# Telegenetics Services in a Tertiary Hospital: Utility and Patient Satisfaction

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## ABSTRACT

**Background.** Telegenetics has been a very useful platform to continue the different services offered by the clinical genetics team especially during the COVID-19 pandemic, when this mode of care had been maximized.

**Objective.** This paper aimed to present the process of telegenetics in a tertiary hospital and the feedback for this service through patient satisfaction surveys.

**Methods.** Telegenetics consultation is divided into three phases: pre-consultation, consultation, and post-consultation. Patient satisfaction in the delivery of genetics services were obtained through a survey answered by patients/caregivers after telegenetics consultation. Ratings of patient satisfaction on telegenetics consultation during the pandemic (September 2020 to February 2021) were compared from that of face-to-face consultations before the pandemic (September 2019 to February 2020).

**Results.** In 2020, there were a total of 1,228 consultations made via telegenetics. Of which, 319 consultations were for the metabolic service, 138 for dysmorphology, 207 for genetic counseling, and 564 for dietary counseling. New patients comprised 13.84% of the consultations and 86.16% were from follow-up patients. In 2021, there were a total of 3,124 consultations made via telegenetics. Of which, 617 consultations were for the metabolic service, 688 for dysmorphology, 961 for genetic counseling, and 858 for dietary counseling. New patients comprised 12.93% of the consultations and 87.07% were from follow-up patients. Over a period of 6 months, pre-pandemic (face-to-face consultation) and pandemic (telegenetics) patient satisfaction survey results showed no significant difference on the results for both new patient consultations and follow-up patient consultations that is a standard satisfactory rating of at least 3 (satisfactory) on customer satisfaction by more than 70% of the respondents.

**Conclusion.** Patient satisfaction ratings on the utility of telegenetics was comparable to that of face-to-face consultations. Its use has shown benefits like cost-effectiveness, time efficiency, improved accessibility, and psychological benefits as some patients fear a hospital setting during the pandemic. It also has limitations like possible technical difficulties during consultations and limited opportunity for physical examination, establishing rapport, and exploring psychosocial issues. Hence it is important to consider the possibility of a telegenetics consultation as an alternative to a face-to-face consultation.

*Keywords: telegenetics, patient satisfaction*



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## INTRODUCTION

The World Health Organization (WHO) defines telehealth as "the delivery of healthcare services, where patients and providers are separated by distance which uses information and communication technologies for the exchange of information for the diagnosis and treatment of diseases and injuries, research and evaluation, and for the continuing education of health professionals." This contributes to the attainment of universal health coverage through providing access to quality and cost-effective health services for patients wherever they may be. This is particularly important for patients in remote areas, for the vulnerable groups, as well as the aging populations. The use of telehealth alleviates concerns like limited access in far-flung areas, the potential spread of disease within clinics or hospitals, and the cost of meeting all patients in person regardless of the scope or urgency of their concerns.[1] Telemedicine refers to the interaction between a patient and a health professional using electronic and communication technologies like videoconferencing rather than face to face.[2] Telehealth has been utilized since the late 1950s, but the technology used has evolved from using the telephone to using internet-based services.[3] In the Philippines, the main mode of consultation remains to be face-to-face consultation where a patient goes to the doctor's clinic for check-up.

The Clinical Genetics and Research Unit of the Institute of Human Genetics, National Institutes of Health, University of the Philippines Manila primarily offers genetic services in the country through the Philippine General Hospital (PGH). Due to the low number of clinical geneticists caring for patients all over the Philippines and the geographic nature of the country, the telegenetics service was launched in 2013. This refers to the provision of genetics services via electronic and communication technologies.[4] The primary mode of communication was through email where doctors from all over the country can send in pictures and patient abstracts after informed consent was obtained. However, videoconferencing was also used. The asynchronous mode allows preparation and a more focused synchronous session. According to the published paper in 2017 by Vrečar and colleagues, there are 4 telegenetics consult modalities being used. This includes live video (synchronous), store-and-forward (asynchronous), remote patient monitoring which uses electronic transmission of personal medical data collected from an individual in one location (usually home) to a provider in a different location for use in care and related support, and mobile health which uses mobile communication devices such as cell phones and tablet computers to provide healthcare and education.[4] The Clinical Genetics team primarily uses the first two modalities then provides recommendations for the referred cases. However, the utilization rate of the service was quite low despite widespread information dissemination.

In March 2020, the WHO characterized COVID-19 as a pandemic.[5] With the threat of spreading the infection, community quarantines and lockdowns had been put into place to limit and avoid transmission. Travel restrictions within and between countries have also been made. In addition to shifting healthcare priority towards the response to the pandemic, outpatient services have been temporarily halted to control the transmission of the virus. The PGH was declared a COVID-19 referral center thereby re-allocating manpower and resources towards the fight against COVID-19.

