Part A – Questions

Financial-Focused Questions:
- How much revenue is made from different types of procedures and what are the trends of revenue and cost?
- How much total revenue and profit is made by procedure type per year?
- How much total revenue and profit is made by specialization type per year?
- Are certain clinics or facility types creating more profit? Does this vary over time?
- Does this revenue and profit by procedure type or specialization vary by clinic city or region?
- Are certain physicians creating more profit? Are there patterns over time?
- Does this revenue and profit vary by Health Insurance type over time? by Health Insurance Company?
- Does this revenue and profit by procedure type or specialization vary by patient age group?
- Are there any trends between revenue and cost for certain procedures? Do lower cost procedures have higher profit or revenue? Are there any correlations or patterns?
- Are certain months more profitable or less profitable when compared year-to-year?
- Is Kaiser more profitable over time, year after year?
- What are the highest cost procedures?

Patient-Focused Questions:
- What are some patterns of patient waiting times by location and type of procedure?
- Are there trends or patterns for average patient waiting times per month when compared year-to-year?
- What are average patient waiting times each year by CA region? By county? By city?
- What are average patient waiting times each year by clinic?
- What are average patient waiting times each year by physician?
- Are patient waiting times longer for longer procedures?
- What are average patient waiting times each year times by procedure type?
- Are patient waiting times longer for higher cost proecures?
- What are average patient waiting times each year times by specialization?
- What was the average patient age group for each clinic?
- What are average patient waiting times each year times by facility type?

- Do the waiting times vary based upon the time of day (morning, afternoon, evening)?
- What are average patient waiting times each year times by patient age group?

