A solid start for the Dutch first thousand days-approach: insights into program adoption, monitoring and cross-sectoral collaboration

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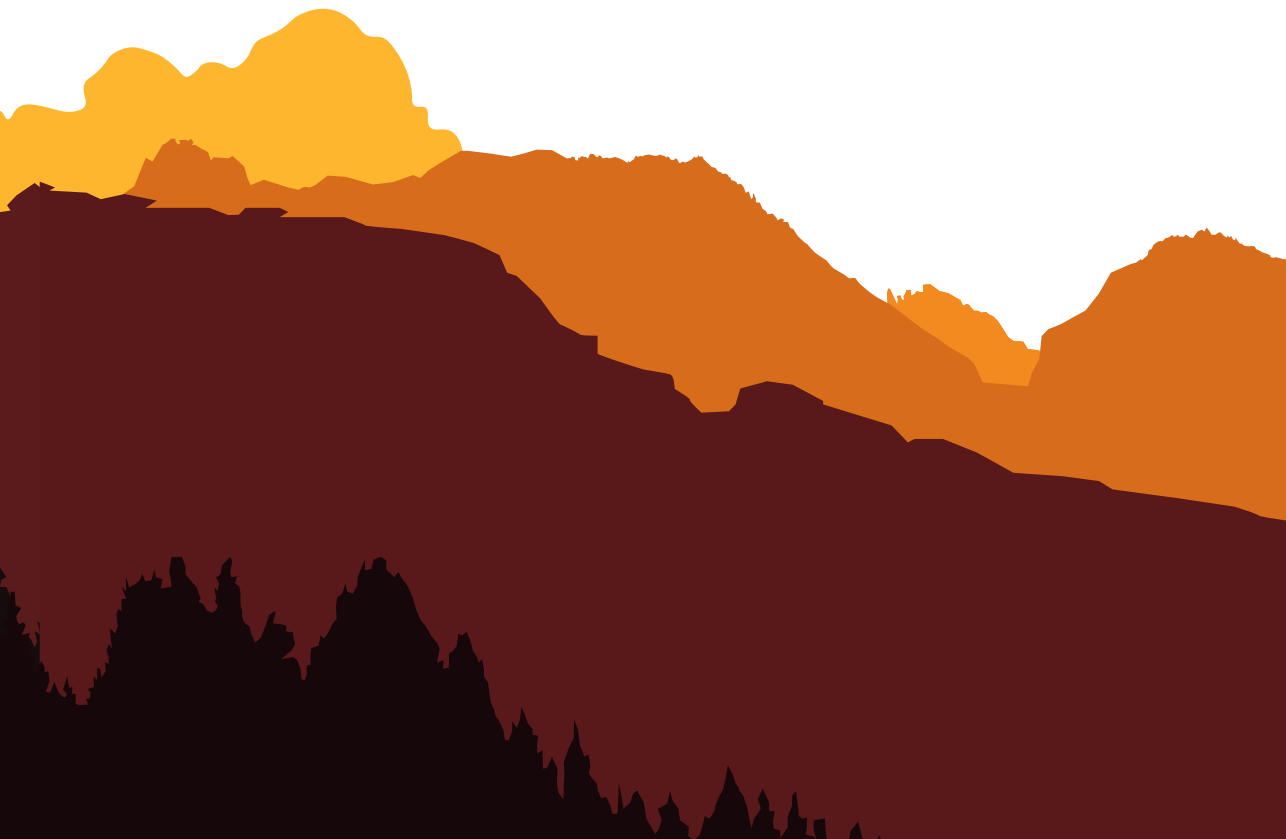
General discussion



The first thousand days of our life, spanning from conception to our second birthday, lay the foundation for optimal future health and well-being (1-3). During those first thousand days, our development and opportunities are not only driven by medical factors, but strongly depend on the direct and indirect influences of social factors as well (4). Reducing health inequities and providing every child a good start in life therefore requires preventive and integrated initiatives across the social and medical sector. In 2018, the nationwide action program 'Solid Start' was launched by the Ministry of Health, Welfare and Sport (Dutch abbreviation: VWS), aiming for the best possible start for all children during the first thousand days of life (5). The action program Solid Start promotes cross-sectoral collaboration and focuses particularly on (future) parents and young children in vulnerable situations. Starting from 2019, the Ministry of Health, Welfare and Sport commissioned the National Institute for Public Health and the Environment (Dutch abbreviation: RIVM) to monitor the action program Solid Start. This thesis forms the scientific basis for the monitor.

The main objective of this thesis was to provide insight into the adoption of the action program Solid Start, thereby focusing on monitoring and cross-sectoral collaboration. Using a wide range of quantitative and qualitative research methods, the studies included in this thesis offer insights into what and how to monitor, as well as the developments and experiences with the action program Solid Start.

This final chapter begins with a summary of the main findings of the included studies in this thesis, followed by a reflection that outlines and contextualizes key lessons learned using the main findings and recent literature. Subsequently, this chapter highlights methodological considerations along with recommendations for research. This chapter closes with a future outlook, providing recommendations for policy, practice and education, and concluding remarks.

MAIN FINDINGS

What is vulnerability during pregnancy, and how to operationalize vulnerability for monitoring?

We studied the concept of vulnerability and its operationalization for monitoring purposes in Chapter 2 and 3. Both studies included pre-pregnancy data on a wide range of social risk and protective factors, as derived from nationwide routinely collected data sources within DIAPER (acronym for Data-InfrAstructure for ParEnts and childRen) and self-reported data on health, wellbeing and lifestyle from the Public Health Monitor 2016 (PHM-2016).

