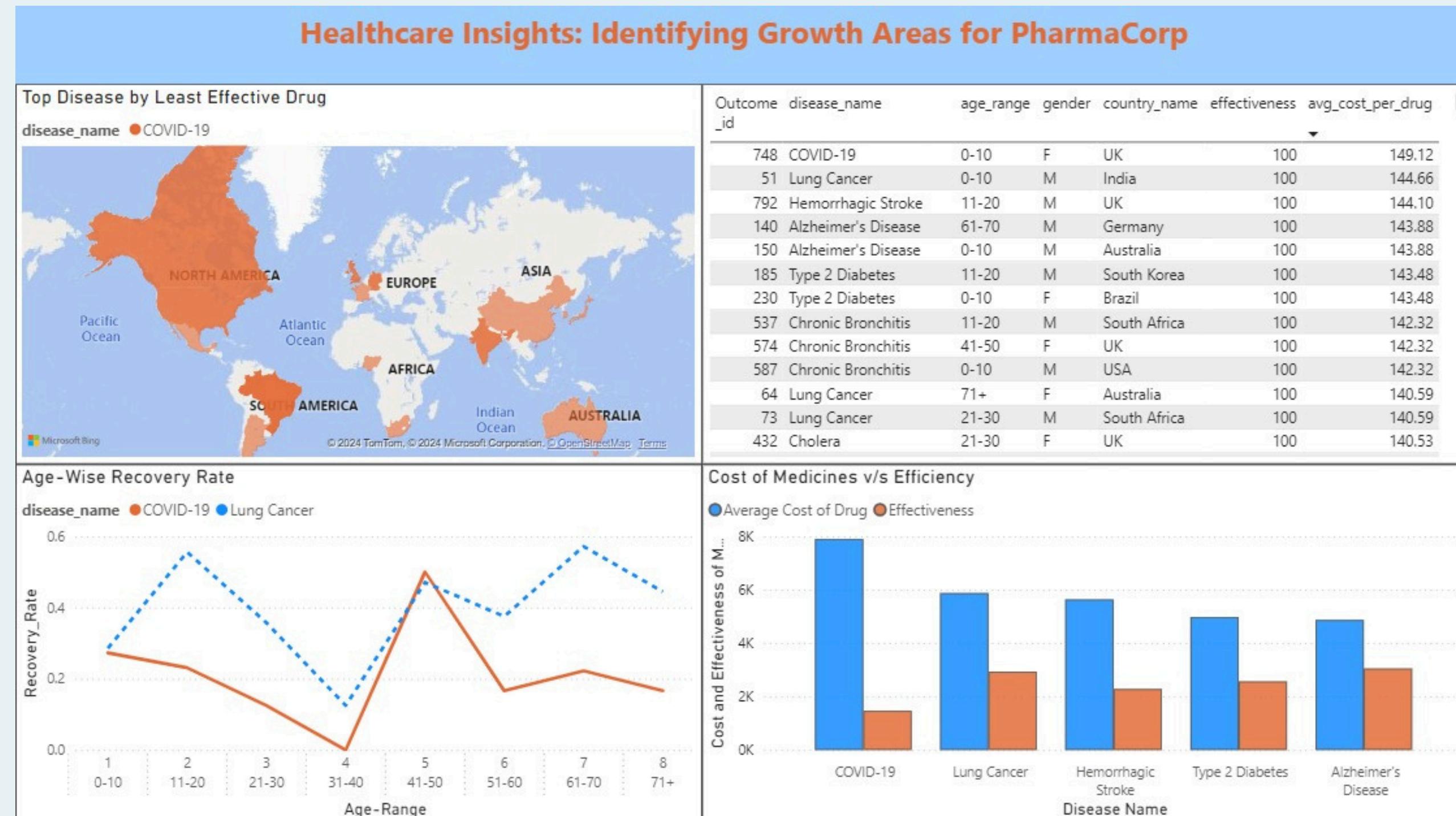
Disease Intensity Levels For 2023

After reviewing the disease intensity levels for 2023, PharmaCorp noticed a significant change in COVID-19. In 2022, COVID-19 had an intensity level of 7, but by 2023, it had increased to 9. This shift in intensity confirmed that COVID-19 had become one of the most urgent diseases to focus on.

