

Supplementary File 1

GeKo Services Objectives

1. To perform a comprehensive geriatric assessment utilising the Pictorial Fit Frail Scale-Malay version (PFFS-M) and identify frailty (PFFS-M score 6 and above) at baseline; and 3 and 6 months after GeKo clinic intervention.
2. To create a personalised care plan that is reviewed routinely
3. To utilise a biopsychosocial approach to involve the multidisciplinary team
4. To reverse PFFS-M scores through disease management, exercise, nutritional interventions, review of prescription medications, cognitive interventions, psychological interventions, and social interventions that are tailored to the individual requirements of each patient.
5. To promote social participation and community integration
6. To enable patients and caregivers to self-manage through family meetings, continuous education, and group activities.
7. To coordinate and manage care transitions across settings
8. To assist patients and their caregivers in traversing the complexities of health and social care systems towards optimal outcomes.
9. To integrate with relevant aged- care services (social welfare, non-profits, etc.) and promote social engagement and community involvement

GeKo Clinic Service Providers

GeKo service providers in the primary care consist of a family medicine specialist, medical officer, assistant medical officer, dentists, nurses, pharmacist, nutritionist/ dietitian, psychological officer, physiotherapist, occupational therapist, and healthcare assistant. There

were three levels of GeKo services delivery, depending on availability of skilled healthcare professionals in the primary care clinic. Metropolitan areas are often better resourced with more comprehensive health services compared to the rural areas, therefore, various levels of implementation is required to ensure accessibility to optimum care for the older persons across Sarawak state. Level 1 GeKo was led by a family medicine specialist with geriatrics training; level 2 GeKo service was led by a GeKo-trained family medicine specialist who have not undergone geriatrics training; and level 3 GeKo was led by GeKo-trained doctors (non-family medicine specialists).

A family medicine specialist with geriatrics training have undergone fellowships and certificates of added qualifications in geriatrics under the Ministry of Health Malaysia. All GeKo service providers have undergone GeKo-training conducted by developers of the GeKo services implementation module, which was a two-days intensive training course, which included 8 hours lectures on GeKo services and intervention programmes, followed by hands-on workshops and small group activities conducted by professional categories.

GeKo Case Manager

A case manager at the GeKo clinic was a health staff who have undergone a 2 days-GeKo case manager training, co-located with the other GeKo health service providers and responsible to the GeKo clinic family medicine specialist and GeKo-trained doctor. The role of the case manager was to functions as the single point of contact into the GeKo clinic services, triages incoming referrals received through the GeKo specialist or doctor, and schedules patient appointments. The role of the case manager also include performing the basic GeKo clinic assessments including blood pressure, pulse rate, timed up and go, and grip strength measurements, facilitate with completion of the Pictorial Fit Frail Scale- Malay version by the

patients or their primary care givers, coordinate care with the GeKo family medicine specialist or doctor, manage the array of services needed by the patient, ensure that the client receives the required services based on the care plan developed by the GeKo specialist/ doctor, advocate for the client as required and ensure periodic reassessments were done by the GeKo healthcare providers as part of monitoring of the client's clinical progress. The GeKo service providers are responsible to the case manager for the delivery of care as described in the care plan although the case manager does not have direct authority over service providers.

The GeKo Clinical Services Implementation module

The GeKo Clinical Services implementation module developed by a multidisciplinary team which included a family medicine specialist, geriatrician, medical officers, physician assistants, nurses, pharmacists, physiotherapists, occupational therapists, psychologists, nutritionists, and healthcare assistants (HCA). The GeKo clinical module is a resource for health professionals providing GeKo services, which provides clinical recommendations for further assessment and a range of potential interventions for deficits identified in PFFS-M assessment. The GeKo clinical services implementation module is available in softcopy at the Sarawak State Health Department website.

GeKo Registry

The GeKo Registry is a web-based medical record and referral system developed in May 2023. Prior development of the GeKo registry, clinical documentations were done on the patients' case notes and clinical data were manually entered into an excel spreadsheet. The GeKo registry was designed to improve data recording and storage, enhance GeKo clinic services coordination, and facilitate seamless referral mechanism and communication

between the multidisciplinary GeKo clinic healthcare providers through this electronic medical record system. GeKo healthcare providers document their consultations and assessments in the GeKo registry which is accessible to all GeKo service providers. The patients will also be referred to the relevant multidisciplinary intervention programmes via the GeKo Registry. Once referrals have been made to the respective healthcare provider via the GeKo registry, an email will be sent to the healthcare provider who is being referred. The GeKo Registry enables the GeKo family medicine specialist to coordinate and oversee the multidisciplinary intervention and clinical progress.

