

SQUAREML

MACHINE LEARNING IN A BOX

A No-Code SaaS Software Platform

Solution for Healthcare Analytics



Presenter - Balaji Modhagala, CEO SquareML | Dr. Joanne Luciano, Distinguished Professor at UVI

ABOUT US



SquareML is a Software Company and Subsidiary of Sivisoft Inc., Headquartered in New Jersey. Sivisoft was started in 2005. SquareML is a Machine Learning and AI Analytics company developing a **No-Code** SAAS based platform. We have strong solutions team with healthcare domain expertise, including PhDs in Data Science, Practicing Doctors with Data Science that can support and help our customers in their ML/AI journey.



SQUAREML AWS PARTNER NETWORK



- One of the leading cloud technologies companies
- Mature with various tools available for
 - Application development (Jupyter Notebook, Managed ES, Kafka, Cassandra,..)
 - Deployment (Docker, Kubernetes, Sagemaker,...)
 - Managing and monitoring (CloudWatch, CloudTrail, Grafana,..)
- Tremendous amount of technical and marketing support
- Large talent pool available
- Does Technical Architecture Review periodically for Compliance

AWS & SQUAREML PARTNERSHIP



- During Pandemic, we deployed Covid surveillance application for country of St, Vincent.
 - Travel forms
 - Vaccination management
 - PCR testing
- AWS nominated it as the best Covid Solution in LATAM
- Diabetes mobile application for members of Diabetes Association of Trinidad and Tobago and Dominica

AWS, UVI and SQUAREML



- AWS Introduced SquareML to UVI to work on Diabetes Registry
- Dr. Joanne Luciano, Distinguished Professor at UVI along with the many distinguished people from Dept. of Health have been driving the Diabetes Registry passionately.
- Joyce Wesley, Manager, Solutions Architecture (Virgin Islander) has been major supporter of the application
- AWS has allocated USD 87,000 Infra Promotional Credits to UVI for deploying Diabetes Registry
- SquareML is deploying Diabetes registry at country of St. Vincent and the Grenadines.
- AWS and SquareML are waiting for UVI to complete formalities to move forward with POC

DIABETES REGISTRY & REPOSITORY POC



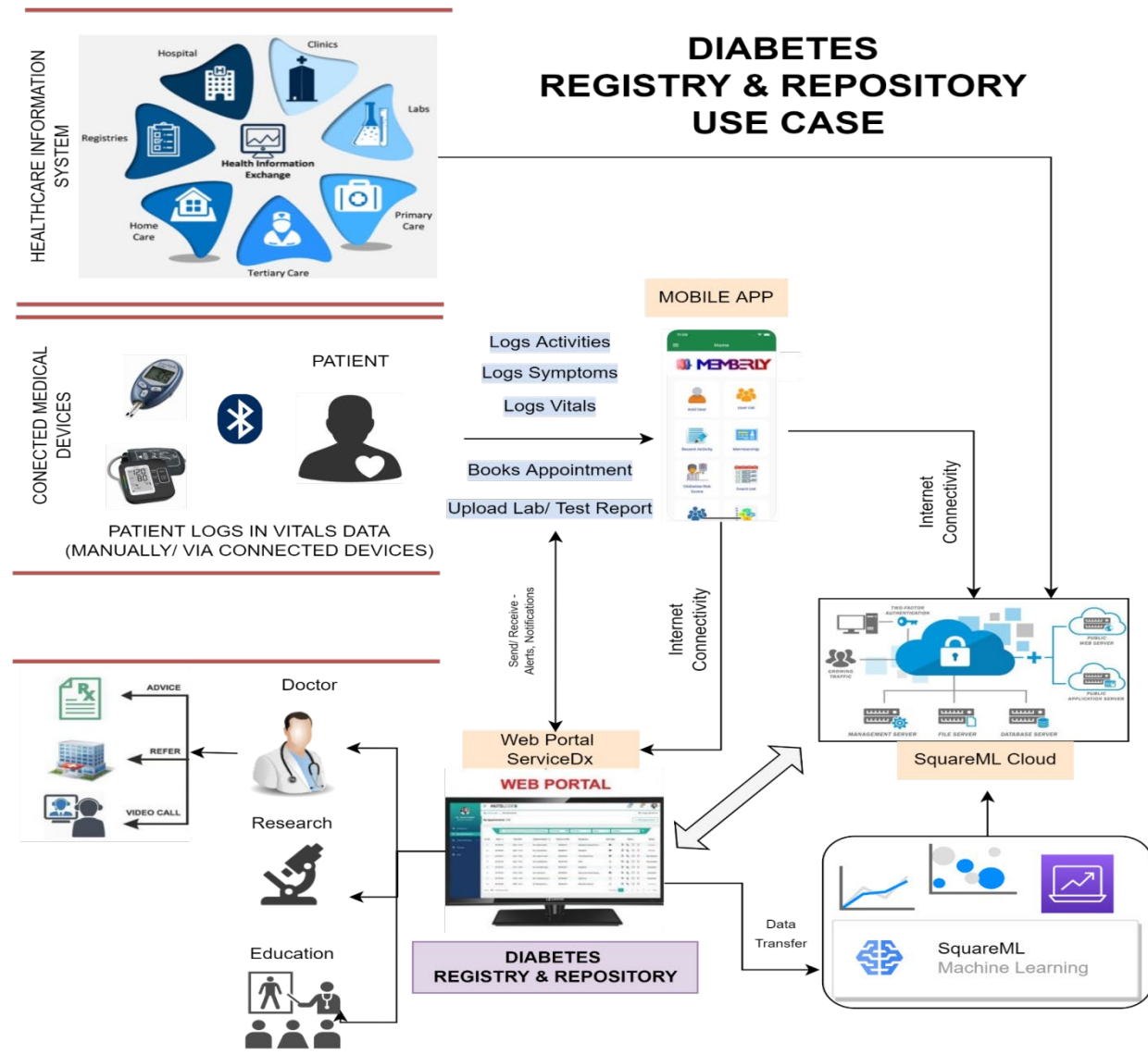
- POC will include the following:
 - Integration with two applications / data sources
 - Multiple user roles
 - Roles based access
- Mobile application for users to register
- POC completion: 120 days