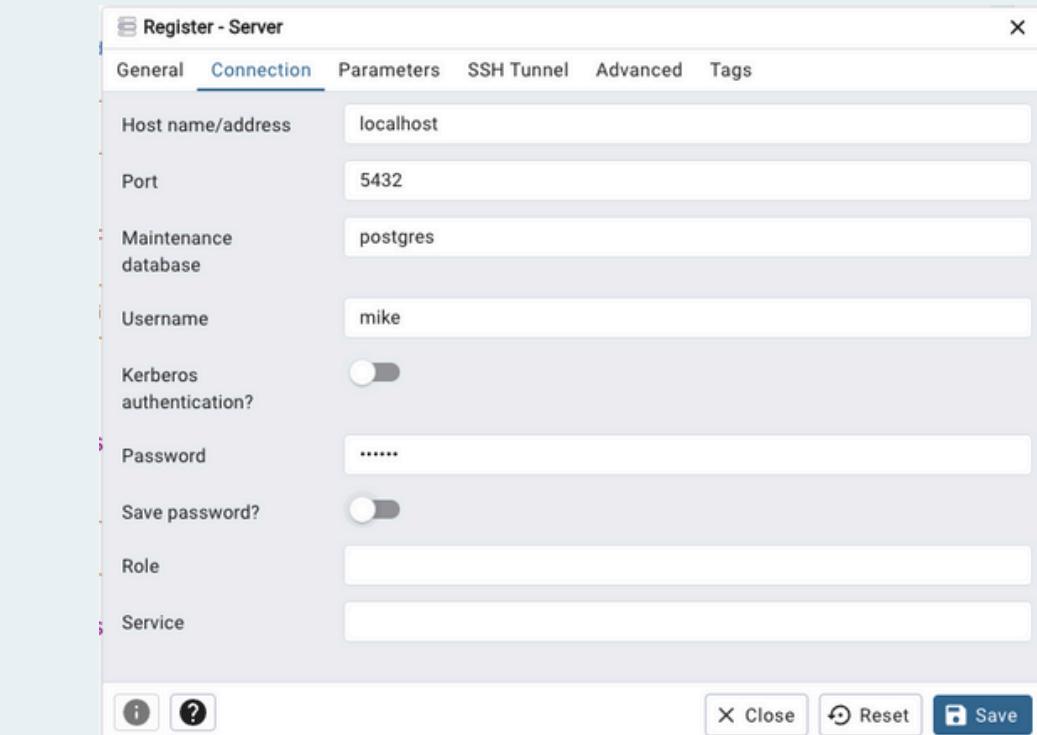
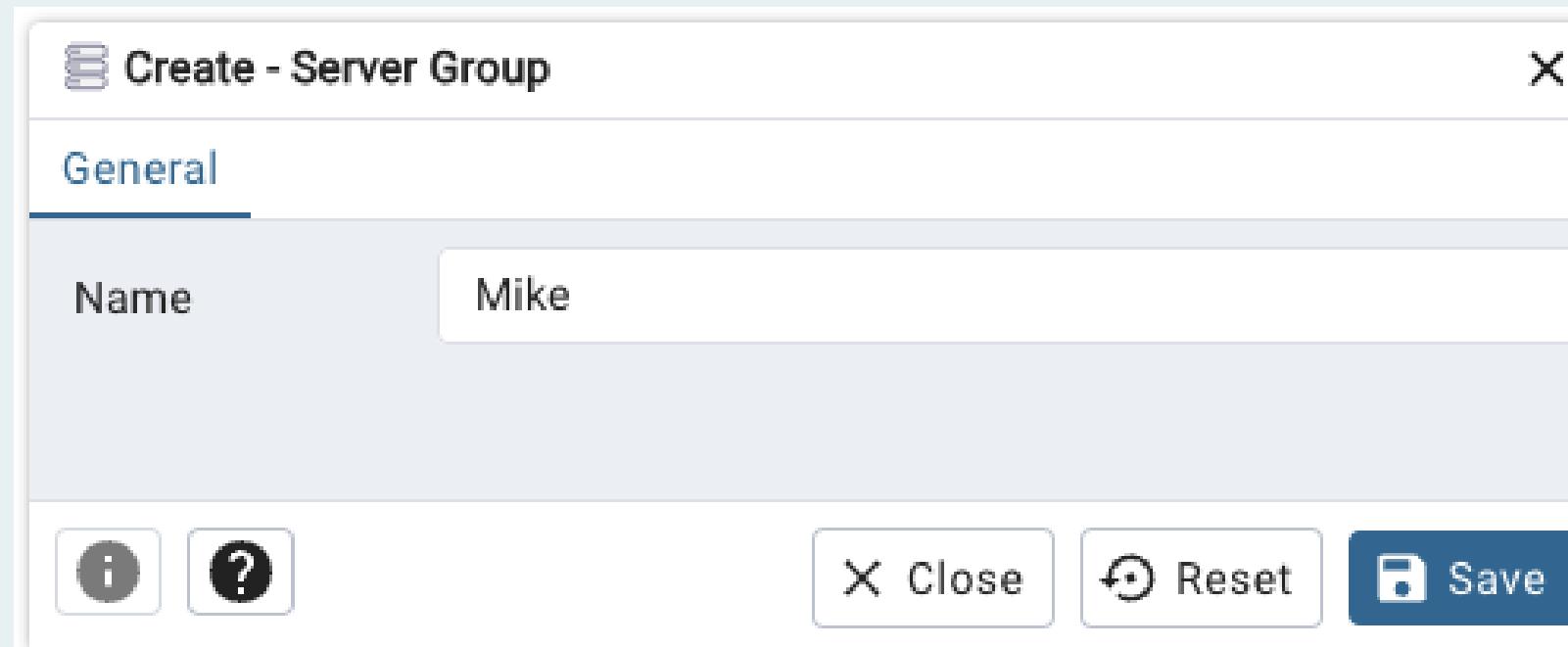
Given this increase in intensity, PharmaCorp decided to prioritize COVID-19 treatment development, directing more resources to research and solutions for this disease, as its heightened intensity and its widespread impact make it a key area for focus and investment.

