

# Country-specific roadmaps for scaling up integrated care in Belgium, Slovenia, and Cambodia - Lessons learned from the SCUBY project

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## Research Article

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## Abstract

## Introduction

The SCUBY project aimed to provide knowledge on the scaling-up of an Integrated Care Package (ICP) for type 2 diabetes and hypertension across three distinct health systems (Cambodia, Slovenia, and Belgium). Here, we analyse the different elements of the country-specific scale-up roadmaps to identify similarities and differences, and share lessons learned.

## Methods

Thematic analysis was used to derive crucial roadmap elements from key SCUBY documents (n = 20), including policy briefs, interim reports, research outputs, and consortium meeting notes.

## Results

Roadmap elements differed according to priority needs, features of the (health) systems, and partly reflected the position of the SCUBY research team within each country. Common cross-country elements were: task-shifting to patients themselves, nurses and community health workers; strengthening monitoring and evaluation; and creating an enabling environment for ICP implementation.

## Discussion

Scale-up of complex interventions requires continuous engagement of multiple stakeholders and contextualization of action plans. The linkage of research teams with key implementation stakeholders and policy makers creates change-teams, allowing advancement from formative research to implementation of roadmap strategies and full scale-up in due time.

## Conclusion

The development processes and contents of the roadmaps provided essential and reciprocal learnings. These help shape future policy dialogues and best practices to tackle chronic disease in each participating country.

### 1. Introduction

Despite a rapidly increasing burden of non-communicable diseases (NCDs) globally, particularly in low-income populations,(1) a large part of the world's population lacks access to adequately integrated and comprehensive health care services and strategies that are inclusive across the patient demographic.(2) Type 2 diabetes (T2D) and hypertension (HT) are of particular relevance due to their shared risk factors, relationship to social determinants of health, and their co-occurrence.(3) According to 2019 global estimates, 463 million adults live with T2D, and 1.13 billion with HT.(4)

Effective interventions for integrated treatment and control of both T2D and HT are available and cost-effective and include the following overall elements: (a) early detection and diagnosis, (b) treatment in primary care services, (c) health education, (d) self-management support to patients and caregivers, and (e) collaboration between caregivers.(5, 6) These bundled interventions can be identified as an 'integrated care package' (ICP), and have been shown to be feasible and effective in mitigating cardiovascular disease and broader health risks.(7, 8) The ICP is in line with various chronic care models and WHO guidelines on integrated care and essential interventions for diabetes and hypertension.(9) However, successfully scaling up an ICP package for T2D and HT can be challenging.(5)

The aim of the "SCale-Up of integrated care for diaBetes and hYpertension in Cambodia, Slovenia and Belgium" (SCUBY) project was to develop, implement, and evaluate country-specific, evidence-based roadmap strategies to support the scaling up of diabetes and hypertension care in each country.(5) Within the SCUBY project, a three-dimensional framework for scale-up has been described. Action along one or more of these dimensions can be considered as "scale-up":

- i. increasing population coverage
- ii. expanding the intervention package; and
- iii. integration of the ICP into the health system.

In the present paper, we (i) describe the contents and distinct elements of the scale-up roadmaps in our three case study countries and (ii) reflect on cross-contextual learnings about roadmaps from these three cases. Aligned with these objectives, our research questions are: (1) What do the country-specific scale-up roadmaps look like (at the end of the SCUBY project), what actions and strategies do they entail?; and (2) What are reciprocal, cross-country lessons we can draw from them, in particular about their similarities and differences?

### 2. Research methods

## 2.1 Study design

The SCUBY project employed a quasi-experimental multiple case study design to develop, implement, and evaluate national strategies (i.e., roadmaps) for the scale-up of integrated care for T2D and HT. A comprehensive protocol for the SCUBY project has been reported elsewhere.(5) The SCUBY project entailed three phases: formative, intervention, and evaluation. During the formative phase, the focus was on assessing the extent to which the ICP was implemented (i.e., baseline assessment) and identifying multi-level barriers and facilitators for ICP implementation across the three countries. Subsequently, during the intervention phase, the learnings from the formative phase were amalgamated into country-specific “living” (i.e., evolving) roadmaps. Finally, the evaluation phase included four types of evaluations: process evaluation, scale-up evaluation, cost evaluation, and impact evaluation. This article can be considered part of the process evaluation, assessing the process of implementing roadmaps to scale-up integrated care in each context.(10) In this study, we take a qualitative approach in examining this process within each country case.

## 2.2 Study settings

**Cambodia** is a lower-middle income country of about 15.3 million inhabitants (2019) with an annual growth rate of 1.2%.(11) Importantly, Cambodia is undergoing an epidemiological transition with the emerging prominence of NCDs. In 2016, 24% of total deaths in Cambodia were attributed to cardiovascular disease.(12) Furthermore, the prevalence of T2D in 2016 was reported at 9.6% among adults aged 18–69 years; an increase from 2.9% among adults aged 25–64 years in 2010.(4, 13) Conversely, its annual health spending on NCDs in 2019 was about 113 USD per capita relative to an overall health expenditure of 321 (USD/capita) in 2019; an increase of ~30% in five years.(14) A population-based survey conducted in Cambodia as part of the SCUBY project’s formative phase suggested a prevalence of 35.2% for hypertension and 11.0% for T2D among those aged 40 years or over.(13, 15) Notably, of the 35.2% of people with hypertension identified, only 35.8% and 10.7% had good control of their blood pressure and glucose level, respectively.(13, 15) This illustrates that people with HT and T2D are often lost along the cascade of care (i.e. from diagnosis to linkage of HT care) and subsequent management for blood pressure control. Furthermore, it illustrates the need for an ICP to strengthen the health system’s response to the increasing burden of HT, T2D, and NCDs in general. The Ministry of Health has identified all components of the integrated care package as vital to Cambodia’s NCD response and has therefore committed to the WHO Package of Essential Noncommunicable (PEN) disease Interventions in each of 103 operational health districts.