The study in Chapter 2 aimed to provide more insight into vulnerability by identifying classes (groups) of pregnant women with similar characteristics, and their relation with adverse outcomes to validate classes. A latent class analysis among pregnant women showed five different vulnerability-classes with varying combinations of risk and protective factors to vulnerability: multidimensional vulnerability, socioeconomic vulnerability, psychosocial vulnerability, high care utilization, and the healthy and socioeconomically

stable-class. Women in the multidimensional vulnerability-class shared multiple risk factors in various domains and a lack of protective factors. These women more often had adverse outcomes, including premature birth and caesarean section, as compared to the healthy and socioeconomically stable-class. The three classes with risk factors in one domain and protective factors in others did not. These results show the importance of considering the co-existence of multiple risk factors and protective factors that may act as positive exposures or buffering mechanisms promoting resilience. The results also suggest that early detection of vulnerability and strategies to improve parental health and well-being might benefit from focusing on different domains and combining medical and social care and support, with attention to the systemic causes of vulnerability.

The next study, described in Chapter 3, further explored which data to use to predict multidimensional vulnerability at population-level. Our previous study was conducted in a non-representative subset of pregnant women, meaning that the prevalence of multidimensional vulnerability among all pregnant women in the Netherlands was unknown. It was unclear whether the prevalence could be assessed using routinely collected nationwide data as readily available in DIAPER. Hence, we studied the feasibility of using solely routinely collected data for predictions, the relevance of adding self-reported data, and the most important predictors. The results showed that it is feasible to use solely routinely collected data to predict multidimensional vulnerability. This data is readily available for the entire population and can provide a robust foundation for longitudinal monitoring and policy formulation at population-level. Nevertheless, results also showed that self-reported data was of added value in the predictions. Moreover, self-reported health variables were found to be important predictors to multidimensional vulnerability, next to socioeconomic characteristics and healthcare utilization. Hence, the results offer the opportunity to explore how self-reported health can be systematically included (e.g. in screening and care registries) to enhance the provision of personalized care and support while further improving population-level predictions in the future.

Which indicators can be used to monitor the action program Solid Start on a local level?
Chapter 4 describes the development of an indicator set to monitor the action program Solid Start at local level, using a modified Delphi study with several rounds of questionnaires and online meetings. For local monitoring, experts desired an indicator set covering both processes and outcomes, both parents and children, and both risk and protective factors. The final indicator set comprised nineteen indicators within the three phases of the action program Solid Start: preconception, pregnancy and after birth. Topics included poverty, psychological/psychiatric problems, stress, smoking, vulnerability, preconception care, low literacy and premature birth. The prioritized indicators primarily related to social determinants of health rather than specific clinical aspects. Additionally, a development agenda was set with topics and indicators lacking nationwide data or clear operationalization (e.g. stress, unintended pregnancy, loneliness). We identified both similarities and differences in the selected indicators for monitoring the action program Solid Start at local level compared to national level. These variations can reasonably be attributed to differing purposes and informational needs: monitoring and evaluating

nationwide implementation versus facilitating the local monitoring and approach. In the local monitoring of the action program Solid Start, the indicator set can enhance the conversation between policymakers, managers, professionals and other stakeholders about the local situation and developments to prioritize local interventions and policies.

What are the developments and experiences with the action program Solid Start and specifically cross-sectoral collaboration?

Chapter 5 describes the implementation of the action program Solid Start during the program's own first thousand days (i.e. 2019, 2020 and 2021), with a specific focus on cross-sectoral collaboration. Generally, the findings from questionnaires, focus group discussions and interviews revealed progress in collaboration at different levels over the years. First, the study reflected on the development of local coalitions Solid Start. We found a growing number of coalitions Solid Start involving diverse stakeholders, and municipalities increasingly reported plans of action, objectives, ambitions and activities for Solid Start. Coalition development varied due to municipalities' unique challenges, focus and historical contexts. Secondly, our results provided insight into the experiences with the action program Solid Start and cross-sectoral collaboration, including facilitators, barriers and needs. Initiating the action program Solid Start increased the sense of urgency for the importance of the first thousand days and stimulated professionals from various backgrounds to get to know each other, resulting in more collaborative agreements and protocols on cross-sectoral care provision. Some general facilitators for effective coalitions Solid Start were an active coordinator as a driving force and a shared societal goal. Moreover, stakeholders appreciated the program's strong local focus and opportunities for learning. However, the action program Solid Start appeared not yet fully incorporated into all professionals' everyday practice. Most common barriers related to systemic integration at macro-level, including limited resources and collaboration-inhibiting regulations. Stakeholders emphasized the importance of continuing with Solid Start and suggested various needs to ensure the program's sustainability. Those needs included sustainable funding, supportive regulations, ongoing knowledge development and learning, responsiveness to stakeholders' needs, and better and more client involvement.

REFLECTION

The action program Solid Start is the first national program to address the full period of the first thousand days while bridging the medical and social sector. The elements of the action program Solid Start were increasingly adopted over the past years, reflecting a shift from traditional, fragmented care towards a more integrated, population health-based care system (6). The approach emphasizes prevention and acknowledges the social determinants of health, which are favoured but still sporadic elements of integrated care models (7). In this thesis, integrated care denotes the collaborative efforts of professionals and organizations across the medical and social sector to provide comprehensive, accessible and coordinated care for the benefit of (future) parents and their children (8, 9).