	fact_disease_intensity_id integer	year integer	disease_name character varying (100)	intensity_level integer
1	22	2022	Alzheimer's Disease	9
2	29	2022	COVID-19	7
3	25	2022	Cholera	7
4	27	2022	Chronic Bronchitis	9
5	30	2022	Hemorrhagic Stroke	9
6	26	2022	Ischemic Heart Disease	10
7	21	2022	Lung Cancer	10
8	24	2022	Pneumonia	8
9	28	2022	Pulmonary Tuberculosis	9
10	23	2022	Type 2 Diabetes	8
11	32	2023	Alzheimer's Disease	9
12	39	2023	COVID-19	9
13	35	2023	Cholera	7
14	37	2023	Chronic Bronchitis	9
15	40	2023	Hemorrhagic Stroke	9
16	36	2023	Ischemic Heart Disease	10
17	31	2023	Lung Cancer	10
18	34	2023	Pneumonia	8
19	38	2023	Pulmonary Tuberculosis	9
20	33	2023	Type 2 Diabetes	8

Cost Effectiveness Dashboard



Create Doctor Server- Doctor Mike



In this slide, we demonstrate the process of creating a server connection for a Doctor role.

First, a server is created by registering a Doctor Mike server with specific connection parameters, including host details, username, and password. After the server is set up, access is granted to the Doctor role, allowing them to execute queries on the database.

Once access is provided, Doctor Mike is able to run queries to view the medical records data.

person_id	last_name	first_name	gender	age	country_name	is_insured	disease	medication_name	severity_value	start_date	end_date
1	Garcia	David	M	58	Canada	true	Ischemic Heart Disease	Aspirin	10	2020-12-12	2020-12-2
2	Martinez	Sophia	F	45	France	false	Ischemic Heart Disease	Nitroglycerin	6	2022-06-12	2023-02-0
3	Martinez	Sophia	F	45	France	false	Ischemic Heart Disease	Nitroglycerin	6	2022-06-12	2023-02-0
4	Johnson	Emily	M	65	India	false	Cholera	Azithromycin	6	2021-07-06	2021-08-0
5	Smith	Matthew	M	93	South Korea	true	Pulmonary Tuberculosis	Rifampicin	4	2022-01-01	2022-11-0
6	Davis	Michael	F	28	Australia	false	Cholera	Tacrine	5	2021-11-18	2021-12-0
7	Martinez	Daniel	M	56	USA	true	Lung Cancer	Gefitinib	1	2022-03-05	2022-03-2
8	Smith	Daniel	F	31	India	false	Pneumonia	AsthmaCare	2	2020-04-15	2021-04-0
9	Davis	Emily	F	82	USA	true	COVID-19	Molnupiravir	4	2022-07-10	2022-09-1
10	Martinez	Michael	F	35	Brazil	false	COVID-19	Zinc Sulfate	3	2020-01-12	2020-12-0

