NCD MALAYSIA

National Cancer Society Malaysia
Giving Hope Celebrating Life

POLICY BRIEF

Cardiovascular-Renal-Metabolic (CRM) syndrome in Malaysia: Bridging the care cascade gap

By Murallitharan M., Sara Manzoor, Leevyadhashiny Ganasan, Nur Nadiah Bakar, Sathiyavani Subramaniam, Yanesha Ramalingam, Mohd Fadzrel Abu Bakar, Jason Chin Yu Aun, Mandy Thoo, Chan Wan Thung, Thaarenee Wiswannadan, Kavinash Loganathan, Saunthari Somasundaram

In collaboration with:

Boehringer Ingelheim

NP-MY-100216
NCSM-02/2026

Executive summary

Cardiovascular-renal-metabolic (CRM) syndrome, affecting heart, kidney and metabolic health, presents a growing health burden in Malaysia. While community screening can identify elevated CRM risks, many individuals are not consistently linked to diagnosis, treatment, follow-up and long-term control. This care cascade gap limits screening impact and leaves high-risk individuals without timely support.

Evidence from the NCSM-Boehringer Ingelheim Saring@Komuniti programme, which screened 5,000 individuals in the Klang Valley, revealed a substantial hidden burden of CRM-linked disease. Among those identified with kidney disease, 100.0% were unaware of their disease status. High unawareness was also seen among those with diabetes, hyperlipidaemia, hypertension, and obesity. Among individuals classified with CRM syndrome, 1,418 of 1,609 individuals, or 88.1%, were unaware of their CRM risk status.

These findings highlight the need to strengthen the CRM care cascade, ensuring that screening results translate into diagnosis, treatment, retention in care and risk-factor control.

Call to action

The policy brief calls for:

- Developing an integrated CRM care pathway
- Strengthening follow-up systems for abnormal screening results
- Managing cardiovascular, renal, and metabolic risks as an integrated clinical cluster
- Improving referral, shared care, and back-referral mechanisms
- Reducing barriers to continuity of care
- Measuring cascade outcomes, not screening activity alone

In summary, bridging the CRM care cascade gap can help Malaysia move beyond risk detection alone. By linking screening to sustained care, Malaysia can improve early intervention, reduce avoidable complications and strengthen outcomes for people living with overlapping CRM risks.

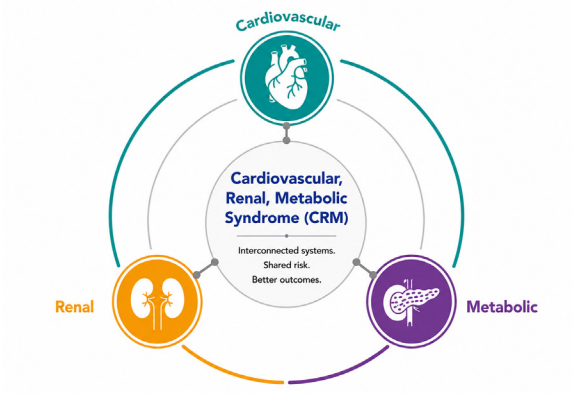

Figure 1: The cardiovascular-renal-metabolic (CRM) syndrome interconnected framework

An introductory view to Cardiovascular-Renal-Metabolic (CRM) syndrome

Approximately two million Malaysians are living with a combination of diabetes, obesity, hypertension, and hyperlipidaemia.[1] The worsening of these diseases can lead to organ failure – particularly of the kidney.[2,3] In 2024, more than 50,000 people in Malaysia had undergone dialysis or kidney transplantation.[4]

The diseases listed above are closely interlinked, largely preventable, and could be detected, treated, and managed in the early stages.[2,5,6] However, in many settings, they are approached independently of each other – and only managed together when they become severe – resulting in complications including premature mortality.[5,6,7]

Emerging evidence shows that treating and managing these interconnected conditions together and early – even during pre-diabetes or pre-hypertension – can improve individual outcomes significantly.[6,8,9] Detecting them early is key.[2,6,7] This integrated and holistic approach, increasingly practiced worldwide, addresses the combined burden as the Cardiovascular-Renal-Metabolic (CRM) syndrome.[7,10]

CRM syndrome, a systemic disorder, results from the interaction between metabolic risk factors such as obesity, Type 2 diabetes, hyperlipidaemia in tandem with cardiovascular and kidney dysfunction. Each of these risk factors is caused by a combination of genetic, behavioural, physiological, and environmental factors, which – when occur together – worsen the effects of each individual disease and hasten the development of complications and even death.[5,7,10]

