



Logo designed by Late Artist Mahmudul Haque, Professor of Fine Art, Dhaka University: this symbolic cancer ribbon describes aggressive nature of diseases and our promise to protect the green ground

WALK THE TALK:

COMMUNITY-ORIENTED PRIMARY CARE IN CANCER CONTROL

THE AMADER GRAM CANCER CARE & RESEARCH CENTER (AGCRC) PROGRAM

ABSTRACT

Primary care has been demonstrated to be associated with enhanced access to health services and better health outcomes. Community-oriented primary care is medical practice that undertakes responsibility for the health of a defined population. The demonstrated barriers to high-quality primary care are: under-resourcing, inadequate payment models, lack of community linkages, limited scope and comprehensiveness, limited integration with other components of the health system, and unexciting/unattractive conditions for physicians.

The nature of cancer control is changing, with an increasing emphasis, fueled by public and political demand, on prevention, early diagnosis, and patient experience during and after treatment. At the same time, primary care is increasingly promoted, by governments and health funders worldwide, as the preferred setting for most health care to meet demands of increasing need, stabilize health-care costs, and accommodate patient preference for care close to home.

Thus, it is timely to consider how primary care can influence cancer control, which has long been dominated by highly technical interventions centered on treatment, and in which the contribution of primary care has been largely perceived as marginal (Ref: <https://www.thelancet.com/commissions/primary-care>).

In June, 2023, on its 8.20-acre medical campus in Rampal, in climate-change-threatened southern Bangladesh, with the major financial help of Government Amader Gram will complete construction of the first two, three-story buildings: a 12,090 ft² outpatient center, and a 14,728 ft² diagnostic center. Based in these facilities, the goal of the AGCRC is to provide accessible and high-quality primary care for all 160,000 Rampal residents and self-selected regional residents before 2026, under a sustainable social business model. The integrated and transformative program network of ambulatory, virtual, and comprehensive community care services in every Rampal village, will earn revenues under subscription and

fee-for-service systems. Complementary health supporting-activities are being developed under a community-led Rampal Forward Initiatives Program. Key components of the medical service system are: A well-developed, primary care ambulatory service model focusing non-communicable diseases (NCDs) with major paraprofessional-specialist conduct of routine guideline-defined processes, key point-of-care cancer diagnostic capacities, and immediate tele-consults, facilitated by a Bangladesh-circumstances-customized, interoperable electronic medical record system focused on major patient care-related functionalities, and wireless broadband connections using the Microsoft teams communication platform.

CONTENTS

Abstract

Specific aims

Implementation/research strategy

Significance and background

Innovation

Approach

Timeline

Future plans

References

Appendices

- I. Architects' image of two initial Amader Gram Medical campus buildings:
Ambulatory care and Diagnostic centers
- II. Rampal Forward Initiative
- III. Credentials and further training of program paraprofessional staff: health record technicians, medical assistants, and Village Health Workers.
- IV. Ambulatory care center patient-visit flow chart
- V. Example templates for new Amader Gram EMR for Major medical diagnoses/problems list, and for Hypertension.
- VI. Diagnostic center facilities and patient-visit flow chart
- VII. Amader Gram community and virtual medical care systems

SPECIFIC AIMS

To address the major barriers to community-oriented primary health care services currently not included NCDs, Cancer in particular, by creating a transformative model program in climate-change-threatened southern Bangladesh by increasing the capacities to sustainability for an integrated program network of ambulatory, virtual, and community care services, specifically:

1. Operationalizing and codifying a primary care ambulatory service model with major paraprofessional-specialist conduct of record-keeping, routine guideline-defined processes, key point-of-care diagnostic capacities, and immediate tele-consults.
2. Developing a customized electronic medical record, focused on patient-care related functionalities, specifically charting and decision-support, which is easily usable by computer-literate health professionals of multiple levels of expertise.
3. Recruiting, and through training increasing the services portfolios of Village Health Workers (n=100) in every Rampal sub-district (upazila) village to include home care-particularly for hypertension, diabetes, asthma, and palliative care; and for health education, contribution of identified patients with major illnesses to network registries, and facilitation of residents' access to and benefits from the Amader Gram ambulatory and increased-quality virtual health services.
4. To meet the annual operating budget completely after 3 years by: expanding the numbers of subscriber network members to provide 25%; increasing system revenue through major growth in fee-for service and diagnostic test customer numbers to provide 33%; developing consultant services, research activities in climate change adaptation, hypertension and asthma, and local and international philanthropy, combined to provide 27%; and continuing line-item annual federal support of 15%.

IMPLEMENTATION/RESEARCH STRATEGY

Significance and background

"The main barriers to accessing health services (in Bangladesh) are inadequate services and poor quality of existing facilities, long waiting times once facilities are reached, aggressive pursuit of monetary gains, and poor levels of competence (of health professionals)" (1).

"Average consultation length is used as an outcome indicator in the primary health care monitoring tool, which was found to be, at less than a minute to an outdoor patient (in Bangladesh)" (2).

"The current doctor-patient ratio in Bangladesh is only 5.26 per 10,000 population" (3).

"More than 70% of rural health facilities do not have all six basic equipment items: thermometers, stethoscopes, blood pressure gauge, weighing scales for infants and adults, and torchlights" (4).

"70–75% people of the country (Bangladesh) use traditional medicine for their healthcare" (5).

"Doctors are accused of taking 30–50% commissions on tests from hospitals/diagnostic centers" (6).

"What we have before us are some breath-taking opportunities disguised as insoluble problems" (7).

Primary health care defined as essential ambulatory, or first-level personal health care, has been demonstrated to be associated with enhanced access to health services, better health outcomes, and decreases in hospitalizations and use of emergency services (8-12: Shi, 2012; Basu, 2019; Levine, 2019; Macinko, 2019; and National Academy of Medicine Consensus Report, 2021). Significantly, the 2021 National Academy of Medicine Consensus Report notes that primary care is the *only* health system component or function that has been shown to produce better population health and health equity (12: National Academy of Medicine Consensus Report, 2021). The WHO goal of reducing mortality from noncommunicable diseases (NCD) in low- and middle-income countries by one third by 2030 is dependent on increasing accessibility to high-quality primary care (13: WHO, 2018). Community-oriented primary care is medical practice that undertakes responsibility for the health of a defined population (8: Institute of Medicine: I.O.M., 1983).

Despite these widely acknowledged and well-documented conclusions, there is a dearth of value-based service models in low- and middle-income countries providing accessibility and adequate quality of care to improve health outcomes globally. Even in the United States, primary health care is dying; 20-40% of Americans do not have a primary care provider (12, 15-19: IOM, 2001; Berendes, 2011; National Academy of Medicine Consensus Report, 2021, p.19; Chin, 2021; Nundy, 2021; WHO Fact sheet, 2021). Additionally, in the United States, the responses to the Covid pandemic have demonstrated and magnified (18: Nundy, 2021):

- Widespread lack of access to medical care
- Overreliance on doctors
- Overreliance on clinics and hospitals
- Lack of systems for chronic care and prevention
- Lack of attention to mental health
- Inadequate investment in primary care
- Massive disparities in healthcare

In summary, globally there is a critical need for the development of community-oriented primary health care service models with greater interaction between clinical medicine activities and those of public health which can provide significantly high-quality care. The creation of successful models anywhere would be a win-win for patients and *economies* internationally (20-25: Council on Foreign Relations, 2014; Frieden, 2015; Dzau, 2017; Mehl, 2014; National Academy of Medicine, 2017; Love, 2019).