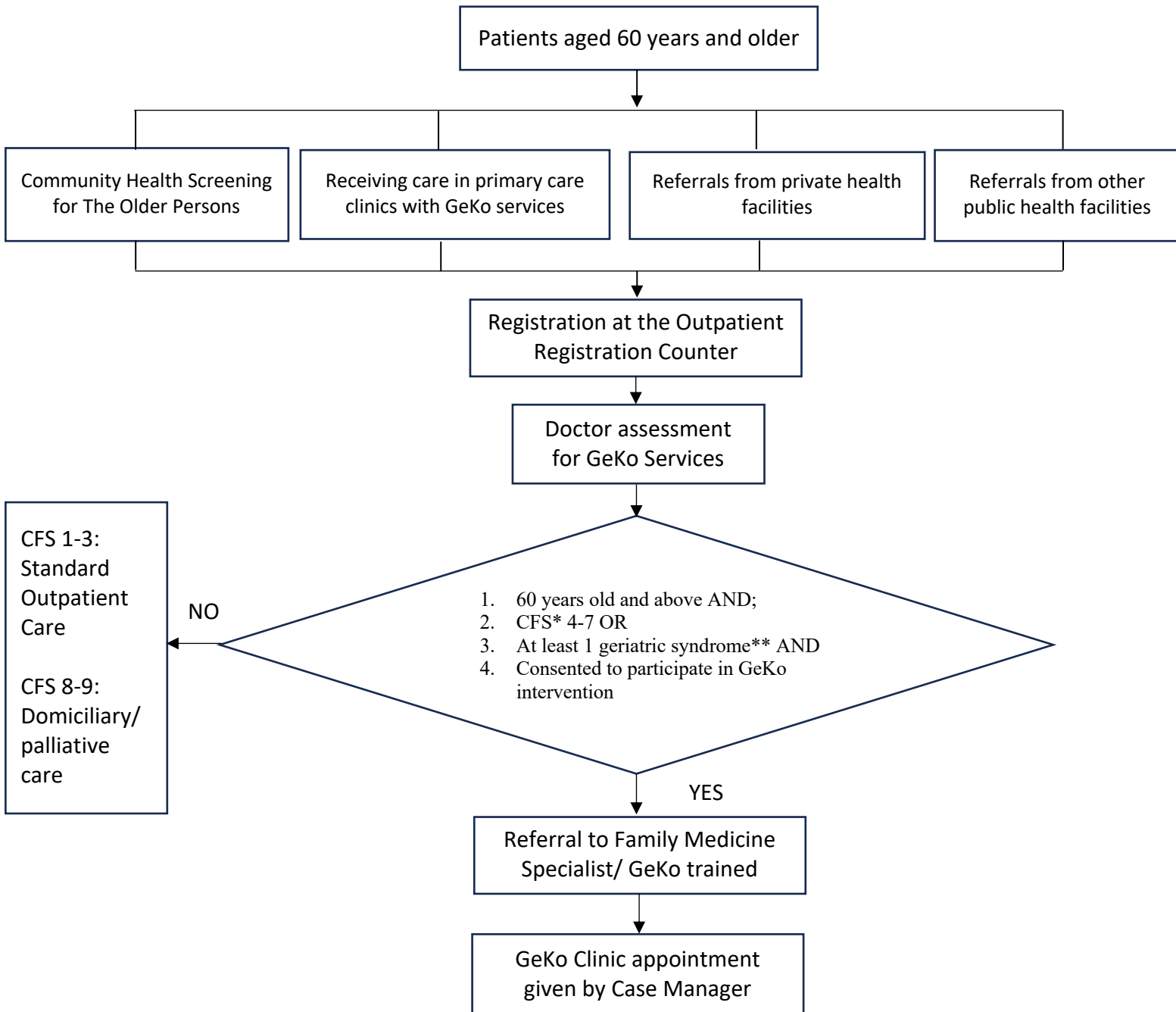
GeKo Patient Identification Pathway

Patients who are eligible for GeKo services are identified through various means: 1) Community health screenings for the older persons using the "Older Persons Health Screening Form" (Borang Saringan Status Kesihatan Warga Emas), as mandated by the Ministry of Health Malaysia (Supplementary file 1); 2) Older persons seeking care for acute or chronic medical conditions at primary care clinics offering GeKo services; 3) Referrals from the private health facilities including hospitals and private general practice clinics; and 4) Referrals from public health facilities including hospitals and primary care centres without GeKo services (Figure 2).

These patients will first be assessed by the doctors in the primary care centre for eligibility into the GeKo integrated services. Patients eligible for GeKo integrated services are; 1) Aged 60 years and older, 2) Have clinical frailty scale (CFS) scores between 4 to 7, or have at least one of the following geriatric syndromes: multi-morbidities, uncontrolled non-communicable diseases, polypharmacy, cognitive and behavioral complaints, mood disorders, recurrent falls, nutritional problems, chronic pain, incontinence, or insomnia; and 3) Must also be willing to participate in the GeKo assessment and intervention programs. The

primary care doctors will refer these patients to the GeKo Family Medicine Specialist or GeKo-trained doctor for admission into the GeKo clinic and a GeKo clinic appointment will be given by the Case manager.