Procedure-Focused Questions:
- How do types of procedures performed on patients vary across time, location, and specializations?
- What are the most common procedures this year? By clinic?
- Are certain procedures more frequent during certain months, when compared year-to-year?
- Are certain procedures performed more or less frequently at certain clinics?
- Are certain procedures performed more orless frequently within certain patient age groups?
- Are certain procedures performed more or less frequently at certain facility types?
- Are certain procedures performed more or less frequently in cities, countys or CA regions?
- What percentge of physicians' procedures are within their specialization?
- What are the highest cost procedures and what are their profit margins?
- What are average total procedure times for procedures by physician per year?
- What are average total procedure times for procedures by clinic per year?
- What are average total procedure times for procedures by facility type per year?
- Do certain clinics perform more procedures on the same patients?
- Do patients need to be re-admitted sooner for another procedure for certain procedure types?
- Are there trends where patients need to be re-admitted for another procedure or visit within a short time-frame for certain procedure types at certain clinics? Or with particular physicians? (This could indicate problems with clinic-realted infections or some other procedure-related problems.)
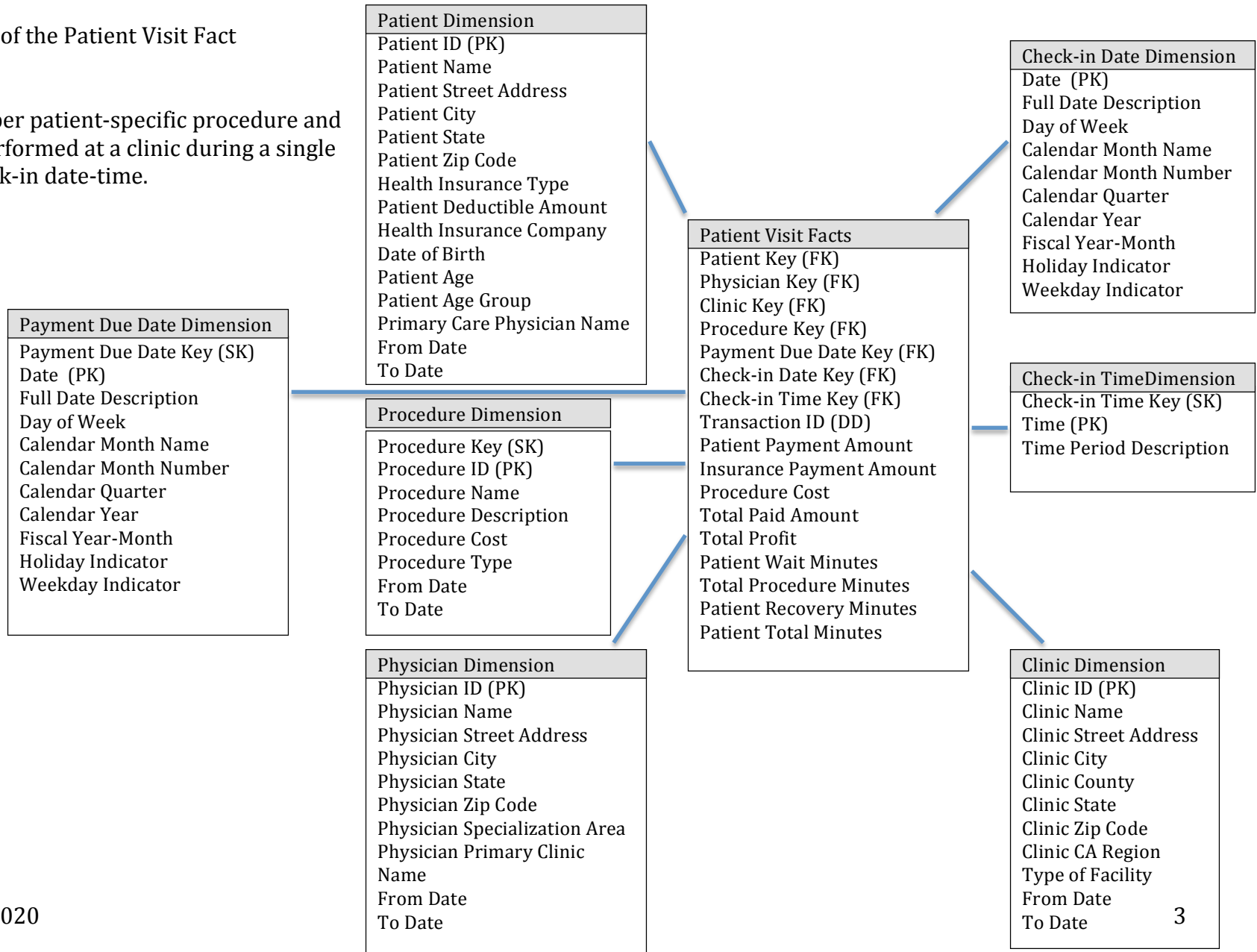
Part B: Star Schema

The grain of the Patient Visit Fact table:

One row per patient-specific procedure and doctor performed at a clinic during a single visit/check-in date-time.

Patient Dimension
Patient ID (PK)
Patient Name
Patient Street Address
Patient City
Patient State
Patient Zip Code
Health Insurance Type
Patient Deductible Amount
Health Insurance Company
Date of Birth
Patient Age
Patient Age Group
Primary Care Physician Name
From Date
To Date

Check-in Date Dimension
Date (PK)
Full Date Description
Day of Week
Calendar Month Name
Calendar Month Number
Calendar Quarter
Calendar Year
Fiscal Year-Month
Holiday Indicator
Weekday Indicator

Payment Due Date Dimension
Payment Due Date Key (SK)
Date (PK)
Full Date Description
Day of Week
Calendar Month Name
Calendar Month Number
Calendar Quarter
Calendar Year
Fiscal Year-Month
Holiday Indicator
Weekday Indicator

Patient Visit Facts
Patient Key (FK)
Physician Key (FK)
Clinic Key (FK)
Procedure Key (FK)
Payment Due Date Key (FK)
Check-in Date Key (FK)
Check-in Time Key (FK)
Transaction ID (DD)
Patient Payment Amount
Insurance Payment Amount
Procedure Cost
Total Paid Amount
Total Profit
Patient Wait Minutes
Total Procedure Minutes
Patient Recovery Minutes
Patient Total Minutes