DIABETES REGISTRY & REPOSITORY

As an IoT-enabled, No-Code, ML & AI-based Healthcare solutions provider, SquareML partnering with UVI, to establish a searchable **Chronic Diabetes Registry and Repository**, convert unstructured healthcare data, address inequities in healthcare outcomes, advance health equity, and increase researcher diversity.

THE PROCESS

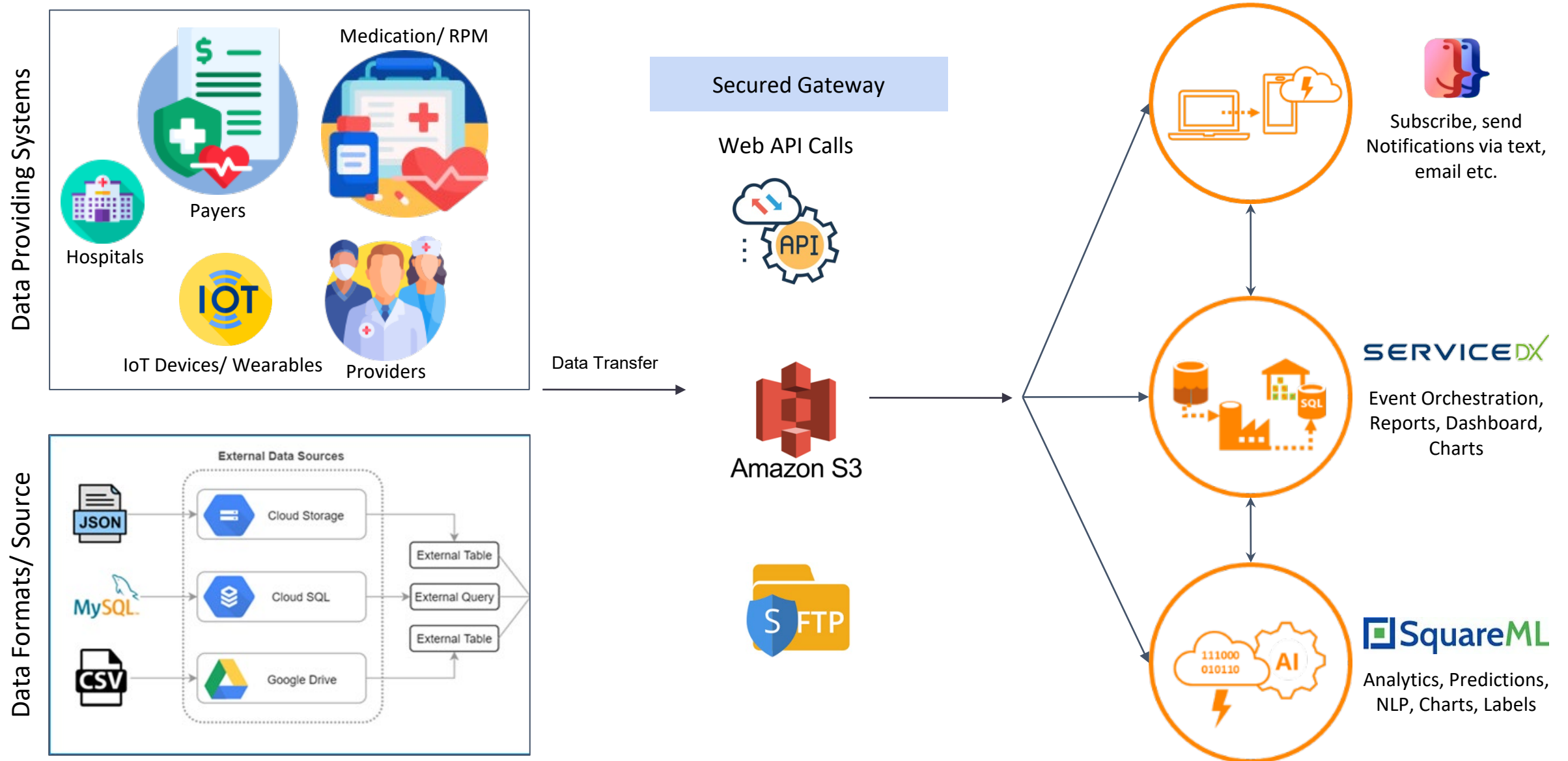
- Integration:** Integrating patient-reported and clinical information from multiple data sources
- Data collection:** Using SquareML, the medical records can be collected and summarized.
- Customization:** SquareML disease registries can customize the unstructured data to be used centrally.



HEALTHCARE SOLUTIONS USING MACHINE LEARNING

- Multiple Data Source Integration (EMRs, Legacy Applications, Excel Worksheets, etc.)
- Digitizing Healthcare (converting paper-based into digital format)
- Natural Language Processing Solutions
- Patient Health Risk Stratification
- Predictive Health Analytics Models

MULTIPLE DATA SOURCE INTEGRATION



DIGITIZING HEALTHCARE

NEW PATIENT REGISTRATION FORM