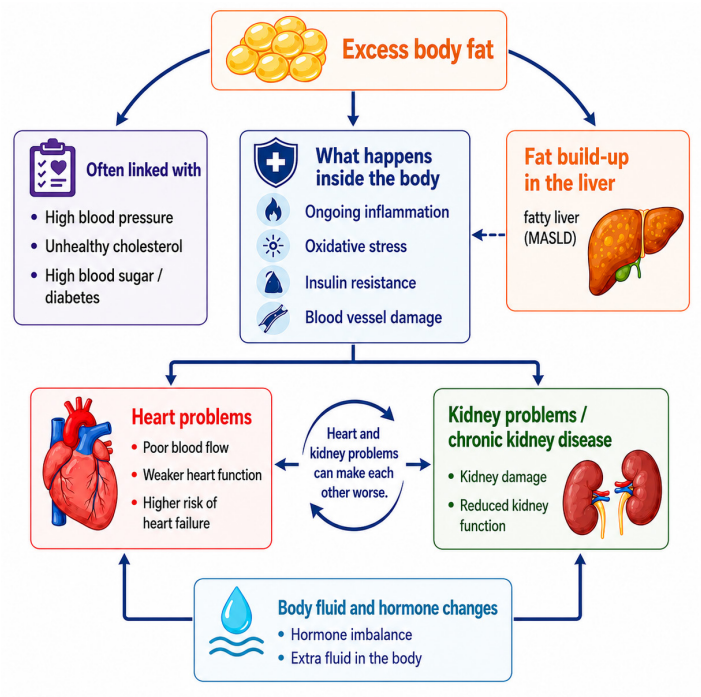

Figure 2: Mechanism of action in cardiovascular-renal-metabolic (CRM) syndrome

CRM syndrome can be categorised into the following stages [11]:

Stage 0	Individuals without CRM risk factors
Stage 1	Excess or dysfunctional adiposity, defined as i) BMI ≥ 25 kg/m2 OR BMI≥ 23 kg/m2 in Asian ancestry ii)Waist circumference ≥ 80 cm in women or ≥ 90 cm in men AND iii)Presence of impaired glucose tolerance or prediabetes.
Stage 2	Chronic kidney disease (CKD) AND metabolic risk factors, as determined by the presence of: i) hypertriglyceridemia (≥1.5 mmol/L), OR ii) hypertension, OR iii) metabolic syndrome, OR iv) diabetes
Stage 3	Individuals with CRM syndrome AND subclinical cardiovascular disease (CVD)
Stage 4	Clinical CVD such as the following: i) coronary heart disease, ii) heart failure, iii) stroke, iv) peripheral heart disease, v) heart failure, vi) stroke, vii) peripheral artery disease, and viii) atrialfibrillation with OR without kidney failure

Recognising connections between CRM syndrome is critical to prevention and early detection. Apart from preventing pre-mortality, managing CRM syndrome well can vastly improve a patient's quality of life.

The care cascade gap in CRM syndrome and CRM-linked diseases

The care cascade gap refers to the loss of people across the pathway from risk identification to sustained disease control. [6,7,11] Within the cardiovascular-renal-metabolic landscape, this means that people with risks such as raised blood pressure, abnormal glucose, dyslipidaemia, obesity, reduced kidney function, albuminuria or high cardiovascular risk are not consistently moved through screening, diagnosis, treatment, follow-up, adherence and control in a timely manner. [6,7,11]

The care cascade gap includes the screening-to-diagnosis gap, where abnormal findings such as raised blood pressure, abnormal glucose, dyslipidaemia, obesity or kidney markers do not lead to confirmatory diagnosis or risk classification. [6,7,11] It also includes the diagnosis-to-treatment gap, often described operationally as the screening-to-treatment gap, where detected or diagnosed individuals do not enter treatment, follow-up, or long-term control. [6,7,11]

Other cascade gaps include low awareness, weak linkage to care, poor retention, treatment non-adherence, therapeutic inertia, and failure to achieve control. [6,7,11]

Why bridging the care cascade gap matters for CRM syndrome and CRM-linked diseases?

Bridging the care cascade gap is important because cardiovascular, kidney, and metabolic risks often cluster, interact and progress silently. [6,7,10,11] Untreated hypertension, diabetes, dyslipidaemia, obesity, and early kidney disease can reinforce one another, increasing the risk of further disease complications such as myocardial infarctions, stroke, kidney failure, disability, and premature mortality, as well as avoidable long-term care costs. [6,7,10,11] For health systems, the gap means screening activity without outcome impact. For patients, the gap means an abnormal screening result may never translate into timely treatment that may save their lives. [6,7,10,11]