Innovation

The idea champion-social entrepreneurs here propose to build on current Amader Gram experience and components for a community-oriented primary care health system in climate change-threatened southern Bangladesh, to create a sustainable, accessible, and patient outcome-influencing high-quality transformative model that *walks the talk*, that is, that puts into action *a total package* grounded in what experts have been saying, reports have recommended (notably the just published American National Academy of Medicine Consensus Report), the Covid pandemic has put a magnifying lens on, and which addresses the information technology “developer-user disconnect” (12, 18, 20, 23, 26-31: Starfield, 2005;

Christensen, 2009; Borstein, 2010; Berendes, 2011; Council on Foreign Relations, 2014; Frieden, 2015; Rudin, 2016; National Academy of Medicine, 2017; Asch, 2019; McGlynn, 2020; National Academy of Medicine Consensus Report, 2021; Nundy, 2021. To quote Steve Jobs, “*connecting the dots*” is what we propose to do. The key shared innovative components of this model are:

- An integrated network of community-oriented primary care service components with an ambulatory service center, a virtual call-in health system, and Rampal (Bangladeshi government sub-district or upazila) population-addressing Village Health Workers in every one of 138 villages (in 100 cluster villages), the latter two components of which are critical to increasing accessibility. We will also make major efforts to link with the current primary care providers throughout the upazila (vide infra). We offer specific plans for creating high quality services and scaling up each of these 3 components. (12, 18, 27, 33, 34: Christensen, 2009; Crisp, 2010; Duffy, 2018; National Academy of Medicine Consensus Report, 2021; Nundy, 2021).
- In June 2023, on its 8.2-acre medical campus in Rampal: Amader Gram will complete construction of the first two, three-story buildings: a 12,090 ft² outpatient center, and a 14,728 ft² diagnostic center (APPENDIX I). Campus utilities and these building are being completed under mostly Bangladesh government financial support.
- A comprehensive primary care ambulatory service model with major paraprofessional specialist record-keeping, routine guideline-defined processes, key point-of-care diagnostic capacities including NCD control, and immediate tele-consults, critical to achieving adequately high-quality of care to favorably influence patient outcomes (12, 25, 27, 33, 34-37: Christensen, 2009; Crisp, 2010; Jani, 2013; Scott, 2014; Emanuel, 2017; Love, 2019; Horn, 2020; National Academy of Medicine Consensus Report, 2021. p.225-6)
- A Bangladeshi-circumstance customized interoperable electronic medical record system focused on usability (collecting information) and major patient care-related automated functionalities (charting and aggregating and making-sense-of information) and decision-supporting tools (to apply the acquired information effectively), and associated disease registries (12: National Academy of Medicine Consensus Report, 2021. p.225-6; 243; 251).
- A novel Amader Gram health care subscription system to provide greater financial support for long-term sustainability, combined with realistic plans for multiple other revenue stream-building activities.
- A complementary Amader Gram-encouraged community-linkages Rampal Forward Initiatives program to address important broad societal challenges and encourage new activities to address issues such as those associated with climate change and undernutrition (APPENDIX II) (38: Marmot, Social determinants of health, 1999).

APPROACH

The goal of the AGCRC is to provide accessible and high-quality primary care in Cancer control for all 160,000 Rampal residents, and self-selected regional residents.

Regional climate change threats and economic development

Rampal sub-district and other Bangladeshi coastal residents are among the most vulnerable and victimized of global citizens because of poverty and climate change, for which they are “the ‘silent financiers’ of climate losses and adaptation efforts”. “Rural families in Bangladesh are estimated to be spending almost \$2 billion a year to repair climate damage or to try to prevent it” according to research by the International Institute for Environment and Development (39: <https://bdnews24.com/bangladesh/2021/12/10/silent-financier-how-bangladesh-s-poor-are-paying-the-costs-of-climate-damage>). Forty per cent of Rampal children are undernourished with associated growth stunting; agricultural land is being lost to rising sea levels; food productivity and quality are falling because of aquifer and weather changes; heat cold and smog-weather patterns are increasing and causing greater illness; noncommunicable disease-hypertension is increasing because of increased salinity of potable water; and mosquito-vectored communicable disease frequencies are increasing—malaria, dengue, encephalitis while the situation with other communicable disease—tuberculosis, cholera and diarrheal disease-- is unclear (40, 41: Black, 2017; Rahman, 2019). The state of current knowledge about the climate change and health has been described as an iceberg: “there is much more to fear from the larger mass beneath”, such as increasing bacterial resistance to antibiotics (42, 43: Salas, 2020; MacFadden, 2018)

Major regional economic development activities however are posing favorable changes (for employment for example > increased incomes > increased disposable income available for health expenditures), but also likely new additional resident challenges (traffic accidents e.g.). The following major activities are funded for completion under the 2021 (July, 2021-June, 2022) national budget:

- The Padma River Bridge for road and rail linking the capital Dhaka and the Khulna division, hugely shortening the time for commercial transportation and people to move between these regions.
- The widening of the highway over this Padma River bridge between Dhaka and the expanding port of Mongla-168 miles currently an 8-hour trip-to 6 lanes, which will further reduce by half or more the duration of this road trip.
- A rail line from Khulna to Mongla with a stop in Rampal.
- Creation of an airport for commercial traffic south of Bagerhat.

The significance of these activities needs to be seen in the context of the enormous economic progress that Bangladesh has made in recent years: Poverty declined from 43.5 percent in 1991 to 14.3 percent in 2016, based on the international poverty line of \$1.90 a day (using 2011 Purchasing Power Parity exchange rate (44: <https://www.worldbank.org/en/country/bangladesh/overview>).