HILLS PEDIATRICS INC.
613 COURTYARD DR.
HILLSBOROUGH, NJ 08844

Patient Information

Last Name _____ First Name _____
 Birth Date _____ Sex: M F
 Street Address _____
 City _____ State _____ Zip Code _____
 Phone _____

Primary Policy Card Holder Information

Last Name _____ First Name _____
 Birth Date _____ Sex: M F
 Street Address _____
 City _____ State _____ Zip Code _____
 Phone _____ Email _____
 Insurance Name _____
 Policy Number _____ Group Number _____

NOTIFY IN CASE OF EMERGENCY:

NAME _____ PHONE _____

I UNDERSTAND THAT PAYMENT OF ALL MEDICAL CARE IS DUE AT THE TIME OF SERVICE. I UNDERSTAND THAT IT IS MY RESPONSIBILITY TO PAY ANY DEDUCTIBLE, CO-INSURANCE, OR ANY OTHER BALANCE NOT PAID BY MY INSURANCE COMPANY. I UNDERSTAND THAT I AM RESPONSIBLE FOR ANY COSTS INCURRED IN THE COLLECTION OF PATIENTS ACCOUNT IN CASE OF DEFAULT. I HEREBY GRANT PERMISSION TO HILLS PEDIATRICS TO RELEASE ANY PERTINENT INFORMATION TO MY INSURANCE COMPANY UPON REQUEST, AND I ALSO AUTHORIZE PAYMENT DIRECTLY TO HILLS PEDIATRICS. A COPY OF THIS AUTHORIZATION SHALL BE CONSIDERED AS EFFECTIVE AND VALID AS THE ORIGINAL.