**Slovenia** is a Central European, high-income country of about two million inhabitants. Its centralised national health system can be described as a combination of the Beveridge and Bismarck models with the main principles of universal coverage, solidarity, fairness in financing, non-profitability and equity in access for all groups of population.(16) In 2016, the mean annual spending on T2D was 2608 USD per person per year. All permanent residents of Slovenia are included in compulsory health insurance at the National Insurance Institute; almost 95% of population has, in addition, a voluntary complementary insurance. Since 2011, the government has invested in the scale-up and upgrading of primary care (family medicine) practices for chronic disease management.(16, 17) This, amongst others, has standardised the diagnosis and management of patients with chronic disease. However, decreasing state expenditure on social services such as pensions has led to concerns for vulnerable groups, such as elderly people and minority groups. Community nurses have been used as a viable strategy to reach vulnerable populations.

**Belgium** is a high-income country of about 12 million inhabitants with a partially decentralised health care system. Furthermore, the organisation of Belgian healthcare and policy is influenced by non-governmental stakeholders including health professional organisations and private, not-for-profit associations of sickness funds. People have a free choice of health insurance and healthcare providers. Subsequently, both patients and healthcare providers have a relatively large decision space related to taking up the ICP. In Belgium, chronic diseases account for at least 90% of the societal burden of disease including disability, and substantial mortality; evidence from 27 European countries suggests that nearly one third of those over 15 years lives with multiple long-term conditions.(18) The high prevalence of multiple chronic conditions has sparked the need for and political commitments to integrated care, which have led to the development of various federal and federated policies since 2008. (19) Yet the partial decentralisation of health care within the Belgium context has led to fragmentation of decision power which undermines these efforts towards integrated care.(19)

To understand the health policy context in each country, which shaped the point of departure for the SCUBY project, a historical overview of health system developments and policies related to NCDs, and integrated care is provided in Fig. 1.

## 2.3 Data sources and analysis

To distil the different components that make up the three roadmaps (primary aim), we opted for various analytical lenses. First, we developed a basic outline of key thematic content elements based on ongoing discussions within the country teams and broader SCUBY consortium over the study period. Second, key documents relevant to the roadmap development in each country were identified by the consortium members and analysed thematically by one member who was not involved in the development process (MH). Ten core roadmap components as described by Weber et al. were identified during this qualitative analysis to organise the different actions and strategies.(21) A total of 20 key documents were identified for document review and analysis, including technical reports to the European Union (n = 5), consortium meeting reports and minutes (n = 6), policy briefs (n = 3), pilot study protocols and reports (considered as “roadmaps” for Slovenia; n = 2), and “living” actual roadmap documents for Belgium (n = 2) and Cambodia (n = 2). Third, we subsequently simplified the complex outcome of the qualitative analysis using the World Health Organisation ExpandNET framework.(22, 23) The ExpandNET framework refers to four types of scale-up strategies being: (1) dissemination and advocacy, (2) organisational processes, (3) cost/resource mobilization, and (4) monitoring and evaluation. Finally, the analysis was reported back to the country-leads and SCUBY steering committee during the SCUBY colloquium and closing consortium meeting (May 2023) to reflect on findings and learnings.(22, 23) For this, a reciprocal learning approach was used characterised by a shared, back-and-forth process between team members, in which each partner is both the learner and the coach.(24)

## 3. Results

The thematic analysis rendered a total of 343 codes pertaining to actions and strategies identified as part of the roadmap for integrated care across all three countries. Unique strategies and actions were collected from these codes and can be found in the complex representation (following Weber et al.'s classification with 10 key components for scale-up) of each roadmap in the online supplement. Tables 1 and 2 provide an overview of key roadmap components for each country, in both a basic format (Table 1) and according to the ExpandNET framework (Table 2). A narrative synopsis of the activities, strategies and actions captured for each country is presented here.

Table 1  
Key roadmap actions and strategies to scale-up integrated care across the three participating countries.

Cambodia	Slovenia	Belgium
<p><b>Component 1. Health Service Delivery and Governance</b></p> <p>Strategy 1.1: Increasing coverage of second-version PEN in primary healthcare.</p> <p>Strategy 1.2: Strengthening the workflow of Second-version PEN at the operational district level.</p> <p>Strategy 1.3: Revising/updating the components of ICP.</p> <p>Strategy 1.4: Adding community-based intervention to ICP.</p> <p><b>Component 2. Medicine Supply</b></p> <p>Strategy 2.1: Strengthening and updating the essential medicine supply system.</p> <p>Strategy 2.2: Reinforcing the capacity of staff in managing medicine inventories.</p> <p><b>Component 3: HR</b></p> <p>Strategy 3.1: Strengthening leadership and management of human resources for health at the operational district and health centre levels.</p> <p>Strategy 3.2: Ensuring appropriate staff/staff capacity / skills-mix through practical training on T2D &amp; HT care (on-site training), including nurses and midwives.</p> <p><b>Component 4: Health financing</b></p> <p>Strategy 4.1: Increasing investments in T2D and HT.</p> <p>Strategy 4.2: Increasing service accessibility at public healthcare facilities.</p> <p>Strategy 4.3: Reducing financial burden to T2D and HT patients.</p> <p><b>Component 5: Health information system</b></p> <p>Strategy 5.1: Monitoring and evaluation.</p>	<ol style="list-style-type: none"> <li>1. An <b>m-health</b> intervention to support and empower patients (telemedicine).</li> <li>2. A <b>group education</b> programme <b>by patients</b> (patients as educators).</li> <li>3. <b>Community-based education</b> programme (with healthy lifestyle intervention(s)).</li> <li>4. An <b>intra-team collaboration</b> project: developing clinical pathways of patients for better team management (with a focus on the education of registered nurses).</li> </ol>	<p><b>1. Change management at practice (micro) level:</b></p> <p>1a: Better care for chronic conditions by GPs through training.</p> <p>1b: Human resource management: Budget for nurse in primary care team.</p> <p><b>2. Data monitoring at organisational / population (meso) level:</b></p> <p>2a: Monitoring of chronic care indicators in Primary Care Zones.</p> <p>2b: Monitoring care organisation at practice level</p> <p><b>3. Health financing at political (macro) level:</b></p> <p>3a: Budget for chronic care that stimulates quality.</p> <p>3b: Alternative financing models in primary care.</p>