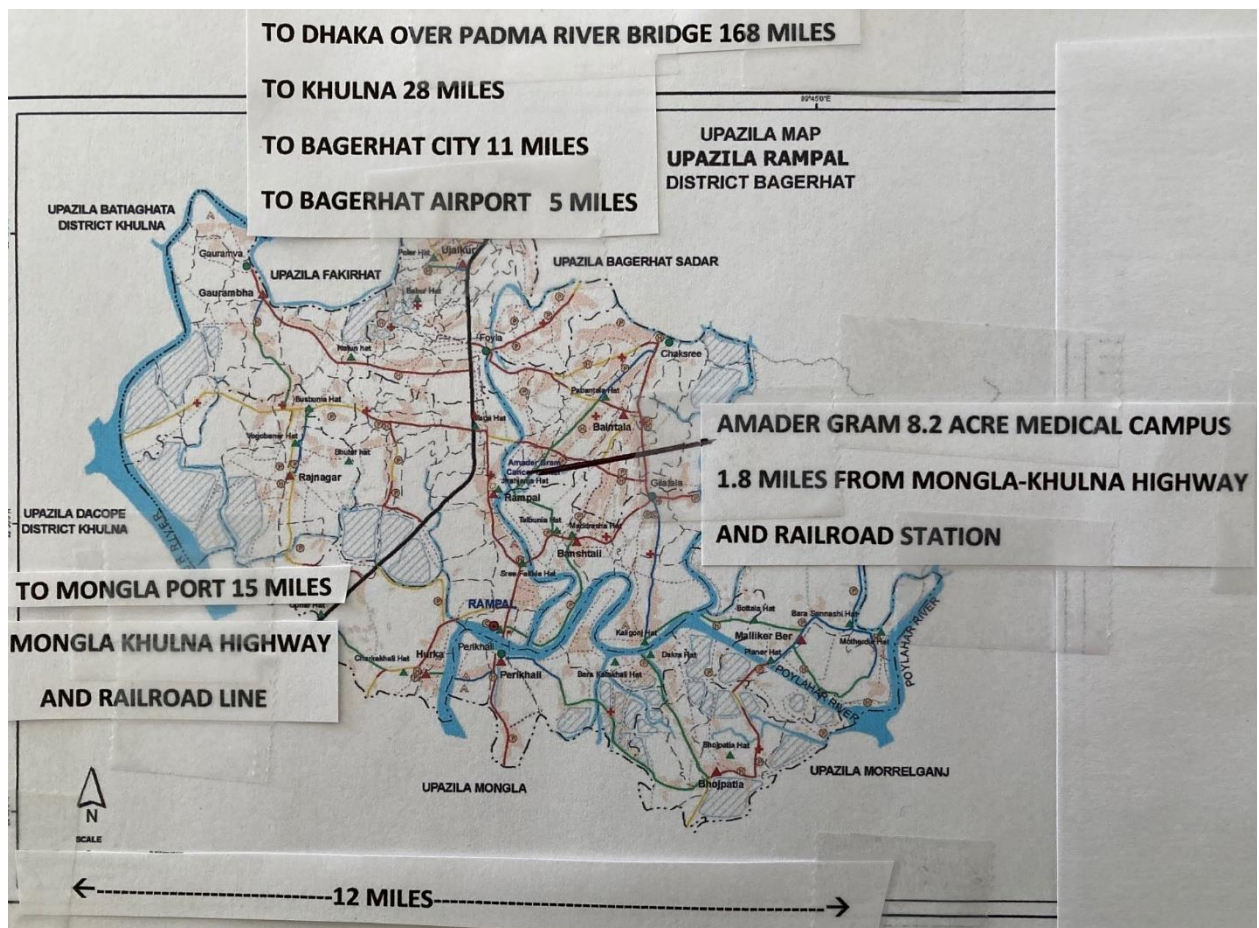


Figure 1: The Rampal sub-district (upazila) is critically located with respect to the discussed major economic infrastructural developments. Distances are from the Amader Gram campus location in the center of the upazila. The importance of boat travel is highlighted the presence of major rivers in this region, one running along the western border of the Amader Gram Campus.

Current Rampal Upazila health services

There is a government administered Rampal health-hospital complex, with limited functioning equipment, which is formally staffed by 14 doctors, but which operationally is served by a smaller number of doctors, and the team manage approximately 25,000 outpatient visits, and 4,000 hospitalizations in a year. Throughout the upazila there are 35 ambulatory care facilities that manage 160,000 visits per year. Of the total of 90 total health services workers in these facilities, 79 are nurses, health assistants or family welfare visitors. These services are focused on acute/communicable disease evaluation and treatment and maternal and child health.

There is a District Hospital in Bagerhat with 24 doctors, which conducts 130,000 outpatient visits per year. It has one ultrasound machine, and one echocardiography machine.

Amader Gram has an ambulatory care clinic in Sreefolতা, Rampal sub-district which currently sees 20 patients a day. There are few other non-governmental organization/private facilities in the Rampal upazila.

There are currently limited medical facilities in Mongla and between Mongla and Bagerhat town.

Demonstrated barriers to high-quality primary care are: (12, 27, 45: Christensen, 2009; Arora, ECHO project, 2011; National Academy of Medicine Consensus Report, 2021, p.22):

1. Lack of community networks, integration, and linkages.
2. Limited scope and comprehensiveness of primary care.
3. Inadequate business and payment models in the face of demonstrated value, and under-resourcing generally.
4. Unexciting/unattractive conditions for physicians.

Key facilitators of high-quality primary care are:

5. Digital information technology user-friendly systems.
6. Quality measures of diagnostic pathways and treatment guidelines based on metrics for efficacy, safety, efficiency, timeliness, patient-centeredness, and equity (12, 45-48: Grimshaw, 1993; I.O.M. 2001; I.O.M. 2012a; I.O.M. 2012b; WHO, 2016; National Academy of Medicine Consensus Report, 2021)
7. Quality measure-associated evaluation and staff accountability activities (12: National Academy of Medicine Consensus Report, 2021).

The developing **AGCRC**, a bottom-up, local-solution initiative, has begun under a planned model which contrasts significantly with the current operational model (Table 1):

Table 1: Current government primary care operating model and planned Amader Gram model in the Rampal upazila

Current government model	Planned Amader Gram model
Posture towards patients- Reactive	Proactive
Activity centers- Hospitals; clinics	Community; homes
Health conditions focus- Communicable disease; maternal and child health	Public Health; non-communicable disease
Operations- Limited accountability	Community accountability; staff development model and Plans à Staff ownership
Governance- Dysfunctional with threats from poor organization, training, equipping, and incentivization	Routine-guideline-defined processes; intense, ongoing training; major point-of-care equipping; explicit values education; strong leadership
Community- Limited action	Community-issues attention central to successful care
Activities design- Fixed	Flexible; constant re-designing

The challenge in these circumstances of an established government operational model, which by various measures appears dysfunctional, and the planned complementary and supplementary Amader Gram model, is to develop a transformative population-benefitting

system. In this context, under this proposal, Amader Gram plans to address the above- listed challenges, in order, by (1-5, 25: Love, 2019):

Re#1 Networks/integration/linkages to provide coordination and continuity

- Over the last year, Amader Gram has planned for 100 full time community health volunteers (CHV) of the Rampal upazila’s 138 villages, to be placed each with about 200 families. We plan to intensely train these volunteers to become the Village Health Workers (VHVs) (APPENDIX III), fully equip them as home health care providers, make them facile in the use of the newly developed Amader Gram EMR system, develop processes to allow their access to Amader Gram Ambulatory center staff through the virtual tele-medicine component of the Amader Gram system thereby allowing them to function under a hybrid-in person/telemedicine model, and increase their numbers to 200 to cover all upazila villages, and enrich their portfolios to play major roles in: 1. Facilitating villagers’ health education and access to the Amader Gram ambulatory care center and virtual care hot line; 2. Contributing to disease registries for cancer, hypertension, diabetes, asthma, undernutrition; and 3. Providing home communicable and non-communicable disease, palliative, and hypertension management care (18, 32, 52-5: Love, 2015, 2020, 2021, 2021; Jaffe, 2016; McGlynn, 2020; Nundy, 2021). These VHVs can be projected to make 250,000 home visits a year, which will exceed the total number of current government facilities’ annual visits, and likely replace many of those visits.
- In last year, Amader Gram has had a 12/7 virtual health care “hot” line tele-medicine consultation service. Started in response to the Covid pandemic, the first 2000 patients served presented with health concerns about: hypertension, diabetes, asthma, new pain, and non-communicable disease symptoms. Thus, at present this service is basically providing urgent care advice and general health information. (30, 33: Duffy, 2018; Asch, 2019).
- We now have use of the secure Microsoft Teams communications platform for up to 1000 Amader Gram employees under a license which will provide such use for the current and expected expanded numbers of our health care workers through 2028. Combined with the Amader Gram developed wireless broadband capacity through the Rampal upazila, this system provides rapid texting, verbal, and visual image messaging communication capacity among health care workers.
- Amader Gram initiated a Rampal Project to describe the demographic, ecological, economic and health conditions of Rampal residents comprehensively (56: Love, Rampal Project, 2015). We are now in the process of analyzing the first data from 5,000 households and 15,000 adults, which will provide a significant window on local residents’ lives.
- In late 2021, recognizing that better addressing social economic factors—social determinants of health-- gives the greatest returns on health metrics, we encouraged the creation of a Rampal Forward Community Initiatives program (21, 38: Marmot, 1999; Frieden, 2015) (APPENDIX II). The initial focus of the