Parent Signature _____ Date _____

Sample



Diabetes -- Web Page Dialog

Diabetes

☐ **Symptoms** **Comment**

☐ ☐ Symptoms of hypoglycemia _____

☐ ☐ Symptoms of diabetic complications _____

Frequency of Fingersticks _____

Typical Blood Sugars:

Pre-breakfast _____

Pre-lunch _____

Pre-dinner _____

Bedtime _____

Other _____

Activity/Exercise _____

OK Cancel

Sample

Paper-based forms used by Nurses to capture patient information



Web-based forms for Nurses to input data

NLP & OCR SOLUTIONS SQUAREML

IMAGE ANALYSIS

- Tune & train your own models to improve image quality.
- Optimize accuracy.
- Analyze radiology images like CT scan, MRI scan etc.

DATA DE-IDENTIFICATION

- Reading text to recognize named entities.
- De-identify data – Generate new PDF or documents that highlight these results

RECOGNIZE ENTITIES IN SCANNED PDFs

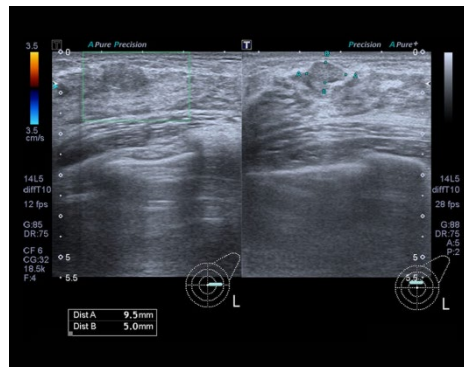
- Import scanned images from cloud storage.
- Preprocess them to recognize text using OCR, recognize clinical entities etc.

EXTRACT DATA FROM IMAGES

- Extract and normalize specific data from custom images and PDFs.

EXTRACT DATA TABLES

- Find tables in images, visually identify rows and columns.
- Extract data from cells into data frames for analysis



Identified Sentence

Patient id 7194334 was examined by Dr. Keith (MD) on Date: 01/13/93.

Deidentified Sentence

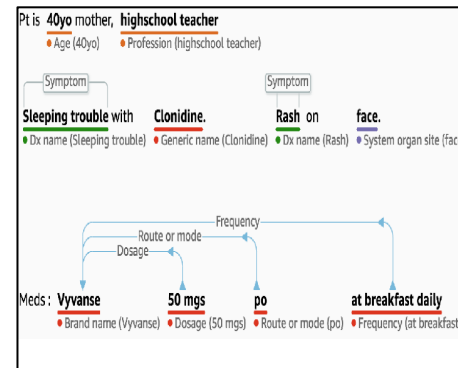
Patient id <MEDICALRECORD> was examined by Dr. <DOCTOR> (MD) on Date: <DATE>.

Entity Recognition

Patient id **7194334** was examined by Dr. **Keith** (MD) on Date: **01/13/93**.

Entity Legend:

- 7194334**: MEDICALRECORD
- Keith**: DOCTOR
- 01/13/93**: DATE



Visit Summary - 4/22/2015

Patient Information		Ref By	
NAME: [REDACTED]	DOB: [REDACTED]	Ref Type: Test Applicable / Name	Ref Type: Test Applicable / Name
DOB: [REDACTED]	Age: 18	# of Ref: [REDACTED]	Ref Reason: [REDACTED]
DOB: [REDACTED]	Age: 18	Ref Reason: [REDACTED]	Ref Reason: [REDACTED]

TESTS	RESULT	FLAG	UNITS
WBC	9.1		x10E3/uL
RBC	5.56		x10E6/uL
Hemoglobin	17.2		g/dL
Hematocrit	48.3		%
MCV	87		fL
MCH	30.9		pg
MCHC	35.6		g/dL
RDW	14.1		%
Platelets	217		x10E3/uL
Neutrophils	73		%
Lymphs	20		%
Monocytes	6		%
Eos	1		%
Basos	0		%
Neutrophils (Absolute)	6.6		x10E3/uL
Lymphs (Absolute)	1.8		x10E3/uL
Monocytes (Absolute)	0.5		x10E3/uL
Eos (Absolute)	0.1		x10E3/uL
Baso (Absolute)	0.0		x10E3/uL
Immature Granulocytes	0		%
Immature Grans (Abs)	0.0		x10E3/uL