Procedure Dimension
Procedure Key (SK)
Procedure ID (PK)
Procedure Name
Procedure Description
Procedure Cost
Procedure Type
From Date
To Date

Check-in TimeDimension
Check-in Time Key (SK)
Time (PK)
Time Period Description

Physician Dimension
Physician ID (PK)
Physician Name
Physician Street Address
Physician City
Physician State
Physician Zip Code
Physician Specialization Area
Physician Primary Clinic Name
From Date
To Date

Clinic Dimension
Clinic ID (PK)
Clinic Name
Clinic Street Address
Clinic City
Clinic County
Clinic State
Clinic Zip Code
Clinic CA Region
Type of Facility
From Date
To Date

Part C: Sample Data

Relational Tables

Patient Table

PID	Name	Address	Health Insurance Type	Deductible Amount	Health Insurance Company	Date of Birth	PrimaryCare PhysicianID
123456	Bob Doe	123 A St, Simi Valley, CA 91345	PPO	50	BC	1979-09-23	4589
223456	Jane Smith	44578 Hill St, Pleanton, CA 97345	HMO	10	K	1999-06-10	8764
323456	Carrie Ho	62b Hamm St, Los Angeles, CA 90345	HDHP	1000	UH	1980-04-23	1121
423456	Ted Parker	2293 Erwin St, Woodland Hills, CA 91367	PPO	125	BS	1956-03-10	7732
523456	Billie Bob	405879 Fulton St, San Francisco, CA 92345	HDHP	2000	UH	1972-02-08	8093
623456	Judy Garland	2234 Shattuck Ave, Berkeley, CA 95345	HMO	30	K	1985-08-13	3937
723456	Stacy Ro	6634 Wooded St, Santa Cruz, CA 96345	PPO	75	BA	2010-10-10	8304
823456	Jessie Hill	6673 Seabury St, San Diego, CA 90345	PPO	150	BS	2001-12-31	8203
923456	Hunter Kirkland	131 Redwood St, Redding, CA 99345	HMO	0	K	1963-01-01	7406
999999	Derren Yo	6943 First St, Hermosa Beach, CA 99254	HMO	40	K	1945-05-25	1037

Procedure Table

ProcedureID	Procedure Name	Procedure Description	Cost	Procedure Type
3456	Angioplasty	Open narrowed blood vessels to heart	900	In
2345	Mohs	Remove cancerous cells from skin	150	Out
5674	Sutures	Close a deep and open wound	20	In
9764	Blood Test	Take Samples of Blood for testing	13	Out
5642	Meniscectomy	Remove portion of meniscus cartilage from knee joint	500	In
1245	Abscess drainage	Drain fluid from abscess	15	Out
9646	Appendectomy	Remove appendix	550	In
2346	PET Scan	Image of the brain	50	Out
4568	Hand Tendon Repair	Repair damaged tendons in the hand	60	In
9874	Balloon Endoscopy	Inspect upper and lower gastrointestinal tract	250	In

Physician Table

PhysicianID	Name	Address	Specialization Area	PrimaryClinicID
4589	Gary Kissel	321 B St, Simi Valley, CA 91345	Cardio	185
8764	Ray Mundo	3423 Harp St, Pleanton, CA 97345	Derm	22
1121	Harper Kerry	78d Flute St, Los Angeles, CA 90345	Emerg	45
7732	Shelly Aggie	3245 Sylvan St, Woodland Hills, CA 91367	Endoc	126
8093	Rebecca Taylor	987234 Family St, San Francisco, CA 92345	Orthop	108
3937	Kira Jones	8984 Telegraph Ave, Berkeley, CA 95345	Geriatric	33
8304	Frank Himmel	9876 Oak St, Santa Cruz, CA 96345	Intern	5
8203	Sharpiro Karlin	9987 Seabury St, San Diego, CA 90345	Neuro	65
7406	Jay Good	987 Redwood St, Redding, CA 99345	Hand	160
1037	James Scharf	100 22nd St, Hermosa Beach, CA 99254	Infect	88