Considering the above, the developments within the action program Solid Start at national level appear to align with the principles of Population Health Management (PHM). The conceptualization and definition of PHM are subject to ongoing refinement, yet PHM typically refers to efforts aimed at integrating services across the public health, social and medical sector. The overarching goal is to enhance health equity, patient experiences, provider well-being and population health, while reducing costs (known as the quintuple aim) (10-12). Regularly, studies appear that describe various elements of PHM initiatives, offering valuable insights into their design, implementation and evaluation (6, 13-16). These elements include population segmentation, risk-stratification, understanding populations' strengths and needs, and monitoring and evaluating population-tailored strategies (10, 16, 17). In the context of the action program Solid Start and specifically the local coalitions, the extensive literature on Learning Health Systems (LHS) is also relevant (18-21). LHS emphasizes a cycle of continuous learning to improve care, using elements such as data-linkage and sharing. Further exploration of both PHM and LHS literature can provide valuable insight into the interpretation of the findings presented in this thesis.

Drawing upon our research findings and in light of recent scientific literature, we provide multiple lessons learned. These insights may guide future endeavours related to the action program Solid Start, and may also be relevant in the adoption and monitoring of other cross-sectoral initiatives. The lessons learned are structured alongside the components of the main research objective, namely the adoption of the action program Solid Start, monitoring and cross-sectoral collaboration.

Lessons learned in *the adoption* of the action program Solid Start

The adoption of the action program Solid Start encountered both facilitators and barriers and seemed to be a continuous learning process, but it showed overall progress. Chapter 5 outlined numerous program-elements and developments that may have contributed to the adoption of the action program Solid Start. Based on these findings, we draw two lessons learned.

1. The adoption was facilitated by a unifying narrative and dedicated champions at all levels

Having a unifying narrative that not only sets a clear societal goal but also resonates with stakeholders at different levels and sectors was instrumental in facilitating the adoption of the action program Solid Start. This narrative, emphasizing the importance of the first thousand days and the imperative for cross-sectoral collaboration, extends beyond immediate issues to build a foundation for long-term improvements. By creating common ground and instilling a sense of urgency, the narrative prompts a shared commitment to the idea that 'we are in the same boat' for the future, thereby laying a solid base for collaboration. These interrelated factors of a shared vision, commitment and societal urgency align with previous literature on cross-sectoral collaboration (9, 22-26) and are influential in initiating and sustaining integrated programs and partnerships.

The narrative, widely spread, was turned into action through the efforts of dedicated champions at different levels. At the local level, proactive coordinators or facilitators acted as driving forces for coalitions' progress. At regional and national level, these individuals were described as ambassadors, advocates or visionary leaders who consistently keep Solid Start on the policy agenda, and who inspire others. In the adoption of innovations or transformations, such strong and committed 'champions' or 'change agents' are frequently described as key factors to initiate, promote and sustain a certain movement or collaborative initiative (19, 20, 25, 27-30). In addition to designated champions, it is essential that informal champions emerge from intrinsically motivated frontline professionals in order to stimulate the engagement of peers (29). Moreover, collaboration among multiple champions, especially those in different positions (e.g. care provider and project coordinator), is described as beneficial (27). This may contribute to boundary-spanning across levels and services, and possibly help to address the gaps that currently arise when a champion leaves. Continuously emphasizing the narrative and providing support to champions across all levels may contribute to the long-term integration of the action program Solid Start into everyday practice of all professionals.

2. National governmental stewardship with strong local focus is a promising combination

The combination of stable national governmental stewardship with a strong local focus increased the action program's adoption, as it provided a clear direction and support while it simultaneously ensured alignment with local contexts, practices and networks. Previous evidence also indicates that implementing and sustaining integrated care involves balancing two approaches: a top-down and bottom-up approach (7, 31-33). Currently, literature describes missed opportunities due to an over-reliance on top-down approaches in integrated care (7).

A more traditional top-down approach can create favourable conditions (regulations, finances, governance) and external motivation for change (7, 31). In our study, a consistent 'push' and structured program with supportive mechanisms from the national government (referred to as national governmental stewardship) prompted a sense of urgency, guided local policy agendas and steered local action. These supportive mechanisms extended beyond mere financial support, including practical support in setting up a coalition Solid Start and implementing interventions. Simultaneously, our study also identified various barriers to integration at systemic level (e.g. limited resources, collaboration-inhibiting laws and regulations), and highlighted the need for more responsiveness to local stakeholders' needs, meaning there is still potential for improvement.

Next, a bottom-up approach fosters engagement and support from professionals who are directly involved in changes, allowing for future-proof innovations that align with local needs (31). In this thesis, encouraging and facilitating municipalities to create their own approach increased flexibility to respond to unique local situations and developments. The synthesis of Wodchis and colleagues (33) on integrated elderly care explains how bottom-up initiatives require top-down support to sustain and spread, and Behrendt and Ramanuj (32) convey that learning processes are part of the synergistic interaction

between the two approaches. Thus, a combined approach, where the top-down approach stimulates the bottom-up approach and vice versa, in an emergent way, is beneficial to implement integrated care. In our study, this combined approach may have promoted the continuation or strengthening of initiatives that existed since before the nationwide action program Solid Start, rather than resulting in stagnation or cessation. Applying a local focus avoids the pitfall of a one-size-fits-all strategy and allows for variation, local leadership, and continuous learning within an enabling policy environment (32).

Lessons learned in *monitoring*

In this thesis, we share our findings on monitoring the action program Solid Start at both national and local level. Our research has provided more insights into the operationalization of vulnerability (Chapter 2 and 3) and increased our understanding of useful indicators and data to monitor the action program Solid Start (Chapter 4). We share two lessons learned in monitoring based on these findings.