Comprehensive Patient Information Overview for Doctor Records

In this slide, we showcase a Comprehensive Patient Information View that is accessible to users with the Doctor role. This view includes key patient details such as person_id, last name, first name, gender, age, disease name, severity value, treatment dates, and insurance status. The doctor role is granted access to this view, ensuring that only authorized healthcare professionals can view sensitive patient records.



	person_id [PK] integer	last_name character varying (50)	first_name character varying (50)	gender character (1)	primary_location_id integer	age integer	disease_id integer	severity_value integer	start_date date	end_date date	is_insured boolean
1	1	Garcia	David	M	6	58	1	10	2020-12-12	2020-12-22	true
2	2	Martinez	Sophia	F	13	45	1	6	2022-06-12	2023-02-07	false
3	3	Johnson	Emily	M	25	65	9	6	2021-07-06	2021-08-02	false
4	4	Smith	Matthew	M	18	93	6	4	2022-01-01	2022-11-05	true
5	5	Davis	Michael	F	11	28	9	5	2021-11-18	2021-12-01	false
6	6	Martinez	Daniel	M	3	56	5	1	2022-03-05	2022-03-27	true
7	7	Smith	Daniel	F	25	31	3	2	2020-04-15	2021-04-01	false
8	8	Davis	Emily	F	5	82	10	4	2022-07-10	2022-09-14	true
9	9	Martinez	Michael	F	21	35	10	3	2020-01-12	2020-12-02	false
10	10	Johnson	Jane	F	3	83	7	7	2021-11-24	2022-02-18	true
11	11	Williams	Emma	F	17	66	1	3	2020-05-11	2020-09-04	false
12	12	Martinez	Michael	F	1	69	6	8	2020-08-10	2021-04-30	false
13	13	Jones	Emily	F	14	65	7	7	2021-09-06	2021-10-20	false
14	14	Rodriguez	Olivia	M	27	14	6	2	2020-01-11	2020-11-06	true
15	15	Garcia	John	F	20	27	1	7	2021-06-03	2022-03-03	true
16	16	Brown	John	M	9	54	5	1	2021-07-20	2022-04-26	true
17	17	Brown	Matthew	F	22	52	6	8	2021-02-08	2022-02-03	false
18	18	Miller	Olivia	F	28	45	3	2	2021-12-26	2022-12-22	true
19	19	Rodriguez	Sophia	M	7	26	3	4	2020-05-02	2021-02-02	false
20	20	Davis	Olivia	F	3	29	2	8	2020-01-19	2020-05-06	true
21	21	Rodriguez	Sophia	M	12	40	6	7	2021-09-03	2022-01-03	false
22	22	Miller	Emily	F	25	13	3	5	2021-04-03	2021-12-31	true
23	23	Davis	Jane	F	1	72	3	6	2020-07-05	2020-09-08	true

Create Patient Server- Patient

David

Create - Server Group

General

Name



Register - Server

General Connection Parameters SSH Tunnel Advanced Tags

Host name/address

Port

Maintenance database

Username

Kerberos authentication?

Password

Save password?

Role

Service



In this slide, we demonstrate the process of creating a Patient Server for David Garcia. The server is registered with the connection details such as host address, port, and password. After configuring the connection and setting the Patient role, David Garcia is able to connect to the database and execute queries.

The screenshot shows David accessing the Patient Server. From this server, David can run queries to view relevant patient data, such as the Medical Records associated with his role. This ensures that patient-specific data is securely accessed and displayed according to the role-based permissions set for David Garcia as a Patient.

```
1 SELECT set_patient_context(1);
2 SET ROLE patient;
3 SELECT
4     o.person_id,
5     dp.last_name,
6     dp.first_name,
7     dp.gender,
8     dp.age,
9     l.country_name,
10    dp.is_insured,
11    d.disease_name AS disease,
12    m.name AS medication_name,
13    dp.severity_value,
14    dp.start_date,
15    dp.end_date
16 FROM
17    diseased_patient dp
18    LEFT JOIN location_l ON dp.primary_location_id = l.location_id
19    LEFT JOIN disease d ON dp.disease_id = d.disease_id
20    LEFT JOIN outcome o ON dp.person_id = o.person_id
21    LEFT JOIN indication i ON o.indication_id = i.indication_id
22    LEFT JOIN medicine m ON i.medicine_id = m.medicine_id
23 WHERE
24    dp.person_id = current_setting('app.current_person_id')::INT;
```