Clinic Table

ClinicID	Name	Address	TypeofFacility
185	Mayberry Kaiser	923 Harp St, Mayberry, CA 97345	Family
22	Woodland Hills Kaiser	99245 Sylvan St, Woodland Hills, CA 91367	Sports
45	Hermosa Beach Kaiser	10 2nd St, Hermosa Beach, CA 99254	Urgent
126	Berkeley Kaiser	2984 Telegraph Ave, Berkeley, CA 95345	Chiropractor
108	Redding Kaiser	887 Redwood St, Redding, CA 99345	Rehabilitation
33	San Diego Kaiser	87b Seabury St, San Diego, CA 90345	Skin
5	Simi Valley Kaiser	323 High St, Simi Valley, CA 91345	Urgent
65	San Francisco Kaiser	66 Sourdough St, San Francisco, CA 92345	Urgent
160	Palm Springs Kaiser	99 SunBaker Lane, Palm Springs CA 90345	Urgent
88	Davis Kaiser	16 Oak St, Santa Cruz, CA 96345	Urgent

Visit Table

Transaction ID	Patient ID	Physician ID	Procedure ID	Clinic ID	CheckInDateTime	CheckoutDateTime	ProcedureStartDateTime	ProcedureEndDateTime	Patient Payment Amount	Insurance Payment Amount	Payment Due Date	Treament Description
93846283	123456	4589	3456	185	2019-09-22 10:30:00	2019-09-22 15:30:00	2019-09-22 12:30:00	2019-09-22 14:30:00	250	1250	2019-10-25	penicillin, swelling, redness, pain, tenderness, itching, ice 20 minutes every 2 hours for next 72 hours
92745102	223456	8764	2345	22	2019-10-02 08:30:00	2019-10-02 20:30:00	2019-10-02 15:30:00	2019-10-02 19:30:00	140	1145	2019-11-15	Vicodin, pain in lower back, radiating, intense, numb leg, rest, elevate, drink fluids
34281540	323456	1121	5674	45	2019-12-06 10:15:00	2019-12-06 15:15:00	2019-12-06 11:15:00	2019-12-06 14:45:00	125	375	2020-01-13	Simvastatin, Lisinopril, Aspirin, stress, light-headed, tired, chest pain, change lifestyle, exercise daily for at least 30 minutes, eat mediterranean diet, more fruits and vegetables, less saturated fat
47293215	423456	7732	9764	126	2019-06-28 06:30:00	2019-06-28 16:15:00	2019-06-28 07:55:00	2019-06-28 09:30:00	400	4657	2019-08-02	Levothryoxine, tired, weight gain, hair loss, take daily in morning and do not eat or drink for one hour afterwards, will need to take for life
19275027	523456	8093	5642	108	2019-09-12 05:30:00	2019-09-13 01:30:00	2019-09-12 10:30:00	2019-09-12 15:30:00	1200	6789	2019-10-15	Zithromax, ear pain, intense, take medicine twice a day for 5 days
27640973	623456	3937	1245	33	2019-04-16 05:17:00	2019-04-17 08:00:00	2019-04-16 11:38:00	2019-04-16 15:02:00	300	3200	2019-05-14	Metformin, fainting, eat regularly, avoid sugar
98202000	723456	8304	9646	5	2019-09-21 07:30:00	2019-09-22 01:30:00	2019-09-21 10:30:00	2019-09-21 14:15:00	100	1200	2019-10-30	Lipitor, high cholesterol, take daily
30567826	823456	8203	2346	65	2019-09-21 05:30:00	2019-09-21 20:30:00	2019-09-21 15:30:00	2019-09-21 18:00:00	20	159	2019-11-03	Amlodipine, high blood pressure, take daily, return visit in 6 weeks
65467 2839	923456	7406	4568	160	2019-11-22 09:15:00	2019-11-22 13:15:00	2019-11-22 10:05:00	2019-11-22 11:15:00	20	340	2019-12-28	Amoxicillin, sinus infection lasting over 2 weeks, fever, headache, chest congestion, sinus congestion, wheezing, take twice daily for 10 days
73548 3917	999999	1037	9874	88	2019-09-22 01:30:00	2019-09-23 20:00:00	2019-09-22 05:30:00	2019-09-22 14:25:00	20	429	2019-11-05	Hydrochlorothiazide, high blood pressure, exercise, eat healthy, lose weight