3. Considering both risk and protective factors is important for a comprehensive perspective

The findings from several of our studies highlighted the significance of considering both risk and protective factors to vulnerability. In Chapter 2, we found that a unidimensional perspective to vulnerability, being focused on (single) risk factors in one domain, may be insufficient to correctly predict adverse outcomes during pregnancy and childbirth. The importance of considering protective factors as well was further supported in Chapter 4, in which we learned that a local indicator set to monitor the action program Solid Start should cover both risk and protective factors.

The interrelatedness between risk and protective factors and viewing health from a broader perspective has become more common. This trend is also evident in other fields like elderly care (34), GP-care and hospital-care, and accompanied by the emergence of more comprehensive concepts and methods (35) in the Netherlands and abroad, such as Positive Health (36) and Salutogenesis (37, 38). These concepts emphasize people's strengths, opportunities and positive experiences, rather than focusing (merely) on weaknesses or risks. Additionally, they adopt a more holistic perspective in health and well-being as they consider physical, social and emotional aspects. This broad perspective encourages cross-sector collaborations and preventive strategies by acknowledging the relevance of multiple sectors to gain insight and create solutions.

Academic literature in early life is also shifting its focus from adversity and risks towards emphasizing the importance of resilience and protective factors (39, 40). Traditionally, studies have primarily concentrated on risk factors in predicting adverse early life outcomes. There is still much to learn about the co-occurrence and interplay of risk and protective factors to improve the health and wellbeing of future generations. Those protective factors are not merely the absence of risks, but additional elements that increase well-being or guard against unfavourable outcomes (41). Hence, research into resilience and protective factors is emerging, with social support being most frequently studied and best supported in the social sciences (39, 40, 42, 43). Additionally, an increasing

number of studies seem to consider the combination of various risks across domains, rather than focusing on single risk factors, as also exemplified in a recent latent class study of Helmikstøl et al. (44). From a preventive and solution-focused perspective, it is important to consider factors that are modifiable, rather than concentrating exclusively on immutable factors for both risk and protective factors. This was also deemed important for monitoring efforts, as stressed in Chapter 4.

4. Monitoring requires longitudinal cross-sectoral data and indicators

Chapter 2 and 3 showed that, in order to operationalize vulnerability among pregnant women, comprehensive data on a wide range of factors in different domains (e.g. socioeconomic, psychosocial and medical risk and protective factors) are necessary. Data within one sector alone cannot capture all relevant elements. Moreover, the indicators that were chosen to monitor the action program Solid Start (Chapter 4) reflected both social and medical aspects, and were not exclusively tied to a single profession or sector. Consequently, the findings in this thesis highlight the need for cross-sectoral data and indicators for longitudinal monitoring. This need aligns with previous literature (e.g. 18, 45). For example, several studies describe the potential of integrating data from various sectors to enhance a data-driven approach and internal-monitoring for population health and increased equity (10, 46), although the majority of PHM-initiatives rely on routine care data from one single sector or organization. In a wider perspective, incorporating data on the social determinants of health in daily care workflows is endorsed to support action (47, 48). Lastly, the linkage, storage and sharing of different data-sources (i.e. next to routine care data also data on the SDOH or patient-reported data) are frequently cited elements of LHS (18-20). In this thesis, we utilized DIAPER, which links individual level routinely collected data from the medical and social sector for parents and children on a national scale. Other examples of linked data infrastructures in the Netherlands include the regional Extramural LUMC Academic Network (ELAN), which supports the Healthy and Happy The Hague movement (46).

Lessons learned in *cross-sectoral collaboration*

Scientific literature emphasizes that cross-sectoral collaboration between the medical and social sector is needed to provide children the best possible start in life (4, 49-51). This statement finds support in the findings described in this thesis, as these point towards the cross-sectoral nature of a solid start and the need for cross-sectoral data and indicators for monitoring (Chapter 2, 3 and 4). Chapter 5 described the developments and experiences with the action program Solid Start and specifically cross-sectoral collaboration. Below, we present two lessons learned in cross-sectoral collaboration based on our findings.

5. Fostering normative integration is a fundamental first step to collaborate

We learned that normative integration was a fundamental step to increase cross-sectoral collaboration. Normative integration includes the 'softer' aspects of integration, such as creating a shared vision, culture, trust, and mutual acquaintanceship (9, 23, 52). Our findings showed for example that the increased sense of urgency coupled with knowing each other provided a solid basis to initiate or intensify activities within the coalitions Solid

Start. Studies in other fields make similar observations that interpersonal dynamics and creating a common frame of reference are essential (13, 22, 30, 34, 53-55). In the context of early life, a recent Danish study into cross-sectoral collaboration for pregnant women in vulnerable situations stressed that knowing each other's working context is helpful (56), and a study into a Canadian Child Health Network mentioned relationships as 'system triggers' that prompt change to professionals' everyday practice. The systematic review of Such et al. (30) used systems thinking to explore the dynamics between relational and structural governance components in successful collaboration across sectors. Their causal loop diagram showed positive feedback loops between relational aspects, and also high interrelatedness between structural and relational components. Both contribute to the credibility and legitimacy of collaborations.

The above implies that continuous efforts should be made to stimulate encounters between professionals from diverse backgrounds, who can then build a collaborative culture and make plans together. While it may be time-consuming and requires acknowledgement of contexts (e.g. historical, political and sociocultural conditions), this seems to be a necessary part of integration. This may be specifically true for collaboration between multiple sectors in contrast to collaboration within one sector, given the larger differences in relational and organizational aspects that require additional investments to foster mutual understanding. Moreover, our findings suggest that positive interpersonal dynamics may facilitate improvements even in the presence of systemic barriers. At the same time, these relational elements are essential to start learning together, which in turn can help to overcome collaborative challenges at different levels (including systemic barriers).