HRH, human resources for health; HT, Hypertension; ICP, Integrated Care Package; PEN, Package of Essential Interventions; T2D, Type 2 Diabetes

Table 2

Overview of different key roadmap elements for each country, stratified by the ExpandNET framework' strategies for scale-up,(22) and dimensions of sca

	Cambodia			Slovenia			Belgium			
	Horizontal (coverage)	Vertical (integration)	Diversification (expanding)	Horizontal (coverage)	Vertical (integration)	Diversification (expanding)	Horizontal (coverage)	Vertical (integration)		Di (e
Organisational processes	- Strengthening the workflow of second-version PEN at the operational district level	- Revising / updating the components of ICP  - Integrating the second-version PEN with other vertical programs  - Ensuring appropriate staff/staff capacity / skills-mix through practical training on T2D & HT care (on-site training), including nurses and midwives.	- Adding community-based intervention to ICP		- An intra-team collaboration project: developing clinical pathways of patients for better team management	- Community-based education programme	- Expansion of care package: Scaling care pathway on heart failure.	- Study alternative financing models in primary care  - Stronger position of nurse practitioners within primary care to facilitate integration of care pathways.		
Stakeholder engagement, dissemination, and advocacy		- Strengthening leadership and management of human resources for health at the operational district and health centre level		- A group education programme by patients (patients as educators)				- Better chronic care by general practitioners through training		
Cost/resource mobilisation	- Increasing coverage of second-version PEN in primary healthcare  - Strengthening the essential medicine supply system  - Increasing the investment in T2D and HT  - Reducing financial burden to T2D and HT patients	- Reinforcing the capacity of staff in managing medicine inventories		- An m-health intervention to support and empower patients (telemedicine)		- An m-health intervention to support and empower patients (telemedicine)		- Human resource management: Budget for nurse in primary care team  - Budget for chronic care that stimulates quality		
Monitoring and evaluation		- Strengthening Monitoring and evaluation						- Monitoring of chronic care indicators in Primary Care Zones  - Monitoring care organisation at practice level		

HT, Hypertension; ICP, Integrated Care Package; PEN, Package of Essential Interventions; T2D, Type 2 Diabetes

### 3.1 Roadmap to scale up ICP in Cambodia

The Cambodian roadmap was developed to address two primary concerns. Firstly, it aims to tackle the low performance of the current T2D and HT interventions in primary healthcare. These are delivered at health centres in a package, which is commonly referred to as the “Package of Essential Non-Communicable Disease Interventions” (PEN). Secondly, the roadmap aims to address the low proportion of people with T2D and/or HTN who know their status, with the majority seeking care in the private sector, resulting in poor health outcomes and high out-of-pocket payment, respectively.

To address these two main issues, the Cambodian roadmap emphasizes strengthening of and further adapting WHO PEN (second version) implementation for NCDs and the need for broader public sector health system strengthening. As such, the roadmap includes components that are largely in line with the WHO health system building blocks as key topics, namely, to improve 1) health service delivery & governance, 2) medicine supply, 3) human resources for health, 4) health financing, and 5) health information system. Contextual adaptation and strengthening of PEN will not only facilitate broader coverage of services but also stronger integration of services within existing structures; two important dimensions for scaling-up. For example, during the formative phase of the SCUBY project, PEN-related activities transpired including updating of standard operation procedures, training on essential medicines, access to electronic record keeping, amongst others. However, such actions require earmarked governmental budget and spending towards NCDs and social health protection, which is why increasing investment as part of health financing arrangements are key areas of focus on the roadmap.

In addition to a focus on strengthening the integration of PEN, other health system thematic elements include optimising adequate referral pathways between referral hospital, health centres, and community health workers within operational districts. One of the strategies in the roadmap was for the operational districts to take a more leading role in strengthening the referral system within their catchment areas, and focal persons at each step of the referral pathway could facilitate collaboration and effective communication. The roadmap likewise acknowledges the important role of community health workers and peer networks to support early detection, optimize care pathways, and promote continuity of care. To facilitate an ICP in the Cambodian context, it was necessary to identify (re)training needs at all levels, from healthcare workers to facility management and leadership. The implementation of top-down decisions could help scale up integrated care, including the introduction of performance-based bonus schemes for health facilities, reduced out-of-pocket expenses, and the formalization of funding streams for outreach activities related to T2D and HT. Moreover, additional investment could be made in an integrated monitoring and evaluation database to strengthen the ability to monitor patient populations along the cascade of care and identify any issues that may arise.

### 3.2 Roadmap to scale-up ICP in Slovenia

The Slovenian roadmap for the scale-up of integrated care for T2D and HT revolves around a series of (ongoing) pilot studies that explored the feasibility and effectiveness of various models of task-shifting to promote self-management in vulnerable populations (e.g., elderly, rural populations). These included an m-health pilot intervention to support and empower vulnerable patients with T2D / HT, a peer support pilot intervention encompassing a group-education program by patients with T2D / HT (patients as educators), a community-based intervention for healthy lifestyle, and an intra-team collaboration project to improve organization of the multidisciplinary team of primary care providers. These potential strategies to enhance integrated chronic disease care were identified through a series of multi-level stakeholder engagements, literature review, assessment of implementation along the ICP assessment grid, an assessment of facilitator/ barriers to integrated care from the patients’ perspectives, and facility-based health-economic survey. These activities identified the need to build up skills, knowledge, and capacities for transferring competencies away from the healthcare facility towards self-management for prevention and health promotion. The identified needs were operationalised into four interventions, consisting out of two longer-running (m-health and peer support) pilot studies to provide evidence for future scale-up as mentioned.(25, 26) An important role was identified for peer supporters in offering continuous support to meet the lifelong requirements of self-care management for T2D and HT,(26) albeit under continued training and mentorship from formally trained diabetes educators (i.e., nurses) as a means to scale-up integrated management of T2D and HT. Strengthening the training and position of peer supporters within the provision of care and self-management as well as other task shifting aids such as m-health and telemedicine interventions were the two key components in the Slovenian roadmap.