Recognizing that Genetics Services must continue, the telegenetics service was revived and improved. It now included provision of a guide for telegenetics to the patients and their families. Preparation prior to consultation had been a very important part of the service. The service also had been flexible hence an option for video calls or phone calls had been considered. Teleconsultations were done through a scheduled basis both in metabolic and dysmorphology services through video and phone calls. This shift has allowed more learning opportunities for the healthcare professionals in the local facilities, continuity clinics, and rural health units (RHUs) in assessing and managing patients with genetic conditions.

The telegenetics services encompass genetic counseling, prenatal and cancer services, metabolic consultations, and dysmorphology evaluation. Genetic counseling both for pretest and posttest for conditions like alpha thalassemia, beta thalassemia, and cystic fibrosis. Prenatal services cater to all mothers with high-risk pregnancy, history of miscarriages and problems with their current pregnancy as seen through the congenital anomaly scan results. With cancer genetics, most of the patients referred are for pretest and posttest counseling for a specific genetic testing. Metabolic consultations cover all those patients with abnormal results in the expanded newborn screening (ENBS) and inborn errors of metabolism. Dysmorphology evaluations are those with birth defects and rare diseases. All these services were provided face-to-face previously. The difference between a face-to-face consultation with that of the telegenetics consultation is with the limited physical examination which mainly rely on visual examination during a telegenetics consultation. In addition, nonverbal cues during the course of consultation may also be limited in telegenetics.

Just like what happens during an outpatient consultation (Appendix A), the conduct of telegenetics consultation (Appendix B) is similar to face-to-face consultation, but now adding extra steps in preparing the patients and family virtually. Telegenetics consultation comes in three phases: pre-consultation, consultation, and post-consultation.

During the pre-consultation phase, the nurse plays an important role in starting and setting up telegenetics (Figure 1). All patients come in contact initially with the nurse who will gather demographic data, laboratory results, referrals and set the schedule of consults. For new patients who are referred by physicians from other institutions, a referral form

that needs to be accomplished is being provided as part of the documents needed aside from the clinical abstract and the laboratory results electronically.

During consultation, the actual video consultation takes place with the patient and the team (genetics fellow, interns nurse, dietitian, genetic counselor, social worker). Once the nurse sets up the teleconsultation, the genetics fellow now takes over the whole process. This part of the consultation is similar to the process in the outpatient setting, from history taking until the virtual physical examination, to genetics education and counseling. In some patients who need dietary counseling especially in metabolic patients, dieticians take over. In some cases, another session will be scheduled for a social worker interview.

In the post-consultation phase, nurses now take over and provide home/discharge instructions to patients providing them the summary of the teleconsultation, laboratory requests and the schedule of follow ups. This is also the time when patients are provided with the satisfaction survey forms for them to answer and evaluate their experience during the whole duration of the teleconsultation.

Patient satisfaction starts from the moment the patient decides to seek consultation and sign himself/herself for an appointment. To help make patient's telehealth experience convenient and satisfying despite the disadvantages that go with it, assisting and providing guides like how to take pictures, measurements and even setting up Zoom and others is very helpful. During consults, primary caregivers are also encouraged to ask questions and concerns about the condition of the patient and even open up about the plan of care. Patients' experiences don't end after giving and sending out lab requests, referral letters and home instructions but still continue on until the next visit.

Patient Satisfaction Survey (paper and pen) before the pandemic were given to parents/guardians every after consultation and were collected before discharge from the clinic. During the pandemic, the team shifted to an online platform of satisfaction survey through google form. Factors like slow or unstable internet connection, inability to follow through the online form in answering the survey and the time allotted when answering the form were noted. To answer these, we assisted parents/guardians in answering the form through phone call (nurses ask the questions through call and input their answers online) or reminding them to feel free to contact the team if there are additional questions in accomplishing the online form.

The aim of this study is to look at patient satisfaction with the current Telegenetics Service being provided by the Clinical Genetics Unit. Results of the patient satisfaction surveys will help improve the service delivery of Genetics consultation. To identify the problems encountered during the whole duration of consultation and to find ways and guides to help patients have an easy, good and smooth consultation experience.