6. Processes of learning are indispensable in cross-sectoral collaboration

A final lesson learned from reviewing this thesis' findings and other scientific and grey literature is that 'learning' and its associated elements of reflection and knowledge sharing should be central in the adoption and monitoring of cross-sectoral approaches (18, 30, 53, 57, 58). Developing coalitions Solid Start, or initiating and sustaining cross-sectoral collaboration in a wider perspective, are novel and non-linear processes that unfold in a rapidly evolving field with changing contexts. In these processes, learning is relevant at different levels and scales, between different stakeholders and for different short and long-term purposes (59, 60). Examples in this thesis include learning from (and with) other professionals and experts-by-experience, within and between local coalitions Solid Start, across local and regional levels, and from other integrated care programs and sectors (Chapter 5). We reported that stakeholders use and want to use learning opportunities to improve, share knowledge, prevent duplication of efforts, and overcome collaborative challenges together. Moreover, our Delphi study (Chapter 4) began with stakeholders expressing an interest to learn from other coalitions about monitoring at local level, and their need for local indicators and data to facilitate discussions about local developments in order to learn for future practice and policy.

A recent mapping review into LHS of De Bruin and colleagues (18) described three processes of learning. The most often reported learning processes were information

sharing between clinical practice and research, and ongoing cyclical improvement processes (from performance to data, data to knowledge, knowledge to performance, and so forth) (18). This second, more 'rapid' process of learning requires (recent) data and a data infrastructure as key elements (18, 20, 61). PHM-literature refers to continuous testing, quality improvement processes and learning cycles, using data-driven insights (10, 16, 19, 62). Fewer papers discuss the third process of learning: recurrent interaction between stakeholders for collaborative learning (18). This facilitates the sharing of best-practices, evaluating processes, identifying opportunities for improvement, setting goals and discussing underlying values (18). Less is known about this form of learning in cross-sectoral collaboration, despite its crucial role in "constantly adapting strategies to changing circumstances and unanticipated situations"(57) (p. 1). Possibly, collaborative learning could also facilitate the other learning processes (i.e. research and cyclical improvement). It also often occurs together with one or two of the others (18). In this thesis, we did not dive into these learning processes in detail, but previous studies described that learning and reflection to support a transformation process was time-consuming and requires certain conditions and competencies (e.g. suitable data and indicators, openness, self-reflection, leadership- and teamwork skills, expertise, regular reflection moments and a supportive culture/climate) (20, 63).

We believe that all three types of learning are relevant in the context of Solid Start. Cross-sectoral collaboration requires an adaptive strategy in order to manage upcoming challenges and changing contexts, while simultaneously work towards the goals and aims that were set. Although learning has been used to some extent (e.g. based on DIAPER), there is untapped potential, for example regarding up-to-data data and opportunities for collective learning. Therefore, it is important to think about how to facilitate learning in a more structured way, together with all relevant stakeholders from policy, research and practice, including experts-by-experience.

METHODOLOGICAL CONSIDERATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

Several methodological considerations should be kept in mind when interpreting the results from this thesis. Most were discussed in the separate chapters. The following three sections provide overarching methodological considerations, along with recommendations for future research.

A broadened scope in monitoring

The monitoring efforts described in this thesis illustrate a growing link between research, policy and practice. In the monitoring of the action program Solid Start conducted by the National Institute for Public Health and the Environment, we have broadened our traditional research role, building upon the foundations laid by previous efforts. Conventionally, the National Institute for Public Health and the Environment offers a cyclical annual update

on quantitative indicators and stakeholder experiences, enabling the Ministry to provide a rationale for her activities and shape future policy developments (e.g. as input for a follow-up approach). Our evolving role implies the adoption of more flexible and collaborative approaches oriented at learning for policy and practice, and involves using a wide variety of qualitative and quantitative methods, and engaging more experts-by-experience. This was most evident in the setup of the learning local monitor Solid Start, which comprised small scale-learning sessions, larger-scale theme sessions and the development of a local indicator set. Responding to participant's needs, we consequently developed a dashboard displaying municipality-level data for these local indicators, available at www.regiobeeld.nl/kansrijkestart, to stimulate local conversations and decision-making. This tool is still in development, with requests to expand its capabilities (e.g. adding neighbourhood- and regional data) and add indicators from the developmental agenda (e.g. stress, unintended pregnancy, loneliness). We believe that involving the experts that will use the indicators from the start of development was beneficial to increase acceptance and utilization, just like previous research described how involving care providers is crucial for transformational change (64). Additionally, our research on the operationalization of vulnerability was notably driven by local and national demands for a better understanding on the prevalence, geographical distributions and trends in vulnerability. As a result of the broadened monitoring scope, we have produced a diverse array of products relevant for policy (factsheets), research (scientific papers) and practice (indicator set, websites, meetings).

The shift away from conducting research in isolation, particularly in the context of complex and cross-sectoral programs, is increasingly apparent in other monitors and projects as well. Examples include the reflexive evaluation of the program 'Right Care at the Right Place' (65, 66) and the monitor of the 'Healthy and Active Living Agreement' (67). Moreover, there is growing adoption of participatory research designs, characterized by collaborations between researchers and local stakeholders to create and apply relevant knowledge for societal issues in practice, to evaluate and facilitate integration across the medical and social sector (e.g. 68). Engaging with knowledge users throughout all research phases can significantly enhance the uptake of research in practice or policy, facilitating a transition from scientist-driven to problem-based research (69-71). Beckett and colleagues (72) call to embrace the inherent complexity and uncertainty of 'research co-production' and not just focus on the end-goal of changing practice, emphasizing that more nuanced effects on knowledge sharing, relationships and research capacity building can be expected.