### 3.3 Roadmap to scale-up ICP in Belgium

The Belgium roadmap for the scale-up of integrated care focussed on a networking approach to facilitate dialogue, synergies, and collaboration between stakeholders including those in health funding, healthcare provision, research, and education space. This networking approach – i.e., iterative stakeholder engagement and dialogue to enable change – fits the fragmented nature of the Belgium health care system, and the scope of other ongoing activities within the country. Three key topics at various levels of the health system were identified as key to progress scale-up of integrated care for chronic conditions in Belgium: 1) change management at health care practice (micro) level, 2) data monitoring at population (meso organisational) level, and 3) health financing at the policy and political (macro) level. Firstly, based on the evidence and various meetings with key scientific and provider associations, the research team and stakeholders concluded that the promotion of change management towards chronic care organisation is warranted, including interdisciplinary collaboration. This requires different actions, including developing mechanisms to facilitate integrated services within current organisational structures, e.g., supporting GPs in chronic care organisation via a training programme as well as advocating for integrating and expanding the role of primary care nurses. Secondly, various activities were conducted to support stakeholders and stakeholder engagements with regards to the effective use of aggregate (population health) data on the state of integrated care for T2D / HT within the Belgian context. This included the set-up of a working group at Flemish level, efforts to connect different data sources, the development of a dashboard for monitoring and evaluation of key indicators, identification of (vulnerable) patient perspectives towards integrated care, and assessment of facility-based health-economic implications of integrated care. Thirdly, our research indicated – and stakeholders confirmed – that an alternative health financing model may be needed to support and incentivise care integration. Specifically, the Belgian SCUBY roadmap advocated – in line with stakeholders’ call – for a broader policy reform towards a mixed provider payment model within primary care that stimulates quality, i.e., pay-for-quality, and where the benefits and drawbacks of the predominant fee-for-service provider payment system in Belgium are balanced out with those of a capitation provider payment system. In 2022, one of the Belgian SCUBY team members became a part of the working group on the Federal New Deal for GP practices

(see Fig. 1), a policy with this provider payment reform as one of its core themes. Overall, the continued engagement between stakeholders and the network approach supported the development, dissemination and implementation of these roadmap actions and strategies.

### 3.4 Cross-country reciprocal learnings

In line with the secondary aim of this paper, we identified similarities and differences between the scale-up roadmaps of the three countries.

Similarities relate to: (a) the roadmap content, whereby several overlapping scale-up strategies highlight the relevance of human resources for health and the goal (and trend) of bringing integrated care closer to patient; and (b) boundary spanning skills gained by the change team. With regards to *roadmap content*, similar strategies in each country's roadmap were: (i) task-shifting to decentralise integrated care through the involvement of community health workers (in Cambodia), patients (as peer supporters in Slovenia), and primary care nurses (in Belgium), (ii) strengthening monitoring and evaluation (as broader roadmaps themes in Belgium and Cambodia; via mhealth in Slovenia), and (iii) supporting an enabling environment for implementation of the ICP (through broad health system strengthening in Cambodia, developing peer support networks to strengthen self-management in Slovenia; and via financing mechanisms in Belgium). As indicated between parentheses, the actions required to contribute to these strategies varied significantly. Nevertheless, these commonalities highlight the required ongoing work to address structural gaps as well as the relevance. With regards to the *change team*, capacity building processes have been important as they have important effects. Organising and attending various policy dialogues on scaling up integrated care for T2D and HT presented opportunities to the research teams to build boundary spanning skills. People with such skills are deemed important knowledge brokers and can act as moderators when looking for consensus across various interest groups. The linkage of research teams with key implementation stakeholders and policy makers not only creates familiarity and trust, but can also create change teams, allowing advancement from formative research to implementation of roadmap strategies and full scale-up in due time. Each SCUBY country team had at least one member – often a professor or senior researcher – with a large network across health actors. As the project progressed and more stakeholder interviews as well as policy dialogues were organised, also the younger team members gained boundary spanning skills and were able to tap into that wider network. This increased the recognition of the research project and the SCUBY team. This reciprocal learning highlights the importance of having informal contacts and reputation building for the purpose of building alliances for more sustainable policy change.