Figure 2: GeKo Patient Referral Pathway in Primary Care Centres



GeKo clinical pathway

On the day of the appointment at GeKo clinic, the case manager will complete the patient's GeKo clinic registration including their sociodemographic information in the GeKo Registry. The GeKo case manager then proceeds with completing the baseline clinical examinations including the Pictorial Fit Frail Scale- Malay version (PFFS-M), blood pressure and grip strength measurements, anthropometric measurements, the Timed-Up-And-Go-Test, and a body composition analysis using the Bioelectrical Impedance Analyzer. The PFFS-M is a pictorial frailty screening tool that is reliable and valid for use in Malaysian primary care clinics. It evaluates fourteen health domains including mobility, function, cognition, social support, affect, medication, incontinence, vision, hearing, balance and aggression; which are important domains evaluated in a Comprehensive Geriatric Assessment (CGA) and the WHO-ICOPE (Integrated Care for the Older People) person-centred assessment in primary care.

¹¹ The cutoffs for PFFS-M scores were (i) 0–3 for no frailty; (ii) 4–5 for at-risk of frailty; (iii) 6–8 for mild frailty; (iv) 9–12 for moderate frailty; and (v) 13 and above for severe frailty.

Upon completion of these assessments, the patient is then seen by the GeKo family medicine specialist or trained medical officer who undertakes further assessments and develops a personalized care plan with the patient and their caregiver, which include multidisciplinary team intervention, based on the recommendations in the GeKo clinical services implementation module, available in the Sarawak State Health Department website.

GeKo clinical assessments

Pictorial Fit Frail Scale-Malay version (PFFS-M)

The PFFS-M is the Malay-language version of the pictorial fit frail scale (PFFS) that assesses frailty in 14 health domains, including mobility, function, cognition, social support, affect,

medication, hearing, vision, incontinence, balance, and aggression, with scores ranged from 0-43, with higher scores indicate greater frailty.

Katz Activities of Daily Living

Katz ADL measures the ability of an individual to perform 6 categories of activities required in daily living, including functions, bathing, dressing, toileting, transferring, continence and feeding. The scores ranged from 0-6, with lower scores indicate higher level of independence.

Lawton Instrumental Activities of Daily Living

Lawton IADL measures the ability of an individual to perform complex activities including home maintenance, financial management, shopping for groceries or personal items, travelling independently on public transport or drives own car, managing one's own medications and being able to prepare one's own meals. The Lawton IADL scores ranged from 0 to 8, with lower scores indicate a higher level of dependence.

The Timed "Up and Go" (TUG) test

The Timed "Up and Go" (TUG) test is a reliable and practical performance test of physical mobility by evaluating the time taken by an individual to stand up from a standard arm chair, walk a distance of 3 meters, turn and return to the chair and sit down again.²⁵ TUG scores < 10 seconds is normal.

GeKo intervention programmes

The GeKo clinics provide for the following intervention programs:

- 1) Frailty InTervenTion with ExeRcise (FITTER) which is a physiotherapist-led programme delivering on group and individual exercise prescriptions to improve mobility, strength, balance and functional ability.
- 2) FINT (Frailty Intervention with Nutritional Therapy); a nutritionist/dietician-led programme, delivering on assessments of malnourished older persons, and consultations on nutritional optimization.
- 3) FLIP (FraILty Intervention Prescriptions review); a pharmacist-led intervention, providing pharmaceutical care, improving medication adherence, and educating patients and their caregivers.
- 4) FLOP (FraILty intervention with Occupational therapy); an occupational therapist-led programme delivering on targeted rehabilitation programs to optimize the older persons' ability to perform basic and instrumental activities of daily living
- 5) FEPHI (Frail Elderly Psychological Health Intervention); a psychology officer-led programme delivering psychological intervention for older persons to improve health-seeking behaviour and address mental health issues
- 6) FLOS (FraILty intervention with Oral health Services); a dentist-led intervention to optimize oral health of the older persons through joint dental consultations and procedures.
- 7) 3 T (Tea Talk Thursday), a social health intervention through social activities through relevant holistic aged-care related topics including health, social, legal, financial, welfare etc delivered by health care professionals and various other agencies.

The recommended clinical interventions were described in the GeKo clinical services implementation module.

Review and Discharge

The GeKo Family Medicine Specialist or doctor will examine the patients using the PFFS-M after 3 months of multidisciplinary management (Figure 3). If the PFFS-M score improves, the GeKo specialist or medical officer may decide to discharge the patient from the GeKo intervention plan to receive standard outpatient care. During standard outpatient care, should the patient manifest clinical decline resulting change in the patient's frailty status or PFFS-M scores following a stressor event, the patient will be referred back to GeKo clinic. If the PFFS-M score does not improve after 3 months of GeKo intervention, the patient requires a comprehensive re-evaluation by the GeKo specialist or medical officer, as well as a review of the patient's ongoing care plan.

Figure 3: GeKo Service Flowchart