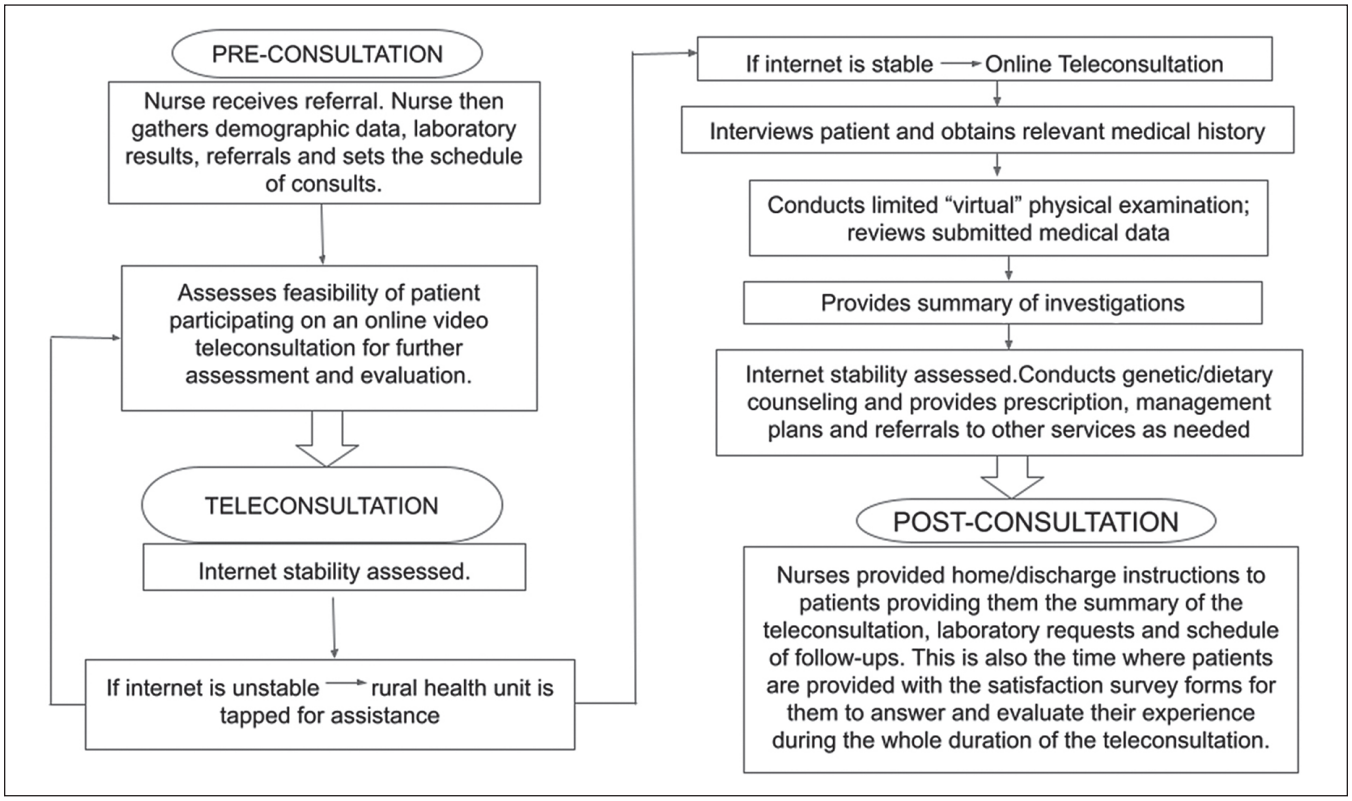


**Figure 1.** Process of telegenetics consultation in three phases.

## METHODS

This study involved a review of our patient satisfaction survey that we routinely ask our patients to fill-up after each consult (both new patients and patients on follow-up). Ethics clearance was obtained from the University of the Philippines Manila Research Ethics Board (UPMREB 2021-0737-EX). We compared the results of the patient satisfaction survey from pre-pandemic (face-to-face consultations) to the current online set-up. In keeping with the shift to the online platform, the survey has also shifted online. The additional steps were unique to the conduct of telegenetics. The areas evaluated on the patient satisfaction form were maintained as it assessed the same areas as that of the face-to-face consultation which included the registration, consultation, competence and conduct of the doctor, nurse, dietitian, and genetic counselor. The details of the items on consultation, however, were modified to evaluate this area more appropriately.

The patient satisfaction survey form (Appendices C and D) included items on the registration, consultation and healthcare provider's competence and conduct. The respondents answered using a 5-point Likert scale. There are, however, open-ended items where they can freely describe their experience. For registration, it looked into the promptness of the process, the conduct of the person doing the process, and the regularity of the process. For the face-to-face consultation, the questions included timeliness of the process and the cleanliness of the clinic. For telegenetics consultation, items included the clarity of explanation of telegenetics consultation and importance of informed consent, assistance in the conduct of telegenetics consultation, the timeliness and the orderliness of the consultation. For the healthcare providers (doctor, nurse, dietitian, genetic counselor), questions on conduct (punctuality, politeness) and competence (clarity in explaining and relaying information to the patient) were noted.

The results of the survey were collected and tallied monthly. Student's t-test was used to determine if means of the ratings differ significantly.