Differences between the three scale-up roadmaps relate to: (a) the scope and format of the roadmap; (b) the scale-up dimension given priority to; and (c) the mandate of the change team. In addition to the diversity in actions and strategies, also the *scope and format* of each roadmap varied. In other words, the type of 'document' can come in different shapes and sizes. For example, while the *scope* of the Cambodian roadmap was broad and comprehensive, the Slovenian roadmap was narrowly focused (on pilot interventions) and detailed. With regards to the *format*, the Cambodian roadmap developed as a comprehensive set of policy recommendations towards a national strategic document (depicting a multi-faceted and multi-stakeholder process from evidence to policy); while in Slovenia, no comprehensive "roadmap" was developed, rather it took the shape of two study protocols for pilot-projects, offering an implementation plan (whilst the evaluation is ongoing), feeding into national developments (eyeing a more linear process from pilot to policy). In Belgium, the roadmap constitutes of a series of internal and external documents consisting out of an overview of evidence as rationale, descriptions of collaborative processes and targets, aligning with the adopted networking approach as well as the complex and fragmented health policy context. While there is no consensus-based definition of a roadmap within implementation science, all three "roadmaps" developed as part of SCUBY present evidence-driven, and stakeholder supported strategies and actions with relevant goals in relation to time. In terms of the *prioritized scale-up dimension*, the Cambodian roadmap has a strong focus on enabling and integrating essential services for T2D and HT (i.e., working on all scale-up dimensions but mostly focused on increasing *coverage and institutionalisation* of the WHO PEN program), while in Slovenia, where there are already high levels of integration/institutionalisation and coverage of integrated care, the roadmap took a strong focus on (technology-supported) task-shifting to improve inclusiveness of elderly and other vulnerable populations (i.e., *expanding the ICP* with aim to increase equitable coverage). The Belgium roadmap centres around a networking approach to facilitate dialogue and synergies between diverse stakeholders within a fragmented health care system (i.e., focused on producing change to support *integration or institutionalisation*). Overall, as a learning, uni-dimensional scale-up roadmaps are not able to tackle complex realities, instead, while different scale-up dimensions were primarily focused on within the different countries, the roadmaps still captured other scale-up dimensions and acted to 'fill the gap', considering contextual needs. The final difference between roadmaps relates to the influence, *mandate, and power of the change team* in the case-study country. For example, in Cambodia, the National Institute of Public Health (NIPH) was a partner in the SCUBY consortium. In their advisory role to the Ministry of Health (MoH), the Cambodian roadmap contains a wide range of recommendations which supports national health system strengthening in line with their mandate. In Slovenia, the SCUBY consortium partner represents the largest Community Health Centre (ie, the Community Health Centre of Ljubljana) which also serves as a role-model, for scaling interventions that are deemed effective and feasible, for other health centres. Consequently, the roadmap developed by the Slovenian SCUBY team focussed on an operational approach (i.e., testing the feasibility of quality improvement interventions through pilot projects). Finally, in Belgium, the SCUBY partners are academic institutions (University of Antwerp and Institute of Tropical Medicine, Antwerp) with limited direct influence and mandate in the organisational or policy field. Hence, a networking approach emerged as an essential component of the roadmap highlighting the importance of science communication to various stakeholders working in the integrated care for chronic diseases field and subsequently creating synergetic partnerships. In summary, a final learning here is that the nature of the roadmap and its strategies can partly rely on the positionality and mandate of the partners involved in their development. Selecting partners carefully would be imperative for a roadmap to be adopted for impact.

## 4. Discussion

In the SCUBY project, three evidence-based scale-up roadmaps for integrated care of T2D and HT across three distinct health systems were developed. The three roadmaps reflect differences in the historical context and current realities within the three distinct health systems, and partly, may be shaped by the expertise and proximity to power of the country-specific working group and extended network (combined, the change team) developing them.(27) Taking this into consideration, roadmaps can be considered complex interventions. In the SCUBY scale-up, multiple roadmap components and stakeholders interact, producing emergent effects which are different from the effects of the individual elements and actors within a socio-ecological system.(28, 29) The roadmap

interventions can change over time because of contextualisation and adaptation. Hence, these roadmaps should be considered a flexible and fluid set of country-specific strategies that evolve over time. (30) highlight the importance of renewing and regenerating complex interventions.<sup>14</sup> Recent implementation studies have therefore stressed the relevance of documenting modifications to evidence-based practices.(31–33) The scale-up roadmaps developed as part of SCUBY indeed emphasise and document the (continuous) adaptation as a result of a co-creative process. To our knowledge, evidence on the use of roadmaps – as a knowledge translation and mobilisation instrument – for scale up is limited.(34–39) Our thematic analyses on the roadmap content, identifying key elements, actions and strategies, as well as similarities and contextual differences can help inform other experiences on (the benefits of) roadmap usage. Hence, this paper offers a response to the need to better understand the various strategies on *how* to scale up.(5, 40) Examining such strategies, policy plans, or ‘roadmaps’ is crucial to enhance scale-up efforts as well as chronic disease control and health system strengthening.

## 4.1 Lessons learnt: proposing a conceptual spiral model for scale-up

Reflections and lessons were shared at various exchange moments during the SCUBY project on what would constitute relevant and effective scale-up strategies or roadmaps. Overall, reciprocal learnings on the roadmap from the three country cases took place at two different stages, i.e., at the end of the formative phase and intervention phase, as illustrated by Fig. 2.

In reflection of the reciprocal learning approach, we conceptualised the cross-country focal areas in scaling-up integrated care across these health systems as a spiral process from creating an enabling environment towards ensuring no one is left behind in Fig. 3. We aligned this conceptual ‘spiral’ model with the scale-up dimensions,(5) where (i) an enabling and elastic environment is a pre-requisite for sustainable care integration and expanding the package of care, (ii) subsequent dialogue is required to institutionalise integrated care within existing governance structures, to (iii) then adopt diversification strategies that focus on coverage of vulnerable populations to not be left behind. Relatedly, Cambodia’s roadmap is mostly focused on creating an enabling environment (i), Belgium’s roadmap adopted a network approach to enter dialogues with a broad variety of stakeholders (ii), while Slovenia’s pilot interventions focused on reaching vulnerable populations (iii). In that regard, the roadmap development and subsequent identified strategies need to be valued in the context of evolving practices, policies and their implementation (Fig. 1). In Cambodia, in collaboration with NGOs and development partners, many initiatives are ongoing to *enable a supportive environment* by strengthening health care and broader economic development. Hence, amidst this, the Cambodian roadmap aimed to identify and synthesize critical yet synergistic strategies (e.g., human resources for health) and actions that can contribute to integrate PEN as a nationwide adopted strategy to establish standardized primary NCD prevention and care and further increasing its reach (coverage) through health system strengthening, including implementation of the revised (second version) PEN model in some health centres, a NGO-led diabetes peer support network (MoPoTsyo), NCD-training of public health care workers by the Ministry of Health, amongst others. Conversely, in Belgium, there is a wide array of disjointed strategies and policies that have been implemented at various levels, involving a broad range of stakeholders. Supporting mechanisms to span boundaries between these initiatives are often lacking. As a result, the Belgium roadmap focuses on addressing these structural gaps (integration) through *strengthening multi-level dialogues, collaboration, and governance*, specifically via three core roadmap actions, which included: supporting change management and task shifting; data harmonisation and monitoring; and health financing reform. Finally, in Slovenia, policies are well implemented and support integrated care organisation and multi-profile teams. Hence, the Slovenian roadmap subsequently focused on providing evidence to extend (expand) these services to vulnerable populations (i.e., rural, elderly) via patient empowerment and self-management, *ensuring no one is left behind*.