Testosterone, Serum

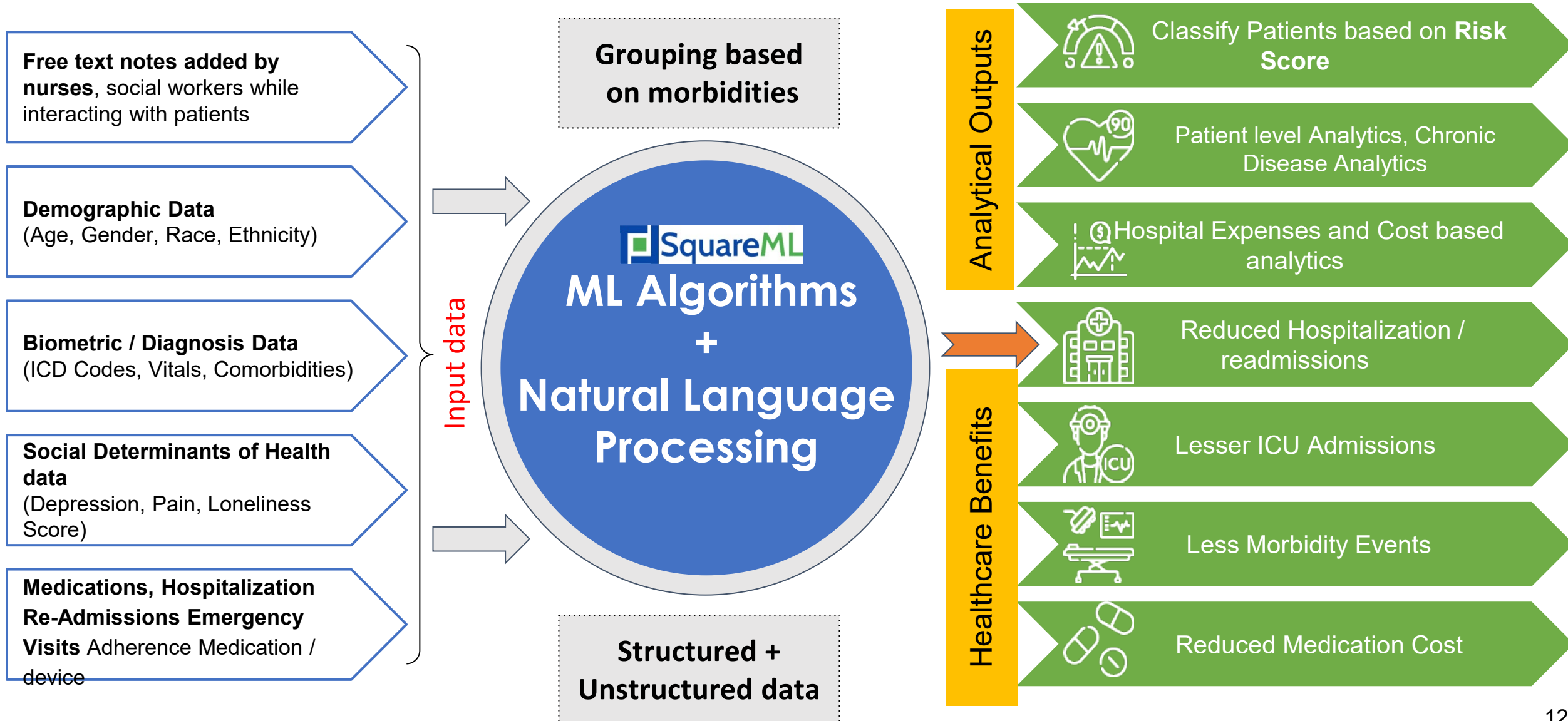
TESTS	RESULT	FLAG	UNITS
Testosterone, Serum	1182	High	ng/dL

Adult male reference interval is based on a population healthy nonobese males (BMI <30) between 19 and 39 years of age. JCEM 2017;102:1161-1173. PMID: 283241