Essential co-screening components for CRM syndrome

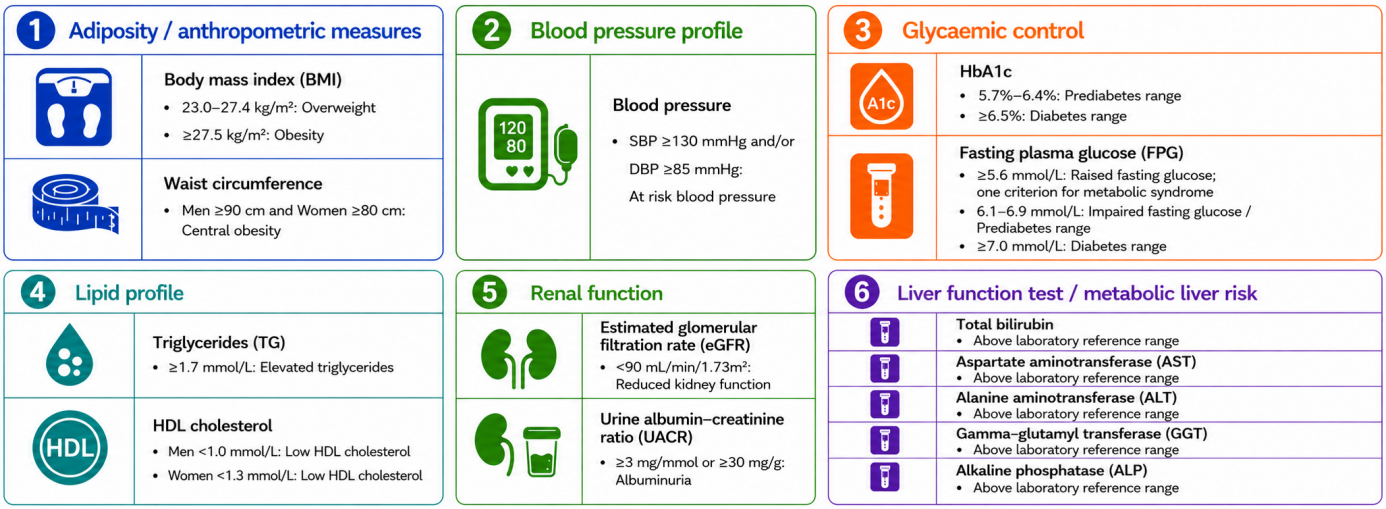

Figure 3: Co-screening for CRM syndrome [7,10,11]

The issue: Challenges in bridging the care cascade gap within the CRM

1. Fragmented service delivery

   Screening, diagnosis, treatment, and follow-up often sit in different programmes, providers, or settings, making it difficult to move patients seamlessly from abnormal results into structured care.[5,6,11]

2. Weak patient tracking systems

   Many screening activities identify risk, but do not have strong registry, recall, referral and feedback mechanisms to confirm whether patients were diagnosed, treated, and controlled. [5,6,11]

3. Primary-care capacity constraints

   Bridging the cascade requires repeated review, counselling, medicine titration, laboratory monitoring, and risk-factor control, but primary care is often overstretched and unevenly resourced. [5,6,11]

4. Financing and access barriers

   Costs, clinic visits, medicines, diagnostics, and follow-up requirements can interrupt movement from screening to diagnosis and from diagnosis to treatment, especially for lower-income patients who are moving between the public and private sectors. [5,6,11]

5. Limited accountability for outcomes

   Programmes may report the number of people screened, but may not consistently measure diagnosis completion, treatment initiation, retention in care, adherence, or risk-factor control. [5,6,11]

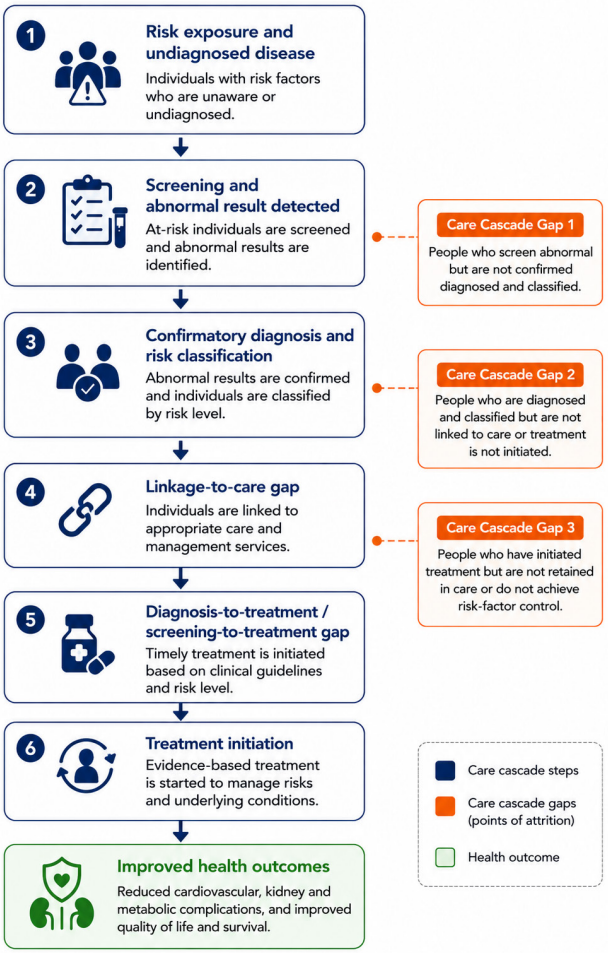

Figure 4: The care cascade gap

NCSM-BI Saring@Komuniti

The NCSM-BI Saring@Komuniti project is a collaborative partnership between Boehringer Ingelheim and the National Cancer Society of Malaysia (NCSM) aimed at increasing awareness, screening, and early detection of CRM syndrome.