## RESULTS

Teleconsultations were mostly utilized during the pandemic to reach out and continue with the delivery services to all patients seeking genetic consultation. In 2020 alone, there were a total of 1,228 consultations made via telegenetics. Of which, 319 consultations are for metabolic service, 138 for dysmorphology, 207 for genetic counseling, and 564 for dietary counseling. New patients comprise 13.84% of the consultations and 86.16% are follow-up patients. In 2021, there were a total of 3,124 consultations made via telegenetics. Of which, 617 consultations were for the metabolic service, 688 for dysmorphology, 961 for genetic counseling, and 858 for dietary counseling. New patients comprised 12.93% of the consultations and 87.07% were from follow-up patients. Table 1 shows the number of patients seen before and during pandemic. It can be noted that in months 3 to 6, the number of patients seen have increased.

**Table 1.** Comparison of the number of patients seen before and during pandemic

| Month | Pre-Pandemic | During Pandemic |
|---|---|---|
| Month 1 | 148 | 144 |
| Month 2 | 168 | 161 |
| Month 3 | 127 | 215 |
| Month 4 | 81 | 160 |
| Month 5 | 182 | 274 |
| Month 6 | 192 | 274 |

There are some teleconsultations done before pandemic, especially patients for genetic counseling (alpha thalassemia, beta thalassemia, and cystic fibrosis). There was a total of 1,705 consultations made in 2019 (before the pandemic).

Teleconsultations are also scheduled per service: dysmorphology, metabolic, prenatal, genetic counseling and dietary. Just like the schedule that we have in the outpatient setting, every first and third week of the month is scheduled for dysmorphology and prenatal, and every second and fourth week of the month for metabolic. Usual days of the clinic is from Wednesday until Friday, on a time slot basis with 1 patient:1 genetic fellow with a minimum of 18 patients seen every scheduled day. Face-to-face consultation at the outpatient department (OPD) takes about an hour and 30 minutes for both new and follow-up consultations depending on the case of the patient. When doing the teleconsultation, there is more time allotted for every consultation, which lasts at least 2 hours including the virtual preparation.

We collected survey results based on the type of patients that we serve, new consults and follow-ups. The patient satisfaction ratings on telegenetics consultations during the pandemic (September 2020 to February 2021) were compared from that of face-to-face consultations before the pandemic (September 2019 to February 2020).

Based on the Measurement, Analysis and Improvement for Quality Objectives and Quality Plan set by the Clinical Genetics and Research Unit, a standard satisfactory rating of 3 (satisfactory) on customer satisfaction by at least 70% of the respondents must be attained. So far, all collated ratings are above the set standard. Over a period of 6 months, pre-pandemic (face-to-face consultation) and pandemic (telegenetics) patient satisfaction surveys show almost similar results for both new patient consultations and follow-up patient consultations. Table 2 shows the mean scores or rating on the different areas evaluated in the patient satisfaction survey. The absolute value of the calculated value is smaller than the critical value. Hence, the means are not significantly different.

**Table 2.** Ratings on the different areas of the patient satisfaction survey and the statistical analysis

| Specific Area Evaluated | Rating | |
|---|---|---|
| | Face-to-face Genetics Consultations (Pre-Pandemic) | Telegenetics (Pandemic) |
| Registration | 4.42 | 4.68 |
| Consultation | 4.34 | 4.68 |
| Doctor's Competence and Conduct | 4.74 | 4.70 |
| Nurse's Competence and Conduct | 4.74 | 4.67 |
| Dietitian's Competence and Conduct | 4.29 | 4.57 |
| Genetic Counselor's Competence and Conduct | 4.77 | 4.59 |
| **Statistical Analysis using Student's T-Test** | | |
| mean | 4.55 | 4.65 |
| variance | 0.0415 | 0.0025 |
| standard deviation | 0.2037 | 0.05 |
| t-value | -1.1485 | |
| degree of freedom | 10 | |
| critical value | 2.228 | |

## DISCUSSION

Telegenetics has been utilized even before the COVID-19 pandemic. However, it was during the pandemic when this mode of care for patients of the clinical genetics service was maximized. As we continue to strive for improvement of the services offered to our patients, evaluation through patient satisfaction surveys has been utilized.

In previous reports, established benefits of telegenetics include cost-effectiveness, time saving, improved access, and even psychological benefits as some patients fear a hospital setting especially during this time of the pandemic.[6] This has been very beneficial especially for the clinical genetics follow-up patients, which were regularly seen by the service and comprised more than 80% of patients seen. They would require regular check-ups and would even be coming from different provinces of the country. With telegenetics, the consultations were made possible and non-adherence to follow-up was avoided.

Identified barriers of telegenetics include limitations of physical examination and technical difficulties during consultations. Another suggested barrier of telegenetics is the potential difficulty with establishing rapport in telegenetics and a greater challenge to explore psychosocial issues.[7-9] These barriers may especially be important in new patients. These limitations were acknowledged by the clinical genetics service. However, its benefits especially during the COVID-19 pandemic outweighs the limitations. Nevertheless, it is understood that a face-to-face consultation for these new patients may be important in succeeding follow-up consultations if the situation permits.