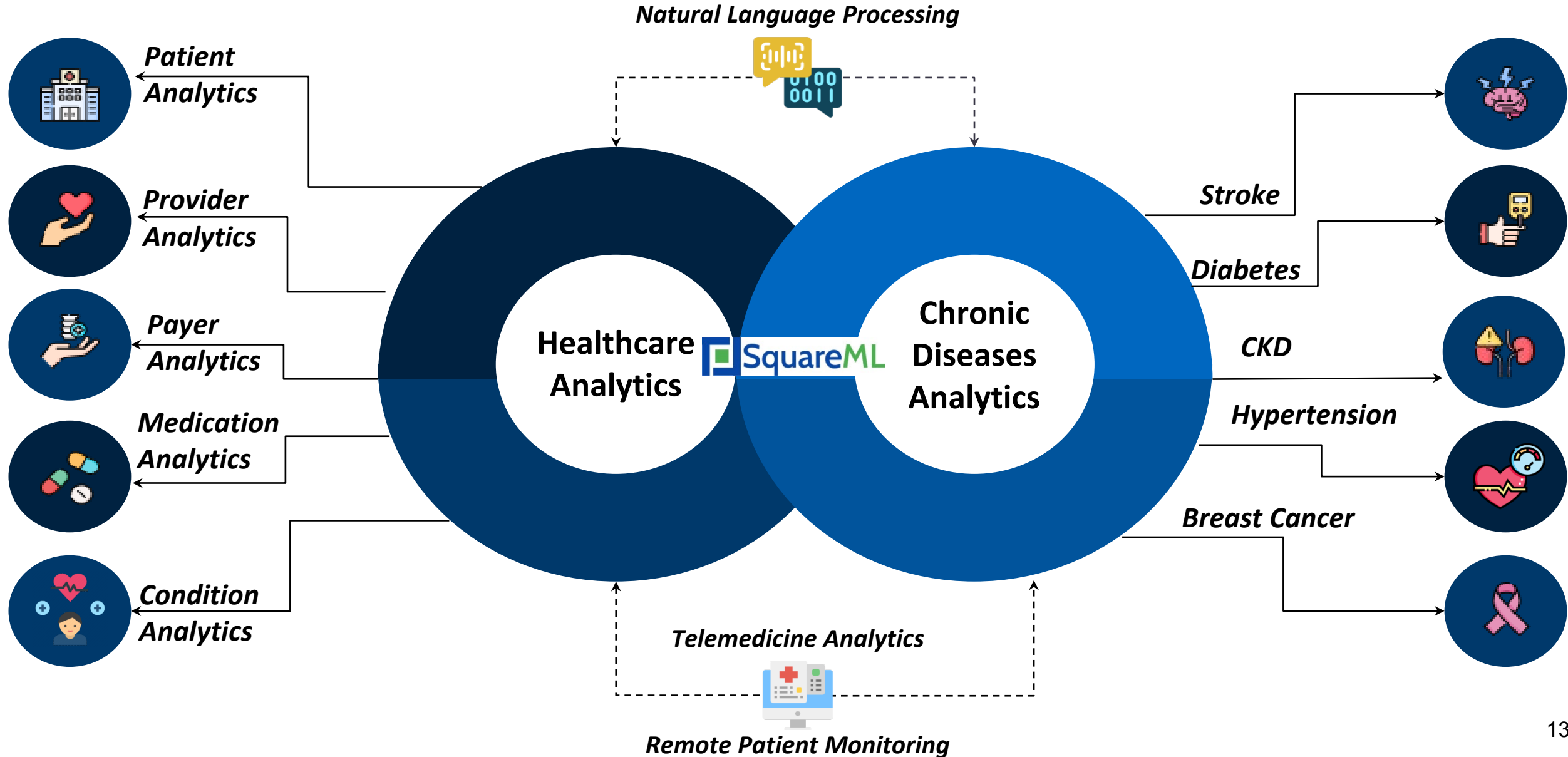
Estrogen, Serum

TESTS	RESULT	FLAG	UNITS
Estrogen, Serum	19.8		pg/mL

PATIENT HEALTH RISK STRATIFICATION



PREDICTIVE HEALTH ANALYTICS MODELS





“ML in a box”

Any Questions ?

Contact us

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START TODAY AND GET THE MOST OUT OF YOUR DATA