committee has been in seeking community input, and in defining priority activity areas.

- Linkages to current health providers. Based on the premise that ecosystem relationships matter most, we propose to mobilize and bring together in regular meetings the 90 upazila health services workers from the current health complex and ambulatory facilities and the traditional medical practitioners in the upazila. Amader Gram will offer that its role will be to help the attendee groups by effecting social mobilization around health, with training in acute communicable disease diagnosis and management. In these gatherings, we need to champion critical values: concern for others, equality, empowerment of women, justice, transparency, accountability, and honesty.



Photo 1: An Amader Gram Employee reading her values pledge card. The signed statement on the card reads: “As an Amader Gram employee I try to practice the following values: trustworthiness, fairness, accountability, transparency, honesty, respectfulness, non-discriminatory actions, privacy-respecting behavior, cleanliness, competence and efficiency in my work”.

Through the activities of a community health organizer, we propose to listen to upazila health workers’ concerns, voice trust in their capabilities and opinions, take their sides, identify what they want and say they need (anticipating that this

will be better equipment in particular), give them power (which will increase their curiosity and innovation), and make them a part of the Rampal Forward Initiative. Overall, we need to help these health care workers to be champions of high-quality care. These allopathic and traditional medicine upazila health workers and the Ministry of Health, and other national/loco-regional health organizations- Diabetes Association, Khulna Eye Hospital, National Heart Foundation, National Immunization Program of Bangladesh- need to be helped toward building a high-quality combined current government/Amader Gram primary care model in this upazila. We anticipate, as a general premise, trying to have the current upazila services be better organized, trained and equipped to provide acute communicable disease care.

- Development of specialist tele-consult network
- In late 2022, beginning Amader Gram electric rickshaw and riverboat transportation services.
- These efforts will occur in the context of major success in decreasing maternal and infant mortality in Bangladesh over the last 30 years through community-based paraprofessional staff care models.

Re#2: Comprehensiveness

Current service model disruption with: (27, 57: Christensen, 2009; Gawande, 2021):

Ambulatory care

- Development of network component organizational efficiencies, building on experience over 11 years in an Amader Gram Breast Care Center with over 22,000 patient visits (25, 27, 31, 34, 58: Christensen, 2009; Nahar, 2016; Duffy, 2018; Asch, 2019; Love, 2019).
- Planned increased use of information technologies: enabling routinizing and simplifying multiple tasks with a highly integrated and automatic linkage-rich customized user and Bangladeshi computer science co-developed EMR (vide infra #5), provider to provider communications (with our Microsoft Teams network), and broadband internet easily accessible services (APPENDIX IV).



Photo 2: This Amader Gram Breast Care Center medical assistant is entering data into a patient's electronic medical record.

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- High (estimate 7:1) paraprofessional to physician staff ratio, with all staff salaried. With record-keeping, and routinized processes achieved by breaking medical interactions and services into component tasks undertaken by paraprofessional specialists (APPENDICES IV AND V). (25, 27, 31: Christensen, 2009; Asch, 2019; Love, 2019)
 - Planned maximal use of point-of-care diagnostic tools: Oximetry, spirometry, EKG, ultrasound (breast, gynecologic, abdomen), and on-site basic blood testing (complete blood count, basic biochemistry studies, urinalysis) and radiologic imaging (Chest X ray, and bone views) (APPENDICES V AND VI) (25, 58-61: WHO, 2009; Moore, 2011; Love, 2019; Diaz-Gomez, 2021).



Photo 3: Use of point of care ultrasound in the doctor's office to image many different organs is inexpensive and accurate. Here the image is from a breast ultrasound examination, one of over 22,000 done in the Amader Gram Breast Care Center. The WHO estimates that a majority of medical imaging can be done with ultrasound.

- Planned use of diagnostic pathway and treatment guidelines (25, 27, 30, 34, 50, 58: Grimshaw, 1993; Christensen, 2009; Nahar, 2016; Duffy, 2018; Asch, 2019; Love, 2019)

Virtual (tele-medical) care

Context: majority of regional residents do not have personal computers so the richer levels of tele-health care being offered in high-income countries are not immediately feasible and practical. Thus, this Amader Gram developing system is really providing cell phone users limited services on an unscheduled basis. Over time however, the Amader Gram extensive use of the Microsoft Teams communications platform offers the possibility of more significant and substantive tele-health visits. The system is designed to operate as follows:

- Village Health Workers' staffing 24/7.
- EMR-guided interviews and record-keeping
- Virtual VHV > Medical assistant > Medical officer case management
- Emergency/urgent care evidence based-guidelines

Community-oriented care is planned as follows:

- VHV and Amader Gram-trained workers (CHVs) in every village.
- Linkages to current allopathic and indigenous health care providers.
- Equipped with cell phone, tablet computer, scale, tape measure, blood pressure monitor, non-contact thermometer, oximeter, respiratory peak flow meter, stethoscope, glucometer, oral rehydration salts, albuterol inhaler.
- Common problem evidence-based guidelines

- Disease registration templates and case definition guidelines (35: Horn, 2020).
- Development of operations with virtual care services with ambulatory care center.



Photo 4: These Amader Gram community health care workers are cellphone empowered and enthusiastic about bringing high quality primary care services to each of their Rampal upazila villages.

Re#3: Revenue and payment models:

Revenues from both open/formal and expected but informal fee-for-primary care services can never by themselves be adequate to cover expenses, yet this is the dominant current model globally, which circumstances explain basically why this primary health care component of health services is struggling and often of poor quality. As Christensen has suggested, significant business model disruption is needed, and Amader Gram proposes a salaried staff system with a multi-source revenue-generating model, seeking income in the following ways (27: Christensen, 2009):

*Subscription system. In 2021, we initiated a system under which, with payment of a one-time family membership fee of \$3 and an annual fee of \$12, each member of a family of 4 could receive ambulatory care visit care at the Amader Gram Sreefoltala clinic at no charge, and diagnostic tests services at 50% of the 50% of market-cost prices (set to make the services more affordable for Rampal residents). We propose this basic arrangement for the new ambulatory care clinic. In particular, we propose that certain, common problem guideline-recommended point-of-care testing (oximetry, spirometry, EKG, ultrasound) be considered part of no-charge visits, which will be a substantial benefit for subscribers.