## 4.2 Limitations

This study had some limitations. First, the COVID-19 pandemic halted much progress in developing and implementing the roadmaps for integrated care for chronic diseases due to other immediate priorities of care providers, decision makers and other stakeholders related to COVID-19 emergency responses. It affected the ‘policy window’ and critical juncture to move from development to implementation.(41) The implication thereof was that the roadmaps were developed in an extended period of time within a rapidly changing health landscape. However, irrespective of COVID-19, the SCUBY project window was relative short to develop, implement *and* evaluate the impact of the three roadmaps. A second limitation relates to the potential transferability of the roadmaps to other (similar) contexts. While we are confident that the roadmaps can be applied to scale-up integrated care package for HT and T2D in Cambodia, Slovenia, and Belgium, it is unclear to what extent these roadmaps can be generalised to other countries, and more specifically, to other types of health systems or health systems which have different pre-implementation characteristics. Nevertheless, we believe that the strengths of this research lie the reciprocal learning that was stimulated and the cross-country lessons that were drawn which are transferable. This warrant (self-)reflexivity on one’s power and role within scale-up efforts and on the implications of diverse and pre-existing cultures, practices, policies, histories, and political contexts. A final limitation relates to this lesson on self-reflexivity. We are aware that, to some extent, the roadmaps may reflect the SCUBY country change team’s positionality and power within their respective country to engage with, inform and influence essential stakeholders to shape the strategies and actions included in the roadmap. The latter reflects the realities in implementation science, which can both hinder and support progress towards scale-up. Irrespective, the three country cases present unique processes to roadmap development and implementation, from which one can learn about contextual differences and similarities to support scale-up through various strategies in these and other countries. As part of the roadmap development process, the respective country change teams have been able to gain boundary spanning skills and enter dialogues that can further assist the scale-up of integrated care.

## 4.3 Conclusion

As part of the SCUBY project, we were able to co-create, in close collaboration with stakeholders, three roadmaps for integrated T2D / HT care across three distinct health systems. The differences in strategies and actions in these roadmaps reflect differences in the historical context and current realities in each of the case study countries. Similar overarching strategies relate to creating an enabling environment for integrated care, facilitating dialogue to institutionalise integrated care in routine practice and optimizing resources through task-shifting to promote equitable access. There lies inherent value in exploring similarities and differences through a consortium approach while developing national or regional strategies to strengthen health systems.



# Declarations

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## Competing interests

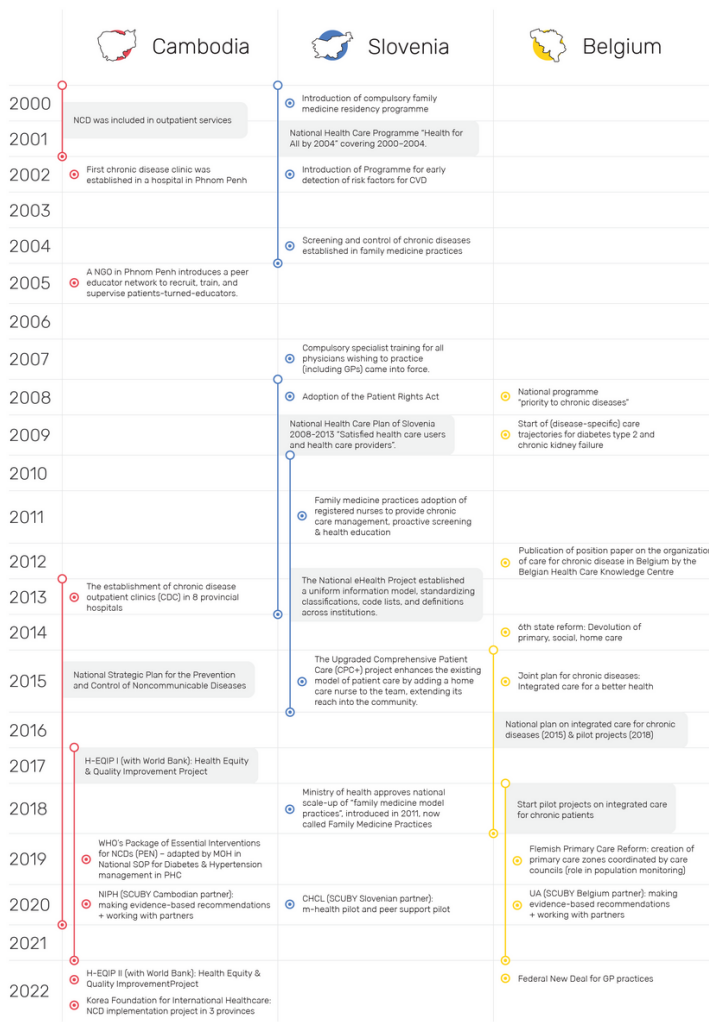
The authors declare no competing interests."