There was no significant difference noted in the rating for registration process and consultation. Considering the difficulties encountered in telegenetics, patient satisfaction was not affected. Conduct of healthcare providers were also maintained despite the mentioned limitations of telegenetics. These may have been deemed acceptable by the patients because of the benefits it entailed.

## CONCLUSION

Patient satisfaction for the utility of telegenetics showed similar results as that of face-to-face consultations. The benefits and limitations of telegenetics had been shown in certain areas. Benefits include cost-effectiveness, time efficiency, improved access, and psychological benefits as some patients fear a hospital setting during the pandemic. It also has limitations like possible technical difficulties during consultations and limited opportunity for physical examination, establishing rapport, and exploring psychosocial issues. Hence, it is important to consider the possibility of a telegenetics consultation as an alternative to a face-to-face consultation in applicable circumstances.

### Statement of Authorship

All authors contributed in the conceptualization of work, acquisition and analysis of data, drafting and revising, and final approval of the version to be published.

### Author Disclosure

All authors declared no conflicts of interest in preparing this article.

### Funding Source

None.

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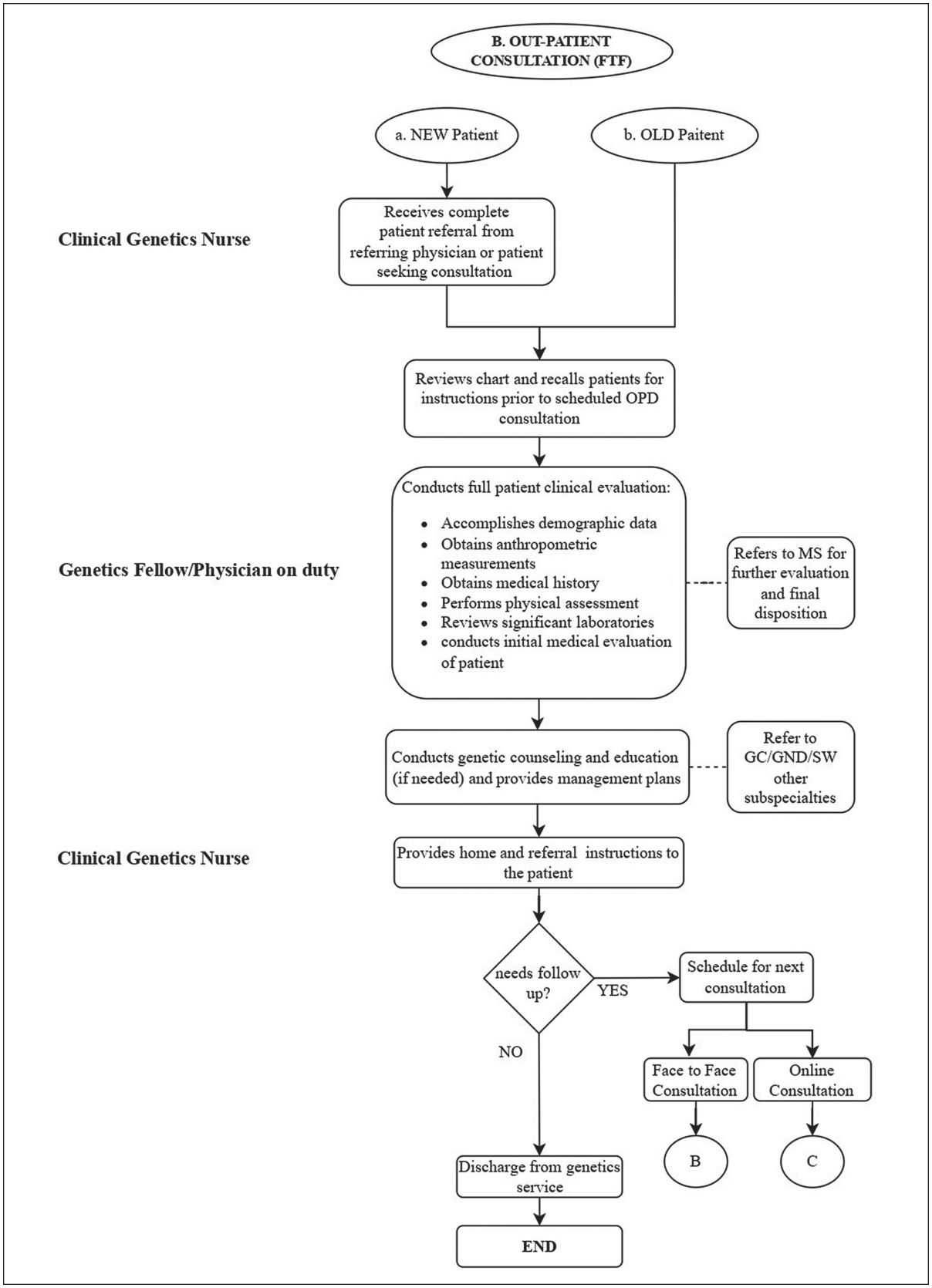
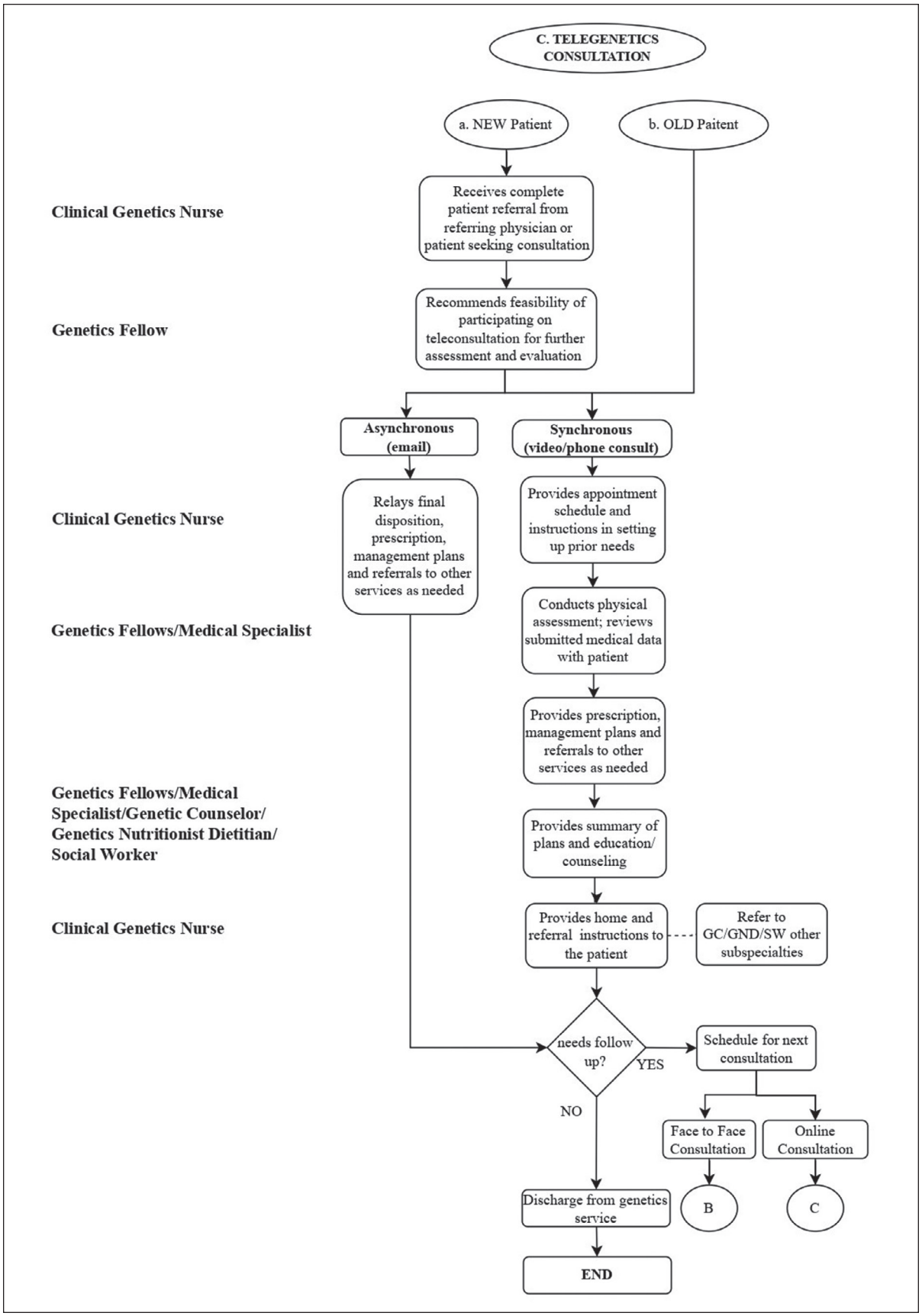
## APPENDICES




**Appendix A.** OPD Consultation Flow (Face-to-Face) with designated persons-in-charge.




**Appendix B.** Telegenetics Consultation Flow with designated persons-in-charge.

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Rev 02; Eff. 4 MAR 2019

## Patient Satisfaction Survey

Upang mapabuti ang serbisyo sa mga pasyente ng Genetics, nais po naming makuha ang inyong mga puna/mungkahi ukol sa inyong karanasan ng pagpapakonsulta. Kayo po ay makakaasa na ang inyong mga sagot ay mapapanatiling lihim. Kami ay lubos na