*Federal line-item annual support for approximately 15% of the annual operating costs budget (continuing support which has been in place for the last 5 years)

*Fees for services: for ambulatory and emergency visits and diagnostic tests for non-subscribers, only of a formal system type. Basic visit rates will be on sliding income scales (which we have successfully used for several years in the Amader Gram Breast Care Center) and vary depending on point of care diagnostic services (oximetry, spirometry, EKG, ultrasound). In the Amader Gram Breast Care Center in Khulna for several years now, we have included bilateral breast ultrasound examinations as part of a basic visit.

*Special consultant and other services Possibilities include medical oncology services; ambulance and transportation services.

*Funding for research projects focusing on climate change adaptation strategies and hypertension, extending the Rampal Project comprehensive data picture to greater numbers of residents (56: Love, Rampal Project, 2015).

*Philanthropy International/American partnership with different University/Institutes providing American taxpayers with a 501c3 organizational mechanism for donations.

Through these revenues' sources, we will seek to cover our operational budget completely by 2026 without seeking cross subsidization from diagnostic testing and hospitalization and surgical services, which are planned in the future.

Re#4: Workforce/physician conditions

The afore-noted Padma River bridge, Rampal train station, Bagerhat airport and expanded highway will dramatically increase access to the Rampal upazila and the Amader Gram Medical campus (Figure 1). This greater access will make working at these facilities more attractive to health professionals.

We will continue to emphasize the central roles of physicians in all physicians to play such roles with significant support. Specifically, we will continue to implement staffing with a high paraprofessional to physician staff ratio and have record keeping and routinized processes achieved by breaking medical interactions and services into component tasks undertaken by paraprofessional specialists > improved efficiency. The goal is to get to mostly routinized care with exception management as Amader Gram has been doing in its Breast Care Center (25, 27, 31: Christensen, 2009; Asch, 2019; Love, 2019). This system, with health record technicians and medical assistants gathering and recording visit data in structured processes, followed by medical officer review, which information is also recorded by a medical assistant, and described in detail in APPENDIX IV, mirrors the system developed in the department of Family Medicine at the University of Colorado (63, 64: Wright, 2018; Goroll, 2017). Key to the success of this model system is planned intense training (APPENDIX VIII) (63: Wright, 2018). Our systems mean limited paper and EMR entry activities for physicians with major paraprofessional record keeping. The user-friendly and work-facilitating EMR (Vide infra #5) we will develop is further designed to address oft-cited complaints about such systems by physicians and to be decision-support assisting.

Re#5: Digital systems/training

Electronic medical record use is clearly associated with improved quality of care, better health outcomes, increased efficiency of care, reduced errors, and decreased utilization of health services (65: Menachemi, 2011). We cannot seriously talk about sustainable high quality primary health care without electronic medical records. Well-functioning EMR systems are the critical glue for integration of medical care, and comprehensiveness of care. Commercially available EMRs come with significant direct and indirect financial burdens associated with their implementation (66: Gawande, 2018). Additionally, the majority of commercially available EMR systems are mostly and significantly complicated, difficult to use, impractical, user-unfriendly, un navigable, inflexible, not interoperable, not structured for clinically useful record searching, overloaded with ever-added on features of limited value, and are grounded in major billing, and regulations-requiring functionalities (coding and insurance data e.g.) and scheduling (63, 66: Gawande, 2018; Goroll, 2017). Open source EMR systems inevitably demand customization and adaptations. Amader Gram has taken steps to develop an EMR in its Breast Care Center, but in moving to its larger integrated ambulatory, virtual and community care model, there is a clear need for a more refined and broader patient care and information-centered teaching, and outcomes-focused EMR, and we will develop such an EMR system (Table 2) (25, 63: Goroll, 2017; Love, 2019). A major source of discontent and limited success in EMR use has been user-developer disconnect, with limited: 1. Careful exploration of diverse users' needs – with repeated exercises of hypothetical user activities, instead outsider/top-down defined functionalities and systems. 2. Multidisciplinary team activity in systems' creation; 3. Care process redesign in parallel with EMR construction; and 4. Experimentation in the creation process (29: Rudin, 2016). These issues will direct the Amader Gram EMR refinement effort.

Table 2

Dominant functionality areas for a patient-care-information-centered-interoperable EMR

- Major diagnoses and health problems list with patient goals, functional status, and social determinants⁺
- Visit records using specific history and physical examination templates^{*}
- Clinical finding or problem, and diagnosis decision-support alerts and linkages
- Intra-record facilitated testing ordering
- Laboratory testing and imaging reports
- Extra-systemic health records.

⁺Template and codebook see Appendix V

^{*}Hypertension⁺, asthma, diabetes, COPD, heart disease, breast problems, breathing problems, gynecological problems, diarrhea, abdominal pain, acute fever/chills, headache/pain, BMI<18, BMI>25, stroke, tobacco smoking, betel-nut chewing, palliative care, general unspecified problem, trauma emergency management (67: Gawande, 2009)

American EMR systems are very patient information- and business operations-directed which accommodate its current medical culture. Across societies there are multiple information technology strategies associated with provision of medical care that are often linked with or part of EMR systems, which, for current cultural circumstances, are not immediately appropriate for the Amader Gram Center: Table 3(18: Mehl, 2014). The table 3 listed functionalities often paralyze EMR operation and significantly distract from the central patient-benefitting roles this tool can play.

Table 3

Functionalities NOT planned as part of the revised Amader Gram EMR

- Billing
- Insurance claim processing
- Scheduling
- Patient education activities and materials or patient portals
- Reminders to providers
- Prescription writing
- Drug interaction alerts
- Provider work planning
- Health member communications
- Coding checks

Clearly, service operations need functionalities like billing and scheduling, and intra-staff communications which can be facilitated by information technologies. For a spectrum of reasons, some most importantly cultural, Amader Gram proposes to conduct these activities under separate, but linked systems.

Absolutely central to the whole digitalization emphasis we will make is the process. As noted above, all-user involvement from the beginning and in ongoing ways in the EMR functionalities' development is crucial, and the connections to the clinical work-flow process need to be continually considered (29: Rudin, 2016). Finally, key to successful EMR implementation is intense and ongoing systematic training, and, as discussed above, having the preponderance of EMR information recording done by paraprofessionals (APPENDIX III) (25, 62, 63: Wright, 2018; Love, 2019; Goroll, 2017).

Re#6: Quality

Our planned quality measures are: diagnostic pathways and treatment guidelines based on metrics for efficacy, safety, efficiency, timeliness, patient-centeredness, and equity; combined with EMR-based report systems to measure guideline use.

Re#7: Quality evaluation and accountability

We will implement quality assurance measures to nurture a culture of accountability: Regular observation and audit of guest host/hostess, registration operator, health

information technologist, medical assistant, and medical officer patient encounters and data entries in EMRs. Regular/weekly case “board” and “guideline” rounds/reviews. Regular surveys of Rampal community residents to evaluate our services: Virtual, Village Health Workers, Outpatient Center, Transportation. Active regular meetings of Community Advisory Board (31, 36: McGlynn, 2020; Scott, 2014). Most critically, however, we plan to institute disease registries and use clear metrics for successful management of the three most common adult noncommunicable diseases in Rampal such as: hypertension (BP<120/80), diabetes (HgbA1c < 6.5) and asthma (FEV1 75%), to evaluate population outcomes (12, 67: Bakris, 2018; National Academy of Medicine, 2021).