The initiative integrates CRM syndrome co-screening with NCSM's Cardiovascular-Renal-Metabolic Information Service (CRM-IS) to ensure holistic patient care, increased screening uptake, and improved follow-up rates.

In 2025, the programme screened 5,000 individuals from underserved, low-income populations in urban Klang Valley (covering the states of Selangor and the Federal Territory of Kuala Lumpur); reflecting key at-risk populations for CRM conditions.

Following are some of the insights obtained from the screening programme:

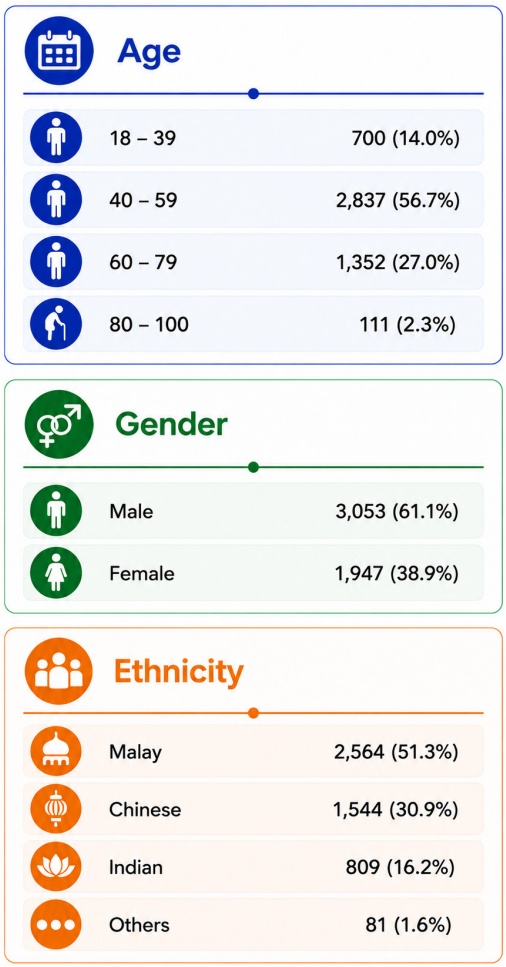

Figure 5: Demographics of attendees to the NCSM-BI Saring@Komuniti programme 2025

The population (N=5,000) was largely middle-aged, with most participants aged 40–59 (56.7%), followed by 60–79 (27.0%). The sample is male-dominant (61.1%) and primarily comprises Malay (51.3%), Chinese (30.9%), and Indian (16.2%) ethnic groups.

From the screening, attendees were assessed on their health status specifically for CRM-linked diseases, namely obesity, hypertension, diabetes, hyperlipidemia, and kidney disease; as well as their CRM syndrome status. Once appraised of their results, attendees were also assessed on whether they were already previously aware of their disease or risk status.

Disease	N (%) (out of 5,000)	Disease Status (Known/Unknown to Patient)	
		Known n (%)	Unknown n (%)
Obesity	2,065 (41.3%)	654 (31.7%)	1,411 (68.3%)
Hypertension	905 (18.1%)	251 (27.7%)	654 (72.3%)
Diabetes	1,754 (35.1%)	248 (14.1%)	1,506 (85.9%)
Hyperlipidaemia	2,376 (47.5%)	423 (17.8%)	1,953 (82.2%)
Kidney Disease	212 (4.2%)	0 (0.0%)	212 (100.0%)

Figure 6: CRM-linked diseases status of attendees to the NCSM-BI Saring@Komuniti programme 2025

Insights

There remains a substantial hidden burden of CRM-linked disease. Across all five conditions, the majority of individuals identified through screening were unaware of their disease conditions, indicating a major care cascade gap between risk detection and prior diagnosis or awareness.

Kidney disease shows the largest gap, with 100% of the 212 individuals determined to have reduced eGFR with elevated urine albumin-creatinine ratio not knowing their disease status.

Diabetes also shows a very high unknown burden, with **1,506 of 1,754 individuals, or 85.9%, being unaware** of their disease status.