Lagyan ng tsek (✓) ang naaangkop sa inyong sitwasyon:

☐ Bagong pasyente ng genetics clinic
☐ Dating Pasyente ng genetics clinic

*Uri ng serbisyo ng Genetics:*
☐ Dysmorphology Consultation ☐ Dietary Counseling
☐ Metabolic Consultation ☐ Genetic Counseling
☐ Prenatal ☐ Iba pa: _____
☐ Cancer

*Uri ng konsultasyon:*
☐ Out-patient
☐ Naka-admit sa PGH konsultasyon (Pay)
☐ Naka-admit sa PGH konsultasyon (Ward)

*Pamaraan ng konsultasyon*:
☐ Teleconsult
☐ Face-to-face/Aktual na konsultasyon
☐ Phone

Petsa: _____
Oras: _____

**BILUGAN ANG PUNTOS NG SERBISYO NG GENETICS AYON SA INYONG OPINYON:**
**5 –** Napakahusay
**4 –** Mas Mahusay
**3 –** Mahusay
**2 –** Bahagyang Mahusay
**1 –** Di Mahusay
**N/A –** Hindi Ayon o *Not Applicable*

Nagpapasalamat sa oras na iginugol ninyo sa pagsagot sa surbey na ito.
Mga impormasyon ng pasyente (optional/hindi obligado):