Hence, we recommend applying more participatory and co-productive forms of research to advance the Solid Start movement. By doing so, we can address questions that align with the needs and priorities of stakeholders in practice, enhance collaborative learning and better support the processes towards integration. In this regard, the National Institute for Public Health and the Environment can further evolve to a learning organization, actively engaging in iterative processes with stakeholders. Embracing participatory and co-productive research approaches also necessitates different competencies (20) and more flexibility. It implies that the authority for decision-making, including goal-setting and methodologies, is no longer exclusively entrusted to those in the academic world (as

an ivory tower), but is instead increasingly driven by those who are directly affected by research, policy or practice.

Therefore, an important aspect in future research and monitoring efforts is to truly involve experts-by-experience and individuals with experiential knowledge in all research phases. While this thesis partially achieved this inclusion in certain aspects, we were limited in others. For instance, an expert-by-experience was involved in organizing and conducting interviews with clients to gain insights into experiences with the action program Solid Start (Chapter 5). However, their perspective was missing in the development of an indicator set (Chapter 4). Experts-by-experience and (future) parents could have suggested and prioritized alternative indicators. Genuine involvement of experts-by-experience and individuals with experiential knowledge could be characterized by elements such as sufficient time and resources, shared responsibility, active listening, respect and a motivation to meaningful engagement. As articulated by Goedhart and colleagues (73), engaging citizens in vulnerable positions in research can involve several strategies, tools and methods that should be context-based and require a supportive cultural shift. Their paper provides a welcome overview of ways to address common concerns to engage citizens in vulnerable positions (e.g. moving beyond the 'usual suspects' with time and budget constraints, navigating predefined research questions, managing power dynamics and addressing diverse priorities).

Experienced progress versus measurable effects

This thesis provided insights in the developments and experiences with the adoption of the action program Solid Start and cross-sectoral collaboration. This thesis did not focus on the effects of the action program Solid Start on aims related to health, wellbeing and equity for parents and children. Stakeholders aspire more insights into early effects to inform ongoing monitoring efforts and to maintain support for the action program Solid Start. Especially policy makers may be seeking measurable outcomes to assess the tangible impact of the program. To address this need, we propose further research into the program's early effects, employing methods such as Difference-in-Differences (DiD). DiD is a quasi-experimental study design in which the relation between policy changes and outcomes can be compared over time between participating and non-participating groups (in our case: municipalities) (74). DiD gained popularity with the increase of longitudinal data and has been successfully applied to assess policy interventions during the first thousand days in other countries (e.g. 75, 76). In a future DiD study, we can build upon the findings of this thesis by utilizing the operationalization of vulnerability to compare municipalities and study equity, and by including the selected indicators as outcome measures. DIAPER presents itself as a suitable data infrastructure for this purpose.

Blindly staring at the measurable effects of the collaborative efforts however, fails to fully grasp the complexity of cross-sectoral collaboration. Despite widespread enthusiasm for cross-sectoral collaboration, there is currently little empirical evidence to suggest that cross-sectoral collaboration in itself is sufficient to improve health outcomes and health equity (30, 77, 78). Several potential reasons for this lack of evidence have been proposed.

The reasons range from overestimating the effects of collaboration in the first place, to difficulties in measuring the effects, especially when the effects are diverse, long-term and influenced by other factors. In the case of the action program Solid Start, an absence of immediate improvements in health outcomes would not necessarily imply a lack of impact, and conversely, any potential improvement in outcomes cannot unequivocally be attributed to the program. Alderwick and colleagues (77) suggest that while collaboration may not directly improve health, it may facilitate other developments and contribute to improvements as part of broader strategies to improve health. Moreover, especially programs focusing on early life and intergenerational aspects may not yield immediate measurable effects on health outcomes or equity. Nonetheless, investing in preventive programs for a good start in life, with the potential for positive impact across generations, remains justifiable even without conclusive evidence of immediate effects.

Consequently, the scientific literature supports our understanding that it is valuable to monitor long-term through varied methods, and, rather than concentrating on outcomes, consider the context and processes in collaboration as well (30, 77). This entails a deeper exploration of the connection between these processes and outcomes within certain contexts, aiming to illuminate the causal pathways that contribute to successful collaboration. Starting from this objective, the previously mentioned systematic review of Such et al. (30) adopted a realist-informed perspective to outline the components and dynamics of collaboration in a causal loop diagram. Based on these insights and our finding that context matters in coalition development for Solid Start, we recommend applying a realist approach in monitoring the action program Solid Start for more insights into what works, for whom, in which context and for which outcomes (53, 79). Such an approach further stimulates learning and facilitates adaptations in daily practice and policy. Moreover, a realist approach also holds promise for studying specific interventions for (future) parents in greater depth (80, 81). It is well-documented that preventive interventions designed to improve overall health inadvertently can widen existing inequities in the population, as individuals in more vulnerable situations participate, respond and benefit less (82, 83). Recent Dutch studies also found that the implementation of early life interventions for parents in vulnerable populations are influenced by many factors (84, 85). Taking a realist approach in studying interventions may further help to identify potential improvements of interventions in a given context, particularly for the benefit of individuals in vulnerable situations. In this line of thought, it may also be beneficial to focus on coalitions that achieve better outcomes despite facing comparable challenges, and to seek understanding of what is working well and why, similar to a positive deviance approach (86).