Dimensions:

Patient Dimension

Patient Key	Patient ID	Patient Name	Patient Street Address	Patient City	Patient State	Patient Zip Code	Health Insurance Type	Patient Deductible Amount	Health Insurance Company	Date of Birth	Patient Age	Patient Age Group	Primary Care Physician Name	From Date	To Date
1	123456	Bob Doe	123 A Street	Simi Valley	California	91345	Preferred Provider Organization	50	Blue Cross	1979-09-23	40	Mid-Life	Gary Kissel	01-01-2018	-
2	223456	Jane Smith	44578 Hill Street	Pleanton	California	97345	Health Maintenance Organization	10	Kaiser	1999-06-10	21	Young Adult	Ray Mundo	01-01-2016	-
3	323456	Carrie Ho	62b Hamm Street	Los Angeles	California	90345	High-Deductible Health Plan	1000	United Healthcare	1980-04-23	40	Mid-Life	Harper Kerry	08-01-2018	-
4	423456	Ted Parker	2293 Erwin Street	Woodland Hills	California	91367	Preferred Provider Organization	125	Blue Shield	1956-03-10	64	Older Adult	Shelly Aggie	06-01-2017	-
5	523456	Billie Bob	405879 Fulton Street	San Francisco	California	92345	High-Deductible Health Plan	2000	United Healthcare	1972-02-08	48	Mid-Life	Rebecca Taylor	05-01-2012	-
6	623456	Judy Garland	2234 Shattuck Avenue	Berkeley	California	95345	Health Maintenance Organization	30	Kaiser	1985-08-13	34	Young Adult	Kira Jones	12-02-2017	-
7	723456	Stacy Ro	6634 Wooded Street	Santa Cruz	California	96345	Preferred Provider Organization	75	Blue Anthem	2010-10-10	9	Adolescent	Frank Himmel	03-15-2019	-
8	823456	Jessie Hill	6673 Seabury Street	San Diego	California	90345	Preferred Provider Organization	150	Blue Shield	2001-12-31	18	Teen	Sharpiro Karlin	03-08-2018	-
9	923456	Hunter Kirkland	131 Redwood Street	Redding	California	99345	Health Maintenance Organization	0	Kaiser	1963-01-01	57	Older Adult	Jay Good	04-01-2011	-
10	999999	Derren Yo	6943 First Street	Hermosa Beach	California	99254	Health Maintenance Organization	40	Kaiser	1945-05-25	75	Geriatric	James Scharf	11-03-2000	-

Physician Dimension

Physician Key	Physician ID	Physician Name	Physician Street Address	Physician City	Physician State	Patient Zip Code	Specialization Area	Physician Primary Clinic Name	From Date	To Date
1	4589	Gary Kissel	321 B St	Simi Valley	California	91345	Cardiovascular	Mayberry Kaiser	01-01-2018	-
2	8764	Ray Mundo	3423 Harp St	Pleanton	California	97345	Dermatology	Woodland Hills Kaiser	01-01-2016	-
3	1121	Harper Kerry	78d Flute St	Los Angeles	California	90345	Emergency Medicine	Hermosa Beach Kaiser	08-01-2018	-
4	7732	Shelly Aggie	3245 Sylvan St	Woodland Hills	California	91367	Endocrinology	Berkeley Kaiser	06-01-2017	-
5	8093	Rebecca Taylor	987234 Family St	San Francisco	California	92345	Orthopaedics	Redding Kaiser	05-01-2012	-
6	3937	Kira Jones	8984 Telegraph Ave	Berkeley	California	95345	Geriatric	San Diego Kaiser	12-02-2017	-
7	8304	Frank Himmel	9876 Oak St	Santa Cruz	California	96345	Internal Medicine	Simi Valley Kaiser	03-15-2019	-
8	8203	Sharpiro Karlin	9987 Seabury St	San Diego	California	90345	Neurology	San Francisco Kaiser	03-08-2018	-
9	7406	Jay Good	987 Redwood St	Redding	California	99345	Hand Surgery	Palm Springs Kaiser	04-01-2011	-
10	1037	James Scharf	100 22nd St	Hermosa Beach	California	99254	Infectious Disease	Davis Kaiser	11-03-2000	-