Pangalan (ng pasyente): _____
Contact Number: _____
Address: _____

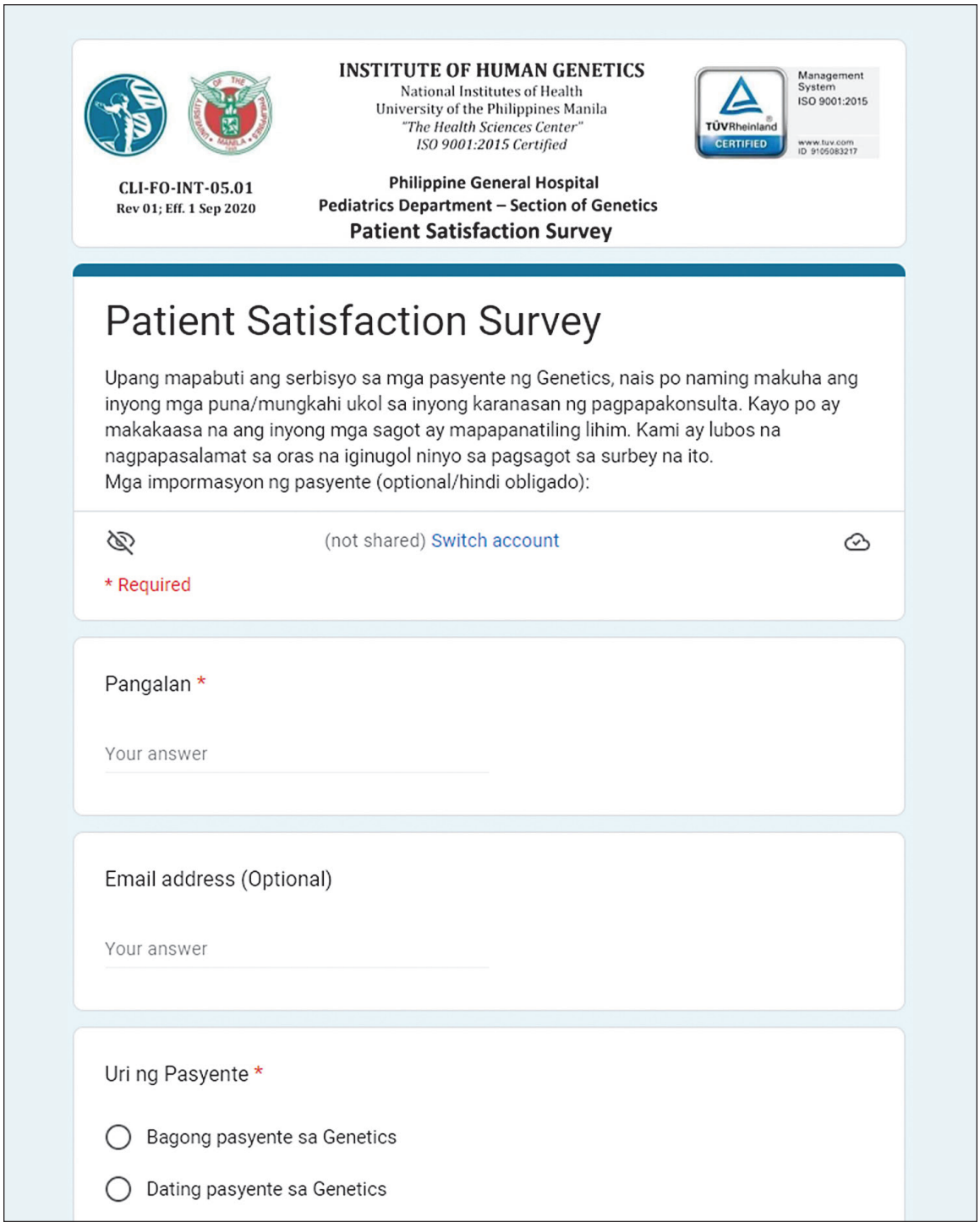
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **1. PALISTAHAN O PAGPAPAREHISTRO NG PASYENTE** | | | | | | | |
| | a. Bilis ng proseso | 5 | 4 | 3 | 2 | 1 | N/A |
| | b. Magalang na mga kawani | 5 | 4 | 3 | 2 | 1 | N/A |
| | c. Pagtawag sa pasyente ayon sa pagrerehistro | | | | | | |
| **2. PAGPAPAKONSULTA SA GENETICS** | | | | | | | |
| | a. Pagtawag sa pasyente ayon sa oras ng pagdating nito | 5 | 4 | 3 | 2 | 1 | N/A |
| | b. Oras ng bukas ng klinika | 5 | 4 | 3 | 2 | 1 | N/A |
| | c. Kalinisan ng kwarto/klinika | 5 | 4 | 3 | 2 | 1 | N/A |
| **3. KATANGIAN NG MGA DOKTOR** | | | | | | | |
| | a. Pagdating sa tamang oras | 5 | 4 | 3 | 2 | 1 | N/A |
| | b. Magalang sa pakikitungo | 5 | 4 | 3 | 2 | 1 | N/A |
| | c. Magandang magpaliwanag ukol sa mga dapat malaman ng pasyente | 5 | 4 | 3 | 2 | 1 | N/A |
| **4. KATANGIAN NG MGA NARS** | | | | | | | |
| | a. Pagdating sa tamang oras | 5 | 4 | 3 | 2 | 1 | N/A |
| | b. Magalang sa pakikitungo | 5 | 4 | 3 | 2 | 1 | N/A |
| | c. Magandang magpaliwanag ukol sa mga dapat malaman ng pasyente | 5 | 4 | 3 | 2 | 1 | N/A |
| **5. IBA PANG SERBISYO (IF APPLICABLE)** | | | | | | | |
| | a. Serbisyo sa pag bigay ng newborn screening | 5 | 4 | 3 | 2 | 1 | N/A |
| | b. Pagbibigay ng mga payo hingil sa mga pagkain na ibibigay sa mga pasyente (Dietary Services) | 5 | 4 | 3 | 2 | 1 | N/A |
| | c. Pagbibigay ng mga payo na may kaugnayan sa kondisyon ng pasyente (Genetic Counseling Service) | 5 | 4 | 3 | 2 | 1 | N/A |
| | d. Pagbibigay ng medical food/gamot sa pasyente (NBS patients ONLY) | 5 | 4 | 3 | 2 | 1 | N/A |
| | e. Enzyme Replacement Therapy (ERT) | 5 | 4 | 3 | 2 | 1 | N/A |
| | f. Pagbibigay payo sa mga pasyente tungkol sa Telegenetics Referral System at PGH Online Consultation Request and Appointment System (OCRA). | 5 | 4 | 3 | 2 | 1 | N/A |

| | | |
|---|---|---|
| Sa kabuuan, kayo po ba ay **nasiyahan** sa serbisyong pangkalusugan na binibigay ng Genetics? | ☐ OO | ☐ HINDI |

Ikaw ba ay nasiyahan sa aming serbisyo? Kung hindi maaring pakilahad ang rason at suhestiyon upang mapabuti pa an gaming serbisyo (Reaksyon/mungkahi/komento)

_____
_____

**Appendix C.** Patient Satisfaction Survey (during face-to-face OPD).



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**Philippine General Hospital**
**Pediatrics Department – Section of Genetics**
**Patient Satisfaction Survey**

# Patient Satisfaction Survey

Upang mapabuti ang serbisyo sa mga pasyente ng Genetics, nais po naming makuha ang inyong mga puna/mungkahi ukol sa inyong karanasan ng pagpapakonsulta. Kayo po ay makakaasa na ang inyong mga sagot ay mapapanatiling lihim. Kami ay lubos na nagpapasalamat sa oras na iginugol ninyo sa pagsagot sa surbey na ito.
Mga impormasyon ng pasyente (optional/hindi obligado):

(not shared) Switch account

* Required

Pangalan *

Your answer

Email address (Optional)

Your answer

Uri ng Pasyente *

- ◯ Bagong pasyente sa Genetics
- ◯ Dating pasyente sa Genetics

**Appendix D.** Patient Satisfaction Survey (Google Form).