Hyperlipidaemia has the largest absolute disease burden, with **2,376 individuals identified, of whom 1,953, or 82.2%, were unaware** of their disease status.

CRM Syndrome Stages	N (out of 5,000) n (%)	Disease status (Known/Unknown to patient)	
		Known (n, %)	Unknown (n, %)
Stage 1	1,429 (28.6%)	191 (13.4%)	1,238 (86.6%)
Stage 2	180 (3.6%)	0 (0.0%)	180 (100.0%)

Figure 7: CRM- syndrome status of attendees to the NCSM-BI Saring@Komuniti programme 2025

Insights

Very high hidden burden across both stages – Most individuals identified through screening were previously unaware of their CRM risk status. Out of 1,609 individuals, **1,418 – or 88.1% – were not aware of the risk they were facing in terms of CRM.**

CRM syndrome stage 1 shows a large early-risk detection gap – 1,238 individuals, or 86.6%, with BMI ≥ 23.0 kg/m² plus impaired glucose tolerance or HbA1c 5.7–6.4%, were unaware of their higher risk. This suggests that early metabolic risk is largely undetected before screening.

CRM syndrome stage 2 shows the most severe care cascade gap – all 180 individuals with kidney disease plus at least one CRM risk factor were unaware of their higher CRM risk status. This is clinically important because kidney involvement suggests progression beyond early metabolic risk, indicating that even more advanced CRM-linked disease may remain clinically silent or undiagnosed.

Impact of a digital patient navigation intervention on the care cascade gap

Following the face-to-face screening of communities in their local settings, NCSM's Cardiovascular-Renal-Metabolic Information Service (CRM-IS) worked to liaise with the patients. This was done to communicate the patients' screening results, address concerns and queries, and navigate them as needed according to their CRM-linked disease or CRM syndrome risk status.

The flowchart depicts the standard operation flow of the patient navigation service offered.

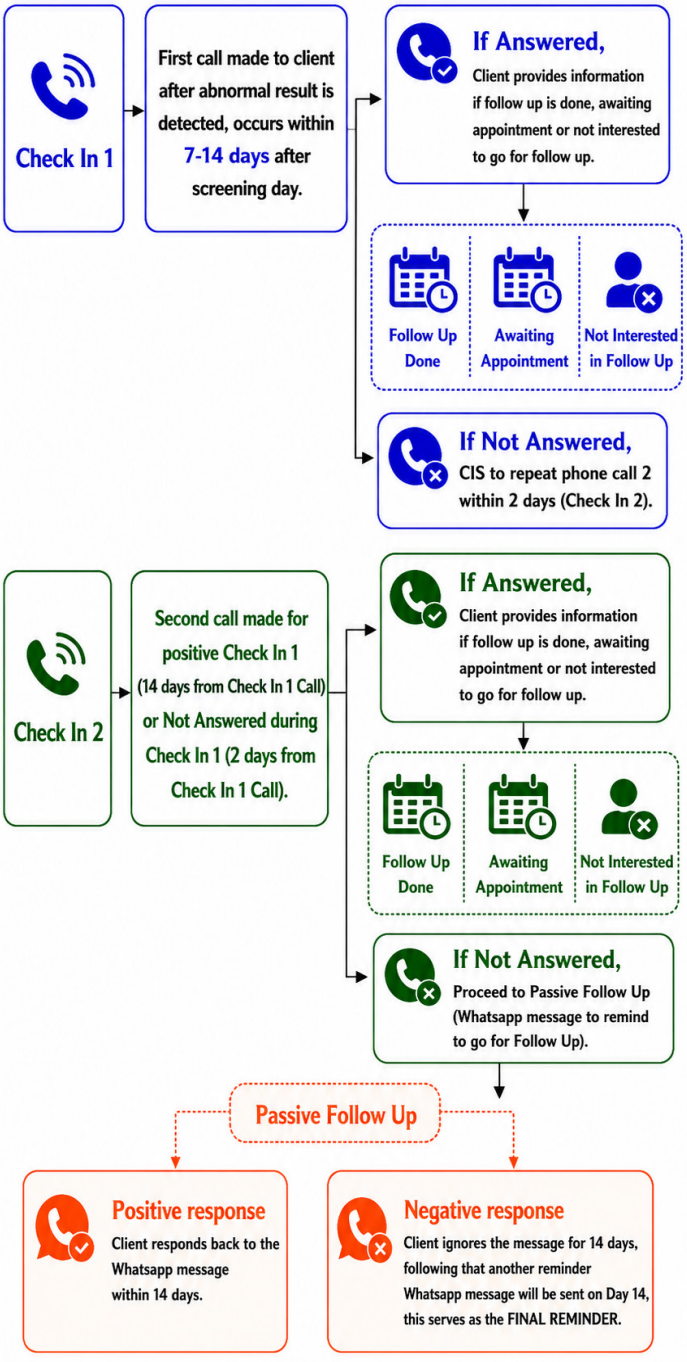

Figure 8: Standard operational flow of NCSM's CRM-IS patient navigation service for NCSM-BI Saring@Komuniti programme 2025

