Short description - Developing a protocol to follow-up on Covid19 recovered patients to assess immunity.

**Problem Definition:**

*\* note : 5 W’s (who, what, when, where, why)*

1. Viraload – People who have tested positive test negative later and vice versa – not so reliable. SPUTUM
2. Body generates antibodies – specific to the pathogen - immunoglobulins - for coronavirus they are not present. They correlate with how severe the disease was. In mild or moderate - reports say n immunoglobulins detected. The immunoglobulins do not get detected in test/dont exist. TITRATIONS. Using a recent kit to avoid cross-reactivity. Not officialy approved, only research proposed.
3. Leucocytes - T-lymphocytes can differentiate once presented with a virus. When this grows it deals with the specific pathogen. Paramount importance for any human process. //Article Link// When they test positive there is actual immunity. By far, the most reliable. Not commercial.//Test can be done in 3rd level hospitals- we just need the reagents //Flow cytometry. SPECIFIC, ACCURATE, COLLABORATIVE
4. Some people are by default immune // not focussing on them

People need to be redirected to the hospitals/institutions which have these tests using an app, we can have database of recovered individuals and their immunity status.

1. Access to app by people and health professionals, must have a smartphone or the hospital has the smartphone/computer
2. User research/field research if possible
3. Need to do social workers counselling - explain well enough to convince someone who is discharged to visit a hospital again.//Need to sell the idea to the patient - it is for the safety of your family.
4. Not be biased against the people who have coronavirus - not to treat them like untouchables or pests.
5. People need to be trained to take the samples - shortage of nurses and doctors - going house to house not so viable, more resources will be needed to do this procedure.

**Elements to Develop:**

1. General Protocol (and participants involved and relationship)
   1. Hospitals / medial institutions
   2. Medical staff & patients (discharged from a previous covid detection)
   3. App / service on cloud: ACTIONABLE
   4. Patients
   5. Tests for covid detection
   6. Data discovery
   7. Future ideas
      1. Apply data science to information collected and make predictions, build data models, mapping immune people, etc.
      2. Unique value proposition based on the information collected
      3. “Google for Health”
2. Tests selection
3. MVP (Minimum Viable Product)
4. Benefits
   1. Normal life
   2. Control a new spread of virus (to prevent China’s Beijing)
   3. scalable / customizacion for each country
   4. Vaccine development (once we have the data)
5. Final presentation

\* is this idea / technology / protocol patentable

\* HIPPA : close as we could comply (AWS + API’s) Intellectual property

\* pricing

**Roles**

Research - Carlos, Ary, Tanya

Presentation - Juan, Dara

Contact doctors - Carlos, Juan

MVP - Juan, Alejandro, Dara

**User Stories**

1. Login (Medical\_ID \* , password) (FAKE)
2. Sign Up

Login Medical Staff

1. Main page:
   1. New patient (FAKE)
      1. Ficha de identificación
         1. ID
         2. Name
         3. Birth date / Age
         4. Sex
         5. Tipo de sangre
         6. Curp
         7. Rfc
         8. Mobile phone
            1. smartphone (yes / no)
            2. data plan (yes / no)
      2. Antecedentes (fake)
         1. Antecedentes Heredeofamiliares
            1. Crónico degenerativas
            2. Infecciosas
            3. Oncológicas
            4. Autoinmunes
            5. Psiquiátricas
         2. Antecedentes Personales No Patológicos
            1. Alimentación
            2. Habitación
            3. Hábitos Higienodietéticos
            4. Ocupación
            5. Residencia
            6. Toxicomanías
         3. Antecedentes Personales Patológicos
            1. Crónico degenerativas
            2. Infecciosas
            3. Oncológicas
            4. Autoinmunes
            5. Psiquiátricas
            6. Quirúrgicos
            7. Hospitalizaciones previas
            8. Fármacos
            9. Nota Clínica
      3. Nota Clínica
         1. Subjetivo
         2. Objetivo
         3. Análisis
         4. Pronóstico
      4. Country customization (fake)\*¨\*\*\*\*\*\*\*\*\*\*\*\*VEREMOS
      5. Covid :
         1. Tests applied / Results / dates
         2. Covid diagnostic date
         3. Covid Hospitalization Date
         4. Covid Discharge date
         5. User consent to participate in future studies / tests
   2. Patient follow-up (ACTIONABLE)
      1. ID
         1. Print Background and Clinical Note
      2. Patient list (Dr)
   3. Information Dashboard
   4. COVID 19 LatAmStatus