Procedure Dimension

Procedure ID	Procedure Name	Procedure Description	Procedure Cost	Procedure Type	From Date	To Date
3456	Angioplasty	Open narrowed blood vessels to heart	900	InPatient	01-01-2018	-
2345	Mohs	Remove cancerous cells from skin	150	OutPatient	01-01-2016	-
5674	Sutures	Close a deep and open wound	20	InPatient	08-01-2018	-
9764	Blood Test	Take Samples of Blood for testing	13	OutPatient	06-01-2017	-
5642	Meniscectomy	Remove portion of meniscus cartilage from knee joint	500	InPatient	05-01-2012	-
1245	Abscess drainage	Drain fluid from abscess	15	OutPatient	12-02-2017	-
9646	Appendectomy	Remove appendix	550	InPatient	03-15-2019	-
2346	PET Scan	Image of the brain	50	OutPatient	03-08-2018	-
4568	Hand Tendon Repair	Repair damaged tendons in the hand	60	InPatient	04-01-2011	-
9874	Balloon Endoscopy	Inspect upper and lower gastrointestinal tract	250	InPatient	11-03-2000	-

Clinic Dimension

Clinic Key	Clinic ID	Clinic Name	Clinic Street Address	Clinic City	Clinic State	Clinic Zip Code	Clinic CA Region	TypeofFacility	From Date	To Date
1	185	Mayberry Kaiser	923 Harp Street	Mayberry	California	97345	Central California	Family Medicine	01-01-2018	-
2	22	Woodland Hills Kaiser	99245 Sylvan Street	Woodland Hill	California	91367	Southern California	Sports Medicine	01-01-2016	-
3	45	Hermosa Beach Kaiser	10 2nd Street	Hermosa Beach	California	99254	Southern California	Walk-in Urgent Care	08-01-2018	-
4	126	Berkeley Kaiser	2984 Telegraph Avenue	Berkeley	California	95343	Northern California	Chiropractor	06-01-2017	-
5	108	Redding Kaiser	887 Redwood Street	Redding	California	99345	Northern California	Rehabilitation Clinics	05-01-2012	-
6	33	San Diego Kaiser	87b Seabury Street	San Diego	California	90345	Southern California	Skin Care	12-02-2017	-
7	5	Simi Valley Kaiser	323 High Street	Simi Valley	California	91345	Southern California	Walk-in Urgent Care	03-15-2019	-
8	65	San Francisco Kaiser	66 Sourdough Street	San Francisco	California	92345	Northern California	Walk-in Urgent Care	03-08-2018	-
9	160	Palm Springs Kaiser	99 SunBaker Lane	Palm Springs	California	90345	Southern California	Walk-in Urgent Care	04-01-2011	-
10	88	Davis Kaiser	16 Oak Street	Santa Cruz	California	96345	Northern California	Walk-in Urgent Care	11-03-2000	-