PROJECT TIMELINE

YEAR ONE January, 2023-December 2023

Process benchmarks:

Ambulatory center:

Progressive growth to 100 outpatient visits per day: 50% subscriber, 50% fee-for-service

15,000 outpatient visits in first year: 50% subscriber, 50% fee-for-service

10 chest X rays per day: 50% subscriber, 50% fee-for-service

6 X-rays per day: 50% subscriber, 50% fee-for-service

Pathology lab tests 50 per day: 50% subscriber, 50% fee-for-service

Progressive increases in staffing to 4 guest hosts/navigators, 3 registration operators, 3 health technicians, 4 guests navigators, 8 medical assistants, and 4 medical officers.

Rigorous and regular training programs for all staff (APPENDIX III)

Virtual care service:

100 virtual patient visits per day

Community care services:

100 completely trained and equipped VHVs covering all 138 upazila villages.

Visit logs indicating expected numbers of daily and weekly home visits

System and patient outcome benchmarks:

Development of quality-of-care tools and systems: guidelines, checklists.

Registries for Hypertension, Diabetes, and Asthma problems among Rampal residents.

Defining, and then organizing an evaluation system, to meet the new hypertension treatment target of < 120/80 in a specified percentage of Rampal adults with hypertension (67: Bakris, 2018).

Revenue sources targets for 2022- 2026 to cover 100% of operating budget-

- Government support
- Service Subscribers
- Fee for services
- Diagnostic services
- Philanthropy
- Special revenues
- Research grants

FUTURE PLANS

We are mindful of the following issues as we continue our planning processes:

- Successor leaders. From the development of the concept for the Amader Gram Cancer Care and Research Center in 2012 through to the present, Reza Salim and Dr. Richard Love have led the processes. Going forward, new leaders who share the vision described here-within for a community-oriented primary health care program, and then population-health benefitting cancer diagnostic and treatment services, are being actively sought.
- Scaling up the AGCRC itself further beyond the plans described in the current document, with attention to:
 - *Emergency services*
 - *Medical Oncology*
 - *Endoscopy*
 - *Retinal imaging (for diabetes)*
 - *Pediatric care*
- Scaling up the AGCRC- current community government services collaborative model described in this document (68: Cash, 2011). Such efforts will turn on successful implementation of the model and plans over time described here.
- Scaling up the overall Amader Gram Cancer Care and Research Center, specifically with development of:
 - a. A paraprofessional and professional training institute
 - b. Radiotherapy services
 - c. A hospital focusing on surgical treatment for cancer
 - d. An Innovation center for public health research

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APPENDIX I: *Architects' image of two initial Amader Gram Medical campus buildings: Ambulatory care and Diagnostic centers to be completed by June 2023.*



Rampal Cancer Care 1

LIST OF PARTNERS (Until June 15, 2022)

Country	Name	Contribution for	Commitment in USD
Bangladesh	Ministry of Social Welfare	Construction (one time)	2.1 million
Bangladesh	Ministry of Health and Family Welfare	Operating costs (annually with possible increase on demand/year)	120,000
United States	International Breast Cancer Research Foundation (IBCRF)	Land purchase (one time)	70,000
United States	Microsoft	Software, Virtual Health Care solution (License for 10 years)	340,000
Bangladesh	Syed Zahid Hossain, Khulna	Matching fund/Earth work	25,000
Bangladesh	Reve Systems	Lab setup	15,000
United Kingdom	Nurul Islam	Earth Work	5,000
Bangladesh	Ambassador at-Large Mohammad Ziauddin and family	Matching fund	28,000

APPENDIX II:

THE RAMPAL FORWARD INITIATIVES PROGRAM

GOALS

In the Rampal Upazila community:

1. Contribute to improvements in health generally through educational and communication projects addressing communicable (Covid, Flu, Cholera, TB, Dengue, Malaria, Diarrhea) and non-communicable diseases (Tobacco and betel nut chewing habits; exercise); climate change-exacerbated heat, cold and smog caused illnesses; and palliative care.
2. Address social, disability and mental health resident challenges.
3. Improve nutritional status of all.
4. Facilitate climate change adaptation activities.
5. Improve the environment—increase traffic and water safety, waste management-recycling, cleanliness, safety from crime.
6. Increase indicators of educational attainment—numbers completing primary and secondary school, literacy levels.
7. Increase childhood ancillary development opportunities (In for example swimming, sports clubs, activity clubs—chess)

The Rampal Forward Leadership Committee

Chairman: Bishnupada Bagchi, Rtd. Headmaster, Dakra High School, Rampal

Members: Nurul Haque Lipon, Vice-chairman, Rampal upzila Parishad
Md. Nasiruddin, Chairman, Rampal Union Parishad
Sk. Bazlur Rahman, Former Chairman, Rampal Union Parishad

Secretary: Khan Zahid Hossain, Joint Director, Amader Gram

Advisors: Talukdar Abdul Khaleque, City Mayor, Khulna
Habibun Nahar MP, State Minister for Environment, Forest and
Climate Change, Government of Bangladesh
Sk. Abdus Salam, Vice-Chancellor, Islamic University, Kushtia;
Sk. Jalal Ahmed, Retired judge

APPENDIX III:

CREDENTIALS AND FURTHER TRAINING OF PROGRAM PARAPROFESSIONAL STAFF: HEALTH RECORD TECHNICIANS, MEDICAL ASSISTANTS, AND VILLAGE HEALTH WORKERS.

All AG employees:

Computer literacy

Medical assistants

Under Medical Assistant Training Schools (MATS) curriculum

Village Health Volunteers (VHV):

Government/Bangladesh Medical and Dental Council (BMDC) guided 3-weeks training course, with examination for certification

Virtual health care providers:

Government/Bangladesh Medical and Dental Council (BMDC) guided 3-dayes training program

Health record technician, Medical Assistant, and VHV Amader Gram training programs:

Amader Gram will develop rigorous and ongoing EMR implementation and operational training activities, and will facilitate the entire guideline development processes for the 3 component primary care program, calling on currently already developed guidelines and pathways (Grimshaw, 1993; Emanuel, 2017; Nundy, 2021);

APPENDIX IV:

AMBULATORY CARE CENTER PATIENT VISIT FLOW CHART

Welcoming and triage

Guest host and hostess navigators

- Emergency problem > Immediate transfer to Diagnostic Building Emergency Suite
- Communicable disease symptoms > Immediate safety measures instituted; Transfer to isolation patient evaluation room.
- Non-emergent, non-communicable disease visit problem:
Follow compassionate and empathetic courtesies protocol and provide introduction to visit



Welcome center

Guest host and hostess navigators

Audio-visual presentation (10 minutes) about visit procedures, facilities, services, costs, and usual duration, with paper summary handout in particular detailing services prices.