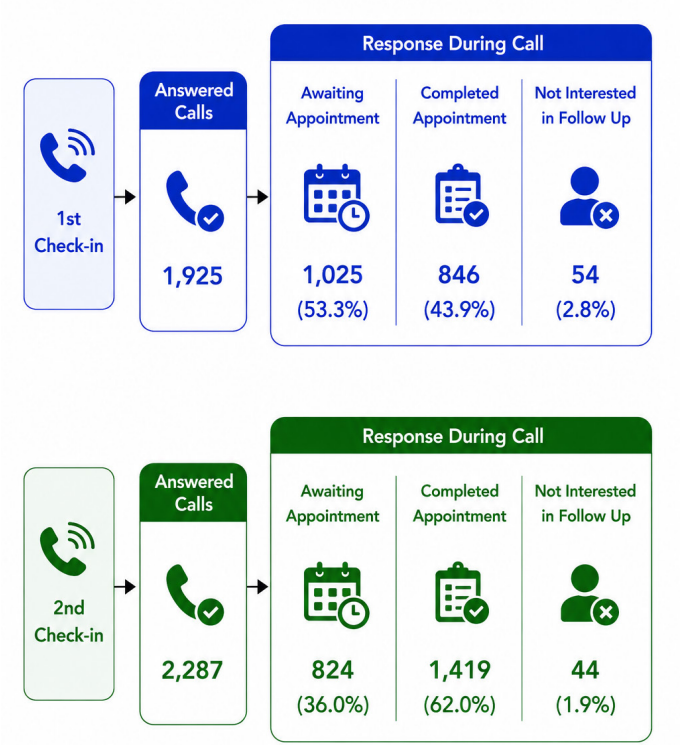

Figure 9: Follow-up call responses among attendees of the NCSM-BI Saring@Komuniti programme 2025

Insights

The follow-up call system appears to have been effective in moving individuals with elevated CRM markers along the care cascade. Among answered calls, completed appointments increased from 846 during the first check-in to 1,419 during the second check-in, representing 573 additional reported completed appointments and an improvement in completion rate from 43.9% to 62.0%. At the same time, the proportion awaiting appointments decreased from 53.3% to 36.0%, while disinterest in follow-up remained low at below 3% across both check-ins.

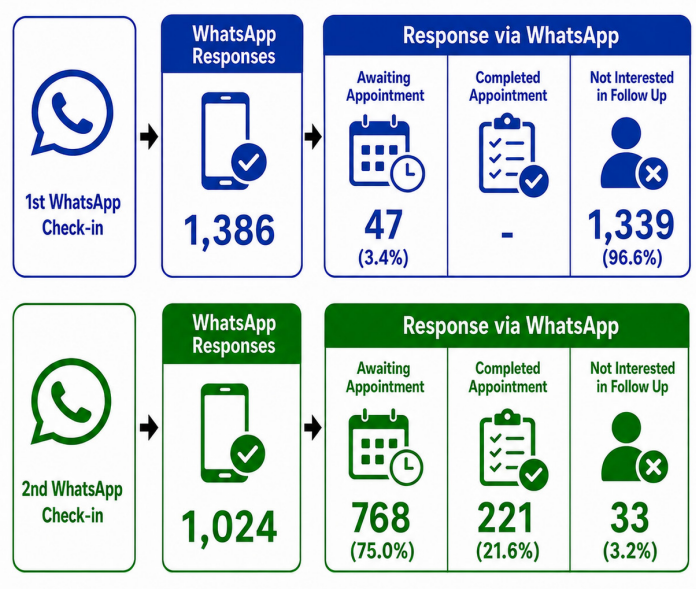

Figure 10: WhatsApp follow-up responses among attendees of the NCSM-BI Saring@Komuniti 2025 programme who were unreachable by follow-up calls

Insights

The WhatsApp follow-up pathway was associated with improved movement along the CRM care cascade. Between the first and second WhatsApp check-in, the proportion awaiting appointment increased from 3.4% to 75.0%, while 21.6% had completed their appointment. At the same time, those not interested in follow-up decreased sharply from 96.6% to 3.2%, suggesting that WhatsApp may help re-engage participants initially unreachable by phone.

Why does this matter?

The combined follow-up approach indicates that patient navigation played a meaningful role in overcoming the care cascade gap by helping individuals with elevated CRM markers progress from detection to active engagement with follow-up care.

Call to action: Bridging the care cascade gap within the Malaysian CRM landscape

1. **For the Ministry of Health — develop an integrated CRM care pathway**
   A nationally aligned CRM pathway should connect screening, confirmatory diagnosis, treatment initiation, referral, follow-up, and long-term risk-factor control across levels of care.