Showing rows: 1 to 1 Page No: 1 of 1 | < > << >> |

Comprehensive Patient Information Overview for Patient Records

	person_id	last_name	first_name	city_name	age	gender	disease_name	severity_value	start_date	end_date	is_insured
	integer	character varying (50)	character varying (50)	character varying (100)	integer	character	character varying (100)	integer	date	date	boolean
1	1	Garcia	David	Toronto	58	M	Ischemic Heart Disease	10	2020-12-12	2020-12-22	true



In this slide, we demonstrate how Row-Level Security (RLS) allows a patient to view only their own records. With RLS enabled, the system ensures that David Garcia can access and view only his personal information, such as his name, disease name (Ischemic Heart Disease), severity value, and other relevant medical details like start and end dates and insurance status.

AWS Architecture & Process



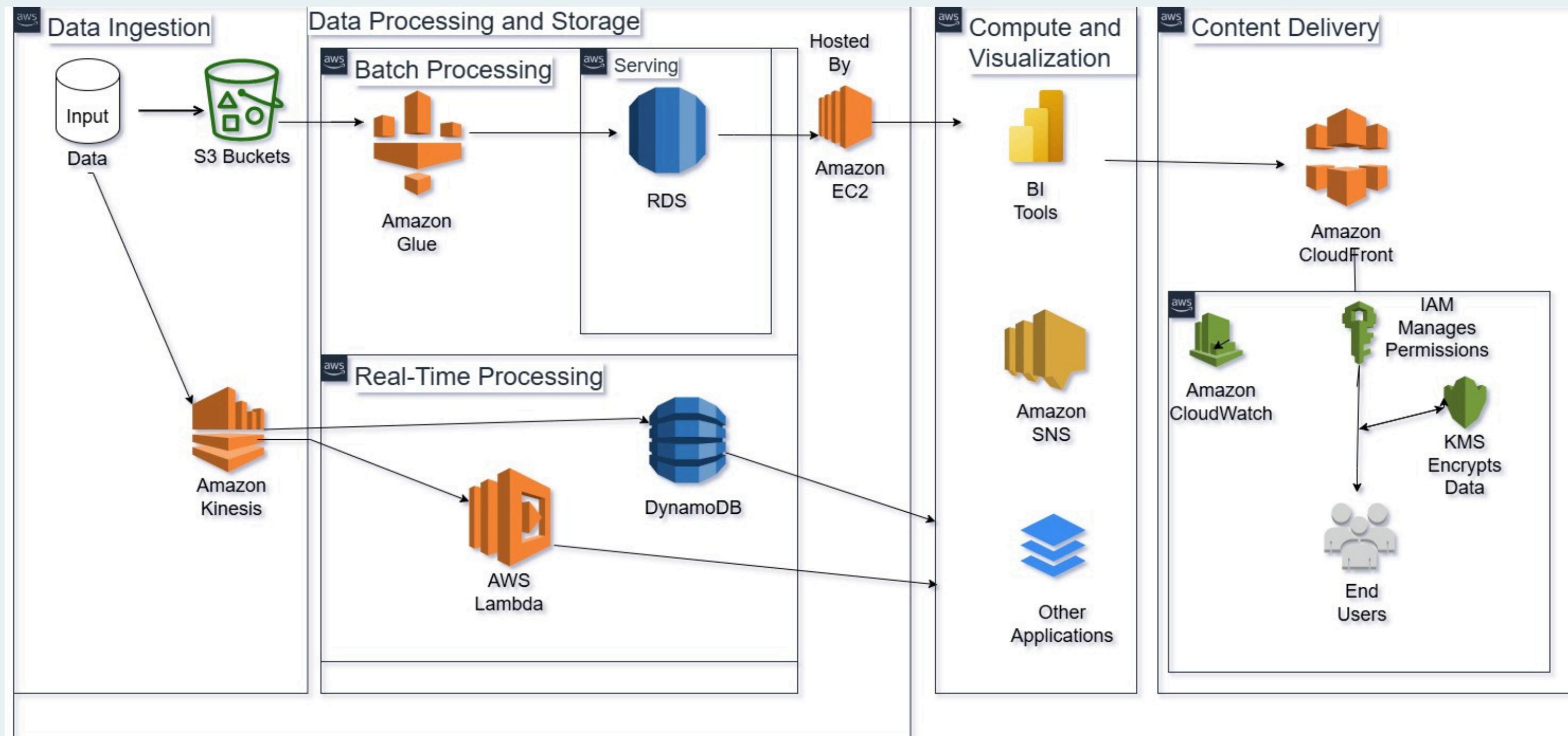
Amazon RDS for relational and Amazon DynamoDB for NOSQL, and hosted in Amazon EC2