Check-in Date Dimension

Check-in Date Key	Date	Full Date Description	Day of Week	Calendar Month Name	Calendar Month Number	Calendar Quarter	Calendar Year	Fiscal Year-Month	Holiday Indicator	Weekday Indicator
20190922	09/22/19	September 22, 2019	Sunday	September	09	Q3	2019	F2019-09	Non-Holiday	Weekend
20191002	10/02/19	October 2, 2019	Wednesday	October	10	Q4	2019	F2019-10	Non-Holiday	Weekday
20191206	12/06/19	December 6, 2019	Friday	December	12	Q4	2019	F2019-12	Non-Holiday	Weekday
20190628	06/28/19	June 28, 2019	Friday	June	06	Q2	2019	F2019-06	Non-Holiday	Weekday
20190912	09/12/19	September 12, 2019	Thursday	September	09	Q3	2019	F2019-09	Non-Holiday	Weekday
20190416	04/16/19	April 16, 2019	Tuesday	April	04	Q2	2019	F2019-04	Non-Holiday	Weekday
20190921	09/21/19	September 21, 2019	Saturday	September	09	Q3	2019	F2019-09	Non-Holiday	Weekend
20190922	09/22/19	September 22, 2019	Sunday	September	09	Q3	2019	F2019-09	Non-Holiday	Weekend
20191122	11/22/19	November 22, 2019	Friday	November	11	Q4	2019	F2019-11	Non-Holiday	Weekday
20190922	09/22/19	September 22, 2019	Sunday	September	09	Q3	2019	F2019-09	Non-Holiday	Weekend

Check-in Time Dimension

Check-in Time Key	Time	Time Period Description
1030	10:30	Mid-Morning
830	8:30	Morning
1015	10:15	Mid-Morning
630	6:30	Early-Morning
530	5:30	Early-Morning
517	5:17	Early-Morning
730	7:30	Early-Morning
530	5:30	Early-Morning
915	9:15	Morning
130	1:30	Middle of Night

MIS 587, Data Warehouse Star Schema Analysis & Design
Kirsten Fure

Payment Due Date Dimension

Payment Due Date Key	Date	Full Date Description	Day of Week	Calendar Month Name	Calendar Month Number	Calendar Quarter	Calendar Year	Fiscal Year-Month	Holiday Indicator	Weekday Indicator
20191025	10/25/19	October 25, 2019	Friday	October	10	Q4	2019	F2019-09	Non-Holiday	Weekday
20191115	11/15/19	November 15, 2019	Friday	November	11	Q4	2019	F2019-10	Non-Holiday	Weekday
20200113	01/13/20	January 13, 2020	Monday	January	1	Q1	2019	F2019-12	Non-Holiday	Weekday
20190802	08/02/19	August 2, 2019	Friday	August	8	Q3	2019	F2019-06	Non-Holiday	Weekday
20191015	10/15/19	October 15, 2019	Tuesday	October	10	Q4	2019	F2019-09	Non-Holiday	Weekday
20190514	05/14/19	May 14, 2019	Tuesday	May	5	Q2	2019	F2019-04	Non-Holiday	Weekday
20191030	10/30/19	October 30, 2019	Wednesday	October	10	Q4	2019	F2019-09	Non-Holiday	Weekday
20191103	11/03/19	November 3, 2019	Sunday	November	11	Q4	2019	F2019-09	Non-Holiday	Weekend
20191228	12/28/19	December 28, 2019	Saturday	December	12	Q4	2019	F2019-11	Non-Holiday	Weekend
20191105	11/05/19	November 5, 2019	Tuesday	November	11	Q4	2019	F2019-09	Non-Holiday	Weekday

Patient Visit Fact Table

Patient Key	Physician Key	Clinic Key	Procedure Key	Check-in Date Key	Check-in Time Key	Payment Due Date Key	Transaction ID	Patient Payment Amount	Insurance Payment Amount	Procedure Cost	Total Paid Amount	Total Profit	Patient Wait Minutes	Total Procedure Minutes	Patient Recovery Minutes	Patient Total Minutes
1	1	1	1	20190922	1030	20191025	93846283	250	1250	900	1500	600	120	120	60	300
2	2	2	2	20191002	830	20191115	92745102	140	1145	150	1285	1135	420	240	60	720
3	3	3	3	20191206	1015	20200113	34281540	125	375	20	500	480	60	210	30	300
4	4	4	4	20190628	630	20190802	47293215	400	4657	13	5057	5044	85	95	405	585
5	5	5	5	20190912	530	20191015	19275027	1200	6789	500	7989	7489	300	300	600	1200
6	6	6	6	20190416	517	20190514	27640973	300	3200	15	3500	3485	381	204	1018	1603
7	7	7	7	20190921	730	20191030	98202000	100	1200	550	1300	750	180	225	675	1080
8	8	8	8	20190922	530	20191103	30567826	20	159	50	179	129	600	150	150	900
9	9	9	9	20191122	915	20191228	654672839	20	340	60	360	300	50	70	120	240
10	10	10	10	20190922	130	20191105	735483917	20	429	250	449	199	240	535	1775	2550