Registration, enrollment and scheduling desks

Registration operator

- Demographic data
- Basic visit fee payment or subscription
- Provision of AG service card



Health data recording offices

Health information technician

- Targeted visit history using selected standard Electronic medical record (EMR) templates¹
- Comprehensive medical diagnoses and problems summary²

Guest navigators



Health education waiting rooms with big screen A-V programs running continuously

Patient examination rooms³

Medical assistant

- Vital signs⁴
- Complete and record visit purpose history using EMR template(s)¹
- Edit, as appropriate, medical problems and diagnosis summary.
- Conduct and record physical Examination following EMR template(s)¹
- Conduct and record point-of-care testing per diagnostic pathway guidelines⁵

Medical officer

- Review and edit EMR history information
- Confirm physical findings and edit EMR
- Review, edit and complete patient medical problems and diagnoses summary
- Aggregate, synthesize and analyze patient data
- Follow EMR automatic linkages enabling optimal clinical decisions for evidence- based information and management guidelines relative to patient specific problems and diagnoses
- Recommend visit disposition (recorded in EMR by medical assistant):
 1. Summary of problem(s) addressed
 2. Recommended diagnostic tests
 3. Tele-consultations to be promptly arranged and conducted with a written record (anticipate that a major fraction of specialty referrals can be handled virtually, and AG has been developing a network of specialists willing to provide such services).
 4. Recommended medical interventions
 5. Patient education: Providing patients with understandable, critical, and targeted-specific information
 6. Follow up visit plans

7. Paper copy of visit record provided to patient with names of the health information technician, medical assistant, medical officer and teleconsultant providers, and contact information for the services (with this visit disposition texts in both English and Bangla)
-

¹EMR Templates: Hypertension; Heart disease; Diabetes or pre-diabetes; Asthma; Chronic Obstructive Pulmonary Disease; BMI<18.5; BMI>25.0; Anemia: hemoglobin <12.0 g/dL women; <14.0 g/dL men; Breast problem; Gynecological problem; Palliative care; Undefined medical problem

²Major medical problems and diagnoses summary: Non communicable diseases; communicable diseases; Allergies/adverse reactions; Immunizations; Habits; Current medications; Functional status, major patient goals and concerns, and barriers-social determinants for achieving optimal health. This last category is critical: private, personal questioning about social needs after establishing relationship in this sequence of medical history-taking can identify key factors which will determine whether and how any medical interventions can be successful (Marmot, 1999; Nundy, 2021).

³Dedicated examination rooms for Hypertension; Diabetes; Respiratory problem; Breast problem; Gynecological problem; Heart disease; Nutritional problems: low or high BMI; Rheumatologic-orthopedic problem: back, neck and joint complaints; Neurological problem: headache; Isolation-Communicable disease problem/immunizations; Behavioral problems: tobacco abuse, betel-nut chewing, physical therapies.

⁴Vital signs: Height, weight, Blood pressure x 3, Pulse, Respiratory rate, Temperature, Anthropometric measures: waist circumference, triceps and abdominal skin fold thickness.

⁵Point-of-care, in office testing: Oximetry; spirometry; EKG; breast, gynecologic, and abdominal ultrasound

APPENDIX V:

- EXAMPLE TEMPLATES FOR NEW AMADER GRAM EMR FOR MAJOR MEDICAL PROBLEMS AND DIAGNOSES, AND FOR HYPERTENSION.
- AMADER GRAM COMMUNITY-ORIENTED PRIMARY HEALTH CARE PROGRAM
- ADULT MEDICINE EMR
- MAJOR MEDICAL PROBLEMS AND DIAGNOSES SUMMARY TEMPLATE

Version 1: 12/21

Non communicable conditions:

Communicable conditions:

Allergies/adverse reactions:

Immunizations:

Habits:

Current medications:

Functional status and patient major concerns and goals:

Barriers and social determinants for health

CODEBOOK

Active noncommunicable disease/conditions and date of onset, such as:

- Hypertension
- Heart disease: ischemic heart disease; Valvular heart disease; Cardiomyopathy, type uncertain
- Diabetes or pre-diabetes (Hemoglobin A1c >6.0)
- Asthma
- Chronic obstructive pulmonary disease
- BMI < 18.5
- BMI > 25.0
- Anemia <12.0 g/dl women; <14.0 g/dl men
- Any abnormal blood test such as lipidemia, elevated liver or kidney function measurements

Active or inactive communicable diseases and dates of infections such as:

- Tuberculosis

Barriers and social determinants for health:

- Poverty
- Remote homesite
- Compromised food supply
- Compromised home circumstances (lack of toilet facilities or substantive shelter from the weather; more than 5 persons or seriously ill person(s) in the home)
- Major belief in indigenous medicine
- Absence of regular source of financial income in family

ADULT MEDICINE EMR

HYPERTENSION TEMPLATE FOR HISTORY AND PHYSICAL EXAMINATION

Version 1: 12/21

History

Date: Month Day Year

Age today: years

Patient-reported onset of hypertension: Year:

Number of years with hypertension:

Other medical problems important in planning management:

Has the patient ever been told that he/she has a heart murmur?

YES NO

Specific symptoms currently the patient attributes to presence of hypertension or cardiovascular problems:

Is the patient currently a cigarette smoker? YES NO

If patient was ever a cigarette smoker, numbers of years patient smoked:

Does the patient have any first-degree relatives (mother, father, brother, or sister) who had had a major cardiovascular disease event before age 60 (a heart attack, sudden death, stroke, heart failure)? YES NO

Previous laboratory or imaging test results relevant to hypertension:

- BUN: No test done
Test done. Date and result:
- Creatinine: No test done
Test done. Date and result:
- Cholesterol/lipids: No tests done
Tests done. Date and results:

- Hemoglobin A1c: No test done
Test done. Date and result:
- Urinalysis for microalbuminuria: No test done
Test done. Date and result:
- Chest X ray: No image taken
X ray done. Date and results:
Heart enlarged: YES NO
Aortic or coronary artery calcification: YES NO
Any abnormality: YES NO
- Electrocardiogram: Tracing done NO
EKG done YES. Date and result:
Increased voltage: YES NO
- Echocardiography: No study done
Echo done. Date and result
- Carotid ultrasound: No study done
Ultrasound done. Date and result:

Does the patient have exposure to cooking fire smoke in his/her home:

YES NO

If patient is a woman: Taking oral contraceptives YES NO

NOT APPLICABLE

Patient reports moderate or greater physical activity during:

Less than 3 hours per week

3-5 hours per week

More than 5 hours per week

Does the patient take an aspirin every day? YES NO

Current treatment for hypertension: NONE

OTHER:

Targeted physical examination

Date: Month Day Year

Vital signs

Weight:

Height:

Estimated B.M.I:

Blood pressure (3rd measurement at rest):

Pulse rate: R and L Pulses simultaneous YES NO

Respiratory rate:

Triceps skinfold thickness: mm

Waist circumference: cm

Hip circumference: cm

Retinal fundus imaging

Hypertensive retinopathy grade:

Thyroid Palpable/enlarged: YES NO

Carotid artery Right Bruit YES NO

Left Bruit YES NO

Posterior tibial artery pulse palpable: Right YES NO

Left YES NO

Pedal/leg edema present: Right YES NO

Left YES NO

Lid lag present YES NO

Cardiac impulse: Normal Increased

Heart sounds: S1 Intensity Normal Increased

S2 Intensity Normal Increased

S2 Increased amplitude and or duration

in aortic area YES NO

Murmurs: None

Present

S3 Present None heard

Lungs: Right No abnormal sounds over all fields

Abnormal sounds:

Left No abnormal sounds over all fields

Abnormal sounds:

Abdomen Liver size estimated to be: Normal

Increased

Spleen: Not felt

Tip felt

Clearly felt - enlarged

Neurological examination:

Is speech fluent: YES NO

Can patient comprehend regular speech: YES NO

Can patient repeat 3 common words: YES NO

Visual fields Intact to right and left and up and down

YES NO

Facial muscles. Smile: Normal Asymmetric

Showing teeth: Normal Asymmetric

Fine finger tremor: PRESENT ABSENT

Gait: REGULAR YES NO

STEADY/STABLE YES NO

Strength: Arm raise right NORMAL WEAK

Arm raise left NORMAL WEAK

Leg raise right NORMAL WEAK

Leg raise left NORMAL WEAK

Reflexes:

Brachial right: NORMAL HYPER DECREASED

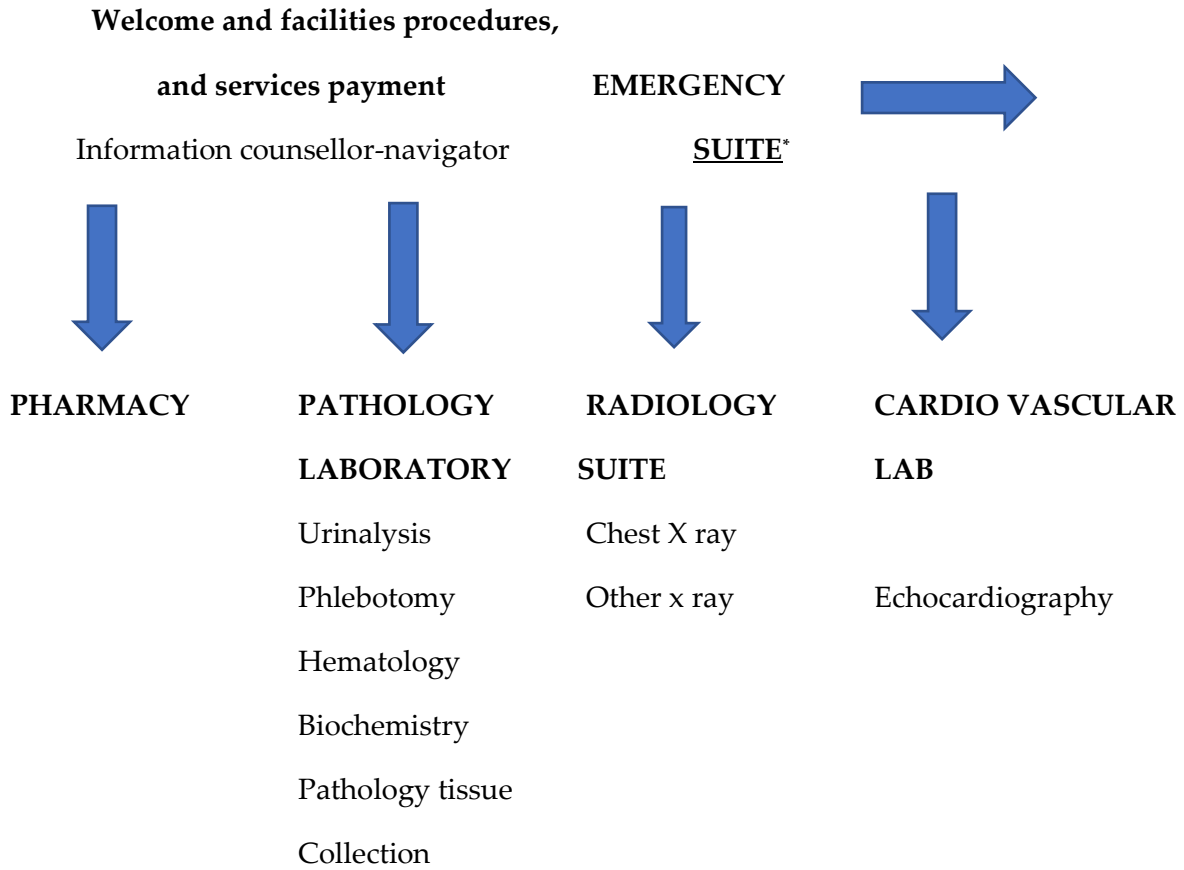
Brachial left: NORMAL HYPER DECREASED

Knee right: NORMAL HYPER DECREASED

Knee left: NORMAL HYPER DECREASED

APPENDIX VI:

DIAGNOSTIC CENTER FACILITIES AND PATIENT VISIT FLOW CHART



*With point-of-care ultrasonography for rapid evaluation of multiple conditions (Diaz-Gomez, 2021)

PALLIATIVE CARE CENTER

VIRTUAL CARE CALL IN CENTER

APPENDIX VII:

AMADER GRAM COMMUNITY AND VIRTUAL MEDICAL CARE SYSTEMS

These systems have and will further significantly increase health care accessibility for upazila residents and are often important first steps in building a trusting and caring relationship with the community.

Village health volunteers (VHVs)

Current status:

- 78 village health volunteers are covering 86 villages in 6 of 10 Unions with 138 villages in Rampal Upazila); (estimate needing 100 Village Health Workers (VHVs) (see below) to cover all Upazila villages)
- These current health service providers earn limited incomes at present by providing: glucose testing, blood pressure measurements,
- Such village health workers provide a trustworthy face of the AG C-O PHCP in their communities.

With major training, we envision expansion of the portfolio of these village health volunteers to become VHVs:

- With linkages to current allopathic and indigenous health care providers
- Equipped with cell phone, laptop computer, scale, tape measure, blood pressure monitor, non-contact thermometer, oximeter, respiratory peak flow meter, stethoscope, glucometer, oral rehydration salts, albuterol inhaler.
- Using common problem evidence-based guidelines, disease registration templates and case definition guidelines (Horn, 2020).
- Using virtual care services to access ambulatory care center medical expertise.

With these resources, these VHVs will:

- Access patient EMR and enter visit record.
- Assist patients in interpretation of any outpatient facility visit records.
- Play major roles in coordinating and caring out home palliative care
- Play major roles in completion of community registries of major illnesses for hypertension, diabetes, asthma, and malnutrition.
- Provide multiple types of home care (hypertension diabetes and asthma checks).

Virtual care call-in center (available 24/7) (Asch, 2019; Nundy, 2021)

- Health supervisor-counselors (trained as VHVs) with considerable field experience in health issues assessment answer urgent patient telephone calls. They record demographic data registering patients into the Amader Gram system, and then create a brief problem record.



- Medical assistants with 4 years of formal medical training then interact with callers and then depending on problem(s)



- Medical officers consult and recommend course forward.

This system has had 2000 patient encounters over the last two years—essentially the Covid pandemic period—with a profile of the calls agendas defined as:

- I. Hypertension/need blood pressure check

What needs to happen now under support of the current proposal is to upgrade this system with respect to the quality of the care provided by specific training outlined in **Appendix III**