Data Backups stored in Amazon S3, Amazon CloudWatch would be used for monitoring, and AWS KMS for encryption and access security using AWS IAM

Batch and real-time loading will use lambda architecture, and streams Amazon Kinesis and AS lambda. For batch loading we will use AWS Glue for ELT and Amazon S3 for staging the data.

For resilience : our databases will be in different availability zones. Amazon Cloudfront and Elastic Load Balancer will aid in higher performance.

AWS Architecture

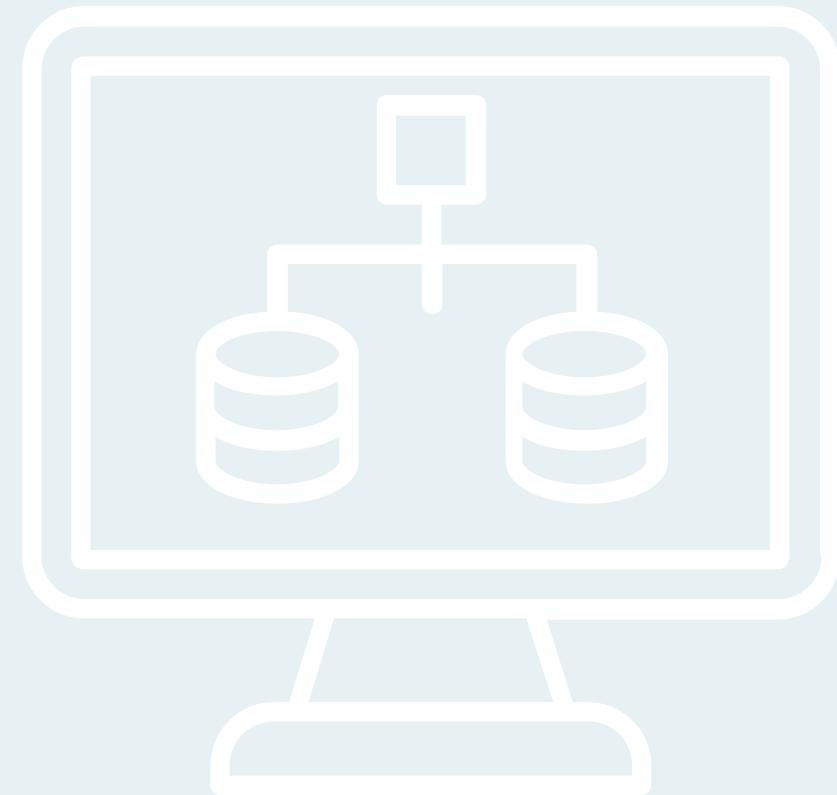


Comparing Relational vs NoSQL Model

Nonrelational : would have tables be a collection of documents with succinct fields,
Relationships would be handled by embedding related data in documents and ID lookups

Relational : data stored in normalized tables and foreign keys enforce relationships

Difference : nonrelational is more flexible (fast and quicker to change), while the relational provides data integrity



Reasons to use Snowflake over PostgreSQL

Scalability : computing and storage are separate, allowing for easier adjustments

Performance : automatic optimization for queries (helps for execution) and automatic clusters (helps with complex queries)

Data Sharing : the sharing is secure and is crucial for a large organization

Ease of Use: the infrastructure being managed reduces administrative tasks

Integration: works with JSON, Avro and Parquet, helping with data handling



Conclusion

PharmaCorp's \$3,000 acquisition of MediHealth secures its industry leadership.

Our analysis highlights COVID-19 as the least cost-effective treatment and rising COVID-19 severity (from 7 to 9). PharmaCorp will focus on improving COVID-19 treatment and making it more cost effective.

We've also developed a secure patient information view, ensuring seamless access for doctors and privacy for patients.