Log In Patient

1. Login (mobile number/ID) (FAKE) \*\*\* for discussion: not everyone will have a mobile phone that we could use as a unique key, what else could we use?
   1. Main Page:
      1. Announcements \* is not a section, just text on top of page (ie: “your next appointment will be … in X Hospital” )
      2. History Record
      3. Action steps
      4. Recommendations

Sign Up Patient

1. Signup
   1. (Next Page… “Complete your registration”):
      1. Name
      2. Birth date
      3. Sex
      4. Mobile phone
         1. smartphone (yes / no)
         2. data plan (yes / no)
      5. Address (Street name, number, col, CP, etc.)
      6. (Next page… “Thank you for registering. Your information will be validated and your appointment will be sent shortly”) GIVES ID, DONT LOSE IT
   2. (Next page… “Your appointment is set to 9:00hrs on June 22… at.. “Hospital Juárez” located at Av. Constitucion No. 1000 , Tel. 55 67789009 )

Ahmed

PCR Gold standard

False negative / False positive - even after recovered in 14 days, they give positive

RTPCR - titration and dilution of testing - more standardised testing protocol

Antigen/antibody - bosch company got approval - data shows they are able to have more purified version of test kit - they solve the cross-sensitivity problem - tests in market are good enough.

Till now - do research on whether flow cytometry has been used - LAMP test and some more mentioned. Ramon spectroscopy / microfluidic mechanism - try to find simpler or cheaper solution to flow cytometry

Why t-lymphocyte and not igg, since more expensive and intensive technique.

WHO/CDM - have not approved for the mass population, only approved for research.

Mass spectroscopy in singapore for trace detection and such.

PCR equipment - 30/40000$ minimum. For setting up the lab it costs 100000$

For the flow cytometry - it is even more expensive, in the long term is it more expensive than PCR or not. Do research. Yes capital cost is high, but long term it is cheaper. Check cost for a PCR test.

Ask someone working on flow cytometry about the costs. //Should we talk to someone from finance background - Okay the existing test IGM costs 6$ and china supplying, RTPCR gold standard - 50$. People go for alizor.

Nature paper on immunity - people who have convalescent plasma, efficiency is not as good as assumed to be. Pool size is 40 patients so not so conclusive, raised questions on the plasma donations. If proven to be true, then how will flow cytometry work? //Keep the judging panel in mind and keep answers shorter.

We assume in few months vaccines, once vaccines are out there, they have to trigger the immune response - how will you evaluate whether it working on the population, screen 31 types of covid, can there be a single bullet for all 31 versions// Tell the judges flow cytometry works. IGG IGM will be misleading when vaccines come out, and for that we will have flow cytometry.

Data get data from flow cytometry - store results from the test- and generate response of probability. //Question from judge - is it scalable? Will it be possible to contact other labs in the world so it can be done in every part of the world. How is it scalable, Teaching hospitals. We can tap into this network of hospitals which have flow cytometry facilities. Since we are relying on existing infrastructure.

//Question - if there is an investor - can there be a patent filed on it. - can you make something proprietary out of it and make money out of it. Most important is the data and the insights from the data - we will have an AI or ML expert who will develop a unique function out of it. No one has made a platform or a system in this domain, we can become the google. Database of millions of users around the world. Comparable to google or uber. Share the pitch deck with Ahmed for his feedback.

Rebecca

Whats the novelty?

Who are the users – health professionals or patients – its actionable. Health care provider

Proof of concept needed.

Should it be on app of hospital - in the phone of health care provider -

IP lawyer