For the longitudinal monitoring of the action program Solid Start, we also propose that stakeholders from policy, practice, research and experts-by-experience together deepen their understanding on the objectives and theories of change of the program. This can be achieved by addressing questions such as: what does 'a solid start for every child' entail? What matters to whom? How is success defined for the action program Solid Start? What short-term developments and proxy measures are anticipated? Which indicators

and monitoring strategies are suitable for subsequent stages in the action program's implementation, with a focus on ensuring sustainability?

Challenges and opportunities with routinely collected data

Several papers in this thesis used DIAPER, a unique data infrastructure that links routinely collected data from several Dutch data sources. Covering the life course from preconception to adulthood, DIAPER provides insights to policy makers, payers and providers in several early life projects (87). Routinely collected data provide the opportunity to study real world situations, leading to results that have strong external validity without additional costs and time spent in collecting data. However, it is essential to consider potential challenges or risks as detailed in Scheefhals'(87) and Ardesch'(46) paper, which related to the quality of the data and its linkages, privacy concerns, missing data and administrative delay. Regarding data quality, it is important to acknowledge that, since data is primarily collected for care purposes and only subsequently used for research, some data may be incomplete or inaccurate. In the linkage of data, there is a risk of errors introducing bias that may disproportionately affect disadvantaged groups that are underrepresented in the data. Privacy concerns that may arise because of increased (technical) possibilities require constant attention and advanced methods for privacy protection. Concerning missing data, the absence of nationwide youth healthcare data (88) is of notable concern. It poses challenges to study children's health, development and underlying determinants, as well as the program's ultimate impact. Additionally, self-reported (experience) measures of parents are lacking. Administrative delays further impede research efforts, as data often becomes available only after undergoing several integration steps and quality checks, limiting its utility in rapid processes of learning and decision-making. Despite these challenges, DIAPER appeared a valuable source to gain insight into vulnerability and to present the data to indicators at both national and local levels.

In order to optimize the utilization of DIAPER for (flexible) practice- and policy-oriented research related to the action program Solid Start and other early life initiatives, three recommendations are proposed. Firstly, the inclusion of youth healthcare data and self-reported (experience) measures, and openness to the possibility of adding additional data depending on the research topic. This could be data from GP practices, schools or specific population-based birth cohorts. Secondly, a proactive approach to identify knowledge gaps relevant to everyday practice and policy, and a flexible allocation of our research time to answer those more ad-hoc questions. Thirdly, an exploration into the feasibility of developing a DIAPER 2.0 version that presents real-time data (e.g. on a monthly basis) from various sectors to support short-term decision-making in daily practice and policy. Throughout these endeavours, it is essential to address stakeholders' potential concerns and communicate the shared benefits to facilitate a supported approach. This also entails that we increase our efforts towards 'open science' and adherence to the FAIR guiding principles ensuring the Findability, Accessibility, Interoperability and Reuse of data (89). For example, we can improve by pre-registering our research methodologies and analysis plan, sharing our scripts (via platforms like GitHub), and uploading preprints of scientific papers.

FUTURE OUTLOOK: RECOMMENDATIONS FOR PRACTICE, POLICY AND EDUCATION

There was a continuous focus on Solid Start in Dutch policy and practice during the time that this thesis was written, marked by new policy developments that further encouraged prevention and integration. In 2022, an Integrated Care Agreement (Dutch abbreviation: IZA) was signed by a wide range of representatives from the health and social care sector. Solid Start was mentioned as one of the approaches to ensure the future quality, affordability and accessibility of healthcare. Moreover, Solid Start was prominently featured in the healthy and active living agreement (Dutch abbreviation: GALA), published at the start of 2023, to contribute to a healthy generation in 2040 (90). These agreements voiced the ambition to integrate a Solid Start approach in every Dutch municipality. This has been translated into structural funding for Solid Start, enabling municipalities to request specific allocation (Dutch abbreviation: SPUK) funds to 1) initiate, strengthen and secure their coalition, 2) enhance the implementation of Solid Start interventions, and 3) establish regional collaborative agreements. In 2022, the Ministry of Health, Welfare and Sport published the follow-up approach *Solid Start 2022–2025 Strong parents, healthy children!* that outlines the mission, vision, strategy and actions to provide all children the best start in life. Additionally, there has been an increase in policy developments and research agendas that focus on prevention and integration through cross-sectoral collaboration for other populations. Essentially, the action program Solid Start must be seen as part of this wider movement.

In light of these developments, this thesis provides several points of discussion that can inform the optimization of the action program Solid Start and potentially similar initiatives. Multiple implications are addressed in the separate chapters. The paragraphs below describe our overall recommendations for practice, policy and education, based on our lessons learned and methodological considerations.

Create a long-term perspective and maintain sense of urgency by positioning Solid Start as the ultimate form of prevention

Integrating the structures, cultures and practices of all involved in the first thousand days is no easy task, but the movement that has been initiated is important to sustain over the long-term to make lasting improvements. Considering that fragmentation has accumulated over time, it is reasonable and well-described that integration or transformation extends over a period of multiple years or decades as well (91). Therefore, we recommend positioning Solid Start even more prominently as an ultimate form of prevention and means to improve health, well-being and equity across the lifespan. In this regard, we believe that the IZA, GALA and follow-up approach help to spread the 'first thousand days-narrative' and maintain a sense of urgency for the action program Solid Start and cross-sectoral collaboration in early life. Next, the IZA, GALA and follow-up approach can provide the necessary sustained governmental stewardship (including structural funding) to build capacity and sustainability in local actions. It still remains important to allow local

and regional coalitions Solid Start the flexibility to develop approaches tailored to their specific context, and to remain responsive to their evolving needs.