# References

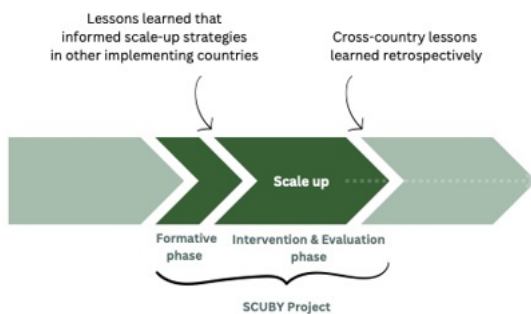
1. Abajobir AA, Abate KH, Abbafati C, Abbas KM, Abd-Allah F, Abdulkader RS, et al. Global, regional, and national disability-adjusted life-years (DALYs) for 333 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *The Lancet*. 2017;390(10100):1260–344.
2. Van Hecke A, Heinen M, Fernández-Ortega P, Graue M, Hendriks JM, Høy B, et al. Systematic literature review on effectiveness of self-management support interventions in patients with chronic conditions and low socio-economic status. *Journal of advanced nursing*. 2017;73(4):775–93.
3. Petrie JR, Guzik TJ, Touyz RM. Diabetes, hypertension, and cardiovascular disease: clinical insights and vascular mechanisms. *Canadian Journal of Cardiology*. 2018;34(5):575–84.
4. GBD Results Tool | GHDx [Internet]. [cited 2018 Jul 5]. Available from: <http://ghdx.healthdata.org/gbd-results-tool>
5. van Olmen J, Menon S, Poplas Susič A, Ir P, Klipstein-Grobusch K, Wouters E, et al. Scale-up integrated care for diabetes and hypertension in Cambodia, Slovenia and Belgium (SCUBY): a study design for a quasi-experimental multiple case study. *Glob Health Action*. 2020;13(1):1824382.
6. Nigatu T. Integration of HIV and noncommunicable diseases in health care delivery in low-and middle-income countries. *Preventing chronic disease*. 2012;9.
7. Zhao Y, Ma Y, Zhao C, Lu J, Jiang H, Cao Y, et al. The effect of integrated health care in patients with hypertension and diabetes: a systematic review and meta-analysis. *BMC Health Serv Res*. 2022;22(1):603.
8. Lee JK, McCutcheon LRM, Fazel MT, Cooley JH, Slack MK. Assessment of Interprofessional Collaborative Practices and Outcomes in Adults With Diabetes and Hypertension in Primary Care: A Systematic Review and Meta-analysis. *JAMA Network Open*. 2021;4(2):e2036725.
9. Demaio AR, Nielsen KK, Tersbøl BP, Kallestrup P, Meyrowitsch DW. Primary Health Care: a strategic framework for the prevention and control of chronic non-communicable disease. *Global health action*. 2014;7(1):24504.
10. Martens M, Wouters E, Van Olmen J, Klemenc-Ketis Z, Chhim S, Chham S, et al. Process evaluation of the scale-up of integrated diabetes and hypertension care in Belgium, Cambodia, and Slovenia (the SCUBY project): A study protocol. *BMJ Open*. 2022;In press.
11. National Institute of Statistics. General Population Census of the Kingdom of Cambodia 2019 [Internet]. Ministry of Planning, Cambodia; 2020. Available from: <https://www.nis.gov.kh/nis/Census2019/Final%20General%20Population%20Census%202019-English.pdf>
12. Noncommunicable diseases Cambodia 2018 country profile [Internet]. [cited 2022 Nov 7]. Available from: <https://www.who.int/publications/m/item/noncommunicable-diseases-khm-country-profile-2018>
13. Te V, Chhim S, Buffel V, Van Damme W, van Olmen J, Ir P, et al. Evaluation of Diabetes Care Performance in Cambodia Through the Cascade-of-Care Framework: Cross-Sectional Study. *JMIR Public Health Surveill*. 2023;9:e41902.
14. World Bank Open Data. World Bank Open Data. 2023 [cited 2023 Jul 17]. World Bank. Current health expenditure per capita, PPP (current international \$) | Data [Internet]. Available from: <https://data.worldbank.org/indicator/SH.XPD.CHEX.PP.CD>
15. Chham S, Buffel V, Van Olmen J, Chhim S, Ir P, Wouters E. The cascade of hypertension care in Cambodia: evidence from a cross-sectional population-based survey. *BMC Health Serv Res*. 2022;22(1):838.
16. Klemenc-Ketis Z, Stojnić N, Zavnik Č, Ružič Gorenjec N, Danhieux K, Lukančič MM, et al. Implementation of Integrated Primary Care for Patients with Diabetes and Hypertension: A Case from Slovenia. *Int J Integr Care*. 2021;21(3):15.
17. Susič AP, Švab I, Klemenc-Ketis Z, Klemenc Ketiš Z, Organization WH. Upgrading the model of care in family medicine: a Slovenian example. *Public health panorama*. 2018;4(04):550–5.
18. OECD. [www.oecd-ilibrary.org](http://www.oecd-ilibrary.org/docserver/5101558b-en.pdf?expires=1667828755&id=id&accname=guest&checksum=27AF146BBA2643639A0AC88549513C9C). 2022 [cited 2022 Nov 7]. Health Status - Chronic Disease Morbidity. Available from: <https://www.oecd-ilibrary.org/docserver/5101558b-en.pdf?expires=1667828755&id=id&accname=guest&checksum=27AF146BBA2643639A0AC88549513C9C>
19. Martens M, Danhieux K, Van Belle S, Wouters E, Van Damme W, Remmen R, et al. Integration or Fragmentation of Health Care? Examining Policies and Politics in a Belgian Case Study. *Int J Health Policy Manag*. 2021;
20. Paulus D, Van den Heede K, Mertens R, Spitters H, Vrijhoef HJM. Position paper: organisatie van zorg voor chronische ziekten in België. 2012;
21. Weber P, Birkholz L, Kohler S, Helsper N, Dippon L, Ruetten A, et al. Development of a Framework for Scaling Up Community-Based Health Promotion: A Best Fit Framework Synthesis. *International Journal of Environmental Research and Public Health*. 2022;19(8):4773.
22. World Health Organization. Nine steps for developing a scaling-up strategy. World Health Organization; 2010.
23. World Health Organization. Practical guidance for scaling up health service innovations. World Health Organization; 2009.