2. **For clinicians and clinical institutions — strengthen follow-up for abnormal screening results**
   Every abnormal blood pressure, glucose, lipid, obesity or kidney-risk finding should be linked to a documented process for referral, diagnostic confirmation, treatment assessment, and follow-up.

3. **For public and private primary-care providers — manage CRM risk as an integrated clinical cluster**
   Patients should be assessed and managed for overlapping cardiovascular, renal, and metabolic risks using standardised protocols, appropriate medicines, counselling, and routine monitoring.

4. **For hospitals and specialist services — improve referral, shared care, and back-referral mechanisms**
   Specialist services should support clear escalation criteria, timely referral for complex disease, and structured back-referral of stable patients to primary care for continuing management.

5. **For payers, employers, and civil-society partners — reduce barriers to continuity of care**
   Financing support, workplace-based follow-up, patient navigation, and community-level adherence support can help patients remain in care after screening and diagnosis.

6. **For programme managers and data systems leads — measure cascade outcomes, not screening activity alone**
   CRM programmes should track diagnosis completion, treatment initiation, retention in care, adherence support, and measurable control of blood pressure, glucose, lipids, weight, and kidney risk.

References

1. Institute for Public Health, National Institutes of Health, Ministry of Health Malaysia. National Health and Morbidity Survey 2023: Key Findings [Internet]. Shah Alam: Institute for Public Health; 2024 [cited 2026 Jun 6]. Available from: Ministry of Health Malaysia NHMS website
2. World Health Organization. Kidney disease [Internet]. Geneva: World Health Organization; 2026 [cited 2026 Jun 6]. Available from: WHO website
3. World Health Organization. Diabetes [Internet]. Geneva: World Health Organization; 2024 [cited 2026 Jun 6]. Available from: WHO website.
4. Bavanandan S, Hooi LS, Ong LM, Choo CL. All kidney replacement therapy in Malaysia. In: 32nd Report of the Malaysian Dialysis and Transplant Registry 2024 [Internet]. Kuala Lumpur: National Renal Registry, Malaysian Society of Nephrology; 2025 [cited 2026 Jun 6]. Available from: National Renal Registry website.
5. World Health Organization. Noncommunicable diseases [Internet]. Geneva: World Health Organization; 2025 [cited 2026 Jun 6]. Available from: WHO website.
6. World Health Organization. HEARTS: technical package for cardiovascular disease management in primary health care: risk-based CVD management [Internet]. Geneva: World Health Organization; 2020 [cited 2026 Jun 6]. Available from: WHO website.
7. Ndumele CE, Rangaswami J, Chow SL, Neeland IJ, Tuttle KR, Khan SS, et al. Cardiovascular-kidney-metabolic health: a presidential advisory from the American Heart Association. Circulation. 2023;148(20):1606-1635. doi:10.1161/CIR.0000000000001184.
8. Knowler WC, Barrett-Connor E, Fowler SE, Hamman RF, Lachin JM, Walker EA, et al. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. N Engl J Med. 2002;346(6):393-403. doi:10.1056/NEJMoa012512
9. Li W, Liu H, Wang X, Liu J, Xiao H, Wang C, et al. Interventions for reducing blood pressure in prehypertension: a meta-analysis. Front Public Health. 2023;11:1139617. doi:10.3389/fpubh.2023.1139617.
10. Ndumele CE, Neeland IJ, Tuttle KR, Chow SL, Mathew RO, Khan SS, et al. A synopsis of the evidence for the science and clinical management of cardiovascular-kidney-metabolic syndrome: a scientific statement from the American Heart Association. Circulation. 2023;148(20):1636-1664. doi:10.1161/CIR.0000000000001186.
11. Wang J, Tan F, Wang Z, Yu Y, Yang J, Wang Y, et al. Understanding gaps in the hypertension and diabetes care cascade: systematic scoping review. JMIR Public Health Surveill. 2024;10. doi:10.2196/51802.