Part D:

ETL Data Transformations:
- Calculate patient age and apply age groupings (based upon patient birthdate and current date) for Patient Dimension.
- Using foreign key PrimaryCarePhysicianID within Patient table, get Physician Name from Physician table.
- Using foreign key PrimaryClinicID within Physician table, get Clinic Name from Clinic table.
- From Clinic Address, separate out street address, city, state, zip code. Spell out California.
- Based upon Clinic Zip Code, put into a pre-defined CA Region (Nothern CA, Central CA, Southern CA, etc…)
- From Patient and Physician address, separate out street address, city, state, zip code. Spell out California.
- Extract the Date from the Check-in Date Time.
- Extract the Time in hours and minutes (hh:mm) from the Check-in Date Time and assign to a Time Category (morning, afternoon, etc…).
- Calculate Total Amount Paid and Total Profit using PatientPaymentAmount, InsurancePaymentAmount and Procedure Cost. Before these calculations, check if there is more than one line item for the same patient, procedure, check-in datetime and clinic and adjust the procedure cost across the transactions according to business rules for multiple doctors. (For example, if there is a surgeon and an anesthesiologist who both work during the procedure and have separate charges, make sure the procedure cost is not doubled for the profit values.)
- Calculate Patient Wait Minutes, Total Procedure Minutes, Patient Recovery Minutes and Patient Total Minutes at Clinic using the date-time stamps for check-in, check-out, procedure start and procedure end date-time stamps.
- Check for any Type II changing dimension attributes in Patient, Physician, Procedure and Clinic tables and when found, create new records and update From and To Dates accordingly.
- Assign and Track Surrogate Keys and Primary Keys.

Assumptions:
- Assuming we base BI reports on either check-in date and/or time or payment due date to analyze financials, waiting times, etc… Based on this assumption, we do not need to store the individual check-out date time, procedure start date time or the procedure end date time in the data warehouse. Instead, we will capture the calculated lag times between these date times and store those as facts in the fact table for anlaysis on waiting times. Confirm with business users.

- Assuming for this assignment that Procedure Cost is inclusive of all related extended costs (physician cost, overhead, paperwork, clinic cost, etc…) and can be used to determine profit.
- Assume Clinic, Physician and Patient Address includes the city, state, zip.
- Assuming that if a Patient changes health insurance, users want to preserve history in the data warehouse, so a Type II Slowly Changing Dimension is being applied and a From Date and To Date are added to the Patient Dimension, so analysis done by insurance company or insurance type can preserve accurate history reporting.
- Assuming that if a Physician changes specializations, users want to preserve history in the data warehouse, so a Type II Slowly Changing Dimenston is being applied and a From Date and To Date are added to the Physician Dimension, so analysis done by specialization can preserve accurate history reporting.
- Assuming that if a Clinic changes location or their type of facility, users want to preserve history in the data warehouse, so a Type II Slowly Changing Dimension is being applied and a From Date and To Date are added to the Clinic Dimension, so analysis done by location or facility type can preserve accurate history reporting.
- Assuming that if a Procedure Cost changes, users want to preserve history in the data warehouse, so a Type II Slowly Changing Dimenston is being applied and a From Date and To Date are added to the Procedure Dimension, so analysis done directly on procedures and their associated costs can be preserved accurately across time.
- Assuming that tracking medications prescribed, symptoms and patient instructions is not necessary for the type of questions management is currently seeking from the data warehouse. (These values are all unformatted within a text field, so would require extra transformation to parse and format consistenly. Check with business users and delve into questions to see if needed.)

**Recommend follow-up discussion with users and mangement to confirm assumptions and address follow-up questions.