Additionally, we suggest closer involvement of other ministries and a more prominent inclusion of the perspective of future generations. Improving health, wellbeing and equity starting in early life entails responsibilities that extend beyond the Ministry of Health, Welfare and Sport to other ministries (i.e. Interior and Kingdom Relations, Social Affairs and Employment, Economic Affairs and Climate Policy, and Education, Culture and Science) (92). These ministries have a role to prevent and solve the larger societal causes of vulnerability, and their policies can influence protective factors and resilience. Enhanced collaboration between different policy sectors can strengthen their separate efforts and contribute to aims both within and outside the health sector (from Health *in* All Policies to Health *for* All Policies) (93, 94). Similarly, the Dutch Council of Public Health & Society (Dutch abbreviation: RVS) stresses the need to safeguard children's rights and interests across all policies and legislations. Hence, aligning with the principles of 'it takes a village to raise a child', we advise to include the perspective of future generations in all policy making.

Integrate the action program Solid Start into everyday practice: facilitate champions and foster 'normative integration'

Following the aforementioned points, we recommend prioritizing the integration of the action program Solid Start into the daily practice of all professionals. More specifically, we suggest providing both financial and practical support to champions within local coalitions Solid Start, regional structures and individuals who serve as advocates at the national level. Additionally, we propose to foster normative integration (i.e. knowing each other, developing a shared vision and culture) through interactions among professionals with diverse backgrounds. This can be achieved through regular in-person coalition meetings or multidisciplinary team gatherings. Additionally, activities such as shadowing peers in their daily practice or organizing work visits can offer valuable insights and promote mutual understanding by providing a behind-the-scenes view. These practices are already done in various locations. Lastly, we recommend identifying coalitions and professionals' needs to integrate the action program Solid Start into everyday practice on an ongoing basis, potentially through a learning infrastructure as elaborated in the next paragraph.

Stimulate and integrate learning processes at different levels

Drawing from the lesson that learning is pivotal, we would recommend to stimulate and accelerate learning processes in different ways and at different levels. Professionals in daily care and support should receive sufficient support and time (working hours) to prioritize collaborative learning activities and cyclical improvement processes. Additionally, a learning infrastructure across local and regional coalitions Solid Start is recommended and could be facilitated by national levels. This includes the provision of resources, practical tools and guidance in how to use learning for reflection and improvement within and across coalitions Solid Start. Next, it is advised to expand a learning infrastructure between local, regional and national levels, and across practice, policy, research and experts-by-experience. These boundary spanning learning processes may help to adequately respond

to the different needs and barriers which cannot be solved separately. In the design and facilitation of such learning infrastructures, we can draw insights from both international as well as national examples, such as the learning network designed within the ZonMw program for unintended pregnancy and vulnerable parenthood (Dutch abbreviation: KOOZ) (95). This national network brings together multiple research projects and collaborative (learning) networks across the country.

Related to learning are education and training. Ideally, young professionals are educated in the importance of cross-sectoral collaboration and the first thousand days right from the start of their career. In this context, interprofessional training is optimal to gain insight into each other's value and start practicing the necessary competencies for collaboration at an early stage.

Broaden the scope beyond the first thousand days

In efforts to broaden the scope of the action program Solid Start, certain municipalities are working towards a 'first 100 + 1000 days-approach', or a 'first 2000 days' approach. The former more explicitly includes the preconception period. A recent study into preconception care showed that there is potential to increase the awareness and uptake of preconception care (96), and several experts call for normalization of the question 'do you want to become pregnant in the coming year?'. It is recommended to place greater emphasis on preconception care and the promotion of a healthy pregnancy, and to make it a more explicit component of the approach. The latter 'first 2000 days' approach continues to age five, and thus extends till the school period. In scientific literature, these 'next thousand days' are described as a critical period to reinform and establish healthy development, including executive and cognitive functions, social-emotional interactions, language and literacy, and self-regulation (97). This period marks a transition from a predominantly home-based environment to increased exposure to the outside environment, as children prepare for and enter formal schooling. Recognizing that development trajectories extend beyond the age of two and acknowledging the importance of coherent resource allocation and alignment, it may be relevant to extend the program's focus to the first 2000 days to ensure continuity between early life and school.

CONCLUDING REMARKS

This thesis provided insight into the adoption of the Dutch nationwide action program Solid Start, with a specific focus to monitoring and cross-sectoral collaboration. Throughout our studies, we learned that monitoring vulnerability in early life and monitoring the action program Solid Start at local level requires a consideration of both risk and protective factors spanning across multiple sectors. This underscores the relevancy for preventive programs that connect the medical and social sector, and it implies that monitoring requires cross-sectoral longitudinal data and indicators.

Throughout the years, we found various incremental changes that supported collaboration across the medical and social sector to improve care and support during the first thousand days. Especially getting to know each other and processes of learning seemed to be indispensable in these processes towards cross-sectoral collaboration. In the wider adoption of the action program Solid Start, a unifying narrative, dedicated champions and a strong local focus appeared important facilitators. However, several challenges remain, and it is vital to learn from those to protect the health and well-being of current and future generations. Therefore, for future practice and policy, we advise to create a long-term perspective by positioning Solid Start as the ultimate form of prevention, and integrate the action program Solid Start into everyday practice, navigating in tandem with the IZA and GALA. Additionally, we recommend to stimulate learning processes within and across local, regional and national levels. These recommendations could help to further optimize the action program Solid Start, and contribute to the wider movement towards prevention and integration. Overall, this thesis implies a solid start for the Dutch first thousand days-approach.

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