Appendix

Appendix 1: NCSM-BI Saring@Komuniti 2025 community screening programme

Wilayah Persekutuan Kuala Lumpur

Venue	Attendees
Surau Baitul Mukaram	18
Wisma Buddhist Medical Welfare Centre	66
Wisma MCA	92
PPR Batu Muda	69
Wangsa Walk Mall	144
Perumahan KTMB Lengkuk Abdullah Bangsar	87
Chinese Temple Community Service	83
PPR Hiliran Ampang	53
Kenduri Madani Rakyat	84
The Salvation Army KL	53
Lee Kong China Basketball Court	150
Hari Komuniti PDRM	198
Program Citawarna Kampung Bharu	224
Karnival Sihat Komuniti	107
Dewan Sanggar Pujangga	187
Sri Sathya Sai Baba Centre	260
Persatuan Shenpen Malaysia	98
Gurdwara Tatt Khalsa, Chow Kit	46
KRT Taman Sri Rampai	57
SJKC Tiong Hwa Kok Bin	36
PPR Muhibbah	92
PPR Hang Tuah	41
PPR Sri Langkawi 2	12
KKA Brickfields, KL	54
Dewan Intan Baiduri	69
Dewan Pendekar, Kuala Lumpur	66
KRT Sri Pantai	67
Masjid Segambut Zon	55
KRT Pantai Indah	75
KRT Sg Penchala	31
KRT Taman Bunga Raya	25
SPRM Putrajaya	207
Jalan Duta Community Centre	97

Selangor

Venue	Attendees
BI KOA Hulu Langat	35
Dewan Puchong Batu 14	22
Gasing Indah, Petaling Jaya	37
Kg Dato Mufti Shuib	27
PPR Kampung Baru HICOM	62
Pangsapuri Bukit Puchong	45
SJKT Simpang Utama, Klang	87
St. Mary Church	104
PPR Kampung Limau	39
Kampung Sungai Sekamat Kajang	91
Dewan Jugra	101
PPR Seri Sarawak	58
PPR Beringin Bukit Jalil	82
Selangor Community Centre	39
Bukit Beruntung	77
Bukit Damansara Community Centre	59
Masjid Ammaniah	116
Dewan Komuniti MPKS	62
SJK (C) Bukit Tangga	76
Surau Al Umum	82
Dewan Komuniti Sg Pelek	64
Dewan Komuniti Sekinchan	54
Nasam PJ, Selangor	61
Taman Paramount Basketball Court	75
Dewan Komuniti Pantai Sepang	76
Kapar Klang	78
Masjid Tengku	197
Gugusan Seroja, Kota Damansara	41
Dewan Kompleks Sukan Pandamaran Klang	50

Table 1: Communities screened under the programme

Variable	Overall N=5,000 n (%)
Age	
18 – 39	700 (14.0%)
40 - 59	2,837 (56.7%)
60 - 79	1,352 (27.0%)
80 - 100	111 (2.3%)
Gender	
Male	3,053 (61.1%)
Female	1,947 (38.9%)
Ethnicity	
Malay	2,564 (51.3%)
Chinese	1,544 (30.9%)
Indian	809 (16.2%)
Others	81 (1.6%)

Table 2: Demographics of screened attendees

Disease	Clinical Markers (Definition)	N	Disease status (Known/ Unknown to patient)	
			Known (n, %)	Un-known (n, %)
Obesity	BMI (≥27.5 kg/m²)	2,065	654 (31.7%)	1,411 (68.3%)
Hypertension	Blood Pressure (≥ 130/85 mmHg)	905	251 (27.7%)	654 (72.3%)
Diabetes	HbA1C (≥ 6.5%)	1,754	248 (14.1%)	1,506 (85.9%)
Hyperlipidemia	High Density Lipoprotein (<1.0 mmol/L for males, <1.3 mmol/L for females) OR Triglycerides (≥ 1.7 mmol/L)	2,376	423 (17.8%)	1,953 (82.2%)
Kidney	Decreased eGFR (<90 mL/ min/1.73m²) AND Elevated Urine Albumin- Creatinine Ratio (≥3.0 mg/ mmol)	212	0 (0.0%)	212 (100.0%)

Table 3: CRM-linked diseases status of attendees to the NCSM-BI Saring@Komuniti programme 2025

CRM Syndrome Stages	Syndrome Markers (Definition)	N	Disease status (Known/ Unknown to patient)	
			Known (n, %)	Un-known (n, %)
Stage 1	BMI (≥23.0 kg/m²) AND EITHER impaired glucose tolerance (fasting blood glucose 6.1 – 6.9 mmol/L) OR HbA1C (5.7 – 6.4%)	1,429	191 (13.4%)	1,238 (86.6%)
Stage 2	Kidney Disease AND EITHER hypertriglyceri-demia (≥1.5 mmol/L), OR hypertension (Blood Pressure ≥ 130/85 mmHg), OR obesity (BMI ≥27.5 kg/m²), OR Diabetes (HbA1C ≥ 6.5%)	180	0 (0.0%)	180 (100.0%)

Table 4: CRM- syndrome stages of attendees to the NCSM-BI Saring@Komuniti programme 2025

NCD MALAYSIA

National Cancer Society Malaysia
Giving Hope Celebrating Life

In collaboration with:

Boehringer Ingelheim

Published by
The National Cancer Society of Malaysia
66 Jalan Raja Muda Abdul Aziz
Kuala Lumpur
www.cancer.org.my
contact@cancer.org.my

Cancer toll-free helpline: 1800-88-1000