24. Olmen J van, Delobelle P, Guwatudde D, Absetz P, Sanders D, Alvensson HM, et al. Using a cross-contextual reciprocal learning approach in a multisite implementation research project to improve self-management for type 2 diabetes. *BMJ Global Health*. 2018;3(6):e001068.
25. Mihevc M, Zavrnik Č, Mori Lukančič M, Vrtič T, Prevolnik Rupel V, Petek Šter M, et al. Telemonitoring of Elderly with Hypertension and Type 2 Diabetes at the Primary Care Level: Protocol for a Multicentric Randomized Controlled Pilot Study. *Zdr Varst*. 2022;61(4):216–23.
26. Vrtič T, Mihevc M, Zavrnik Č, Mori Lukančič M, Poplas Susič A, Klemenc-Ketiš Z. Peer Support as Part of Scaling-Up Integrated Care in Patients with Type 2 Diabetes and Arterial Hypertension at the Primary Healthcare Level: A Study Protocol. *Zdr Varst*. 2023;62(2):93–100.
27. Campos PA, Reich MR. Political Analysis for Health Policy Implementation. *Health Systems & Reform*. 2019;5(3):224–35.
28. Luke DA, Stamatakis KA. Systems Science Methods in Public Health: Dynamics, Networks, and Agents. *Annu Rev Public Health*. 2012;33(1):357–76.
29. Moore GF, Audrey S, Barker M, Bond L, Bonell C, Hardeman W, et al. Process evaluation of complex interventions: Medical Research Council guidance. *BMJ [Internet]*. 2015 Mar 19 [cited 2020 Jun 2];350. Available from: <https://www.bmj.com/content/350/bmj.h1258>
30. Willis CD, Riley BL, Stockton L, Abramowicz A, Zummach D, Wong G, et al. Scaling up complex interventions: Insights from a realist synthesis. Vol. 14, *Health Research Policy and Systems*. BioMed Central Ltd.; 2016. p. 88.
31. Wiltsey Stirman S, Baumann AA, Miller CJ. The FRAME: an expanded framework for reporting adaptations and modifications to evidence-based interventions. *Implementation Sci*. 2019;14(1):58.
32. Escoffery C, Lebow-Skelley E, Udelson H, Böing EA, Wood R, Fernandez ME, et al. A scoping study of frameworks for adapting public health evidence-based interventions. *Translational behavioral medicine*. 2019;9(1):1–10.
33. Miller CJ, Barnett ML, Baumann AA, Gutner CA, Wiltsey-Stirman S. The FRAME-IS: a framework for documenting modifications to implementation strategies in healthcare. *Implementation Sci*. 2021;16(1):36.
34. Adam T, Hsu J, De Savigny D, Lavis JN, Røttingen JA, Bennett S. Evaluating health systems strengthening interventions in low-income and middle-income countries: are we asking the right questions? *Health policy and planning*. 2012;27(suppl\_4):iv9–19.
35. Davies HT, Powell AE, Nutley SM. Mobilising knowledge to improve UK health care: learning from other countries and other sectors—a multimethod mapping study. 2015 [cited 2023 Oct 9]; Available from: <https://europepmc.org/books/nbk299400>
36. Gilson L, Barasa E, Brady L, Kagwanja N, Nxumalo N, Nzinga J, et al. Collective sensemaking for action: researchers and decision makers working collaboratively to strengthen health systems. *bmj [Internet]*. 2021 [cited 2023 Oct 9];372. Available from: <https://www.bmj.com/content/372/bmj.m4650>
37. Gilson L, Raphaely N. The terrain of health policy analysis in low and middle income countries: a review of published literature 1994–2007. *Health policy and planning*. 2008;23(5):294–307.
38. Gore R, Parker R. Analysing power and politics in health policies and systems. *Global Public Health*. 2019;14(4):481–8.
39. Redman S, Greenhalgh T, Adedokun L, Staniszewska S, Denegri S, Committee C production of KCS. Co-production of knowledge: the future [Internet]. Vol. 372, *bmj*. British Medical Journal Publishing Group; 2021 [cited 2023 Oct 9]. Available from: <https://www.bmj.com/content/372/bmj.n434.full>
40. Willis CD, Riley BL, Stockton L, Abramowicz A, Zummach D, Wong G, et al. Scaling up complex interventions: insights from a realist synthesis. *Health Res Policy Sys*. 2016;14(1):88.
41. Martens M, Olmen J van, Wouters E, Boateng D, Damme WV, Belle SV. Using the multiple streams model to elicit an initial programme theory: from policy dialogues to a roadmap for scaling up integrated care. *BMJ Global Health*. 2023;8(9):e012637.

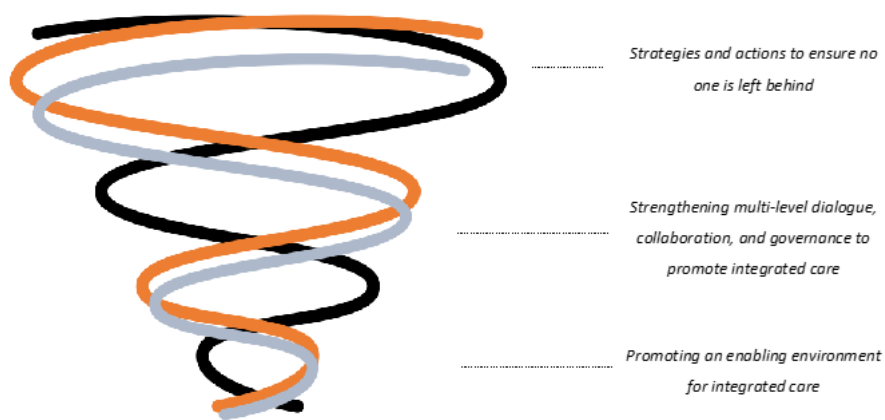
## Figures



**Figure 1**  
 Key health system developments and policy initiatives relevant to the scale-up of integrated care prior to and during the SCUBY project. NCD, Non-Communicable Disease; CVD, Cardiovascular Disease; MHO, Ministry of Health; NGO, Non-governmental Organisation; GP, General Practitioner; H-EQIP, Health Equity and Quality Improvement Project; NIPH, National Institute of Public Health; UA, University of Antwerp; CHCL, Community Health Center Ljubljana. Reference to position paper (Belgium).(20)



**Figure 2**  
 Cross-country lessons can be drawn prior to the roadmap development as well as retrospectively.



**Figure 3**

Conceptual model for scaling-up integrated care across health systems, aligned with the scale-up dimensions reported elsewhere,(5) where (i) an enabling and elastic environment is a pre-requisite for sustainable care integration and expanding the package of care, (ii) subsequent dialogue is required to institutionalise integrated care within existing governance structures, to (iii) then adopt diversification strategies that focus on coverage of vulnerable populations to not be left behind.

## Supplementary Files

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